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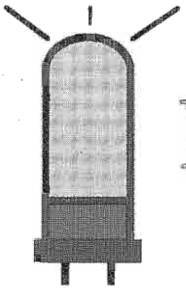

ELECTRIC RADIO

celebrating a bygone era

Merry Christmas From Electric Radio!

Number 211 December 2006

ELECTRIC RADIO

Published monthly by Symbolic Publishing Company
PO Box 242, Bailey, Colorado 80421-0242
Periodicals postage paid at Cortez, CO
Printed by Southwest Printing Inc., Cortez, CO
USPS no. 004-611
ISSN 1048-3020

Postmaster send address changes to:
Electric Radio
PO Box 242
Bailey, CO 80421-0242

Editor
Ray Osterwald, NØDMS

Editor Emeritus
Barry R. Wiseman, N6CSW

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), Gary Halverson (K6GLH), Brian Harris (WA5UEK), John Hruza (KBØOKU), Hal Guretzky (K6DPZ)

Editor's Comments

Season's Greetings

Once again, it is Christmas time and the holiday season has arrived. It seems like it's occuring faster every year! I would like to wish everyone a safe and merry Christmas, and send my sincere thanks for your support and encouragement over this past year.

Bob Grinder (K7AK) has given us special "Centennial Commeration" articles that appeared in the August, October, and in this issue, December 2006, that is published 100 years later, to the month, that Fessenden is said to have first broadcast speech and music. These three articles are intended to commemorate the 100th anniversaries of significant events in radio history. In future issues, Bob will return to his series, "Milestones in the History of Amateur Radio."

FCC Rule Change Update

Get ready for December 15, 2006! The FCC Report and Order was published in the Federal Register on November 15, and go into effect December 15. The revised band plan was published in November 2006, Electric Radio, and in other publications. This has been long awaited, and is a long-overdue change to the rules that govern radiotelephone operations for amateurs. One thing to *watch out for* is the possibility that ARRL may file a petition to "reconsider several items in the Report and Order." At this time it is unknown what this might be referring to, but I'll bet it will have something to do with how the amount of spectrum available for data transmission was reduced for Extra, Advanced, and General licencees in the 80-meter band.

2006 Heavy Metal Rally

Listen for multi-operator stations December 30, in the HMR. W5CZ, in Colorado, and several stations on the East and West Coasts are planning big operations.

73, Ray, NØDMS

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Cover: It's Christmas 1962 and some lucky ham is getting a shiny new Hammarlund HQ-180 receiver and matching speaker, a new ElectroVoice 664 microphone, and a pair of Eimac 4-400s for the new homebrew transmitter in the shack. He or she must have been *very* good! Santa has delivered the goods in plenty of time for the 2006 Electric Radio Heavy Metal Rally! (Photo composition courtesy of Gary Halverson, K6GLH)

Microphone Selection and Phasing

By Tom Marcellino, W3BYM
13806 Parkland Drive
Rockville, MD 20853
w3bym@logonbasic.com

If you have been reading my articles in ER and other magazines going back to the 1980s you know that I am a builder. Sometimes, I think I enjoy the design and building aspects of this great hobby more than operating. My projects have ranged from the not-so-complex to the complex. In fact, some are so simple that I've hesitated to publish them. On the other hand, maybe there is just one reader out there who would benefit from the information.

The project for this article falls into the not-so-complex but very functional column. It stems from my recent revamping of the shack; a never ending process. When I was gainfully employed we used other words for revamped and liked to say it was continuous improvement. The revamping in my shack involved condensing three stand-alone stations down to just one receiver and three transmitters. As a result, I put a 51J-4 and R-390 in the closet for storage. So, in this little 9 x 10 foot shack there is the new configuration of one receiver and three transmitters plus two other stand-alone transceivers. All the gear is, like they say these days, on-line and ready to go on the air with the flip of a coax switch.

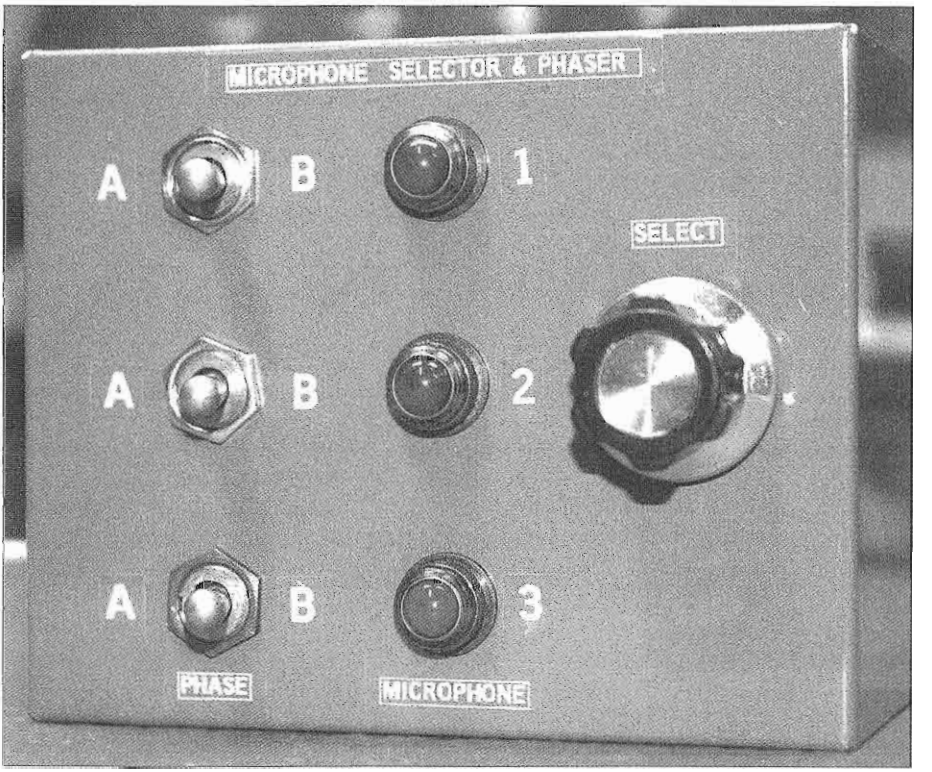


Figure 1: Front panel view, with the selector switches and indicator lamps showing.

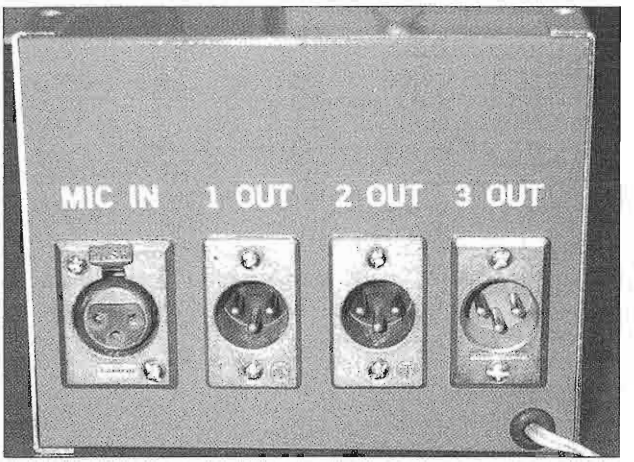


Figure 2: Rear view, showing how the XLR connectors are mounted to the minibox.

In addition, I wanted to use just one microphone with the three transmitters. This required some sort of switching arrangement, with the added capability to alter the phase of the microphone for each transmitter. Hence, the "Microphone Selector and Phaser" was born. If you have never built anything and have an interest in doing so, this would make an excellent project to get your feet wet. The cost is minimal and will depend on factors such as your supply of junk parts, your friend's junk box, and your scrounging talents at a hamfest. In my case, I had everything except the rear panel XLR microphone connectors. You will notice in the photo, **Figure 2**, that these output connectors are recessed male types. This isn't a common part found at the hamfest. This gender is necessary to maintain all the cables in the correct gender throughout.

Another way to remember microphone cable gender is that the male XLR pins always point in the direction of the sound waves, or away from the microphone, no matter how many cables you have between the microphone and speech amplifier. Of course, one could purchase the connectors, but that takes some of the fun away from the project. The next step for me was to send out some emails to hams who I knew were builders. I was very fortunate and the recipient of more connectors than needed. In my case I appreciate the generosity from WC3E, Frank, WB3JLK, Rich, and NØDMS, Ray.

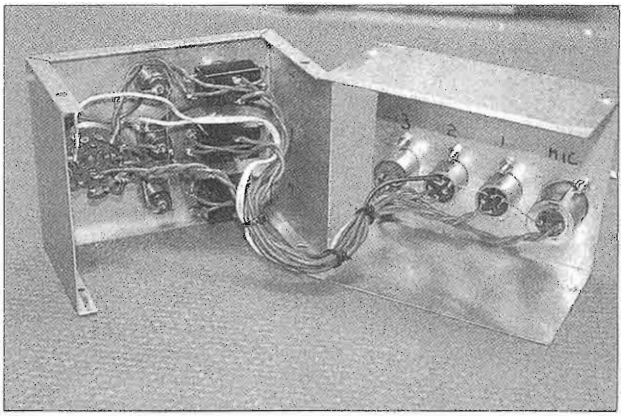


Figure 3: The internal view shows the neat cable lacing and how everything is located.

The front panel was jazzed up with some miniature pilot lamps, which then required a wall wart power supply. If lamps aren't your thing then don't use them and save some parts and the need for the external power supply. That's the fun of designing and building. The choices are all up to you, the builder.

The circuit in **Figure 4** is self explanatory, so the "how it works" won't be addressed. As far as the construction goes, it also isn't rocket science. The type of wire will depend on the type of

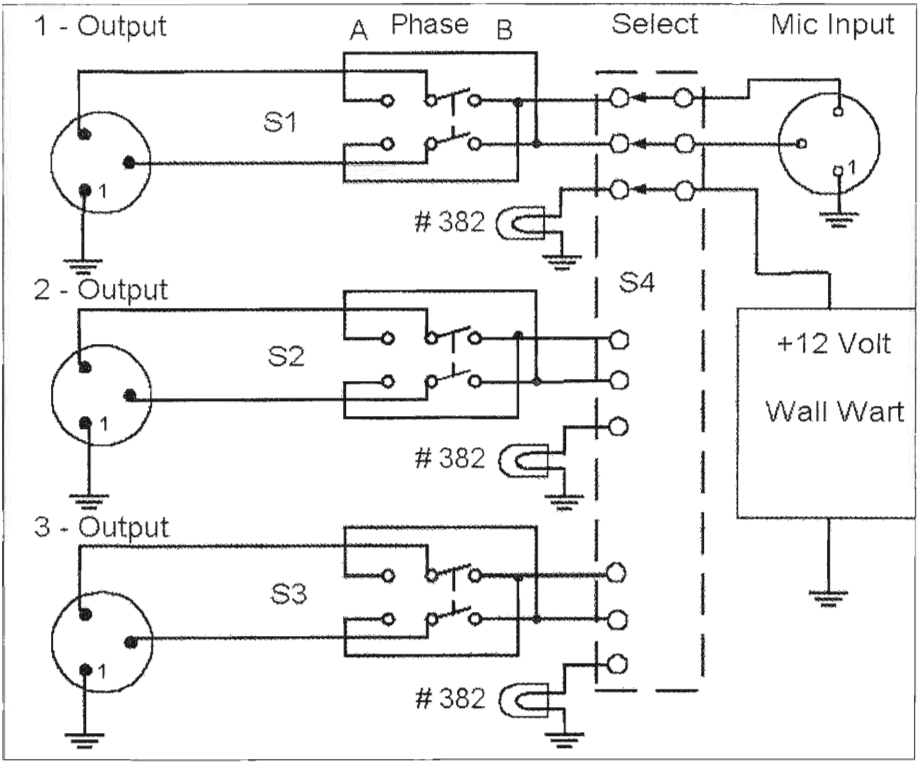


Figure 4: Complete schematic of the microphone switching and phasing box.

microphone used. Mine is a low-Z dynamic so ordinary stranded covered hookup wire worked well. If you are using a hi-Z microphone, such as a crystal, then I would strongly suggest the use of shielded wire to reduce the susceptibility of hum pickup. Note that there is no PTT capability in this project. I guess, when it comes to PTT, I'm a little antiquated and like to turn a switch.

What is important and worthy of a few words is the purpose of phasing the microphone for each transmitter. The following text is associated with the three waveforms (A), (B), and (C) in **Figure 5**. Rather then trying to rewrite my reference material, I've elected to use it word-for-word. This explanation is clear and simple and was extracted from the Radio Handbook, by Bill Orr. In this explanation, the word "polarity" has the same meaning as my use of the word "phase."

"The waveforms show the effects of using the proper polarity of the speech wave for modulating an AM transmitter. (A) shows the effect of the proper speech polarity on the transmitter having an upward modulation capability of greater then 100 percent. (B) shows the effect of using proper speech polarity on a transmitter having upward modulation capability of only 100 percent. Both these conditions will give a clean signal without objectionable splatter. (C) shows the effect of the use of improper speech polarity. This condition will cause serious splatter due to negative-peak clipping in the modulated-amplifier stage."

Besides having a transmitter-receiver combination or transceiver, the AM station should have an oscilloscope in use and some means to monitor the transmitted audio. The proper

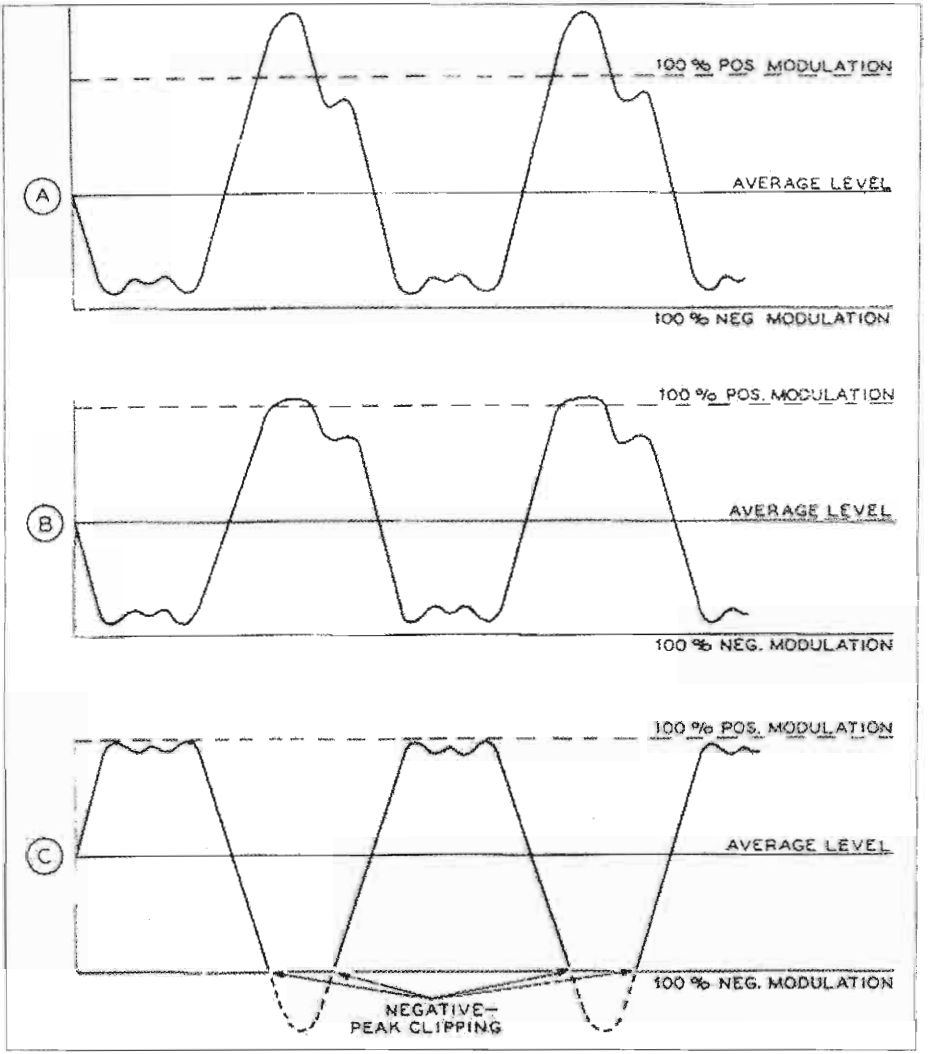


Figure 5: Speech waveforms, from Bill Orr's Radio Handbook.

microphone phase can be detected while observing the transmitted waveform. A properly adjusted transmitter will show negative going peaks approaching 100% and positive going peaks ranging from approaching 100% to in some cases exceeding 100%. When the phase is setup for one of my transmitters the word "yeah" is repeated into the microphone while simultaneously doing two things; switching the phase control and adjusting the speech amplifier microphone gain. The bottom line is to get the maximum positive peaks while not exceeding 100% negative peaks. Sounds simple, and it is. Once the proper phase has been determined for a particular transmitter it need never be changed unless you change the microphone or alter the audio section.

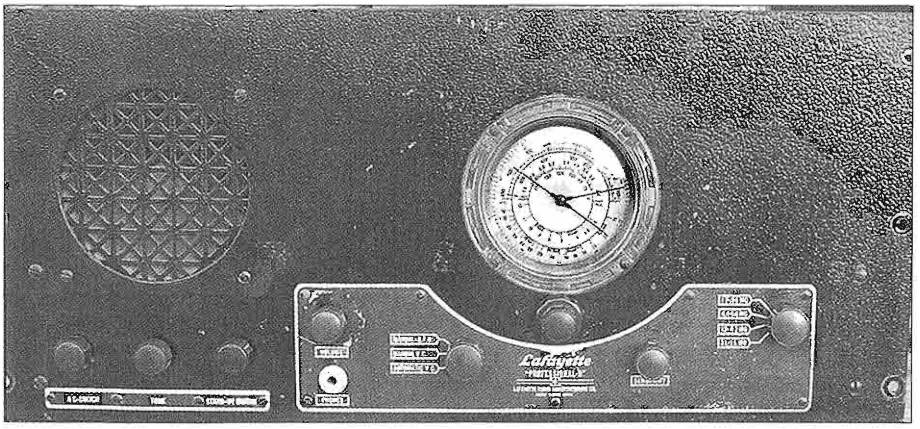
So, have a go at building something. Start with a very small project. It's loads of fun, you will make new friends, enjoy sharing parts with others, and discover building and operating your project is very satisfying. *ER*

The Lafayette Professional 9 Receiver

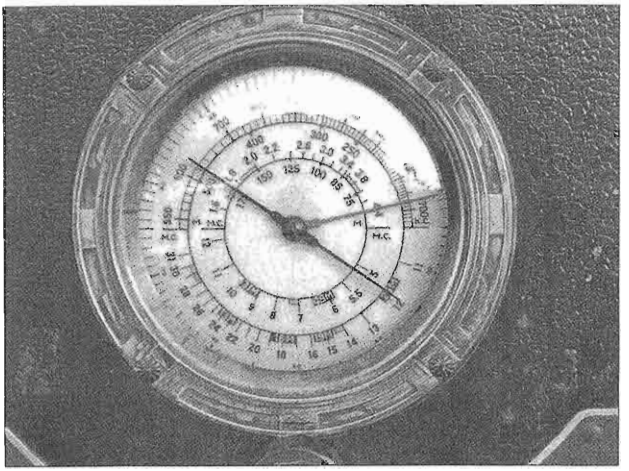
By Charles W. Cassidy, AC7GZ
1614 W. Bentrup Ct
Chandler, AZ 85224
cactusch@earthlink.net

For radio aficionados, the decade of the 1930s was arguably one of tremendous excitement with new commercial radios and new circuits being introduced by every manufacturer. In fact, looking at the radio periodicals of the time, one would be hard pressed to know that the world was in the depths of a worldwide depression. 1935 looked like a veritable wireless feast. New radios seemed to be coming out monthly. The old standbys, TRF receivers and the venerable regenerative receivers, were still being built by young hams and shortwave enthusiasts. Regenerative and TRF kit radio kits occupied page after page of the periodicals, but the subject of this article was apparently almost unknown: a super heterodyne kit radio. By today's standards, the reasons given in the paragraphs below seem a little strange in 2006, but the world *was* in a depression, and money was just a *little* on the scarce side. Apparently, most hams, or at least most kit builders, did not own a signal generator or VTVM in the '30s.

Browsing the shortwave periodicals of the time, I couldn't help but think that the 1930s commercial radio manufacturers were engaged in a radio version of the muscle car horsepower race of the 1960s: If 5 tubes were good, then 9 must be better, and if 9 were better, then 16 must be truly spectacular, and so it went. This seems to be a uniquely American phenomenon. The notion of "if one of something is good, then two must be better" was not lost on commercial radio manufacturers. The early days of struggling to hear signals on a one-lung regenerative receiver equipped with an O1A or a WD-11 were little more than a dozen years past. The memories of those days influenced nearly every radio listener's desire to be able to fill a room with concert music (or perhaps the traffic station, VQ7LO in Nairobi). Obviously, this was the goal of every radio manufacturer too. One could argue that the 30-tube Scott receivers were the GTOs of this cubic-inch displacement



Front panel of the Layayette Professional 9, a 4-band superhet receiver that was available in 1935 and 1936 as a kit.



