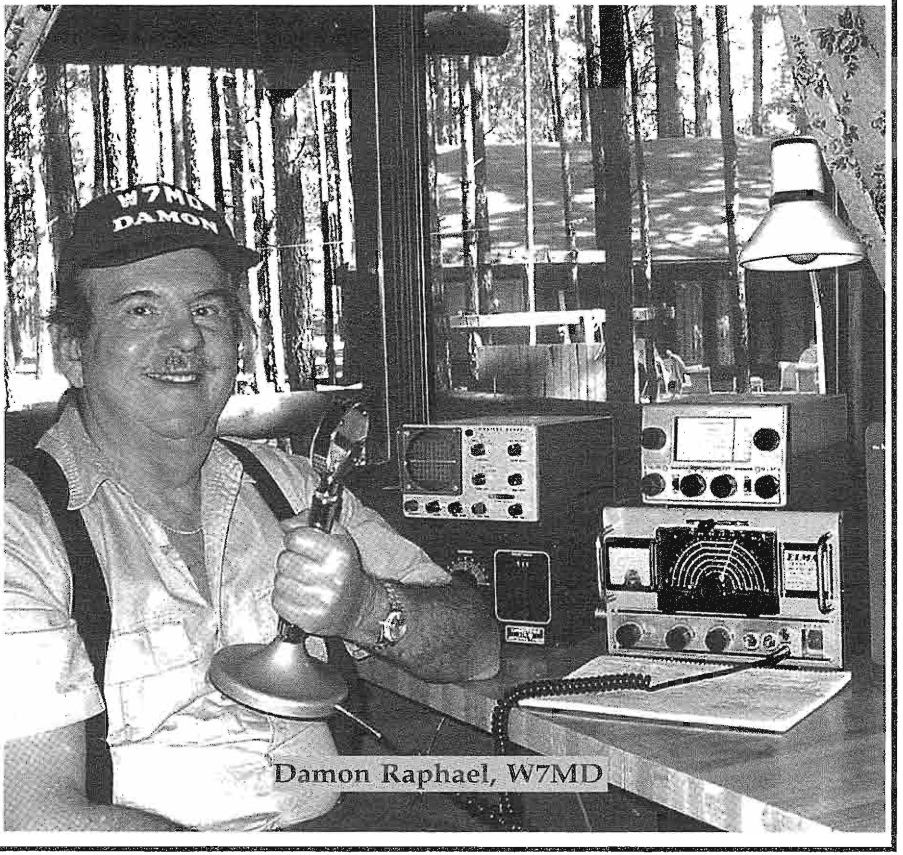
$3.75

ELECTRIC RADIO

celebrating a bygone era

Number 185 October 2004



Damon Raphael, W7MD

ELECTRIC RADIO

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

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

Editor
Ray Osterwald, NØDMS

Editor Emeritus
Barry R. Wiseman, N6CSW

Electric Radio is 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 for those who appreciate the intrinsic value of operating vintage equipment and the rich history of radio. It is hoped that the magazine will provide inspiration and encouragement to collectors, restorers and builders.

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 (KW1I), Chuck Teeters (W4MEW), Bruce Vaughan (NR5Q), Bob Grinder (K7AK), Jim Hanlon (W8KGI), Brian Harris (WA5UEK), Tom Marcellino (W3BYM), John Hruza (KBØOKU), Bill Feldman (N6PY), Hal Guretzky (K6DPZ)

Editor's Comments

Transatlantic AM

Since mid-August of this year, John Thuren (AA5T) has been organizing transatlantic AM QSOs between AM operators in the United States and in the United Kingdom. The operations have been promoted as "The Return of the Transatlantic AM Tests." Every Friday afternoon at 2200 UTC, on or around 14.286 Mc, AMers in the US have been regularly working Dave Gordon-Smith (G3UUR) and Alan Morris (G4GEN). Band conditions have not been very good, but with average propagation quite a number of solid contacts have been made. Logs sent in so far have reported that John (AA5T), Bill (W8VYZ), Jack (K2ZA), Sam (KS2AM), John (WAØENE), and Harold (K4HCA) have all been in solid AM contact with the UK. On the 24th of September, I had a nice QSO with G3UUR running 30 watts. I think this activity is an excellent way to publicize AM operations and vintage equipment operations, and I encourage everyone who is able to join in on Friday afternoons.

Radio Club to Hold Second Annual QSO Party on November 6

By Bob Raide W2ZM
2514 E. Sherman Hollow Rd.
Penn Yan, NY 14527 rlraide@adelphia.net

The Radio Club of America (RCA) was established in 1909. It's mission is to operate exclusively for charitable, educational and scientific purposes and provide and contribute to the development of radio communications. It provides a scholarship fund for needy and worthy students for the study of radio communications. Last November, our QSO event was scheduled on CW, with many RCA member and non-member stations participating. This year's event will be similar in format with member and non-member stations participating, however, phone will be the

[Continued on page 47...]

TABLE OF CONTENTS

Cover: Dr. Damon Raphael (W7MD) operated an Elmac station during Vintage Field Day from his cabin near Pinetop, Lakeside, Arizona. Damon mentioned that the 7500 ft. elevation was certainly cooler than his home QTH in Tucson!

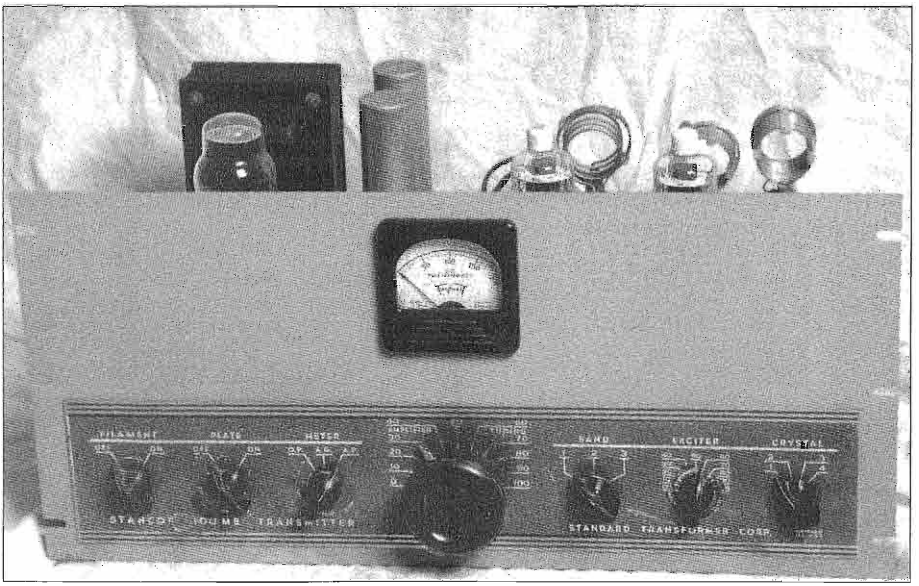
The Stancor 100-MB Band Switching Transmitter

By Chuck Teeters, W4MEW
110 Red Bud Lane
Martinez, GA 30907
Photos by Reggie Frazier, KG4HAD

The Standard Transformer Company of Chicago, Stancor, was the Heathkit of Ham transmitters and audio amplifiers in the thirties and forties. Between 1938 and 1951 they turned out over 40 different transmitter and amplifier kits. Most were conventional and used various circuits from Ham periodicals as the basis of their designs. However, in 1940 they took a significant step forward with their kit line. The 1940 Stancor 100-MB was the first and only band switching transmitter kit Stancor made.

