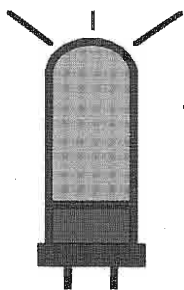


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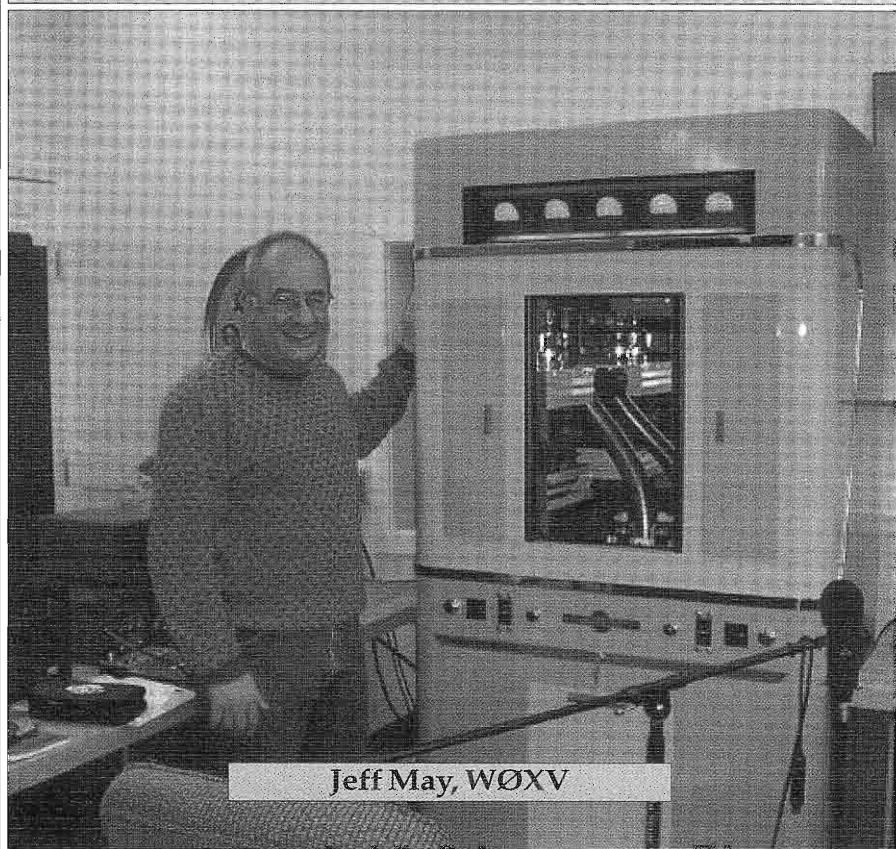


# ELECTRIC RADIO

celebrating a bygone era

Number 202

March 2006



Jeff May, WØXV

# ELECTRIC RADIO

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Electric Radio is all about the restoration, maintenance, and continued use of vintage radio equipment. Founded in May of 1989 by Barry Wiseman (N6CSW), the magazine continues publication for those who appreciate the value of operating vintage equipment and the rich history of radio. It is hoped that the magazine will provide inspiration and encouragement to collectors, restorers and builders. It is dedicated to the generations of radio amateurs, experimenters, and engineers who have preceded us, without whom many features of life, now taken for granted, would not be possible.

We depend on our readers to supply material for ER. Our primary interest is in articles that pertain to vintage equipment and operating with a primary emphasis on AM, but articles on CW, SSB, and shortwave listening are also needed. Photos of Hams in their radio shacks are always appreciated. We invite those interested in writing for ER to write, e-mail, or call.

Regular contributors include:

Chuck Teeters (W4MEW), Jim Hanlon (W8KGI), Tom Marcellino (W3BYM), Bruce Vaughan (NR5Q), Bob Grinder (K7AK), Bill Feldman (N6PY), Dave Gordon-Smith (G3UUR), Dale Gagnon (KW1I), David Kuraner (K2DK), Larry Will (W3LW), Brian Harris (WA5UEK), John Hruza (KBØOKU), Hal Guretzky (K6DPZ)

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# Editor's Comments

## Winter Operating Events

I should be receiving the results of the recent winter Classic Exchange "CX" event and from the American Wireless Association's AM QSO Party in the coming weeks; I will print them in ER when they become available. The AWA AM event probably had more participation than did the CX, and at times it was hard to find other stations in the Classic Exchange to work on the bands. I did work Jim Hanlon (W8KGI) on 80 CW, and Jim had 8 different transmitters running, most of which either had been or will be the subject of ER articles! It sure was great to hear that many rigs, and the other stations I worked had equally interesting gear, some of which were from the early 1930s. Unfortunately, other commitments prevented my participation in the AWA phone contest.

There was a lot of participation in the Electric Radio Heavy Metal Rally last December. I have only received 3 logs, so I am declaring the three entries equal winners. The rally is a lot of fun and is popular, but I will probably need to think about changing the rules for next December.

## A Correction

W2FU, Meir, has kindly sent a correction for the photograph on page 44 of the February 2006 edition of ER: "... The equipment depicted in the magazine is not from the US Navy, but is from a WWII Victory ship (US Maritime Commission) model FT-102 MF/HF radio console, manufactured by Federal Radio and Telegraph (later became ITT). The transmitter is the McKay 167-BY. It's a CW-only transmitter, covering 2 to 24 MHz. The output is a pair of 803s, rated output is 125W. The middle part, where the owner put a modulator, is where originally the receiver was mounted. According to the manual, the receiver should be either the RMCA AR-8506 or the Scott SLR-F..."

Thanks, Meir, for sending this valuable information.

## The AM Broadcast Transmitter Log

Dave Kuraner's popular series on broadcast transmitters and audio processing will return in next month's issue. 73, Ray, NØDMS, and Keep the Filaments Lit!

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Cover: Jeff May (WØXV) is understandably proud of his Collins 20V-2 that has been custom rebuilt by Robert Smith (WØVMC). As anyone who has heard this station can testify, the transmitter sounds great.



## Martha's Breadboard Deluxe, Part 2

### A Modern Version of Homebrewing in the Mid-1930s

By Gary Halverson, K6GLH  
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only simplified the modulator construction, but also facilitated audio tailoring with an outboard audio chain. The 300-volt DC power supply built on the modulator chassis for the oscillator also provided enough current to power the 45s.

The original choice for the modulator tubes was a pair of 211s operating in Class B with a new old stock 200-watt Hadley universal Class B output transformer. However, the bias requirement meant adding yet another power supply, and since this voltage was normally supplied by dry batteries in 1935, switching to the near zero-bias 838 seemed like a logical choice. But alas, the Amperex/Collins ZB-120 was designed specifically for Class B modulator service without any bias, and there just happened to be



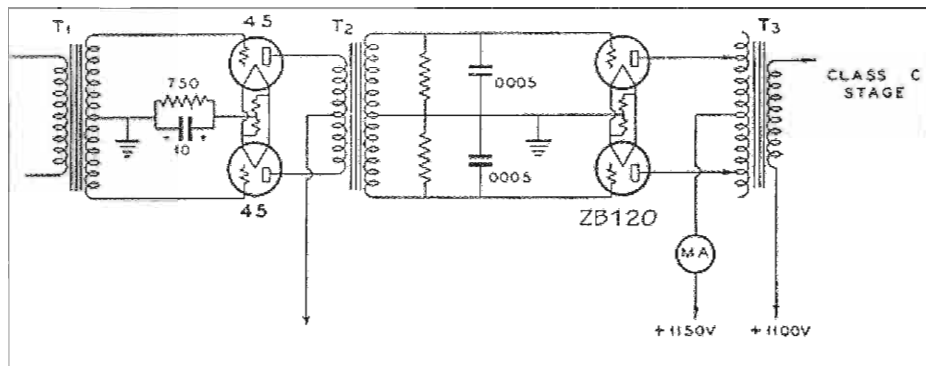
In last month's story I was all excited about the 1935 re-enactment homebrew project. By this time, however, the feeling was very different. I've learned a lot, mostly about things never anticipated. While the construction was fun and finding vintage-correct parts was challenging, getting the rig to work has proven to be a major effort that has left me humbled by how much I didn't know.

#### The Modulator

Once the RF section was working, the modulator was the next step. I decided not to mess with a low-level microphone preamplifier on the breadboard due to ground loop and hum pickup possibilities, but rather just go with a line-level input and use a pair of 45s running Class A to drive the modulator tubes. This not

several NOS pairs in the tube cupboard.

Bringing the modulator up ushered in the next set of challenges. The first problem was insufficient modulation. This turned out to be a silly miswiring of the universal modulation transformer secondary. Correcting this problem produced more than enough audio which led to the next problem, flashover in the RF deck PA plate tuning capacitor plates. Because the high voltage was on the PA tank components, anytime flashover occurred, it put a major strain on the 866 high voltage rectifiers. Some "cheating" was clearly in order, so a DC blocking cap was installed to remove the high voltage from the tank capacitor. While this minimized the flashover problem, it still occurred occasionally on voice peaks. A 200-watt



Schematic of the modulator with line level input.

modulator feeding a 100-watt RF final just wasn't going to work.

### The Power Amplifier

There was no escaping the inevitability of adding an RF power amplifier deck to provide a more appropriate load for the modulator. Combined with the reality of needing at least 200-watts of carrier power in today's AM window for relatively comfortable communications, it made sense to bite the bullet and add another deck to the wooden tower.

A push-pull circuit using a pair of 203As was selected from the handbook and a fourth wooden chassis was built. The amplifier components were laid out for symmetry. Construction went smoothly and the completed unit was stacked on top of the exciter and wired into the interconnect harness. A short twisted pair feedline connected the output link on the exciter to the input link on the power amplifier. A 4-turn link on the output was substituted for the capacitive coupling on the output tank coil. Everything checked



Martha's backside during construction of the interconnect wiring harness.

out. And that's when the fun started.

First, the coupling link on the exciter

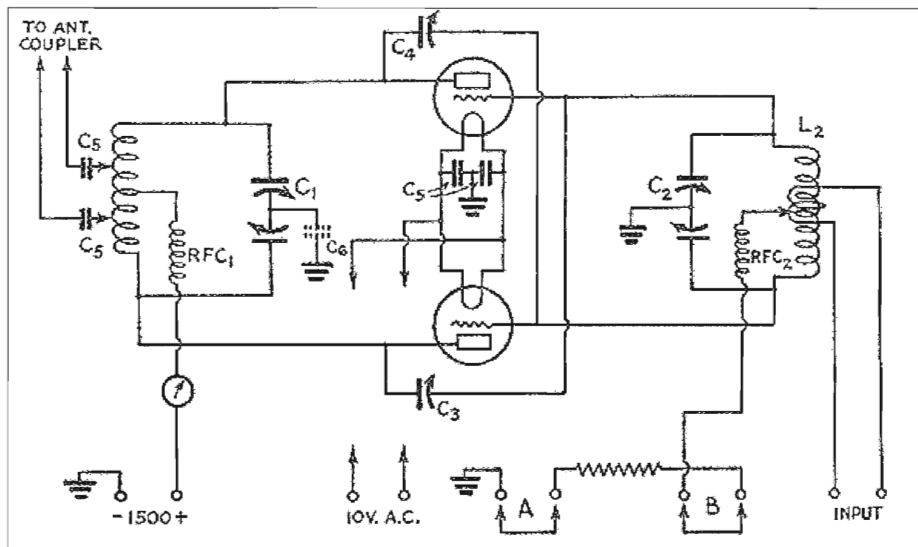
was moved out to reduce the loading to about 30 or 40 watts. Then the 203As were neutralized. When the high voltage was connected back to the 203 plates and the rig keyed, BAM! The plate and grid current meters pegged, the transformers groaned, and the 866s lit up like they were going to explode.

The ham of 1935 didn't know the term "bummed out," but I was definitely singin' the RF Amp Blues. I discovered

didn't happen.

After some soul searching, I realized that one of the things about the old transmitters that I've never really understood is the link output coupling, and more specifically, how to match it to 50-ohm coaxial cable. When I put a Millen Transmatch in series with the dummy load there was finally some improvement in power output.

The output coupling link is 4 turns



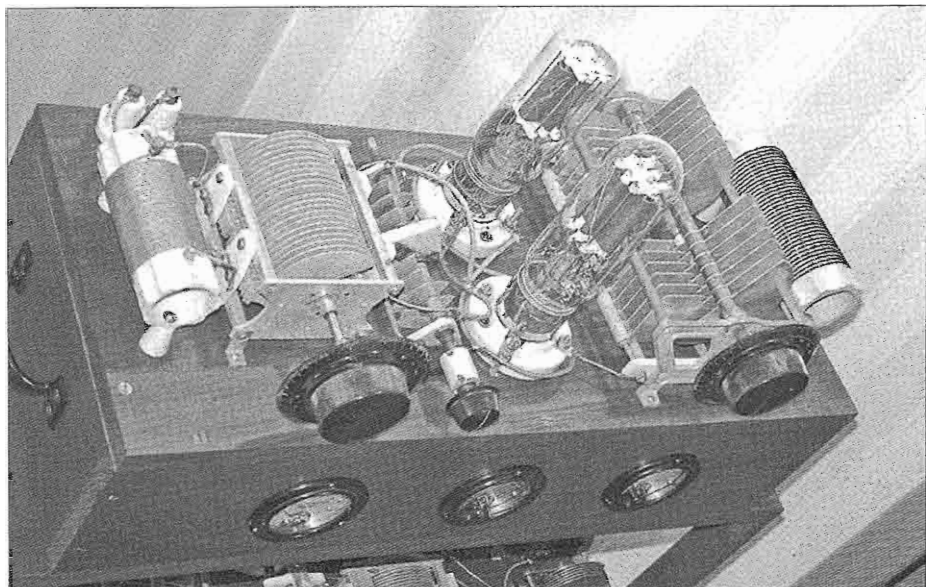
Push-pull power amp from the 1936 ARRL handbook.

that in order to prevent the amplifier from going into self-oscillation, the neutralizing adjust had to be turned well beyond the point of deepest null when looking at the RF in the tank circuit (with the HV disconnected). Once the neutralization was adjusted so that the amplifier was stable, the output power was only about 120 watts or about half of expected. There was plenty of grid drive. A shielding plate was added between the grid circuit and the tubes, as well as on the bottom of the RF amp. But nothing I did seemed to help.

At my wits end, the project was set aside for couple of months. I kept hoping for a flash of insight that might inspire me to understand what was going on. It

wound on a coil form that is inserted inside the final tank coil form. The link coil is positioned physically centered on the B+ feed tap of the tank coil. After studying up on link coupling, I realized that all that was really needed was a variable capacitor in series with the link to tune out any reactance, which is essentially what the Transmatch had been doing. One problem solved.

After carefully watching what was happening in tuning up the amplifier, two dips were discovered. They were so close together that they hadn't been noticed at first. One dip produced good power output and the other dip caused lower power output along with a 275 kHz oscillation. The amp just wasn't stable. Sometimes



**The push-pull 203A PA deck on top of the exciter.**

keying it would cause it go into self-oscillation, sometimes not. Nothing I did seemed to make any difference.

There was also a problem with negative-going modulation. Changing the audio phase in the modulator didn't seem to matter. It was beginning to look like the high-voltage power supply just couldn't handle the modulator (with its 120-mA idling current), the exciter PA, and the push-pull final amplifier. By this time I was so frustrated that I considered putting the whole project in the fireplace.

My friend Dick (W1QG) had suggested moving the push-pull amplifier away from the exciter to determine if any magnetic coupling was occurring. There was no easy way to do this without building another shelf unit to match the original. Since a new high-voltage power supply also needed a place to live, I had no choice but to buy some more wood and build up another shelf unit. Two weeks later, the new power supply and new shelf were finished. The power amp was moved onto the top shelf and wired to the power supply on the bottom shelf. Of course the new unit had to be named "Stewart."

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Outside of finding two funky old 866s that didn't arc over and one of the old filter caps that developed heavy leakage with any voltage on it, the new high voltage supply worked fine. But, while the old Thordarson plate transformer perfectly matched the one on the original high voltage supply, it put out too much voltage, about 2300 volts with no load, and about 1800 with a 50k resistive load. This was way outside of the maximum plate voltage rating on the 203As, so it was necessary to add an old 15-volt filament transformer wired "buck mode" in series with the plate transformer primary. This brought the voltage down to about 1700 volts no load and 1350 under full load.

By this time, the magic of '30s homebrewing had faded into a deep null. I was ready for some good news. Firing up the amplifier in its new home with its new power supply was uneventful. In fact, it was putting out about 160 watts and the double dip was gone. The plate capacitor was rotated through a nice broad dip with no instability. Another problem solved.

But, by the time all the main problems

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**Martha on the left and Stewart on the right**

were solved, it was publication deadline time. However, we lifted the wire and on February 9<sup>th</sup> at approximately 2:00pm PST, Martha had her first contact on 3.885 with, appropriately, Dick (W1QG), and a trans-generational contact with Jon (K6JEK) on his Class E AM transmitter. Both declared the carrier clean and the audio quite good without any outboard equalization. At long last, I can now enjoy a proper meal on the kitchen table.

### **Conclusion**

After having built up a functional spark station from the early twenties, then tuning to 1935, I'm impressed with how quickly the electronics industry had evolved during that time – at a rate similar to how microprocessors evolved between the mid '70s to the early '90s. In surveying several old QSL cards from the thirties, it appears that the average ham did indeed build his own transmitter and it was relatively low power (a relatively simple design). These guys didn't memorize a license manual; most of the time

they actually built and understood their own rigs. They paid their dues in hard work, sweat and a lot of time invested.

But what really blows me away is what these guys had to go through to have a project turn out successfully. They didn't have scopes and frequency counters and wattmeters back then, so troubleshooting strange or difficult problems must have been a big challenge. I suspect that the radio club meetings were well attended and the old-timers must have been pelted with questions from the youngsters building their first rigs. An Elmer was certainly the new Ham's best friend.

When you look at a schematic from the '30s, you won't find many of the components in common use decades later. Bypass caps on the cold end of RF chokes usually weren't used. Voltage-carrying leads were typically never bypassed. So when you built up something, it was usually from a tried and proven design. Stray from that design (like putting a





**Team Martha – the completed project and QSL card from my first contact.  
Note the HRO coil boxes on Stewart's center shelf.**

power amp on top of an exciter without proper shielding) and you were on your own. Then too, there were the pink tickets in the mailbox when things weren't working right.

The rig that I ended up building would probably have cost about as much as a commercially built rig back then. It's clear that purchasing a commercial rig then was the easy way to a big signal. Art Collins knew this and did much of the hard engineering work for the ham community. He also supported his reliable products with great customer service to build what later became the leading manufacturer of communications gear.

The original purpose of this project was to re-create the homebrew experience of 1935, and in that spirit, there were several occasions during construction and testing where I felt the same kind of excitement, frustration, and satisfaction our ancestor hams of 1935 must have experienced. But, it was gratifying

to have built a vintage transmitter. The wood chassis are beautiful to look at and have a warmth all their own like an elegant piece of furniture. And, I'll always remember what I learned from this experience with a deeper sense of appreciation for the homebrewers of then and now.

If you're interested in constructing your own thirties vintage wooden transmitter, an excellent example can be found in the 1937 Frank Jones Radio Handbook. Other designs can be found in back issues of *Electric Radio*, as well as the ARRL Handbooks of the mid-to-late thirties and other popular Ham-related publications of the day.

Thanks to all who provided encouragement and tutoring during the course of this project, including Dick Benson, W1QG, Rod Brink, KQ6F, J.B. Jenkins, W5EU, and Ray Osterwald, NØDMS.