The Pro-9 uses an airplane style double dial that is very attractive when illuminated from behind.

mindset.

Competition for advertising dollars was every bit as intense as it is today. Of course, QST magazine was the official organ of Amateur Radio, and was aimed squarely at the ham radio community, but Hugo Gernsback's Short Wave Craft magazine was read by thousands of SWLs and hams alike. Until finding the Lafayette Professional 9, I was unfamiliar with Short Wave Craft. Since then, I've managed to acquire several issues of the magazine from the 1930s, and it is obvious that Mr. Gernsback's monthly publication attempted to cater to both the SWL and the amateur radio community. I have no data to support a claim that most amateurs do some listening outside of the ham bands, but it is a fact that virtually every transceiver made today offers continuous coverage from at least 1600 kHz to 30 Megahertz. Most actually begin at 100 kHz.

Amateur radio manufacturers advertised in QST, Short Wave Craft, and presumably other competing periodicals of the time, but the October 1935 Short Wave Craft magazine contains two real jewels: The inside rear cover features a full-page ad for one of the most widely-known 1930s communications receivers, the now-classic HRO. Page 348 of the same issue has a three page review of the new Lafayette Professional 9.

Written by Frank Lester, W2AMJ, the article heaps praise upon the Pro 9. While no self-respecting ham would be caught dead without a signal generator and a decent multimeter today, in the midst of the Great Depression, those items were a genuine luxury. And this is what apparently prompted W2AMJ to rave about the Lafayette Pro 9! In his words:

"...there are many excellent factory-built receivers to be had, but even the hams who can well afford to buy them inquire about kits because they obtain both pleasure and valuable experience in assembling and wiring a knock-down outfit. The hitch in this connection is the difficulty experienced by the average ham in lining up the R.F. signal circuits."[1] It is interesting to note that Frank clearly presents the Pro 9 as a ham receiver.

Covering 560 meters through 9.7 meters in four bands, the RF deck including the RF amp, mixer, and oscillator coils came as a pre-wired unit and of course, already aligned. All four bands used a 6D6 RF amplifier. As the first photo illustrates, the unit was a well-shielded package. As the author points out in his article, Lafayette chose to use a 41 as the oscillator. As the RCA Receiving Tube manual states, the 41 (later to be the 6K6) was intended to be an audio power amplifier.[2] W2AMJ notes that as an oscillator it performs at the highest frequencies required by the receiver. Of course, so does a 6C6.

The tube lineup is remarkably similar to an HRO Junior which I own, see **Table** 1 on page 8.

	Pro-9	HRO Junior
1st RF	6D6	6D6
2nd RF	—	6D6
1st Det/Mix	6C6	6C6
1st IF	6D6	6D6
2nd IF/AVC	6B7	6B7
HF Osc	41	6C6
BFO	76	6C6

The frequencies covered by the four Pro-9 bands are as follows:

1. 550 kc – 1.7 Mc
2. 1.6 Mc – 4.4 Mc
3. 4.2 Mc – 12 Mc
4. 11 Mc – 31 Mc

Table 1: Tube lineup, comparing the Pro-9 to an HRO Junior and showing Pro-9 band coverage.

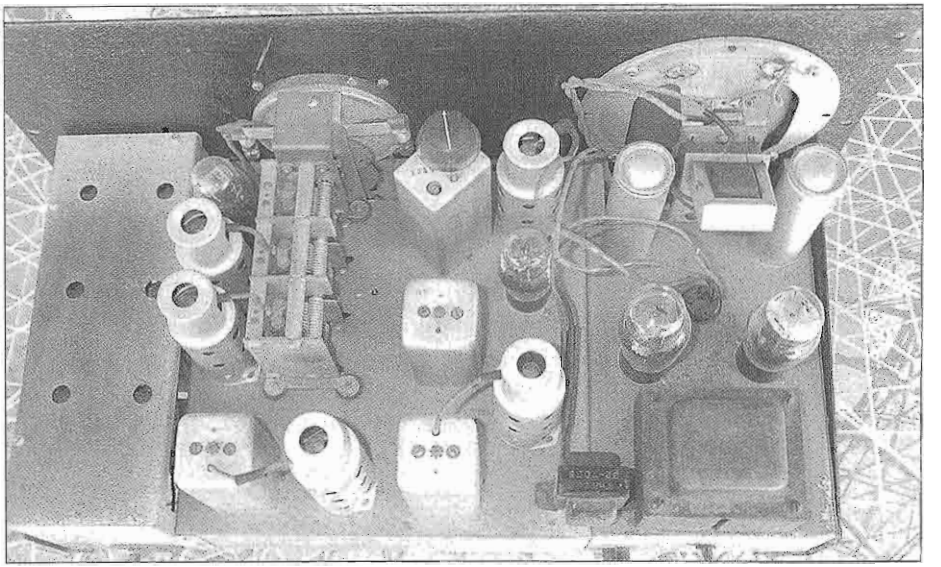
I was extremely fortunate to obtain a photocopy of the construction and alignment data. What is shown in the Pro-9 alignment information, but which is not mentioned in W2AMJ's article, is that apparently there was a five-band version which offered 175 kHz to 375 kHz long wave in addition to the four bands mentioned above. As I had buttoned up the chassis in the enclosure, and I saw only four holes per stage, I suspected that I had a standard four-band model, however the band switch freely turned to one more detent below band one. I tuned for the Scottsdale, Arizona LF beacon, but heard nothing. Furthermore, there was no background noise as one would expect in an urban environment. Undaunted, I pulled the chassis out again and looked at the coil arrangement. Sure enough, there were holes in the switch wafers where contacts would go, but alas, no contacts or coils.

As the top-chassis photo on page 9 shows, there is no evidence of component crowding! There might not be room to swing a dead cat inside of this receiver, but Lolita the cat finds it to be a nice, warm spot on a cool December evening in Phoenix. This particular receiver sports a very obvious knob attached to the BFO air variable. While the photo of the model in the Short Wave Craft review pictures a lever to adjust the BFO, I have the impression that the knob is original. Certainly, the knob is from the right time period. Also, my receiver has the later round tube shields, but the model in the review has the form-fitting, two-piece tube shields. One other thing was apparent: the speaker appears to be entirely original, but the filter choke for the power supply which had been attached to the speaker frame was missing, but in its place beside the power transformer is a Philco choke. The vintage spaghetti sleeving over the connection attests to the fact that the repair was done some time ago—or the repair was done by someone with vintage spaghetti.

Unlike some of the commercial receivers of the time, Lafayette put boldly etched control function plates on the front panel. As W2AMJ so aptly puts it:

"These knobs are all plainly marked by legible etched plates so the operator does not have to take a week off and memorize their functions!"[3]

As the photo on page 7 shows, an airplane-style double dial is utilized with a double knob band-spreading arrangement. W2AMJ describes the



The top-chassis view shows how uncrowded the component layout is.

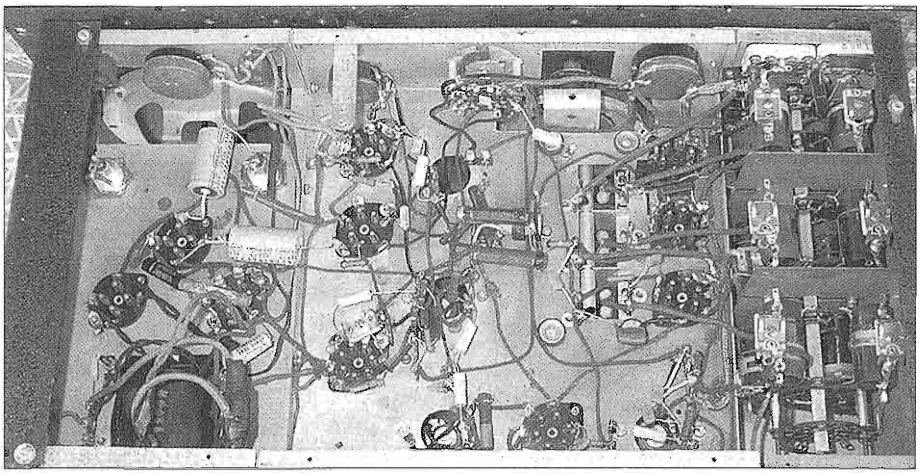
coarse dial as having a 25:1 ratio and the fine tuning as 125:1, and I must say it does a very satisfactory job. The weighting is good with no detectable backlash. Excursions from one end of a band to the other are slow, but there is no danger of getting *R-390 wrist* either. A stroll through 1935 ads shows that virtually every commercial manufacturer was offering an airplane dial. In fact, the 1935 Hallicrafters model 5T Skybuddy has a dial which looks like it could have been manufactured by Lafayette (or vice-versa). Of course, the Hallicrafters boy is absent from the Lafayette dial.[4]

It is interesting to note the striking resemblances between the Hallicrafters Super 7; the S8-A, and the Pro-9 in terms of front panel layout and the general lines of the enclosure.[5]

While grayscale photographs cannot show it, the dial has that warm yellow translucent glow which is so pleasant to look at, and which can't seem to be duplicated by modern radio manufacturers. (The amber display on my FT-817 is as close as I can get with solid state stuff I own.) The shortwave bands are highlighted in black, and the amateur bands are cross hatched. The pointer colors are black for the main and red for the band spread. The dial escutcheon appears to be bronze and is decorated in a classic art-deco style. The enclosure is painted in the ubiquitous black-crackle finish of the time. According to the review, the enclosure was an option. Fortunately for me, the original owner opted for the enclosure.

I didn't think to take a before shot of the underside of the chassis before recapping, but it contained the usual assortment of wax bypass caps in their usual state of leakage. I used 600-volt Mylar capacitors where I could. Metal film caps filled in elsewhere. Of course, the 8-µfd filter capacitor's internal electrolytic had long since turned to powder. The junk box yielded a couple of 500-volt, 22-µfd electrolytics which took care of the B+ supply. Readers may note an added fuse in the AC line. That was a later addition, but in the interest of fire prevention, I left it in place.

The pre-assembled and pre-aligned RF deck is visible in the under-chassis shot

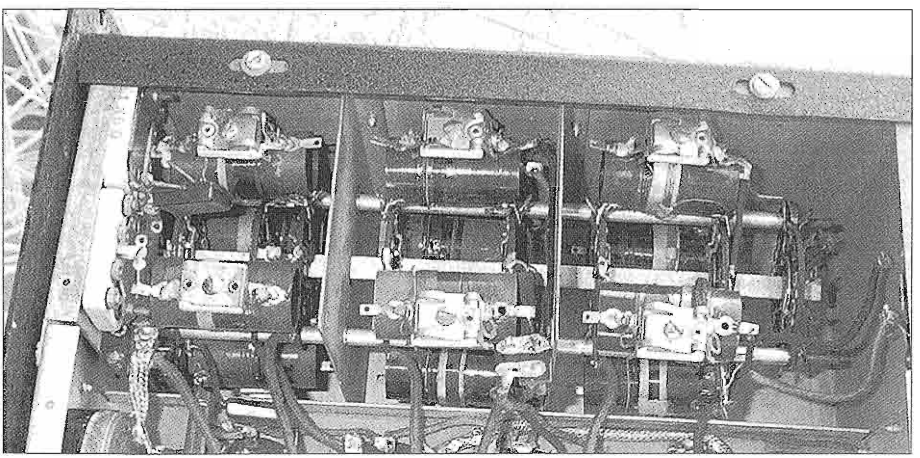


The replacement electrolytic capacitors are shown in this under-chassis view in the top left and left center of the photo.

as well as the close-up photo. Once in a while, I get lucky and find a vintage receiver which has not had the IF cans and trimmer caps tightened down nice and snugly. This one was one of those cases. The IF (an oddball 470 kHz) alignment was right on and dial tracking seemed adequate; so I left it alone. WWV was dead on at 2.5, 5, 10, and 15 MHz; so someone had obviously aligned it properly.

I did my usual burnishing of the contacts of the variable capacitor; followed by an application of NAPA's copper-based anti-seize compound which seems to forever prevent oxidation of aluminum to phosphor-bronze contacts. A liberal dose of *LPS*™ contact cleaner on the various potentiometers eliminated noisy volume and RF gain pot problems.

The individual who wired the kit did a very nice job of soldering. Lead dress is neat, and all long wire runs hug the chassis. One of the stator plates on the main tuning cap was intermittent with



This close-up view shows the pre-assembled RF coils and the bandswitch.

the rotor. As is generally the case, the warped section was buried and nearly impossible to see, but it eventually was coaxed back to something approximating its original location.

Unfortunately, the Short Wave Craft article made no mention of the retail price, and I have not found any references which might show the price. I am guessing it probably was less than an HRO, but I am sure it was near the high end of commercial radios of the time. Being a kit, it probably sold for more than fifty dollars and less than eighty dollars. The Hallicrafters S7 and S8 were each $49.00.

I want to put in an unsolicited comment regarding the Electric Radio Magazine Inrush Current Limiter. Here in Chandler, the AC line voltage averages 122 volts on my recently checked Fluke 23 digital VOM. I noticed a small arc inside the 80 when switching the B+ on with the standby switch. That means either the tube is gassy, or the voltages were too high. Possibly both. Not wishing to take chances with a rare old gem such as this one, I ordered an AB-1 Inrush Current Limiter from E.R. The line voltage is now on the order of 110V; the soft start is extremely gentle, and the voltages inside the 80 are well below the maximum 1400-volt PIV rating of the tube.

One of the things we all know, but tend to forget, is that the insulation in power transformers in old (and new) equipment tends to dry out and become brittle. The inrush current into a transformer causes a small but very real scrubbing action between layers as well as between the primary and secondary windings. Many unexplained transformer failures are due to nothing more than the normal wear and tear of being energized at full line voltage. Obviously, in 1935 a replacement power transformer sold for perhaps $5. Today, it would be a case of finding something close enough to form-fit and function to work, and the cost is going to be 15 times that—if one is lucky enough to find something which will work. The AB-1 Inrush Current Limiter should postpone that for many years.

In conclusion, I could hardly call this a restoration since everything original was there with the exception of the filter choke on the speaker. I am very pleased that I bought it because it is an uncommon, if not a rare example of an early superhet kit. It certainly fits the definition of the term *boat anchor* because the empty enclosure weighs more than my FT-840. Assembled, it probably weighs 65 pounds. Mechanically, it is a brick. It measures 22.5"W x 11.5"D x 10.5" H. (I think the standard 19.5" rack panel mount was adopted in WWII, so installing a Pro 9 in a rack panel probably meant you made it yourself). In terms of operating, its stability is better than most of the early radios I own. After an hour's warm up, it is stable enough to copy W1AW CW broadcasts for more than 15 minutes at a time without touching the fine tuning. It has no crystal filter, which means the selectivity is totally inadequate for today's band conditions, and it certainly would have been grossly inadequate for the band conditions of the day. The *Single-Signal* capability of the HRO would have left the Pro-9 in the dust. As a shortwave BC receiver, it is quite acceptable, and it sits on the BBC much of the time. (Or, until I get tired of the politics and tune it to one of the other international broadcasters.) The audio quality is excellent, and the 42 audio amp is putting out something on the order of 7 or 8 watts into what is a very good quality 4.5" speaker.

I almost passed it by, but it called me to give it a home, and I'm glad I did.

Footnotes

1. Short Wave Craft Magazine, October 1935, p. 348

2. RCA Receiving Tube Manual, No. RC 14, 1940, p. 179

3. Short Wave Craft Magazine, Ibid

4. Dachis, Chuck, Radios by Hallicrafters, 1996. p. 27

5. Ibid, p. 27-28

ER

Milestones in the History of Amateur Radio

Reginald Fessenden's Radio Broadcast

A Centennial Commemoration

By Robert E. Grinder, K7AK
7735 N. Ironwood Dr.
Paradise Valley, AZ 85253
Atreg@asu.edu

Imagine yourself as a shipboard radio operator of the U. S. Navy or the United Fruit Company in late December, 1906. You are on a vessel plying among ports on the Atlantic Coast and the Caribbean Sea. Within the past year or two, your venerable coherer has been supplanted by a new receiver that enables you to actually listen to signals with your headphones. Now, the humdrum of your daily routine is interrupted unexpectedly. You are invited to listen on Christmas Eve for a program of speeches, music, and singing. Perhaps you are puzzled—no such event has ever occurred before—you alert your shipmates; you anticipate the improbable.

Promptly at 9:00pm on December 24, 1906, you receive from a powerful land station a general call—CQ, CQ, CQ, sent out in dots and dashes. Immediately afterwards, Reginald Aubrey Fessenden, the inventor of your new receiver introduces the first wireless broadcast, using—incredibly—a microphone. An assistant then turns on an Edison phonograph and a solo voice sings Handel's Largo. Fessenden expected another assistant to follow with a few comments, but mike fright overcomes him, so Fessenden grabs his violin and you hear him play and sing "O Holy Night." Next his wife and his secretary read together from the Bible text, "Glory to God in the highest and on earth peace to men of good will", but they, too, partially suffer stage fright as they face the microphone. Fessenden concludes the program by wishing his listeners "A Merry Christmas" (Fry, 1973). If you really had been on board one of these ships on Christmas Eve, 1906, surely your instantaneous exhilaration would have been indescribable. The uncanny moment would be the most surreal of your life![1]

Reginald Aubrey Fessenden (1866-1932) who engineered and directed the first wireless program, was a genius in the mold of many of his forbears—precocious and creative. His prodigious mathematical abilities and astute aptitude for solving complex, practical problems propelled him in his youth into the professional orbits of such titans as Thomas Alva Edison, J. Pierpont Morgan, and George Westinghouse, who recognized readily the incomparable breadth of his competence. Fessenden has identified Edison as his boyhood idol; he assiduously maintained a scrapbook of newspaper announcements of the latter's inventions. After schooling in Quebec, his birthplace, Fessenden at age 18 accepted a teaching post in Bermuda, where he met his wife.

Two years later, he moved to New York, where he haunted Edison facilities until he lucked into an entry-level job as an instrument tester. He rose quickly to chief tester and primary trouble-shooter. When a fire ruined the electric generator at J. Pierpont Morgan's mansion, Fessenden was sent to restore the lighting system. As soon as Edison learned of Fessenden's skills, he brought him to his main laboratory in New Jersey to work on generators and rubber insulation for electric wires. At age 24 Edison elevated him to chief chemist, but shortly thereafter, financial exigencies forced

Edison to lay him off. However, Morgan recommended him to George Westinghouse, who hired him without hesitation. Fessenden, in turn, returned the favor, for Westinghouse had obligated his Company to light the 1892 Columbian Exposition in Chicago, and ideas from two of Fessenden's patents on lead-in wires for bulbs facilitated completion of the project.

Fessenden's fame spread rapidly within the scientific community, which induced faculty at Purdue University to lure him to their campus with an offer of a professorship in physics and electrical engineering. He spent only one year at Purdue, but in teaching a course in Hertzian waves in 1892-3, his interest intensified in the general development of wireless communications, and in the particular problems of transmitting speech by wireless.

He returned to work again for Westinghouse, who enabled him to continue his research projects at the University of Pittsburgh. About the turn-of-the-century, Lee de Forest and a cohort of scientists obsessed on the thought "If one can only teach the spark to talk, we will have wireless telephony" (de Forest, 1922, p. 334). Fessenden disagreed. Not only was spark telephony extremely dangerous, but it was also technically infeasible because the number of receding sparks per second were incapable of modulating the higher frequencies of a human voice. Fessenden argued that as high-frequency waves are created, they ripple outward, like those of a pebble when dropped into a puddle of water. Thus, if they could be generated continuously, they could be varied or modulated in accordance with speech and music. Consequently Fessesden declared that the spark-gap/coherer system was wholly inadequate for anything except dots and dashes. The challenge he set forth for himself was to develop receivers capable of copying signals continuously and to develop transmitters capable of transmitting signals continuously.

When he was 37 years old, two Pittsburgh millionaires created the National Electric Signaling Company in 1903 to exploit his talents to help them develop wireless installations in the United States and Europe. Fessenden agreed to assign patents for new inventions to the Company, and with its resources, built two powerful, flagship stations at Brant Rock, Massachusetts, and three additional stations in New York, Philadelphia, and Washington, D.C. In January 1906, the Company established a station, similar to that at Brant Rock, at Machrihanish, Scotland, and in June, 1906, a small testing station at Plymouth, eleven miles from Brant Rock.

While the transmitting installations were under construction, Fessenden concentrated his research on replacing the spark-gap transmitter and the coherer receiver. Few shared his optimism. Once, when he asked Edison whether wireless telephony was possible, Edison is reported to have replied: "Fezzie, what do you say are man's chances of jumping over the moon? I think one is as likely as the other." (see www.ewh.ieee.org/reg/7/millennium/radio/radio_home.html)

Nonetheless, Fessenden persisted. In 1903 he invented the liquid Baretter or electrolytic receiver, a novel conception based on the suspension of an iron wire filament in a hydrogen-filled container. As Adams (1996, p. 90) put it: "Fessenden invented the first audio receiving device that made the hearing of wireless voice transmission possible"! Fessenden in cooperation with a young colleague, E. F. W. Alexanderson also proceeded apace to develop continuous wave, high-speed alternators. In their design, the rotating part of the generator carried no windings. The surface of the iron rotor was slotted so as to form teeth. As the rotor revolved, the passage of the inductor teeth across magnetic poles generated an alternating

current, sometimes as high as 200 kHz. Fessenden and Alexanderson managed to develop three dynamos at the Brant Rock station, two of them operated at 50,000 Hz and one of them at 100,000 Hz (Hogan, p. 16; Joyce, 1922).