Plug-in coils had reigned supreme in both transmitters and receivers until the early thirties as the preferred method of changing bands. In the early thirties the broadcast receiver manufacturers started building sets with short wave band switching. Ham receiver manufacturers followed suit, notably RME and Hallicrafters, with band switching Ham communications receivers. Nationals Jim Millen, a perfectionist in design, was not sure coil switching arrangements were entirely satisfactory. He designed a moving coil drawer that held coils, which were moved into the operating position by the band change knob for the National 100 series. However, he held on to separate plug-in coils for the HRO. But, by 1940, all other receivers were coil switching band change, and plug-in coils were a thing of the past in most Ham receivers.

Transmitters were a different story.



A front-panel view of the rare Stancor 100-MB band-switching transmitter shows its similarity to the Stancor audio equipment.

With the higher voltages and currents in transmitters, coil switching was not easily accomplished, and most manufacturers and homebuilders stuck with plug-in coils. The first attempts at transmitter band switching were the transmitters designed by Bob Samuelson at Hallicrafters, the 1937 100 watt HT-1 and -2. They really were plug-in coil transmitters, but had room and coil sockets inside the cabinet for three sets of plug-in coils which could be switch selected from the front panel. Hallicrafters followed up in 1938 with the 400-watt HT-4 (Signal Corps BC-610 three years later) which used the same plug-in coil band switching arrangement except for the final amplifier which required a coil change for each band. In 1939, Hallicrafters built the 25-watt HT-6 that had three complete sets of coils plugged inside with a front panel switch to change the active coils. Ed Kelly, W9HPD, the kit engineer at Stancor, must have liked the idea because in 1940 Stancor introduced their "Novel Band Switching Economy Transmitter Kit", the 100-watt model 100-MB.

The 100-MB has space for 3 plug-in final coils and 1 exciter coil inside the cabinet that permitted band switching coverage of three adjacent amateur bands. The 100-MB is unusual in that it uses only one exciter coil for the three bands, hence the "economy" in the description. The 100-MB uses a B&W baby series MC coil in the exciter, a small air wound coil. In the kit assembly phase, Stancor had the kit builder tap the MC coil to provide for two-band operation. The band switch changed the push-pull final to a push-push doubler on the third band, therefore with 1 exciter coil and three final coils, three adjacent bands could be covered. The crystal controlled transmitter operates straight through on band 1 and doubles in the oscillator on band 2 with the final operating push-pull. On band 3 the oscillator doubles and the push-push final doubles to the band 3 frequency. Stancor recommended the kit builder set the band coverage for 160-80-40 meters or 80-40-20 meters. When built for 160, 80, and 40, the final band switching could be wired to operating straight through or double to 40. They did not recommend using the 100-MB on 10 meters as the efficiency, even with the ceramic band switch, was poor.

Stancor built-in the 425 volt plate supply for the RF tubes. No bias supply was required as both RF stages, the oscillator and power amplifier, used grid leak bias. The PA was cathode-keyed for CW. There was no modulator in the 100-MB but provisions were made for connections to a matching modulator kit, the 440-M and the 100-MB had switching to control plate power in the 440-M. The 440-M was unusual in that it included a vacuum tube over-modulation indicator. Stancor also included plans, but no parts, for converting the modulation indicator to an automatic modulation control system. Today we would call it ALC. With out a built-in modulator or bias supply and a 14" by 17" by 3" chassis the 100-MB is a very roomy transmitter. There is lots of empty space on and particularly under the chassis. As a result the 100-MB has the neatest look of any kit built transmitter I've ever seen. Even a sloppy kit builder could end up with a nice looking transmitter as nothing is crowded together.

The 100-MB uses a 6L6 tri-tet crystal oscillator driving a pair of class-C 807's. The full-wave power supply has separate plate and filament transformers and a 5Z3 rectifier tube to provide over 425 volts D.C. at 250 mA through a single section pi filter. As in all pre-WW2 Stancors, the filter caps are oil filled and last forever. The 6L6 oscillator can provide fundamental or second harmonic output. There is provision for 4 each ¾" spacing crystals inside with selection from a front panel switch. A 200 mA panel meter can be switched to read oscillator plate, final grid, or final plate currents. For tune up protection, plate and screen

voltage is applied to the 807s only when the meter is in the PA plate current position. The modulator output and control circuits, as well as the CW key, are connected to a recessed rear terminal strip. A minor discrepancy in the power switching design is during tune up when plate power is on only to the oscillator, modulator plate power is on. Without a load it would be possible to arc over the 440-M modulation transformer if you woof into the mike during tune up. The balanced RF output is from a pair of ½" ceramic feed-through insulators on the rear apron.

I acquired my 100-MB from the Internet thanks to the watchful eyes of HB9DTA. Alex spotted the 100-MB listed as a "Stanco" transmitter, not a Stancor. Turned out that a hole was drilled through the "r" in the Stancor name on the front, and the seller was not aware of the correct name. As a result, the shipping from N.Y. City cost twice as much as this very rare transmitter, second only to the 1946 ST-201 in rarity (there is only one 201 around somewhere). However, this 100-MB had been extensively modified, by somebody with nothing smaller than a ½" drill and 12" vice grips. The only original parts, other than the chassis and front panel, were found in the power supply, the final tank capacitor, meter and meter switch, and several tube sockets. Based on the number of holes in the panel and chassis it was used as a drilling jig for manufacturing colanders. A complete strip down, hole plugging and repainting was necessary. Luckily the painted chrome escutcheon on the front panel was in excellent shape except for one ½" hole (through the "r" in Stancor). As Stancor used off-the-shelf standard parts, a search of my and friends junk

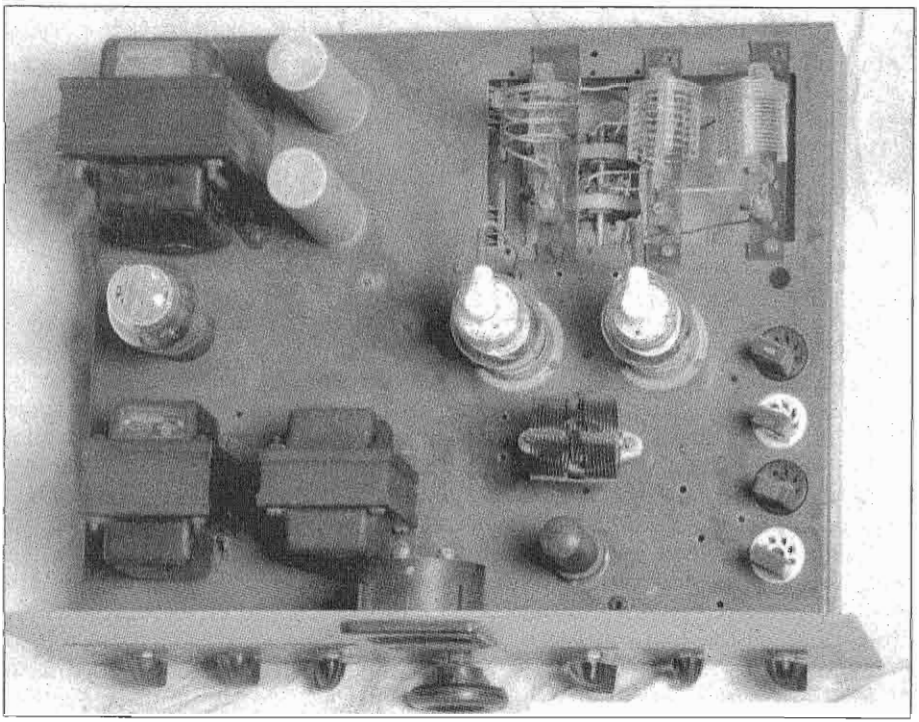


Figure 1: A top view of the 100-MB shows how the well laid-out the components fit on the roomy chassis.