**ER**



## Restoring a Hammarlund SP-200LX

By Larry H. Will, P.E., W3LW  
1055 Powderhorn Dr.  
Glen Mills, PA 19342

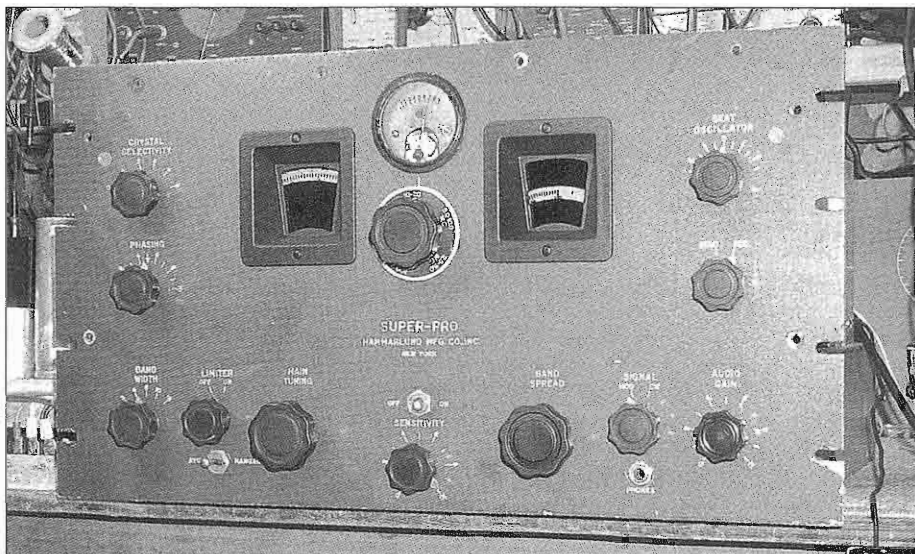
### Introduction

The SP-200LX is a 5-band, general-purpose radio dating from the early 1940s and is single conversion from 100 kcs to 400 kcs, and 2.5 Mcs to 20 Mcs, utilizing a 465 kcs IF. The audio output terminals are 600 ohm, so a suitable transformer is needed to match whatever speaker impedance you plan to use. The receiver I have restored came from the estate of W3BED but did not include a matching power supply. Thanks to John (W4AWM) a self-contained tabletop power supply was obtained for the receiver. This power supply was very rusty but, except for the missing type 80 and 5Z3 rectifiers, appeared to be intact. Restoration of both units started in the winter of 2004-2005 and was finally finished (after a long pe-

riod of no work) in early 2006.

This particular SP-200LX is clearly a civilian model "adopted" by the Signal Corps and was ink stamped (although mostly faded) with a Signal Corps Contract order number "SC 1547 PA 42" on the cover over the camshaft for the band changing cams and on the rear panel. The ink stamped S/N is "62" and the punched S/N is "8032."

Thanks to Chuck Teeters' (W4MEW) amazing knowledge of early Signal Corps activities, here is additional information regarding these and other "adopted" sets. The "42 PA" order was made by the Plant Engineering Agency section of the United States Army Communications Service Agency. They were the operating command for stateside ACAN stations and for some unknown reason Asmara, Ethiopia also. The Plant Engineering Agency at that time was made up of AT&T people from the long distance radio section. They



This is a front-panel view of the SP-200LX in operation. It was taken after the chassis had been restored and the front panel was cleaned up as described in this article.

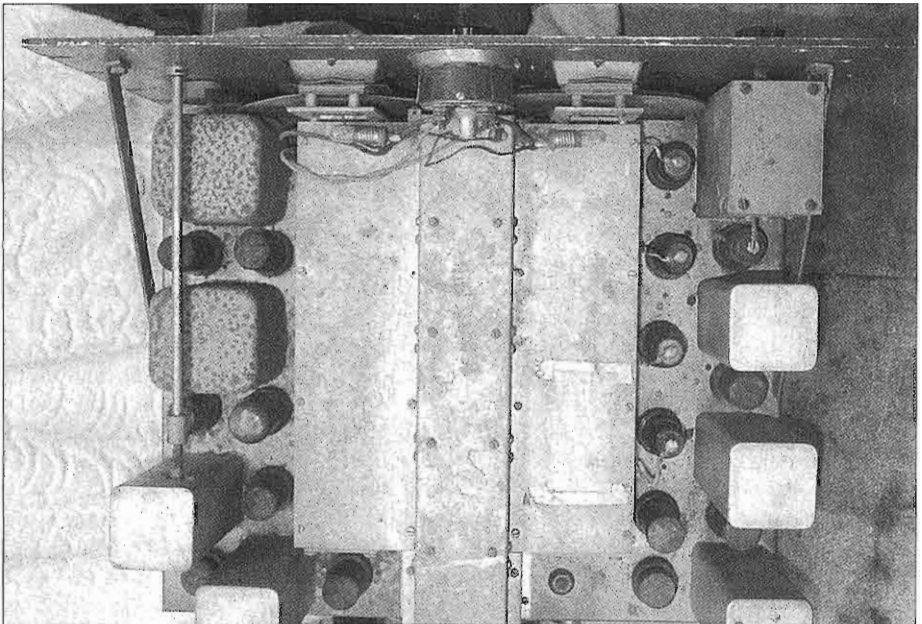
were responsible for building fixed communications facilities, ACAN and AAF Airways Sections. They were the ones who were buying up ham stuff in 1942. Their list of receivers wanted also included the -LX Super Pro of this article with the low freq ranges. They were also buying Hallicrafters, National, Federal, and Wilcox receivers. Transmitters wanted were Aircraft Accessories Corp, Federal, Pan American Airways, Press Wireless, Temco, Western Electric, and Wilcox. Incidentally the Super Pro with the low freq band was for the AAF airways stations, so they could monitor the low frequency radio range stations, the old A-N four-course colored airways. They were colored red, green, and amber. Red was North-South, green was East-West, and amber was interconnecting airways. A lot of the surplus Super Pros have a faded sector on the dial since they sat on the same frequency for years.

After completing some major house exterior improvements over the spring

and summer, it was time to finish the SP-200. As I usually do with radios that have sat for a long time, I did not attempt to power up the receiver before starting restoration. I did do a check on the health of the power transformer and found it in good shape. The two chokes and the audio driver and output transformers were also checked with the 1000V meg-ohm-meter and found to have no leakage.

#### Receiver Restoration

This receiver, even though it was at least 10 years older, appeared to be in a lot better shape than the SP-600-JX11/R450 I cleaned up earlier<sup>1</sup>. The power supply chassis was very rusty and will be discussed later. Also rusty were some of the cover components on the tuning assembly. Some of the zinc-plated hardware had also rusted. Underneath, the chassis was dirty but not otherwise too bad. The front panel appeared in fairly good shape with only minor dings and scratches. As usual, the entire set was covered with nicotine, not an unusual



This is a top view of the SP-200 as I received it. Notice the rust and corrosion on all of the top surfaces. Compare this with the photo, page 13, that shows the same parts after restoration was completed.



The power supply was in rough condition when it was received. All of all the components were removed and the chassis was completely restored. Compare with the post-restoration photo on page 14.

condition for any set from this era. The receiver was not MFP varnished.

The aluminum surfaces facing upward had slight pitting from oxidation. As was done with the SP-600 IF and oscillator cans in my earlier article, and for the five cans in the SP-200 IF system, an Oakite® professional degreaser was used for degreasing and clear Alodine provided a clear coating on exposed aluminum surfaces<sup>2</sup>. The corroded can tops were first sanded with #00 steel wool, which doesn't leave noticeable scratches. Although not perfect, the degreasing and anodizing sure makes these parts look 1000% better.

The tuning system in the SP-200LX is simple, utilizing only 3 gears. These gears serve only to drive the black "reveal" rotary escutcheon for the actual frequencies on each band. The main tuning and simple 0-100 bandspread tuning capacitors are attached directly to the indicat-

ing dials and a friction drive on the edge of each moves each capacitor. If you disassemble these friction drives for cleaning, be sure and properly tighten the rear nut to insure a tight friction drive when reassembling. The translucent dials were cleaned with the usual solvents and the high gloss black "windows" were cleaned and then hand polished with Novus® Number 1 plastic polish<sup>3</sup>. When you disassemble the clear plastic parts that contain the dial calibration line, be sure to remember the order of the hard paper spacers. They set the correct spacing to insure no drag when the dials rotate. This is especially true for the main tuning side where both the black shroud and the main tuning numbers rotate separately. The bands are changed by a series of eccentric cams that engage sets of contacts below the cams to connect the various coil assemblies to the tuning system. The cam in each compartment closest to

the receiver front switches 100-200 kcs and the bands increase as you look towards the rear in each case. These and the tuning capacitor sections were cleaned with DeOxit<sup>4</sup>.

### Capacitors and Resistors

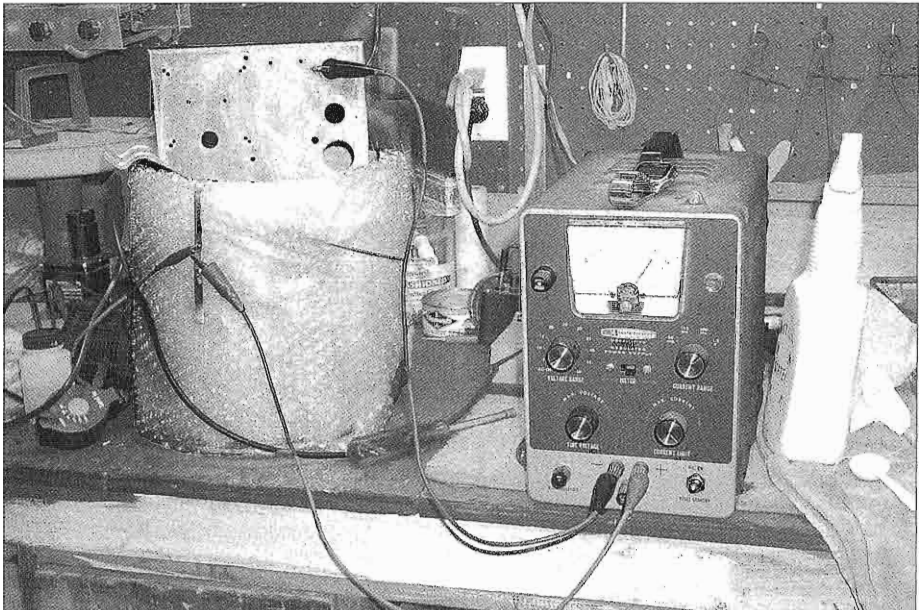
All small electrolytic capacitors in the receiver and power supply were replaced. The receiver uses a mixture of mica, tubular, and bathtub capacitors and only those that were obviously leaking by ohm-meter testing were replaced. All resistors were checked and those out of tolerance were replaced with modern units. The closest RETMA values to the even-value resistors in this radio were used as replacements. Keep in mind that in this era, "m" was used for "k-ohms," so a 50m resistor is really 50k.

The disassembly included the complete removal of the two filter chokes, power transformer and audio transformers for cleaning and repainting. All of these had some paint gone and surface rust which was cleaned up and stabilized with Permatex® Rust Treatment<sup>5</sup>. While not

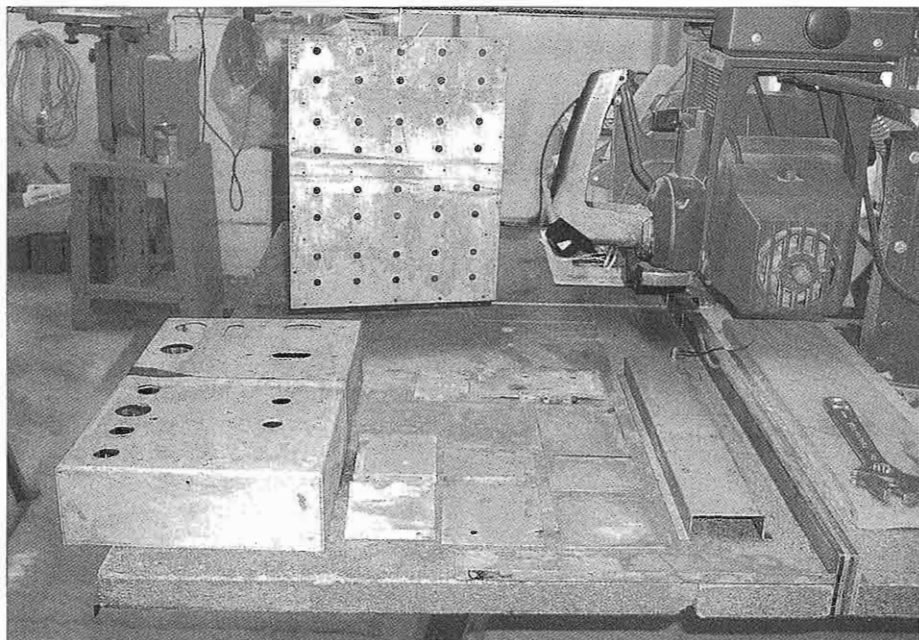
exactly the same color, I used a gray-silver looking paint on the audio parts. The power supply transformers are black.

### Power Supply Restoration

The tabletop power supply tag says it is a "SUPER-PRO POWER SUPPLY." No model number is given. The Signal Corps Order Number, which is stamped on the nameplate and chassis, is 10177. Serial Number is listed as P1. The large wirewound resistors used as bleeders and voltage dividers were all good. It appeared that the electrolytics were all changed out over the years, as they did not match schematic values and style. This supply also was designed for use with a field coil speaker, as some civilian units had that option. A second small choke, visible in the "before" picture on page 14 was bridged across the speaker terminals. That small choke was replaced with a choke more closely matching the original. For now, the wires leading to the field coil terminals were left unconnected to power and simply coiled up under the chassis. The power supply chas-



This was how my original setup with the 2 gallon plating tank looked when I was working on the power supply chassis restoration.



This photo shows the results of my first attempt at plating the parts that were corroded so badly when I received the SP-200. The plated pieces have been all laid out before the second plating step to hide the gaps caused by only doing one half at a time.

sis was already drilled for the second choke so no new holes were needed. The supply had considerable rusting, so all components were stripped off the chassis in preparation for cleaning and plating. N.O.S. electrolytic capacitors were substituted for the existing ones because they all had very high leakage, some as much as 200 mils. All old wiring that was still serviceable was reused. The power transformer input tap was placed on the 125-volt point. The output voltages on the reworked supply with the receiver running were measured at 6.3 VAC at the receiver and 390, 350, and 150 VDC.

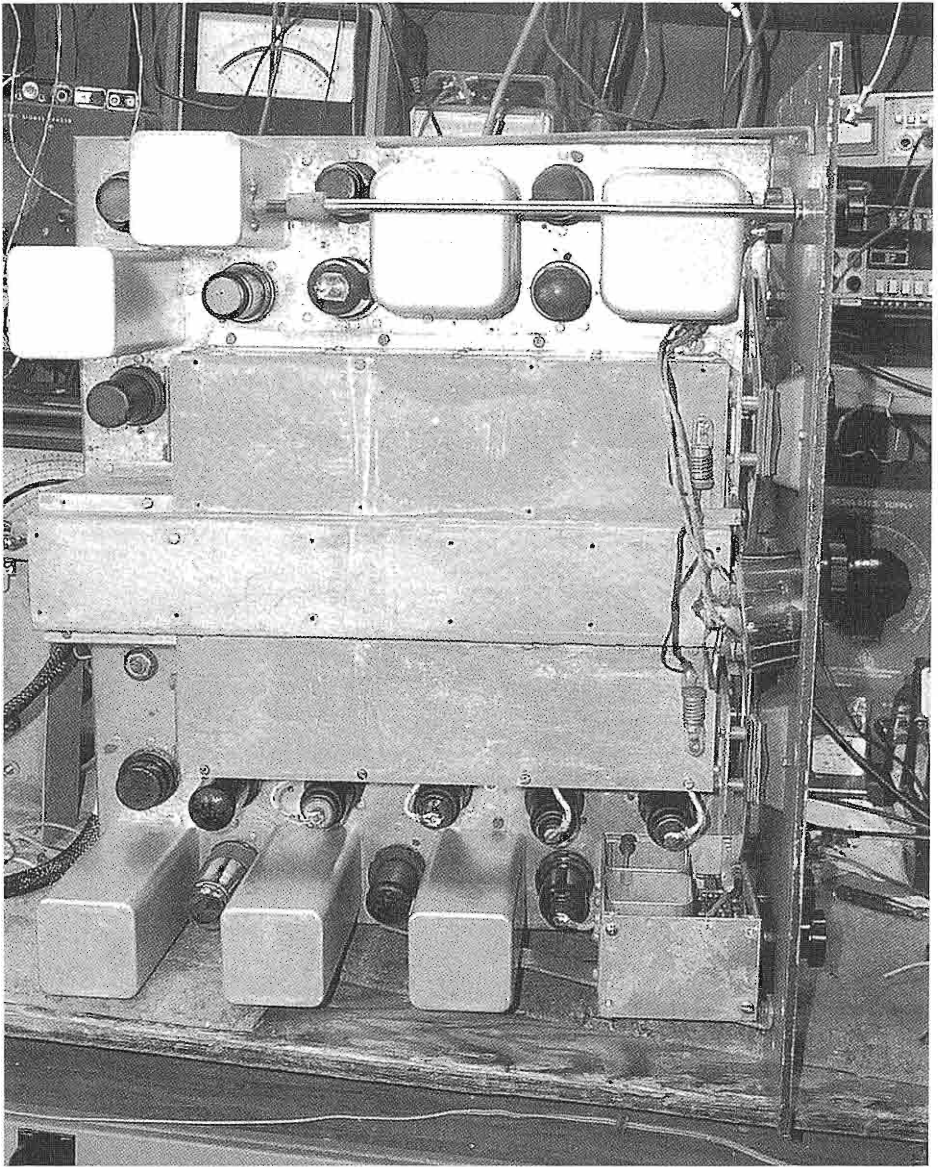
#### **Metal Restoration and Copy-Cad® Plating**

Because the power supply chassis was so bad, I thought that this project was a candidate for my first attempt at replating. I found a site on the Internet for Caswell Plating® and it is quite comprehensive. I ordered their "Copy-Cad®" kit, which is

actually a zinc-based plating bath kit. Cadmium plating is a very toxic process which I doubt anyone would want to tackle on their own without a suitable venting system. A very comprehensive book is included with the kit and I obtained the other needed small support materials locally. In addition, a lot of good information is on their web site. This is not an inexpensive process, and for a single radio it probably makes more sense to seek out a local metal plater to do the job. However, I like to experiment so I dove in.

Along with the power supply chassis, all cad plated metal plates and covers from the receiver were removed. All in all, there were about 9 pieces to clean and plate. Because the small components on the receiver were all riveted, I decided that the receiver chassis was not a candidate for replating at this time. The cleaning of the top of the receiver chassis was





This is a good view of the replated parts of the tuning section and how nice the aluminum IF cans looked when the procedure was completed. Note that not all of the old screws were replaced when this picture was taken.

completed with Krud Kutter®, available at my local hardware store, followed by a thorough water rinse. The chassis was stabilized and cleaned but still looked like it's 60 years old with this

minimal cleaning and preparation.

The plating kit was setup per the supplied instructions and all parts were cleaned to remove as much rust as possible. The plating kit included a degreaser,



The power supply looks like it is brand new after restoration was completed. In this photo, all work was completed and the unit was in service and working.

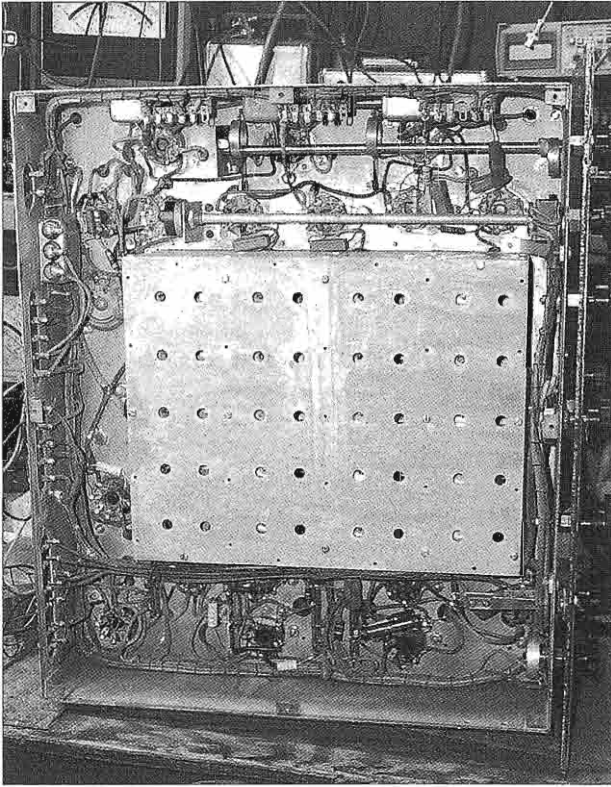
which was heated to 190 degrees F to completely remove all traces of grease on the metal to be plated. All parts were washed in distilled water between degreasing and plating, and also afterwards. The distilled water was used to mix up the degreaser and the plating solution. The kit included two zinc anodes, each 4" x 8" by approximately 5/32" thick, the heaters, and a thermostat for heating the liquids, and plastic pails with tight-fitting lids to use as both plating tanks and chemical storage. The results obtained were fair, and the main reason that they are not better is that Caswell strongly recommended that only sandblasting with beads be used as a metal preparation for replating old materials with Copy-Cad®. Not having the sandblaster, I used the next best thing, mild abrasive pads. To get the rust out of the corners underneath the power supply chassis, I ran a "reverse plate" per the manual instructions to pull the rust out.

