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ELECTRIC RADIO

celebrating a bygone era

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King Spark at 5AX

ELECTRIC RADIO

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Editor
Ray Osterwald, NØDMS

Editor Emeritus
Barry R. Wiseman, N6CSW

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

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, email, or call.

Regular contributors include:
Bob Dennison (W2HBE); Dale Gagnon (KWll); Chuck Teeters (W4MEW); Bruce Vaughan (NR5Q); Bob Grinder (K7AK); Jim Hanlon (W8KGI); Brian Harris (WA5UEK); Tom Marcellino (W3BYM); John Hruza (KBØOKU)

Editor's Comments

This month I'm proud to announce that Mark Bell (K3ZX) has agreed to become the Electric Radio Magazine Awards Manager. This is due to the resumption of the Electric Radio Worked All States-AM Award program that is announced in this issue. I'd like everyone to welcome Mark to Electric Radio. Barry Wiseman, as many of you know, started the WAS-AM Award several years ago. In response to very many requests, the award program has been reinstated. The text of the award requirements is on page 17, but due to space limitations in this issue we will print the award certificate in a later issue. We have decided to make the process formal, with QSL verifications, so that the award can be verified and that it means something to those who take the time to earn it. We are looking forward to sponsoring an WAS-AM weekend sometime this fall. This event should give everyone who is interested a start on the award.

The Annual Electric Radio Vintage Field Day is scheduled for the 7th of June, 2003. I had originally planned to operate from the former site of a railroad telegraph office at Boreas Pass, Colorado, but due the heavy spring snow it is likely that we will need to find an alternate location. I intend to find a spot that is high enough so I can hear everyone. I'll start out on 7290, and we should plan on using the traditional AM frequencies as in the past. The 7th of June should hopefully be free of conflicts with other Ham radio activities that month.

I have a few corrections to make to previous articles. In ER #163, "Ground Loops Revisited, Part 2", page 40, the diagram of the overall grounding scheme has an error. The ground wire should go to the choke first, before touching anything, and not to the filter. Then attach the ground wire to the box wall after passing thru the choke. The filter case needs to be attached to the box wall.

In ER #167, "Remembering Hoisy", the photo caption on page 9 has an error. The FCC didn't exist in 1930, and it was the Federal Radio Commission that issued Hoisy's first license. [continued on page 9...]

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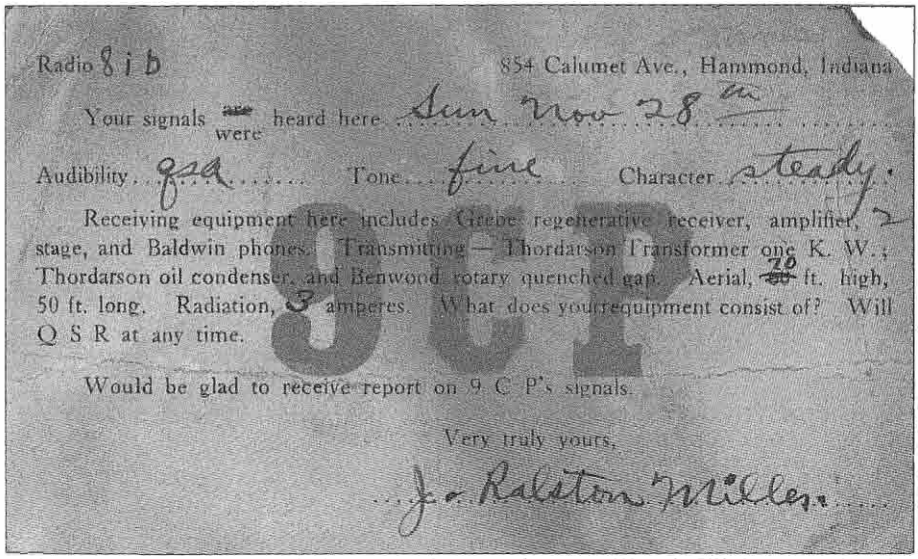
Cover: A very early QSL card that was sent to Bob Higgy (8IB) from 5AX, D.R. Simms, in Shreveport LA. A note on the rear reads "...aerial is flat 4 wires 60 ft. long, 40 ft. high N.W. and S.E..." The story by Jim Hanlon begins on page 2.

CQ de W8IB
A 1930's Style Transmitter Built by W8IB
or
Finding Pure Gold in the Junk Box

by Jim Hanlon, W8KGI
PO Box 581
Sandia Park, NM 87047
w8kgi@arrl.net

Robert C. (Bob) Higgy, W8IB, was one of the people who touched and influenced my life. He was my Electrical Engineering professor at The Ohio State University, my Alpha Sigma Phi fraternity brother, fellow radio amateur, mentor and friend. Bob was born around the turn of the last century, December 7, 1901 if my Internet search is correct, and he grew up with radio. The July 1, 1916 "Radio Stations of the United States" listing published by the Department of Commerce, Bureau of Navigation, Radio Service, that he left me when I helped his widow, Pauline, clear out his radio gear, lists Robert C. Higgy as 8PM at 1072 Market Street, Lima, Ohio. And it record that Bob was running 0.5 kW, undoubtedly to a spark transmitter. I also have some postcards of his from 1921 that show that he was then 8IB, living at 92 East Frambes Avenue in Columbus, Ohio, where he continued to live when I was a student of his at Ohio State. He was at that time the chairman of the Columbus Radio Club. Several of the cards were forwarded to him in Bellaire, Michigan during July and August of 1921, where he was probably vacationing with his


Radio 8 i b — 854 Calumet Ave., Hammond, Indiana

Your signals ~~are~~ were heard here Sun Nov 28 m

Audibility QSA Tone fine Character steady.

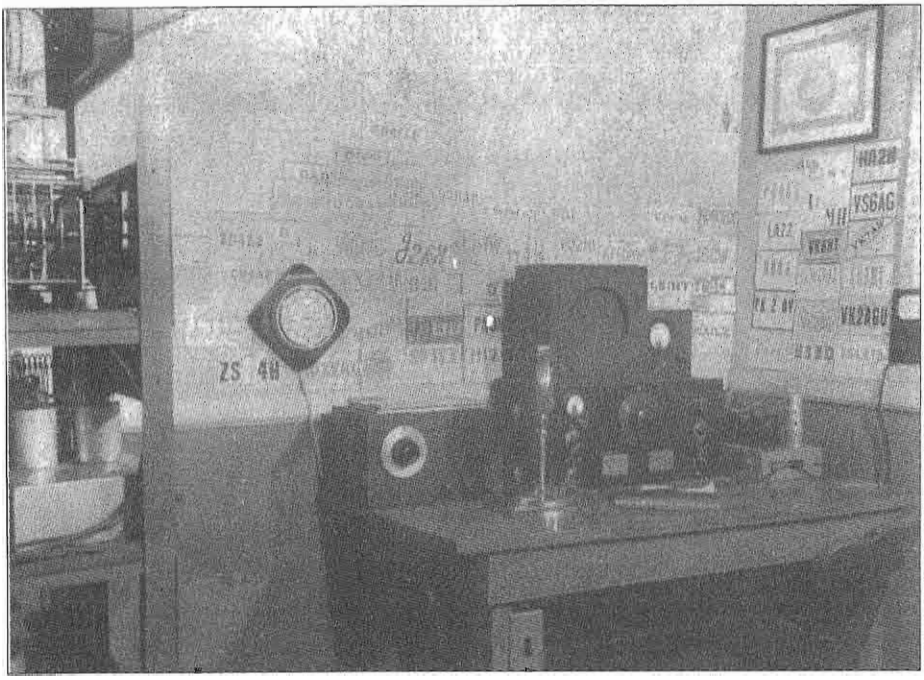
Receiving equipment here includes Grebe regenerative receiver, amplifier, 2 stage, and Baldwin phones. Transmitting — Thordarson Transformer one K. W.; Thordarson oil condenser, and Benwood rotary quenched gap. Aerial, ~~50~~ 70 ft. high, 50 ft. long. Radiation, 3 amperes. What does your equipment consist of? Will Q S R at any time.

Would be glad to receive report on 9 C P's signals.

Very truly yours,

J. Ralston Miller.

Bob Higgy (8IB) received this QSL from Ralston Miller (9CP) in 1931, by the postmark on the reverse. Miller's Grebe regen and 2-stage audio was working well this day! (QSL from the collection of W8KGI)



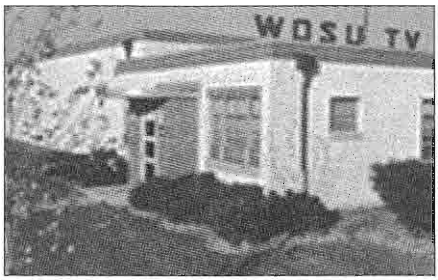
Bob Higgy was holding the call sign of W8LFE in Columbus, Ohio when this picture was taken sometime after 1937, judging by the DXCC award on the wall. Obviously Bob was very proud of his HRO, as it is in the center of the photo. One can almost imagine paying a visit to W8LFE and finding the filaments in the open-rack homebrew transmitter at the left brightly glowing, the HRO's B+ switch in the "On" position, and dozens of great AM and CW QSOs coming from the big speaker. (Photo, collection of W8KGI)

family, something he and Pauline continued to do well up into the 1970's when my family visited them in his lake-front cottage. One of those post cards contains a question about his new 200-meter CW (as opposed to spark) transmitter using a VT-1 "receiving tube." He had published a letter, "Transmitting on VT-1's," in QST for July 1921, page 60. The letter contains two schematics, one a Hartley oscillator with the CW key shorting out a link in series with the antenna-coupling link and also with a carbon microphone and a "buzzer" in series with the antenna link, and the other an inductively coupled circuit with the antenna directly coupled to the plate coil but thankfully at ground potential with respect to the B+. Using 375 volts from "an old 500 volt motor" driven as a generator and an antenna only 20 feet high and 60 feet long that ran from his back porch to a telephone pole, he reported working 8FT 62 miles away in Troy, Ohio at 1 P.M. That wouldn't be bad even today for relative QRP with a poor antenna on about 1500 Kc!

Bob also authored other QST articles. In February 1922 he published on "Practical Radio Amplification," where he described using a triode RF amplifier ahead of a regenerative detector. Apparently he had not discovered how to neutralize his amplifier, because he described several schemes for avoiding oscillation by biasing, detuning, or resistive loading instead. In March 1922,

he published an 8-page article, "The Successful Transatlantic Stations," in which he described 20 CW stations and 5 spark stations that were heard by Paul Godley at Adrossan Moor in Scotland in the December 1921 Transatlantic Tests[1]. Bob sent a questionnaire to all of the stations making it across the pond, and he presented quite a bit of information and pictures about their transmitters and antennas.

I also have a picture of Bob's shack when he was W8LFE sometime in the 1930's showing his HRO and open rack transmitter. Bob was teaching Electrical Engineering at Ohio State at that time, and he had acquired his HRO, slightly used, from the Ohio State Highway Patrol in partial payment for a consulting job.



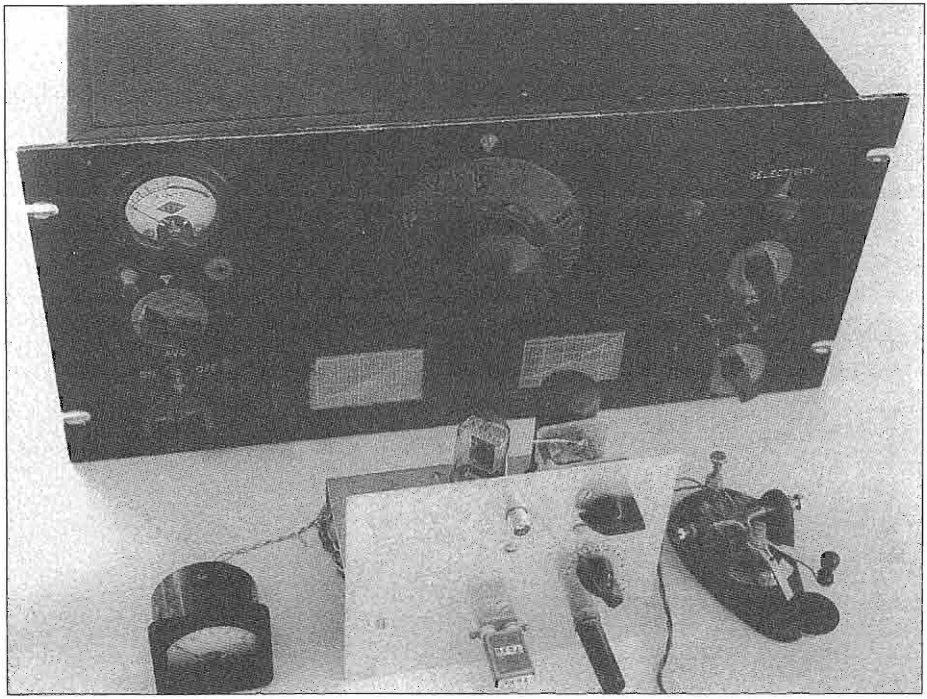
A remodeled white stucco building housed WOSU-TV in 1956.

Bob was quite involved in early amateur and broadcast radio as a young man. He was the chief engineer of The Ohio State University AM broadcast station, WOSU, when it started, and he salvaged aluminum from their "ET" recording disks for his ham projects. He was also responsible for starting up the WOSU-TV station on UHF in the 50's.

One story that Bob told me about his early days went something like this. A group of advertising sales people and technicians from the first AM broadcast station on the air, KDKA in Pittsburgh, had come to Columbus. They set up shop in a downtown hotel, intending to demonstrate to the local merchants how well KDKA could be heard in Columbus and to encourage them to advertise on their station. When they got their gear set up, they couldn't pick up KDKA, just some ham kid from the north end of town! Being enterprising folks, they found the kid, R. C. Higgy of course, and hired him to stand in for KDKA. It worked so well in impressing the local merchants that they engaged Bob to travel with them to other Ohio towns they visited that summer, filling in with his amateur gear when KDKA could not be heard. Since Bob's VT-1 transmitter dates from before July, 1921 and KDKA first went on the air transmitting amplitude modulated music as 8XK on November 2, 1920[2], this story hangs together pretty well with the available information from the era.

Bob, or "Doc" as we Electrical Engineering students at Ohio State knew him, was really in his element as a hands-on laboratory instructor. I saw his influence in a lot of the equipment we used in the labs, "home brewed" per Doc's own designs by the EE Department's technicians. Among other things, there were RF signal generators that looked a bit like general-coverage Meissner Signal Shifters and tube-regulated DC power supplies. I remember turning in an analysis on those power supplies in a lab report one time in which I had discovered that the preamplifier in the regulator circuit actually had a gain of less than unity and made the regulation of the supply worse instead of better! I got a little grin from Doc when he returned the report to me, and a remark that most of his students missed that.

Bob gave me a lot of his junk box parts when I helped him and Pauline move from their ancestral home on Frambes to a more manageable apartment around 1966. He also entrusted me with his grandfather HRO that you

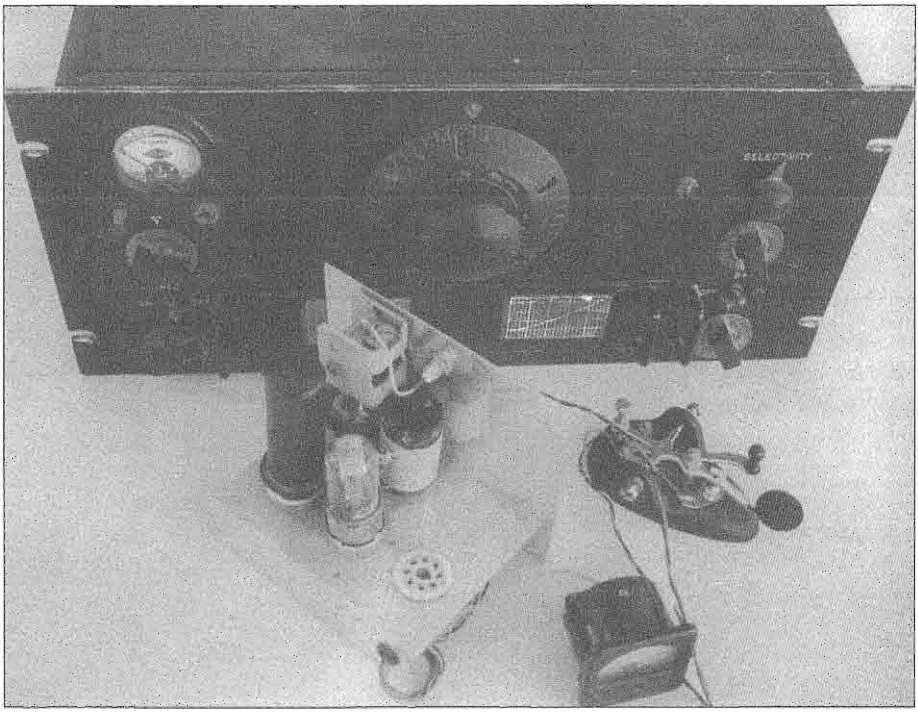


Here is the authentic 1930's station used by the author during the American Wireless Association transmitter contest of March 2003. This is the same HRO pictured on page 3 at W8LFE.

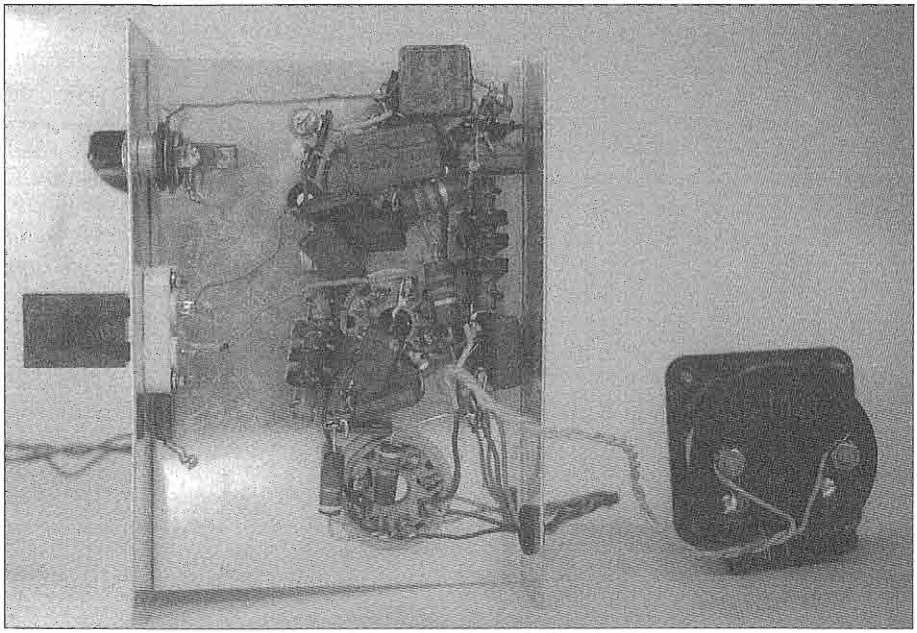
see in his W8LFE picture to "keep for him," which I have done faithfully ever since.[3] After Bob died I helped Pauline clear out his remaining gear and sell what we could. The few leftovers she gave to me, and I took them home, integrating them into my growing junk box. I forgot about one particular little piece of that gear until just last Christmas vacation.