boxes turned up most of the parts needed for restoration. The most difficult part to duplicate was the band switch. It is a three-position ceramic rotary switch with six sections spread over 13". I was able to build up a duplicate from several different rotary switches in the extensive junk box of KN4AV. The only parts that I had to make were the 13 half-inch tie rods to assemble the switch.

The power supply, control circuits and metering were restored to the original configuration. In the interest of reducing the crystal current for small postwar FT-243 crystals, the original 6L6 oscillator was wired for a 6AG7. This is the best octal tube you can use in a crystal oscillator. If you are having crystal oscillator problems, check W1JEQ's article on crystal oscillators in the March, 1950, QST. The 4 five-pin sockets for ¾" prewar crystals were replaced with octal sockets which will hold the post war ½" crystals. The three final tank coils were originally plugged into ceramic strip sockets, but I made up socket strips from Lucite. I had 80, 40, and 20 meter 100 watt coils for the final so those were the bands I wired the 100-MB for. As per the original, I had a B&W baby coil for 80 and I tapped it so the band switch could switch it to 40 meters on bands 2 and 3. Again, as per the original, I used the band switch to parallel the 807 plates for push-push doubler operation on band 3, 20 meters. However my 100 watt 80 and 40 meter coils were not center tapped, so I ran the 807's in parallel on 80 and 40. Options such as this turn out to be easy with the band switch under and adjacent to the coil and tube sockets, and all the empty space under the chassis.

With very little rust on the chassis, I didn't expect any problems with leaky

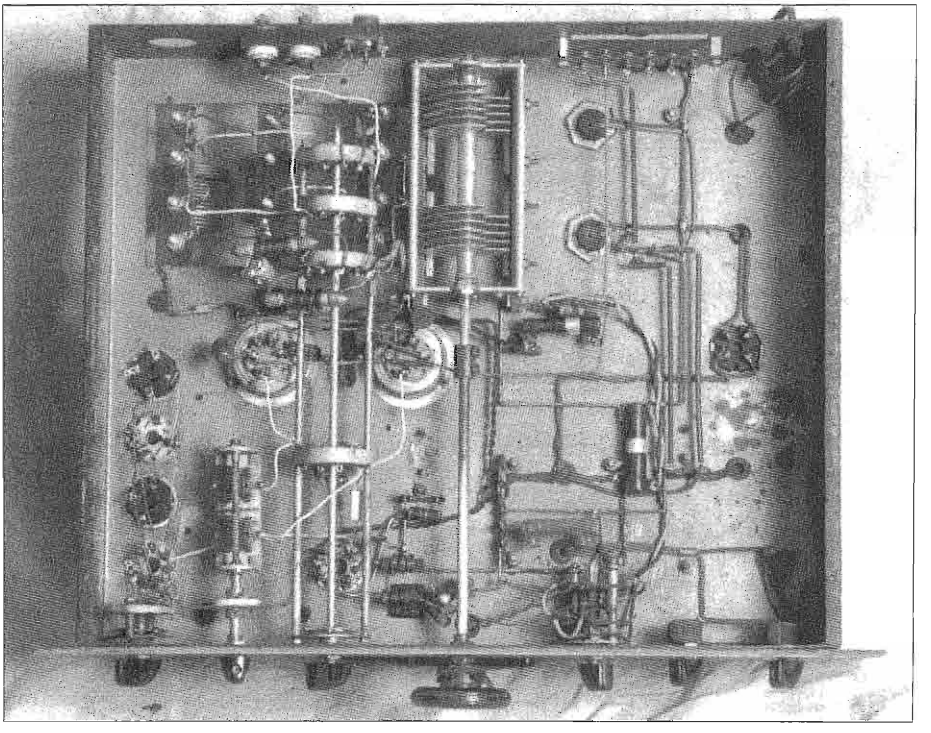


Figure 2: Underneath the 100-MB chassis are found more neatly placed parts.

power transformers, and there were none. A 12-hour cook-in on the filament and 2 hours on the plate transformer produced very little heat. The high voltage power supply took off when the 5Z3 was plugged in and the high voltage switch turned on. The high voltage was over 470 volts of ripple-free DC. Hooray for oil filter caps. The 6AG7 crystal oscillator worked fine and provided over 11 mA grid drive to the 807s on 20 and more on 80 and 40. Hooray for W1JEQ's crystal oscillator article in QST. Turning the meter switch to the plate position applied plate and screen voltage to the 807s. Out of resonance plate current was over 200 mA and dipped to under 25 mills at resonance. I connected up my dummy load and Bird wattmeter and could get 64 watts on 80 meters. On 20 meters it dropped to 47 watts. There was no sign of instability, nor could I find any sign of parasitic oscillations. With no suppressors of any kind, the only thing I can attribute this to is the long plate leads and short grid leads, as per Terman. Possibly 807s developed their instability problems when they got into the forties, fifties, and sixties. The older I get, the more unstable (physically only) I have become.

'Twas time to connect up the antenna and stuff and see how it sounded on the air. I have a coax fed T2FD, so since the 100-MB worked OK with the 50-ohm dummy load I connected the antenna directly to the transmitter. One of the many modifications on this 100-MB was a PL-259 which I left on the rear beside the ceramic antenna feed-through insulators. Connecting my key was a different matter. The key has a PL-55 and the transmitter uses a terminal strip. A ¼" jack and some short wires should have made it easy, but with the recessed terminals, which the Stancor book said were "difficult to touch", were also difficult to connect wires to. I had to stand the unit on its side and work under the chassis to make a good neat connection. Keying was terrible; the clicks could be heard from the broadcast band to 2 meters. I measured the voltage across the open key, over 200 volts. That would light up your day if you got across the key contacts. I connected up my electronic key, which has a dry relay output and doesn't care about polarity, voltage, or current, within reason. It also has an LC filter and spark suppressor to take care of keying old rigs. CW reports on 40 were all T9. I have a Stancor postwar 50-watt 807 modulator that was designed for the 1946 ST-202. I connected it up, again with the recessed terminal strip making it very difficult to get secure connections. A dummy load, scope, mike and the 100-MB modulated fine on 75 meters. It looked good on the scope and sounded good on the monitor. I did not, however, try it out on 3885 kHz with a live QSO. Satisfied with the transmitter's operation, I put the 100-MB on the shelf to wait for a later opportunity to put it to use.