This worked well and allowed plating of the tight corners and brackets underneath the power supply chassis, which were otherwise difficult to prepare.

I recently found a fairly large sand-bead sandblaster, which I will be picking up shortly. This unit will be used to redo the SP-200 tabletop power supply cover. I hope to report back after that project is completed.

Good plating takes practice and I am sure as I do other projects the results will be better with time. One thing I did find was the instructions said it's OK to plate one-half of a part and then invert and do the other half if your bucket is not large enough. I found out that this left marks on the exposed section, which could not be buffed out. I obtained a larger five-gallon bucket and replated over the "mistake" with much better results. I don't recommend doing any large items except as all at once.





Above is an after-restoration view underneath the SP-200 chassis. Some hardware parts have been replaced. This view also shows the locations of the access points to HF alignment points under the cover in the center.

### Radio Restoration

All the badly rusted steel hardware that needed to be replaced was measured, and the correct zinc-plated hardware was obtained from McMaster-Carr in New Jersey<sup>7</sup>. The myriad of small self-tapping screws used on the tuning unit covers cleaned up very nicely with a weak muriatic acid solution<sup>8</sup>.

K3JPB reminded me that the band indicator mounted on the band select knob was etched to slightly raise all the lettering and the outer circle. Spraying a layer of black paint on the entire knob and then, after through drying, light careful sanding with #600 grit paper brought out

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the lettering and outer ring beautifully. The front panel, which has an unusual gray metallic look, was not repainted but only cleaned multiple times with Krud-Kutter®, removing 60 years of dirt and grime. The lettering was a simple etch, with no-fill paint, and was cleaned up with a very sharp stainless steel pick.

All but one of the grid cap wires was beyond use due to crumbling insulation. These leads were replaced. However, for the two RF stages, the mixer and HF oscillator; the process is tricky. The wires run in thru small grommets (which were also replaced) to connections on the main 4-gang tuning capacitor assembly. The ceramic (or steatite) mounting for some of the smaller grid circuit

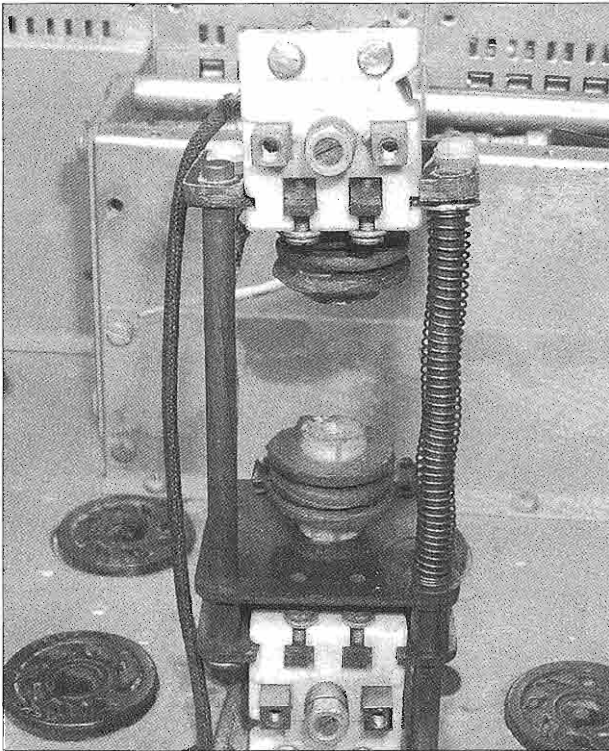
components also centers the plates of each capacitor section so care must be taken to insure that upon reassembly the capacitor section(s) do not short out. Using a small mirror on a swivel handle allows looking at the plates while tightening the mounting screws.

### Reassembly of the Radio

The audio transformers were reinstalled, being careful to replace the wires exactly as found. The covers on the tuning assembly were also reinstalled. A new 11-wire cable was constructed by placing 20 gauge wires in a large flexible wire cover section, which was secured with shrink tubing at each end. 2 wires were used for each side of the filament connection. Both the radio and power supply were missing the protective covers over these terminals as well as the "RELAY" and "SPEAKER" field terminals and they are a nice shock hazard.

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This is an internal view of an open variable IF can showing the 2 cores and their caps. The bottom core is movable.

The SP-200LX uses two fully-variable IF cans whereby one of the "PI" coils is moved up and down to change the coupling to the adjacent coil, see the photo above on this page. A long, highly-compressed spring provides the return force.

The pivoting mechanism for each, which is mounted underneath the chassis, was completely disassembled and cleaned inside each can. The air variable trimmers were also cleaned. All the passive components were checked for value and/or leakage, and were replaced as needed.

I found that reassembling the cans to the chassis while securing the air variables took a bit of patience. I used a longer 4-36 bolt to "grab" one side of a dangling air cap to get it in approximate

position. Then, it was a simple matter to secure the second screw and lock washer. Finally, the long bolt was replaced with the correct bolt and lock washer. The plate side of each can has HV on the exposed tuning capacitor shaft. I will cover realignment later.

The SP-200LX can be made operational pretty much with the front panel off. Start by re-assembling the tuning dials and gears and get both the main tuning and bandspread running smoothly. Without all tuning assembly covers securely fastened, the rather poor stability of this radio is worsened drastically. In addition, the chassis becomes microphonic with the slightest tap appearing as a "bong" in the audio.

#### Front Panel, Meter, and Knobs

The next step in reassembly was to reinstall the signal meter and bezels on the front panel. The bezels were completely stripped, primed, and painted. The Plexiglas® items were cleaned up with Novus® plastic scratch remover and polish. The meter scale has yellowed, but it's printed on paper so it was not cleaned up. Likewise, the tuning and logging dials had yellowed, but any cleaner that would not attack the underlying paint did not remove the yellowing. I stopped before I had a real problem. The markings are not perfect, but not bad either. New dress nuts and flat and lock washers were used on most controls, as some of the originals were badly corroded. The short black machine screws used to attach the bezels were cleaned and repainted. The rivets holding the power supply nameplate will be replaced with black screws and nuts. The knobs were all

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cleaned thoroughly, but all have a dull finish. A close inspection with magnifications shows a myriad of coarse, deep cracks which can only partially be buffed out.

### Smoke Test

I first fired up the set using a Variac® and with the rectifier tubes removed to check the filament circuits. All seemed in order, so the rectifiers were replaced and the radio brought up slowly. In spite of all the work that was done on the set, on the second try at full 120 VAC, I heard noise on all bands. That was after I found one wire to the 6F6 plates that was not reconnected on reassembly.

### IF Alignment

The SP-200LX early Signal Corps manual provides instructions on re-alignment of both the IF and RF stages. The only tricky part is the re-setting of the xtal filter can. The original SP-200LX manual is vague on the alignment of L27. The Army TM 11-866 is better but I used a procedure as follows. First I determined the actual xtal phasing xtal frequency by setting the variable IF bandwidth to 3 kcs and the xtal filter switch to "5" with the phasing control accurately centered. I found that my radio had the IF crystal at 464.8 kcs so IF alignment was completed at that frequency. Initial IF alignment was done with the xtal filter OFF and the variable bandwidth at 3 kcs. I monitored the AVC with my RCA VTVM and the terminated 600-ohm audio with 600 ohms and the Tek scope. Initial alignment was done at 464.8 kcs CW with AVC – MANUAL switch set to AVC and keeping the AVC voltage around 8-10 volts by reducing signal level as needed. Injection was into the grid of the HF mixer. All cans are peaked except the plate of the last IF, T-4, which cannot be tuned by this procedure as it is after the AVC pick-off point. Don't forget to peak L-34, as this is the feed to the separate 6H6 AVC detector. The BFO is set to zero beat to 464.8 kcs and the knob centered. To align T-4, I modulated the AM signal

Electric Radio #202

generator with a low distortion 6 kcs sine wave at about 70% modulation, widened the IF bandwidth and adjusted the capacitors of T-4 for lowest distortion of the audio signal as seen on the scope. This procedure "centers" the last IF into the audio diode detector.

To align the xtal filter, I connected my HP 8557 spectrum analyzer to the grid of V7, the last IF amplifier with the HP high-Z probe, set the xtal calibrator to position "3" and centered the xtal phasing knob. I modulated the generator with a 6 kcs tone and alternately adjusted L-27 and C35 (the bridge fine balance located inside T-1) so that the noise and audio sidebands at 461.8 and 467.8 kcs were symmetrical and the lower sideband was attenuated as the phasing knob was rotated CCW and the upper sideband was attenuated when the phasing knob was rotated CW. 6 kcs modulation was used due to limitations in resolving the sidebands from the carrier of the 464.8 kcs signal. This simple alignment resulted in a smooth narrowing of bandwidth as the xtal calibrator was rotated from "1" to "5" with "5" as the narrowest position and also assured correct xtal bridge balance.

### HF Alignment

The HF alignment was completed per the instructions in the manual. When doing final alignment, be sure you have all the covers replaced and ALL hardware well tightened to minimize microphonics on the higher bands. Reasonable end-to-end oscillator tracking on all bands was easily accomplished in 2 or 3 iterations of the L and C in the various oscillator sections. With the lower tuning unit cover on, reaching the adjustments is a bit tricky as they are down in from the access holes, but after awhile I could hit them pretty easily.

### On-Air Tests

All during the restoration process, I had an antenna connected to the receiver to do some casual listening and evaluation. Since this is basically an AM/CW

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receiver, casual listening to shortwave stations, even on 19 meters, showed that the receiver was working quite well. However, oscillator stability left something to be desired, especially from a cold start.

As Chuck (W4MEW) told me, the SP-200 never stops drifting even if you leave it on all day.

Amateur stations on 40 and 75 meter AM sound just fine. The smooth, variable IF bandwidth is a pleasure to use as it allows easy adjustment on each station to counter band conditions and signal strength.

The audio response, as measured at the audio output tube plate, with the receiver in the 16-kcs position, was down only about 4 dB at 6 kcs. The triode-connected 6F6 driver and the triode-connected P-P 6F6 finals do give quite acceptable performance. The audio response is plotted in the manual and this receiver is pretty close. Not "HiFi" by any means, but with a decent speaker it is quite acceptable on AM. Good quality amateur and SW broadcast signals all sound OK.

Footnotes:

<sup>1</sup>Larry Will, W3LW, Restoring a Hammarlund SP-600J11 Variant - The Navy R-450/FRR-28, ER #184, September 2004

<sup>2</sup>Oakite degreasers are professional products that may be toxic and may not be available locally. Readers should check with local plating shops for a suitable substitute degreaser. Oakite® products are distributed by Tarksol Environmental Products, PMB-300 3400 Ridge Road, W. Rochester, NY 14626, 585-663-3346. The Oakite website is [www.oakite.com](http://www.oakite.com)

Alodine is a caustic, hazardous material not available to the public. Alodine is

a chromic acid conversion process that leaves a corrosion resistant film on aluminum surfaces. Readers are advised to find a contractor to do this work on a per-piece basis. Companies offering Alodine aluminum treatment are MagnaTech Manufacturing, 1-800-972-8841 and Anoplate Corporation, 459 Pulaski St., Syracuse, New York 13204, 315- 471-6143.

<sup>3</sup>Novus Number 1 Plastic Polish is available from Antique Electronic Supply, 480-820-5411, P/N S-C216 or S-C226.

<sup>4</sup>Caig "DeOxit" is available from Antique Electronic Supply in several containers.

<sup>5</sup>Permatex® Rust Treatment is a one-step rust treatment that leaves a tough coating that may be painted over. Try local auto parts stores, or 1-800-543-7500 to find local distributors.

<sup>6</sup>Caswell Inc.: Phone 315-946-1213, 7696 Route 31, Lyons NY 14489, [www.caswellplating.com](http://www.caswellplating.com). The plating process is hazardous, be sure to read all the directions and use common sense before trying plating at home.

<sup>7</sup>McMaster-Carr Supply Company has several nationwide distribution centers. Try their information line at 732-392-6200 or [www.mcmaster.com](http://www.mcmaster.com).

<sup>8</sup>Muriatic acid is a weak and impure form of hydrochloric acid commonly used for cleaning brick and masonry. It's usually available at hardware stores. Be sure to use eye and hand protection during use, and apply plenty of common sense.

*ER*





# The American VHF-AM Equipment Gallery

## Part 1, The Heathkit Pawnee HW-20 Transceiver

By Jim Riff, K7SC  
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When the well-known and common Gonsets came on the market in the 1950s, they established the standard for compact VHF transceivers. The combination of receiver, transmitter, and power supply in one package was a new and exciting concept. Many companies offered 2-meter components, but Faust Gonsett combined them into one system, and made mobile and base operation possible with one compact package. These Gonsset Communicators have been written about extensively, so we will focus on the other companies who challenged this technology with their own designs.

In a series of articles, we will cover 7 of the next-generation 2-meter AM tube transceivers that competed for market

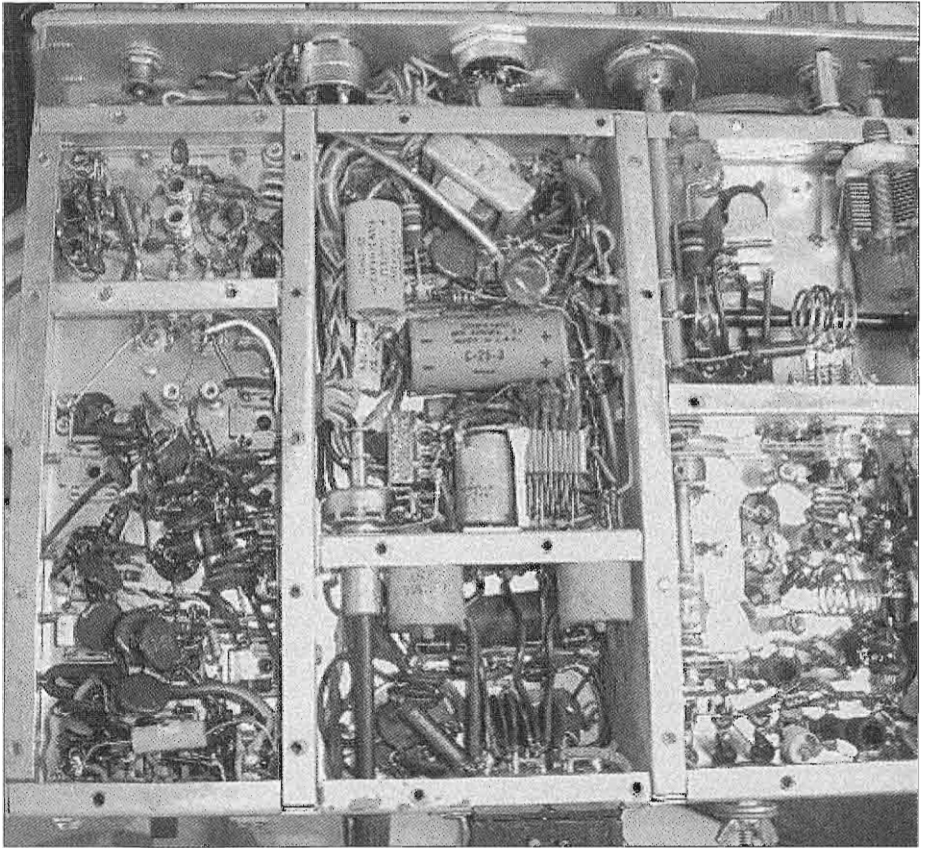
share in the then fast-growing, 2-meter market. Today, with the growing interest in 2-meter AM activity in the US, these old tubed "boatanchors" have become increasingly popular. Operation, maintenance, repairs, and just collecting of these giants has become easy and fun. It is *deja vu!*

First of this series is the Pawnee HW-20, to be followed by the Poly-Comm 2, Clegg 22er MkII, Lafayette HA-1200, Clegg 22er, the ComCraft CT-2, and the Gonsset Sidewinder. Of these, only the Heathkit Pawnee was a kit. See **Figure 1**, page 21.

Heathkit introduced its Pawnee as their top-of-the-line, 2-meter AM station in 1961. This kit was one of the most diffi-



The Heathkit Pawnee is a very attractive, full-featured piece of equipment.



The Heath HW-20 Pawnee chassis is divided into several compartments. In this bottom view the front panel is at the top. The two center sections contain the power supply, receive audio, transmit audio and circuits for switching the T/R relay. To the lower right is the transmit exciter, and the upper right shows the PA circuitry. At the upper left is the receiver front end, and the lower left chassis has all the remaining receiver circuits except for the audio.

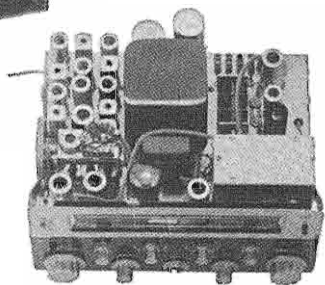
cult and complex Ham kits that Heath ever offered. Taking over 40 hours of "expert" assembly time, these kits were usually built by seasoned kit builders. The complex dial stringing and tight, compact chassis (see photo above) made assembly very difficult. The engineering was of commercial communications standards. Each section was compartmentalized and bypassed with numerous feedthru capacitors, and the bottom cover was secured with no less than 36 screws. A temperature compensated VFO and

receiver were featured along with a broad-band type of ganged transmitter tuning system. 8-inch VFO and receiver dial scales provided plenty of band spread. Using 14 common tubes and ceramic coupling capacitors, the Pawnee is easy to maintain, and should provide years of service.

**PROS:** great push-pull modulation, AM/CW operation, full featured with 11 front panel controls, VFO and crystal controlled transmitter, fairly stable VFO and receiver, variable BFO for possible SSB



KIT HW-10 \$199.95



Compare features, performance, and price...and you'll choose Heath's new VHF transceivers, "Pawnee" and "Shawnee"

- Output: 10 watts nominal CW, 8 watts nominal AM • Built-in VFO • Tracked exciter stages for single-knob tuning • 4 switch-selected crystal positions • "Spotting" switch • Built-in low pass filter • Built-in 3-way power supply, 117 vac, 6 or 12 vdc • Push-pull 6360 final rf amplifier • Dual-purpose modulator provides 10 watts for plate modulation or 15 watts for public address operation with external speaker • Push-to-talk microphone • Double conversion with first oscillator crystal controlled, first IF and second oscillator gang tuned • Voltage regulated oscillators • Illuminated slide-rule dial • Tuning meter automatically reads signal strength or relative power output • Squelch and noise limiter controls • Built-in speaker • Heavy-duty AC & DC power cables • Primary fused relay • Complete shielding • Compact, 6" h x 12" w x 10" d • Recommended for the experienced ham kit builder; time approximately 70 hours.

KIT HW-10 (6 meter), KIT HW-20 (2 meter)...\$20 dn., \$17 mo.....\$199.95 ea.

Figure 1: A Heath advertisement for the HW-20 Pawnee kit appeared in the the August 1961 issue of QST magazine.

reception.

**CONS:** manuals are very large (141 pages) and expensive, receiver and VFO tuning is slow and not very smooth, the unit is heavy, has low receiver sensitivity, and features complex dial stringing.

**Specifications:** 117V, 12V and 6V operation, 7W output (6360 PA). Receiver sensitivity .5uv, selectivity 15kc, weight 34 lbs., size: 12 inches X 6 inches X 10

inches, cost in 1961 \$199.

**Conclusion:** The Pawnee is lately becoming hard to find and expensive following the market trend for most Heathkit collectibles. It's easy and fun to operate on the popular 2-meter AM nets on 144.450 MHz. The Pawnee is a reliable, conservative design that will sound and perform well.