Morecroft (1927, p. 742) has illustrated Fessenden's basic system of radio telephony (see Figure 1). An antenna and loading inductance were connected in series with a Fessenden alternator and an ordinary carbon microphone. When the microphone was inactive, the high-frequency current of the alternator was a continuous wave of constant amplitude. As sound affected variations in the resistance of the microphone, corresponding variations took place in the amplitude of the antenna current.

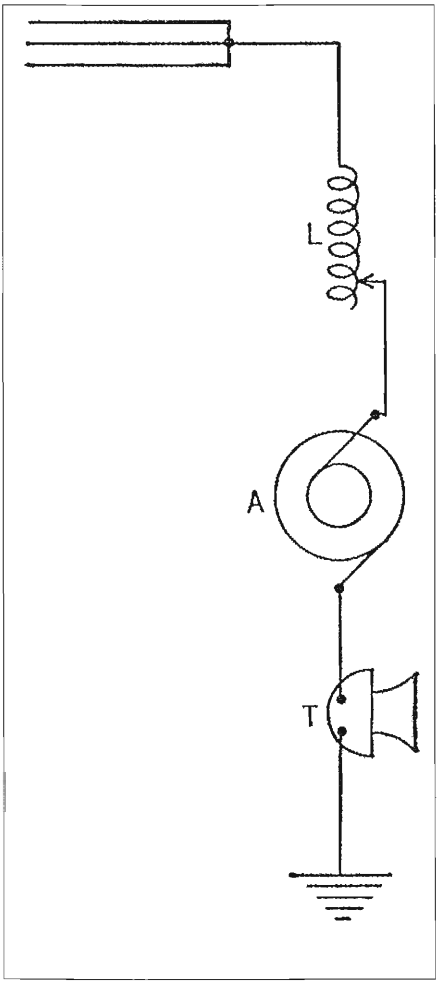


Figure 1: Fessenden's scheme for radio telephony: a microphone (T), high-frequency alternator (A), in series with a tuning inductor (L) and the antenna. From Morecroft (1927), p. 742.

Part of the genius of Fessenden's method of telephony was that the carbon microphone needed only to be of high resistance and of low-current capability, because it carried the field current of the alternator rather than that of either the oscillating circuit or the antenna (Morecroft, 1927).

Fessenden is also credited with transmitting the first human voice from the United States to Europe. As he struggled to improve the efficiency of his high frequency alternators, his teams of technicians at Brant Rock and Plymouth, eleven miles apart, held regularly scheduled contacts via voice transmissions. One cold evening during November, 1906, operators at Machrihanish, Scotland, were astounded to hear clearly instructions from Brant Rock to Plymouth to turn on the alternator.

Following successful experimentation and the very successful Christmas Eve, 1906 program, one might anticipate that Fessenden's efforts would have produced handsome commercial remuneration. His demonstrations of voice transmissions did result in contracts being drawn up in 1908 for the installation of radio-telephone links between Boston, New York, Buffalo, and Washington. Banking interests, however, declined the investment opportunity. Why spend millions of dollars for high-frequency alternators, liquid receivers, and station facilities when the alternative was simply to pick up the telephone and ask an

operator to put through a call. Fessenden's remarkable contribution to early radio-telephony, because of objections like this, never attained commercial prominence (Joyce, 1922).

Radio-telephony experimentation thus languished until the advent of vacuum tube technology during the post-WWI years. When the broadcast era made its debut in the early 1920s, Fessenden, for two reasons, was not acknowledged to be "the father of broadcasting." First, his primary reason for the 1906 Christmas Eve program was to prove that radio telephony was technically feasible and to advertise its commercial prospects—he did not conceive of broadcasting in the form in which later it burst upon society. Second, the transmitting and receiving apparatus that he had so laboriously evolved was in the 1920s obsolete beyond redemption.

Footnote:

[1]Halper and Sterling (2006) question whether Fessenden's Christmas broadcast actually occurred. The researchers' review of scholarly commentary and media reports at the time found that their sources were uniformly silent about the broadcast. However, an infinite variety of negative instances cannot disprove anything with certainty; thus, Halper and Sterling (2006) acknowledge that it might have occurred. Fessenden was regularly making radiotelephone transmissions in 1906, and he had developed both continuous-wave transmitters and receivers for shipboard use that were technologically suitable for the broadcast. Whether the saga of the Christmas Eve broadcast is eventually accepted widely as a myth, it is surely one of the more intriguing in the lore of radio history.

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http://home.wi.rr.com/n9oo/ersearch.html

The Heathkit HW-100 *AM* Transceiver

By David Kuraner, K2DK
2526 Little River Rd.
Haymarket, VA 20169
k2dk@comcast.net

Readers of last month's ER #209, November 2006 issue, could easily see this new Heathkit "product" coming. The prototype is the HW-100-AM, but any one of the HW or SB vacuum tube transceivers can have the "AM" designation. For the benefit of those who forgot or haven't read that issue, here is a brief review.

These transceivers use a common frequency conversion scheme as do the SB-300 series receivers and the SB-400/401 transmitters. The heterodyne, carrier generator crystals, and the IF crystal filters are all electrically interchangeable. So, the AM 6-kHz crystal filter from the SB-300 series can be substituted for the narrow SSB 2.1-kHz crystal filter. Several ER articles [issue numbers 139 and 140] have been written showing how to get the transmitter sections on AM.

The Transmitter Conversion Options

I am aware of three suggestions for this conversion. One essentially is to unbalance the balanced modulator and adjust the audio for proper AM. The other two use either grid or carrier controlled grid modulation.

One description is posted on the

Figure 1: The HW-100-AM with two series-cathode modulators on top of the Heath transceiver. The one on the left has a plate meter to replace the lost plate metering function. The other is the prototype described I described in ER #191, April 2005.

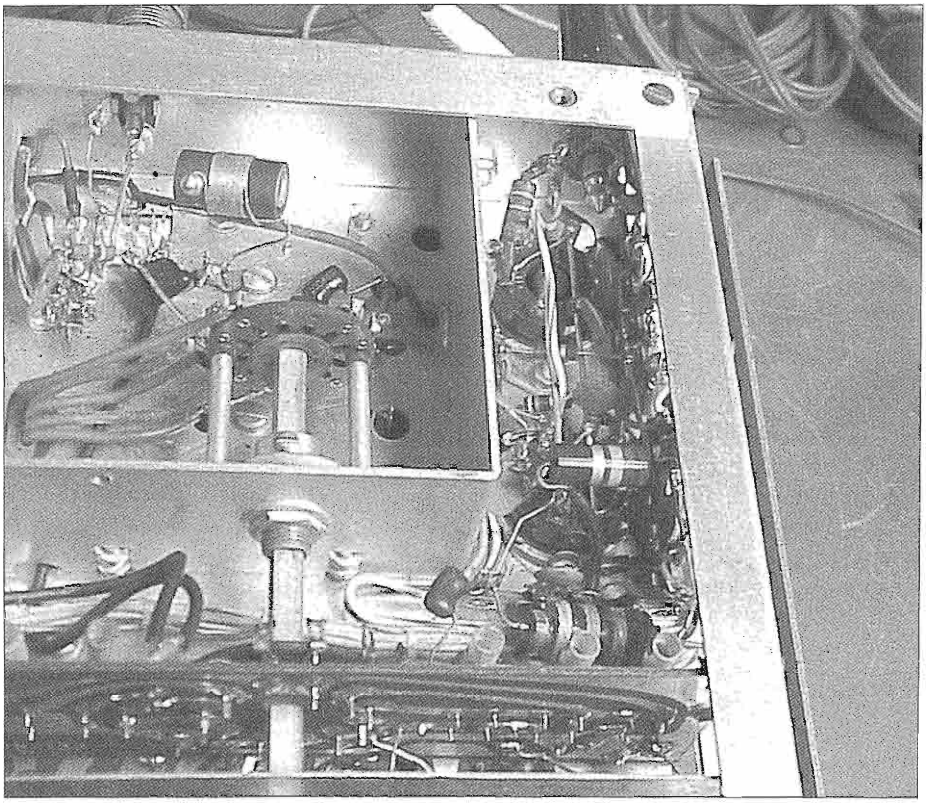


Figure 2: The underneath view of the final stage. Note the phone jack with the 2.2-ohm meter shunt at the back panel, the 22-k resistor and the grid choke. The driver coil shield was removed for clarity.

Internet by Chris Jackson (KD2XA). He makes a few modifications in the speech amp, bypasses the SSB filter and shorts the ALC circuit which must be done to get good sounding audio. The only problem here is that he was not using the transceiver as a transceiver. It was just an exciter. If this were done and you attempted to use the receive function, the IF would be so wide that you would hear every QSO on the band simultaneously. And this is not an exaggeration. So for true transceiver function, this will not work.

Bowie Bill Breshears (WC3K, SK) did the same thing with an SB-401 transmitter in ER #139, December 2000. Again, it was perfectly usable since there is no receive function to deal with. In the same article, Bill described a carrier control grid modulator to be built inside the transmitter. Bill preferred carrier control to drive a linear and I must concur that this is probably the best way to do it.

The problem is that many people dislike controlled carrier and numerous modifications for various equipment have been published to change to straight grid modulation. At least one drawback is the extensive work that has to be done internally for this carrier control circuit. Since we are talking transceiver, even thought the circuits are essentially identical, room and layout placement is

not quite the same.

For those of you who dislike carrier control and don't wish to make extensive internal modifications, the third option was described in ER #191, April 2005. My favorite is series-cathode modulation, which is grid bias modulation placed in the cathode circuit. The advantages are that the rig can be placed in the CW mode and safely tuned when the audio circuits are switched in. And, no serious internal modification is made. All control switching is now external and within the modulator chassis. There is no need to mess with the rig's speech amplifier since the mike is attached to the external box.

Now just because I wrote that article, what makes you think that I might be just a little prejudiced toward this circuit? The real truth is that I am lazy and this method employs the least amount of work. I already have built several and I know from experience that I get about 10 to 15 watts of super clean, upward modulated carrier. This is just perfect for driving a linear to about 150 watts carrier. The modifications are simple.

The Receiver Modifications

Replacing the filter with the wider AM band pass is, of course, just the beginning. If the transceiver has the CW filter, this is the one that should be replaced since the transceiver will be used in the CW mode for AM operation. The crystal filters are 4-pole lattice styles. You can use the upper and lower sideband carrier crystals to build your own two pole lattice filter. The HW-16 CW transceiver has a circuit for the same IF frequency. The Heathkit HR-10 and the Hallicrafters SX-140 also use a similar 2-pole crystal filter made from discrete components. Several ER construction articles by Bob Dennison (W2HBE, SK) and ARRL publications by Lew McCoy (W1ICP, SK) show similar circuits in simple receiver projects. But, I must say that it's much less effort and just about the same cost to buy the correct 4-pole filter off Internet sources than to build a 2-pole filter from scratch.

Converting the product detector to AM is not as simple, but still painless. You are going to disconnect the cable from the carrier oscillator, which provides the BFO injection for the product detector. This still keeps the crystal oscillating, and it will heterodyne with the incoming AM signal. You will have to completely disable the carrier oscillator on receive but insure it is enabled during transmit.

Next, it was found that simply removing the injection did not make the stage into a plate-envelope detector. The grid bias was wrong as were other components. A 1N270 diode was placed between the last IF transformer and the original product detector grid. Break the printed circuit from pin 3 of T103 and pin 8 of V13C and place the diode across this break. Then remove R123, the 470-ohm resistor in the grid circuit, and substitute a 100-k resistor. The stage now becomes an audio amplifier–you may wish to experiment with this value as there is now excessive amounts of receive audio with three stages.

In order to silence the oscillator during receive, the B plus to the stage has to be removed. If you switch the wires on pins 5 (yellow) and 9 (blue/white) on "Relay 2" you will do just that. Instead of the oscillator on constantly, it will only be energized in the transmit mode.

You have now produced a true AM receiver. It functions just like the SB-300 series receivers in the AM mode. The CW transmitter is now more or less in sync with the receiver's frequency. (I often wonder just how close the Drake TR-4 transceivers are when tuning in AM signals.)

The Transmitter Conversion

You might think that with the AM filter in the circuit, you could just unbalance the SSB modulator and use the internal speech amplifiers. The problem is that

the audio pass band through that filter is very restricted. Your AM audio will not sound natural, but more like sideband only, with the carrier inserted. You could wire a relay to switch the filter out of the circuit during transmit, however this induces a host of problems. They include complexity and guaranteed feed-through of signals around the filter due to stray capacitance from the leads to the relay.

Assuming you wish to use my pet circuit, here are the really simple modifications needed to be made for the transmit function. First lift the 2.2-ohm, 2-watt resistor from pin 8 of V8, the final cathode circuit. Mount a closed-circuit, ¼-inch jack on the rear panel in close proximity. The resistor goes to the tip terminal. A wire is connected from the wiper terminal back to pin 8.

Follow the RF choke from pin 5 of V8, the final grid, to its other side. With this step, you are removing the fixed bias and replacing it with a self-biasing grid resistor. This is absolutely essential for proper grid modulation via the cathode circuit. Remove the wire between the two adjacent tie points on the ground side of the choke. This disconnects it from the bias supply. Just leave it and not cut it should you ever want to restore it to original operation. Place a 22-k, 1-watt resistor between the choke and the nearest ground. The stage is now self-biased. (You may wish to experiment with its value for best modulation and output.) *Warning*! You no longer have the protection of using low drive to reduce plate current while tuning. You will regain protection once the modulator is in line and you tune in the CW position.

You need to bring the PTT circuit to the relay control inside the external modulator. You can pick up the PTT line from pin 8 of V12B. This is one of the VOX tubes and a wire from the VOX delay pot is going to pin 9 for easy identification. Just run a wire from pin 8 to the spare RCA jack on the back panel. The key line will need to be closed by the external relay and V15 removed from its socket. This is the CW side-tone generator and its amplifier. That's it. With the external modulator connected you have the Heathkit HW-100 AM Transceiver! (The key line can not be hard-wired closed because the unit would always be in the transmit mode. The side tone must be disabled since it would be heard when transmitting.)

Tuning and Operation

The modulator is plugged into the phone jack while the spare RCA jack gets connected to a normally open relay at the modulator's control circuitry. A linear could be triggered from either the transceiver or modulator control relay.

Receiver tuning is just what you expect and identical to other vintage receivers.

For tuning the transmitter section, have the modulator in line for plate current protection and make sure the filaments are warmed up to operating temperature before placing it in the transmit mode. With a scope and a relative output meter, tune the RF controls for maximum. Your plate meter has been disabled when the 2.2-ohm resistor was lifted from ground. (When using the unit as a receiver only with the modulator disconnect, disable the finals with a non-connected phone plug in the cathode jack. This insures no current is following in the finals while receiving.) Next, adjust the cathode resistor in the modulator for good upward peaks. This should result in about 10 to 25-watts of carrier into the linear. You are now ready to totally bewilder the guy on the other end of the QSO by telling him you're using a Heathkit HW-100!

A future ER article will elaborate on the HW-16 AM transceiver.

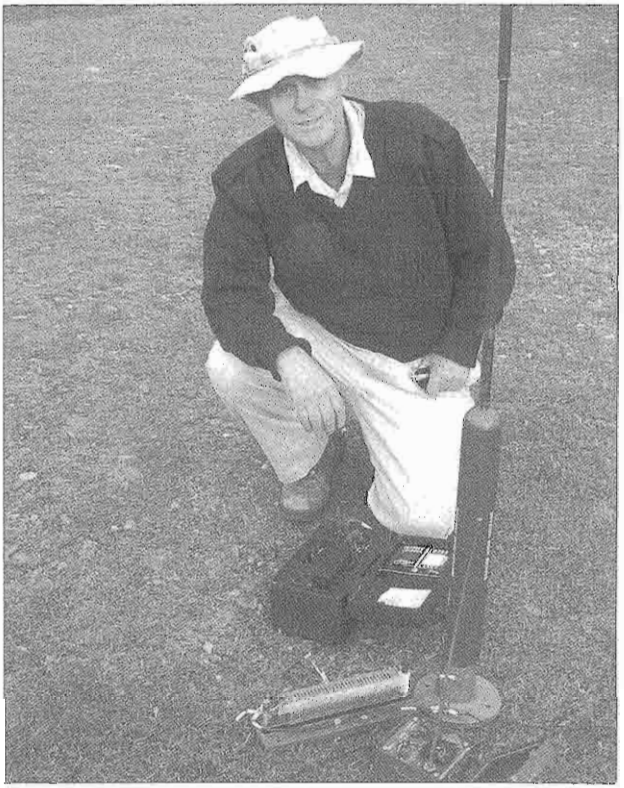
ER

Military Radio Collectors Association Meet – 2006

By Dale Gagnon, KW1I
9 Dean Ave.
Bow, NH 03304

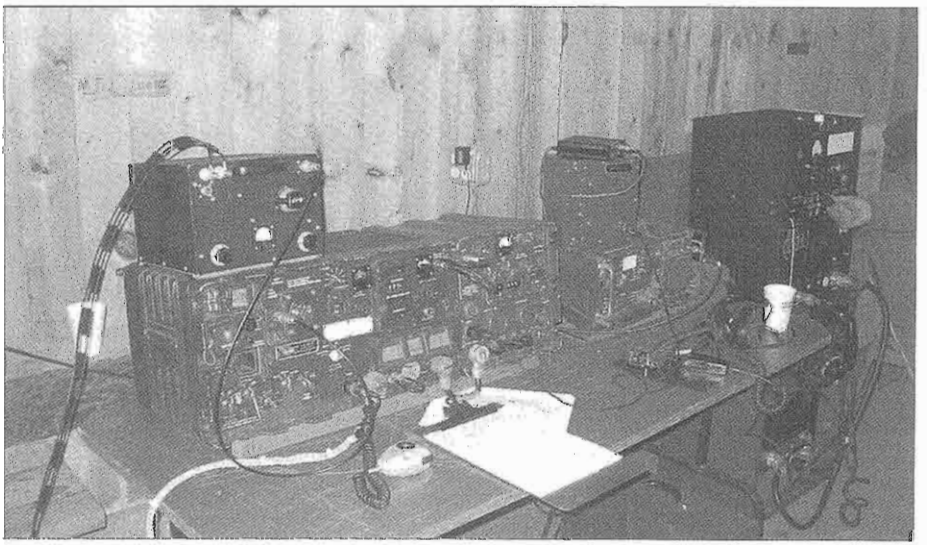
About three dozen military radio enthusiasts met for the annual MRCA Meet at the Gilbert, PA fairgrounds the weekend of September 21-23. The MRCA Meet occurs concurrently with the Red Ball Military Transport annual rally. The management of that event graciously allows our much smaller activity to sub-let one of the buildings for our displays and meetings. The pastoral setting with plenty of shade trees, the nice fairground facilities, nearby shopping and restaurants and the military ambiance created by the Red Ball group makes for an enjoyable time for a military radio enthusiast. Some of us arrived on Thursday to put up antennas and ready the building for subsequent arrivals. Camping is available on site, so overnighters usually all camp in the vicinity of the MRCA display building. In the evenings we tinker with equipment and talk about radios by the light of military issue Coleman style gasoline lanterns even though there is plenty of AC power available. On Friday, Ted Young (W3PWW) arrived with his GRC-19 and BC-669 for the base communication system. In the early afternoon our first organized field radio activity took place: the mission to *Big Pocono*. This is one of the highest spots in eastern Pennsylvania and is about 12 air miles away. The trip takes about 45 minutes one way. This year there were four vehicles carrying a variety of HF field sets and all but one

Top Row (L to R): Ray-KA3EKH, Ted-W3PWW, Bill-KA3AIS, Bill-W2DGB, Al-N3FRQ, Mike-WB3CTC, Joe-WA2EJT, William Donzelli, Rich-W3OSS, Dennis-KFØTG. Bottom Row (L to R): Breck-K4CHE, Rob-K2WI, Dale-KW1I, Lou-N3OD, Dean-KK1K, Gene-AD3F, Roger-KØRMK (Photo by K4CHE)