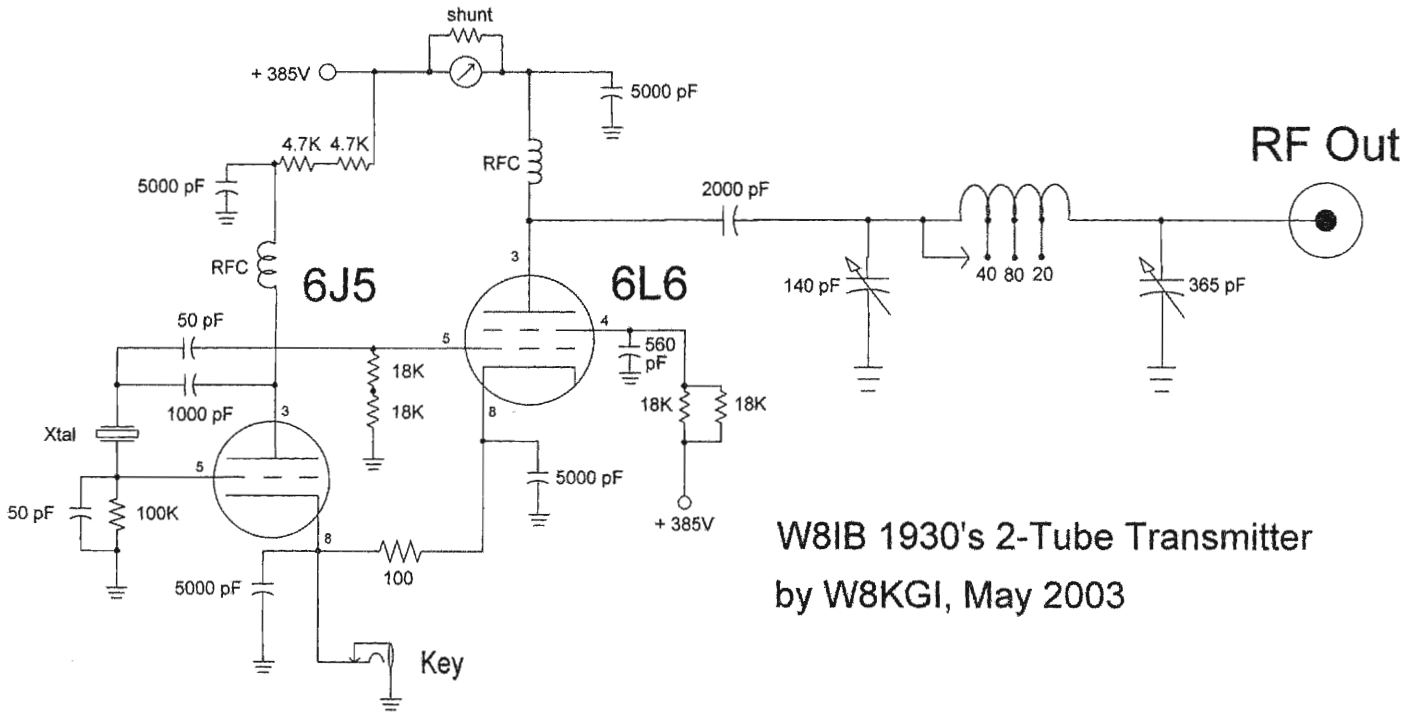
I was motivated to go junk-box diving by the AWA's declaring a 1930's transmitter contest. The contest was called for March 13th, 6 p.m. to 11 p.m. EST, 2003, on the bottom 25 kc of the old 80-meter Novice Band. I had acquired a good 3720 kc crystal, and I was looking around for the parts needed to build a 6L6 tri-tet crystal oscillator. My junk box index said there was a bottle of tube sockets up in the attic over the garage in box #4, so I went up to see if I could find a couple of octal sockets. I found the box, the bottle, and the sockets right away. But another object in the box caught my eye as well, something I had tucked away and forgotten about after Bob had died. My find was what you see in the pictures, a Bob Higgy home-brewed, two-tube, late 30's style transmitter, with a frame and panel from salvaged ET disk aluminum. Here was my 1930's transmitter already built and just waiting for me!

I traced the circuit diagram and found, as you can see in the figure, that the transmitter consists of a 6J5 Pierce crystal oscillator driving a 6L6 power amplifier. The Pierce oscillator is characterized by the crystal connected between its grid and plate and also by the RF choke in its plate circuit rather than a tuned circuit. A crystal of any fre-



Above is a behind-panel view of the 2-tube 1930's transmitter, and the photo below shows the components below the chassis, which are mostly all vintage parts and correct for the period. A complete schematic is opposite on page 7.




shunt
+ 385V
5000 pF
4.7K 4.7K
RFC
5000 pF
RF Out
2000 pF
RFC
6J5
6L6
3
4
5
8
140 pF
40 80 20
365 pF
50 pF
560 pF
18K
18K
1000 pF
18K
18K
Xtal
3
5
8
5000 pF
50 pF
100K
+ 385V
100
5000 pF
Key
W8IB 1930's 2-Tube Transmitter
by W8KGI, May 2003

quency, in particular in the range from 3.5 to 7.3 mc, will oscillate at its fundamental, series-resonant frequency in this circuit. Bob used a pi-match in the plate of his 6L6 final amplifier with taps on the coil such that it resonates on 80, 40, and 20 meters. It actually hits 30 meters as well on the 20-meter tap, although I'm sure Bob wasn't concerned about that when he built this little rig. Normally a 6L6 amplifier would have to be neutralized to avoid acting as a TGTP oscillator in a hook-up like this; but because the 6J5 plate/6L6 grid circuit is just an RFC instead of a parallel-tuned circuit, neutralization is not necessary. The 6L6 runs either as a straight-through amplifier or as a doubler, so the rig can cover the 80, 40 and 20-meter bands with crystals on 80 and 40. I fiddled with the rig a little bit, adding a BNC socket to the front panel so I could connect it to my antenna cables and winding a shunt for one of the meters Bob left me so that it would have suitable sensitivity to measure 6L6 plate current. But there wasn't really anything that I've done so far that made the rig work any better than it did right "out of the box" as Bob built it. With about 350 volts from a Lambda power supply, the 6L6 runs 45 milliamps plate current on 80 for 15.75 watts input and puts out about 8 watts into a 50-ohm load. On 40 it loads up to 90 milliamps and puts out about 14 watts with a 40-meter crystal or 10 watts doubling from an 80-meter crystal. It does about the same doubling to 30 or 20 meters as well. Surprisingly, TVI is non-existent on my family set on channels 2, 3, 4, 5, 7, 11 or 13 when the rig is tuned up on 80, 40 or 20, despite the fact that it is wide open as far as shielding or bypassing is concerned.

What ties this rig to 1930's designs is it's Pierce oscillator, 6L6 beam power amplifier line-up. There was a series of rigs in QST of this basic design, most of them pointed toward portable or emergency use. The earliest one I have found has a 6F6/807 lineup along with a modulator, described in "Norfolk Amateurs Prepare for Emergencies," by Fenton Priest (W3EEM) and Laurie Turner (W3BEK) and appearing in the September 1938 QST starting on page 8. This rig even uses a tapped pi-match in the 807 output, although it is coupled to a parallel-tuned circuit for better harmonic suppression. Follow-on rigs using a similar design include several described in "Portable Emergency Transmitters, Five Variations in Compact Equipment Design," appearing in the August 1939 QST starting on page 22. Three of the rigs in that article are very similar to Bob's. "A Universal Portable Transmitter" by Ed Blavaty (W9ACO) has a 6F6G Pierce oscillator driving a 6L6G final with the same parallel tuned tank coupled to a pi-match used in the Norfolk rigs. A "QRR Rig - 1939 Model" by C. E. McGuigan (W9TMY) features a 6C5 triode Pierce oscillator very similar to Bob's 6J5 and a 6L6 final, again using the Norfolk output coupling circuit. Francis L. Sherwood (W8NCM) contributed "A Simple Portable Transmitter" in the same article that used a 6L6 Pierce oscillator driving a 6L6 final with a straight pi-match in the output circuit just like the one Bob used. The Pierce oscillator/beam power amplifier design continued to be replicated well into the early 1950's, turning up as a 6C5/6L6 in "A Sailor's Five-Tube Station," by Wilson Jennings (W1MGK), QST, October 1940, and also as a 6V6 or 6F6/6L6 in the 1948 ARRL Handbook's "An Inexpensive Two-Tube Transmitter, as a 6AG7/807 "A Beginner's CW Transmitter" by Richard M. Smith (W1FTX) in QST, May 1948, and finally as a 6C4/2E26 80 Meter Novice Transmitter in CQ, March 1951. This last rig was the first one that I built and put on the air as WN4VIV in 1952.

Bob's rig was certainly built after the

war, because its crystal socket is the right size for WW-2 FT243 crystals rather than the pre-war crystals that fit into a 5-pin tube socket. But the parts that he used to build it, likely from his well-equipped junk box or borrowed from the OSU EE Departments stores, are the postage-stamp mica condensers and stripe color-coded resistors that were state-of-the-art in the late 1930's, as are his selection of tubes. So I don't have a problem declaring it eligible for the AWA 1930's contest, it is as good a 30's vintage rig as I could have built only Bob did it for me a few decades before I started hunting for parts for a less fancy transmitter.

I paired Bob's little rig on the Classic Exchange in February and I plan on running it in the AWA 30's contest this year with his HRO that's still a centerpiece of my shack. It will probably not be the first time that it has been on the air with that HRO. Wherever Bob is now, I hope that he will pardon me for signing W8KGI instead of W8IB when I call CQ-CX or AWA with this combination. I'm sure he will be glad when he hears that they are on the air together yet one more time. Thanks, Bob, for the neat transmitter!

1 – 200 Meters and Down, Clinon B. DeSoto, 1936, 1981, pp 72-74.

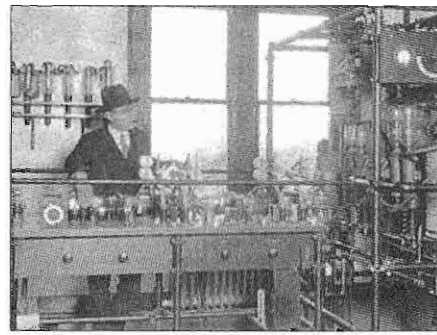
2 – Ob. Cit., page 70.

3 – "An HRO Story," Hanlon, Electric Radio, June-July 1994.

ER

[...Editor's Comments from page 1]

Also in ER #167, "Radio's Golden Age-Episode 22, Part 1", KDKA is located in Pittsburgh PA, and has been there since 1920.



This early photo of the KDKA transmitter is from the Hammond Museum of Broadcast. One wonders if the high voltage was off when this picture was taken!

Cora Cobb (KBØLPZ) has sent an update to her article in November 2002 ER, #163, "Taking Digital Pictures For ER Articles." She writes:

"...JPEG format pictures lose information every time they go through the open-and-save cycle or are compressed. (This happened with the tube pictures I sent you, so I had to send the full-size originals.) A solution to this problem is to save the pictures in TIFF format before they are resized. Save only the final version of your pictures in JPEG. Reference: "Digital Photography, Second Edition," by Erica Sadun, Sybex publishers, 2000. As an experiment, I saved the receiving tube picture in TIFF, then resized it to 4.8" width and saved it in JPEG. Very little detail was lost."

The tube pictures she is referring to are for a future article, not part of the earlier work.

73, Keep Those Filaments Lit!
NØDMS

Loudenboomer Mark IIA Amplifier

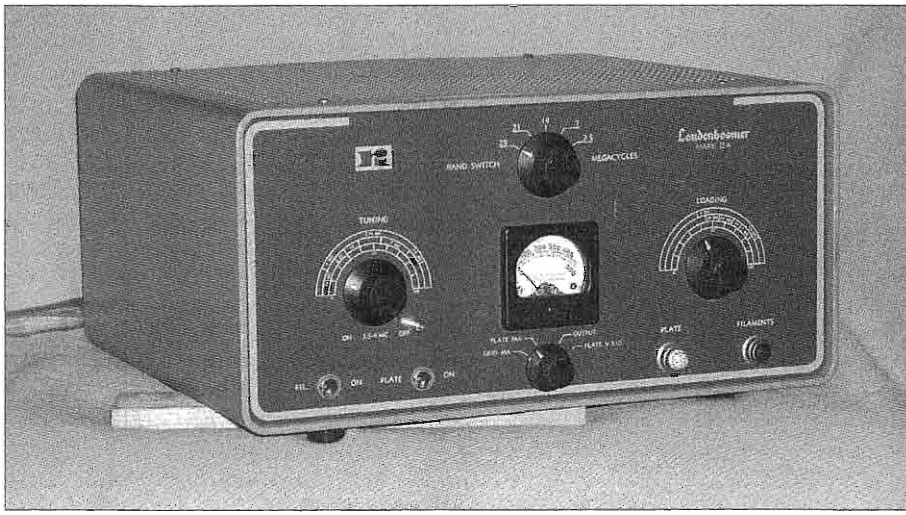
by Brian K. Harris WA5UEK
3521 Teakwood Lane
Plano, Texas 75075
brian.k.harris@philips.com

Introduction

Southern Oklahoma's Lake Texoma hamfest always seems more of a social event to me than a particularly good place to find the unusual. Nonetheless, since it's less than an hour and a half from my home, I make the trip more often than not. One fall, as I walked briskly past the wobbly tables, dropped tailgates and gaping trunks; I caught a glimpse of something that caused me to quickly break my stride. It was a Loudenboomer Mark IIA. Having never seen one in person before I had to stop for a little touch 'n' feel. Although I didn't need another amplifier, I could not resist the Loudenboomer's uncommon charm and a transaction ensued. Collecting dust in the 'to-be-restored' group became the cleverly named newcomer's occupation until a recent move of equipment from my primary shack to a new, secondary shack resulted in shelf space and an application for the Loudenboomer. Accordingly, the dust collection ceased and restoration began.

History

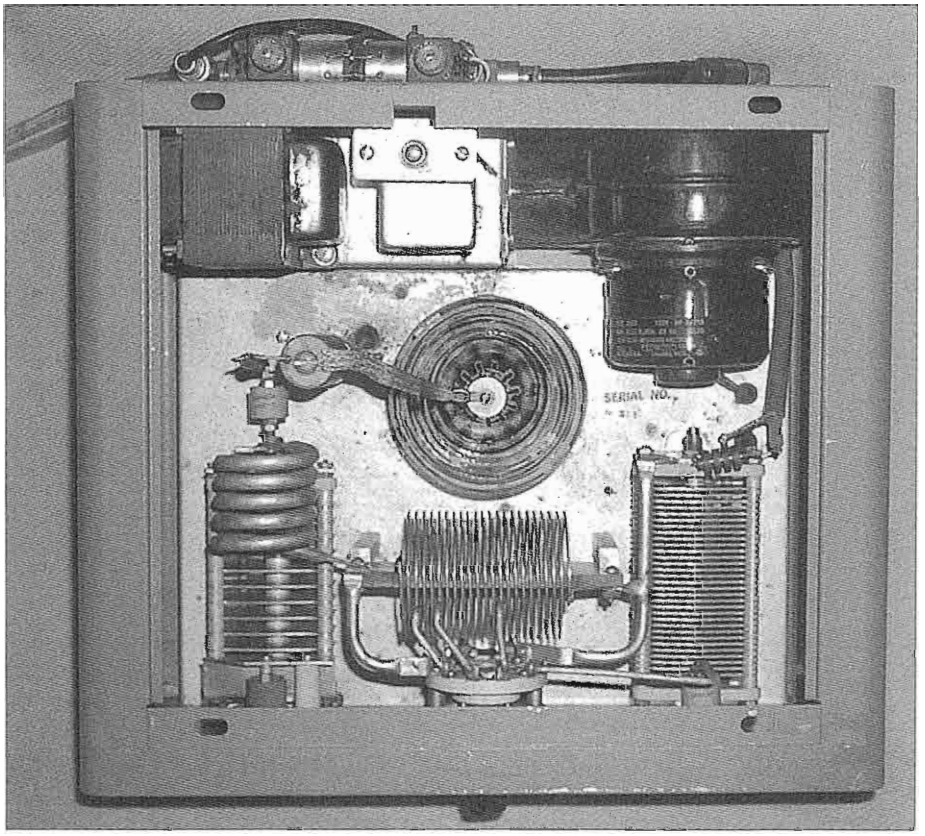
While I would like to provide details of the Loudenboomer's development and the background of its Kansas City, Kansas based manufacturer, Radio Industries, Inc., to date I have been unable to gather information toward that end. All I have been able to ascertain is that Radio Industries introduced the Loudenboomer Mark II (not the Mark



Here is the author's Radio Industries Loudenboomer Mark IIA as it looked after restoration was completed. Notice that the front panel is properly marked in "MEGACYCLES!"

IIA) in 1962 and the company was a subsidiary of Hallicrafters by 1963. Unfortunately the Hallicrafters' family of today is apparently reluctant to share information concerning the company's business dealings so it may be difficult, if not impossible, to ever learn more.

It is well known that Hallicrafters repackaged the Loudenboomer as the HT-45 but before this happened at least three versions of the amplifier were produced. The Mark II photographed for the manual has a lid with a circle full of perforations directly above the final tube. This lid wraps down around the sides of the cabinet and attaches with screws. In contrast, the cabinet of my Mark IIA wraps up and over the sides and the almost totally perforated lid is held in place with four plastic fasteners that lock with 1/4 turn. The silk-screened emblem on my Mark IIA's front panel is purely one of Radio Industries, which makes me think it was produced prior to the Hallicrafters acquisition. A third version, the one depicted in the Mark IIA manual, has an emblem that is a combination of the logos of Radio Industries and Hallicrafters. The Loudenboomer production volume is unknown to me but mine is serial #311 and I know of #324. Considering these serial numbers and



Here's a bird-eye view of the top of the Loudenboomer, looking directly down at the 3-400Z power amplifier. The plate tank components are along the front of the chassis, and along the rear is the blower motor and the filament choke.