*ER*





# High-Performance Audio for R-390 AM Reception

## Part 1

By Bill Feldmann, N6PY  
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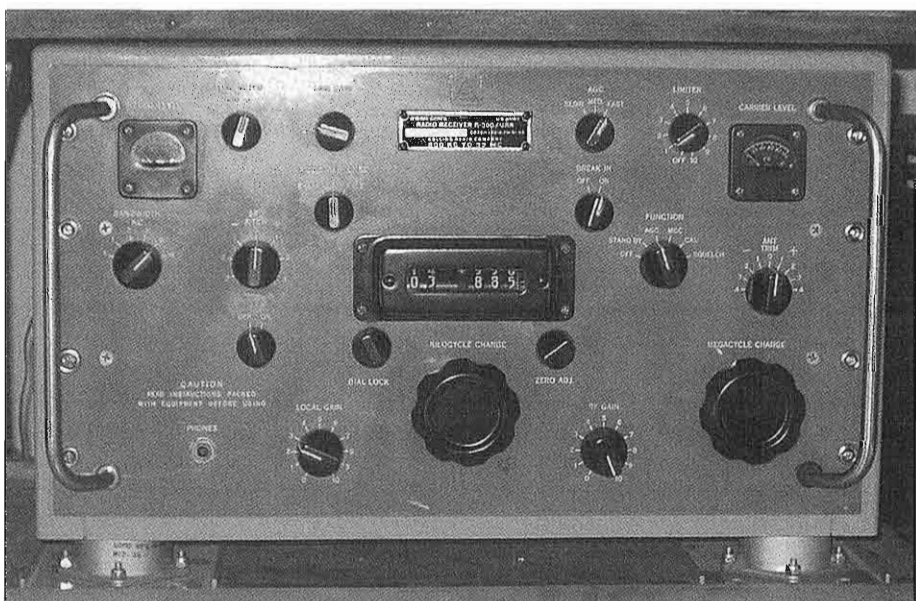
In this article I'll describe my experience refurbishing, testing and using a Collins non-A R-390, S/N 691 of order 14214-PH-51-93 shown in **Figure 1**. I'll compare its RF performance with a R-390A and describe a very effective out-board audio system that I use with my R-390.

About four years ago I purchased an early Collins R-390 from a friend who had found and purchased two of these from a Boy Scout camp. He kept one and sold me the second. Two years ago I obtained a surplus R-390 military cabinet from my friend Mac (W5MC) but never got around to using my R-390 because of other projects. After obtaining a copy of the R-390 instruction book from [www.W7FG.com](http://www.W7FG.com), I was also a little in-

timidated by the receiver's complexity and doubted my ability to work on it.

Those familiar with the more common R-390A may wonder what's the difference between the A and non-A models since they look the same from the outside. Except for their general design of triple conversion below 8 Mc, double conversion from 8 Mc to 32 Mc, and the use of a very sophisticated mechanical method of slug-tuning the RF along with the first and second IF stages, there are numerous design differences. Below, I'll describe some of the most significant differences.

The R-390 uses two stages of RF amplification with a 6AJ5 first RF and a 6BJ6 second RF, where the A model uses a single stage with a 6DC6. The R-390 uses 6BJ6 IF amplifier tubes where the A model uses 6BA6's. Both use triode mixers that generate much less noise than the



My Collins R-390. This is *not* the "A" model, and does not have mechanical filters.



pentagrid mixers common in many tube receivers. The most significant difference in IF design is the use of mechanical filters in the A model, in its last IF for 2, 4, 8, and 16-mc selectivity. The R-390A has better skirt selectivity than the variable selectivity transformers in the earlier R-390. But, I've found the R-390's five variable-selectivity IF transformers are much better with less distortion of AM signals than the "A" model's mechanical filters. Both have similar audio circuits with the exception of a 3.5-kc audio filter in the R-390 that was deleted in the A model. I find this filter to be very useful when receiving weak AM signals. These receivers were designed for military communications and not high fidelity audio, so they have weak audio output with high distortion at maximum output. The R-390 has an audio squelch circuit that I've found not very useful. It was dropped on the A model.

To use small filter caps, the R-390 uses a higher supply voltage with a regulator circuit to regulate all B+ voltage and eliminate hum. This circuit is located on the audio module and will cook audio components if the radio is installed in a cabinet. There is also an often-troublesome hum-balance adjustment on these regulated power supplies. The heat problem can have a negative effect on reliability so I added a muffin fan under my R-390's cabinet, just below the audio module to reduce heating. The A model uses a more conventional power supply with larger filter caps and does not require a regulator circuit for hum reduction. There is only regulation for power going to voltage critical circuits, but is not located on the audio module.

Additionally, the R-390 uses series filament wiring to power the tube filaments directly from 28 VDC. This allowed the radio to be powered directly from 28 VDC with an outboard dynamotor for B+ voltage for portable or mobile use. But, this makes it difficult to change to tubes with different filament current requirements

when modifying the R-390. The A model has a 6.3VAC winding on its power transformer that allows parallel wiring of the tube filaments.

If one is planning to use an R-390 for mostly CW or SSB reception the A model is a better choice. For those of us who enjoy good quality AM audio, the earlier non-A model is superior, having the non-mechanical filter IF stages, more than adequate selectivity, and less phase distortion. Of course, the best choice would be the third one; to obtain a R-725 described in issue #200 of ER. It has the later power supply, a better RF design, and the earlier LC-selectivity IF amplifier. However, since only around 300 of these were built the chance of finding one is between slim and impossible. So, I decided to refurbish and modify my R-390 for Ham and broadcast AM reception, which was a very educational experience in audio design.

Last fall, after having surgery on my arm and not being able to do much for a while, I sat down and read the theory of operation chapter in my manual to see if I could use my R-390 with my BC-610F. After better understanding the receiver, I got my nerve up and became very enthusiastic about using it for AM. I've also noticed most stations having a large collection of good receivers seem to always report using a R-390 or R-390A for AM. My SX-28s have only two variable coupling IF transformers and perform outstanding for AM reception, so I also wanted to see how much better an IF using five transformers would perform.

After checking out and aligning my R-390, I was pleased with its performance. Its selectivity was outstanding using all the selectivity choices available from its LC filter system. Its IF had a very flat response, and skirt selectivity was much better than any non-mechanical or crystal filter-equipped receiver I've used, as the diagram in figure 94 of its manual shows. Just like my SX-28s, it was able to copy very weak AM signals much better

than my radios with conventional filters, including my 75A-4. Its sensitivity and frequency tracking were also excellent after I adjusted the PTO's internal tracking coil, L701. The only thing it could use would be a notch filter for rejecting QRM from stations that like tuning up on AM QSOs and nets. But, the 4-kc filter is useful for reducing this problem. I can select the AM sideband opposite the undesired signal. I also find the 3.5-kc audio filter—not available on later A models—very useful for further noise and QRM rejection when using the 8-kc IF selectivity.

I next tested its noise floor and 3rd-order intermod rejection on 20 meters using a fixture I built 25 years ago. The fixture uses 14.02-Mc and 14.04-Mc crystal oscillators of equal power output, followed by a hybrid mixer and adjustable attenuators, to introduce signals into a receiver's input. By tuning to the frequency of one of the oscillators and using the attenuators, the noise floor can be determined. By using both oscillators and listening at 14.00 Mc or 14.06 Mc while adjusting the attenuators, the signal power required to generate a spurious 3rd-order intermod signal can be determined.

My R-390 beat most other receivers I've previously tested except my FT1000D and HF-380. The HF-380 is outstanding for intermod rejection but terrible for noise floor. As a further comparison, I tested a R-390A owned by Wayne Spring (W6IRD) who had Foster Paulis (W4HCX) align it. Foster is an excellent technician and worked on R-390s in the Navy, so I was testing one that was in top shape. I found the R-390A had a better 3rd-intermod rejection. It took two signals of minus 42 dBm to produce a spurious response 3 db above the receiver's noise. The R-390 was at minus 50 dBm. The better 3rd-order intermod performance is most likely due to the R-390A's single RF amplifier and a better RF amplifier tube. My non-A had better noise floor performance. It

required a signal of -145 dBm to be heard 3db above its internal noise, whereas the "A" took a stronger signal of -140 dBm. The intermod and noise floor performance of both receivers is far superior to what is required on the HF Ham bands, and way above most modern Ham receivers except the very top-of-the-line ones.

My numbers for noise floor and dynamic range may seem a little different than those others have reported. This is because my tests use only a 3-db above the noise for noise and intermod testing and a narrower 1-kc IF selectivity. My method is a test of a receiver's capability to receive weak CW signals. Most AM receiver numbers I've seen are based on tests for AM reception using a wider bandwidth, like 6 kc, and a higher signal-above-noise level, like 6 db. But, I used the CW method so I could compare my R-390 to receivers I've tested over the last 25 years. When I built and started using this fixture, I was more interested in CW performance. I've found the CW test is a good test for comparing receiver performance for all receiving modes. Because the values from my experiment are based only on one sample of each model, they will not accurately describe the noise floor or intermod performance of all these models but, at best, only qualitatively indicate the performance differences between these two models.

I aligned my R-390 with a UG-971/U adapter installed to convert the balanced input to a unbalanced, BNC, coaxial input to be able to use all the receiver's RF input coils for more front end selectivity, and also be able to easily connect it to my BC-610F's TR relay.

I set the IF gain pot so that the carrier meter would indicate 60 db on a 100- $\mu$ v signal on 20 meters. This made it easy to convert, in my head, to S-meter type readings for giving signal reports. I had found when I used other recommended methods of setting the IF gain, it usually resulted in lower carrier level readings. Some claim this will result in better re-

ceiver performance.

So, I ran some tests with my fixture to determine how the IF gain setting affected receiver performance. I found the setting had very little effect on the receiver noise floor or intermodulation when using IF gain settings that resulted in carrier meter readings of between 30 dB and 70 dB for a 100- $\mu$ v input signal.

This is because the noise floor and intermod performance is determined mostly in the RF and mixer stages and the last IF introduces very little extra noise.

For convenience, I calibrated the carrier meter for how I wanted to use the receiver. Also, the 100  $\mu$ v input signal that caused a carrier level reading of 60 dB seemed to hold within 15% between 3 Mc and 32 Mc on my receiver, showing the excellent design of the R-390.

I did a few very simple but worthwhile modifications to my R-390. I decreased the values of R541 and R544 to 330k and changed R542 to 470k in the audio noise limiter. This gave me better sounding audio with the limiter at low settings because the audio signal was not over clipped. Street light QRM could still be reduced. (Over clipping causes distortion of the desired audio signal). I also added the popular Langford SSB modification that increased the AVC's attack time and BFO injection. This simple modification adds 1N4148 diodes in parallel with the 180k and 220k resistors, R556 and R557, between the plate of the AGC rectifier and grid of the time constant tube with their cathodes toward the AGC tube plate to decrease the AGC attack time. Additionally, a 47-pf cap is added across the 10-pf cap, C536, between the plate of the BFO and the detector to increase BFO signal injection voltage.

Using 2-kc or 4-kc selectivity produces performance on SSB almost as good as with a product detector. Performance is not as good in fast or medium AVC as in slow AVC because the AVC attack time is still a little too slow, even with the diode additions. But, I mostly use my R-390 for

AM and only use SSB for finding clear places in the bands or searching out sources of QRM. When I first installed the Langford mod, it slightly degraded AM performance when using fast AVC. Adding a .5- $\mu$ f cap across pins 1 and 2 of S104, the AVC switch, removed the audio that was getting on the AVC line and causing this problem.

When transmitting with my BC-610F, I first used the R-390's break-in circuit by wiring between terminals 9 and 16 on the terminal strip on the back of my R-390 to the normally-open set of auxiliary contact on the transmitter's Dow Key T/R relay. This worked fine until I connected my Heath SB-610 monitor scope to the R-390's J106 IF output. Because the scope also monitors output of my BC-610F, I found the trace of the transmitted signal was being interfered with. The problem is that the R-390's break-in circuit only shorts the R-390's antenna input and audio output, while leaving the RF and IF circuits still active. There was still enough IF signal to interfere with the scope's RF output trace. I also needed a way to disable the R-390's IF.

A simple solution was to remove the jumper across pins 1 and 2 on the R-390's back panel terminal strip and connect a second set of T/R relay normally-closed contacts across these pins. This disconnected the R-390's IF gain pot from the tube's cathode, muted the IF stages, and removed the receiver's signal from the scope.

The receiver could be completely muted by only breaking these connections, but I also used the break-in circuit when transmitting to further protect the receiver.

[Editor's note: Part 2 is coming up in next month's issue]

ER



# Using Component Source Date Codes

## A Valuable Tool for Determining the Age of Radio Equipment

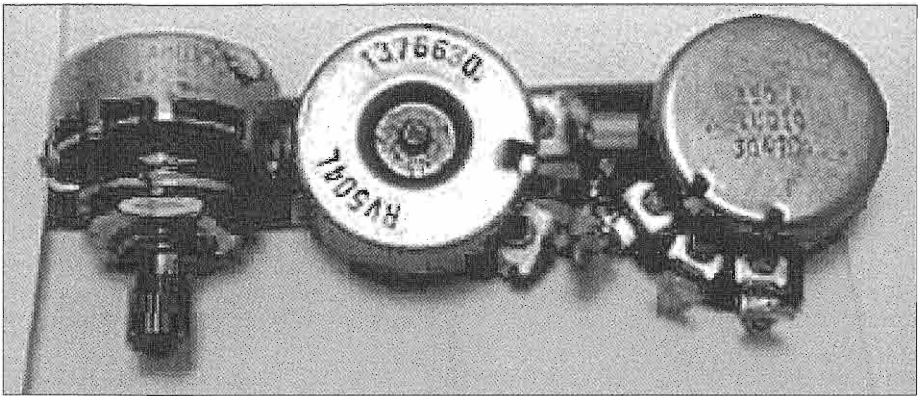
By Bob Scupp, K5SEP  
PO Box 804  
Mountainair, NM 87036

When we obtain an antique radio, one of the first questions we have is "how old is it?"

One can look at collector's guides and get the date that production started, but how long was this model/chassis number manufactured? Can we somehow more precisely discover the year our new find was produced?

The answer is yes, for many radios manufactured after 1945 when manufacturers of electronic components began printing source date codes (SDC) on them! Is this helpful in determining an antique radio's age? You bet it does! Let's

and speakers and give us a more accurate age of the device they were used in. Sometimes manufacturers of electronic products would buy components, using them in their production for one, two or even three years. Sometimes, comparing the source date codes of potentiometers and speakers in the same electronic product may help. I am using a median of one year as a general, but not accurate, measure in this article. Some manufacturer models and chassis were made for several years or more. Source date codes make it possible to get an approximate age of an electronic product. With antique radios, you are more accurate but not precise. Source date codes during the 1940s through the 1950s have six digits. The first three are the code for the manu-



**Figure 1:** "1376630" is a source date code on a potentiometer shown above. "137" is the manufacturer's code for Chicago Telephone Supply (CTS) and "6630" represents the date of manufacture, in this case it is the 30th week of 1966.

take a better look at how it works.

The Electronic Industries Association was founded in 1924. Source date codes were used from that date on, especially during, and after the late 1920's. However, EIA did not establish source date codes as an industry standard until after 1945. They were used on potentiometers

and the last three are for the week and year of production. The codes starting in 1960 and up until most recently have seven digits. The first three are the manufacturer and the last four are the week and year of production

Last year, I purchased several items at the Albuquerque Tailgate Swapfest. One



**Figure 2: The speaker above carries the date cod of "285703." The number sequence "285" means the manufacturer was Rola, and "709" represents the 9th week of 1957.**

of them was an Emerson model G-1705A Lifetimer II AM/Clock radio. It was not listed in my collector's guide to tell me the original production starting year. I queried the AWA and Nostalgic Air Internet message forums and asked if anyone could tell me the first production year. I also requested a copy of the schematic and parts list. One person answered and told me it was in Sams Photofact #615-6, issued February 1963. Therefore, the first year of production for this model was 1962. But, how many years did Emerson manufacture this model number? In the scheme of things, in what specific year was my example made? Was this asking too much? Apparently, it was not. Another responder gave me an Internet hyperlink to research source date codes on electronic components. At that site it became clear to me how to unravel

the mystery of source date codes.

As mentioned previously, the first three or four digits in the code tell who the manufacturer was. For example, any electronic component beginning with "106" is Allen-Bradley. A component beginning with "137" was made by Chicago Telephone Supply, or CTS. CTS were a major electronic component manufacturer and sub-contractor for many other companies, including TRW. I remember our line of TRW products while working at the Electronic Parts Company in Albuquerque, New Mexico. Many of their resistor products, such as trimmer potentiometers and variable potentiometers had CTS stamped on them. The stamped part number began with 137! Of course TRW had their special part number as well.

I noticed on the Emerson G-1705A that the tone control had a 1376404 number-series stamped on its back. The "137" is the code for the manufacturer, CTS (Chicago Telephone Supply). The "6404" is a code for the manufacturing date of the fourth week of 1964. Since it would be highly unlikely that Emerson would have stocked parts for a year, I determined it was made during the year 1964! The speaker had a part number of 180263, but it turned out to be Emerson's part number and not the source date code. By the way, the speaker according to Sams #615-6 was manufactured by Quam. Can this SDC system be used elsewhere? Absolutely yes! These electronic components are common to many other electronic devices such as guitar amplifiers, TVs, etc.

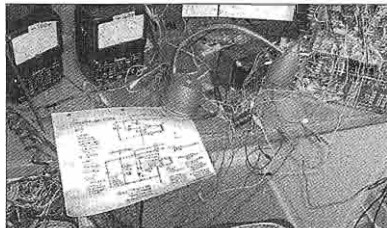
The website on the Internet for reading source date codes is <http://www.provide.net/~cfh/pots.html>. Enjoy the ability to date electronic products through the source date code system!

I will follow-up this article with more source date code research as it becomes available to me.

[Photos reprinted by permission of the Internet site quoted above...Ed.]

**ER**

# The Restoration Corner



## Rebuilding Vintage National Chokes

By Bruce Vaughan, NR5Q

I have been building a replica 1930s-vintage transmitter, and some months ago I bought 15 National 2.5 mH chokes from a fellow in Hawaii for the project. They were rather ragged looking. The windings had loose turns, and the coating of varnish or whatever National used had long since turned to dust. I checked all the windings and found one that seemed beyond hope. I then gave each choke a thin coat of GC Radio Service Cement. I let 'em dry and then gave each choke a dip in Poly varnish and hung them up to dry. I checked all chokes again when dry.

Well, to be brief, if you checked the resistance by holding the test leads on the lead ends they checked good. HOW-EVER even though the leads were solidly connected to the lead end caps, the leads were not electrically connected to the lead end caps. I was surprised to find two that measured open. Heating the end caps until they melted resulted in a solid electrical connection, very strange.

OK, so I now resoldered the choke back in the circuit and bingo! I now had an oscillator working. I then applied my 750 volt supply to the PP 807's and it worked perfectly. No neutralization needed. Keying is fine, and according to my instruments I am putting about 70 watts into the 807's. Unfortunately, I think my efficiency is poor or my readings in error. I have yet to connect it to an antenna but experience tells me that I am

getting about 25 watts out. I hope my experience is in error.

## Stabilizing Old VFOs

By Steve Hobensack, N8YE

I thought I'd pass along some information on a couple good improvements that I recently made to my Central Electronics 458 VFO. There is a nice power supply that will power the VFO instead of stealing power from the transmitter. It is the little antique radio power supply kit at Antique Radio Supply. It is part K-101A; both the B+ and the 6v filament voltages are regulated. With this power supply, you will be able to remove the big power wasting resistor on the back and the regulator tube. You still must power the 12-volt filaments from the transmitter.

I also made another mod that will make the VFO stable enough for PSK on 7070 USB. I had an old Collins PTO (permeability tuned oscillator) lying around unused. I simply phase locked the second harmonic of the Collins oscillator to the 458 VFO. The Collins unit was from either from a T-368 or T-195 transmitter with output from 1.5 to 3 MHz. I found it at a hamfest several years ago. Perhaps other PTOs will work. I powered up the PTO using power supply K-101A, which powers the 458 VFO at the same time. To couple the output of the PTO to the CE 450 VFO, use the "gimmick" capacitor method. Just hook a small insulated wire to the center of the BNC connector on the PTO, and then wrap it around the RF output wire of the 1626 tube. Attach the

shield to the 458 VFO chassis. You could install a BNC chassis mount connector to make a nice job. The coupling is on the order of just a few pf, but it was enough to achieve phase-lock to the 458 VFO.

An easy way to assure phase-lock is to listen to the 458 VFO output with an auxiliary receiver. Tune the transmitter to 7070 kHz. The 458 VFO should have a fundamental frequency somewhere near 5356 kHz. Turn on the Collins unit. Turn the shaft until its output is near 2678 kHz. The second harmonic will be near 5356. As you are listening, the two signals will seem to lock together as one when you are turning the PTO shaft. When they are in phase lock, you will notice an apparent backlash in the 458 VFO dial. The output is now being controlled by the more stable Collins unit!

I think the R-390 PTO is still being sold at Fair radio. Its output is from 2555 to 3555 kHz and it should work. It is probably possible to phase lock a Collins PTO to other less stable VFOs such as the VF-122, VF-1, HG-10 etc.