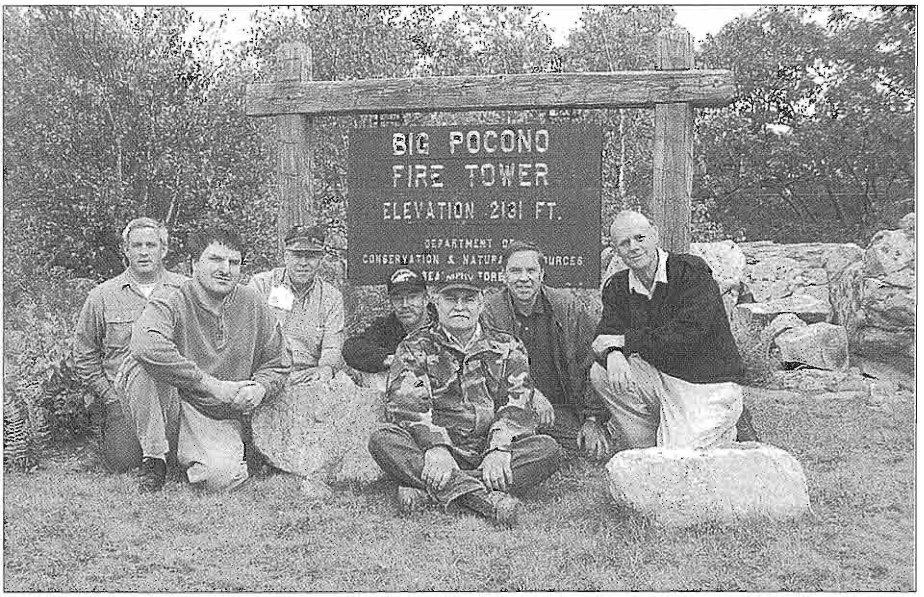


Breck Smith (K4CHE) is ready to go with his PRC-64 on "Big Pocono." (KW1I image)

were equipped with 51-MHz FM mobile radios. Ted, at the fairgrounds, had a RT-524 on 51 MHz to monitor the progress of our trip and coordinate the HF communication from the hilltop. Most of our low power HF sets were able to contact W3PWW at base. We had varying conditions and growing QRM in the segment of the AM window we chose to operate in. The addition of the FM liaison was a real advantage over previous years to avoid confusion on HF. Some of the radios used on Big Pocono were TCS, BC-474, PRC-108, PRC-64 and Racal TRA-906A. After base communication, we fanned out over the hill top with backpack radios and BC-611 handhelds for close- in radio work, climbing the fire tower and enjoying the view. On Friday night, several groups

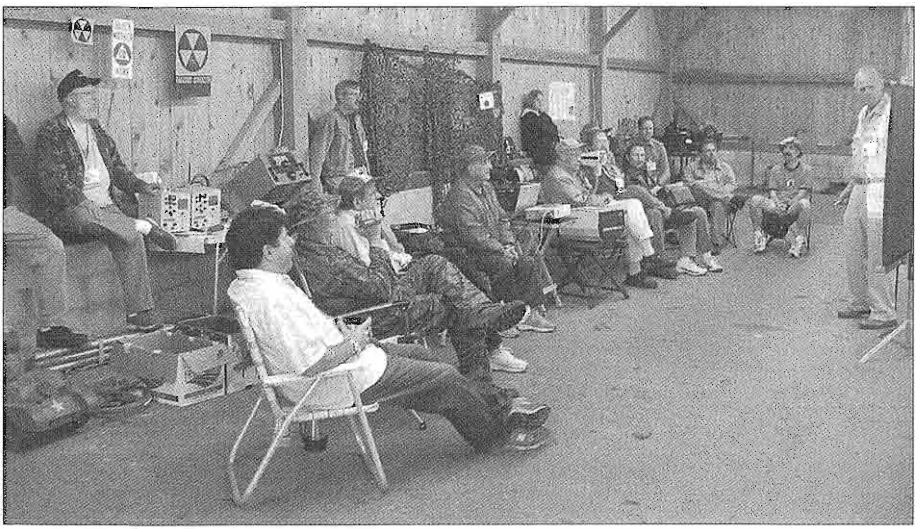


This is the fairgrounds base station: GRC19, RT-524, and BC-669. (KW1I image)

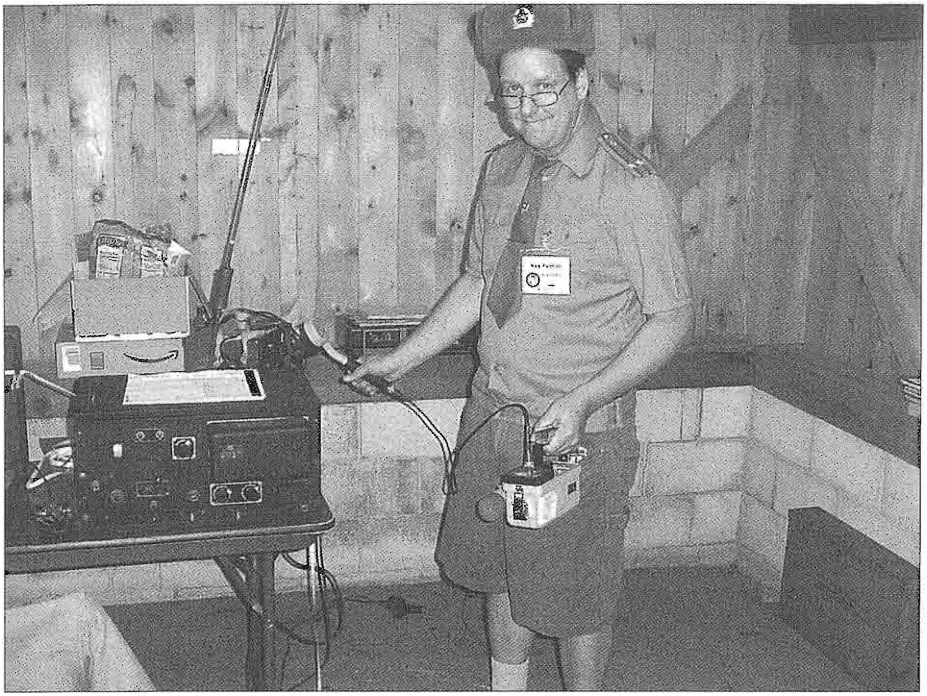


Here is a group photo taken at Big Pocono: (L to R) Rob-K2WI, Bill-, Dean-KK1K, Brown-W1NZR, Larry-N1PHV, Dale-KW1I, and Breck-K4CHE. (K4CHE image)

got together and went to Stroudsburg, PA restaurants that they have enjoyed visiting over the past few years. Saturday morning started early with the Old Military Radio Net operating portable from the fairgrounds at 0500 with Ted (W3PWW) as net control. Conditions were typical of this summer, very noisy and very long propagation to start. Many normal check-ins were in attendance at the meet or traveling to the meet so the net was smaller than usual. Though most of the weather was fair for us, just before the net and for two hours during, a heavy

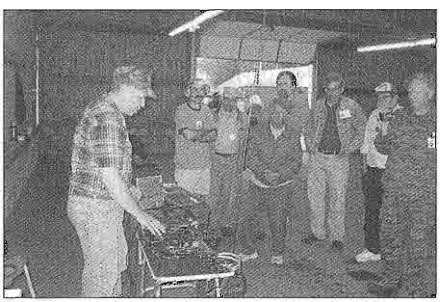


This was the Saturday presentation. (KW1I image)

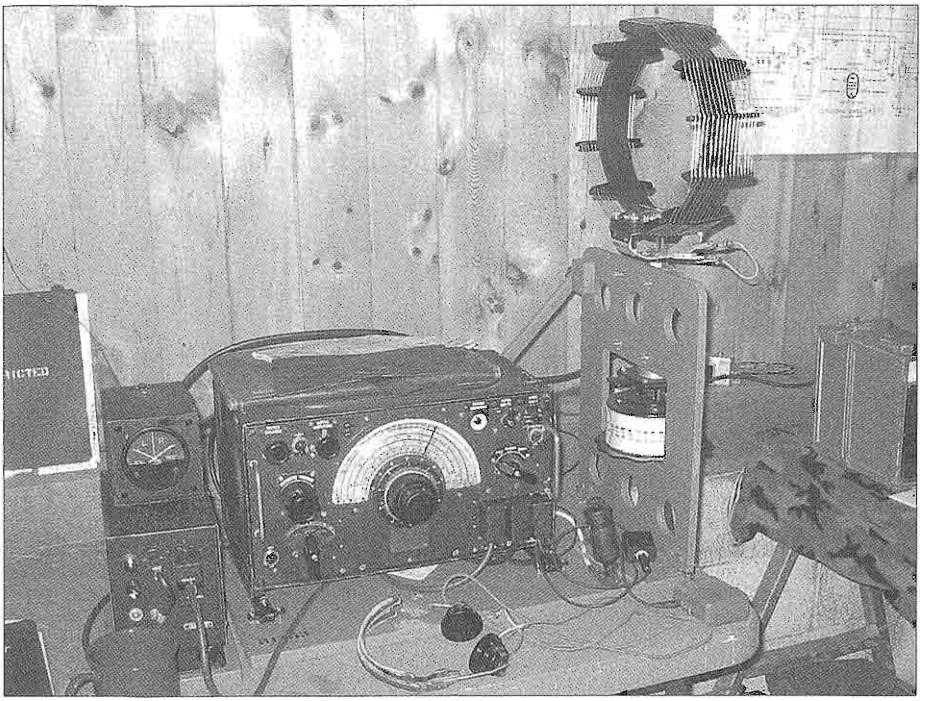


Russian **Ray (KA3EKH) checking equipment radiation levels (K4CHE image)**

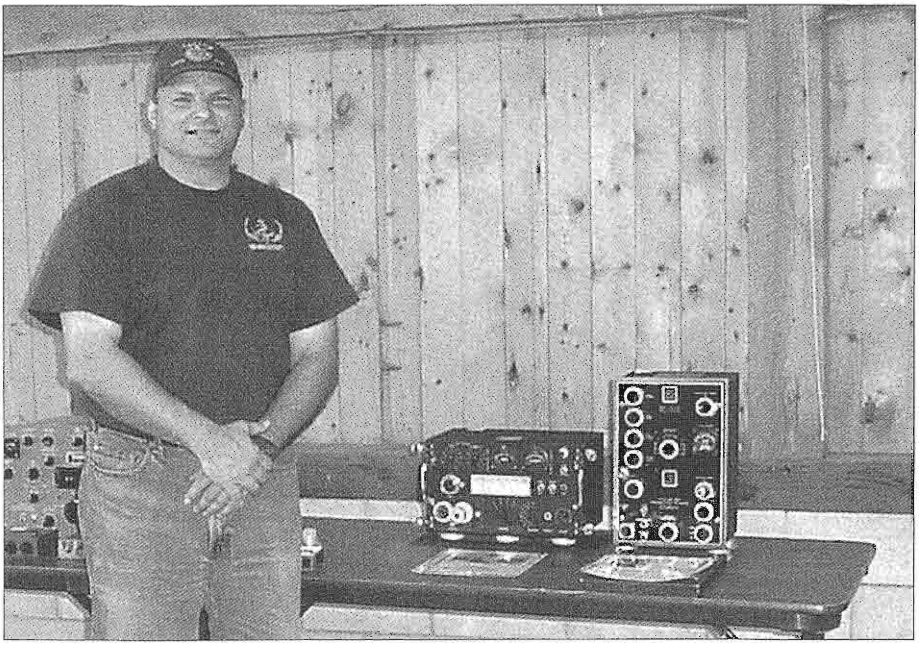
rainstorm occurred. This did not dampen our spirits, but it did at times result in a lot of rain static. In spite of the wet ground, after breakfast two radio teams were deployed in the local area to predetermined sites only a few miles away. The sites were identified earlier in the week and permission granted from land owners. Teams received intelligence acquisition assignments, which needed to be reported after communications were established. At this range, field radios can not only contact base, but they can contact each other. It's a lot of fun. In the heat of setting up, mistakes can be made and occasionally power cords, mics, keys, and coax cables are forgotten, lost, or misplaced leading to rapid work-around measures. A good part of the enjoyment of this activity is organizing your field equipment before the meet. It is important to review how to hook it up and turn it on, and especially how to zero beat to a net frequency! It is likely this tactical ops activity will be expanded in future years. Mid-morning with comm teams back at the fairgrounds more participants had arrived, some setting up additional radio displays. Chairs, screen and projection equipment were arranged for several presentations. Breck Smith (K4CHE) talked about and demonstrated the British R.1155A receiver set up with the dual needle cockpit indicator and a scale working model of the very rare Type 3



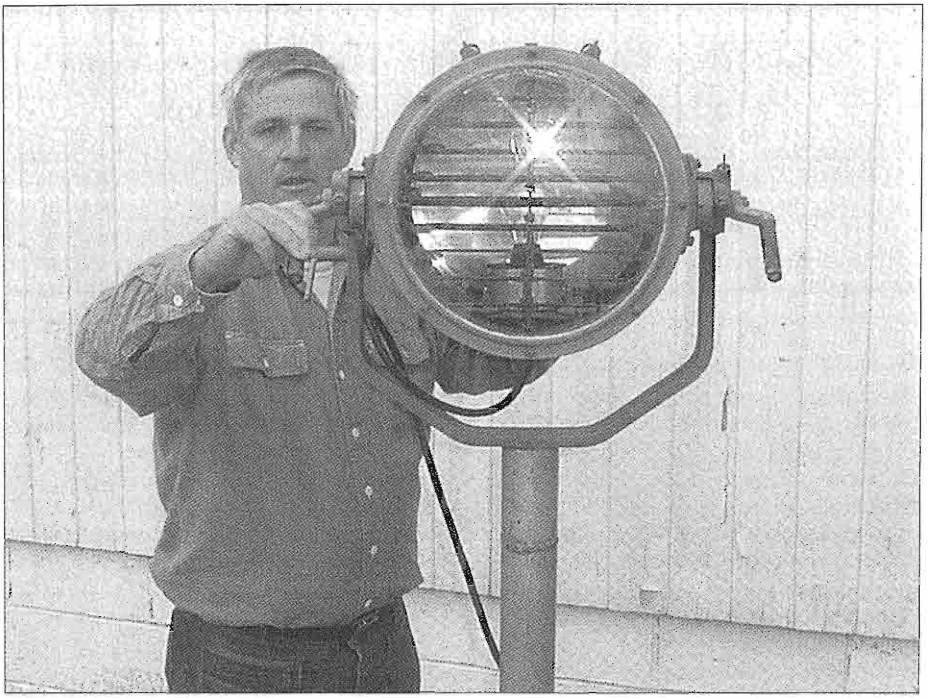
KK1K explains his exhibit of GRC-109, Racal 4021and SEM-35. (KW1I image)



Lancaster bomber radio and a model of the Type 3 DF antenna. (KW1I image)



Steve Finelli (N3NNG) displayed rare HF equipment: a Navy MO-1 and Collins 18M-5. (K4CHE image)



Rob Flory (K2WI) with a Navy signal lamp. (K4CHE image)

directional finding antenna. This receiver was used in the British Lancaster bomber in WWII. Roger Klingman (KØRMK) gave a presentation on Civil Defense, and radios and radio amateur activities that were part of our nation's Civil Defense effort during the Cold War period. Rich Arland (W3OSS) took a few minutes to tell us about how he got into military radio collecting and the resources that were helpful to him. Following the presentations we took the group picture. Then each exhibitor explained his exhibit to the audience as they went from display to display. Ray Fantini's (KA3EKH) display was notable in that it was all Russian radios. He even dressed up in a Russian military uniform. He also performed the invaluable service of checking everyone's radio meters and lettering for radiation with his Geiger counter. Steve Finelli (N3NNG), among other equipment, displayed some rare HF radio beauties, a 3-8 MHz Navy MO-1 and a Collins 18M-5, otherwise known as a TCH 2-16 MHz mobile radio. Some buying and selling does occur at the meet, but it is limited because the limited number of participants. Military radios and accessories are sold by many Red Ball vendors so time is well spent perusing the larger event. Antennas are lowered and equipment packed later in the afternoon as the event winds down. But, radio activity does not cease. Some of us who convoy home with others fill up the hours on the road talking on the FM sets between vehicles. Following the event we were contacted by organizers of a future military vehicle event in New Jersey. They asked us if we would consider coming to their rally to demonstrate military communications. Apparently, the lure of military radio gear and the fun we were having with it were apparent to the larger group meeting at the fairgrounds!

ER

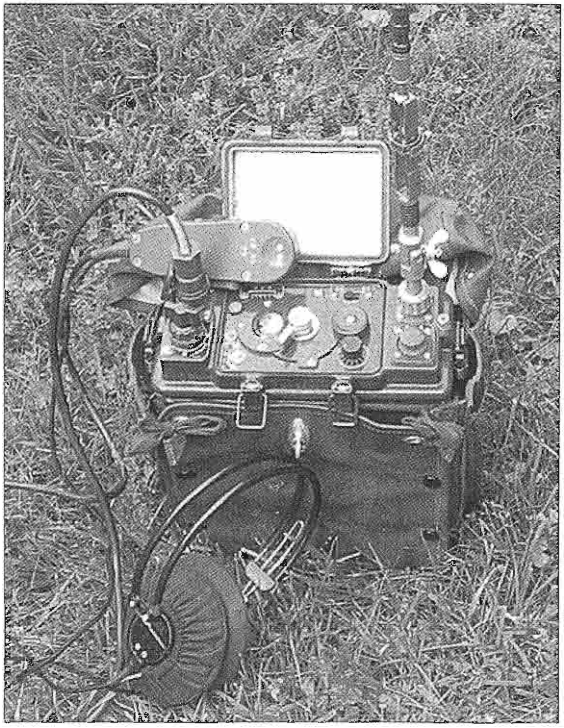
The Other Guy's PRC-10: The Chinese Army Model 884 VHF Packset Transceiver

By Doran "Jeep" Platt, K3HVG
12196 Overlook Dr
Monrovia, MD 21770

It's not too often that we get to see, have, and actually use radio communications gear that belongs to the "other side." As the tides of fortune change, however, the opportunity sometimes does arise. There's been some equipment coming out of the old Warsaw Pact countries and various sets have arrived from the conflicts in the Middle East. Currently, there are a couple of radios available from China, imported as any usual commodity would be. These include the 102E HF and the Type 884 VHF backpack set, both said to have been used by forces opposing the US during the conflict in Viet Nam. I've not been an avid collector of foreign sets until this past year. I've procured both the aforementioned equipments and have all of it currently on the air. I'd like to relate some quick-and-dirty information for getting the Type 884 on the air.

The Type 884 is a portable radio set and, although transistorized, arguably approximates the older PRC-8, 9, and 10 radios, versus the newer PRC-25 and '77. The Type 884 operates from about 45 to approximately 50.08 MHz, so it just makes it into 6 meters (but not quite up to the popular military FM frequency of 50.1 MHz). It produces both CW and wide-band FM, with deviation of over 10 kHz. The transmitter output is approximately ½ watt. The receiver is broad, exhibits no image rejection whatever, but appears sufficiently sensitive. I can hear VHF TV stations at various points on the dial. The receiver also has no squelch circuit. There is an internal crystal calibrator that provides a few calibration dial markers and there are both receiver and transmitter calibration adjustments on the front panel. This set utilizes a hand mic and headset combination, with the mic including both a PTT and a main power switch. The radio has a built-in CW push-button key. The BFO tone control on some variants also acts as a volume control.

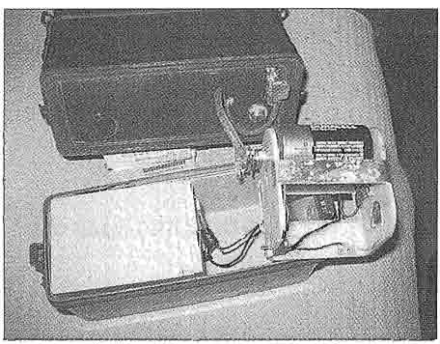
The whip-like antenna on this radio is a strange bird. It's a collapsible, steel-wire affair that hinges at the base and has a 3-section whisker extension at the top. Measurements make it to be a ¼ wave at 6 meters. To erect the whip, one has to snap out a folding elbow and extend the whiskers. I ended up using a set of



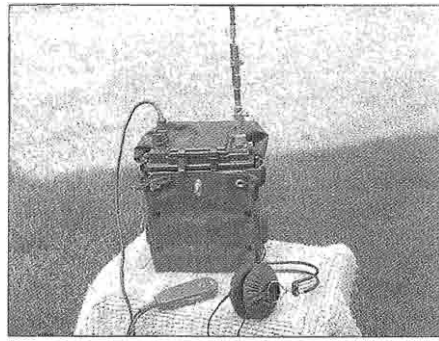
Front panel of the Chinese Type 884 transceiver.

channel-locks, carefully, to get the thing to lock up. The books shows a simple flick of the wrist.... good luck! Also, don't put it in a vise and try to lock it. I did and ended up with a bent-up antenna! When unfolded and in tension, rigidity and shape of the whip are provided by a string of plastic beads. There's a tension adjustment just above the folding elbow to allow for aging and stretching of the tensioning wire. The radio sounded OK into a PRC-25 and on my Icom R-7000 receiver, using wide FM. Note, though, that even the lightest of modulation will totally chop the 884's signal out of the bandpass of a modern, ham VHF-FM transceiver!

As received, Type 884s come with the R/T unit with battery case and carrying pack. Also included is an accessory bag, replete with two sets of mic-headset assemblies, two flexible whip antennas (good thing!), a single wire antenna, a few spare relays and lamps, a few tools, and wallet-sized manual in Chinese, all in sealed boxes and bags. Of the 4 radio sets I have, one pair appears to be of a later issue. The headsets appear to come with in two variants, the later of the two is a bit less robust that its predecessor. The older headset cushions interestingly fit either ANB or R-14 headset elements, perfectly! There's a fold-out schematic in the manual that will prove invaluable. I made enlarged copies of the schematics so I could read them better and have space for notations. I'm including some of this information that will hopefully make someone else's activation process a bit easier.