Now that I have the 100-MB finished up and ready to go, I look at it and wonder what Stancor's reasoning for offering it was? Was it just to show that they could build a band switching transmitter kit? Perhaps it was the band switching kits offered by the competition, particularly Thordarson and Utah, fellow transformer manufactures. Maybe the Gross and Tempo band switching transmitters were the incentive. If you didn't need or want band switching, Stancor offered the CW only 125-CW plug-in coil transmitter that was cheaper, smaller, and had almost twice the output of the 100-MB. If you wanted to stay with Stancor and wanted a phone and CW rig, the 110-CM kit was only $6 more than the 100-MB and even with the AM modulator on the same chassis it was smaller, and had the same output power. If you wanted to operate AM with the 100-MB and bought the 440- M modulator the price jumped to almost $100 for the combination and doubled the size and weight of the package. Judging from the number

surviving today, Stancor did not sell many 100-MEs. The early Hallicrafters band switchers are also rare, and Hammarlund and National band-switching transmitters and sub assemblies are practically nonexistent. Apparently the ability to change your band of operation with a switch instead of plug-in coils was not a high priority with hams in 1940. I know it wasn't with me, of course I stuck to 160, phone and CW.

Prewar band switching was more like having an internal storage area for the unused coils than the true band switching we have grown used to. Pi-section output and better tubes made it possible to produce compact, efficient 100 watt transmitter kits like the Johnson Viking and DX-100. The Viking 1 is nine years newer than the Stancor 100-MB, and reflects the advances made in tubes, components and circuits, mostly during WW2. But like those of us who like to collect vintage equipment that matches the time that we were first licensed, I'm happy to have the 100-MB on the shelf. While I never owned one or had any desire to do so back in 1940, the Stancors were part of my catalog browsing and the 100-MB gives me a bit to think about when comparing it to the other vintage band switchers.

ER

Stancor 100MB product announcement from Radio Magazine, October, 1939.

Drake 2-B...One More Time

By Richard Lucas, K4JEJ
6065 Felter St.
Jupiter, FL 33458

A vague memory is what started this article, and somehow it turned into reality with a happy ending. Back in the '60s I bought my first Drake 2-B receiver and used it on CW and SSB. After a string of S-40-like receivers the 2-B was a real treat, and I remember being quite impressed and pleased with it. And having owned many other radios since then, I got to wondering just how good those memories really were.

So when I had a recent opportunity to buy a like new 2-B I jumped at it. Well, I'm happy to report that those memories and the radio held up very well. There is just something about the 2-B/2-BQ combination and the way it sounds on CW that just has not been replicated by any modern state-of-the-art devices. The only real "problem" for a CW guy like me is that of monitoring my own transmitter. Like any receiver, the Drake is overloaded by a co-located transmitter, such as my Heathkit DX-60...another story in itself.

Anyway it was time then to "tame" the 2-B. I cured the problem from several angles, none of which are difficult to duplicate. All it takes is a willingness to make it happen and a couple of hours spent doing it. First, I built an antenna changeover relay for the DX-60 that not only switches the antenna between receiver and transmitter, but it also grounds the receiver antenna input in the transmit position, thereby reducing the RF input to the 2-B. It takes a relay with DPDT contacts. A Radio Shack 275-249

This is my present station with a Drake 2-B receiver, 2-BQ speaker/Q-multiplier, and a Heathkit DX-60 transmitter on the top shelf.

works well.

Next I set out to limit the signal in the 2-B to a ceiling point, well above any received signal, but low enough to chop my transmitter signal before it got detected and the AGC took over. Hence an ultra-simple diode clipper was installed on the signal-input grid of the product detector. I simply soldered two back-to-back 1N914's from pin #7 to ground on V7, the 6BE6 product detector.

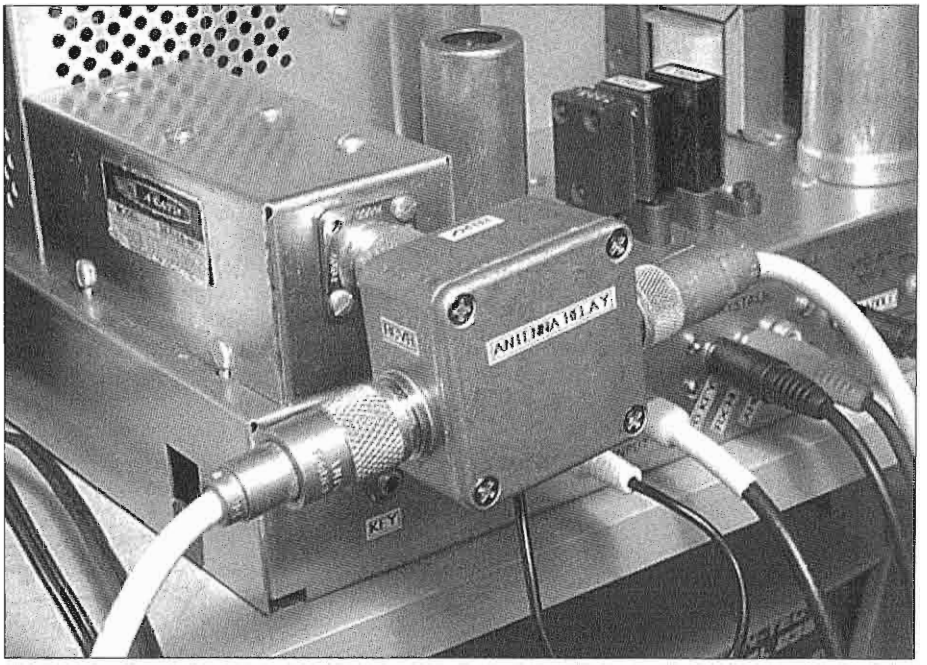
These two changes were enough to bring the transmitted CW signal to very-near the same volume as received signals with no unwanted byproducts. A very pleasing situation! The slow AGC, however was still a bit sluggish on recovery from the transmit mode...enter the mute mod.

I decided that instead of leaving the receiver totally unmuted on transmit; there must be a way to gate it on just enough to hear the transmitter. Again, a simple fix was found: I installed a zener diode between the "mute" terminal on the rear of the 2-B and ground, cathode to mute, anode to ground. Don't forget to switch the STBY/RCV switch to STBY. A string of reverse-connected 1N914's would have worked as well.

This change will open up the receiver gain (on transmit) to about 30-db over S-9, just enough to provide you with a really good transmit monitor. Then, on the switch back to receive the 2-B is instantly returned to full RF gain. I used a 1N4734, a ½ watt, 5.6-volt zener. The monitor gives you the real story: the drifting VFO, chirps, clicks-anything that's coming out of the transmitter is heard at full-volume, in sharp, clear sine wave form.

These simple changes were all that was needed to make the 2-B into a first-rate CW receiver and companion to the DX-60 or any transmitter like it. Zener diodes and 1N914's weren't around when the 2-B was new, but it doesn't seem to object to their presence now. It's a keeper.

ER



This is a close-up of my homebrew antenna relay that is mounted on the DX-60.

The British Army Wireless Sender No. 53

By Alan Morriss, G4GEN
Pippingford Park
Nutley Sussex
TN22 3HW
United Kingdom

In the early part of WW2, the British Army used several sets of medium power for semi mobile long range communication. The lease lends American BC-610 and EY-4336 were the best, but supplies were vulnerable to U-boat attack.