73....Steve....N8YE

### **Cleaning Corroded Battery Contacts**

By Bob Scupp, K5SEP

Some time ago, on eBay, I purchased a 1957 Philco T500 transistor radio for my collection. The case was in excellent condition. However, some of the AA batteries at one time had leaked, but the damage did not look, off hand, to be substantial.

My friend, Jim Steuber, in our New Mexico Radio Collector's Club, recommended Connoisseur's silvery jewelry cleaner for the battery contacts and other metal areas. Since it comes in a plastic container it should not be very abrasive at all. You can find it at the jewelry department of Wal-Mart for about \$3.50 for an 8-ounce container. It can be applied with a Q-tip for less than a minute. Then use the other Q-tip end with water on it to wash it off.

73's, Bob K5SEP

Electric Radio #202

### **DANGER! Check that Heathkit**

**Boatanchor.**

By Jim Fitton, W1FMR

For a while now, a Heathkit C-2 Condenser checker was used to on the bench to check electrolytics before installing them into old radios. The capacitors measured pretty close, and leakage levels seemed to be in line with expected values with the instrument.

Recently, while fixing an old Hallicrafters S-108 receiver, I decided to check a capacitor in-circuit. The black lead from the condenser checker was clipped to the S-108 chassis and POW! There was a loud noise, a huge spark and the room went dark.

Sitting there in the dark I wondered if I had passed on to greener pastures. After recovering slightly, I found a flashlight, unplugged everything on the bench, and went downstairs to reset the circuit breaker. Upstairs later, the receiver AC wiring showed nothing wrong. The antenna had been connected, putting chassis at ground potential. When the condenser checker was opened up I nearly fainted. Wow! The hot side of the 110-volt AC line was connected directly to the black negative test lead jack.

Electrocution or serious harm would have occurred by holding the negative test lead while coming in contact with ground. That is extremely scary. I thank God for sparing me (this time). The builder of the condenser checker made a horrible error. Hope it didn't result in harm or electrocution to him.

Always inspect the AC connections on any Hamfest bargain that plugs into an AC outlet.

Joseph Carr said it best on page 245 of "Old Time Radios," "...Make it your practice never to work on equipment that has the plug inserted into the power outlet. Don't trust switches, circuits, fuses, circuit breakers, or other people."

Stay healthy and safe...and write articles for ER!

73, Jim Fitton, W1FMR

March 2006

**ER**



## Ham Radio's Twins

### Conar's Model 500 Receiver and Model 400 Transmitter

By Harold Smith, W4PQW  
1435 Bush St.  
Pensacola, FL 32534

Conar was a division of the National Radio Institute (NRI) in Washington, DC.

The twins were introduced in 1965 as a novice band receiver and transmitter. They came in kit form as part of the NRI radio training course. The student would assemble the kits and be able to work CW on the novice bands.

The twins were also available completely assembled from the National Radio Institute Electronics Division.

The Conar Twins appear to be quite rare; at least they seldom show up at Hamfests or on the computer networks.

#### Conar Model 500 Receiver

The model 500 covers the 80, 40, and 15 meter bands, which were the original novice bands. It has AM and CW modes. It came with four tubes, a diode detector and power supply rectifier. It works on 120 VAC with a built-in power supply and has a built-in speaker. See the block diagram in **Figure 1**.

By using dual-purpose tubes and two diodes, this receiver is actually equivalent to a 9-tube set.

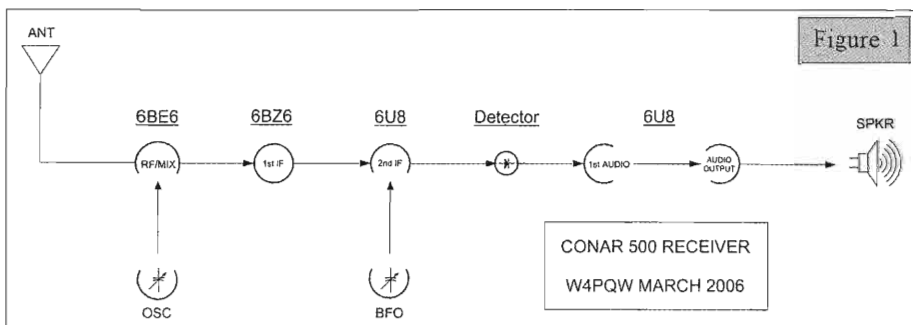
The receiver has the following controls: a main tuning dial, Antenna Trimmer, Gain (IF gain), Volume (audio gain), and a BFO switch that selects the AM,

Standby, and CW modes.

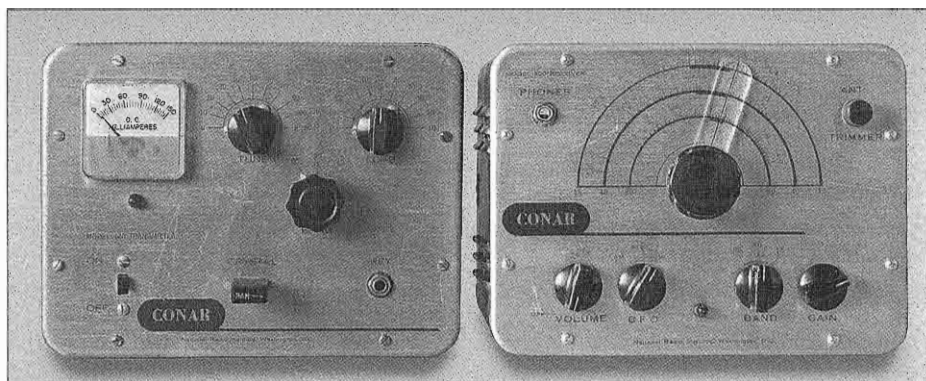
When I connect the antenna to this little receiver, sit back to tune around the bands and enjoy its ability to pull in the stations I am reminded of an "Old Time" story.

When I was first licensed in 1948, my Elmer, Bill Wiggs (W4RDC, SK), had helped me study and get my license. He was always there to help me along. He taught me more useful stuff than any book could have ever done. Bill was the best radioman that I have ever known—and I have known many. He was trained in the Army Signal Corp during WWII, served all over the world as a communications specialist, and installed and maintained radio systems. He taught radio in the service and many years in civilian life.

I had been a Ham for about 10 years when I decided to build a "super receiver." I bought a new chassis and cabinet, collected all the parts with schematic and layout plans and went to work. My design was to have two RF stages, three IF stages, three audio stages with a noise limiter, oscillator and beat oscillator. I had about 11 tubes total. I was so careful with my drilling, filing and cutting. I wanted it to look sharp! When it was finished it did look good. At least, I thought it did! When I fired it up it looked all OK—no fire, no smoke. I proceeded to







The Conar 400 transmitter is on the left, and the 500 receiver is on the right.

(Photography by Joe Veras, K9OCO)

align the RF and IF stages. To make a long story short, it had so much gain that I could not control it—no way—even with RF gain turned back, AVC on 3 stages, I just could not make it behave. It was running away, squealing, whistling, popping, squeaking and whatever. It was terrible!

I gave up and called my friend Bill to get me out of this one. Bill came in, looked it over—top, bottom, and he looked at my schematic. He said "You have two chances to make this work—SLIM and NONE." He said if I would reduce all plate and screen voltages by 50% it MIGHT work. As he left, he turned to me and said "There is no way that you can use all of the gain that a five tube receiver can deliver." So, I bought a new chassis and built a receiver with a total of five tubes: RF-MIX/OSC—IF-DET-1st AF and AF output. I used it for years and added a few trimmings like a noise blanker, "S" meter, and a BFO.

For years, the manufacturers such as National, Hallicrafters, RME, Hammarlund and others built a basic 5-tube receiver with success.

The Conar 500 is a basic design and works fine on phone and CW. It is smooth tuning, fairly stable, and is nice to listen to.

#### Conar Model 400 Transmitter

This is the last word in simplicity. It works 3 novice bands, CW only. It uses a

single PA tube, a 6DQ6B, and is crystal controlled. It is rated at 25 watts input.

For 80 and 40 meters, Conar recommend using fundamental crystals. On 15 meters they used 10.5 MHz crystals and doubled to 21 MHz.

One statement in the manual that I find amusing says "To provide stabilization of the crystal frequency and to protect the crystal from excessive crystal current, a positive temperature coefficient resistor in the form of a pilot lamp (#40) is used in the crystal circuit. This variable resistor lamp virtually eliminates any chirp frequency shift of the output signal when the transmitter is keyed".

I must say that this lamp in series with the crystal doesn't work for me. My transmitter chirps no matter what! It does put out a pretty good signal—enough to go on the air and make contacts. It is easy to tune up, too. This design was first shown in QST, December 1957, by Lew McCoy (W1ICP) and in the 1962 ARRL handbook. The Conar version is not an exact copy, but is very similar. It was most likely based on this design.

I would not put the Conar Twins in the "serious" radio category. It was, after all, a student project. It is a part of our radio history and a connection to the past.

It no doubt provided many youngsters with a start in radio. My hat is off to National Radio Institute and the Conar Twins.

**ER**

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## Another 1984 R-390A Has Survived

### Is it the Very First, or the Very Last of the Fowlers?

By Paolo Viappiani  
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19124 La Spezia, Italy  
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*"Paolo, are you interested in an R-390A by Fowler Industries, one of those last five units? I can get such a radio for you."* When some months ago I read such an e-mail message from my friend Rick Mish, I almost jumped my chair: *"No, it isn't possible... it's only a joke"* I thought. But it wasn't a joke at all, it was true!

I accepted that somewhat incredible offer at once, so after a relatively short time I had that radio delivered to my home in La Spezia, Italy. And now I'm just ready to tell ER readers something about this one and the other Fowler units in general.

#### A Short Survey on R-390A History

Thanks to the very interesting articles by Les Locklear and Tom Marcotte (N5OFF) that have appeared on ER pages in the past<sup>1</sup>, most of the readers who are interested in R-390As are well aware that no other receiver in the radio history had a longer production life than this wonderful champion.

Its design at Fort Monmouth and at Collins Radio Company started jointly in late 1953, just some years after the final development of the predecessor R-390, whose design started at the very same places in mid-to-late 1949. Originally conceived under a "cost-reduction program" for the R-390 (as that receiver seemed a bit too expensive to Uncle Sam), its name was at first "R-390(XC-3)", then it turned to "R-390A"<sup>2</sup>.

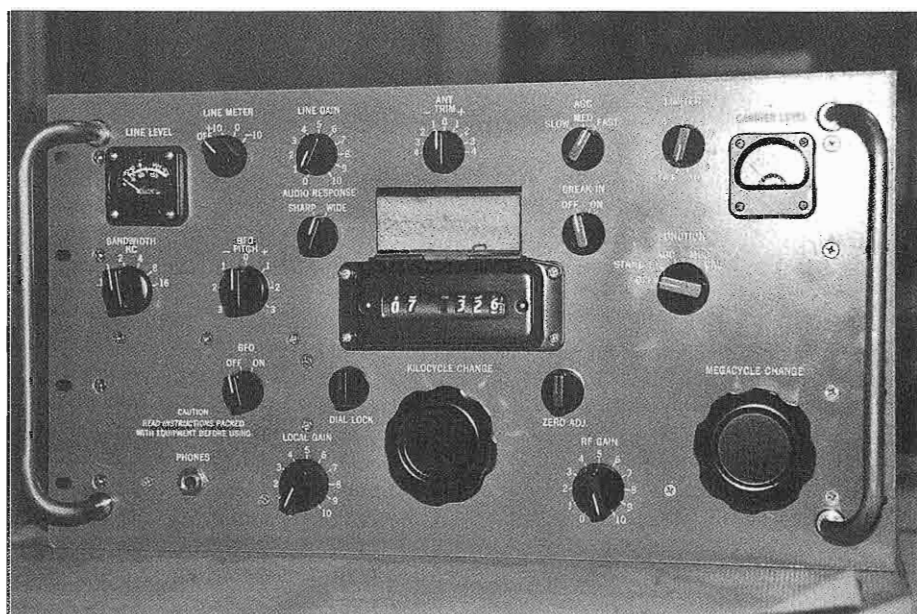


Figure 1: Front panel of the Fowler R-390A with the dial window lid open.

The first R-390A production run was done by Collins Radio Company of Cedar Rapids, Iowa, in 1954 (under a contract for R-390's dated 1951), and the last one was made by Fowler Industries of Port Jervis, NY, under a Navy contract dated 1984.

A thirty-year period and a total estimated production for over 50,000 units, a true and unsurpassed record!

Between 1954 and 1984, R-390As were produced by several manufacturers other than Collins, as there were a number of Military contracts for which successful bids were made from other firms (i.e. Motorola, Amelco/Teledyne, Stewart-Warner, EAC, etc.)<sup>3</sup>.

Probably somewhere in the world there are also a few of the R-390As the tag of which is signed "Helena Rubinstein"<sup>4</sup>, the cosmetic maker. The story of this strange radio contractor is known thanks to Les Locklear and Tom Marcotte. In about 1959, Helena-Rubinstein decided to diversify into electronics and so they bid a ridiculously low price on a Navy contract for 80 R-390As. Of course, they won, but as they weren't able to set up an assembly line, were compelled to buy all the needed R-390A's off the shelf from Collins. After having put their own labels on the radios and having delivered them to the Navy, Helena-Rubinstein promptly forgot about going into electronics.

Coming back to the Fowler production, it followed by 15-17 years the final R-390A production runs made by EAC and Dittmore-Freimuth in 1968 under the DAAB05-68-C-0040 Military contract.

The five units produced by Fowler Industries in 1983-1985 have been the last R-390As ever made.

#### **Fowler and Avondale**

If you give a look at the original front tag of the R-390A built by Fowler Industries that survived first<sup>5</sup>, you can read: "*Manufactured for Avondale Shipyards, Inc./Contractor/Fowler Industries, Inc./Con-*

*tract: N00024-84-C-2027"*.

But, who are (or were at that time) Avondale Shipyards and Fowler Industries?

Avondale Shipyards, Inc. (now Avondale Industries, Inc., recently merged into Northrop Grumman Ship Systems) is one of the largest shipbuilders in the United States, specialized in the design, construction, conversion and repair of various types of ocean-going vessels for the military and commercial markets.

Organized in 1938, Avondale first began building ocean-going ships in the 1950s. From 1959 to 1985, the Company operated as a subsidiary of Ogden Corporation, a Company headquartered in New York, N.Y.

Over the years, what began as a small barge repair company grew to become an imposing industrial complex, producing a wide variety of naval and commercial shipbuilding programs. Prior to the 1980s, Avondale built both military and commercial vessels, including the construction of many destroyer escorts for the US Navy.

Since 1982, Avondale has used modular construction to build ships, as this technology is the most efficient and cost effective way to build a ship today.

The Company's corporate headquarters and main shipyard are located on the west bank of the Mississippi River at Avondale, LA., approximately 15 miles from downtown New Orleans. That facility includes approximately 230 acres of company-owned land, a 900-foot floating dry dock/launch platform that permits construction, conversion or repair of vessels up to approximately 1,000 feet in length and a 650-foot floating dry dock principally used for ship repair, multiple building ways and side launching facilities.

Among the U.S. Navy vessels built or under construction at Avondale during the 1980s were just six LSD's (Dock Land-

ing Ships) belonging to the "LSD-41 Whidbey Island Class" (*Germantown LSD-42, Gunston Hall LSD-44, Comstock LSD-45, Tortuga LSD-46, Rushmore SD-47 and Ashland LSD-48*).

Dock landing ships support amphibious operations including landings via landing craft air cushion (LCAC), conventional landing craft and helicopters, onto hostile shores. These ships transport and launch amphibious craft and vehicles with their crews and embarked personnel in amphibious assault operations.

Well, it was just for one (or more, I don't really know) of the above LSD ships that the Navy requested Avondale Shipyards, Inc. to furnish five, and only five, brand-new R-390As. This was in about 1983.

I guess it is still unknown exactly which ship(s) those receivers went onboard and also why the Navy made such a choice at that time; I was told of an old spec for LSD ships which had not been updated for modern use, but it was also rumoured that R-390As were chosen due to their excellent large-signal handling capability (and for sure it helps in a limited-space environment like a ship full of antennas and high-power transmitters).

It seems that the Navy later replaced all of the R-390As on these ships with R-1051s and Harris RF-590s, however.

Whatever could have been the reasons for that Navy choice, Avondale Shipyards signed a Navy contract in 1984, and in order to fulfil it they were compelled to search for an electronic manufacturer who could set up a new production line for only five R-390As. Then, Avondale Shipyards subcontracted the needed receivers to Fowler Industries.

Fowler Industries, Inc. was a company headquartered in Port Jervis, N.Y. (I don't know if there were any Fowler plants or facilities near Avondale Shipyards in LA.); most likely (but it's only a supposition) Avondale and Fowler had already had

business relations before this new order for five R-390As.

More information on Fowler Industries and on this subject can probably be obtained from Tom Marcotte (N5OFF)<sup>6</sup> who in the past had some contacts with the purchasing agent at Avondale and also with the man who was the production manager of Fowler Industries in that period.

#### **The Five R-390As by Fowler**

There is no written documentation on the five R-390As built by Fowler Industries in 1983-1985, so all I can say is based on the information I kindly obtained from Les Locklear<sup>7</sup>, Tom Marcotte and Rick Mish<sup>8</sup>, and also on visual inspection of my unit.

For sure, setting up a complete assembly line for building only five R-390As wasn't so simple and straight for Fowler Industries, hence there were some start-up problems.

Tom Marcotte tells me also that the gentleman at Fowler told him they obtained parts from wherever they could and that the only modules manufactured by Fowler were the IF decks, so "*the rest were made up of parts obtained from various sources.*"

This can easily justify the small (but evident) differences among some of the four units that have survived until now, but it also leads to still unanswered questions; some of them will be discussed below.

About the R-390As built by Fowler Industries, it has to be emphasized first that they were identical in design to all other late production R-390As: no further modifications, improvements or schematic changes had been implemented.

So the only differences are in manufacturing dates, in some of the parts that Fowler employed in building their units and in a few minor details. Incidentally, among the parts that seem to be common to all the five Fowler units there are the

PTOs (all manufactured by Cosmos Industries), the presence of one, or more, Dittmore-Freimuth mechanical filters, the BFO-PTO (manufactured by Artisan Electronics) and the meters (manufactured by A&M Instruments and of a particular window shape).

Tom Marcotte reported that he was told by Rick Mish about some of those differences: *"Few people see as many R-390As as does Rick Mish. He rebuilt one of the Fowlers<sup>9</sup>, and commented to me that... the crystals and caps were mostly 1986 (although the big caps in the audio module were older, like the 70s). The wiring was less than neat, and the wafers on the switches was thinner than other makes. The filters were late production Dittmore-Freimuth. The pots were made in Mexico."*

As it had been already verified by Les Locklear and Tom Marcotte, we must take note of the existence of only one contract for five R-390A units (none less, none more) dated 1984. That contract is just related to the Fowler production and it is known as the "N00024-84-C-2027."<sup>10</sup>

One contract with five units, but we don't know when those five R-390As were assembled or exactly in which order they were numbered. Certainly, all of them had been built within the 1983-1986 period, most likely at Fowler Industries, who had already started searching for and ordering all the needed parts and components by 1983.

Recently, Tom Marcotte confirmed for me what I had been already told by Rick Mish. The man from Fowler told Marcotte they made runs of two and three, so it is really possible that those five units were built in two subsequent production runs, both of them under the same contract.

Hence, one contract for five units, and there were two production runs. The latter run produced the last R-390A in history, in 1985 or 1986, when the fifth unit was finally delivered to Avondale and U.S. Navy.

About the cost of the radios, it was

rumoured that each unit cost the U.S. Navy about \$35,000 to \$38,000 (1984 dollars), but I really don't know if these figures are correct.

But, did the U.S. Navy have a real need for ordering new R-390As? Maybe they did; I don't know.

However, just a consideration could be made on this subject. Maybe I'm wrong, but as *"many of the later units from the late 1960s were built for contract purposes and set aside, never to enter service."*<sup>11</sup> Most likely at that time some new or like-new R-390As could have been still found in Navy or Army depots.

If so, there couldn't have been any need for a further order of newly-manufactured units!

After some years of honored service to the U.S. Navy, the Fowler units were replaced by later models and probably went to a Navy depot, from which all of them but the "No. 2" found their way to St. Julien's Creek<sup>13</sup>, where all the front nomenclature tags were removed.

The "No. 2" (the first Fowler unit that had survived) was more fortunate than its brothers; it seems it went to the current owner following a different and more straightforward way.