Battery box adapter, see text for detail.



The 884 with it's lid closed.

The book calls for the use of either a single, primary 12V battery or a stack of 8 D-cells. Additionally, 3 more D-cells are installed in an adjacent plastic holder. I found out during early testing that the radio will work fine on just a 12V battery. I have ended up using a Yuasa 12V, 4.5AH sealed lead-acid battery (tight, but perfect fit!) and one D-cell. More about this, though. The book explains (via Chinese-speaking assistance) that the radio normally works with the 12V battery and one of the 3 extra D-cells, wired in series, providing (in total) about 13.5V, depending on battery condition. There's a switch on the front panel of the radio that will engage two additional D-cells (in series) which adds some voltage as the main batteries discharge. Clever? The third D-cell, the one that I actually did install, is used as part of the booster and for the calibration dial light.

The long and short of it all is to simply hook a suitable 12V battery to Pin 5 (+12V) and Pin 3 (-12v) of the battery-box D-connector. Also install a single D-cell in the location that will feed the +1.5V to Pin 1 and -1.5V to pin 3 of the same D-connector. That's it. The small slide switch on the front panel that formerly engaged the booster D-cells will now be effectively inoperative. Installing the 3rd D-cell will provide dial-light operation.

Caution: If you use a single 12V battery, I'd highly recommend that you install the plastic battery holder and radio-to-battery box interconnect cable in advance of the

12V battery itself. The D-connector's close-spaced pins will easily short out with the slightest misalignment when plugging them in. Sealed lead-acid batteries pack a lot of current and I also recommend that a battery fuse (1.5A) be installed within the plastic battery holder to provide some protection.

In most radios, with the exception of a simple PTT switch, transmit/receive switching functions occur in the radio itself. In the Type 884, however, some of these functions occur within the mic PTT switch assembly. The mic uses a medium impedance dynamic element that can be talked into from either side. With activation of the PTT switch, audio from the mic element and is fed into the receiver's audio amplifier (within the radio) and then back into the microphone assembly, and over to the headset (for sidetone). Again, when the PTT is activated, and along with normal PTT action, the amplified mic signal is switched and fed back again into the radio where it goes to the transmitter reactance modulator. I thought about maybe adapting an H-250, or something. Then I thought....why?

Although no real modifications to the radio itself or to the battery box are necessary, except for the direct connection of the 12v battery to the appropriate point(s), I elected to install a small, panel-mount type wall-wart receptacle on the battery box, adjacent to where the plastic battery holder sits. I can now conveniently charge the battery without its removal. This is entirely optional, however. There is a connector on top of the plastic battery holder that normally is used to connect up a 12v battery. Don't use this if you're using only a 12v battery because it's wired up to include the use of the auxiliary battery. Of course, if you're going to load up your '884 with a ton of D-cells, all the above can be disregarded.

As always, I'll be happy to compare notes and information with others interested in these radios and if someone can tell me how to reliably use that dial-lock, I'll be eternally grateful!

Model 884 Mic/Headset connector pinout:

Pin 1	Gnd
Pin2	Mic lo out to rx. audio amp
Pin 3	PTT (+12v to tx, sw from pin 6)
Pin 4	Amplified mic hi, out to Tx
Pin 5	Rec Audio (sidetone and mic hi, in xmit)
Pin 6	+12v DC in (pwr sw. also to PTT sw)
Pin 7	Switched +12v (to rec.)

Model 884 Original Battery Box connector pinout:

Pin 1	Dial light +1.5v
Pin 2	n.c.
Pin 3	Gnd (also -1.5 dial light)
Pin 4	n.c.
Pin 5	+13.5v
Pin 6	Boost battery + to front panel switch
Pin 7	n.c.
Pin 8	Boost battery - to front panel (corrected)
Pin 9	n.c.

884 Abbreviated Battery Box pinout if using single 12v battery and 1 D-cell:

Pin 1	+1.5v (from dial-lite D-cell)
Pin 3	Gnd (-1.5v dial-lite D-cell and -12v battery)
Pin 5	+12v (from main battery)

ER

A Knight-Kit R-100A and T-150A Story

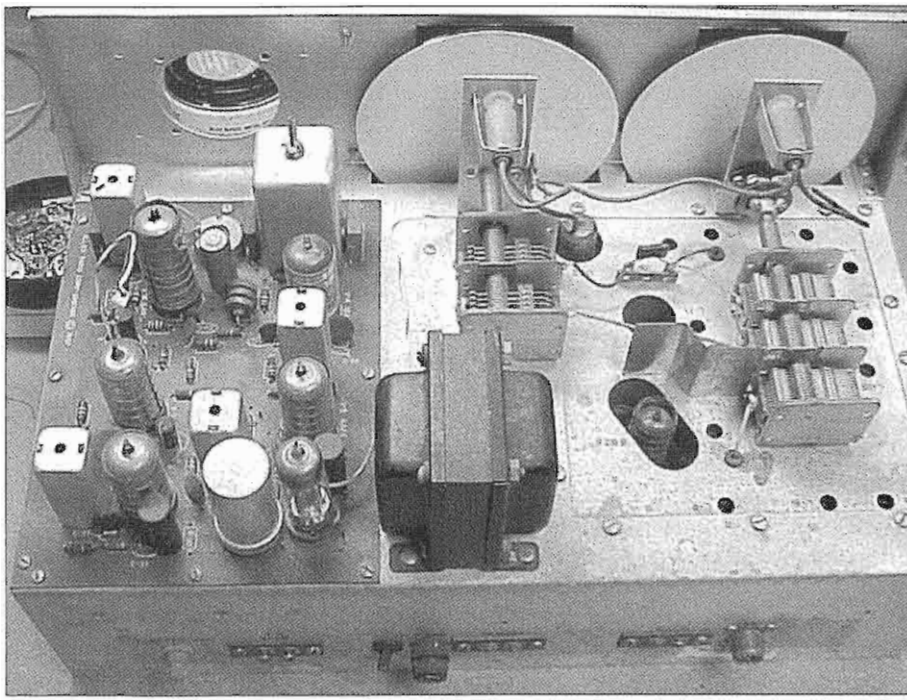
By Joe Rose, WA2PJP
276 Woodland Ave
Manorville, NY 11949

As with most of us that grew up in the 1950s, '60s, and '70s, the Lafayette and Allied catalogs were always around somewhere with a great displays of amateur gear. As a very young boy in the '60s, the Allied catalogs were my first introduction in to the world of electronics and amateur radio. I would sit and memorize each piece of gear that I would come across and say to myself someday I might just have that.

The most favorite for me were the 1963 and 1964 Allied catalogs with the Knight-Kit section in the back that displayed so many great kits that could be assembled. I think that these two years were Knight's peak in popularity and equipment. Some of the kits that I had *lusted* after were the R-100A and T-150A *outfits*, as they were called, and the C-22 5-channel CB transceiver. I would dream of the day that these two rigs would be sitting on my bench and I would be working the world on them.

In those years I was only 8 and 9 years old, so I never had the money, nor did my parents have the money to purchase these great radios. As a result, I never got that childhood dream station. Knight discontinued the T-150A in 1964 and the R-100A a few years later, and eventually Allied and Knight were taken over by Tandy Corporation and the Knight line just vanished.

Joe Rose is proud of his recently restored early-1960s Knight station.

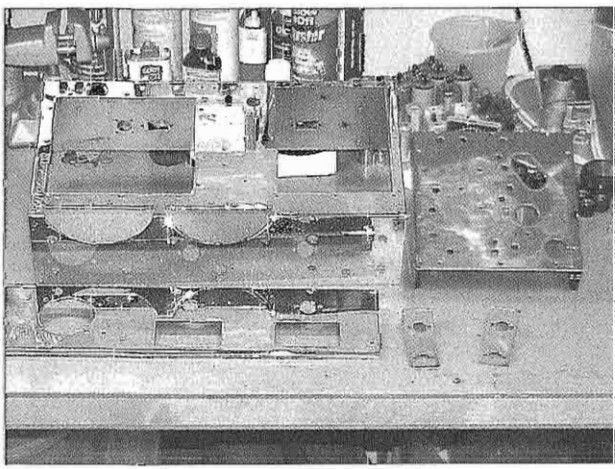


Here is the R-100A receiver before it was disassembled and rebuilt. Notice the corrosion on the chassis and other components.

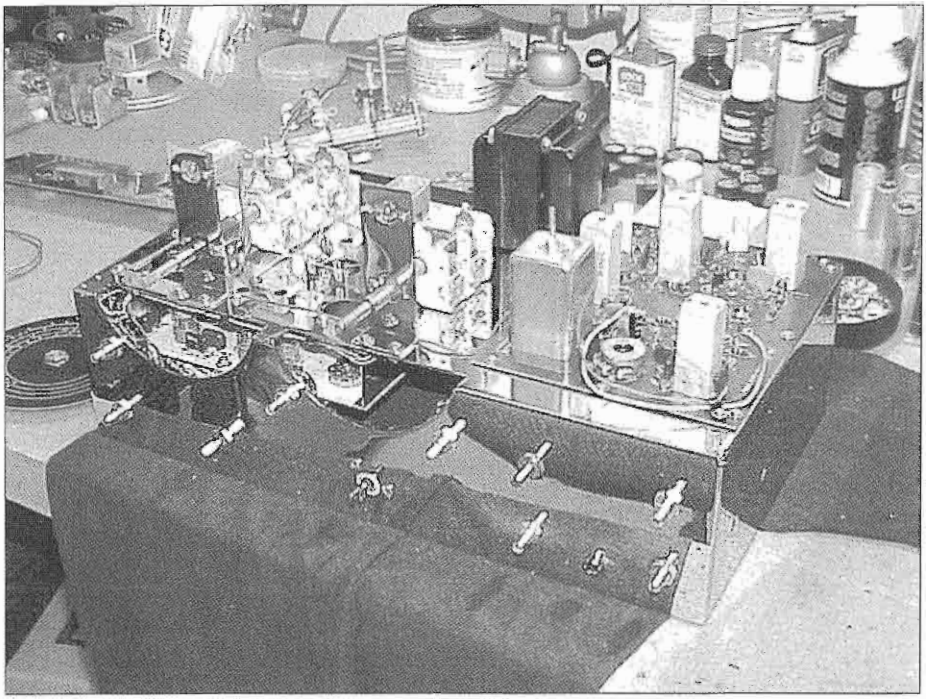
Now, almost 40 years later, I was finally able to put that dreamed about station together and actually operate it on the air. But this article is really to show the restoration of these units more than anything.

It seemed like just about every R-100A / T-150A combo was in beaten and battered shape with rusty chassis and banged up cabinets. Since I wanted a nice pair to operate and display, I knew I would just have to completely restore and rebuild a pair to get what I wanted. But, I was lucky enough to find a partial C-22 kit in the box to assemble. It was missing resistors caps and hardware; I had to piece this together also.

I stared by obtaining several combinations of the pair and took the best front panels, knobs and cabinets to start the restoration. Each cabinet was powder

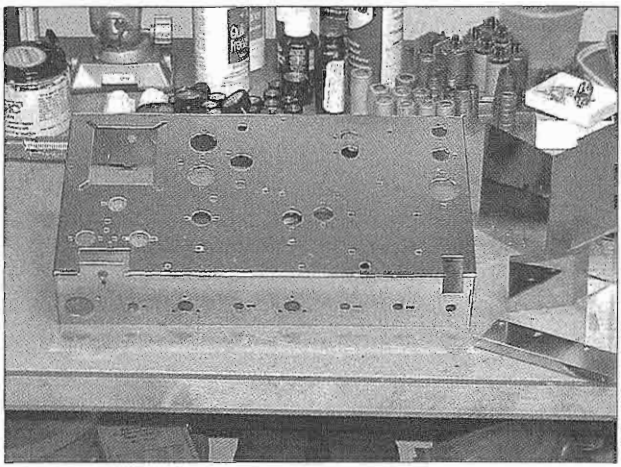


The chassis, as received from the plating shop.



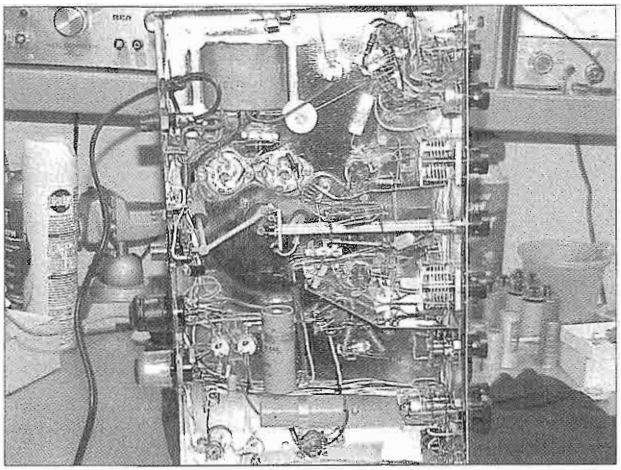
The R-100A receiver has been partially reassembled on the gleaming chrome plated chassis.

coated to the correct wrinkle and gray finish that Knight had used. Since all the chassis were badly corroded with rust spots, I decided that chrome plating would be the way to go for this project. I sent both the T-150A chassis and the R-100A chassis out to the plater's shop along with brackets, shields, shafts and the matching S-8A speaker and P-2 power monitor. As you can see in the pictures, they came back very nice and look stunning just like a piece of vintage McIntosh gear. The C-22 chassis was also sent to the plating shop because after years of sitting around, it too had developed rust and corrosion on the chassis.



The chrome plated T-150A chassis before reassembly.

Another problem that had to be rectified was the original wiring. Most of these kits were assembled by very young hams that couldn't solder and just had bad construction techniques. Some tube sockets were damaged,

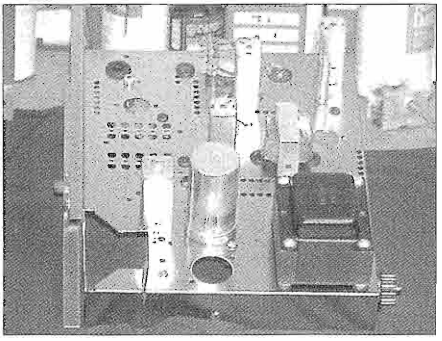


Component view of the T-150A transmitter.

some components had over heated, and there was burned wiring and so on. I decide to just throw out all the old tube sockets, components and wiring and start with all new NOS components. I saved only the meters, switches, brackets, and coils that were needed.

The assembly was very easy because I followed the assembly instructions just as you would with a new kit opened for the first time. With all new

The C-22 CB transceiver was found as an unassembled partial kit.



The C-22 has been partially assembled on a custom chrome plated chassis.

components and wiring, along with new stainless hardware and careful assembly, both of these rigs came out great. So did the C-22. With the chromed chassis and new hardware, they look better than they did coming from Knight.

My first contacts were a great thrill, running a controlled carrier transmitter was a lot of fun and having my childhood dream station at last really put me back to those days when young radio engineers lusted through the old Allied catalogs. When other stations would ask what the rig is, and I stated "the *Knight Twins*," most people really perked up to say "I wanted those when I a kid."

The C-22 chassis was chrome plated, and now Joe is busy with assembly of his Knight-kit.

The receiver works very well on the low band but falls very short above the 20-meter band. Tuning becomes very erratic at the high end. The transmitter works very well with good audio reports (as far as controlled carrier goes) and the signal was pretty decent with about 75 watts on peaks. The VFO was surprisingly stable for such a simple circuit.

I guess it's never too late to live those childhood dreams!

ER

The completed C-22 transceiver is ready for its first 11-meter contact.

W9ARA and W9BSP

Two Who Made a Difference

By Bruce Vaughan, NR5Q
504 Maple Drive,
Springdale, AR 72764
nr5q@aol.com

The stories of Marshall Ensor, W9BSP, and that of Bob Henry, W9ARA, have appeared in print many times. Rather than to retell a story ER readers are familiar with, I want to tell you how these two men touched the lives of every ham in our small town. In 1939-40 we had eight licensed Amateur Radio Operators in the call book thanks to W9BSP and his 160-meter AM code and theory lessons. Most of these hams had nice stations—thanks to Bob Henry, and his "easy payment" plan. I believe I am the last of the eight hams still living—and I don't feel all that great.

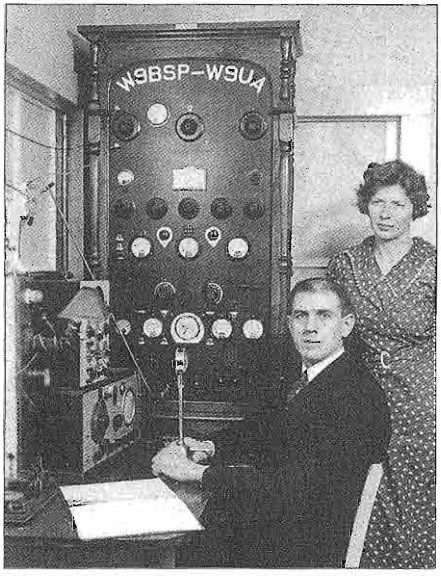
This story is as true and factual as my memory permits. I may be off a month or so on my dates. Please remember that all these things happened almost 70 years ago.

September, 1937

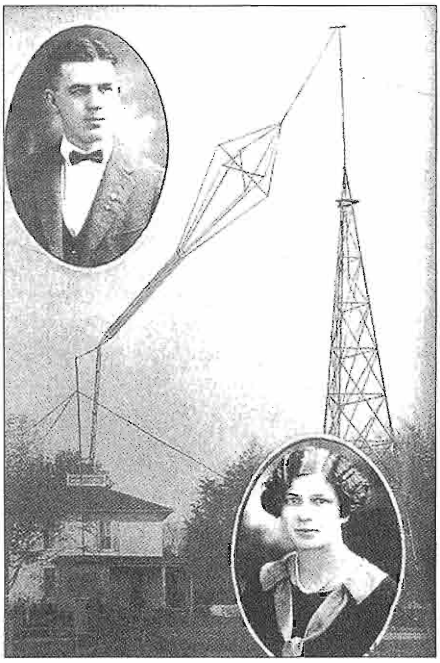
Wade could feel one of his seizures coming on, and he uttered an oath as it hit him full force. He clutched his arms tightly across his chest, and fell from his seat in the schoolroom. As usual, his seizures caused a minor panic among the students. Even though such seizures were frequent with Wade, often four or more a week, they always caused a rapid exodus from the classroom. Today, Wade's life would have been far different. The decision to quit school seemed to be the only option. A mutual agreement between student and school board was made—Wade's formal education came to an end. In 1937, public schools had no idea how to deal with epilepsy. Special Education, and No Child Left Behind, were concepts far in the future.

Wade had an exceptional IQ, with grit and determination in abundance. His family, considered upper middle-class at the time, were very conservative with Wade's spending money. His funds for ham gear could be described as nonexistent.

That fall, W9BSP, in Olathe, Kansas, started his usual course on 160-meter



Here are the exact words written on the back of this photograph: "This station is located at our home 6 miles south of Olathe, Kansas. The transmitter runs 1 KW to a pair of 822, modulated by a pair of 822 Class B, Thordarson 30 watt speech amplifier. The receiver is a Super Skyrider SX-16-DuMont oscillograph.
The aerial is a horizontal Hertz, Zep fed 246 ft long, 75-100 ft. high. 73's Marshall & Loretta Ensor.
Authors note—I believe Marshall traded receivers. This appears to be an early Skyrider—not a SX-16. My SX-16 looks nothing like this receiver.



Marshall Ensor (9BSP), Loretta Ensor (9UA) and their cage antenna, circa 1923.

AM, teaching both code and theory. Marshall Ensor, a long time teacher in the Olathe schools, was a well qualified instructor. He was running a full kw with excellent antennas. He came in here like a local station—loud and clear with audio as good or better than some BC stations.

Wade's family agreed to turn over the living room, and use of the family Zenith radio, so that he could study for his ham ticket. Wade still had some hope that somehow he could get his old Sky Buddy working.

Before the nightly classes ended that fall, Wade walked over to the Jones Truck Lines terminal and home office. JTL, as it was known, was a LTL (less than truckload) freight carrier with terminals in larger cities within a 500 mile radius of Springdale. One of their terminals was in Kansas City. One or more JTL trucks made the trip to KC every day. Wade made arrangements with a driver to ride to KC with him the next time FCC exams were offered. He rode up the day before, spent the night in a bus station, walked to the Federal building, took the exam, and walked several miles to the JTL terminal and waited for a ride home. He felt good about the exam, and rightly so. Six weeks later his license arrived in the mail. Wade was now W5GWA—he was 14 years old.

Before his 20th birthday, Wade earned a Class-A ham license and a Second Class Radiotelegraph license. During WWII, he was Chief Engineer for a radio station in Alaska.

October, 1937

Some months before I moved to town, someone gave Wade an inoperative Sky Buddy. Wade was only twelve years old at the time, and had no idea how to repair the little five-tube receiver. He took it to an older friend, Raymond, who hoped to one day become a ham. It was rumored around town that Raymond had a certain amount of knowledge about radio repair. It was a rumor totally without merit.