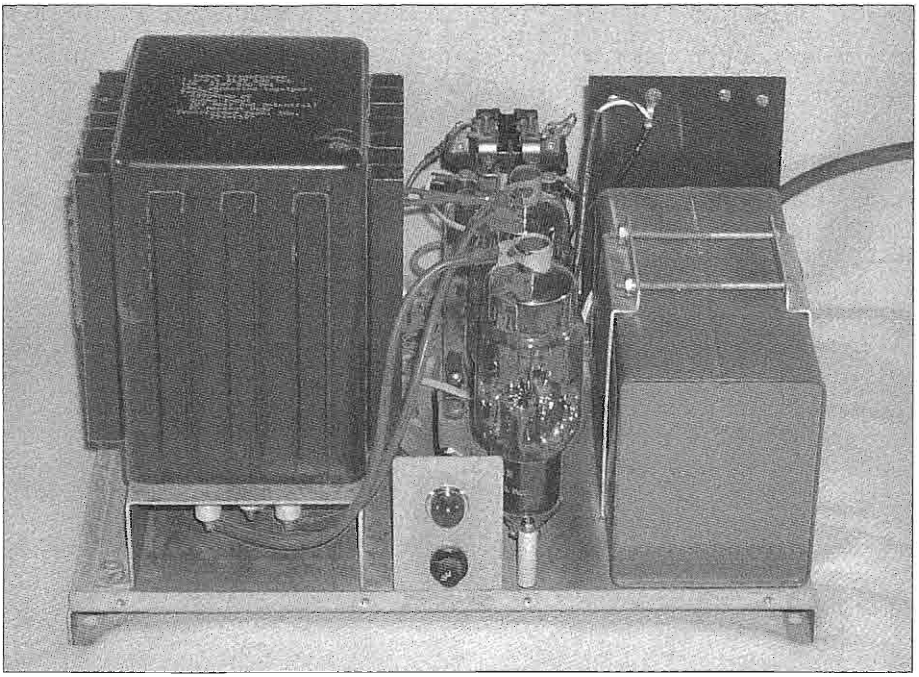
infrequent Loudenboomer hamfest sightings, I would classify them as uncommon rather than rare.

Optional power supplies were available for the Mark II and the Mark IIA but it was clear in both their manuals that Radio Industries expected some Loudenboomer buyers to build their own. Actually, the Mark II manual says, "Since the amplifier is designed for the amateur who would like to build his own power supply or possibly use an existing power supply from an AM or CW transmitter, the schematic and parts list as shown are the minimum requirements." No doubt many purchasers chose the homebrew path so don't be surprised or disappointed if you find a Loudenboomer without the original power supply. While far from a scientific sample, the power supply serial numbers known to me (#206 and #220) hint there might have been approximately three amplifiers sold for every two power supplies.

Physical Description

One of several commendable aspects of the Loudenboomer is its cabinet. While it is proportioned similar to S-Line receivers and transmitters, if Collins trim rings had been made of 0.125" thick aluminum like the Loudenboomer's there would not be so many Collins collectors scrambling to find replacements for their marred trim rings. The aluminum cabinet measures 15" wide, 13" deep and 8" high and is painted a light grey, à la S-Line however, the paint has a texture that is neither wrinkle nor crackle. Lacking a better description, it appears to have small, thin splashes of matching paint over an original smooth coat.

Mounted on the top of the larger of



Once removed from the cabinet, the power supply chassis reveals a compact, well thought out design. The main power transformer is mounted on the left, rectifiers in the center, and to the right are the filter condensers.

the two inner chassis are the single final tube, the pi network components, and the RF choke. A smaller chassis that holds the filament and RF input transformers is mounted at the rear of the larger chassis. Cooling air from the quiet 50 cfm squirrel cage blower passes through the two pressurized chassis and up between the final and its H.S. Martin & Son chimney. The amplifier weighs just 25 pounds.

At the bottom of the darker, flat grey front panel, from left to right, are toggle switches for filament and plate voltage control, a knob for meter selection and red and green jeweled lamps for plate and filament voltage indication. Immediately above these controls, also left to right, are the tuning control, the meter, and the loading control. Above the meter and centered in the panel is the bandswitch. Concentrically mounted with the plate tuning control is a lever for a switch whose function will be discussed later. On the back panel is an SO-239 connector (RF Out), an RCA phone jack (RF In), a fuse holder, a two contact terminal strip, a grounding lug and a 6' multi-conductor cable for connection to the power supply.

As one might expect, the Mark IIA power supply is larger and heavier than the amplifier. Measuring 12" x 14.5" x 14", it weighs a substantial 58 pounds. The components mount on top of a simple steel chassis and a glossy dark grey steel cover that is perforated on two sides and the top provides protection from dangerous voltages. The finned plate transformer has bottom-side terminals and mounts vertically on a small sub-chassis. A phenolic board containing the bleeder resistors and a spark gap for the choke mounts in the vertical plane on the two terminals of a large oil filled capacitor that is laid horizontally. The AC power relay sits on top of the rectifiers' filament transformer. Although there are no controls on the power supply, the front panel has a fuse holder and a lamp. Access to the female Millen high voltage connector and the 10 contact terminal strip is via a small cutout at the bottom left of the cover's backside.

Electrical Description

Eimac's lesser known 3-400Z is the foundation for the Loudenboomer's grounded grid design. Provided this triode's plate voltage is 3KV or less, zero bias operation is possible without exceeding the 400-Watt dissipation of the 3-500Z's little brother. To reduce the plate dissipation during standby periods, a 150-Ohm resistor in the cathode return creates sufficient negative bias to reduce the idling current from 120 mA to 40 mA. This resistor must be shorted during operation with a jumper or relay via the terminal strip on the rear panel.

A broadband balun wound in trifilar-fashion on a 'ferramic' core transforms the unbalanced input from the exciter to the balanced output required to drive the 3-400Z's cathode. While adding to the cost of the design, this transformer contributes to increased efficiency compared to amplifiers with simple resistive loading.

Output impedance matching comes via a pi network with an edge-wound coil that is used on all bands except 10 meters, where coil of 1/4" aluminum tubing is utilized. The proper tank inductance is selected by a 5-position ceramic bandswitch. Plate tuning and loading is accomplished with air variables of 14-101 and 30-1000 pF, respectively. The extra 100 pF of tuning capacitance required on 80 meters is added by activating the switch lever mentioned earlier and an additional 1000 pF of loading capacitance is always present in the 3.5 Mc meter position. Should the .001 plate coupling capacitor short or leak, a 2.5 mH RF choke from the pi network output to ground prevents high voltage DC from

reaching the antenna.

Unlike many amplifiers, the Loudenboomer has a four-function multimeter that allows monitoring of the plate voltage, grid current, plate current and RF output voltage. The rotary switch on the front panel selects these functions. The manufacturer wisely included an interlock to remove AC power from power supply when the cabinet lid is not in place.

According to the manuals, the Mark II and Mark IIA differ in that the Mark II does not have the 150-Ohm current limiting resistor, and the Mark II grid current is sensed by the voltage drop across a grid resistor rather than a similar resistor in the cathode circuit of the Mark IIA.

Although my power supply came with a pair of 3B28's, the original rectifiers were 866A's. The husky plate transformer has a center-tapped secondary and a primary capable of 115V or 230V operation. A double pole, single throw relay with an 115VAC coil sits between the transformer primary and the AC line. A single fuse of 8A or 15A, depending on the line voltage chosen, protects the power supply. The full wave rectified DC is smoothed with a single choke input filter consisting of a 4-16 Hy, 350 mA swinging choke and an 8-uF oil filled capacitor. An NE-51 neon bulb paralleled with a 10K wirewound at the bottom of the bleeder chain signals the presence of high voltage rather than when AC is applied to the high voltage transformer. The spark gap mentioned earlier is made with a pair of solder lugs and, while the gap was adjusted much larger than the 1/16 inch recommended in the manual, evidence of at least one arc can be seen on the phenolic board directly under these lugs. According to the manual, the Mark II supply did not support 230V operation and lacked the NE-51 lamp and the remotely controlled plate relay.

Restoration

As one should expect of a well designed and well built vintage amplifier that has experienced reasonable care through its years, my Loudenboomer did not require much work to bring it back to reliable operation. Apart from lubrication of the blower motor and a serious cleaning, only three minor repairs were required.

The first and simplest was replacement of a strain relief for the interconnecting cable where it exits the power supply.

The second repair was replacement of the lamp socket that was missing from the power supply. While replacing the socket I pondered why it was missing. The original wiring remained and had been black-taped to avoid problems. With another socket and a new NE-51 in place, I connected my Variac and brought the high voltage up without issue. With 120V input and the high voltage cable disconnected from the amplifier, the voltage was very close to 4KV, a level that I was uncomfortable with given the 3KV rating of the filter capacitor. When I shut off the power supply I noticed that the NE-51 remained lit for nearly 10 seconds, about ten times longer than it should take for 210K Ohms to discharge an 8-uF capacitor. I immediately suspected the 10K wirewound at the bottom of the bleeder chain was open. Do you remember those warnings about not trusting bleeder resistors? Believe them! This one had a minor blowout that I hadn't noticed earlier as it was on the side facing the phenolic board. Indeed the resistor was open. Without this resistor, the only bleeder current flowing was through the overloaded NE-51, thus causing the long discharge time. If you think about it, when a previous NE-51 under these conditions gave up (and it quickly would), the full plate voltage would have been present at the lamp socket. Neither the socket nor the

lamp was designed for anywhere near 3KV. No doubt the bulb/socket combination let a previous owner know about the situation with arcing or, even worse, a serious shock if bulb replacement was attempted while high voltage was present. Either way, why the lamp socket was missing is no longer a mystery.

With the third repair complete (replacement of the open bleeder), the NE-51 extinguishes in about one second when the plate supply is de-energized.

Performance

As I was curious about the amplifier's broadband input transformer, I first measured the amplifier's input impedance. For this task I used an MFJ-259B antenna analyzer. If you don't already have one of these handy instruments you might consider getting one as they can be used for much more than just antenna analysis. With the filament on I started the measurement process at 3.5 Mc, where the impedance was a 47+j3 ohm. The impedance remained slightly inductive and there were no bumps as the frequency was increased to 29.7 Mc, where the impedance peaked at 58+j6 ohm. These readings, which were not effected by the positions of the bandswitch or the tuning and loading capacitors, represent an SWR of 1.2:1 or less, therefore any exciter should be comfortable driving the Loudenboomer.

I was also interested to know what power level would be required to drive the amplifier to a given output, so I inserted a Drake W-4 wattmeter between the amplifier input and a Yaesu FT-707 transceiver chosen as a driver because of its frequency and output power agility. A Waters Model 334 Dummy Load / Wattmeter would absorb and measure the output power.

In order to facilitate easy bypassing of the amplifier, a previous owner of my Loudenboomer neatly installed an aluminum plate on the rear of the cabinet. On this plate are two Dow coax relays, both of which have extra contacts. One of the contact pairs is used to short the plate current limiting resistor mentioned earlier. Before applying the high voltage, I elected to disconnect this contact pair so the limiting resistor would be in line. With the plate voltage applied, I was pleased to see the standby plate current settle safely at 40 mA, but I was surprised to see the plate glowing a dark orange. The next step was to check the idling current, so I reconnected the contact pair. Again, the amplifier behaved as it should, with 120 mA of idle current, but now the plate glowed a medium to light orange. Although I was not particularly comfortable with the plate's color, I was comfortable with the plate currents so it was time to introduce excitation.

Following the tune-up procedure detailed in the manual, which calls for a plate current of 333 mA and a grid current of 150 mA (maximum 200 mA), the Loudenboomer managed 550 watts output on 80 meters with 45 watts of drive. The power output on 10 meters dropped to 450 Watts with the same level of drive. Performance on 40, 20 and 15 meters was similar to that on 80 meters. Knowing the amplifier's input was truly broadband; I wanted to know if it would work on the WARC bands. Unfortunately I was unable to obtain any significant power output on 12 meters using either the 10 or 15-meter settings. With a kilowatt DC input on 17 meters the Loudenboomer managed but 300 watts in the 15-meter position. No doubt the non-ideal pi network Q caused the much-reduced efficiency. If one were to use a Loudenboomer on this band it would be advisable to run less than maximum power to avoid excessive tank coil heating. Conversely, performance on 30 meters was a surprising 500 watts output in the 40-meter

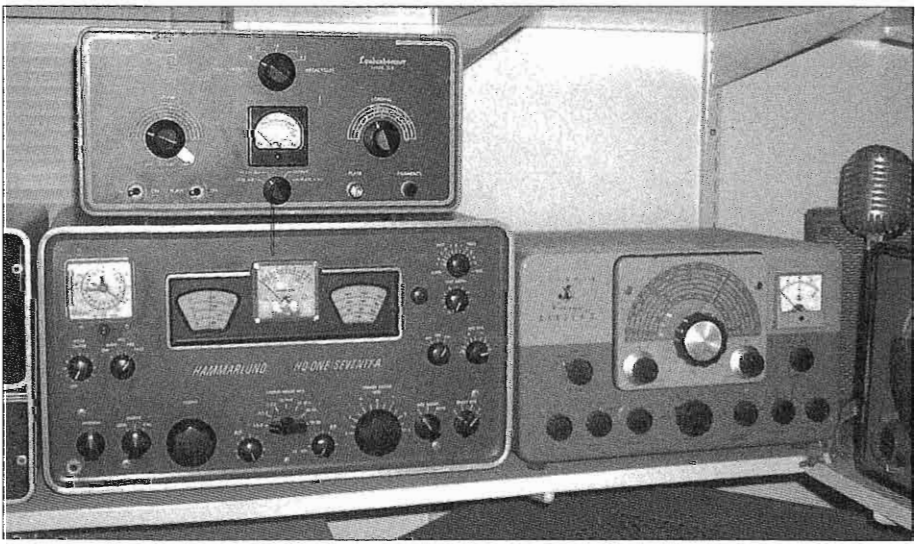
position.

Since I wanted to use the Loudenboomer with a Viking Ranger II/HQ-170A pair, it was crucial to know what input power would be required to achieve the recommended AM plate current of 200 mA. This exercise revealed the drive power required was 12-15 watts on all bands and the power output was 165-175 watts, except on 10 meters, where it dropped to 150 watts. This input power requirement was nearly ideal as I had a spare 6 dB attenuator available to reduce the Ranger's 40-50 watt output.

Conclusion

Considering the input power requirements, the Loudenboomer seems better suited for SSB/CW operation, as such transmitters usually have easily adjustable power output levels but it is certainly usable in the AM linear mode provided you supply the correct drive level. The only potential difficulty I see with the Loudenboomer, other than finding one, is the 3-400Z final. While these are not yet unavailable, they are not abundant like the 3-500Z. That said, according to the Eimac data sheet, there appears to be room within the Loudenboomer to install a 3-500Z should the need arise. In order to better understand the Loudenboomer production volume I would appreciate hearing from any owners.

ER



Now in it's new home, the Loudenboomer is paired with the Johnson Ranger transmitter and Hammarlund HQ-170A receiver in a classic setting. The Shure 55 microphone finishes out this classic station at WA5UEK.

The Electric Radio Worked All States-AM Award

by Mark Bell, K3ZX
Electric Radio Awards Manager
66 Flaharty Rd.
Airville PA, 17302

The Electric Radio (ER) Worked All States Amplitude Modulation (WAS AM) Award is available to all radio amateurs worldwide who submit proof of having contacted each of the 50 states of the United States of America using the AM mode of communication.

The purpose of this award is to recognize the efforts of radio amateurs involved in the use of the heritage mode of AM, the restoration of vacuum tube radio equipment, and the building of new AM amateur radios based upon state of the art technologies.

Two-way communications must be established on amateur bands with each state using Amplitude Modulation (AM), on or after the start of the 21st Century (i.e., on or after 1 January 2001)

All amateur bands (HF, VHF, etc) may be used. There is no minimum signal report required.

The District of Columbia may be counted for Maryland.

Contacts must be made from the same location, or from locations no two of which are more than 50 miles apart.

Contacts may be confirmed in one of three ways:

1) Contacts may be confirmed in writing, preferably in the form of QSL cards. Written confirmations must be submitted (no photocopies).

2) Contacts may be confirmed via eQSL electronic QSLs. QSL Cards do not need to be printed out and submitted; rather the awards manager will confirm them directly. All submitted eQSLs must have "Authenticity Guaranteed"

3) Any combination of 1) and 2) above.

All confirmations must clearly show your call, contact month, day, year and time, frequency, and indicate that two-way AM communications was established.

All contacts must be made without any intermediate power relay method (ex: satellites, repeaters) or use of the internet (ex: Echolink, IRLP. All stations contacted must be "land stations." Contact with ships, anchored or otherwise, and aircraft, cannot be counted. EXCEPTION: Permanently docked exhibition ships, such as the Queen Mary and other historic ships will be considered land based.

Disqualification. False statements on the application or submission of forged or altered cards may result in disqualification. ER does not attempt to determine who has altered a submitted card. The decision of the ER Awards Manager in such cases is final.

Application Procedure:

Confirmations (QSLs) and Application Form should be sent to the address specified on the Application Form. The Application Form will be available from ER by mail. All QSL cards sent must be accompanied by sufficient postage for their safe return (registered mail is recommended because it is traceable).

There is no fee for the WAS-AM award.

High Fidelity AM Detection

by Paul Thomson, WØOD
6335 S. Dudley Way
Littleton CO 80123

Many radio techniques that were well known during the 1930's seem to have been forgotten in later times. Like the use of nichrome wire to suppress VHF parasitics in power amplifiers, the use of an audio discharge resistor in an AM detector circuit to allow for full audio recovery seems to have been neglected in the post-war era. Unlike many audio design changes where the effects are so subtle that you must almost convince yourself that an improvement has been made, adding the missing discharge resistor will let you will know right away that you have made a big improvement. Many receivers have seen a 50% reduction in total harmonic distortion.

The example schematic in Figure 3 is from a post-war Hallicrafters S-38. In this receiver, 91K ohms was added across C24c to give a time constant of 20 microseconds. It creates the necessary discharge path that was left out of the design for some unknown reason. This change allows full audio recovery during both portions of the audio cycle. Although it turned out to be 91K in the S-38, other receivers will require their own values of resistance. For example, a Scott SLR-M needed 68K, a Grundig-Majestic 3262 needed 82K, and a Howard 437 ended up with 100K for the best audio.

To find the right value, tune to an AM broadcast station in your area that is known for high quality, or use a low-distortion AM signal generator. Connect an oscilloscope to the point shown in Figure 3. If you are without test equipment, just listen to the receive

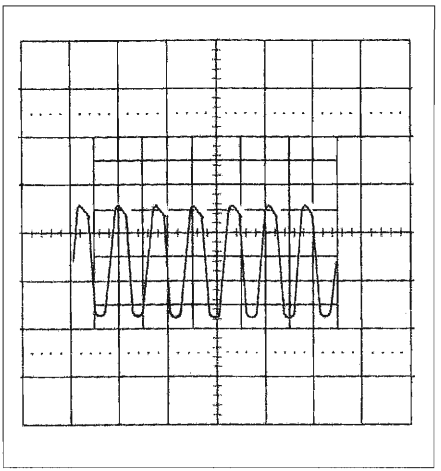


Figure 1: S-38 audio before modification of the detector.