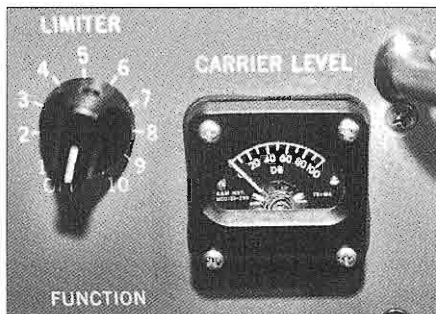
Apart from the "No. 2," until now it was known that only two more Fowler units had survived (and they were identified as "No. 1" and "No. 3" thanks to the mylar decals on their modules). But recently, a further R-390A built by Fowler Industries has appeared (the unit described below), hence it seems that there is only one still missing, and nobody knows where it is.

Almost needless to say, the five Fowler units were provided with a new (and last, in my knowledge) official edition of the Navy Technical Manual, the SPAWAR 0913-PL-009-1400 dated May 15, 1985 (that superseded the NAVELEX 0967-LP-063-2010 of April 15, 1970 and its later additions)<sup>12</sup>.

## A Brief Description of my Fowler Unit

As it can be seen in **Figure 1**, the front panel of this unit shows no differences with R-390As of earlier production but the particular shape of the meters. The panel has engraved (not silk-screened) lettering and the black cover of the Veeder-Root mechanical counter has rounded corners, just like the usual one.

A particular that in my opinion has little or no significance is the presence of



**Figure 2: The Carrier Level meter is made by A&M Instruments.**

a hinged window mask, attached to the upper side, and this lid can be turned down over the dial window in order to hide the selected frequency (or more likely to keep the radio room obscured). This is not a novelty; the device had been already seen on some units from the 1960s.



**Figure 3: The nomenclature tag is discussed in the text.**

The two meters (**Figure 2** is the “Carrier Level”) are both of A&M manufacture and have a particular bevelled shape for the window mask (as stated above, these details seem to be common to all the Fowler units).

The front tag fitted on this unit (**Figure 3**) is clearly a repro and the number “1”

silk-screened on it could be wrong (who knows? I’ll talk later about it).

Taking a look at the rear panel (**Figure 4**) we can point out some details: the “AN” sub-panel with three Cannon connectors for power supply and audio outputs, the presence of the “old” support for the tools (screwdriver and fluted-socket wrench), the absence of any “Fowler” signature and, very important, the presence of a typo (please give a better look at the writing under the great hole in the center, you’ll read “SYWC XTAL OSC” instead of “SYNC XTAL OSC”).

While the presence of the “AN” subpanel has no great significance (it could have been “retro-fitted” or added later). The presence of that tool holder could suggest that the rear panel of this unit is not original, as the tool support in R-390As had been omitted since long before the 1967 EAC production.

Not at all! It shows nothing else but that Fowler Industries had some difficulties in obtaining new parts and they were compelled to make use also of some refurbished items obtained from various sources. As it will be more clear later, also the “old-fashioned” rear panel of this unit seems to be original, most likely it is a refurbished part that they cleaned and silkscreened to represent a new part

The picture in **Figure 5** is typical of the inside of the radio after a total restoration by my friend, Rick Mish. He took a great care upon doing it; all the modules and single parts were carefully cleaned, checked, and re-aligned to full performance specifications. Every part received careful attention, also the gear box and the slug racks have been cleaned and polished and after such a treatment the radio looks as close to new as it was possible. Rick did it at his best and I’m very grateful to him for the attention he paid to this unit.

There is no evidence of use of IERC tube shields throughout the radio, all the

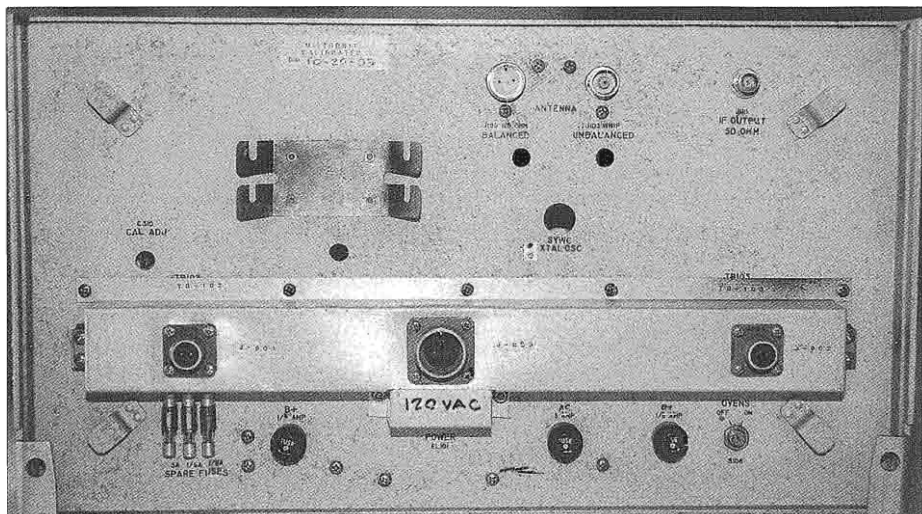


Figure 4: The rear panel does not show any Fowler markings. Please notice the misspelled word "SYWC" instead of SYNC and the different connector sub panel.

shields are of the chrome-plated type without any particular heat-dissipating device inside.

On one side of the IF subchassis (Figure 6) there are the Fowler markings, and the same markings are deep-stamped on

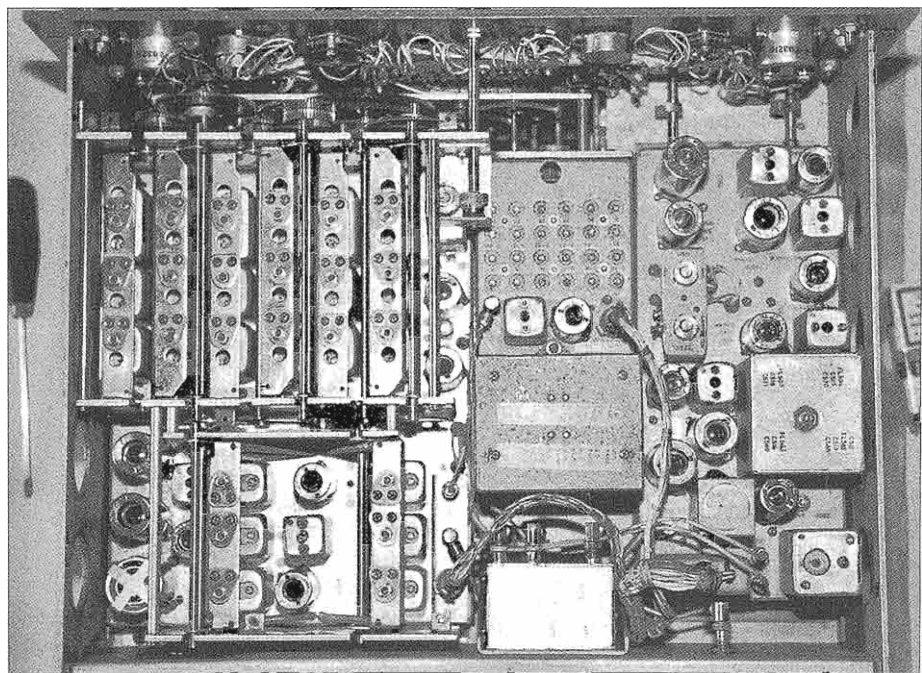


Figure 5: A top view of the restored Fowler R-390A.





Figure 6: Left-side view of the IF subchassis with the filter cover removed that shows the D-F mechanical filter (foreground, left) and the Fowler markings, which have been silk screened on the chassis and stamped on an IF can.

some IF cans; the BFO-PTO can is labelled "Artisan Electronics" (Figure 7). About mechanical filters, please notice that in this Fowler unit one only is from Dittmore-Freimuth, all the remaining ones are from Collins.

Sorry, I haven't given a closer look at the pots yet to see if they were built in

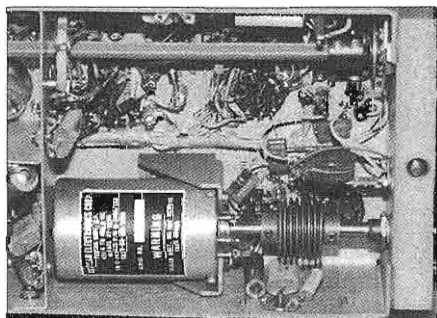


Figure 7: Bottom side of the IF subchassis, with the "Artisan Electronics" BFO-PTO unit showing.

Mexico or in the U.S.; I'll do it as soon as possible!

Also, one side of the AF subchassis (Figure 9) is marked "Fowler" and all the transformer and relay cans are date-coded 1983. The Fowler signature also appears on the power supply subchassis between the connector (J811/P111) and the 25Z6 tubes (Figure 9).

This R-390A is provided with a Cosmos PTO, the serial number of which is 28998 (Figure 10).

The "Fowler" deep-stamped markings appear also on the RF and Xtal Osc. modules and on most coil cans of both of them.

Despite this extensive presence of stamped markings on the various modules (that is sufficient to legitimate this R-390A as one of the "Fowler" units by itself), there is no evidence of any serial number on them, however. Every sub-



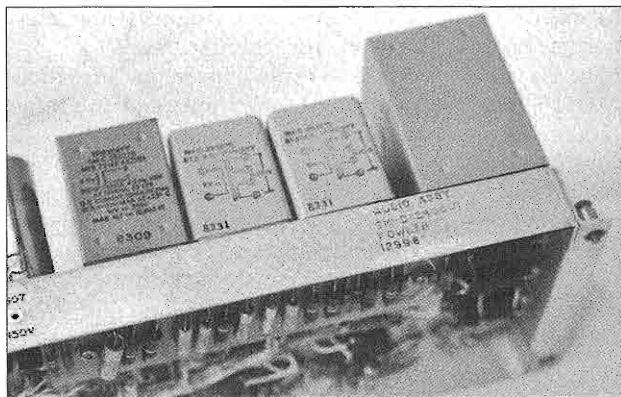


Figure 8: One side of the audio subchassis. Please note the Fowler marking stamped on the chassis and the 1983 date codes on all of the transformers.

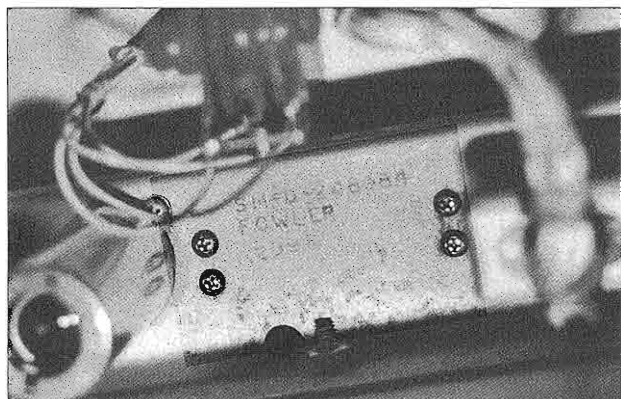


Figure 9: The "Fowler" marking is also stamped on the power supply subchassis, show in this photo.

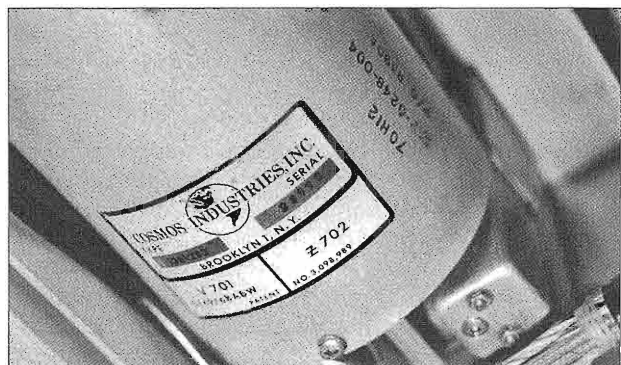


Figure 10: A close-up view of the Cosmos PTO that was installed in the Fowler R-390A.

chassis shows its correct part number (in the form "SM-X-NNNNNN") and a Fowler signature, but the only number that is common to all of them is that repeated "12996", and it seems not to be either a serial number or a date-code at all.

About the performances of this unit, I can say that it works very well, just like all the other R-390As in my collection, and also that I am very satisfied with this new radio. Thanks to the very accurate final alignment that Rick carried out, I can say for sure that all the performance figures are well in excess of the original Collins/U.S. Army specifications.

Just a minor malfunction in the break-in circuit of this R-390A has to be emphasized here. The audio output is not muted by putting the break-in switch to "on" unless the function switch is set to "cal" (or "stand-by"). When Rick first discovered this malfunction, he pointed out to me that it was due not to a component failure or a broken connection, but to a bad spot in the original wiring. I asked him not to make any repair or modification and to leave all the wiring just as he found it.

I have had no time for further investigation yet, but I presume that, as both the break-in relay, K601, and the antenna relay, K101, (oh, I forgot to

specify that K101 is a "Amphenol" item in this radio) seem to be properly working, the "bad wire spot" could be placed at J619, the male socket, or at P119, the female plug, or, most likely, at the K601 lugs directly (erroneous connection of both the wires from the AF cathode follower V601B and from the "function" switch to pin 5, please see the R-390A schematic diagram).

I'll have a closer look at those connections as soon as possible. But, wherever that bad spot is, it is very interesting to have found one just in a Fowler R-390A (could that detail be common to any of the other units?).

This R-390A, just like all the other Fowler units that have survived but the "No. 2", was found in the St. Julien's Creek piles, and thanks to the great work that Rick Mish did on this radio, it went to an almost excellent condition and, apart from some minor details, it is very good also in appearance (as shown in the pictures). Nobody could imagine that such a unit comes from "the great radio massacre!"<sup>13</sup>.

I was also told that just this unit was once employed aboard the LSD-44 "Gunston Hall" U.S. Navy ship (but I cannot be certain of anything except that it came from one of the LSD ships of the Whidbey Island Class built by Avondale).

Something about the price I had to pay for it? I got this radio at a substantial discount off of the \$ 35,000-\$38,000 it cost the U.S. Navy!

### **Differences from Other Fowler R-390As**

As I have never seen any Fowler unit other than mine, the differences listed below are the ones of which I was told of by my friends Les Locklear and Tom Marcotte after they had a close look at all the pictures I sent them. It is obvious that just after I received my unit I contacted them both immediately, in order to share any useful information on Fowler R-390As; hence in the past week there had

been a frequent exchange of e-mail messages over the Atlantic ocean.

As far as I know, the main differences among my Fowler unit and the other ones that have survived are:

1) In the other units all the modules have black and silver mylar decals with their name, contract number and the serial number on them;

2) The rear panels of all the other units don't have the "AN-Cannon" sub panel and the old-fashioned tool holder; all of them have a Fowler ID (stamped or silk-screened) however;

3) The Veeder-Root cover/dial window in the other three units looks a bit different from the usual one (Tom Marcotte reported me that Fowler Industries had to hand-make that counter dial cover).

About the rest, it seems that only the "No. 2" has its original nomenclature tag on the front panel, the tags were missing in the "No. 1" and in the "No. 3" (as they both came from St. Julien's Creek).

Furthermore, I am certain that the pots on the IF deck of the Fowler "No. 2" were made in Mexico (this is quite unusual for a US military radio!), don't know where the pots of the "No.1", "No. 3," and of my unit came from.

And, there is also something that is worth speaking of now; it's only a small but very important detail: that typo "SYWC" on the rear panel (see **Figure 4**) appears in the Fowler "No. 2" too. Hence, most likely Fowler Industries really made use of some refurbished parts in their new units! I don't know whether this detail is also common to "No. 1" and "No. 3" units, a closer look at their rear panels could be very interesting anyway.

A short consideration on making use of refurbished parts by Fowler Industries: as it seems they were compelled to do it that way due to the difficulty of obtaining brand new parts (some counter dial covers, some front panels, and what else?), why didn't they apply to a source of surplus parts in that circumstance?

Instead of hand-making an unusual-shaped counter cover and/or other parts, it could have been sufficient for them to make a visit (or, more simply, to give a call) to Mr. Sellati at Fair Radio, and Fowler could have obtained as many as original parts as they needed for refurbishing.

Coming back again to the differences among the units, in my opinion the date-codes that can be read on some components and parts are not meaningful enough: minor components can have been mixed or replaced, and most likely major discrete parts (like transformers, relays, etc.) carry the same date-codes in all the five units. Maybe I'm wrong, but I think it is highly improbable that Fowler Industries could have ordered the special parts they needed... one part at a time (also keeping in mind that only five pieces is not an industrial quantity, and for sure it was not easy for them to obtain).

#### A Hamletic Question

And now, a Hamletic question: "to be or not..." oh, sorry: "which number this Fowler is?"

In order to try giving a credible reply (to the latter question!) we have to start from the following considerations:

- Only five R-390A's were produced by Fowler industries under one only 1984 contract and there were no other or further contracts with them;
- It seems that no prototypes were made by Fowler;
- This is a legitimate Fowler unit;
- All the other three known units have the "black and silver mylar decals" on each subchassis, this unit doesn't have;
- In addition, the above quoted labels clearly identify the three known units as "No. 1", "No. 2" and "No. 3;"
- The man at Fowler talked to Tom Marcotte about two "production runs;"
- The "black and silver decals" and other minor details seem to point out that all the three above quoted units belong to the same "production run."

So, there are two possibilities only:

1) Fowler Industries made use of two different numerations for each production run, and this is the real "No.1" (or "No.2"). In such a case, the three already known Fowler R-390As are the third, fourth and fifth units they produced. This is the opinion of Rick Mish, who insists on this being the first R-390A produced by Fowler, the true "S/N 1." In consequence, he thinks that Fowler numbers 4 and 5 never did exist.

Also, Tom Marcotte wrote me in the early period of our correspondence regarding this subject: "*This is possibly the first one Fowler did before they figured out how to do proper markings.*"

2) There was only one progressive Fowler numeration, and it was common to the two production runs (and to all units). This is the final opinion of both Les Locklear and Tom Marcotte, who seem to be almost sure that the Fowler serial numbers ran 1 through 5.

So, if it is true, my unit should be the Fowler "No. 4" or the "No. 5." On this subject. Les Locklear let me know his thought recently: "*Seems you probably have serial number 5.*" So, possibly they were Mylar decals out of stock or a different and later way of marking modules?

I guess further investigation is needed in order to better identify this unit, anyway I'm sure that with the help and the cooperation of everyone who is concerned or interested in the R-390A history and of the current owners of the other Fowlers, we'll be able to take (sooner or later) a step forward into the knowledge of these radios.

For now, my answer to the Hamletic question is: "who knows," hence the heading of this paper.

#### Conclusion and Acknowledgments

I can't be sure about the correct serial number of my unit yet, but whichever it is I am very happy for the survival of a further one of the Fowlers. I hope it has found a good home with me and I am

very proud to own one of the last R-390As ever made.

I wish to thank my friend Rick Mish for his patience with me and for his great work on the radio. I wish to thank also my friends Les Locklear and Tom Marcotte for their very valuable support and assistance; I wouldn't be able to write this article without their help.

And many special thanks also to Ray (NØDMS, the Ed); he encouraged me to write this paper for the magazine and I'm sure he had a lot of trouble in revising my poor English. [Paolo, your English is far better than my Italian!—Ed]

The only purpose of this article is to share information with ER readers; I hope to have succeeded, and I apologize for any unwanted inaccuracy or omission. I also apologize to the owners of the other three Fowler units for not having quoted their names in this article; I don't know if any of them prefers not to be publicly known.

Any contribution for a better knowledge about Fowler R-390A production and/or on the Fowler units is very welcome and will be greatly appreciated. Keep those filaments lit!

#### References

1: Les Locklear, "The R-390A Receiver", ER #71/March 1995, pages 3-5; "R-390A Contract/Order - An Update", HSN #35/Spring 1995, page 5; "R-390A Contract/Order - Update Number 2", ER #72/April 1995, pages 18 & 35; "R-390A Contract/Order - Update No. 3, ER #75/July 1995, pages 10-11. Tom Marcotte & Les Locklear, "R-390A Mainframe and Module Contract Number Update", ER #163/Dec. 2002, pages 42 & 43.

2: "Cost Reduction Program For Radio Receivers, R-390/391[ ]/URR - Final Progress Report", A publication of The Research and Development Laboratories, Collins Radio Company, Cedar Rapids, IA. (about 1955, copies available on the Internet).

3: see the complete list in the above quoted papers by Les and Tom.

4: I take this opportunity for pointing out

that the correct brand name of the cosmetic maker is "Helena-Rubinstein" (not "Rubenstein" as often reported). Thanks to my wife for this useful info!

5: Les Locklear, "R-390A Contract/Order - Update Number 2", ER #72/April 1995, photo on page 8 (in the bottom).