Raymond, an employee of Nelson's Winery, decided the Sky Buddy—less than two years old—needed a complete recapping. Raymond carefully, and neatly, snipped out every capacitor in the set, and ordered new ones. The problems began when he realized he had no idea where he had snipped out the capacitors. The set was put under the workbench and designated as non-repairable.

June, 1938

We moved from Huntsville to Springdale in early summer. I brought with me a four-tube Haynes regenerative receiver, a stack of second hand Short Wave Craft magazines, and a burning desire to become a ham radio operator. Huntsville, at the time, had no hams that I could discuss radio with. When I found that a real, legally licensed, amateur radio operator lived less than two blocks from our apartment in Springdale I was excited. Wade and I were close to the same age and shared two things in common—a love of radio, and no money.

Wade soon introduced me to Clarence,

W5BQI who would become my Elmer and friend.

The first day we met, Wade and I made plans—a lot of plans—to build a 5-meter transceiver so we could visit via the airwaves. That night I was so excited that sleep was impossible. All I could think of was building a real working radio.

Within days, Wade introduced me to the entire ham and would-be ham population of Springdale. Carl was sixteen years old and a sophomore in high school. Clarence, W5BQI, was an auto mechanic, long on ability and very short on money. Raymond was a thirty-five year old truck driver. Alan (W5A??) was a clerk in a dime store, and Clyde W5FKT, managed the local theater. These six constituted the ham population of the city at that instant. W5BVT would soon move to town and become an active ham.

July, 1938

Clarence received a raise at the automobile garage where he worked. His salary was increased from $12.50 to $14.00 a week. He decided to move from the small two room house into a larger five room house. The rent was only a dollar more a month—and best of all, it was directly across the street from Raymond, who was one of three students that Clarence, W5BQI, was Elmering.

The house was not large, so Clarence had his rig in the living room. It was all ready to go except he had no receiver—other than an old BC receiver that covered the 80 and 160-meter bands. That made it a bit difficult to work out as his rig was for CW only, and the BC receiver had no BFO.

Clarence was teaching Carl, Raymond, and me the basics of ham radio. Of course Wade attended every meeting even though he was already licensed. There were only two other hams in town and both were unable to attend our meetings.

Soon after moving into their new home, Clarence bought a Hallicrafters Sky Champion from Bob Henry. His payments were $3.45 a month.

Clarence required only two things of his three students—listen to W9BSP every night without fail, and practice the code thirty minutes every day.

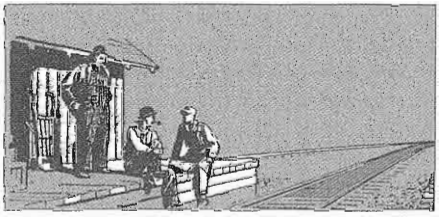
Those were the days before multiple choice exams. Even though there were only ten questions on the exam, they required a bit of radio knowledge. For example: A question might be worded like this: A) Draw a schematic, indicating all component values, of a 400-VDC, full-wave power supply with a choke input. B) Draw the power supply with a half-wave rectifier. C) Draw the power supply with a bridge rectifier. All three power supplies to operate from a 110-VAC power main.

Another question might be: Make a drawing of three different antennas suitable for use on the 40 meter band. Show all dimensions of antennas and feeders, and a simple way to match each antenna to a push-pull amplifier.

This is how we spent our time on with Clarence. He had one of those minds that stored schematics in his skull. He could build a receiver, or transmitter, without looking at any books or schematics—and he demanded no less of his students. I am not sure, but I do not believe he went above the eighth grade in school, but he was a masterful builder who could take a pile of junk and turn it into a nice looking transmitter.

August, 1938

The loading dock of the S & E Wholesale Grocery warehouse was dark and quiet, At 4:45 AM the eastern sky gave no hint of the approaching dawn. In the dim light cast by two post lamps in front of the Frisco depot, two figures sitting on the rough oak loading dock were engaged in a serious discussion.



"If the train is on time you will soon be the owner of a real communications receiver," said Wade. "Paul Jones is a real nice express agent. He'll let you have it as soon as he pulls his cart into the express office. Paul just arrived at the office. I saw Blackie, his old German Shepherd, looking out the window."

"I am sure it will be on the train. I called Bob Henry yesterday morning and he promised to get it to the office before train time," I replied. "I already have my credit established, and have been paying him $1.65 every month for the Sky Buddy 5T."

In reality, the S-19 was not a big improvement over the 5T. The advantage was mostly in our mind. I think the German Silver dial is what convinced me to trade. It looked a little like the Super Skyrider SX-17—and that made it a real communications receiver.

How did I get the $1.65 payment? I got it the old fashioned way, I worked for it. Dr. Sisco's offices and clinic occupied the entire second floor of the Arkansas Western Gas Company building. The wind, due to some unknown reason, tended to deposit an unusual amount of papers, dust, and trash in the entrance, and up the stairway of Doctor Sisco's office. He paid me $1.50 per week to sweep the sidewalk, vestibule, and stairway leading into his offices. That was quite a windfall. It only took about thirty minutes a day to do the job—and I did not have to sweep at all on Sunday.

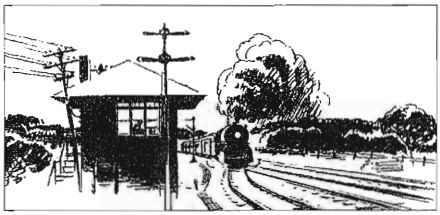
Henry Radio Shop, as it was known at the time, was located in Butler, Missouri, about fifty miles south of Kansas City, and 150 miles north of Springdale. Anything we ordered from Bob arrived the following day on the 5:10 AM Frisco.

Henry Radio sold on very easy credit terms. You could buy any item for 20% down, and pay the balance in twelve payments at 6%, financed by Bob Henry—not a finance company. Any item Bob sold was returnable within ten days if you were dissatisfied, plus—he had the items in stock; seldom was anything back-

ordered.

Wade, W5GWA, was fourteen years old, and had been my constant companion and friend since my family moved to Springdale. Our small apartment was a stone's throw away from Wade's big, white two-story home. His shack was a large unfinished attic room. At the time he had built a receiver, and a transmitter—neither of which worked. He had nothing capable of actual two-way radio communications. You can understand our eagerness to operate this new radio.

He was almost as excited as I was about the new S-19 Sky Buddy I had coming. We were glad to give up a few hours sleep and meet the train. That way, we got our radio gear about five hours faster than waiting for Paul to deliver it. Somehow, the early rising and waiting at the express office added to the excitement. I had a four-tube regenerative receiver at the time that was marginal in operation—mostly because of the operator. My old 5T served as my down payment on my new S-19. We were both anxious to have a receiver capable of listening in on the ham bands.



In the distance we heard a whistle, as a train approached the Lowell crossing, only five miles north. We got up and walked across the tracks, and sat down on a Railway Express cart. We anxiously gazed northward for the sight of the sweeping headlight on the old steam engine. As we waited, I thought back over the events of the past few months. A dream that seemed impossible only months before was about to become a reality. That beautiful summer morning, just as the eastern sky showed the first glow of approaching day, I became the owner of a genuine Hallicrafters receiver.

September, 1938

Carl's father was one of the towns more prosperous businessmen in the early part of the Century. During WWI he served as a Major in the AEF. Major Owenby died while Carl was still in primary school. Carl and his mother lived in the Owenby family home—a large, two story house on Thompson Street. The house, typical of more expensive homes of the time, had a solarium, or a sun room, on the south side. Carl took the sun room for his future shack.

Mrs. Owenby was very fond of Carl, and did not hesitate to treat him to the latest SX-17, with matching speaker. Carl ordered it from Bob Henry because he could get next day delivery—not that he needed, or used, Bob's easy payment plan.

Carl could not wait to show me his SX-17. I thought it was the most beautiful thing ever built by man. As Carl tuned across the bands I could not believe the audio power and fidelity that came from that set. I kept wishing Carl would let me tune it once—but no, he never let anyone touch that receiver.

September, 1938

Wade and I make our evening trip to see Clarence and talk radio. Clarence was obviously in no mood to visit that evening. We knew something was wrong—then we noticed the bare space on the operating table beside the homebrew transmitter.

"I had to let it go back to Bob Henry," explained Clarence, "I never should have ordered it in the first place. I know that $3.45 a month don't sound like a lot, but it is an impossible payment when you don't have the money."

Neither of us could disagree with that. Clarence was married with girls to educate, house rent to pay, groceries to buy, and $56.00 a month doesn't stretch all that far.

October, 1938

"Wade, I've been thinking," I said. "I think I will be able to pass the ham exam in a few weeks. I am going to need a transmitter. Clarence needs a receiver. Why don't we walk up there tonight and see if we can trade Clarence my regen for his help in building me a rig. I'd be glad to make him a present of it, but he would never take it. I think I can convince him that I really need his help."

I'll be brief; Clarence went for the deal immediately. I took him the receiver the following day. Two weeks later, Clarence had the RF deck finished. It used a 47 crystal oscillator and a pair of 45s in the final. I had to furnish the crystal and holder, and a few parts from my junk box—such as it was.

I went to work and built two power supplies, and rewound a transformer to deliver 2.5 VAC. Parts came from old BC receivers—all but the filter caps for one power supply. I ordered them from Walter Ashe in St. Louis, who had a special going—450 volt filters for less than a half dollar. I bought four and hooked two in

series to handle the 600-volt supply.

The transmitter was constructed on a chassis made from hardboard, painted gloss black. The variable capacitors were from old BC radios. The final tank capacitor was one in which every other plate had been removed. Our country was just beginning to become electrified by the REA. Near recently installed poles you could find a lot of scraps of #8 copper or aluminum wire. My final tank was wound with those scraps. The neutralizing capacitors were BC tuning capacitors with all but three plates removed. Even the wiring itself was salvage from a number of sources—one being old, twisted, green lamp cord. It was not beautiful but it served for many months enabled me to make literally thousands of contacts.

600 volts? To a 45 tube? Well, yes, but you did not make dashes exceptionally long. If you held the key down the plates on the 45s started glowing. First a small red spot in the center of the plate that gradually got larger the longer you kept the key down.

Actually I had the receiver and transmitter all ready to go when Alan came to my house and gave me the exam.

November, 1938

Wade kept urging me to "put that rig on the air. Go ahead and use my call. I don't have anything on the air and won't have until I get a little money."

Now, here I was with a fine $29.95 receiver, and a transmitter that I proudly said should run at least forty watts. Secretly I knew better. Twenty five watts out of those old 45s would be a miracle. A seventeen year old boy finds temptation hard to resist. Every afternoon I'd rush home from school to see if my ticket had arrived. After another disappointing day, I'd turn on the receiver, and listen to CW on forty meters. I'd turn on the transmitter, and tune it up for the tenth time that week. I used a tail light bulb and a single loop of wire as my tune up indicator. No doubt, I was getting RF into the antenna. I burned out a bulb or two proving it.

One fateful afternoon that little CQ demon sitting on my shoulder finally got the best of me. I grabbed the changeover knife switch, applied plate voltage to the transmitter and let a CQ fly through the ether. Secretly I hoped no one heard me. I started tuning the band from the bottom upward. My single crystal was ground for 7209 kc. Somewhere around 7150 kc I heard Wade's call. I started shaking and grabbed a pencil....W5GWA W5GWA W5GWA de W5HHR W5HHR. There it was—clear as day—I had established two way contact with a ham.

I managed to go back to W5HHR, and send some sort of a report—I think. I have never been so scared. After missing most of his transmission, I reached up and pulled the big switch. I went out on the front porch to clear my head. I looked up at the gleaming 40 meter zepp, all of 20 feet off the ground, and gazed at it with reverence. Few things in this life are as thrilling as your first QSO—even if you do flub it and quit in nervous frustration.

I was proud—and at the same time deeply ashamed. It was not the illegal operation that bothered me; it was my fear and nervousness when a station answered me. I decided to rectify that shameful attitude. I set the alarm clock for 3:00 AM. I reasoned that most hams with any sense would be sleeping. I'd get on the air when there were not a lot of hams to hear me mess up a QSO. That morning I worked three stations between 3:00 AM and 5:30 AM. My rig was in one corner of the living room of our small three room apartment. As soon as my parents arose, I shut down the rig. My Dad tolerated ham radio but he refused to discuss it with me. I tried to keep well out of his way.

By the way—W5HHR was using a single 30 tube in a regenerative receiver circuit, and a 10-watt transmitter.

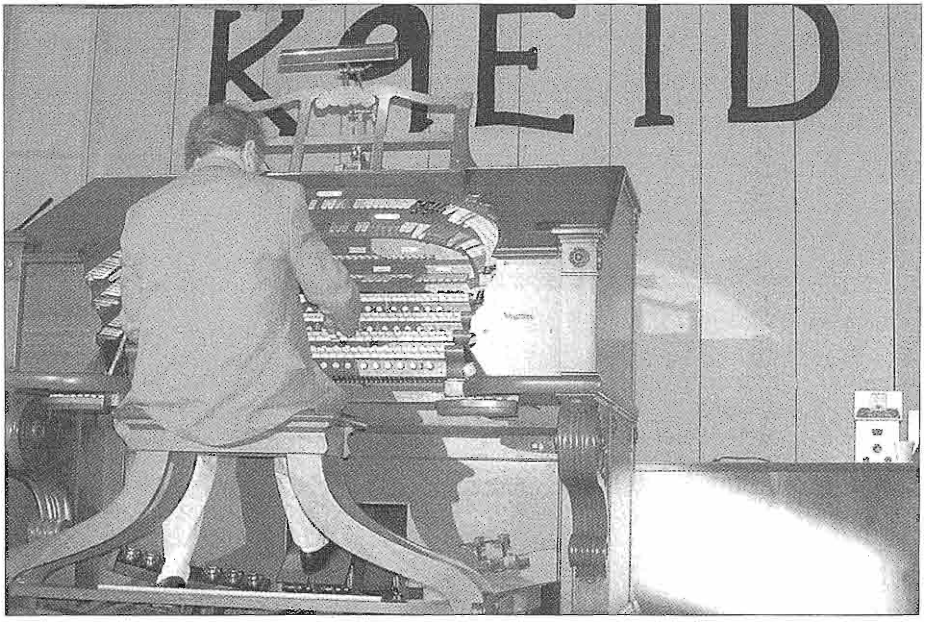
[Bruces' story concludes in January 2007, ER—Ed.]

ER

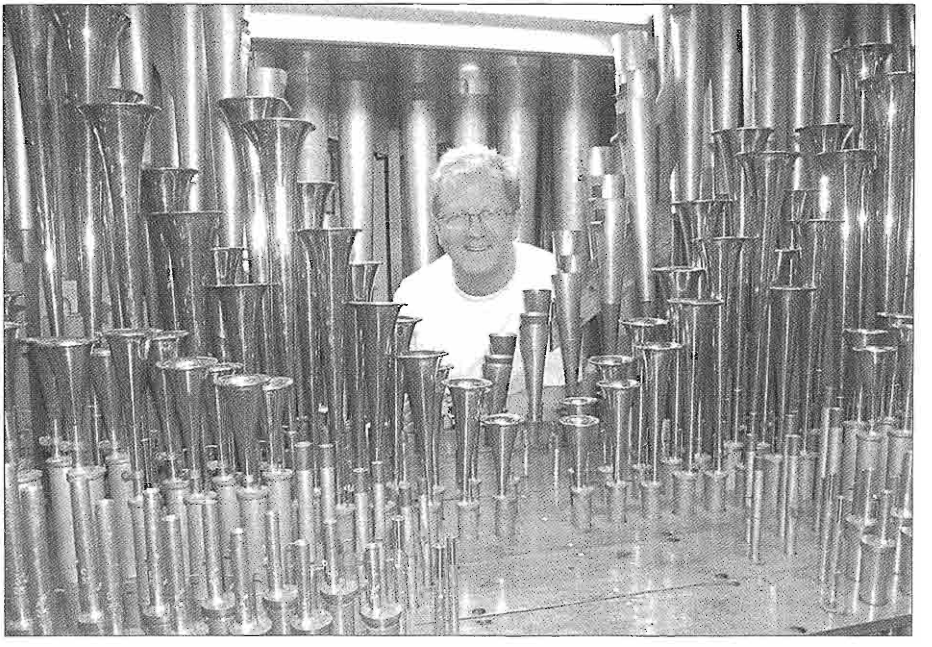
PHOTOS

West Coast 2006 AMI Bash

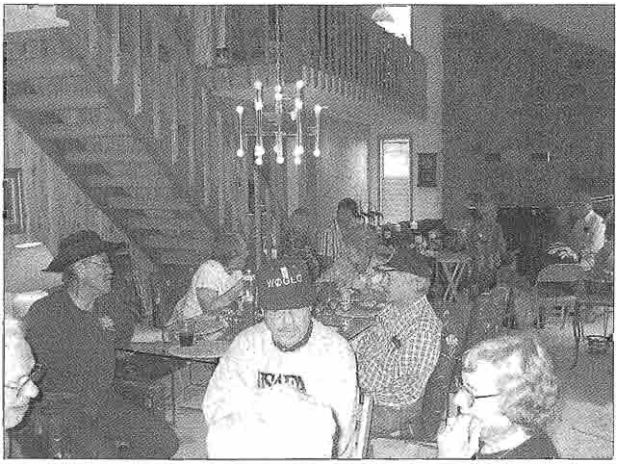
During February 2006, many West Coast AMI members attended a luncheon in San Diego about noon, before traveling to Trinity Church for a concert by Bob Heil. As people arrived, they were greeted in the parking lot by music from Charlie Porter's (KG6PRO) homebrew band organ installed on a 5-ton step van. The music playing automatically from paper rolls (no keyboard) set the theme for the wonderful afternoon of music by Bob Heil. It was an incredible event with about 30 AMI members present. Bob did a wonderful program to a great audience of about 80 people. Many local amateur radio operators, theatre organ society members, and the general public were in attendance. From the opening introduction by Joe Walsh (WB6ACU) and introductory tune "California Here I Come," Bob entertained and captivated everyone with his talents for 1 and 1/2 hours at the 4 manual- 24 rank "Mighty Wurlitzer." Bob has a great CD recording, (Bob Heil -Then And Now) that we had on sale out in the lobby. They sold well! We had vintage radio equipment on display on the stage area around the organ console and the lobby area of the church. This was courtesy of Mike McGinnis (N6TYF), Pat Bunsold (WA6MHZ), Charlie Porter (KG6PRO), and Russ Peck (KG6CLA). Russ is a soon-to-be AMI enthusiast, as he has a Heathkit DX-60 and DX-100 awaiting restoration. AMI member John Movius (WA6JUS) recorded the event with vintage microphones and a Revox reel-to-reel recorder.



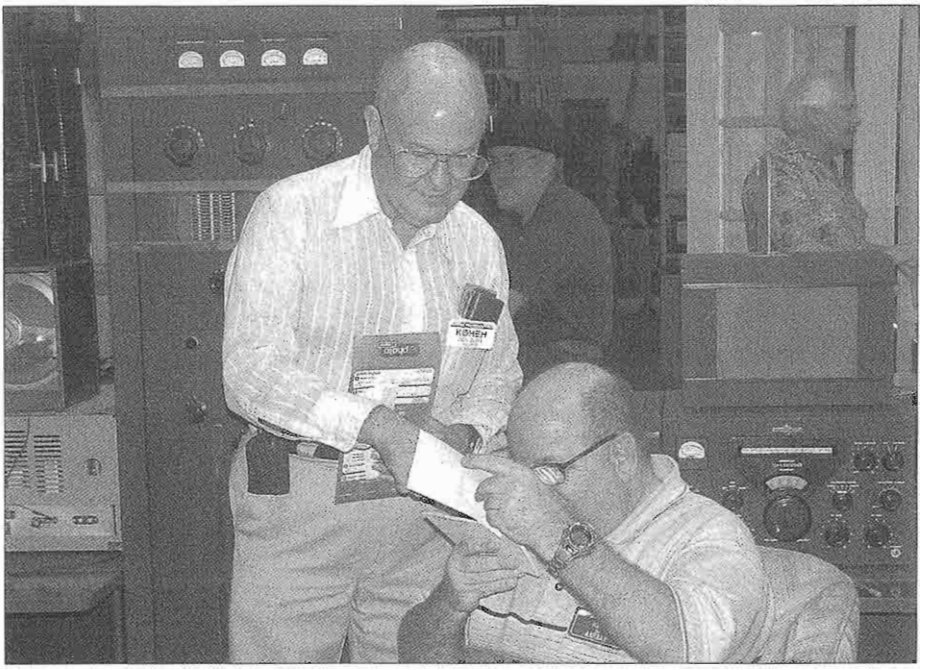
Above, Bob Heil at at the keyboard of "The Mighty Wurlitzer," and below, Bob is in "a field of brass" up in the pipe loft that everyone toured after the concert was over. Many were facinated with the mechanics of the totally restored vintage 1927 Wurlitzer theatre pipe organ. A history was given about the many places it had been installed before coming to San Diego.