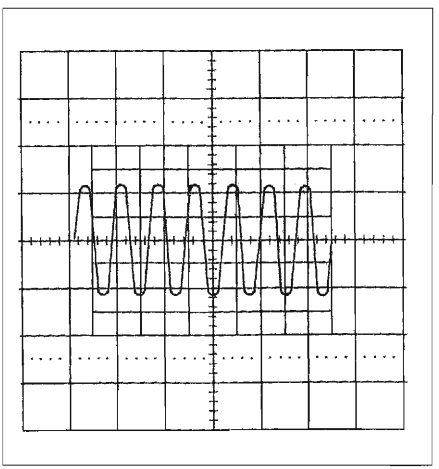


Figure 2: Here is the audio waveform that results when the detector is modified.

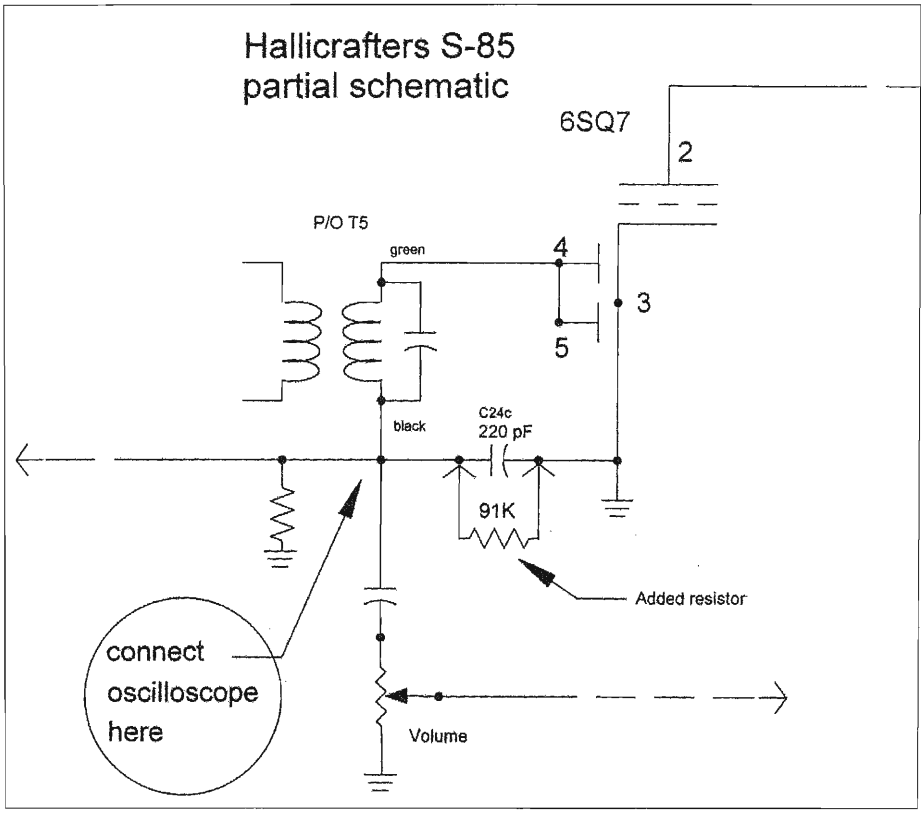


Figure 3: Here is a partial schematic of the Hallicrafters S-38 showing the location of the detector modification and where to connect the test equipment.

audio. The original distorted audio signal is shown in Figure 1. Start with 150K and work down in value until the waveform is like Figure 2, and the audio sounds clean and undistorted. Once you have found the best value, stop there, because you don't want the resistance any smaller than necessary.

Happy AM'ing!

[Editor's note: Readers should note that in the S-85, and many other receivers, the volume control is not part of the detector load. If the author's change is made to a receiver with a different design where the volume control forms part, or all of the detector load, the improvement in audio performance will only be seen at one setting of the audio gain control. It should also be pointed out that in any diode AM detector there is some modulation percentage, usually about 75 to 80%, above which distortion rises rapidly no matter how the detector load is arranged. This is because the dynamic loadline of a vacuum diode reaches cut-off at about 75% modulation depth at typical values of load resistance. In years past, many attempts were made to build compensated diode detectors to overcome this problem, and they worked by placing a positive bias on the detector plate that varied in proportion to the incoming carrier level. In effect, changing the slope of the loadline.]

ER

A Very Early Homebrew Station

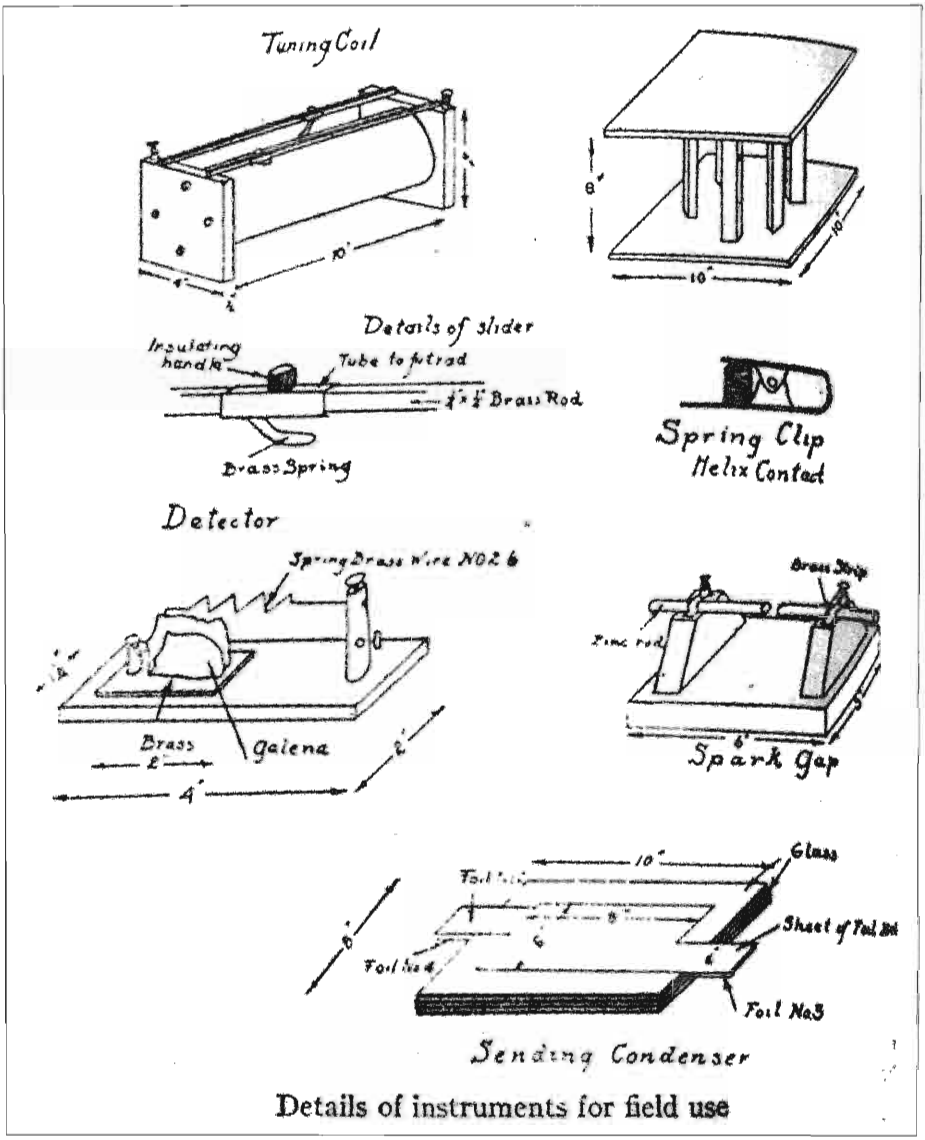
by Don Meadows, N6DM
1683 Daphne Ln.
Yuba City, CA 95993

Before the era of vacuum tubes, hams were active on the air. My father was one of those hams in the year 1912. The following account is based on oral testimony from him recollected as random segments of history expressed sporadically across time. These segments were later unified, expanded and clarified during a taped interview with him in March 1988, six years before he became a Silent Key in 1994 at age 97. The following account is based also on documentation from the same Boy Scout Handbook, preserved in the family archives, that he consulted in the year 1912 at age fifteen. He belongs to the first generation of radio homebrewers.

1912 BSA Handbook

Back then spark was the only practical means of wireless communication for the increasing numbers of hobbyists and burgeoning experimenters. In the year 1912 amateur radio, in fact radio itself, had not yet reached the adult age of twenty-one. The term then was not radio, but "wireless." It was a young science, something new, and something a bit awesome. Everyone who worked with it, professionally or otherwise, was an experimenter. The distress messages from the Titanic in April 1912 helped the world see the practical value of "wireless" communication—a sad instance, but yet one that demonstrated the power of this medium. This new science fired the imagination of all age groups. It inspired both trained scientists, and teenagers. DeForest had already invented the triode vacuum tube, whose practical applications were just then leaving his laboratory. The outside world's enthusiasm for "wireless" was being stoked meanwhile by publications like those of Hugo Gernsback whose vision saw both the romantic and practical impact of this new, somewhat mysterious medium whose power seemed limitless. He was able to communicate this vision to thousands of inspired readers.

In his hometown of Orange, California, my father at age 15 wanted to get on the air. He had read Hugo Gernsback but didn't have the capital to subscribe to Gernsback's publications. But my father happened to enter Boy Scouting during the third year of that movement's existence in the United States. Fortunately, his Boy Scout Hand-



The Boy Scout Handbook for 1912 included these plans for construction of the receiving and transmitting instruments which, if carefully built, would produce the magic then known as wireless telegraphy.

book of 1912, which has been preserved, told how to build a wireless station. The instructions contained in the Handbook's chapter on signaling are detailed and clear. This new Boy Scout, suddenly no longer dependent on Gernsback, did his best to follow these instructions written in a correct, dignified prose that one today rarely sees addressed to teenagers.

The Scout is told how to build a successful spark station that should be "capable of sending messages from 8 to 10 miles." My father, aided by ad-

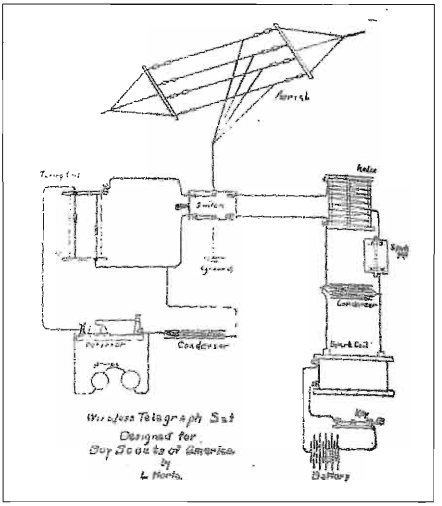
vice from more advanced local operators, homebrewed a station based on these Boy Scout Handbook instructions and actually communicated with it. His call was DCM, his initials. Licensing was unheard of at that time, although government regulation was just around the corner. The Radio Act of 1912, passed later that year, provided for licensing of amateurs but required no examination. There were no wavelength restrictions.

Back then, no one balked at learning the code. If you didn't know the code, you didn't communicate via wireless, because all conventional transmitters used on/off keying of the spark gap. DCM built himself a buzzer and a key and sat down to learn the code. In about three weeks he was able to copy slowly, maybe around five words a minute, but that was fast enough to get on the air.

The Scout was instructed how to make his receiving and sending sets out of materials commonly available. For the receiver, however, two items had to be purchased. Quoting the 1912 handbook: "For use in the detector, lead sulphide or galena crystals must be secured. The telephone receivers cannot well be made and must therefore be bought. The type of 'phones' used will depend entirely on the builder's purse." With his friend CJL down the block, also a wireless novice, DCM traveled to Los Angeles by streetcar to purchase a single headphone and a piece of "silicon" which he was advised to use for his detector.

Parts for the sending set were also homemade. Exceptions were the spark coil and the batteries. Again, quoting from the 1912 handbook: "For the experimenter, it will be far cheaper to buy a spark coil for his sending set than to attempt to make one." DCM used the spark coil out of a Ford automobile. This was powered by four dry cells in series. DCM made his own spark gap and his own key. The four dry cells in series feeding the Ford coil could produce a spark barely able to jump an eighth-inch gap.

Even back then, wireless experimenters knew that the antenna was a key item for the successful station. His Boy Scout Handbook stressed this point: "The most fundamentally important part of a wireless telegraph station is



The 1912 handbook reproduced plans for the wireless telegraph set which included a sketch of a typical skyhook, or aerial, of the era.

the aerial. The builder should aim to get as high and long an aerial as possible, height being the more important factor."

DCM's parents were cooperative—up to a point. When his feet clambering on the roof began to loosen shingles, there was trouble. But a 20-foot mast with guy wires finally stood tall on the roof. In the back yard a pole was sunk in the ground. It provided the rear support for a horizontal flat top about 40 feet high consisting of several parallel wires whose midpoints were tied to a downlead that entered the shack.

Once he was on the air, DCM was always able to copy certain signals. Although he experienced erratic recep-

tion of CJL, his friend down the block, at least commercial and government transmitters in San Diego, San Pedro, and the San Francisco Bay region came in loud and clear. Starting up, their rotary spark gaps left a clear impression on the listener. A slow rumble around sixty cycles slid upwards in a musical glissando to a tone leveling off at around a thousand cycles. Then the transmission began. Most of the time the code was sent too fast, but just being able to hear those stations was a thrill. Of greatest interest historically were the days when DCM's silicon detector picked up the sounds of music—real music! The single earphone's diaphragm vibrated out the tune of "Oh, You Beautiful Doll!" The tune came through again and again, over and over, sometimes interrupted by comments in a male voice. My father, DCM, even when well into his nineties, said he'd never forgotten this tune because it came in so strong and so clear. These were rumored to be experimental transmissions of Dr. Lee DeForest in California, known to be working on sending music via radio. My research shows that on May 7, 1912, DeForest was issued Patent No. 1,025,908 for, a "Wireless Music Transmitter."

DCM frequently heard one or two of the advanced "old timers" across town, guys perhaps a decade older at most, but his best two-way DX was his friend CJL who had a similar station three houses down the street. Even at this short distance they had difficulty working each other. A Ford spark coil powered by four dry cells in series put out a marginal signal at best. But inept mastery of their equipment may also have been a factor. DCM and CJL finally discovered that wired communication was more dependable. They ran a wire between their houses and each operator used his headphone both as a mic and as a receiver—a private telephone circuit. This wasn't wireless, but at least they could talk to each other while they tinkered with their radios.

This was my father's first and last direct involvement with ham radio. It lasted less than a year. But it programmed him to understand and encourage the future ham-radio career of his only son born eighteen years later, for whom he had set a precedent. Sometimes he'd watch with fascination as I homebrewed something on the workbench because he was still a bit intrigued about the mysteries of radio. He always provided moral support for his teenage son's hobby, perhaps seeing in his son a projection of his own youth. Thus he was even ready sometimes to underwrite the cost of his son's vacuum tubes—things he didn't understand but which he knew were the essence of modern radio.

My father's memory of the code stuck with him over the years. Later in his life, when I fired up my homebrewed surplus-parts CW rig late at night and made a contact with my then-call W6ZGM, enough of the keying monitor's tone leaked through the adjoining bedroom's wall to awaken the old-timer who claimed the next day to have copied almost solid much of my straight key's transmission. He was usually correct when he mentioned some fragments of these transmissions, like the handle and location he'd heard me give out—he said he could copy that the receiver was a Hallicrafters S-40A, but the keying monitor's details about the homebrew transmitter and antenna mostly eluded him. He was always impressed the next day when he learned the location of the station I had worked. Responding to my apologies for having disrupted his sleep, he said such experiences were valuable for him—they made him feel young. More than once, he said he wished he could have done as well with his own wireless station back in 1912.

National HRO 60 and HRO 50 Power Transformer Substitution

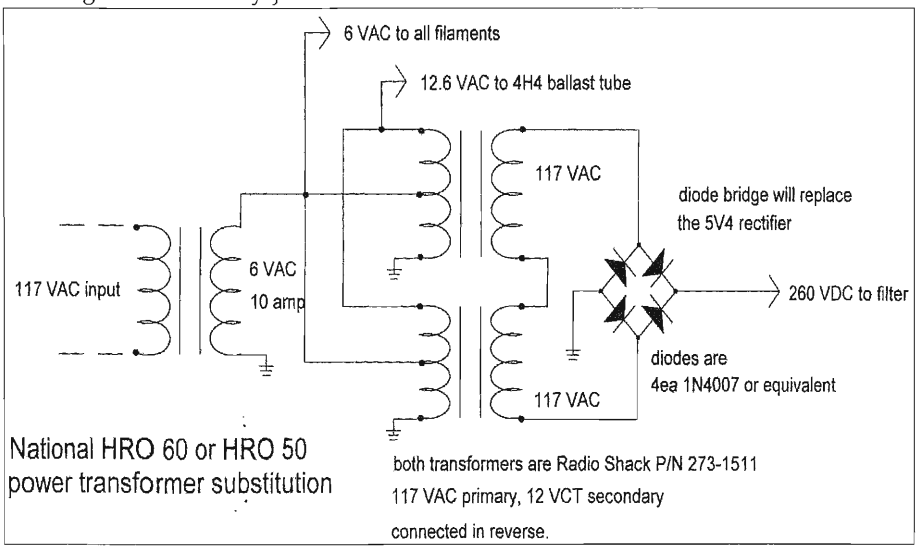
by Hal Guretzky, K6DPZ
95-15 108 St.
Richmond Hill, NY
11419

A common problem found with with unrestored National HRO-60s and HRO-50s is an open power transformer. The usual cause of this failure is the paper capacitor that National placed across the secondary of the power transformer to act as a noise filter. Its original voltage rating was inadequate when transients and surges over many, many years take their toll. They usually fail in a shorted condition, and the direct short across the power transformer will quickly ruin it.

To restore the receiver, one can purchase a replacement transformer at a cost in 2003 between $165.00 and $200.00, or rewind the old one. Rewinding in not an easy job.

There is an inexpensive alternative to both of these solutions. By using a 6 volt filament transformer and two Radio Shack power transformers, 30 to 50% of your power supply restoration costs may be saved.

The filament transformer may currently be obtained from Fair Radio Sales for $9.99 in limited quantities, or a Hammond filament transformer from Antique Electronic Supply, part number P-T16656, for $25.40 is available. The two Radio Shack power transformers are part number 273-1511 and are currently priced at $9.99. A husky diode bridge may be obtained for about $2.50, or the 1N4007 diodes at 12 cents each.



There is plenty of room inside the HRO cabinet for this replacement supply, but do not mount it so that the installation is not completely reversible should some Ham 50 years from now find original parts. Also be sure to observe the proper transformer phasing so the output voltages are right. ER

Radio's Golden Age, Episode 23
Part 2

by Bruce Vaughan, NR5Q
504 Maple Drive,
Springdale, AR 72764
NR5Q@AOL.COM

Gunsmoke in the Parlor, conclusion

From Robert "Bob" H. Clark, a pioneer citizen of Springdale Arkansas, October 1993:

"I had the first real radio in Springdale—not necessarily the first radio. Several boys around town were playing with crystal radios, with practically no success. I must have built a dozen. Occasionally you could hear one of the high-power spark transmitters sending code. That is all there was then.