6: Thomas Marcotte, N5OFF, 210 Clem Dr., Lafayette, LA 70503

[courir26@yahoo.com](mailto:courir26@yahoo.com)

7: Les Locklear: 1122 36th St., Gulfport, MS 39501-7116

[leslocklear@cableone.net](mailto:leslocklear@cableone.net)

8: Rick Mish, 36 E. Manhattan Blvd., Toledo, OH 43608

[radiomon@accesstoledo.com](http://radiomon@accesstoledo.com)

Phone: 419 255-6220 (9 AM to 9 PM Eastern Time). Miltronix website: <http://www.dxing.com/r390/mish.htm>

9: Please notice this is a report taken from a mailing list dated 1998, Rick has rebuilt two more Fowlers since then.

10: The correct number of the only (and unique) 1984 contract is: N00024-84-C-2027. I must specify it, as unfortunately the number was badly reported (due to some typos) both in ER #163, page 42 and also in the very interesting Chuck Rippel's website at <http://www.r390a.com/>.

11: Look at the explanation of the photo on ER #163/Dec. 2002, page 43 (top).

12: A very interesting and updated (but unofficial) version of this manual, called "The 21st Century R-390A/URR Technical Reference" has been provided by Al Tirevold (WAØHQQ) and the most current copy of the document is available for downloading at <http://www.r-390a.net/y2k-r2/index.htm>.

13: Look at the pictures of St. Julien's Creek R-390A piles in a special page ("The Great Radio Massacre") of the above quoted Chuck Rippel's website at <http://www.r390a.com/>.

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**Boatanchors CW Group:** QNI "CQ BA or CQ GB" 3546.5, 7050, 7147, 10120, 14050 kc. Check 80M winter nights, 40 summer nights, 20 and 30 meters day. Informal nightly net about 0200-0400Z.

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**Collins Collectors Association (CCA) Nets:** Tech./swap sessions every Sun. on 14.263 Mc @ 2000Z. Informal ragchew nets meet Tue. evening on 3805 kc @ 2100 Eastern time, and Thu. on 3875 kc. West Coast 75M net is on 3895 kc 2000 Pacific time. 10M AM net starts 1800Z on 29.05 Mc Sundays, QSX op 1700Z. CCA Monthly AM Night: First Wed. of each month, 3880 kc starting @ 2000 CST, or 0200 UTC. All AM stations are welcome.

**Drake Technical Net:** Meets Sun. on 7238 kc, 2000Z. Hosted by John (KB9AT), Jeff (WA8SAJ), and Mark (WBØIQK).

**Drake Users Net:** Check 3865 kc, Tue. nights @ 8 PM ET. QSX Gary (KG4D), Don (W8NS), and Dan (WA4SDE)

**DX-60 Net:** Meets on 3880 Kc @ 0800 AM, ET on Sun. QSX op is Mike (N8ECR), with alternates. The net is all about classic entry-level AM rigs like the Heath DX-60.

**Eastern AM Swap Net:** Thu. evenings on 3885 kc @ 7:30 PM ET. Net is for exchange of AM related equipment only.

**Eastcoast Military Net:** Sat. mornings, 3885 kc +/- QRM. QSX op W3PWW, Ted. It isn't necessary to check in with military gear, but that is what this net is all about.

**Fort Wayne Area 6-Meter AM net:** Meets nightly @ 7 PM ET on 50.58 Mc. Another long-time net, meeting since the late '50s. Most members use vintage or homebrew gear.

**Gulf Coast Mullet Society:** Thu. @ 9PM CT, 3885 kc, QSX control op W4GCN in Pensacola.

**Gray Hair Net:** One of the oldest nets, @44+ years, 160 meter AM Tue. evening 1945 kc @8:00 PM EST and 8:30 EDT. Also check [www.hamelectronics.com/ghn](http://www.hamelectronics.com/ghn)

**Heathkit Net:** Sun. on 14.293 Mc 2030Z right after the Vintage SSB net. QSX op W6LRG, Don.

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**K6HQI Memorial 20 Meter Net:** Flagship AM net 14.286 Mc daily for 25+ years. Check 5:00 PM Pacific Time.

**Lake Erie Boatanchor CW Net:** Sat. mornings, 7143 kc, 10:00 Eastern time. QSX op Steve (WA3JTT) or Ron (W8KYD).

**Midwest Classic Radio Net:** Sat. morning 3885 kc @ 7:30 AM, CT. Only AM checkins. Swap/sale, hamfest info, tech. help are frequent topics. QSX op is Rob (WA9ZTY).

**Mighty Elmac Net:** Wed. nights @8PM ET (not the first Wed., reserved for CCA AM Net), 3880 +5 kc. Closes for a few summer months QSX op is N8ECR

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**Swan Nets:** User's Group Sun. @4PM CT, 14.250 Mc. QSX op Dean (WA9AZK). Technical Net is Sat, 7235 kc, 1900Z. QSX op is Stu (K4BOV)

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**Vintage SSB Net:** Sun. 1900Z-2000Z 14.293 & 0300Z Wed. QSX op Lynn (K5LYN) and Andy (WBØSNF)

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**FOR SALE:** NC303 (no spkr) - looks great, pwr supply and alignment needed. \$300. DX100B - looks great, works on 80 mtrs only, w/D104 mic. \$200. DX100 - a little beat up, doesn't work. \$50. G-76 (2 each, with one pwr supply) - needs work. \$100. TV-7B/U - good condition. \$100. Heathkit G8 Signal Generator - looks great, doesn't work. Free Take all for \$650 cash or check. Pick up only. Tom Long, W3ONE, 5308 Manorfield Rd. Rockville, MD 20853 301- 460-9299 [tlongsr@JUNO.com](mailto:tlongsr@JUNO.com)

**FOR SALE:** Millen grid dip meters, exc. in wood case, manual, like new, \$75. Navy surplus tube sockets for 4-1000A, with air ducts, choke coils, \$35 ea. 2 piece Navy speech scrambler \$200. ARC-11A light aircraft transmitter, 118-135 Mc, new, \$200. Mil spec infared metascope Polan F41 in metal case with manual \$200. Harry Gartsman, [W6ATC@aol.com](mailto:W6ATC@aol.com), 310-276-5934

**FOR SALE:** Tektronix service note copy: Troubleshooting Two-Way Radios w/ spectrum analyzer. 28 pages, \$25. Ross Wollrab, 229 N. Oakcrest Ave, Decatur, IL, 62522. 217-428-7385. [rewollrab@aol.com](mailto:rewollrab@aol.com)

**FOR SALE:** Telephone Filters, suppress >1MHz interference, plug in, 1/\$7, 2/\$11, 3/\$14, 4/\$16.75, shipped U.S. Brian Harris WA5UEK 3521 Teakwood Lane, Plano TX 75075 [brian.k.harris@philips.com](mailto:brian.k.harris@philips.com) 214-763-5977

**FOR SALE:** Johnson: BIG neutralizing capacitor, 159-750-3, NOS \$40; variable capacitor, 250E30, NIB, \$30. Richard Prester, 131 Ridge Road, West Milford, NJ 07480. 973-728-2454. [rprester@warwick.net](mailto:rprester@warwick.net)

**FOR SALE:** Military whip antennas, radio receiving set AN/GRR5 \$150. Bruce Beckeney, 5472 Timberway, Presque Isle, MI 49777, 989-595-6483

**FOR SALE:** Hallicrafters SX-71 \$175. S40A \$125. S77A \$125. S40 \$100. S40B \$175. S20R Sky Champion \$225. Hammarlund HQ-150 \$175. HQ-100 \$125. HQ-215 \$275. HQ-129X \$325. Heath SB-303 \$150. National NC-300 \$260. Knight R-55 \$75. Atlas RX110 \$150. Eldico SSB-100MIL \$200. Tracor 599K as new (no printed circuit boards) \$125. Fluke 207-1 VLF rec (for parts) \$175. Mosley CM-1 \$225. B&W 5100B \$300. 51SB-13 \$95. Drake 2A \$185. 2B \$220 2C \$185 R4 \$225. Atlas 210X \$250. Collins 651S-1 \$995, Collins 75A-4 \$875, Collins 32V transmitter \$600. Bill, KD4AF, 336-699-8699

**FOR SALE OR TRADE:** Complete QST 1915 to now, \$6000, price and shipping negotiable. K8CCV, 330-427-2303

**FOR SALE:** Naval Receivers RAK, RAL, RAO, RBA, RBB, RBC, RBL, RBM. Some checked, pwr splys available. \$75-\$450 depending on condx. Many other types. Carl Bloom, [carl.bloom@prodigy.net](mailto:carl.bloom@prodigy.net) 714-639-1679

**FOR SALE:** QSTs from 1930s into 1980s, SASE for contents pages. State subjects, months, years. One dollar up plus postage. Charles Graham, W1HFI, 4 Fieldwood Dr, Bedfore Hills, NY 10507 914-666-4253

**QSLs FOR SALE:** Your old QSL card? Search by call free, buy find at \$3.50 ppd. Chuck, NZ5M, [NZ5M@arri.net](mailto:NZ5M@arri.net)

**FOR SALE:** DRAKE TR-7/TR-7A/R-7/R-7A Service kit. Includes 13 Extender Boards and Digital Jumper Card. \$63.85 includes postage. See <http://pweb.amerion.com/~w7avk>, Bob, W7AVK, 807 Westshore J28, Moses Lake, WA 98837, [w7avk@arri.net](mailto:w7avk@arri.net), 509-766-7277.

**SERVICE FOR SALE:** Let's get that old radio of yours working again! Antique Radio Repair - All Makes- Also Transistor Radio Repair. <http://tomsradiorepair.bizland.com> Tom Senne, N5KCL 937-865-5213

## Announcing the Felton Electronic Services R390F High Performance HF Receiver

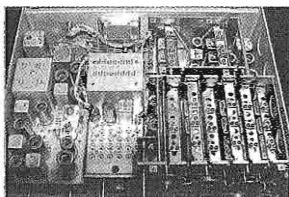
The Felton Update Engineered R390A comes with speaker, antenna, lab quality alignment and service, plus full guarantees. All the upgrades are hand wired with parts like original and include the following excellent upgrades:

**Audio:** 2 watts hi-fi audio, low-distortion Class A stages with all low-level stages reworked for lowest distortion and noise. Three new audio filters are front-panel selectable: 4 kc LP, voice only 170-3200 cps, or CW at 250 cps BW.

**Enhanced Sensitivity and Large Signal Handling:** This includes installation of a new 6BZ6 RF amplifier and a linear diode detector. Minimum discernable signal is at least -145 dbm.

**All-New AGC System:** No overshoot, pumping or distortion. Many advanced feaures, characteristics are optimized for AM and CW-SSB. Line audio channel reworked to drive your low-impedance headphones through a stereo panel-mounted headphone jack. Hand-selected Eminence loudspeaker for precisely defined music and voice.

The KDØZS R390A answers that nagging question in the back of your mind as you look through the ever larger and more glossy advertisements: "Are these things for real?"



For full details and pricing of this once-a-lifetime opportunity call Chuck Felton (KDØZS) at 307-634-5858, or e-mail at: [Feltondesign@yahoo.com](mailto:Feltondesign@yahoo.com) web: [FeltonDesign.com](http://FeltonDesign.com)

# Vintage Radio Auction

April 2006

The Collection of Dexter T. Deeley

at the Expo Auction Center in Burbank, Ohio

Estes Auctions is pleased to be selected to offer the vast collection of Dexter T. Deeley of Lake Lure, North Carolina. As a collector Dexter spent 50 years in the hobby. His first radio and the one that led to collecting all those years, was a Crosley Pup with the original box which he still had and it will be sold in this auction. Dexter was a very active member of the AWA while residing in New York. He joined the AWA in 1963 and became treasurer in 1968. He served 30 years at that position. He was the type of radio collector that would take time to help anyone who was just getting started in this great hobby. With his retirement and moving to North Carolina Dexter felt it was time to let others enjoy his collection. Among the offerings are a Grebe CR-3, CR-5, CR-6, CR-8, CR-9, CR-12, CR-13, CR-14, Grebe Clarifier, Grebe RORN, Grebe CR-18 with coils, Grebe RORD, Grebe RORH, Grebe RKAB, Grebe RORK, Grebe RORJ, Grebe Synchrophase 7, Zenith 3R, Zenith 4R, Zenith 2M, Magnavox AC-2 amp, Amrad 2634-3475, Western Electric 4D, 2B tuning unit and 7A amplifier, Western Electric loop antenna, Kennedy Type 311 portable, Kennedy 220, Kennedy 525 amp, Kennedy Model 15, Kennedy Model 5, Kennedy Model 20 Type 440, Kennedy 35 Type 445, Kennedy 281, Kennedy 521 amp, Kennedy T-3, Kennedy 110, Federal 61, Federal 58, Federal Jr. crystal set, Federal 57, Federal 110, Federal 102, Federal Pleiophone, Tuska 225, Tuska 228, Tuskadyne, Tuska Superdyne Jr., Clapp-Eastham HR, Type HZ amp, GE ER-753 crystal set, GE ER-753A, Radiola Special, Radiola 6, Radiola VII, Radiola VIIB, Radiola Super VIII, Radiola Regenoflex, Radiola V, Radiola VI, Radiola 28, Radiola Grand, Radiola X, Radiola IV, Radiola III, IIIA, Radiola 24, Radiola Sr., Radiola Type RS, DeForest interpanel set, DeForest D-10 w/loop, Adams Morgan RA-10, Adams Morgan DA-2 amp, Radiola II, crystal sets DeForest DT600, AW Gamage, Radiola Bijou, Gecophone, Meago MR-101, RDO R-100A, Kilbourne & Clark, Giblin, Marvel, A.C. Gilbert and others. Crosley Type 50, 50A, 51, Type 5, 6, 52, 52SD, 51SD, Type XJ, Trirdyn 3R3, 51 portable, Super Trirdyn, Wireless Specialty 501, many horn speakers, loop antennas and **AMATEUR RADIO RECEIVERS** Breting 12, Hammarlund HQ-120, National NC-183D, National NC-300, converter & speaker for NC-300, National HRO-60 w/coils, National SW-3, RME-69, Hallicrafters HT-33 amp, HT-32 xmtr, SX-100 receiver, Hammarlund Comet Pro, Central Electronics - 100V, National HRO-500 new w/box, Heathkit DX-60, 10B, HR-10, HG-10 VFO, Knight P-55 receiver, Lafayette KT-200, Globe King 500. Also many other radios, early meters and tube testers. We will update the sale as time passes so watch *Antique Radio Classified*.

Richard Estes, K8LRY - Auctioneer

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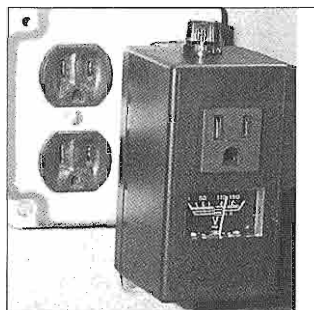
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Inrush Current Limiters are now available from the Electric Radio Store or on-line! These inrush limiters were reviewed in the September 2004 issue of Electric Radio and are available in three versions:

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**with meter** ..... \$39.95  
**Model AB-1 (With Pilot Light)** ..... \$29.95  
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 (4 or more limiters are shipped free for US orders. Overseas customers please ask for shipping quotes.)



Model AB1-M

**Electric Radio Store**  
 720-924-0171

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**ALPHA AMP PARTS FOR SALE:** 8877's, chassis, meters, pwr xfr, and more. Bob, WØYVA. Call 703-450-7049 or email; robert@isquare.com

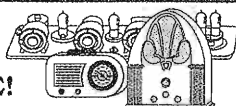
**FOR SALE/TRADE:** Original manuals: Heathkit, National, Hallicrafters, Swan, Hammarlund, Drake, EICO, Collins, WRL, Sams, NI4Q, POB 690098, Orlando FL 32869, 407-351-5536, ni4q@juno.com

**FOR SALE/TRADE:** Transmitting/Receiving tubes, new and used. LSASE or email for list. **WANTED:** Taylor 204A, 211, TR40M and Eimac 500T. John H. Walker Jr., 13406 W. 128th Terr., Overland Park, KS. 66213. PH: 913-782-6455, Email: jwalker83@kc.rr.com

**FOR SALE:** FT243 CRYSTALS: 3500, 3505, 3515, 3520, 3546, 3548, 3558, 3645, 3686, 3702, 3805, 3825, 3830, 3837, 3855, 3875, 3880, 3885, 3890, 3983, 5355, 5360, 7000, 7025, 7030, 7035, 7037, 7040, 7044, 7045, 7047, 7050, 7060, 7125, 7146, 8025, 8400, 10106, 10116, 10120, 12500, 14060, 14286kHz. See: <http://www.af4k.com/crystals.htm> or call Brian, AF4K, at 407-323-4178

**HALLICRAFTERS SERVICE MANUALS:** Ham, SWL, CB, Consumer, Military. Need your model number. Write or email. Ardco Electronics, PO Box 24, Palos Park IL, 60464, WA9GOB@aol.com, 708-361-9012 [www.Ardcoelectronics.com](http://www.Ardcoelectronics.com)

**NOTICE:** Visit [Radioing.com](http://www.radioing.com), dedicated to traditional ham radio & vintage radio resources. Let's Radio! Charlie, W5AM. <http://www.radioing.com>.



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**DRAKE INFO FOR SALE:** Drake C-Line Service Information. Hi-Res Color photos of boards and chassis with parts identified. CD also includes Hi-Res scans of R-4C and T-4XC manuals, various version schematics and more. Gary Barrell, [K4OAH@mindspring.com](mailto:K4OAH@mindspring.com), 4126 Howell Ferry Rd, Duluth, GA 30096. 404-641-2717

**HALLICRAFTERS PARTS:** Hallicrafters SX101/101A reproduction main tuning knob. Includes silver inlay and set screws. \$35.00 Mike Langston KL7CD, 1933 Diamond Ridge Drive, Carrollton, Texas 75010, [milangston@hcpriceco.com](mailto:milangston@hcpriceco.com) 972-392-5336

**JOHNSON PARTS:** EFJ replacement parts: Valiant tie bolts-4 for \$18.50. Ranger tie bolts-3 for \$17. 80-2CM mic connector (also for Heath/Collins/others) \$10 All ppd. Contact Cal Eustaquio, N6KYR/8, 823 W. Shiawasee St, Lansing, MI 48915, [catman351@yahoo.com](mailto:catman351@yahoo.com)

**DRAKE SERVICE FOR SALE:** R.L. Drake repair and reconditioning, most models including TR-7's, 35 years experience. Jeff Covelli, WA8SAJ, 440-951-6406 AFTER 4 PM, [wa8saj@ncweb.com](mailto:wa8saj@ncweb.com)

**FOR SALE:** QRP transmitter kits. Tube crystal oscillators, 5W \$15, 1W \$10. Power transformer add \$15. All postpaid USA. Robert Larson, 1325 Ridgeway, Medford, OR 97504 [W7LNG@arrl.net](mailto:W7LNG@arrl.net)

**SERVICE FOR SALE:** Repair, upgrade, performance modification of tube comm.


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**FOR SALE:** Obsolete Triplet parts. Send part number and description for possible quote. USA only. Also several tons of transformers, switches, other material that's Triplet surplus. Bigelow Electronics, POB 125, Bluffton, OH 45817-0125

**BOOKS FOR SALE:** Lots of old radio & related books. Please contact Eugene Rippen, WB6SZS, [www.muchstuff.com](http://www.muchstuff.com)

**SERVICE FOR SALE:** Authorized repairs and sales of all types of amateur radio, communications, and test equipment. Please call Land Air Communications, 718-847-3090, visit our web site: [www.landaircom.com](http://www.landaircom.com). We have over 3,000 items in inventory and carry all types of communications parts.



The Astatic T-3 microphone  
Contributed by Richard Lusk, K4EJ

January 2006  
Monthly Planner

SUN	MON	TUE	WED	THUR	FRI	SAT
1 New Year's Day	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16 Martin Luther King, Jr.	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Sun 000  
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The 2006 Electric Radio wall calendar is now available from the ER Bookstore. 12 full color photos of vintage equipment and shacks! \$11.95 postpaid! See p. 63 for order information.