The British ones were the W/S 33 and the W/S 12 High Power. Both of these were based on the successful W/S No. 12. This was a relatively low power 25 watt CW and 7 watt R/T transmitter for fixed and mobile use. The set was the same size as the R-107 receiver with which it was generally used and covered 1.2 to 17.5 MHz. It was an excellent and stable transmitter, although bulky and heavy for what it did.

The 33 was basically a 12 set with a linear amplifier on top. It was not all that good, and in 1942 was replaced by the W/S 12 High Power. This was a great improvement, and the 12 set was used to supply drive for the amplifier. This comprised two PA tubes, with a separate modulator and power supply. The 3 units fitted in a large rack cabinet, with the 12 and 107 mounted beside. The prototype is reputedly lying at the bottom of a fjord in Norway where it fell off a ship during an operation.

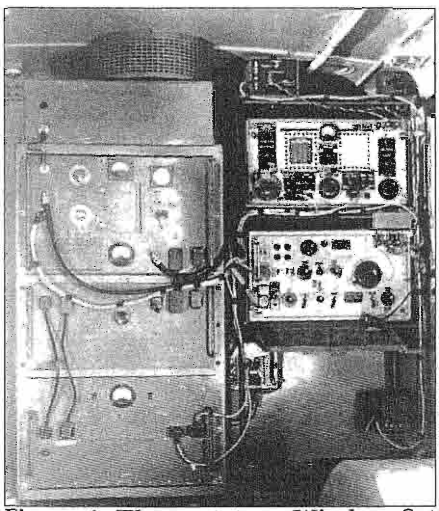


Figure 1: The prototype Wireless Set No. 12, High Power version, in a mobile installation.

The whole set up was a compromise, and the 53 was designed to replace it. The same rack cabinet was used, and a similar layout adopted. The problem was to make a Master Oscillator unit which would replace the 12 set and fit into the PA unit. This was overcome, and an extremely stable unit was developed which did the job.

It was envisaged that the set could be used as a temporary broadcast transmitter for the local populace as well as the troops after the invasion. To this end the modulator was designed to have excellent audio quality, with considerable negative feedback.

The usual mobile installation was in a Bedford Truck with the R-107, and a low power W/S 19. This was the same set as used in Armoured Fighting Vehicles and other mobile requirements. The commander and his staff had accommodation in the vehicle as did the operators. Reputedly a Bedford truck of this type was the first non-armoured vehicle brought ashore on D day by the British, thus assuring reliable communications with England. My own set is supposed to have taken part in the invasion.

The complete 53 comprises 3 units mounted in the rack cabinet, and an antenna coupling unit fixed on top. At

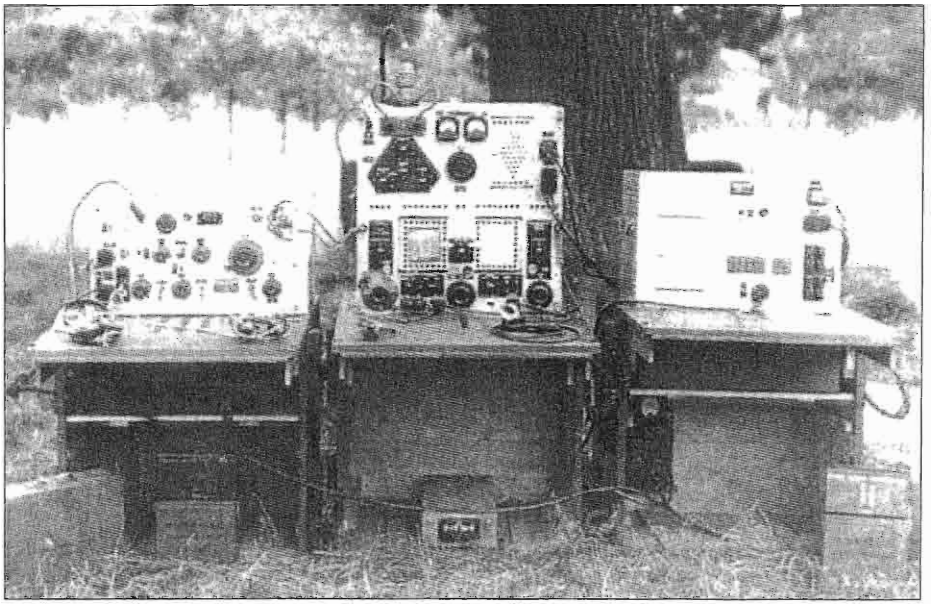


Figure 2: Wireless Set No. 33, ground station. A ground station is carried in wooden cases. Supports drawn out from the cases with the lid in position form a table for use by the operator. Note aerial coupling equipment "G" on the ground at the right. [Figures 1 and 2 from "Wireless for the Warrior, Volume 1]

the top of the rack is the Amplifier, RF No 4, with the Modulator Unit No. 27 below, and the Power Supply Unit No. 26 at the bottom. The whole is mounted on an anti vibration frame fixed to the vehicle floor.

The complete set weighs in at 600 Lbs, so is not a one man job to shift around. The units and cabinet are painted in Army grey, and all the cables, plugs and sockets are on the front externally, thus ensuring ease of servicing and dismantling. This is in contrast to the RCA ET-4336, which is difficult to dismantle, as is the BC-610. Both these transmitters were basically pre-war civil sets, with little thought given to servicing in the field.

The electrical design is unusual in that the PA has no variable capacitors. Instead, solid silver variable inductances are used in conjunction with rugged fixed capacitors. The frequency range is selected by adjusting links which select the appropriate capacitor. This eliminates flashover and corona discharge in the loading and tuning capacitors .It also seems to be more efficient.

The MO has the usual band switching arrangement current at the time. The whole set has a protection circuit, which incorporates the cooling fan.

Any flap or panel which is opened disables the HT. The fan switch must also be on. This makes it safe for the operators, as the HT is 1500 Volts for the PA.

The design of the RF section is fairly straight forward. The oscillator has 4 crystal positions or is fully variable in the MO position. It has 4 switched bands. Band 1 covers 1.2 to 2.2 MHz. Band 2 from 2.2 to 4.4, Band 3, 4.4 to 8.8, and Band 4 from 8.8 to 17.5 MHz. The tube is the Army VT-501 which is a small RF pentode. There is little cooling for this tube, and in consequence it runs hot, Negative temperature coefficient capacitors are also used. This was a design intention, as it acts as its own oven, and rapidly attains working temperature, and is rock stable

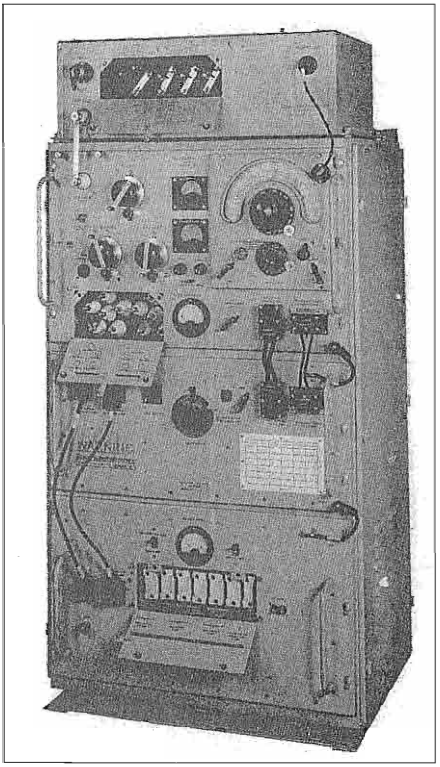


Figure 3: Wireless Sender No. 53, Mk.1, reproduced from a British Army manual.