I became interested in electricity when the town branch, as was its custom, flooded the basement of The Famous Hardware. Several dry cell batteries stored there had their cardboard covers ruined, rendering them unfit for resale. Dad asked me if I would like to have them. Of course, I was interested. He brought them home. I was curious to see whether they had any 'life' left in them. I picked up a pair of pliers and shorted out the positive terminal to ground. Sparks flew all over my shop. I was so excited that I had no other thought in life but to find out everything I could about electricity. Dad was with me all the way.

[Author's note: In 1921, I was 15 years old. We had been taking Radio News magazine for two or three years. We took two magazines: The American Boy, and Radio News. I sent off for an A. C. Gilbert Company catalog. The Gilbert Company sold Erector sets, chemistry sets, radio and electrical supplies. The company was built on the scientific curiosity of young people.]

Donovan Youree was my friend and fellow experimenter. He lived on the corner of Blair and Allen Streets. We had been building crystal sets with little or no success. Anyway, in the A. C. Gilbert catalog they had a one-Audion [tube] radio kit for sale. The tube had wires coming out of the top and bottom. I showed the ad to my dad and asked if I could have the Audion receiver kit for Christmas.

Dad said, 'you sure can, Son. I will see that you get it.'

I built the set and kept fiddling around with it. Donovan had his crystal set. We learned the code and, using Model T coils as spark transmitters, communicated between our house on Thompson, across from the Lutheran Church, and Donovan's home on Allen. I strung my aerial, or antenna, from the top of the old water tower, behind our house on Johnson and Highway 71 to the barn that was just south of our house. The aerial was sixty feet long and consisted of four copper wires strung between six-foot cross arms located on each end. It was a handsome thing, glistening in the sun.

I had a telephone, but Donovan didn't. After we spent an hour or so each night transmitting messages in code, we would meet half way between our homes, sit on the curb under a streetlight, and compare notes to see how well we had done. Of course, we were operating without a license, and therefore illegally, but the government was rather lax about such things in 1921.

We loved to listen to the rotary spark

gap transmitter they had at the University of Arkansas amateur radio station. It would start with a low raspy note of about 60 cycles and gradually increase in frequency up to 600 cycles or so as the rotary gap picked up speed. It made so much noise that they had to rig up a sound isolation room to house it.

I could pick up the Arlington time signals on the one-tube receiver. I got a lot of publicity on this. Jewelers and others would come to the house and set their watches by the signals.

I had my one-tube Audion working well. I was sitting there one night, spinning the dial, when I heard a voice. You can imagine my surprise. Back then there was nothing on the air but code transmitters. I was glued to that thing for at least a half hour. Finally I heard them say 'This is KDKA, Pittsburgh.'

I was so flabbergasted-I had no idea I could reach that far. I ran downstairs and told my parents I was hearing voices on my radio. Dad said, 'Let's go upstairs and take a look at that wondrous wireless set.'

I listened to see that KDKA was still coming through and handed Dad the headphone. He put it to his ear and listened and listened. We stood perfectly still; finally he lowered the little earphone. He looked at me with amazement, and said, 'Do you know what I just heard? I heard a Miss Birch from Argentina-a soprano-singing opera.' Dad sat down on a box and was quiet for some time. Then he said, 'Son, is there some way we could have that louder so the family and friends could enjoy it?'

I was way ahead of him.'Dad,' I said, 'for two hundred and fifty-nine dollars I can buy enough stuff to build a regenerative detector, and two-step audio amplifier. That price would include one of the new Magnavox horn-type speakers.'

I had the price figured to the penny. My prices were from the latest 'Tucker Duck and Rubber Company' catalog. The Duck catalog was the prime reference and dream book for experimenters in the late teens and twenties.

Dad said, 'Son, you take that catalog down to the store [The Famous Hardware] tomorrow, and give it to 'Stant' [Mr. Thompson.] He's our bookkeeper. Tell him to order everything you need and charge it to me.'

Dad was anxious for the parts to arrive. When they came, I built the radio on a breadboard with the usual black Bakelite panel. When it was finished, I checked it out to be sure it was working, I then called Dad upstairs to my attic workshop. He listened to it and just went crazy. After listening for time, he looked at me and said, 'Son, that is amazing, but can't you make it look a little bit better? '

'Well, I guess so.' I answered.

He replied, 'There is an excellent cabinetmaker downtown. Take it to him tomorrow and tell him to build a solid walnut cabinet for that radio. I want it to look as good as it sounds.'

Well, I can't remember the cabinetmaker's name, but he built the prettiest walnut cabinet you can imagine. It was about thirty inches wide and had a hinged door across the top.

Every night our living room was full of friends and family. We just could not take care of all the people who wanted to hear radio. They came from Hindsville, Siloam Springs, Rogers, and all around just to hear this new marvel. Finally, Dad had an idea. We took out the upstairs attic window, and placed the horn speaker so that it aimed outside and downward. Then we borrowed folding chairs to seat fifty people. Sometimes every chair was filled, with some listeners sitting on the grass."

I suppose we could now say radio was off and running. In reality it was more like a slow walk. To understand why, let's take a look at some of the

factors involved.

Before 1927 all radios were battery-powered. Only those who remember that time can fully appreciate the cost and problems involved with battery operation. Unlike today's radios, they required a lot more than a tiny dry cell costing less than a dollar. And what a nightmare they were to hook up: two wires to the "A" Battery, usually three to the "B" batteries, and at least two to the "C" battery. In addition, there were connections between each of the "B" batteries. One slip, one wrong connection, and you could blow two months' salary. If you succeeded in getting the batteries connected correctly, you had four more connections to make: one to the antenna, one to ground, and two to the speaker or headphones.

Radio batteries were large, heavy, and expensive. Placed on the floor under the radio table, batteries added little to the decor of the parlor. Lead-acid "A" batteries had a nasty habit of eating holes in the carpet, and would within time do permanent damage to floors. Perhaps the most annoying feature of battery-powered radios was the need to have the "A" battery re-charged at regular intervals, usually every two weeks. This involved removal of the battery, a trip to the nearest garage or service station that offered re-charging service, and a wait of at least three days while the battery charged. There were no quick-chargers in those days. The fee for charging a battery ranged from fifty to seventy-five cents.

There was no shortage of places where one could have batteries charged. Automotive garages, hardware stores, and even a few enterprising grocers bought chargers. Cost of a heavy-duty unit—one that would charge up to a dozen batteries at a time—ran from sixty to eighty dollars.

"B" batteries were of the dry cell type, 45 volts per battery with a 22.5-volt tap or 22.5 volts only. With a listening time of two hours a day, "B" batteries could be expected to last about two months. Costs ran from $1.50 to $1.75 each. The smallest battery required was a low voltage, low amperage, "C" battery that furnished bias for the tubes. It cost less than one dollar and lasted a very long time.

More affluent owners purchased two "A" batteries, and a charging device. One battery was kept on the charger, while the other was attached to the radio. Cost of battery and a home type charger ran from $30.00 upward.

The radio itself would likely employ a regenerative detector, with one or more stages of RF amplification, plus audio output stages. While extremely sensitive, these sets were difficult to tune. Normally, three dials had to be adjusted to the station frequency. Other controls included the cantankerous regeneration adjustment, antenna coupling, filament voltage, and volume controls. If the operator tuned everything correctly, reception on a clear, cold night might include stations from several hundred miles away. More likely, stations within a hundred miles or so would come in through static crashes, noise, and interference from adjacent stations. We are assuming, of course, that the radio owner had an aerial at least 100 feet long, as high as possible, and in the clear. It was also important that a good ground rod was properly installed.

More creative radio fans, not content with a copper clad ground rod, buried everything from automobile radiators, steam heat radiators, and other large metallic items deep in the ground. A daily watering with salt water was said to improve reception.

Better radios had ample power to drive a horn type loudspeaker; now the entire family could listen at the same time. Speakers were little more than a single headphone attached to a horn made of molded composition, wood,

or metal; hence a "tinny" sound was associated with early radio.

What did all this cost? Let's look at a typical magazine ad from this period. In 1922, RCA ran an ad for their Aeriola Grand, a four-tube radio. Complete with mahogany stand, storage battery, battery charger, and antenna wire, the price was $409.95. To better understand the cost of radio, let's see what $409.95 would buy in 1922.

For $400 you could pay tuition for one student at the University of Arkansas for a full four-year education, with money left over. The old Blue Mill Cafe, a few years later, served a 16 oz. sirloin steak—with all the trimmings—for 80 cents. With $400 you could take a family of four on a two-week vacation to the Grand Canyon, and buy trinkets at every Indian trading post along the route. Or perhaps you needed a new car—a Ford or Chevrolet could be purchased for approximately the same cost as the Aeriola.

Yes, radio must come down in price, improve in quality of reception, become easier to operate, and be made into an attractive piece of furniture before it would become a common household accessory.

All this became possible in 1927 with the introduction of AC tubes. Now, radios could be plugged into any electrical outlet—no more messy and expensive batteries. Higher voltages available from AC power supplies meant widespread use of the superheterodyne circuit, single control tuning of frequency, louder reception, better tonal quality, lower prices, and smaller cabinets. Finally, radio was on its way. Even the great depression could not slow the growth of this mighty juggernaut—radio.

"Radio communication of the future obviously tends to include all moving vehicles; it is already beyond the experimental stage for installation on ships at sea, in submersibles, in aircraft, and railroad trains. It is reasonable to expect its eventual application to automobiles and even in some cases to individuals." (Quote by David Sarnoff, 1891-1971, General Manager for RCA in the New York Sunday Times of May 14, 1922)

The years from 1927-28 until the start of World War II did not see any radical improvements in broadcast radio. What we did see was a gradual evolution of the art, a steady improvement of basic ideas and construction practices. As a matter of fact, radios built in 1946-50 were generally inferior to those built in 1935. So called improvements like AC-DC tubes, cheaply built slug tuners, miniature tubes, and modular construction resulted in a less dependable, low fidelity, and costly to maintain product. Later, after years of perfection, almost all of those ideas would prove highly practical.

Well-known names from the twenties began to disappear. Atwater Kent, De Forest, Majestic, Freshman, Freed-Eisemann, and dozens more were replaced by companies which would become giants of the radio industry: RCA, Zenith, Magnavox, Crosley, General Electric, Philco, and newcomers Admiral and Motorola.

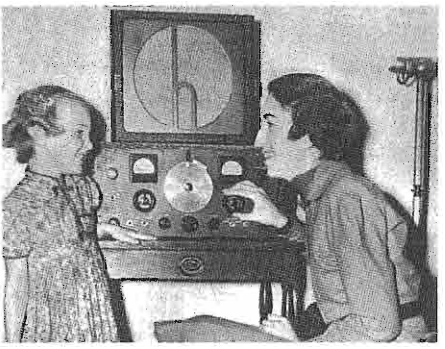
"Of all the dramatic media, radio is the most visual." (John Reeves, English Tenor)

For Americans growing up during the Great Depression, radio was a vital part of life. No other age group would, or could, share their feeling toward this great entertainment medium. The golden era of radio started in the late twenties and ended, rather quickly, in the late forties. Its demise, while expected, caught many of us in the business off guard. It is absolutely unbelievable—so short a life span for such a

wonderful invention.

Before 1927 and the introduction of the electric radio, listening time was carefully allotted to a few favorite programs. By the 1940s everyone, including families on a limited budget, could afford to use the radio as much as they pleased.

How much did it cost to operate an electric radio? Well, in 1930 most utility companies charged between three and four cents per kilowatt-hour. The average console or floor model radio with six or seven tubes might use eighty watts. Table radios drew somewhere between forty and sixty watts. If my eighth grade arithmetic is correct, a radio pulling sixty watts, at four cents per KWH, would cost around one fourth cent per hour to operate. Large consoles might cost one-third cent per hour. Fifteen hours of entertainment for a nickel is a good investment.



If possible, families finished their evening meal around five o'clock. This gave mother enough time to "do" the dishes before joining the family around the radio. During the 1920's, the evening's radio listening started with Lowell Thomas and the six o'clock news. Who can ever forget that wonderful voice? It made even cheap radio speakers vibrate with a deep resonance.

"Good evening, Mr. and Mrs. North and South America, and all the ships and clippers at sea! Let's go to press! Flash!" With this well-known line, Walter Winchell opened his evening news broadcasts. His fast delivery and coverage of the more offbeat and sensational news items assured him a large audience. Winchell had a running feud with Ben Bernie, a well-known Dance Orchestra Maestro. The best of friends, they used the "feud" to garner more listeners to each of their radio programs.

And how we loved Amos n' Andy! Sure, they were "colored" and not very good at running their taxi service, but we were not laughing at a race—we were laughing at two individuals.

We greatly enjoyed Bob Burns and his bazooka and his jokes. No 'Arkansayer' was offended because he was an Arkansan from Van Buren. He was a comedian, and he was funny. Who could take offense if he was from our home state?

Equally popular was Lum and Abner from Pine Ridge. Most of us could relate in some way to those two old-timers running the "Jot 'em Down" store. No offense was intended for people in Arkansas, and none taken. Why are people so sensitive today?

Talk about realism—Death Valley Days was so real you could smell the odors of the twenty-mule teams, and feel the heat reflect off the sands of Death Valley.

Smilin' Ed McConnell did much to save the eyesight of America. He was on the air selling Aladdin Kerosene mantle lamps. Remember—much of our country lived in rural areas not yet serviced by any electric company. Night after night, Smilin' Ed softly and convincingly told farmers across this land that they were ruining the eyesight of their children by not buying an Aladdin lamp. He reminded us of poor mother, trying to darn socks and piece quilts by the flickering yellow light from our

old—fashioned lamp. He told us about grandma—her eyes no longer strong—and oh, how much she would love to read her Bible again. And, by gosh, people believed him. "Smilin' Ed" wouldn't mislead you! When a traveling salesman came around selling Aladdin lamps, farm families scraped up the seven to ten dollars needed, so they could listen to the radio in a well-lighted room. You know what—he was right! The Aladdin was well worth the money. I still have my Great Grandmother's old Aladdin lamp.

Remember Don Ameche and First Nighter? In the '30s everyone in America was treated to a Broadway show every week. Who needed to see the action? It was just as real as your imagination could make it.

Jack Benny and Rochester, Bob Hope, George Burns and Gracie Allen, Will Rogers, Joe Penner, Fibber McGee and Molly, Red Skelton, Eddie Cantor, Fred Allen (remember Allen's Alley?), Jimmy Durante, Ed Wynn, Milton Berle, and Charlie McCarthy, aided by Edgar Bergen, entertained us with jokes and comedy skits—none of which had, or needed, four-letter words.

Two people, President Franklin D. Roosevelt, and H. V. Kaltenborn, with their compelling radio personalities, did much to pull America through the Great Depression, and the first frightening months of World War II. President Roosevelt ("F. D. R.") and his "fireside chats" could very well have saved this country from a revolution in the early thirties. Millions were unemployed, banks were failing; plants and small businesses were closing. Money just disappeared from circulation.

There were no insured bank accounts, no welfare payments, no food stamps, no unemployment insurance, no Social Security checks, or government help of any kind. If you were out of work, you were out of food. Larger cities opened up soup kitchens to keep people from starving. Those lucky enough to live in the country grew their own food.

The country was caught up in strikes, marches on the Capitol, riots, crime, and unrest that could have led us into a revolution. Then F. D. R. came on the radio and told us: "The only thing you have to fear—is fear itself." He assured us the government was going to take action. We were willing to wait and see. As he promised, things began to improve. Progress was slow, but each year was a little better than the preceding one.

Then came Pearl Harbor! We were caught with our pants at half-mast. All the explaining by the military could not cover up the fact that we were terribly unprepared to fight a war—a war raging on two widely spaced fronts. In the Atlantic our ships were being sunk by German U-boats every week. France had fallen. Russia was being beaten back. England was hanging on by sheer guts alone. We lost base after base in the Pacific, including the Philippines. The loss of American lives was staggering—Wake Island, Bataan, Corregidor. It seemed there was nothing but bad news; there was no hope.

Then we turned on the radio for H. V. Kaltenborn's news broadcast. "Ah, yes, there's good news tonight," Mr. Kaltenborn would say. Then he would stress the good news that had happened that day. It might be insignificant to the rest of the world, but it was encouraging to hear just a little bit of good news. Somehow we always slept a little better after listening to H. V. Kaltenborn.

Remember those great "remotes" we used to listen to after going to bed? You could close your eyes and go to ballrooms from coast to coast: The Meadowbrook, The Rustic Cabin, The Paragon, Roseland, The Coconut Grove, The Pump Room, The Glen Island Casino—one after the other until we finally went to sleep. And the bands—

Rudy Vallee, Kaye Kyser, Blue Barron, Herbie Kaye, Sammy Kaye, Bob Chester, Jack Teagarden, Artie Shaw, The Dorseys, Bob Crosby, Glenn Miller, Benny Goodman, Chick Webb, Count Basie, Jimmy Lunceford, Jay McShann, Larry Clinton, Glen Gray, Ben Bernie, Ted Lewis, and yes, even Lawrence Welk, though I never met anyone when I was young who liked his music. Lawrence Welk's music was like oatmeal; most people developed a taste for it about the time their teeth fell out.

Just for the fun of it, let's take a little test.....Match the proper letters and numbers.

If you missed one or two, you can find the correct answers at the end of this chapter.

Advancement of vacuum tube technology enabled rural families to enjoy radio almost as economically as their city cousins. Shortly after the introduction of electric radios, manufacturers developed two-volt, and later 1.5-volt radio tubes. The "thousand hour" battery pack was born in the late 30's. One battery, one plug to connect to the battery, and you were ready to enjoy one

thousand hours of entertainment. Within a few years battery life was extended to 1,300 hours. The cost was about five dollars; total cost of listening, not much more than for those living in the cities. Of course those old 1½-volt sets only pumped out a fraction of a watt of audio—not much, but entirely adequate for voice and passable for music—far better than nothing at all.