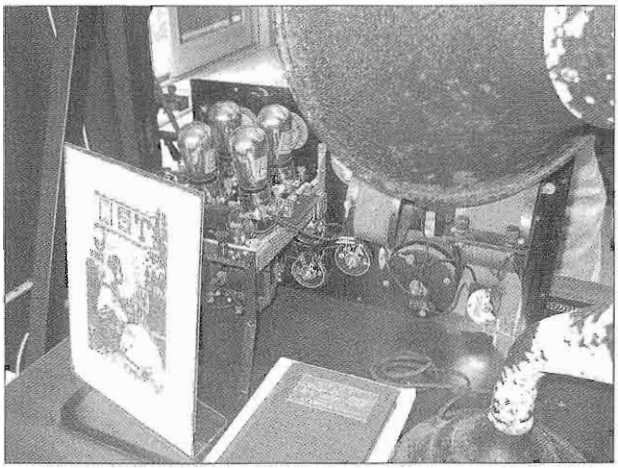
Above: Clyde's Fest, 2006 was a very special occasion, gathering Middle Tennesee and Middle Alabama AMers at the "world famous" K4UXK station November 25, 2006. Fine fellowship, stimulating conversation, and adventures were offered while touring the K4UXK shack, and Clyde's XYL's coffee and great, fresh, banana nut bread kept everyone from going hungry. Everyone enjoyed meeting other AMers in-person for the first time. Shown L to R are N4DKD, Brian, K4TQR, Hop, W4AEE, Mike, KE4ID, Jack, K4UXK Clyde, KØBS, Butch and K4BKC, Bob. In the background is K4UXK's shack, and near the window is his new RCA-1M transmitter that is about ready to be put on the air. (Photo and text courtesy of Butch Schartau, KØBS)



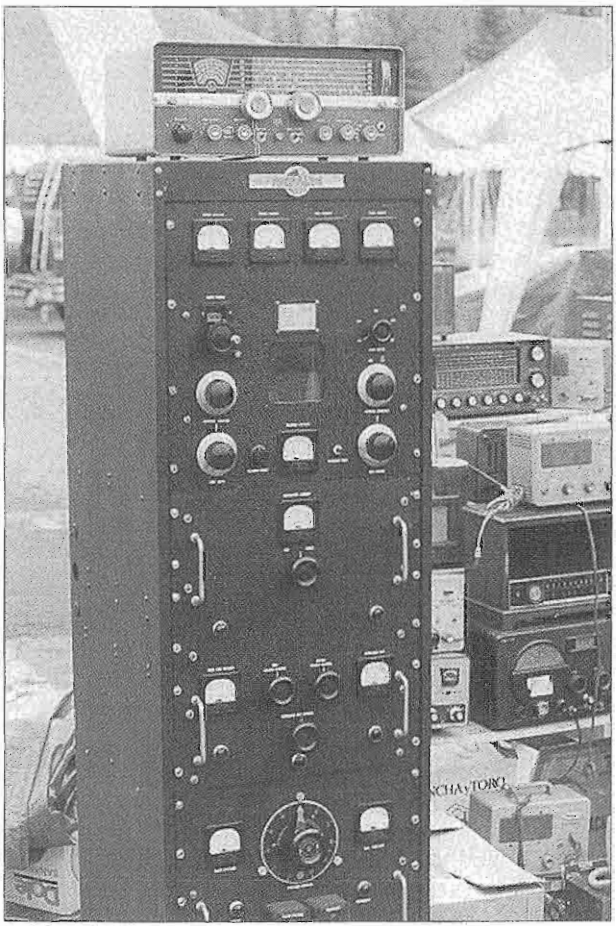
Left: Approximately 35 persons attended the W5CZ Heavy Metal Museum open house in Indian Hills, CO, on August 5, 2006. The event included door prizes, food and drink, as well as the chance to meet and share a mutual interest in the earlier days of amateur radio. Gary Halverson (K6GLH), the featured speaker, presented a fascinating history of the early days of radio before about 1930. This included rare recordings of the voices of Marconi, Lee DeForest, and Edwin H. Armstrong. Most attendees came from Colorado, but K6JEK, K6GLH, KQ6F, and Chuck Felton (KDØZS) came from out of state.



Above, Jack Quinn (KØHEH), standing, and O.J. Jenkins (KØOJ), are looking at some of the interesting documentation on display at the W5CZ museum. In the background is Mike Hall (WØCMH), left, and Gary Halverson (K6GLH). Below is one of the many fully-functional operating positions at W5CZ.



The W5CZ museum has artifacts from the spark era into modern times. From the early days of vacuum tube radio communications, behind the horn speaker (to the right) and the display material (at the left) is a rare Federal Model 59 receiver that was made about 1920.



JeRB Buchanan, K8WPI, would like help identifying the mystery transmitter at the left. We are thinking it's a homebrew with a winged Collins nameplate, but perhaps not. Here is what JeRB had to say about this interesting rig:

"...It would be interesting to see if your readers can identify. Taken at Dayton a few years ago, it was a spectacular transmitter, as nice on the inside as the outside. Unfortunately, I could find no nomenclature for the model and the owner was completely unhelpful. Although the price was reasonable, I had no way to cart it home, or it would have made the trip with me."

JeRB's email is oldbugger@earthlink.net, or write Electric Radio at the address inside the rear cover.

VINTAGE NETS

AM Carrier Net: Sunday mornings, 8:30AM local Eastern time, 3835 kc. QSX W2DAP. Friendly format.
Arizona AM Nets: Sat & Sun: 160M 1885 kc @ sunrise. 75M 3855 kc @ 6 AM MST. 40M 7293 kc 10 AM MST. 6M 50.4 Mc Sat 8PM MST. Tuesday: 2M 144.45 7:30 PM MST.
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.
California Early Bird Net: Sat. mornings @ 8 AM PST on 3870 kc.
California Vintage SSB Net: Sun. mornings @ 8AM PST on 3860 +/-
Colorado Morning Net: Informal AMers on 3875 kc daily @ 6:00 to 6:15 AM, MT. QSX KØOJ
Canadian Boatanchor Net: Daily 3725 kc (+/-) @ 8:00 PM ET. Hosts are AL (VE3AJM) and Ken (VE3MAW)
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 starting 0500, 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. Late checkins are welcome.
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. @ 6PM 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
Heathkit Net: Sun. on 14.293 Mc 2030Z right after the Vintage SSB net. QSX op W6LRG, Don.
K1JCL 6-meter AM repeater: Operates 50.4 Mc in, 50.4 Mc out. Repeater QTH is Connecticut.
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 (WA3JJT) 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 N8ECR.
MOKAM AM'ers: 1500Z Mon. thru Fri. on 3885 kc. A ragchew net open to all interested in old equipment.
Northwest AM Net: AM daily 3870 kc 3PM-5PM winter, 5-7 PM summer, local. 6M @50.4 Mc. Sun., Wed. @8:00 PM. 2M Tues. and Thurs. @ 8:00 PM on 144.4 Mc.
Nostalgia/Hi-Fi Net: Started in 1978, this net meets Fri. @7 PM PT, 1930 kc.
Old Buzzards Net: Daily @10 AM ET, 3945 kc in the New England area. QSX op George (W1GAC) and Paul (W1ECO).
Southeast AM Radio Club: Tue. evening swap, 3885 @7:30 ET/6:30 CT. QSX op Andy (WA4KCY), Sam (KF4TXQ), Wayne (WB4WB). SAMRC also for Sun. Morning Coffee Club Net, 3885 @ 7:30 ET, 6:30 CT.
Southern Calif. Sun. Morning 6 Meter AM Net: 10 AM on 50.4 Mc. QSX op is Will (AA6DD).
Swan Nets: User Net Sunday 2200z winter 14.250Mc ±QRM. QSX op rotates Jim (WA5BDR), Jay (WB6MWL), Norm (W7RXG), Bill (W4WHW). Tech Nets: Wednesday 2300z 14.251Mhz / Saturday 1900z 7235 kc QSX op Stu (K4BOV)
Texoma Trader's Net: Sat. morning 8:00AM CT 3890 kc, AM & vintage equip. swap net.
Vintage SSB Net: Sun. 1900Z-2000Z 14.293 & 0300Z Wed. QSX op Lynn (K5LYN) and Andy (WBØSNF)
West Coast AMI Net: 3870 kc, Wed. 8PM Pacific Time (winter). Net control rotates between Brian (NI6Q), Skip (K6LGL), Don (W6BCN), Bill (N6PY) & Vic (KF6RIP)
Westcoast Military Radio Collectors Net: Meets Sat. @ 2130 Pacific Time on 3980 kc +/- QRM. QSX W7QHO.
Wireless Set No. 19 Net: Meets second Sun. every month on 7270 kc (+/- 25 Kc) @ 1800Z. Alternate frequency 3760 kc, +/- 25 kc. QSX op is Dave (VA3ORP).

CLASSIFIEDS

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Subscribers receive 1 free 20-word ad per month. **Extra words are 20 cents.** Here is how to count the words in your ad: "For Sale" or "Wanted" and your contact information counts as 7 words. Hyphenated and slashed words/numbers count as 2 words. **Please count the words in your ad as described above, and if you are over 20 words, send payment for the extra words at .20 each.** Note: Not all readers use e-mail, so it is a good idea to include phone numbers. Non-subscribers: $3.00 minimum for each ad up to 20 words. Each additional word is 25 cents.

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VINTAGE EQUIPMENT ONLY!

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Ray@ERmag.com (Email ads OK)

Deadline for the January 2007 issue: ☞ Monday, December 27!

SERVICE FOR SALE: Repair and restoration on all vintage equipment; over 50 years of experience. Barney Wooters, W5KSO, 8303 E. Mansfield Ave., Denver, CO 80237. 303-770-5314

MANUALS FOR SALE: Military Radio manuals, orig. & reprints. List for address label & $1. For specific requests, feel free to write or (best) email. Robert Downs, 2027 Mapleton Dr., Houston, TX 77043, wa5cab@cs.com

SERVICE FOR SALE: COMPLETE SERVICE JOHNSON "TURBO" RANGER, Valiant, Viking 500, Viking II, include panel and cabinet refinish. Hammarlund 180(A), National 300, 303, R390(A), Collins. Powdercoating. http://w4pnt.8k.com Patty & Dee's Marina: 534 W. Main St. Waynesboro, Va. 22980 w4pnt@highspeedlink.net 540-249-3161 Cell: 540-480-7179

FOR SALE: Collins: KWM-2, updated, crystal pack. 516F2, 312B5, turner, EV, D104 microphones. Hallicrafters EC1A. Bill Coolahan, 1450 Miami Dr. NE, Cedar Rapids, IA 52402, 1-319-393-8075

FOR SALE: Hallicrafters SX-115, nice condition. 4CX1000A/JAN8168, Swan 250C w/PS117B w/matching speaker, Drake TR-4 w/AC4 and MS4 speaker. Bill Swiger, 304-842-4635, email:

ridgeradio@cebridge.net.

FOR SALE: Heath HW-101 with HP-23 supply, $225. National NC-300, $225. Viking II, $275. Viking 122 VFO, $75. 275 watt Matchbox, $125. All plus shipping. Ken Sands K8TFD 505-Parkview Drive Plymouth Mi. 48170 734-453-7658 cell 313-917-0144

FOR SALE: Westinghouse RC (RA/DA) 1922 very nice condition. $300 with new 01A tubes $350. John Snow, 1910 Remington Ct., Andover KS 67002, 316-733-1856

FOR SALE OR TRADE: 20V-2 Collins AM broadcast transmitter, w/ manual, PU only, $500. Needs restoration, call for details, George, K1ANX, 413-527-4304

FOR SALE: HRO 50-T-1, nice, w/4 coils; HRO R-105, WW II military version HRO Sr., w/rare rackmount power supply & 4 coils; National RCH, aviation version NC-100, four SW bands/1 NDB band; RCA Radio Marine, AR8503 w/AR8503P pre-selector; Marconi MSL5 WW II nav radio; DZ-2 nav receiver from B-17. **WANTED**: Headset, power supply, key for AN/TRC-77A & schematic; tuner/bandswitch knob w/skirt for Collins R-388/51J3; also top, side covers & ID tag; Johnson SSB unit 240/305 & T/R switch 230-39 or someone like him! **ALWAYS BUYING**: Vintage broadcast mics, stands, tube pre's, compressors, other ancient recording gear, interesting WW II era boat anchors. Ward Kremer, KI4 JHA, 1179 Petunia Rd., Newport, TN 37821, Ph/fax: 423/625-1994, E-mail: witzend99@bellsouth.net; More cool stuff at website: radioattic.com/kremer.

FOR SALE: Antique headsets, 40 pair in various stages of repair, 18 different manufactures. Make a reasonable offer plus shipping. John Snow, 1910 Remington Ct., Andover, KS 67002. 316-733-1856

FOR SALE: EFJ 6N2 converter model 250-43-42. Need to sell my QSTs: 1923-1991, 1993-6/94, 7/97 to 5/2005. They are pickup only, but the price is right! Also two Carter rotary inverters, 110 VAC 60 Hz out. One is 12VDC in, 90 watts, other is 24 VDC in, 350 watts. Great for field day! Will ship inverters. Rudy, W2ZIA, 716-937-9279.

FOR SALE: SX28 cabinet $35. Heath DX60 $60. Heath Cheyenne MT1 $40. Globe Chief 90A $75. Richard Cohen, 813-962-2460

FOR SALE: Zenith Transoceanic R7000-1, beautiful condition, strong receiver all bands, $250. Johnny Umphress, 1415 Moore Terrace, Arlington, TX 76010, 817-915-4706, www.jgumphress@yahoo.com

GIVEAWAY: General Electric Type BT-20-A 250-watt broadcast transmitter Model 4BT20A1. (850 lbs) Pick up only north of Atlanta, GA Tom, K4OTM 678-965-6040, k4otm@mindspring.com

FOR SALE: C-375/URC. C87/ART13. GP-7 antenna load. BC442. C97/AIC-2. BC461. WANTED: Junker BC348. Dean, 612-869-9264

FOR SALE: Viking I & VFO. Two ART-13s & P.S. Navy TCK-7, #19 RTTY & demod. QSTs for 50s on. HRO-60, full coils & digital readout. Globe Scout 65A. Lots of test gear, tubes, and parts. George Cummings, K7DU, POB 657, Hanna, WY 82327, 307-325-9081, K7du@vcn.com

FOR SALE: CRTs: 2AP1A 3AP1, 5AXP4, 5BP1, 5UP1, 7BP1A, 8XP4, 14RP4. All guaranteed or money back, each $10 plus shipping. John Snow, 1910 Remington Ct., Andover, KS 67002, 316-733-1856

FOR SALE: National coil set Type JC 3.5mc to 7.3mc looks new $35. John Snow, 1910 Remington Ct., Andover, KS 67002, 316-733-1856

FOR SALE: 10,000 plus tubes in original boxes, $2500 plus shipping. John Snow 1910 Remington Ct., Andover, KS 67002 316-733-1856

FOR SALE: Channel Master Model 7275 solid state Field Strength Meter exc cond.$65. John Snow 1910 Remington Ct., Andover, KS 67002, 316-733-1856

FOR SALE: KWM-2 CDs. All original material, not a copy of the manual. High resolution color pictures which will really help locate parts, plus much more. For more information visit my web page at http://www.heavymetalradios.com/ or E-Mail me at boatanchors@comcast.net, DW Holtman, WB7SSN

FOR SALE: B&K 700 tube tester $75. Eico 950 RC Bridge, $25. Aerovox 97 LC checker/GDO, $35. 1950 ARRL Handbook, $10. Norbert C. Wokasch, WAØKJE,3312 W. Bijou, Colorado Springs, CO 80904. 719-633-5661.

WANTED: UTC A-34 interstage audio transformer pictured to left. Please call or email Thomas Nickel, W8AI.
713-502-7799
HL9XX@yahoo.com

FOR SALE: HQ110C. HQ170C. Hammarlund S200 speaker. Multi-Products A54H transmitter. Drake W4 wattmeter. George, WA7HDL, 167 Highway 93 South, Salmon, ID 83467 208-756-4147

gbabits@salmoninternet.com

FOR SALE: Harvey-Wells T90 & PS, $150. RME DB20 $40. Hammarlund Super Pro $125. Richard Cohen, 813-962-2460

FOR SALE: Winged Collins: PM-2 power supply #15123, $225. LS-116/U speaker, $180. Thumb screws and hdwr, $55. Prices include shipping. Doc, KØGRM, 701-258-6747

FOR SALE: Vibroplex Vibro Keyer; with Standard base, brown; NY Address; in original box; $70. Contact: Mike Grimes; 5306 Creekside Ct.; Plano, TX, 75094, 972-384-1133, k5mlg@verizon.net

FOR SALE: B&W 5100A transmitter, Johnson Viking II transmitter, Hammarlund SP600 (with case), Drake B Line, Hallicrafters Cyclone III SR400A, Yaesu FTDX401, Yaesu FTDX 570, Hallicrafters SX-28 (needs recapping) Elmac AF68 with PS; all working well, excellent to mint condition; KBØW/6, 916-635-4442, fdellechaie@sbcglobal.net

FOR SALE: 19 MT-500 Motorola walkie-talkies; 2 RCA; 4 Motorola desk chargers; 2 RCA desk chargers; 4 automobile chargers; extra rubber duckies; manuals and extra crystals; All units were in use when re-moved from service. Make reasonable offer for all units. John Snow, 1910 Remington Ct., Andover, KS 67002, 316-733-1856

FOR SALE: EICO 1064 power supply exc cond $35 plus shipping. John Snow 1910 Remington Ct., Andover, KS 67002 316-733-1856

FOR SALE: Technical Books & CDs. Harold Kinley (WA4GIB), 204 Tanglewylde Dr., Spartanburg, SC 29301 www.radiotechnologies.net

FOR SALE: "Unique Radio Parts", LLC. www.wa9tgt.com (Replacement parts for "Drake" radio equipment)

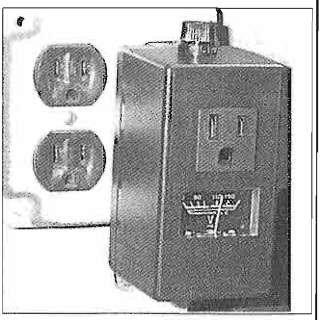
ZIM ELECTRONICS INRUSH CURRENT LIMITERS

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:

Model AB-1M, (With Voltmeter) $34.95
Model AB-300M, 300 watts (2.5 amps x 120 VAC) with meter $39.95
Model AB-1 (With Pilot Light) $29.95
Shipping, each limiter $5.45

(4 or more limiters are shipped free for US orders. Overseas customers please ask for shipping quotes.)

The Inrush Limiter provides a gentle, slow startup for your valuable vintage radio equipment. They also reduce the line voltage closer to original design values due to the voltage drop across the limiter element. AB-1 and AB-1M are 150W. All models come with a full money-back guarantee.



Model AB1-M

Electric Radio Store
720-924-0171

FOR SALE: New, universal power supply for Elmac, Gonset, Harvey Wells, others. SASE for brochure. Harold Smith, W4PQW, 1435 Bush St., Pensacola, Fl. 32534 850-476 8107 w4pqw@cox.net

FOR SALE: Chinese Army type 65 hand crank generators for 102E radio sets. Ken, KD6B, kd6b@bendbroadband.com 541-923-1013, POB 310, Redmond, OR 97756

FOR SALE: Transformers, chokes, meters, tubes, (other parts, ask), consider offers plus shipping. E.F. Hayes, WØJFN, 3109 N. Douglas Ave, Loveland, CO 80538-2548

FOR SALE: Atwater-Kent dual speed tuner repair kit. Complete details at www.adamsradio.com Adams Manufacturing CO., POB 1005, Lincoln Park, MI 48146

FOR SALE: Thermistors, 100+ of various shapes and resistances, $10 post paid via priority mail. Len Gardner, 458 Two Mile Creek Rd, Tonawanda, NY 14150, radiolen@att.net

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 214-763-5977

FOR SALE: Military whip antennas, NOS, $45 ea. plus shipping. Bruce Beckeney, 5472 Timberway, Presque Isle, MI 49777, 989-595-6483

FOR SALE: Naval Receivers RAK, RAL, RAO, RBA, RBB, RBC, RBL, RBM. Some

This is possibly a long shot, but I would like to obtain an unrestorable SX-88 for parts. A chassis with missing unobtainable parts or a complete receiver in very rough condition is preferred to prevent breaking up an otherwise restorable unit. I am willing to pay above-market for the right chassis or parts unit and I will make it available to others whom might also have a project SX-88 on hold due to needing parts.

Greg Gore, WA1KBQ
10291 Kendan Knoll Dr.
Charlotte, NC 28262
704-503-5952
WA1KBQ@AOL.COM

checked, pwr splys available. $75-$450 depending on condx. Many other types. Carl Bloom, carl.bloom@prodigy.net 714-639-1679

FOR SALE: Used Electric Radio issues 1-202, boxed, in perfect condx, $450 + shpg. Don Galarneau, W7KCK, 503-289-2326 kack7@qwest.net

QSLs FOR SALE: Your old QSL card? Search by call free, buy find at $3.50 ppd. Chuck, NZ5M, nz5m@arrl.net

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

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@arrl.net 509-766-7277.