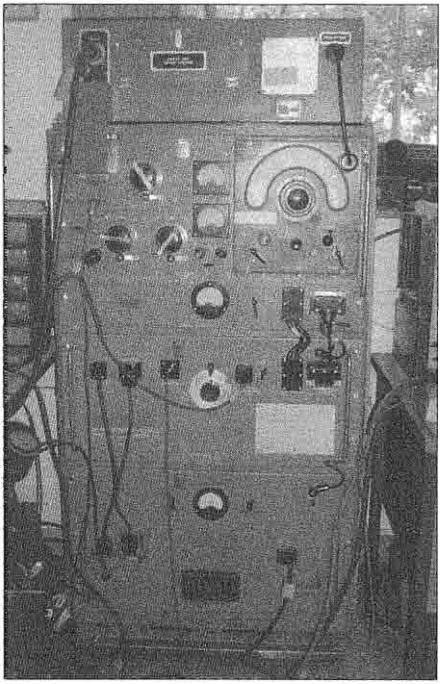


Figure 4: The Wireless Sender No. 53 installed and in service at G4GEN.

for long periods. A flashlight bulb is in series with the crystal, a feature carried on from the 12. The MO is tuned for maximum brightness.

The anode circuit is ganged to the grid circuit and operates at twice the grid frequency. Depending on the band in use, the MO frequency is either amplified or doubled by the buffer. This means that it is necessary to use crystals cut for half frequency on bands 2 and 4.

The buffer is another VT-501, and feeds the driver which is the ubiquitous 807, ATS25 in British Army parlance.

The buffer and driver are tuned by a ganged pair of capacitors, which has a frequency scale on the dial. This is set at the approximate frequency in use, and the PA plate current peaked by adjusting the control.

The MO unit also has the oscillator voltage stabilisers and the 6X5 bias rectifier on board. It fits in a receptacle at the top left hand side of the RF unit, and is easily removed. All that is necessary is to undo the multi plug at the rear, the RF output coax plug beside it, and 4 screws on the front panel.

The output of the MO unit is sufficient to drive the pair of 813s (army CVI77) to full output in Class C. in fact there is more than enough drive on the lower frequencies, and a drive level control is fitted, which consists of a chain of resistors in the screen supply to the 807 driver.

The limits for grid current are very conservative, and the drive control must be set so that 15 mA on phone or 10 mA on CW is not exceeded. This will produce an output of 250 watts on phone or 350 on CW. In the low power position, the output is just under half. This is ample for most purposes.

The P0A section uses three variable inductors, which are extremely rugged,

being constructed of ceramic with heavy gauge solid silver wire. This type of wire is used extensively in the RF section, which accounts for there being so few sets surviving.

The PA tuning consists of a variable inductance with a fixed capacitor across it. All three of these "Roller Coasters" are identical. The Aerial Coupling inductor has a series of different value capacitors across, which can be selected by setting the appropriate links. This eliminates the need for band switching, which is always a source of trouble at high RF powers. In the BC-610, this is taken care of by changing the complete tank coil, but the 53 system is a great improvement on that.

From the aerial coupling inductor, the RF flows through another inductor, the aerial loading inductor. This is only used to add lumped inductance to enable rod or end fed antennas to be matched to the PA circuit. When using untuned feeders such as coax, it is set to "0".

There is a fixed air spaced neutralising capacitor from plate to ground fitted, and the two 813s have a common silver plated top connector for the plates, which serves to keep them located in a high vibration environment.

The heavy duty antenna change over relay grounds the receiver antenna connection on transmit. One interesting feature of this relay is that it is operated by the T/R circuit, and has a pair of contacts which operate the HT relay. This system eliminates the possibility of the set going to transmit when the antenna is still connected to the receiver.

Below the RF unit, is the Modulator No 27. This unit contains the speech amplifier, MCW oscillator and keying circuit. The keying arrangement is unusual. In view of the high currents involved, a 6J5 keying tube is used. The anode of this is connected to the 400V HT2, and the cathode to the screens of the buffer and driver tubes via the drive level resistor chain. In the key up state, the tube is biased to cut off, and so no screen current flows. With the key down, the 6J5 conducts, and so the buffer and driver operate. The keying of this tube is carried out by a sensitive high speed keying relay. The result of this is a beautifully shaped dot or dash, if viewed on an oscilloscope, with tapered ends. The consequent sound is soft, and devoid of clicks.

When MCW (modulated continuous wave) is selected, the carrier is not keyed, but another 6J5 audio Oscillator provides a tone to the modulator. This is keyed by another high speed relay. MCW can be received without the use of a BFO, and is often easier to copy in high noise conditions.

The modulator itself is of a high quality. The microphone amplifier is a variable-Mu tube, with the bias supplied from two sources, the normal cathode bias from the cathode resistor, and grid bias from the 6X5 speech clipper. The negative feedback from the 807s in the driver stage is fed to the cathode of this tube. The output of this stage goes to a 6J5 conventional R/C coupled amplifier, which in turn drives a two tube floating paraphase stage. This is the phase splitter, using two further 6J5s providing a balanced output to the push pull driver stage. This uses two 807s. The modulator tubes are two 813s strapped as triodes modulating the plate and screen of the PA. The modulation quality is very high if the clipping level is correctly set, and reports of "BBC quality" are regularly received.

Below the modulator is the power supply unit No.26.This is extremely heavy, and is quite conventional. It provides 1500 volts for the PA, 400V for the rest of the set, 6.3V for all the heaters except the 813s, and 10 volts for them. The bias transformer is mounted on the modulator chassis. All circuits are fused, and power factor correction capacitors are used for the sake of efficiency. The mains supply has to be of 230V, and a voltmeter reads the supply voltage at all times. Another requirement is an external 12V supply which is routed through the remote control unit. This powers the cooling fan, relays and protection circuit.