1. Ted Lewis	A. The Dipsy Doodler
2. Ben Bernie	B. The Casa Loma Orchestra
3. Rudy Vallee	C. Swing and Sway with———
4. Benny Goodman	D. The Bobcats
5. Artie Shaw	E. A megaphone
6. Sammy Kaye	F. Is Everybody Happy?
7. Lawrence Welk	G. The Old Maestro
8. Bob Crosby	H. The King of Swing
9. Glen Gray	I. The Champagne Music of.....
10. Larry Clinton	J. The Gramercy Five

Did anyone play records in those pre-war years? Sure they did, but not to any great extent. Jukebox operators accounted for much of the record market. Recorded music technology was on hold. Ten-inch 78 RPM records, mostly unchanged since 1914, were still the industry standard. They played less than four minutes per side. Some 12-

inch records were available—mostly classical music. Playing time for this larger record was about five minutes. Records were normally played on one of three types of machines: the old wind-up phonograph, cheap AC/DC operated portable phonographs, and radio-phonograph combinations. It was well known that every time a record was played on a wind-up phonograph, the record suffered considerable damage. Sharp steel needles, plus a heavy pickup pressure, quickly destroyed what little fidelity the record possessed in the beginning. A surface noise or scratchy sound was superimposed on the music in the delicate record grooves after very few playings. I remember buying a few 78s from Guisinger's Music House in Fayetteville during my college years. They cost me seventy-five cents in 1940. Few jobs were available that paid over thirty-five cents per hour. It took two hours labor to buy three minutes of recorded music. Recording companies spent little effort to offer true high fidelity recordings. The public had not been educated to appreciate good sound, and those who did were likely to own equipment incapable of reproducing wide-range recordings. Electric phonographs and radio-phonograph combinations used electrical pickups; most weighed in excess of twenty-five grams. Piezo-electric, or crystal pickups, common throughout the industry, required a heavy stylus pressure for proper operation. Demand for high quality record playing equipment did not warrant large expenditures of capital by manufacturers.

Music lovers became aware of potential record damage early on and resorted to many devices to minimize record wear. One of the more successful was use of cactus needles. Cactus did less damage to the delicate records and imparted a softness to sound reproduction that many found pleasing. A cactus needle, if it was to sound its best, required sharpening after every record—a lot of trouble for three minutes of music. Cactus needle sharpeners, available for around two dollars, made the chore a little less unpleasant. Others, like me, rigged up a counterweight to lessen needle pressure. My records lasted longer; however, fidelity suffered when crystal pickups were operated at less than the recommended stylus pressure. Steel needles came in small envelopes. A dozen or so cost twenty-five cents. Cactus needles cost a little more. "Permanent" style needles with either sapphire or diamond points became available before World War II. Costing from $1.50 to $5, they sold well, even though record wear was still a major problem.

To overcome the inconvenience of changing records every three minutes, most companies offered record changers. "Record destroyers" would have been a more appropriate name. When they worked properly—a rather rare occurrence, your records were often scratched and chipped. If you forgot and left records on the changer, they tended to warp, especially in warm weather. It is easy to understand why consumers were reluctant to spend hard-earned dollars on phonograph records.

As early as 1860, Paul Nipkow of Germany designed a simple disc; around the outer edge was a spiral of holes containing small lenses. Its purpose was to transmit pictures through a wire. Later the disc was combined with wireless to send pictures through the air. Others developed various mechanical means of transmitting pictures before the turn of the century. Some produced pictures good enough to encourage further experimentation. None compared, however, to the Zworykin iconoscope—a modification of the cathode ray tube.

In 1926, John Logie Baird demon-

strated his television system to the Royal Institute in London. This system, unfortunately, still relied on the Nipkow mechanical system of TV. Though the British Broadcasting Company was impressed, they finally realized that, if TV was to become practical, the mechanical systems must be replaced by more modern technology. They started broadcasting in 1934 with the Zworykin system, using an iconoscope in the camera and a cathode ray tube in the receiver. These TV transmissions were far superior to the disc. The results were sharp black-and-white images with a good gray scale, whereas the disc television produced silhouette-type pictures only. Though the disc was inferior to electronic scanning, a few still believed in the obsolete mechanical TV system. Amateur experimenters were especially fond of scanning disc TV, because it contained few parts and was easy to build. And the cost was a small fraction of cathode ray systems. Strangely enough, as late as 1994, scanning disc TV kits were still manufactured for sale to schools, museums, and radio experimenters interested in antique equipment. Perhaps they are still available today.

Television was demonstrated to millions during the New York World's Fair in 1939. Images had a greenish-blue cast and were limited to postcard size, but millions who watched the small pictures came away convinced TV would soon be in every home. A few television stations, financed by various manufacturers, transmitted television images occasionally during the '30s, some on a rather loose weekly schedule.

By the end of World War II, necessary technology was in place to build television transmitting stations and receiving sets. There was a general feeling among the buying public that TV was at last just around the corner. We must make decisions and predictions based upon present day technology. If the general public had understood the magnitude of the problems that faced the TV industry, they would have been less optimistic. Those in the industry were aware of problems the public never even thought of—and some seemed impossible to solve. To us, TV was "down the road a piece," not "around the corner." For example, if coast-to-coast TV was to become a reality, there must be a method of connecting every TV station in America to network studios. Otherwise, our TV programs would be limited to film or live programs produced in each TV station studio. The obvious solution was to run a very expensive, low loss, high definition co-axial cable to every TV station. Cost was estimated in the many billions of dollars. The completion time was about twenty years!

Who could dream that when the Russians launched the little beep-beeping "Sputnik" that our problems were practically solved? Communication satellites could do the job of the cable—much better and at a fraction of the cost. Television, the long awaited miracle, finally 'rounded' its long predicted corner.

Answers to quiz. 1-F, 2-G, 3-E, 4-H, 5-J, 6-C, 7-I, 8-D, 9-B, 10-A——

If you answered 8 or more correctly your score is much above average.

Please note: Most of the material in this episode is from my book "Emma, We Love You," published by our local Museum, The Shiloh Museum of Ozark History, and is used with permission.

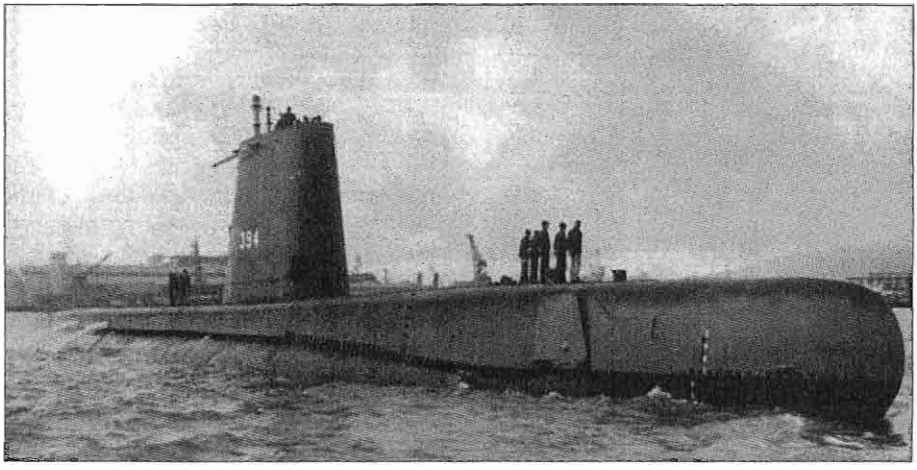
Submarines On The Air

by Carl Raish, KGØHS, SVARA SSN
1873 S. Tennyson St.
Denver CO, 80219

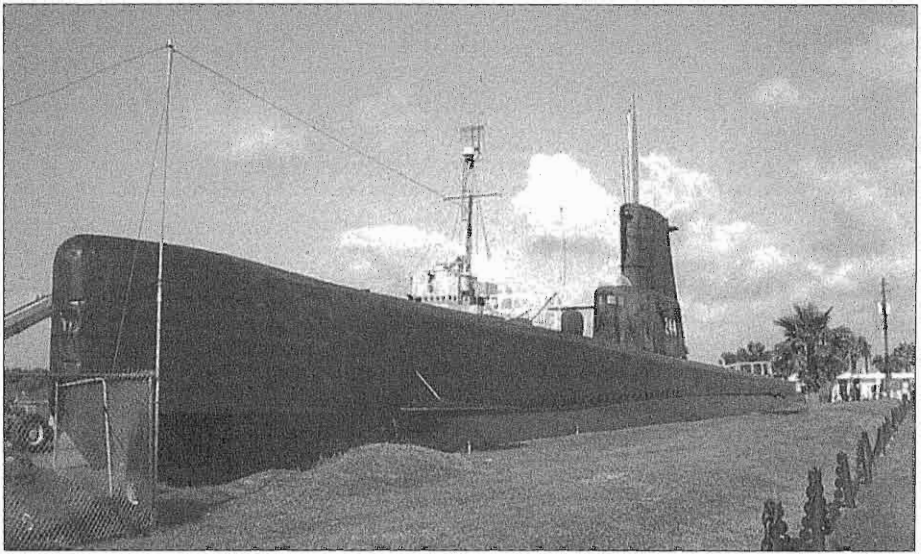
Submarines On The Air is a special event weekend sponsored by the Submarine Amateur Radio Association (SVARA) that is held the last weekend in April. We have done this for many years now, and the popularity is growing. We operate from as many of the museum submarines as possible. This is done as a locally arranged event. We have had as many as 25 subs and submarine memorials on the air these weekends.

One of the major roles in the event is to get the radio rooms restored. A lot of progress has been made in this endeavor, with complete restoration in some cases. The Clamagore in Charleston is getting all of her Collins gear operational with a lot of hard work from the group down there. There is a line of communication that is open between the different museum volunteer groups for exchange of equipment. In some cases, all of the radio gear was stripped or vandalized and the group had to start from scratch. We are continuously looking for any old radio gear that was used on the subs. Finding authentic antennas that were used on the old subs has been a real challenge. In some cases the original whip antennas will work, but trying to get the original long wire antenna put up and working is a feat.

The Razorback, SS394, was sold to Turkey years ago, and currently is being decommissioned by the Turks. A group of submarine veterans, along with the city of Little Rock, Arkansas have purchased the boat and are making plans to bring it back home. The radio room has been completely stripped, so it will be a real challenge to find all the old gear to put her back together. The Turkish Navy has volunteered to bring her back, and there is a



The USS Razorback is leaving port sometime after commissioning in April 1944, location unknown. (Photo courtesy US Naval History Center)

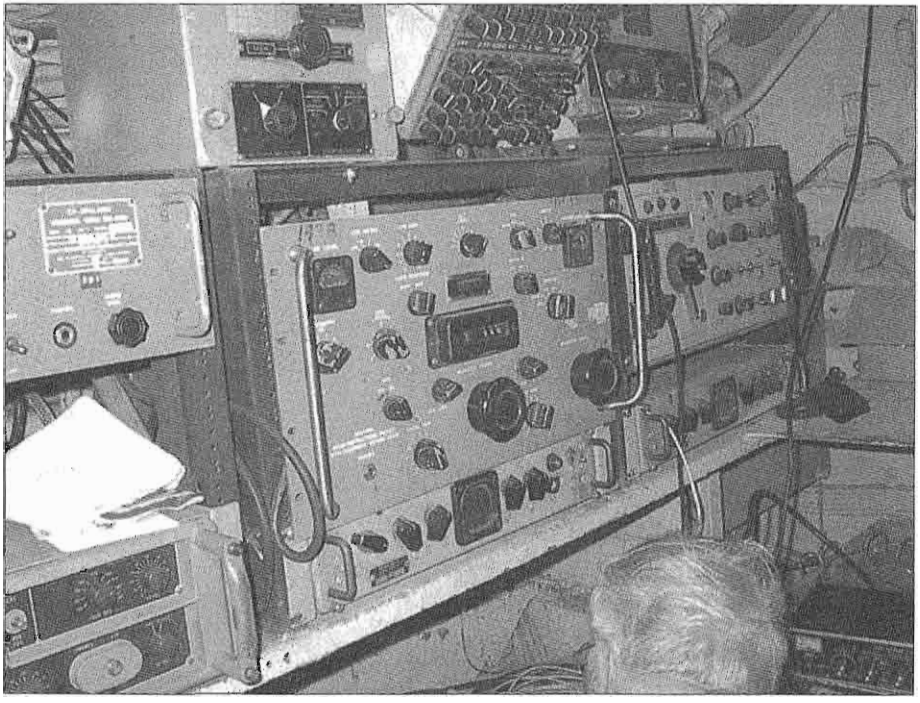


The USS Cavalla, SS-244 as it appeared in the summer of 2002, now on permanent display as a museum ship in Seawolf Park, Galveston Texas. (Photo by Carl Raish, KGØHS)

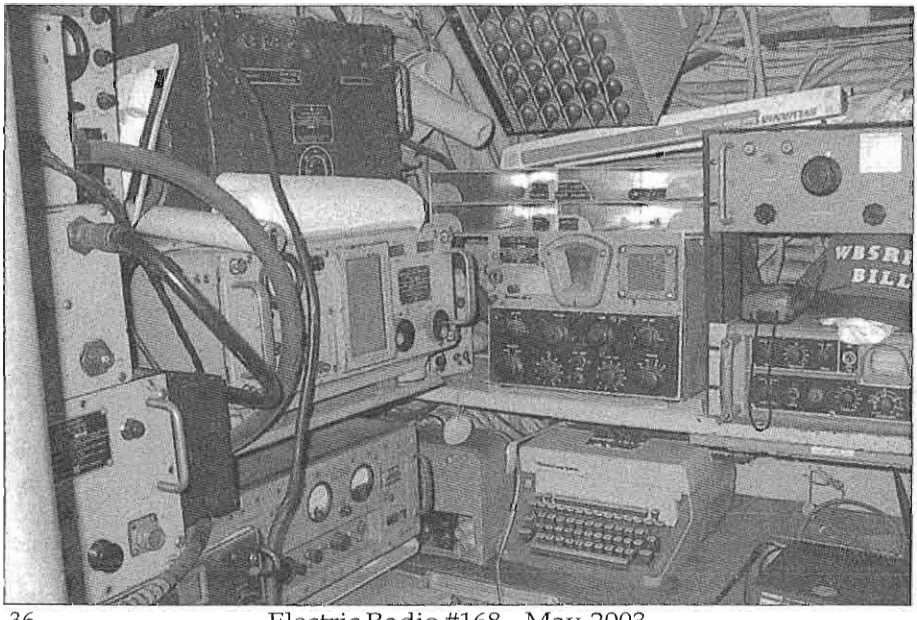
big list of sub vet volunteers waiting for the chance to ride her home. The pictures and reports show this sub to be in top-notch condition.

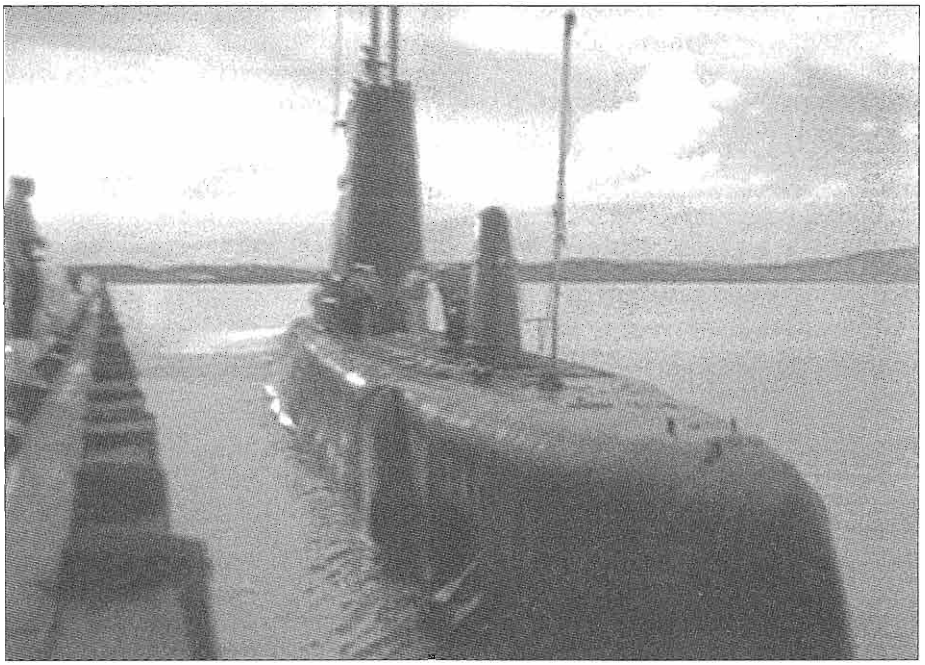
Last year I made a trip to the Cavalla at Sea Wolf Park in Galveston, Texas for the special event weekend and really enjoyed myself. I never served on a diesel submarine, but spent 10 years on nuclear submarines. They all go under water and smell the same. It brought back a lot of memories, and it was easy to identify things. There has been a lot of work on this sub to bring her back to show quality. The radio room needs a lot work; the radios are there but nothing is yet operational. We ran some new coax through the hull penetrations to reach the antennas in the sail. There is plenty of power to run the radios and a lot of old time gear that needs it's wiring traced out. There is a Destroyer Escort sitting along side the sub for display, it has a radio room full of gear ready to be restored [Editor's Note: This is the USS Stewart, DE-238]. The berthing spaces and dining areas are restored so volunteers can live on board while working on either ship.

From some of the pictures I have seen of other submarine radio rooms, these little rooms would be heaven to old time radio guys. Since I am somewhat new to the radio world there is a lot of gear there that baffles



These two photos were taken in the USS Cavalla's radio room, and many familiar radio panels are shown. The man facing the R390A is not identified. These rooms were quite a contrast with the roomy facilities on the aircraft carrier in ER #166, March 2003. (Photo by Carl Raish, KGØHS)





From the US Navy photo archives, the USS Clamagore, SS-343, is shown during operations sometime during WW2. The exact location is not known.

my mind. I was a Machinist Mate on the subs and never got around the radio rooms that much. Besides, it took a real high clearance to be in there.

There are museum subs all over the country and some even have radio clubs taking care of them. The Pampanito in San Francisco has it's own radio club, known as the Pampanito Amateur Radio Club. They are frequently on the air. The Mancord Radio Club puts the Cobia in Manitowoc, Wisconsin on the air. This group has restored some of their engines to running condition. There is a Russian sub up in Washington for display, and its radio room is being setup by hams. Right out in the middle of the country in Oklahoma, the Batfish is setting in a field with a group of hams working on the radio room. If you hear the call WW2SUB, that will be the club station call for the Batfish. Many of the subs have gotten their old navy calls with a number inserted in the middle, such as NY3EC, NJ6VT, NS2ND and many more.

World War 2 submarine veterans that wanted to stay in touch with each other formed the Submarine Veterans Amateur Radio Association about 50 years ago. It has been going strong ever since. A group of cold war sub vets are picking up the ball and carrying on to keep the traditions going. Submariners are a close nit group of guys that learned to get along in confined spaces for long periods of time, and that hasn't changed even today. Recently, an Admiral described the submarine force as intelligent groups of misfits that get along well together, and I guess we are! The SVARA now has over 300 in the database of names and a lot more keep showing up every day. We are doing our best to collect all the information we can from the old submariners to be able to keep their gear working. I hope in the future to have more articles writ-

ten by hams at each museum sub that will describe in detail the gear in the radio rooms and the status.