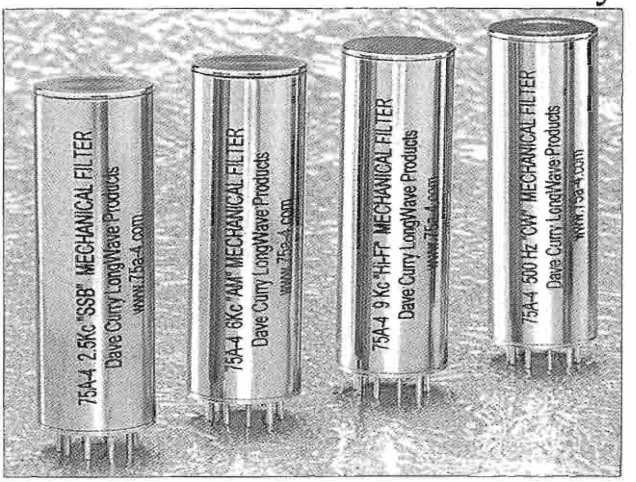
FOR SALE/TRADE: Manuals: Collins, National, Hammarlund, Drake, B&W, Johnson, Multi-Elmac, WRL, Hallicrafters, Gonset, Swan. NI4Q, POB 690098, Orlando, F1 32869 407-351-5536 ni4q@juno.com

FOR SALE: Collins 516E-2 24VDC power supply $150. 24VDC 15A output ACPS $50. Cushcraft A4-S beam $200, prefer meet or pick-up. Steve Davis KD2NX, 71 Oak Street, Keansburg, NJ 07734, 732-495-8275 kd2nx66@yahoo.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: Used back issues of Electric Radio. Call Dick at 207-490-5870, $1 per issue.

The Collins Filter Family



By Application, Left to Right:

75A-4 2.5Kc 75A-4 6Kc 75A-4 9Kc 75A-4 .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 1950s design. AM (6 kc), CW (500 cycles), SSB (2.5 kc), Hi-Fi AM (9 kc Ceramic Filter) Money-back guarantee

$199 each, $178 for 9 kc, plus $5.45 S&H within the U.S. each order

In stock for immediate shipment from the ER Store, or on-line at

WWW.ERMAG.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

DRAKE PARTS FOR SALE: New spun inlays for the B Line or TR4 main knob. $6. Also sell new pointer knobs. Alan, KC9YS, 630-879-1132 after 7pm.

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

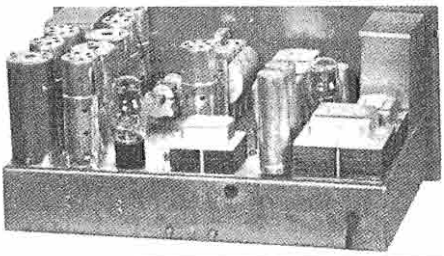
DRAKE INFO FOR SALE: Drake C-Line Service Information. Hi-Res Color photos of boards and chassis with parts identified. CD also includes Hi-Res scans of R-4C and T-4XC manuals, various version schematics and more. Garey Barrell, k4oah@mindspring.com 4126 Howell Ferry Rd, Duluth, GA 30096. 404-641-2717

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

BOOKS FOR SALE: Lots of old radio & related books. Please contact Eugene Rippen, WB6SZS, www.muchstuff.com

REWARD – WANTED!

THE NEW "RME-9" SUPER



Will pay $2000 for complete RME-9 receiver in any condition. Not tested, working order unknown or needs restoration is OK. The RME-9 has a single airplane style tuning dial and was the forerunner to the later RME-9D and RME-69. Greg Gore, WA1KBQ; 10291 Kendan Knoll Dr.; Charlotte, NC 28262 (704) 503-5952; wa1kbq@aol.com

DRAKE SERVICE FOR SALE: R.L. Drake repair and reconditioning, most models including TR-7's, 35 years experience. Jeff Covelli, WA8SAJ, Telephone 440-951-6406 or email: wa8saj@ncweb.com

FOR SALE: QRP transmitter kits. Step-by-step instructions. Wood model, up to 5 watts 40/80M $15. "Tunatin" one watt 40M $10. You furnish crystal and power. Robert Larson, 1325 Ridgeway, Medford, OR 97504 w7lng@arrl.net

SERVICE FOR SALE: Repair, upgrade, performance modification of tube comm. & test equip. Accepting most military, all Collins & Drake, & better efforts from others. Laboratory performance documentation on request. Work guaranteed. Chuck Felton, KDØZS, Felton Electronic Design, 1115 S. Greeley Hwy, Cheyenne, WY 82007. 307-634-5858 feltondesign@yahoo.com

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

FOR SALE: Tubes tested good globe 224 $6, 226 $8, 227 $9. Write or e-mail: tubes@qwestnet for price lists or see www.fathauer.com. Slightly weak tubes guaranteed to work in early radios 1/2 regular price. 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: Repair of tube and solid state 1930 to 1975 radio equipment, auto, shortwave and older amateur gear. Please contact Ken Hubbard, KA9WRN, at 608-362-1896 or write Vintage Radio Service, POB 792, Beloit, WI 53512-0792.

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. We have over 3,000 items in inventory and carry all types of communications parts.

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

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

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: 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

REWARD – WANTED!

Will pay $1000 for a 1930s National type LRR 36" relay rack. The National LRR is a lightweight knockdown style tabletop rack for amateur use and can be identified by its ¾" wide top and bottom crossmembers with a red "National Co.; Malden, Mass" decal on the top crossmember. Greg Gore, WA1KBQ; 10291 Kendan Knoll Dr.; Charlotte, NC 28262

704-503-5952 **email: wa1kbq@aol.com**

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

FOR SALE: Vintage electronics at Alameda Antique Mall, 9837 Alameda Genoa in Houston. Visit www.RadioWorld-OnLine.com Carl Blomstran, POB 890473, Houston, TX 77289

PLANS FOR SALE: Build your own "Midget" bug replication by KØYQX, ca 1918, featured by K4TWJ in CQ Magazine, May '98. 10 detailed blueprints. FAX: 507-345-8626 or mobeng@hickorytech.net

NOTICE: Visit Radioing.com, dedicated to traditional ham radio & vintage radio resources. Let's Radio! Charlie, W5AM. www.radioing.com.

WANTED: Cabinet for a Johnson 500 or Johnson Valiant. Have Ranger cabinet for partial trade. Bob, KFØAM, 605-923-5309, bobh16@rushmore.com

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

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

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

TREASURES FROM THE CLOSET! Go to www.cjpworld.com/micromart to find some unique items many hams would lust for! Gus, WA, 360-699-0038 gus@wa-net.com

WANTED: Spinner knob as used on some RBL receivers or similar. Ideally 2-1/4 to 2 3/4" max diameter at skirt, stubby spinner. February 1996 73 magazine, complete issue. JeRB, K8WPI. 269-226-8873: oldbugger@earthlink.net

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

WANTED: Heath SSB transmitter in good condition with HS-1661 speaker. Al, KAØCHZ, 218-386-1718, 1009 Steenerson ST NE, BOX 176, Warroad, MN 56763

WANTED: Harvey-Wells APS-90 power supply in good working condition for my newly acquired TS-90 transmitter. Alan W. Fremmer, KB2HEI, 550-H Grand Street, New York, NY 10002, 212-777-3630, awfremmer@aol.com.

WANTED: Hallicrafters HT33 with salvageable power supply. The RF section is not required to be useable, need a power supply to contribute to one that is. Gary Schonwald K2PVC. gschonwald@earthlink.net phone: 917-359-8826

WANTED: Technical Materiel Corp rack mounted antenna tuner and RF /SWR meters to be used with the 350-watt or 1000-watt TMC linear amplifiers. Will consider other TMC transmitting equipment and accessories for collection and on-air use. Gary Schonwald K2PVC. gschonwald@earthlink.net phone: 917-359-8826

The Caps Are Back!

By popular request, we are offering another run of the popular Electric Radio baseball caps. These new caps are a nice 5-panel all-cotton style with an adjustable rear headband and a 3-inch front brim. The background color is light tan, and the ER logo is embroidered in 3 colors, not printed. These hats will hold up for a long time.

$19.95, including priority shipping.

ER Store
PO Box 242
Bailey, CO 80421
720-924-0171
Or on-line: www.ermag.com

WANTED: For collection: Eldico SSB–1000F. Dave, WA6GNZ. 775-852-3394 dhuntmd@sbcglobal.net

WANTED: Collins service bulletins for 651S-1 HF receiver. Contact: mmoss@mindspring.com

WANTED: RF deck for R-390A receiver in working condition. Robert Goff, W7MKA, 1930 SE Portola Dr. Grants Pass, OR 97526, 541-476-2064, robert.h.goff@gmail.com.

WANTED: Hookup info, Spectronics frequency display to FT-101E. Also Sylvania 6ESB pilot lamp. Ed Rehm, W9NXR, 847-566-9312

WANTED: Older NC black wrinkle speaker, reasonable, or trades. Jim, K7BTB, 928-635-2117 or jeldgl@aol.com

WANTED: Two inch round meter. 0-5 mA. Will buy or swap for another meter. Tom Marcellino, W3BYM, 13806 Parkland Dr., Rockville, MD 20853. 301-871-7463. w3bym@logonbasic.com

WANTED: Tuning/band change knob for Collins R-388/51J-3; Top dust cover, bottom cover & ID tags or scans of same to make dupes. Ward Kremer, KI4 JHA, 1179 Petunia Rd., Newport, TN 37821, Ph/fax: 423-625-1994, Email: witzend99@bellsouth.net

WANTED: Need two Westinghouse RT35 0-1 RF amps, 3-1/2" round Steve Bartkowski, 1-708-430-5080

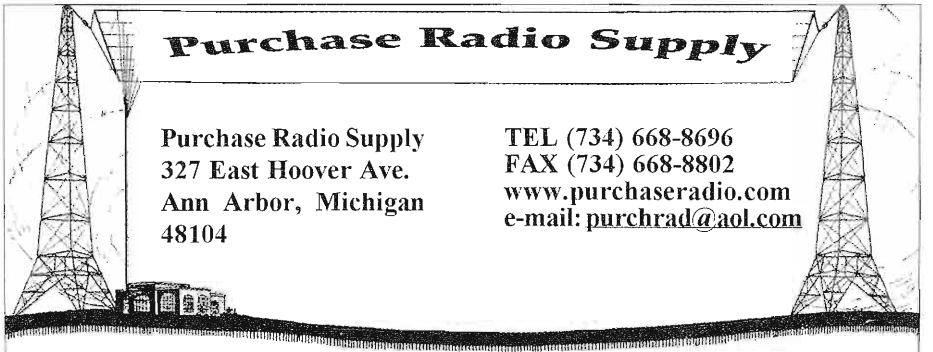
WANTED: 60 cycle frequency meter for monitoring single phase power generator. J.I. Lillie, POB 128, Onondaga, MI 49264, 517-628-3531 BEFORE 9PM Eastern.

WANTED: Hallicrafters SR500 console, any condition considered. Eddie Hatcher, KV5I, 2618 Heatherwood, Dallas, TX 75228 eh54@sbcglobal.net 214-320-5835

WANTED: Meter movement for Western Electric tube tester KS-15750. Walter Hughes, WB4FPD, 6 Academy Ct., Berryville, VA 22611 540-955-2635

WANTED: Vacuum Tubes: 279A, 212E, 249B, 258B, 271A, 242A, C120, C100A, 804, RK20, CK70, GL805, C201, ZB-120, 802. Components for rebuilding Collins 30J RF output deck, including Cardwell or equivalent dual section variable 440 pF and 240 pF capacitors. Components for Collins 12H /12N speech input console, including preamplifiers and program amplifiers. Rod, W5CZ, 303-324-2725, rodperala@aol.com

WANTED: QSL cards from W6JYS, Carl Lunghart. Clayton Vedder, 1037 Route 23A, Catskill, NY 12414



Founded in 1930, Purchase Radio Supply is the Midwest's popular vintage parts dealer. We specialize in friendly service providing components for Real Radio that other "antiseptic" radio stores can not match. If you are looking for transmitting and receiving tubes, components, hardware, or publications please give us a call. We may just have your parts for that special project. We are also a stocking distributor for major electronics manufacturers and carry modern components.

WANTED: Bias and filament transformer from HT-33A or B, also HT32B transmitter parts unit. John, W8JKS, 740-998-4518

WANTED: Will buy SP-600 and some other Hammarlund equipment, working, not, or incomplete. Al, W8UT, anchor@ec.rr.com 252-636-0837

WANTED: Pearce-Simpson manual/ schematics for VHF marine radio, model "Catalina", JR Linden, K7PUR, PO Box 4927, Cave Creek, AZ 85327, jrlinden@usa.net

WANTED: Clean National Select-O-Ject, NC-183DTS and Heath VX-1. Contact RIC at c6ani@arrl.net.

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

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

WANTED: Seeking unbuilt Heathkits, Knight kits. Gene Peroni, POB 7164, St. Davids, PA 19087. 215-806-2005

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

WANTED: One of my "KN8GCC" QSLs from the mid-1950s. Tom Root, 1508 Henry Court, Flushing, MI 48433, wb8uuj@arrl.net 810-659-5404.

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, SC.29649, 864-227-6292, brentw2@earthlink.net

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

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. See 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: 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: 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

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

WANTED: QSL card from W9QLY, Frank (Mac) Maruna, from 1956 or before. WILL PAY TOP DOLLAR. Don Barsema, KC8WBM, 1458 Byron SE, Grand Rapids, MI 49506, 616-451-9874

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

WANTED: Top dollar paid for WWII radios, PRC-1, PRC-5, AR-11, SSTR-1, SSTR-5, British B2, need pts for PRS-1 mine detector. Steve Bartkowski, 708-863-3090

WANTED: Sonar CB transceiver model J23 mobile set. 23-channel, tube-type CB radios, also 23-channel mobile sets. Ed, WA7DAX, 1649 E. Stratford Ave., Salt Lake City, UT 84106. 801-484-5853

WANTED: TCS & TBY Navy radios. Ken Kolthoff, K8AXH, PO Box 215, Craig, MO 64437. 913-634-3863.

WANTED: ARC-5 rcvrs, racks, dynamotors. Jim Hebert, 900 N. San Marcos Dr. Lot 77, Apache Junction, AZ 85220

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

WANTED: Harvey-Wells Odds-'N-Ends: Speakers, phones, mikes, manuals, supplies, prototypes, military, aircraft. Kelley, W8GFG, 219-365-4730, 9010 Marquette St., St. John, IN 46373

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: 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: Receivers. Telefunken E1800, Rohde Schwarz, EK-56/4, NC-400, Racal 3712, Hallicrafters SX 88, Collins HF8054A, Collins 851S-1. Manual for Racal R2174B(P)URR 310-812-0188(w) alan.royce@ngc.com

I NEED INFO!: Radiomarine T-408/URT-12/USCG/1955. Sam, KF4TXQ, PO Box 161. Dadeville, AL 36853-0161 stimber@lakemartin.net 256-825-7305

WANTED: Scott Special Communications rcvr. EA4JL, please call Kurt Keller, CT, 203-431-6850

WANTED: Copy of article "HAM WHAT 'AM" published in either RADIO ELECTRONICS or ELECTRONICS WORLD between 1960-1964. Vern, W9STB Email:telegrapher@hotmail.com.

DOWNSIZING MY EQUIPMENT: Looking for a new home Heath DX60, HR10, and VF-1 vfo set up. Yours for payment of FEDEX ground charges! Call or email, Dennis Olmstead, WB9EMD, 970-249-4099, dwotrans@bresnan.net

WANTED: SCR-602 components, BC-1083, BC-1084 displays, and APS-4 components. Carl Bloom, 714-639-1679

WANTED: Western Electric horns, speakers, amps, and mics. Barry Nadel, POB 29303, San Francisco, CA 94129 museumofsound@earthlink.net

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

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

DONATIONS WANTED: Southern Appalachian Radio Museum, Asheville, NC, where others can view your radio treasures. For general information or donations call Clinton Gorman, Curator, 828-299-1276

WANTED: Mint, complete or parts sets. Hammarlund SP-600 JX-28 version, has nomenclature tag R-620, doesn't have name engraved on panel like others, 1937 RCA ACR-111, RCA CR-88B version, RCA AR-8516, TMC CV-1758 SSB converter, and DEI Defense Electronics TR-711 telemetry receivers and modules. Will send custom shipping carton for easy transaction/shipment. Dan Gutowski, AB8VM, P.O. Box 142 Dexter, MI 48130 734-718-7450. dg16ms26@msn.com

WANTED: WW-2 IFF Equip FM-80 rack BC-126F RA-105A 1-221, BC-1293. Will pay top dollar. Steve Bartkowski, 1-708-430-5080, 7702 Austin Ave, Burkank, IL 60459

WANTED: Radio correspondence course lessons by National Radio Institute (NRI) of Washington, DC. George Reese, 380 9th St., Tracy, MN 56175, 507-629-4831

WANTED: Popular Electronics magazine circa 1963 (?) article on computer analysis of World War I causes. Louis L. D'Antuono, WA2CBZ, 8802-Ridge Blvd., Bklyn, NY 11209. 718-748-9612 AFTER 6 PM Eastern Time.

PARTING OUT: Collins 32V-2. Contact me for your needs. Cliff, N6ZU, 209-477-1235.

STATEMENT OF OWNERSHIP, MANAGEMENT, AND CIRCULATION
(1) Publication name: Electric Radio (2) Publication No.: 1048-3020. (3) Filing date: October 4, 2006 (4) Issue frequency: Monthly (5) No. of issues published annually: 38400 (6) Annual subscription price: $32 (7) Complete mailing address of known office of publication: PO Box 242 Bailey CO 80421 (8) Complete address of headquarters or general business office of publisher: Same as 7 (9) Full names and complete addresses of publisher, editor and managing editor: Symbolic Publishing Company. LLC PO Box 242 Bailey CO 80421 Ray Osterwald PO Box 242 Bailey CO 80421 (10) Symbolic Publishing Company. LLC PO Box 242 Bailey CO 80421 (11) Known bondholders: none (12) not apply (13) Publication name: Electric Radio (14) Issue date for circulation data below: November 2006. Statement Ownership will print in December 2006 issue of this magazine

(15) Extent and nature of publication	Avg No. copies each issue	Actual no. of copies during preceding 12 Mo.
(a)Total no. copies (net press run)	3200	3200
(b) Paid and/or requested circulation	2733	2733
1) Sales through dealers and carriers, street vendors and counter sales (not mailed)	137	137
(2)Paid and/or requested mail subscriptions	2600	2600
c. Total paid and/or requested circulation (Sum of 15b1 and 15b2)	2870	2870
d. Free distribution by mail (Samples, complementary, and other free)	0	0
e. Free distribution outside the mail (Carriers or other means)	0	0
f. Total free distribution (Sum 15d and 15e)	0	0
g. Total distribution (Sum 15c and 15f)	2733	2733
h. Copies not distributed	330	330
(1)Office use, left over, spoiled	0	0
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Percent paid and/or requested circulation (15c/15gX100)	100	100

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WANTED: Technical Materiel Corp (TMC) power supplies PS4 (low voltage and bias) and PS5 (high voltage) for the TMC PAL 1K kilowatt linear amplifier, also known as the RFD or RFA. Gary K2PVC; gschonwald@earthlink.net 917-359-8826

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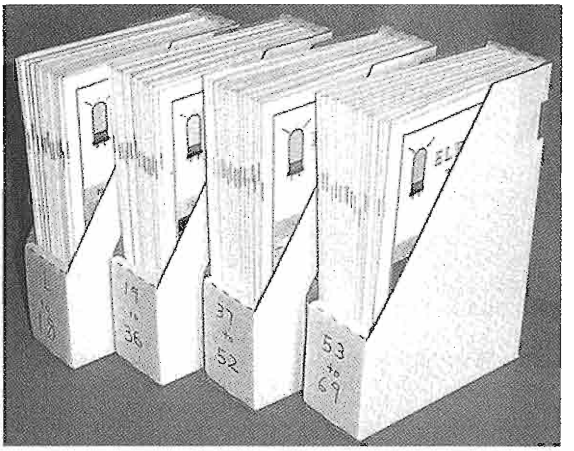

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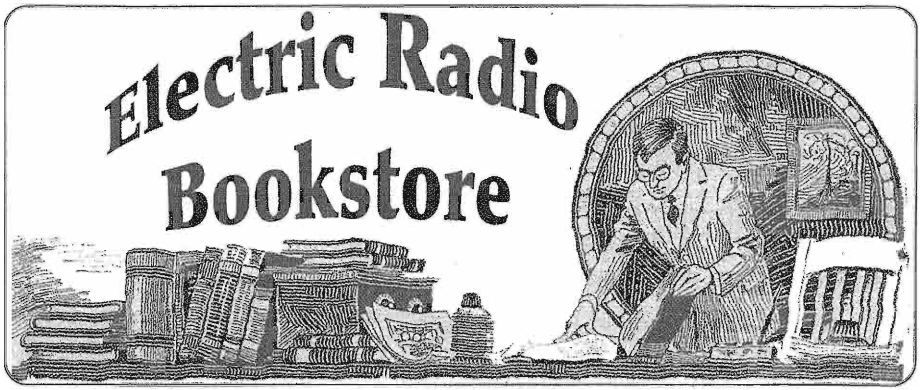

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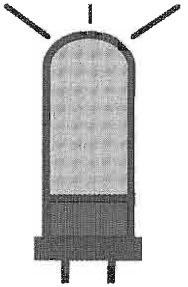

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