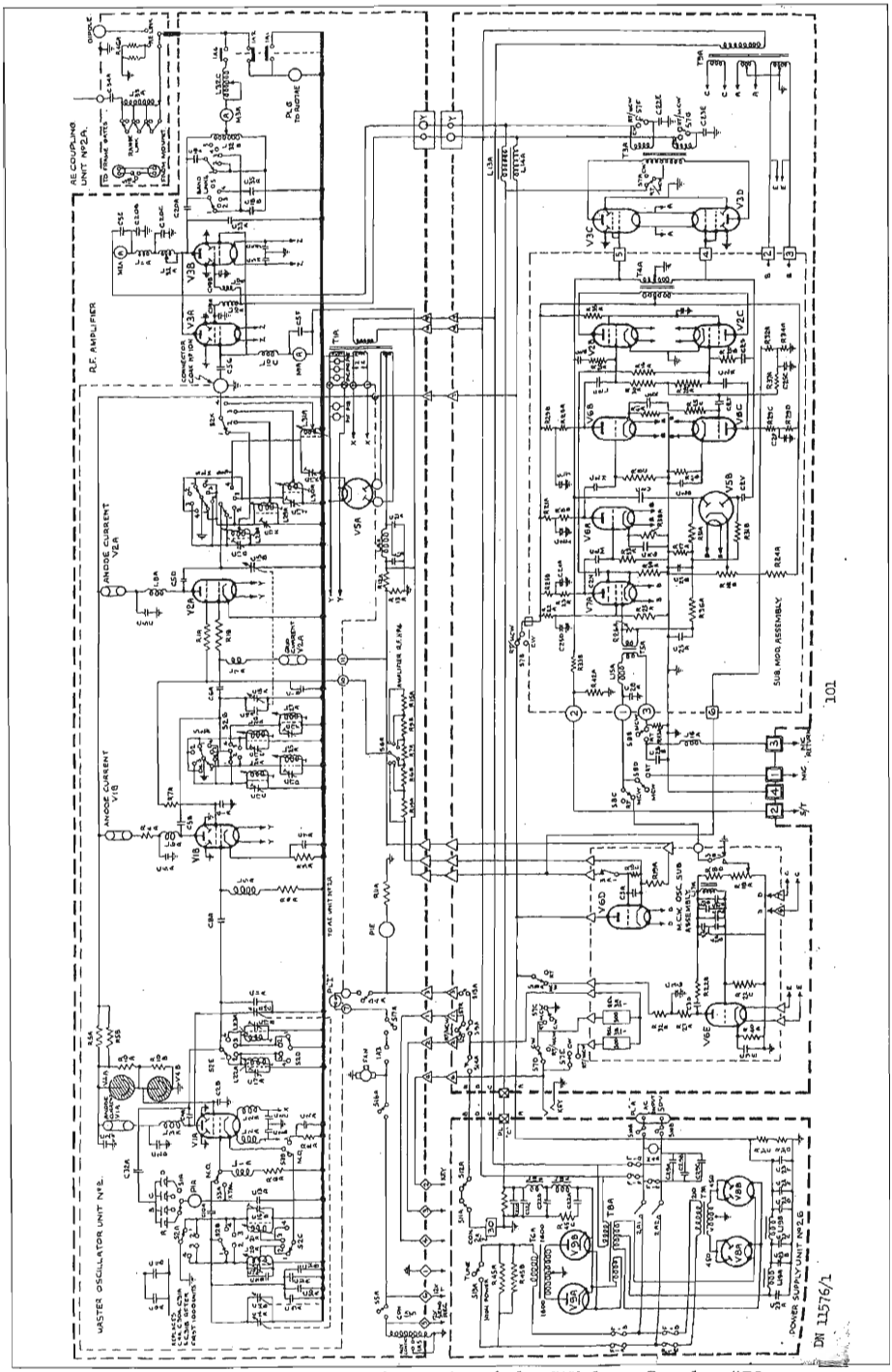


Figure 5: Complete schematic of the Wirless Sender #53

All high voltage plugs and access panels are protected, and if any one is opened or plug removed, the HT is disabled.

On the top of the rack cabinet, almost as a sort of afterthought, is mounted the aerial coupling unit. This has a selection of fixed inductances, again made of solid silver wire which can be put into circuit by means of links. This is for short rod antennas, and is bypassed if "feeder" is selected. A circular opening in the top of this unit has a large capacitor with a screw top inside. This is the blocking capacitor to protect the set, and presumably the operators as well, in the event of the antenna rod touching a high voltage power line. The unit also has a dummy load incorporated in order to enable the transmitter to be tuned up without giving the enemy too much time for interception and DF.

For correct operation of this transmitter it is necessary to use the remote control units. These fed the output of the R-107 receiver to the headphones, muted it on transmit, provided sidetone, and enabled transmit/receive operation. The whole set up in the truck fed the signals and operation to the commander as well as the operators. Of course, local operation of the set is possible, but inconvenient.

In operation it is necessary to set the various inductances to the appropriate settings for the frequency in use, and whatever antenna is connected. Tuning up is simple once this has been completed, and when difficulties occur, it is usually because something has been wrongly set. It is carried out in the low power position, and the dip is found by carefully rotating the PA tuning control. The Aerial Coupling control is then advanced, and the PA again set for maximum dip. When 110 Ma has been achieved on the PA current meter, that is it. If the high power position is selected, 250 Ma should be indicated. If this is not the case, the procedure must be repeated, either increasing or lowering the PA current.

Switching to CW should then give 350 Ma key down. Of course, the earlier stages must have been correctly adjusted to give the highest PA current, and the correct grid current.

After a bit of practice, the process is easy and rapid, and once set, the VFO is rock steady. The set would run all day key down, as it was designed for high speed Morse, and the later sets used frequency shift keying for teleprinter operation.

The 53 was in use by the British Army until the late '60s, and Bedford QLR radio trucks were used in the Borneo campaign against Indonesian insurgents. My own one came from the Royal Electrical and Mechanical Engineers museum, by way of a deal involving my donating some equipment they did not have, and had been rebuilt in the mid '60s by them. The consequence of this is that the wiring is plastic covered, and the set was in excellent condition. What I did not know was that it had ended its days as a training aid. Deliberate faults were introduced, and the trainees had to fix it. Unfortunately the last one had never been sorted out. The wrong modulation transformer had been fitted, and it was many years before I cottoned on!

About 20 years ago, I used to amuse myself by participating in contests on 20 meters with it. I used to net on to someone the other side of the Atlantic calling CQ contest, and reply. Once it was established I was using AM, I always received a glowing report and a nice compliment regarding the audio quality. My best result was a CW contact with a Russian amateur at one of their Antarctic stations. He was also using an old tube transmitter, and gave me 5,9, and 9.

I cannot imagine ever parting with my set. I have often said to people that there must be many more paintings by Rembrandt than 53 sets in existence, so as a significant milestone in the history of our technology, it will eventually be more valuable!

ER

Vintage Field Day Reports
June, 2004

By Hank Brown, W6DJX
4141 West Ave L-2
Lancaster, CA 93536

AN/ARC-5 W6DJX/6

The Vintage Field Day was a great experience. A site at 6,300 feet up in the Tehachapi Mountains about 30 miles north of Lancaster was selected for the two-day event. About 4 PM Friday the two antennas (80 and 40 meter dipoles) were checked with SWR analyzers and each was found to be out of the band on the low end. Removing a couple feet on each one brought the 80-meter dipole to just below 3.5 mc but the 40-meter dipole was up out of band on the high end. However, SWR checks with the transmitters indicated they were useable.

A pair of auto batteries supplied 28 volts DC for the ARC-5 dynamotors while a home- brew charger running on a gas generator kept the charge up. The T-17, T-19 and T-22 transmitters were plugged into the rack with receivers for the bands in use. Power output ran 20 to 30 watts on each band. An MD-7 modulated the transmitters and a J-16 jack box allowed phones/speaker and key to be used with the set up.