[Editor's note: ER has obtained the following additional information from the U.S. Naval History Center:

Razorback: Balao Class Submarine laid down 9 September 1943, at Portsmouth Navy Yard, Kittery, ME; Launched, 27 January 1944; Commissioned USS Razorback (SS-394), 3 April 1944; Decommisioned 1 Aug 1952, for Guppy conversion; Recomm. in Jan 1954; Decomm., at Hunters Point Naval Shipyard, San Francisco, CA., struck from the Naval Register, and transferred to Turkey (sold) under terms of the Security Assistance Program, 30 November 1970; Commissioned into the Turkish Navy as Murat Reis (S-336); Returning to Arkansas to be made a permanent maritime museum in North Little Rock, Jan. 2003. Razorback received five battle stars for World War II service, and four stars for Vietnam service. Callsign NKNX

Clamagore: Balao Class Submarine, laid down, 16 March 1944, at the Electric Boat Co., Groton, CT.; Launched, 25 February 1945; Commissioned USS Clamagore (SS-343), 28 June 1945; Converted to a Guppy type submarine in 1948; Decommissioned, 12 June 1975; Struck from the Naval Register, 27 June 1975; Serving as Museum Ship at Patriot's Point, Charleston, South Carolina. Callsign NJDU

Cavalla: Gato Class Submarine, laid down, 4 March 1943, at the Electric Boat Co., Groton, CT.; Launched, 14 November 1943; Commissioned USS Cavalla (SS-244), 29 February 1944; Decommissioned, 16 March 1946, at New London, CT.; Laid up in the Atlantic Reserve Fleet, New London Group; Recommissioned, 10 April 1951; Decommissioned, 3 September 1952; Redesignated Hunter-Killer Submarine (SSK-244), 18 February 1953; Recommissioned, 15 July 1953; Redesignated (SS-244), 15 August 1959; Reclassified Auxiliary Submarine (AGSS-244) in July 1963; Decommissioned, and struck from the Naval Register, 30 December 1969; Donated, 21 January 1971, for display as a permanent submarine museum at Seawolf Park, Galveston, TX. Cavalla was awarded a Presidential Unit Citation and four battle stars for World War II service. Callsign NBPS

Pampanito: Balao Class Submarine, laid down, 15 March 1943, at Portsmouth Navy Yard, Portsmouth, NH; Launched, 12 July 1943; Commissioned USS Pampanito (SS-383), 6 November 1943; Decommissioned 15 December 1945; Laid up in the Pacific Reserve Fleet; Reactivated and place in service as a Naval Reserve Training Ship in April 1960, assigned to the Mare Island Naval Reserve Training Center; Reclassified Auxiliary Submarine (AGSS-383), 6 November 1962; Struck from the Naval Register, 20 December 1971; On permanent display at the San Francisco Maritime Museum. Pampanito received six battle stars for World War II service. Callsign NJVT

Cobia: Gato Class Submarine, laid down, 17 March 1943, at Electric Boat Co., Groton, CT.; Launched, 28 November 1943; Commissioned USS Cobia (SS-245), 29 March 1944; Decommissioned, 22 May 1946, at New London, CT.; Laid up in the Atlantic Reserve Fleet; Recommissioned, 6 July 1951; Decommissioned, 19 March 1954, at New London, CT.; Laid up in the Atlantic Reserve Fleet; Redesignated Auxiliary Submarine, 1 December 1962; Struck from the Naval Register, 1 July 1970; On permanent display as a museum ship at the Wisconsin Maritime Museum, Manitowoc, WI. Callsign NBQV]

Electric Radio Yearly Index
May 2002 to April 2003
(Issues 156 to 167)

Compiled by Don Buska, N9OO
4805 64th Ave.
Kenosha WI
53144-1712

Photographs of Hams

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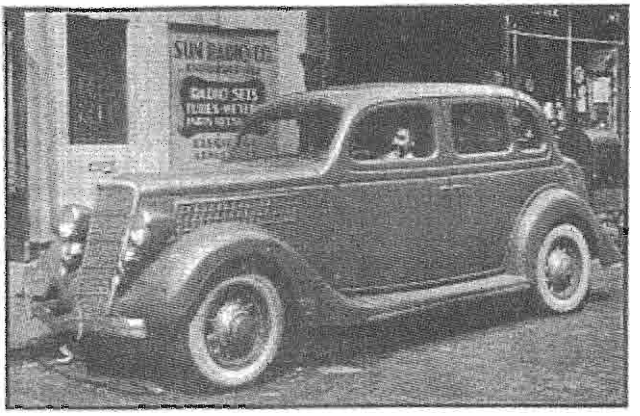

VINTAGE NETS

Nets that are underlined are either new, or have changed times or frequencies since the last issue.

Arizona AM Nets: Sat & Sun: 160M 1885 Kc at sunrise. 75M 3855 Kc at 6 AM MST. 40M 7293 Kc 10AM MST. 6M 50.4 Mc Sat. at 8 PM MST. Tuesday: 2M 144.45 7:30 PM MST.

Boatanchors CW Group: 3546.5, 7050, 7147, 10120, 14050 Kc. Check 80 winter nights, 40 summer nights, 20 and 30 meters day. Nightly informal net about 0200-0400 UTC. QNI "CQ BA" or "CQ GB".

California Early Bird Net: Saturday mornings at 8 AM PST on 3870.

California Vintage SSB Net: Sunday mornings at 8AM PST on 3860 +/-

Colorado Morning Net: An informal group of AM'ers get together on 3875 Kc Monday, Wednesday, Friday, Saturday, and Sunday at 7 AM MT.

Canadian Boatanchor Net: Meets daily on 3725 Kc (+/-) at 8:00 PM ET. Hosts are AL(VE3AJM) and Ken (VE3MAW)

Collins Collectors Association Nets: Technical/swap sessions meet every Sunday on 14.263 Mc at 2000Z. A long-established net run by call areas. Informal ragchew nets meet Tuesday evening on 3805 Kc at 2100 Eastern time, and Thursday on 3875 Kc. West Coast 75 M net is on 3895 at 2000 Pacific time.

Collins Collector Association Monthly AM Night: Meets the first Wednesday of each month on 3880 Kc starting at 2000 CST, or 0200 UTC. All AM stations are welcome.

Collins Radio Association nets: Mon. & Wed. 0100Z on 3805 kc., also Sat 1700Z on 14.250 Mc.

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

Drake Users Net: This group gets together on 3865 Kc, Tuesday nights at 8 PM Eastern Time. Net controls are Gary (KG4D), Don (W8NS), and Dan (WA4SDE)

DX-60 Net: This net meets on 3880 Kc at 0800 AM, Eastern Time on Sundays. Net control is Jim (N8LUV), with alternates. The net is all about entry-level AM rigs like the Heath DX-60.

Eastern AM Swap Net: Thursday evenings on 3885 Kc at 7:30 PM Eastern Time. Net is for exchange of AM related equipment only.

Eastcoast Military Net: Check Saturday mornings on 3885 Kc +/- QRM. Net control station is W3PWW, Ted. It isn't necessary to check in with military gear, but that is what this net is all about.

Fort Wayne Area 6-Meter AM net: Meets nightly at 7 PM Eastern Time on 50.58 Mc. This is another long-time net, meeting since the late '50s. Most members use vintage or homebrew gear.

Gray Hair Net: The oldest (or at least one of the oldest at 44+ years) 160 meter AM nets. Net time is Tuesday evening on 1945 Kc at 8:00 PM EST and 8:30 EDT. Also check www.hamelectronics.com/ghn

Hallicrafters Collectors Association Net: Sunday on 14.293 Mc, 1730-1845 UTC. Control op varies. Mid-west net Sat. 7280 Kc 1700Z. Control op Jim (WB8DML). Pacific Northwest net Sunday 7220 Kc at 2200Z. Control op Dennis (VE7DH).

K1JCL 6-meter AM repeater: Operates 50.4 Mc in, 50.4 Mc out. Repeater QTH is Connecticut.

K6HQI Memorial Twenty Meter Net: This flagship 20 meter net on 14.286 Mc has been in continuous operation for at least 20 years. It starts at 5:00 PM Pacific Time and goes for about 2 hours.

Midwest Classic Radio Net: Meeting Saturday morning on 3885 Kc at 7:30 AM, Central Time. Only AM checkins are allowed. Swap and sale, hamfest info, and technical help are frequent topics. Control op is Rob (WA9ZTY).

MOKAM AM'ers 1500Z Mon. thru Fri. on 3885 kc. A ragchew net open to all interested in old equipment.

Northwest AM Net: AM activity is daily 3 PM to 5 PM on 3875 Kc. The same group meets on 6 meters at 50.4 Mc. Times are Sundays and Wednesdays at 8:00 PM. 2 Meters Tues. and Thurs. at 8:00 PM on 144.4 Mc. The formal AM net and swap session is on 3875 Kc, Sundays at 3 PM.

Nostalgia/Hi-Fi Net: Started in 1978, this net meets Friday at 7 PM Pacific Time on 1930 Kc.

Old Buzzards Net: Daily at 10 AM local time on 3945 Kc in the New England area. Listen for net hosts George (W1GAC) and Paul (W1ECO).

Southeast Swap Net: Tuesday at 7:30 PM Eastern Time on 3885 Kc. Net controls are Andy (WA4KCY) and Sam (KF4TXQ). Group also meets Sunday on 3885 Kc at 2 PM Eastern Time.

Southern Calif. Sunday Morning 6 Meter AM Net: 10 AM on 50.4 Mc. Net control op is Will (AA6DD).

Swan Nets: User's Group meets Sunday at 4 PM Central Time on 14.250 Mc. Net control op is usually Dean (WA9AZK). Technical Net is Sat, 7235 kc, 1900Z. Net control is Stu (K4BOV)

Vintage SSB Net: Sunday 2100Z 14.293 & 0300Z Wednesday. Net control Lynn (K5LYN) and Andy (WBØSNF)

West Coast AMI Net: 3870 kc, Wed. 8PM Pacific Time (winter). Net control rotates between Skip (K6YKZ), DJ (K6RCL), Don (W6BCN), Bill (N6PY) & Vic (KF6RIP)

Westcoast Military Radio Collectors Net: Meets Saturday at 2130 Pacific Time on 3980 Kc +/- QRM. Net control op is Dennis (W7QHO).

Wireless Set No. 19 Net: Meets the second Sunday of every month on 7270 Kc (+/- 25 Kc) at 1800Z. Alternate frequency is 3760 Kc, +/- 25 Kc. Net control 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 words 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 email, so it is a good idea to include phone numbers.

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Deadline for the June 2003 Issue: Saturday, May 28

FOR SALE: Repair and restoration on all vintage equipment; 45 years experience. Barney Wooters, W5KSO, 8303 E. Mansfield Ave., Denver, CO 80237. (303) 770-5314

FOR SALE: Hallicrafters SX-88. Receiver looks almost new, no mods. $9,995.00 OBO. W6ZPE1@cs.com

FOR SALE: Hallicrafters SX-28. Looks great and works great. $275, prefer pickup, very heavy to ship. Ken, 254-772-7307, Waco Texas.

FOR SALE: Collins KWM-2 with PM-2 Supply excellent condition $750.00 Cliff Fleury AI7Y P.O Box 1233, Goldendale, WA 98620 cfre@gorge.net 509-493-8203

FOR SALE: Johnson Desk Kilowatt transmitter. $2,800, PU only. Please call for details. Herb, K9GTB, 618-362-6539

FOR SALE: Parting out kilowatt commercial AM transmitter. Heavy Stuff. Bargain prices, good condx. Includes three 833 tubes, four mercury vapor rectifiers. For 220 AC power. Request parts list & prices. Charles Graham, K2VGE, 4 Fieldwood Drive, Bedford Hills, NY. 10507. 914-666-4523

FOR SALE: Hallicrafters S-53A in good working condx $60.00 + shipping. Vern Snyder, 5 Parkview Drive, Winder GA, 30680-3956 970-307-1459

FOR SALE: Hallicrafters HT-7 Frequency Standard w/orig manual. $50.00. Jim, KB8RIT 906-293-3318

FOR SALE: Johnson Viking II with VFO model #122, $275.00. Johnson Viking I, $175.00. Hammarlund HQ-180 with matching speaker, $300.00. Bud, K5JDU, 580-298-3105

FOR SALE: Triumph 3 inch scope #830, $20.00. Kenwood QR666 rcvr $85.00. Henry Mohr, W3NCX, 1005 W. Wyoming, Allentown PA 18103-3131

FOR SALE: Two Aerovox HV filter caps, 36 uF @ 5200 V. No PCB. Tested in my 2400 V. supply. $30.00 each including shipping. Carl, W2IQK, Slate Hill NY, 845-355-1596 eaglewing10@juno.com

FOR SALE: Galaxy 300 with matching power supply and manual. Radio was new in 1963 and in storage since owners' death in 1965. Very nice condition, asking $175 + shipping OBO. Russell Gundlach 716-326-2090, 38 Clinton St. Westfield NY, 14787

FOR SALE: Motorola and GE tube FM gear for sale, ask W2OQI@optonline.net, 631-878-1591, 17 Inwood Rd, Center Moriches, NY 11934

FOR SALE: Rohde & Schwartz type SK043/31 400-watt shortwave transmitter. This rare and unusual transmitter was made in Germany in the early 1950s. It operates 1.8 to 6 mhz. I am aware of only two of these in operational condition in the US. This transmitter is restored and on the air. Includes complete manual and documentation of problems found during restoration. Digital pictures available by email. $1000.Pickup only. Jim Jorgensen, K9RJ, 1709 Oxnard Dr., Downers Grove, IL 60516. 630-852-4704. k9rj@attbi.com

FOR SALE/TRADE: QST's 1915 to 1970's some years incomplete but dupes 20's to 40's, $1000.00 OBO or trade for communications receivers. K8CCV, Box 210, Leetonia, OH 44431-0231, 330-427-2303 Weekdays.

FOR SALE: Parting out Harvey Wells Bandmaster TBS50C. Muzak 8 Watt audio amp $20.00. Mel, WØMLT, 970-249-1544

FOR SALE: Very large lot of parts for transmitters and receivers. Tubes, coils, National dials. Stuart T. Carter, II. W4NHC, 680 Fernwood Drive, Melbourne FL 32904, 321-727-3015

FOR SALE: Hallicrafters HT-32A $325.00. Hallicrafters HA2 & HA6 with power supply $225.00. All with manuals and in excellent condition. Bob W1RMB (508) 261-8231 (work number).

FOR SALE: KWM-2A plug-in relays K2 & K4 manufactured by Allied Signal, P/N T163-6C-115D and T163-4C-115D. $35.00 for a set + $3.85 priority mail. Mike Hutnick, 450 Riverview Ave., Bloomsburg PA, 17815, hutnick@epix.net

FOR SALE: ARRL Handbooks 1952, 1959, 1960, 1964, 1968. $10.00 each + shipping. Richard Cohen, 813-962-2460

FOR SALE: Vacuum fixed and variable capacitors. Details at: http://www.isquare.com/personal pages/forsale-vacvar.htm Bob, WØYVA, Great Falls, VA. 703-450-7049.

FOR SALE: Vibroplex "Presentation" bug, new, w/case, $265: Clegg Thor 6 AM/CW Transceiver, w/AC supplly, $225. Richard Prester, 131 Ridge Road, West Milford, NJ 07480. 973/728-2454. rprester@warwick.net

FOR SALE: NOS Tungsol 26Z5W as used in the R390A, $16.00 each. Electron Tube Enterprises, Box 652, Springvale ME 04083. 207-490-5870

FOR SALE: Webber Mod. 20 signal generator (1938) $40, Military whip antennas. Bruce Beckeney, 5472 Timberway Dr., Presque Isle, MI 49777, 989-595-6483

FOR SALE: Plans reprinted from 1936/1943 Gernsback "Radio-Craft" for simple vacuum tube "Magic Eye" projects. Free list. Bob Ryan, 1000 S. Gilbert St., Apt 132, Hemet CA 92543-7065

FOR SALE: Tested good globe 201A $14.00, 26 $15.00, 227 $10.00 and others. Slightly weak tubes guaranteed to work in early radios ½ price shown. Write or e-mail: tubes@qwest.net for a new price list or see www.fathauer.com. George H. Fathauer & Assoc., 688 W. First St. Ste 4, Tempe, AZ 85281, 480-968-7686. Toll Free 877-307-1414

FOR SALE: Authorized repairs and sales of all types of amateur radio and communications equipment, and also test equipment. Please call us at LAND AIR COMMUNICATIONS, 718-847-3090 and visit our web site: www.landaircom.com. We have over 3,000 items in inventory and carry all types of communications parts.

FOR SALE: Swan 350, $150: Heathkit SSB Filter #404-328, 2.1KHZ at 3.395KHZ, NOS $50. D. Michael, W3TS, 129 Church Lane, Halifax, PA 17032; 1-717-896-3973

FOR SALE: Repair, Restore, Sales of antique, vintage tube radios. John Hartman, NM1H, www.radioattic.com/nm1h

FOR SALE: Hallicrafters 71, parts set, $50. Signal Corps Antenna A-58 CAAZ 1974, $25 Mike Grimes, K5MLG; 3805 Appomattox Cir; Plano, Texas, 75023, (972) 867-6373. Email: grimesm@flash.net

FOR SALE: Yaesu FV-101 VFO-$115, SP-101 speaker-$40, SP 901-$40, Collins tubesters. Carter 434 979 7383. CElliott14@aol.com

FOR SALE: LM-21 Crystal calibrated frequency indication equipment, 125-2000 freq. range, manual and charts. $60 plus shipping. Call Charles, 305-745-1801

FOR SALE: Military Radio manuals, origs & 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

FOR SALE: Collins 4:1 knobs, guaranteed satisfaction. $55.00 + shipping. Dutch WB7DYW 832-549-1540 wb7dyw@ev1.net http://users2.ev1.net/~wb7dyw/4to1knob.jpg

FOR SALE: Porcelain-based Tx tubes, send SASE for list. W7SC, 3932 S. Mesa View Ln, Boise ID, 83706-6052

FOR SALE: First user friendly circuit for early BC-348's! Send $4.00 + .37 US stamp + business envelope. Ray Larson, 12241 ½ Gorham Ave., W. Los Angeles CA 90049-5214

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

FOR SALE: Motorola car radio, steering column controls, w/508 box, (controls fit box) $100. Heathkit VFO model HG-10 $50. Panasonic CB 23 channel model RJ-3200 w/mic @9 $25.Books: Fundamentals of Electronics by Owens and Keaton Vol 1-2&3 plus solid state & conductor physics W/jackets & sleeves $10..Bernie Samek, 113 Old Palmer Rd, Brimfield MA 01010, 413-245-7174 FAX 0441. NOTICE: If I don't return your call, please call again because message was garbled on my machine or I copied wrong.