**TUBES FOR SALE:** Tested good globe 201A and 226 \$14, 227 \$10 and others. Slightly weak 226, 227, 245, 280 guaranteed to work in early radios ½ regular price. Write or e-mail: [tubes@qwest.net](mailto:tubes@qwest.net) for a new price list or see [www.fathauer.com](http://www.fathauer.com). George H. Fathauer & Assoc., 123 N. Centennial Way, Ste. 105, Mesa, AZ 85201. 480-968-7686 or toll free 877-307-1414

**SERVICE FOR SALE:** Vintage Radio Service. We repair radios, record changers, radios home, auto, tube & transistors. 1930-1980. Ken Hubbard, KA9WRN, POB 792, Beloit, WI 53512. 608-362-1896

**BOOKS FOR SALE:** Radio books, magazines, catalogs, manuals (copies), radios, hi-fi, parts. Send 2 stamp, LSASE. David Crowell, KA1EDP, 40 Briarwood Rd., North Scituate, RI 02857. [ka1edp@juno.com](mailto:ka1edp@juno.com)

**SERVICE FOR SALE:** Repair, Restore, Sales of antique, vintage tube radios. John Hartman, NM1H, [www.radioattic.com/nm1h](http://www.radioattic.com/nm1h)

**JOHNSON PARTS:** New Ranger 1, Valiant 1, & Navigator plastic dials, freq numbers in green, with all the holes just like orig.-\$17.50 ppd. Bruce Kryder, W4LWW, 277 Mallory Station Dr., Ste. 109, Franklin, TN 37067. [b.kpvt@provisiontools.com](mailto:b.kpvt@provisiontools.com)

**FOR SALE:** 160m FT243 CRYSTALS: 1885, 1900, 1915, 1925, 1930, 1945, 1970, 1977, 1985 kHz. See: <http://www.af4k.com/crystals.htm> or call Brian, AF4K, at 407-323-4178

**ACCESSORIES FOR SALE:** KWM2/S-line metal logo pins. Meatball or winged. Excellent replica of the original. Put one on your hat, badge, or replace a missing logo on your panel, \$6.25 shipped. W6ZZ, 1362 Via Rancho Pkwy, Escondido, CA 92029. 760-747-8710, [w6zz@cox.net](mailto:w6zz@cox.net)

**BOOK FOR SALE:** Heath Nostalgia, 124 page book contains history, pictures, many stories by longtime Heath employees. (See ER Bookstore) Terry Perdue, 18617 65th Ct., NE, Kenmore, WA 98028



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**FOR SALE:** Tubes for sale at my eBay store: RadioWorld-OnLine. Carl Blomstran P.O. Box 890473, Houston, Texas 77289, 281-660-4571.

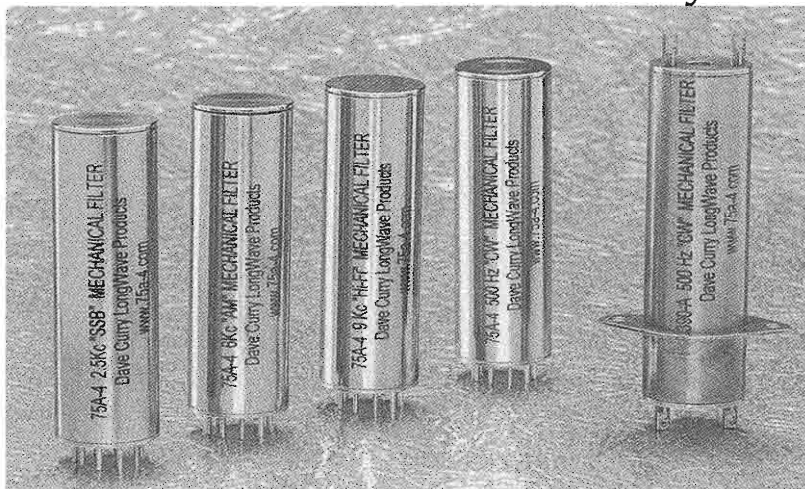
**ACCESSORIES FOR SALE:** Spun Aluminum Knob Inlays for most Boatanchors. Collins Dial Drum Overlays. Dakaware Knobs. Charlie Talbott, 13192 Pinnacle Lane, Leesburg VA 20176-6146. 540-822-5643, [k3ich@arrl.net](mailto:k3ich@arrl.net)

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**PARTS FOR SALE:** Parts, tubes, books, ECT. Send two stamp SASE or email [letourneau@wiktel.com](mailto:letourneau@wiktel.com) for list. Wayne LeTourneau, POB 62, Wannaska, MN 56761

**WANTED:** Holtzer-Cabot AN/PSM-2-A Megger in good condition, Mike, VE7MMH, at [mike46@shaw.ca](mailto:mike46@shaw.ca)

## The Collins Filter Family



By Application, Left to Right:

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75A-4 6Kc

75A-4 9Kc

75A-4 .5Kc

R-390A .5Kc

by Dave Curry Longwave Products

These are exact duplicates of the original filters using the latest, modern design Collins mechanical filters. The electrical specifications exceed the original Collins design.

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**ACCESSORY FOR SALE:** RIT for Collins KWM-2/2A; No modifications needed. \$79.95 SASE for details. John Webb, W1ETC, Box 747, Amherst NH 03031 [w1etc@adelphia.net](mailto:w1etc@adelphia.net)

**PARTS FOR SALE:** Aluminum heat dissipating plate and grid connectors for all 3, 4 and T series Eimac tubes including 3-500Z, 4-1000, 304T's and others. Alan Price, [fixer7526@wmconnect.com](mailto:fixer7526@wmconnect.com)

**SERVICE FOR SALE:** I build hot-rod receivers: R-390A, SP-600, R-388/51J. NC-183D and transmitters: Valiant, DX-100, T-4X-A-B, HT-32, AF-67. 51J-4 filter replacements, R390A Hi-fi AM \$245.00 ea. Chuck Felton, KDØZS, Wyoming, 307-634-5858, [feltondesign@yahoo.com](mailto:feltondesign@yahoo.com)

**WANTED:** Dust cover for Hammarlund Super Pro receiver and power supply. Bill Coolahan, 1450 Miami Drive NE, Cedar Rapids, IA 52402. 1-319-393-8075

**WANTED:** Miller coils: 4407 (2), 4408, 4409 (2), 4411 (2), 6314, 6313, 6319. State price. K1MBI, 21 Freestone Ave, Portland CT, 06480

**WANTED:** Lafayette HE-25 transmitter. Thomas L. Nickle, W8AI, [h19xx@yahoo.com](mailto:h19xx@yahoo.com) or 713-502-7799 weekends.

**WANTED:** NC-303. Also crystal calibrator and speaker. Bob, WØYVA, [robert@isquare.com](mailto:robert@isquare.com). 703-450-7049, Virginia.

**WANTED:** Anything by DAVID GRIMES: radios, especially model 3XP, and advertising, ephemera, literature, references, parts; please contact: Mike Grimes, K5MLG; 5306 Creekside Ct.; Plano, Texas, 75094, 972-384-1133, [grimesm@flash.net](mailto:grimesm@flash.net)

**WANTED:** 2nd IF transformer from National NC-44 receiver. Joe, W5JDY, 405-321-4717, [w5jdy@cox.net](mailto:w5jdy@cox.net)

**WANTED:** Radio magazine, November 1939 and all after March 1942. Bill, [w6fa@caltech.edu](mailto:w6fa@caltech.edu) or 626-836-2065.

**WANTED:** For TCS transmitter and receiver setup: Dynamotor power supply and one connector or complete cable from supply to speaker/control. Also need a 4 volt vibrator for TBY radio power supply. Ken Kolthoff, K8AXH, POB 215, Craig, MO 64437. Work #913-577-8422.

**WANTED:** Clean Hallicrafters SX-101A, R-48 speaker, Viking Ranger. Al Johnson, K1IK, POB 77, West Dover, VT 05356. 802-464-2571

**WANTED:** The output voltmeter from a HP-606A, B RF sig gen. Cash or trade. John Gibson, [gibsonj@mindspring.com](mailto:gibsonj@mindspring.com) 510-849-1051

**WANTED:** Hallicrafters SX100 tuning slugs, P/N 77A068, or will buy junker with coils. Robert Luther, KG4LOQ, 2115 Buckingham Drive, Huntsville, AL 35803, [RNLuther@hiwaay.net](mailto:RNLuther@hiwaay.net), 256-881-2245.

**WANTED:** Globe model UM-1 plate modulator and/or Globe model SM-1 screen modulator in good working condition. Alan W. Fremmer, KB2HEI, 550-H Grand Street, New York, NY 10002, 212-777-3630, [awfremmer@aol.com](mailto:awfremmer@aol.com)

**WANTED:** Service for my Hallicrafters transmitters. Will deliver/pickup within 4 hours drive of Savannah, GA. Bob, W4WTO, 912-663-4311. [armco1@bellsouth.net](mailto:armco1@bellsouth.net)

**WANTED:** Clean Gonset G76 with power supply/speaker and working R390A. Frank, KB0W/6, [fdellechaie@sbcglobal.net](mailto:fdellechaie@sbcglobal.net), 916-635-4442.

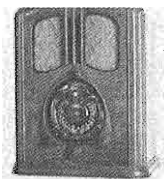
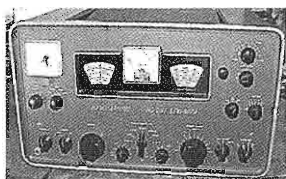
**WANTED:** National NC-183DTS speaker, NFM-83-50 adaptor and SOJ-3 Selectojet. Contact Ric at [C6ANI@arrl.net](mailto:C6ANI@arrl.net)

**WANTED:** Parts to fix up Trans-Oceanic radios. I need a plastic front panel for a H500. A cabinet would be great if you have one. Need a plastic wavemagnet cover for a 600 series. Need mounting parts for the main carrying handle for the 600. The G500, H500, and all 600 series handles will interchange. Kevin Rutsky, R.D. #1, Box 155, Pittsfield, PA 16340. 814-489-3193

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**WANTED:** SX115, HT32B, HT33B and SP600JX21A. Also cabinet for 51J4 and SX73. Ward Rehkopf, 16173 Indian Valley St., Schoolcraft, MI 49087 269-679-3435. [radiohound2@yahoo.com](mailto:radiohound2@yahoo.com)

**WANTED:** ITT-Mackay Marine 3010-C Receiver, late S/N, complete and in good or VG conditions, with original box and manual. The item has to be shipped to a friend in Ohio (not outside U.S.). Send your offer to Paolo Viappiani, Via Valle 7, 19124 La Spezia, Italy, or [pviappiani@tin.it](mailto:pviappiani@tin.it)

**WANTED:** One of my own "KN8GCC" QSLs from the mid-1950s. Tom Root, 1508 Henry Court, Flushing, MI 48433, [wb8uuuj@arrl.net](mailto:wb8uuuj@arrl.net), 810-659-5404.

**WANTED:** National NTE-30 Transmitter. Any condition, any price! I love National. Sylvia Thompson, [n1vj@hotmail.com](mailto:n1vj@hotmail.com) 33 Lawton Foster Rd., Hopkinton, RI 02833. 401-377-4912.

**WANTED:** Parts to fix up Trans-Oceanic radios. I need a plastic front panel for a H500. A cabinet would be great if you have one. Need a plastic wavemagnet cover for a 600 series. Need mounting parts for the main carrying handle for the 600. The G500, H500, and all 600 series handles will interchange. Kevin Rutsky, R.D. #1, Box 155, Pittsfield, PA 16340. 814-489-3193

**WANTED:** Navy WW2 shipboard receivers and transmitters. Need equipment, manuals and general operating information. Receivers of the type RAK, RAL, RBA, RBB, RBC, RLS etc, Transmitters of the type TBA, TBK & TBM (with modulators), TDE TBS etc. Equipment is for the restoration of Radio facilities aboard the **USS Alabama (BB-60)**, now part of the Battleship Memorial Park, Mobile, Alabama. I was a Radio Technician aboard the Alabama in WW2

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**WANTED:** Schematic and info on a USN loop ALR 25, 10kc to 30 Mc, made by Electro-Metrics, NY. [KB6BKN@Juno.com](mailto:KB6BKN@Juno.com)

**WANTED:** Meter movement for Western Electric tube tester KS-15750. Walter

Hughes, WB4FPD, 6 Academy Ct., Berryville, VA 22611 540-955-2635

**WANTED:** Tektronix **Type 570** curve tracer, any condition. Ron, AA2QQ, 718-824-6922

**WANTED:** Manual/schematic for Pearce-Simpson Marine Radio “Catalina”. JR Linden, K7PUR, PO Box 4927, Cave Creek, AZ 85327 480-502-6396, [jrlinden@usa.net](mailto:jrlinden@usa.net)

**WANTED:** CONAR Tuned Signal Tracer, mfg for National Radio Institute students. Also radio correspondence courses by National Radio Institute of Washington, DC. George Reese, 380 9th St., Tracy, MN 56175, 507-629-6091

**WANTED:** Heath SB104, SB102, SB301, SB303, HG108. Hallicrafters SR series transceiver 150-2000. BC348, T195, R392 and others. Jimmy Weaver, KB5WLB, 870-238-8328

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**WANTED:** Harvey Radio Labs Tri-Tet Exciter or FT-30 Transmitter. \$1000 reward! Robert Enemark, W1EC, PO Box 1607, Duxbury, MA 02331, 781-585-6233

**WANTED:** Any TMC Equipment or Manuals, what have you? Will buy or trade. Brent Bailey, 109 Belcourt Dr., Greenwood, S.C. 29649, 864- 227-6292 [brentw@emerald.is.com](mailto:brentw@emerald.is.com)

**WANTED:** Top prices paid for globe shape radio tubes, new or used. Send for buy list or send your list for offers. Write or e-mail: [tubes@qwest.net](mailto:tubes@qwest.net). See [www.fathauer.com](http://www.fathauer.com) or send for catalog of tubes for sale. George H. Fathauer & Assoc., 123 N. Centennial Way, Ste 105, Mesa AZ 85201. 480-968-7686, Call toll free 877-307-1414

**WANTED:** ER back issues. Please advise what you have and price. Phil Wilson, 1355 Big Otter Dr, Blue Ridge, VA 24064 [k6cra@arrl.net](mailto:k6cra@arrl.net)

**WANTED:** Manuals, manuals, and manuals for radio-related equipment to buy or swap. Catalog available. Pete Markavage, WA2CWA, 27 Walling St., Sayreville, NJ 08872. 732-238-8964

**WANTED:** Postcards of old wireless stations; QSL cards showing pre-WWII ham shacks/equip. George, W2KRM, NY, 631-360-9011, [w2krm@optonline.net](mailto:w2krm@optonline.net)

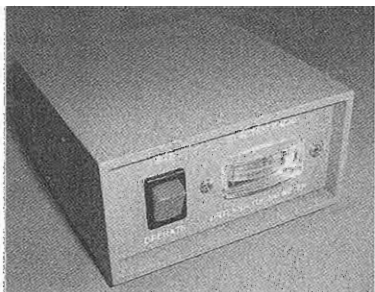
**WANTED:** Searching for RME CT-100 or 3R9 xmtrs and info about them. David Edsall, W1TDD, 156 Sunset Ave., Amherst, MA 01002. 413-549-0349, [dedsall@crocker.com](mailto:dedsall@crocker.com)

**WANTED:** WW II German, Japanese, Italian, French equipment, tubes, manuals and parts. Bob Graham, 2105 NW 30th, Oklahoma City, OK 73112. 405-525-3376, [bgfcc@aol.com](mailto:bgfcc@aol.com)

**WANTED:** Looking for a National NTX or NTE transmitter/exciter for use in my vintage hamshack. Any condition, even basket cases or parts, considered. Will pick up in New England, or arrange shipping if outside of area. Paying any reasonable price, and most unreasonable ones! Please email with details or photos, all considered and most likely bought! Thanks! Bruce, W1UJR, 207-882-9969 or [w1ujr@arrl.net](mailto:w1ujr@arrl.net)

**WANTED:** Schematic and related info on Halowatt TR5 broadcast rcvr made mid-1920s in Portland, OR. Fern Rivard, VE7GZ, PO Box 457, Cranbrook, BC V1C4H9 Canada [crc@cyberlink.bc.ca](mailto:crc@cyberlink.bc.ca)

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**WANTED:** Incarcerated ham seeks correspondence. w/others on mil (R-390's & backpacks) & tube radios. Also copies of postwar-90's surplus catalogs, backpack specs & photos. W.K. Smith, 44684-083, FCI Cumberland Unit A-1, POB 1000, Cumberland, MD 21501.

**WANTED:** Bias and filament transformer from HT33 A or B amplifier. John, W8JKS, 740-998-4518

**WANTED:** Commercial or kit-built 1930s and 40s transmitters. Doc, K7SO, 505-920-5528 or [doc@cybermesa.com](mailto:doc@cybermesa.com)

**WANTED:** Early QSL cards from my Grandfather, Hal Smith (SK). His calls were KH6KA, K6YJR, K6OQE. Gladly reimburse postage plus modest finder's fee! Phil Wilson, 1355 Big Otter Dr, Blue Ridge, VA 24064 [k6cra@arrl.net](mailto:k6cra@arrl.net)

**WANTED:** Hallicrafters SX115, SX88, Collins 75A-1, AM broadcast transmitter in New England area, Heath DX100B. Will pay good price for good equipment. [w1txjohn@aol.com](mailto:w1txjohn@aol.com), 802-775-7632 Eves.

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**WANTED:** Collins R-389 LF receivers, parts, documentation, anecdotes, antidotes. W5OR Don Reaves, PO Box 241455, Little Rock AR, 72223 501-868-1287, w5or@militaryradio.com or www.r-389.com

**WANTED:** A "junkie" No.19 Mark II. Any condition or without tubes. Ted Bracco, W0NZW, braccot@hotmail.com A.C. 717-857-6404 X306

**WANTED:** Tektronix memorabilia & promotional literature or catalogs from 1946-1980. James True, N5ARW, POB 820, Hot Springs, AR 71902. 501-318-1844, Fax 623-8783, www.boatanchor.com

**WANTED:** Collins promotional literature, catalogs and manuals for the period 1933-1993. Jim Stitzinger, WA3CEX, 23800 Via Irana, Valencia, CA 91355. 661-259-2011. FAX: 661-259-3830 [jstitz@pacbell.net](mailto:jstitz@pacbell.net)

**WANTED:** Westinghouse SSB Transmitters **MW-3** (Exciter, Amplifier, Power Supply). Also, **MW-2** (AM). Will pickup anywhere. Gary, WA4ODY, Seabrook, TX 77586, 281-291-7701 [myctpab@earthlink.net](mailto:myctpab@earthlink.net)

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**WANTED:** Hammarlund ED-4 transmitter. Any condition or information. Bob Mattson, W2AMI 16 Carly Drive Highland NY 12528. 895-691-6247

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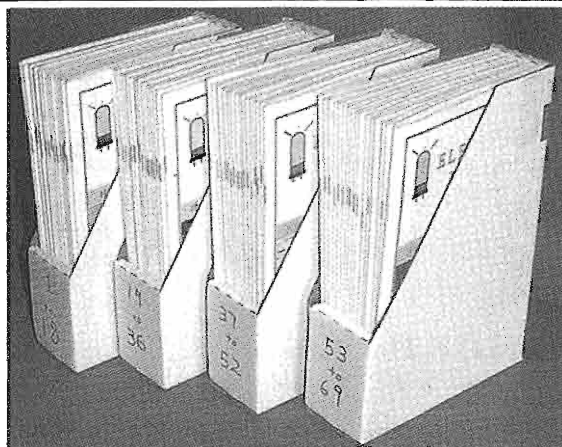
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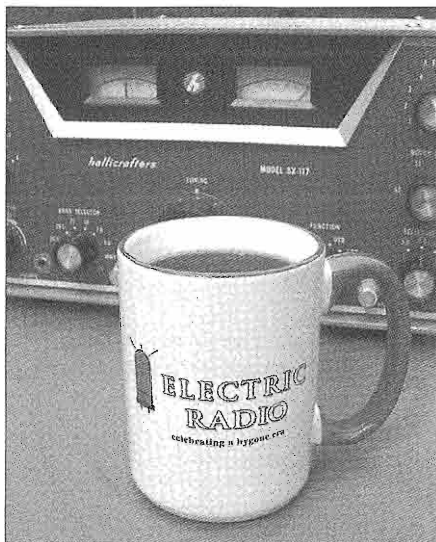
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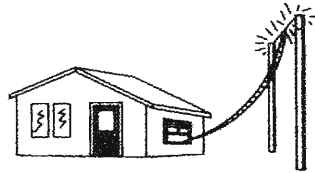


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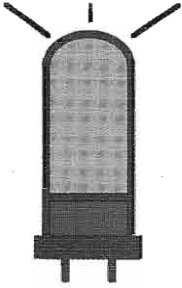
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