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

FOR SALE: Collins Radio stock certificates, 33 avail, 10-share (green) or 100-share (blue), issued to various companies. $20.00 each, limit one per customer. Check or MO. No choice on color. William O. Dean, KC7ICH, PO Box 3105, Tonopah, NV, 89049

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FOR SALE: 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. bak@provisiontools.com

FOR SALE: Communications Receivers, Military Communications and some test equipment. SASE, Don Jeffery, 131 North Ivy Ave., Monrovia CA, 91016, boallan@aol.com

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 Prky, Escondido, CA 92029. (760) 747-8710, w6zz@cox.net

FOR SALE: Send SASE for large list of excess parts. Publications, ham & test gear. K4AFW, 104 Glenwood Dr., Williamsburg, VA 23185

FOR SALE: Repro Nameplates, R-390A generic $9, S1J-3 and S1J-4 exact replicas, $12. Tom Marcotte, N5OFF, 210 Clem Dr., Lafayette, LA.70503. courir@yahoo.com

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

FOR SALE: Heath Nostalgia, 124 PG book contains history, pictures, many stories by longtime Heath employees. (See BOOKS inside back cover.) Terry Perdue, 18617 65th Ct., NE, Kenmore, WA 98028

FOR SALE: DX-35, DX-40 \reproduction crystal doors. $11.50 shipped. Texans add 8.25% sales tax. Glen Zook, 410 Lawndale Dr., Richardson, TX 75080

FOR SALE: TX'ers, rcvrs, parts, manuals, etc. Send a large SASE. More at http://come.to/AF4K/ Brian Carling, 117 Sterling Pine Street, Sanford, FL 32773 Brian Carling, AF4K, 117 Sterling Pine St., Sanford, FL 32773.

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FOR SALE: Books, send SASE. **WANTED:** Anything by Fairchild or Langevin. send SASE for my want list. Richard Robinson POB 1425 Wallingford CT 06492, 203-949-0871 or richmix@erols.com

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FOR SALE: Please visit RadioWorld-Online.Come to see our ham gear, parts, and more. Carl Blomstran PO Box 890473 Houston Tx. 281-660-4571.

FOR SALE: Aluminum knob inlays, Collins, Drake, National, Hallicrafters, Heath; Collins Dial Drum Overlays. Charlie Talbott, 13192 Pinnacle Ln, Leesburg VA 20176 540-822-5643, k3ich@arrl.net

FOR SALE: Some unused obsolete Triplett tester transformers. Free List. Bigelow Electronics, POB 125, Bluffton, OH 45817-0125

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 e-mail bugs@mnic.net

FOR SALE: Parts, tubes, books, ECT. Send two stamp SASE or email for list. Wayne LeTourneau, POB 62, Wannaska, MN 56761 wb0cte@arrl.net

FOR SALE: Collins restoration. Everything inside & out to make it as Art Collins built it. 50 yrs experience. W9OJI / N4FZ, IL, 815-734-4255 or N4PZ@aol.com

FOR SALE: Collins S-line and A-line repair. FCC licensed, many years of experience. lal@metrocast.net 207-457-9257

FOR SALE: Convert any wattmeter to read PEP! Perfect for AM/SSB-$24.95 ppd for complete kit! HI-RES, 8232 Woodview, Clarkston MI 48348, 248-391-6666, info@hi-rescom.com

FOR SALE: Complete hardware set to connect Collins PM2 to KWM2 -$19.95 ppd. Warren Hall, KØZQD, FOB 282, and Ash Grove, MO 65604-0282.

FOR SALE: Repair, upgrade, performance modification of tube communications & test equip. Accepting most military, all Collins & Drake designs, & the better efforts from others. Laboratory performance documentation on request. Work guaranteed. Chuck Felton, KDØZS, Felton Electronic Design, Box 187, Wheatland, WY 82201. 307-322-5858 feltoned@yahoo.com, www.feltondesign.com

FOR SALE: New Release. For details send 2-stamp LSASE to: Olde Tyme Radio Co, 2445 Lyttonsville Rd. Ste 317, Silver Spring, MD 20910

FOR SALE: Military and commercial communications items. Murphy's Surplus, 401 N. Johnson Ave., El Cajon, CA 92020. 619-444-7717 www.Murphyjunk.com

FOR SALE: Tube list, new & used, wide variety audio, and ham. Recently expanded. SASE 52c. Bill McCombs, WBØWNQ, 10532 Bartlett Ct., Wichita, KS 67212-1212

FOR SALE: PANEL AND CABINET REFINISHING; Johnson, Hammarlund 180(a), R390(A), & others total restoration & sales; My updated web site: http://w4pnt.8k.com Patty & Dee's Marina; Dee Almquist, 534W. Main St., Waynesboro, VA 22980. 540-249-3161 Cell: 540-480-7179, FAX 540-249-5064

FOR SALE: RIT for Collins KWM-2/2A; No modifications needed. $79.95 SASE for details. John Webb, W1ETC, Box 747, Amherst NH 03031 bigspndr@bit-net.com

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 fixr7526@cs.com

FOR SALE: Many parts for radio builders please call to discuss needs. Joe Battyany, W6CAS, 1501 Sherwood Ave., Sacremento CA 916-731-8261

FOR SALE: Ships radio room clock repros, boatanchor mugs and t-shirts, more. http://www.cafeshops.com/amradio,amradio2

FOR SALE: Transistors (not radios) most new unused, 255 pcs, free list. L. Gardner, 458 Two Mile Creed Rd., Tonawanda, NY, 14150. radiolen@aol.com

FOR SALE: I built hot-rod receivers; R390A, SP-600, R-388/51J. NC-183D...and transmitters: Valiant, DX-100, T-4X-A-B, HT-32. 51J-4 filter replacements, R390A Hi-fi AM $245.00 ea. Chuck Felton, KDØZS, Wyoming, 307-322-5858, feltondesign@yahoo.com

FOR SALE: "E.R.", #1 thru current, $265 & shipping. Email: "Jim321@webtv.net"or message phone: 909-882-7634(CA).

FOR TRADE: Two good RCA 833A's for one Taylor 833A. Also looking for Taylor 204A, 813, TR40M. John H. Walker Jr., 13406W. 128th Terr., Overland Park, KS 66213. PH: 913-782-6455, Email: jhwalker@prodigy.net

WANTED: James Millen plug-in coils: p/n 42080, 42040, 42015 43015. National NC-101X w/meter. Gary Carter, WA4IAM, 1405 Sherwood Drive, Reidsville, NC 27320. Phone: 336-349-1991. Email: gcarter01@triad.rr.com.

WANTED: W.E. Type 215-A (military VT-5) vacuum tubes. Roland V. Matson, POB 956, Lake Panasoffkee FL 33538 1-352-568-1629

WANTED: Info on Electro Tone Labs M100. Maybe a screen modulator. Has volume control & 2 slide switches, CW-phone, Tone-mic on front. 4 terminal on rear plus adjustable control that controls voltage to 2 of the terminals. Randy, 411 Woodhaven Dr., Lynchburg, VA 24502, 434-239-6127.

RWC-radiocollector@worldnet.att.net

WANTED: Eldico SSB-100F linear amplifier, good condx, working. Bill, W4TXL, 336-969-2057, W4TXL@msn.com

WANTED: Manual, info on Hallicrafters SX-96A (NOT SX-96). Jim Novak, WA9FIH, 2335 S. 2nd Ave., North Riverside IL, 60546-1308, WA9FIH@arrl.net

WANTED: Looking for the emblem of National "NC". Katsu JO1GEG/ ex.N8EYH, khirai@ieee.org

WANTED: Chassis knockout keyway punch for octal socket. K1MBI, 21 Freestone Ave, Portland CT 06480

WANTED: One tuning knob for SX-96, SX-99, or SX-100. Herb, K9GTB, 6486 Bow Lane, Gillespie IL, 62033. 618-362-6539

WANTED: Meter for Hammarlund HXL-One linear. Paul, KU6T, 310-453-6631, pkcwang@ee.ucla.edu

WANTED: National HRO-500-TS and LF-10 preselector. Information on improving SSB distortion in the HRO-500. Bob, WØYVA. bobs@isquare.com; 703-450-7049.

WANTED: 111C telephone company repeat coils.Jim Alexander, K0HIP, 479-968-7270, ealexand@cswnet.com

WANTED: 390A clean, working condx. John V. Smith W4ACG, 1924 Dolphin Blvd, St. Petersburg FL, 33707, email: forbbsmith@aol.com

WANTED: Poly-impedance modulation xfmr, 125 watt plus. Bill, KØRZ, 303-499-1936, billK0RZ@aol.com

WANTED: Audio transformers, with good windings, for Westinghouse RADA and Aeriola Sr amplifier. Paying $40.00 each plus shipping. Roland V. Matson, POB 956, Lake Panasoffkee FL

WANTED: SCR602 components, BC-1083, BC-1084 displays, any APS-4 components. Carl Bloom, 714-639-1679, 3778111@mcimail.com

WANTED: Waters Q-Multiplier for Collins KWM-2. Claude Fleureau, F6GGF, 14 Sentier-Du-Buvier, 92130 Issy-Les-Moulineaux, France

WANTED: Anyone interested in forming an email discussion group on OS-8/U oscilloscopes please email Mike at: mikehardie@shaw.ca

WANTED: Power transformer for Collins 310B3 exciter—will buy junk unit if needed. Brian Roberts K9VKY, 130 Tara Dr., Fombell, PA 16123 (724)758-2688 k9vky@arrl.net

WANTED: Marantz first power amp, uses EL39 tubes. Condx unimportant. Or pay well for photo of same. For use in upcoming "History of Audio" book. Charles Graham, 914-666-4523

WANTED: WW-2 Japanese Military Radio of any kind. Yokohama WW-2 Japanese Military Radio Museum, Takashi Doi, 1-21-4,Minamidai, Seyaku, Yokohama, 246 Japan takadoi@carrot.ocn.ne.jp http://www.yokohamaradiomuseum.com/

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, www.r-389.com

WANTED: Central Electronics 600L and MacKay 3010 rcvr. Cliff WA9SWE 608-625-4527 after 6 PM Central.

WANTED: HELP: I need information on an E.M. Sargent Co.Model 205A 5-band radio circa late 30's (?). David Miller, 307 754-4351 or K7ALR@arrl.net.

WANTED: Any TMC Equipment or Manuals, what have you? Will buy or trade. Brent Bailey, 109 Belcourt Dr.,Greenwood, S.C. 29649 864-227-6292 brent@emeraldis.com

WANTED: Older rigs & accessories. Brian Carling, AF4K, 117 Sterling Pine St., Sanford, FL 32773. http://come.to/AF4K/

WANTED: National NTE CW xmtr in working Condx. I love National. Sylvia Thompson, 33 Lawton Foster Rd., Hopkinton, RI 02833. (401) 377-4912. n1vj@arrl.net

WANTED: National Co. emblems, escutcheons, and logos from equipment, also National AN/WRR2 in working order. Don Barsema, 1458 Byron SE, Grand Rapids, MI 46606. (616) 451-9874. dbarsema@prodigy.net

WANTED: BC-348 () rcvr w/following suffix: B, C, H, J, K, M, N, P, S, for collection. Ken Kolthoff, K8AXH, POB 215, Craig, MO 64437. 660-683-5353

WANTED: Hallicrafters SX 88 parts chassis with cabinet, power,audio output, 50khz IF and 2mhz I F transformers. Ops service manual for Eddystone EC958. Allan, Norco CA, 310-812-0188, alan.royce@trw.com

WANTED: ARC-5 rcvrs, racks, dynamotors. Jim Hebert, 1572 Newman Ave. Lakewood, 0H 44107.

WANTED: Old military radar displays, scopes, antennae, receivers, manuals, etc. Even half ton items! William Donzelli, 15 MacArthur Dr., Carmel, NY 10512. 847-225-2547, aw288@osfn.org

WANTED: Seeking unbuilt Heathkits, Knight kits. Gene Peroni, POB 7164, St. Davids, PA 19087. 610-293-2421

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

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

WANTED: Collecting military electronics including radio, radar, RDF and test, manuals & literature. William Van Lennep, POB 211, Pepperell, MA 01463. 978-433-6031

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

WANTED: Stancor/Chicago PCC200, PCO/PSO15O, RC8150; Triad A-9-J, A-l0-J, A-1l-J, A-12-j. **FOR SALE:** Books, send SASE, Richard Robinson, POB 1425, Wallingford, CT 06492. 203-949-0871 richmix@erols.com

WANTED: R-390A rcvrs, parts rigs or restorable, will restore yours at reasonable prices. Walter Wilson, KK4DF, 706-733-8323 wewilson@knology.net, www.knology.net/~wewilson

WANTED: Info on xmtrs made by Clough-Brengle Co. Used by the CCC, in the mid to late 30's. Any help would be greatly appreciated. Ron Lawrence, KC4YOY, POB 3015, Matthews, NC 28106. (704) 289-1166 hm, kc4yoy@trellis.net

WANTED: QSL cards from old/pre WW II Ham DX countries; old regen kits. Hajime Suzuki, Nishikuniyoshi 1644-24, Ichihara-Shi, Chiba-Ken, 290-0231 Japan

WANTED: WW II Japanese xmtrs & rcvrs (parts, plug-in coils) for restoration & ER articles. Ken Lakin, KD6B, 63140 Britta St., Ste. C106, Bend, OR 97701. 541-923-1013. klakin@aol.com

WANTED: Visitors and tubes by museum. Old and odd amateur or commercial tubes, foreign and domestic purchased, traded or donations welcome. All correspondence answered. K6DIA, Ye Olde Transmitting Tube Museum, POB 97, Crescent City, CA 95531. 707-464-6470

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: Orig Heath manuals for ham & test equip. Please state condx & price. Warren, K1BOX, NC, (828) 688-1922, k1box@arrl.net

The Collins Video Library

The Collins KWM-2 Video (4 hours, $89.95) Highly detailed video on operation, rebuilding, alignment, troubleshooting, and neutralization of this classic! A must for anyone who owns and operates a KWM-2 or 2A. Printed documentation included.

The Collins 75S-3 and 32S-3 Video (3.5 hours, $74.95) An excellent in-depth examination of the most popular version of the S-Line equipment. Operation, modification, alignment, neutralization are covered and more! Much of this information applies to all versions of the S-Line!

The Collins 30L-1 video (1 hour, $39.95) This is a complete guide to the 30L-1 amplifier. Topics covered are operation and safety, updates, and a discussion of the classic 811A triode. Learn the secrets to greater performance.

The Collins 30S-1 video (1 hour, $39.95) Finally, here is the one everybody has wanted! This extraordinary video describes operation and user safety, maintenance and modifications of this classic Collins powerhouse amplifier. Very informative--truly a must for all 30S-1 owners. Complete with printed documentation.

The Collins Amateur Radio Radio Eqipment Video Spotter's Guide (1 hour and 40 minutes, $24.95) Close to 90 individual pieces of Collins Radio equipment are shown in the video. Examples of some of the gear covered are: KW-1, KWS-1, 30K-1, 20V-3, 75A-4, KWM-2, S-Line, KWM-1, 30S-1, 30L-1, KWM-380 and much more. Study up before that next hamfest!

The Collins KWS-1 Video (2 hours, $39.95) This video is the perfect companion to the 75A-4 video for owners of the "Gold Dust Twins"! Butch Schartau (K0BS) shows you how to operate, maintain and repair your KWS-1. Watch as Butch goes theough the entire alignment and neutralization process, as well as showing you how to properly operate this famous transmitter.

The Collins 75A-4 Video (4 hours, $89.95) This video is four hours of great information on how to repair, maintain and restore this classic receiver. Butch Schartau (K0BS) guides you through all aspects of keeping your 75A-4 running like a top.

R-390A Video (7 hours, $109.95) At last it's available! Long awaited by serious "boatanchor" enthusiasts this is a great video all about the ultimate receiver. Now you will have the ultimate video to go along with it. R-390A expert Chuck Rippel (WA4HHG) covers an absolutely incredible array of information in this "heavy duty" video. This video looks at operation, the receiver modules, complete circuit description, front and rear panel details, complete mechanical and electrical alignment, PTO details, and performance evaluation, modifications, troubleshooting, and restoration. There is nothing like this video available today, at any price!

R390A Addendum Video ($49.95) Another 3 hours and 40 miutes of R-390A information from Chuck Rippel (WA4HHG).

SP-600JX Video (4 hours, $89.95) In this video, Chuck Rippel takes us through all aspects of SP-600-JX servicing including repairs, restoration and modifications. This video is a must for any new owner needing to work on the SP-600.

Purchase three or more videos and get 10% off of the retail price!
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Produced by Floyd Soo, W8RO (ex-KF8AT)

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WANTED: WW II German, Japanese, Italian, French equipment, tubes, manuals and parts. Bob Graham, 2105 NW3Oth, Oklahoma City, OK 73112. 405-525-3376, bglcc@aol.com

WANTED: Heath Gear, unassembled kits, catalogs and manuals. Bill Robbins, 5339 Chickadee Dr., Kalamazoo, MI 49009. 616-375-7978, billrobb@net-link.net

WANTED: I wish to correspond with owners of National FB7/FBXA/AGS coil sets. Jim, KE4DSP, 108 Bayfield Dr., Brandon, FL 33511 j.c.clifford@Juno.com

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

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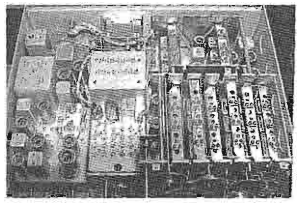

For full details and pricing of this once-a-lifetime opportunity call Chuck Felton (KDØZS) at 307-322-5858, or email at: Feltondesign@yahoo.com web: FeltonDesign.com

WANTED: DC ammeters, aircraft instruments, panel meters; meter books & gauge catalogs; photos of meters & control panels. Chris Cross, POB 94, McConnell, IL 61050.

WANTED: Long wire antennas AT1O1, AT1O2, GRC-9; Bendix ATD tuning unit Type CRR 47211, 9050 to 15800 kcs; Gas engine generator UPG-12 (GRC-109) KA1ZQR, 348 N. Main St., Stonington, CT 06378.

WANTED: References to articles concerned with the use of Ham radio on U.S. railroads. Louis L. D'Antuono, 8802 Ridge Blvd, Brooklyn NY 11209. 718-748-9612, AFTER 6PM.Eastern Time

HAMFEST: Sunday June 8, 6-Meter Club of Chicago and Antique Radio Club of Illinois Spring Swap Meet, DuPage Fairgrounds, 2015 Manchester, Wheaton IL. Indoor/Outdoor flea market, vintage/antique equipment, dealers, ARRL. Overnight RV parking available. Info: 708-442-4961 24 hours or www.qsl.net/k9ona

WANTED: Manual (copy OK) for Tapetone Skysweep 435 Receiver; correspondence w/other Skysweep owners. Geoff Fors, POB 342, Monterey CA 93942 wb6nvh@mbay.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 email: tubes@qwest.net See WWW.Fathauer.Com or send for catalog of tubes for sale. George H. Fathauer & Assoc., 688 West. First St., Ste 4, Tempe, AZ 85281. 480-968-7686, Call toll free 877-307-1414

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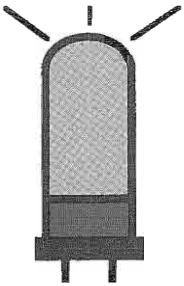

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