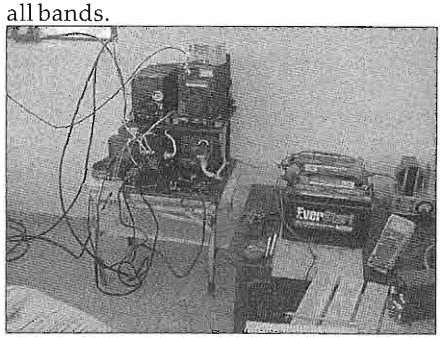
Early Saturday morning the equipment was fired up and an operating schedule following W7QHO's message was followed. On 160 meters, a couple of W7's were heard but no QSO's were established. The antenna was only a 25-foot wire into some trees. A quick QSY to 75 phone produced about eight contacts from 6 AM to 8 AM. NI6Q had a good signal running 5 watts from a WS-19. W6PSS in Ramona also had a good signal with only 4 watts. Propagation was such that several stations were working each other at the same time. Some were working out east while others, not hearing the easterners, were working stations to the west. All in all a very interesting session!

About 10 AM 40-meter phone was activated and three more stations worked. The farthest off was in Phoenix.

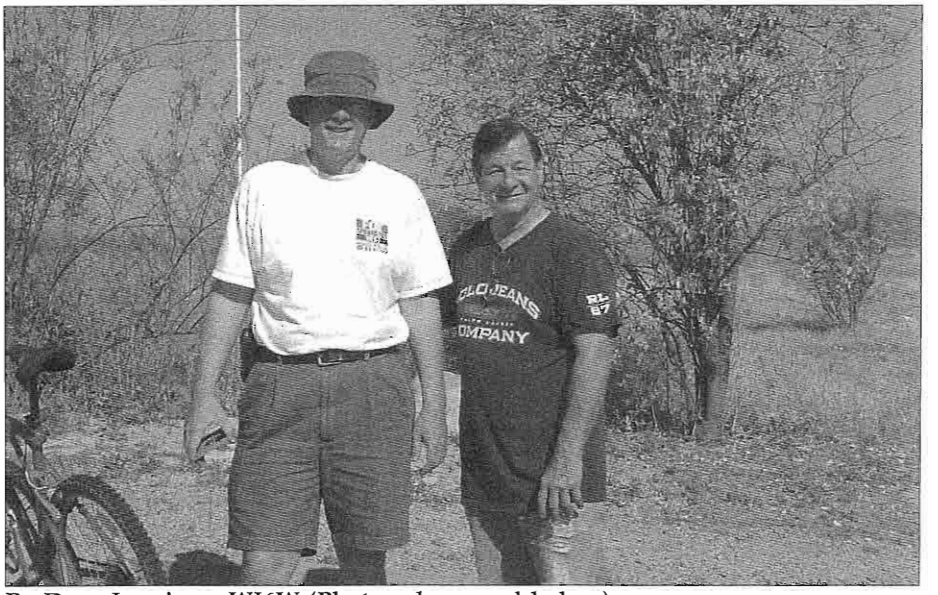
W7QHO ran the West Coast Military Net on 3982 kc from 9 PM to 10 PM and 8 more stations entered the log. Static was rather heavy but signals ranged from 5/4 to 5/9. A quick change to 1925 kc did not result in a QSO but three stations were copied. The 25-foot wire was just not enough for that band.

On Sunday morning, activity was nil on 160, 75 and 40 meters. The BC stations on the high end of 40 were very strong. On and off listening produced nil on the bands. At 10 AM, a small PRC-25 with a whip was set up on 50.4 mcs for the SOCAL 6-meter net. Several transmissions were made but only two very weak stations were heard and they were both down in the noise.

Overall, a most enjoyable weekend and will be looking foreword to next year's event. Plans are to add some more antennas and use equipment that will cover all bands.

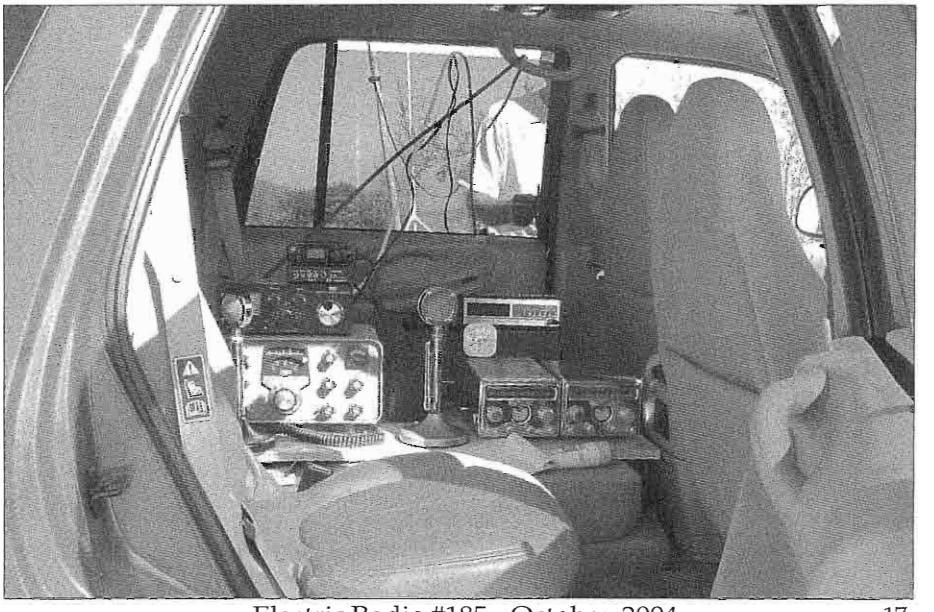


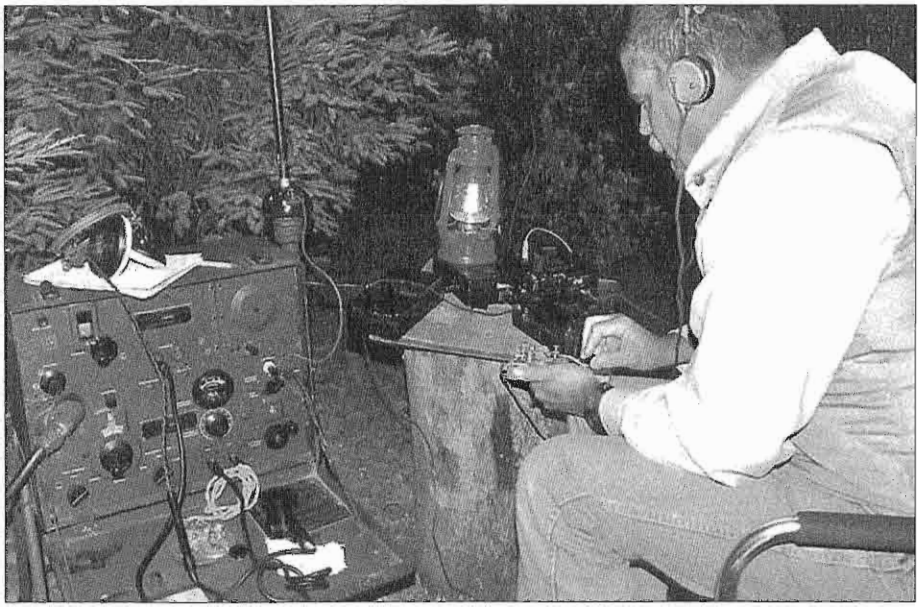
Hanks's ARC-5 VFD station.



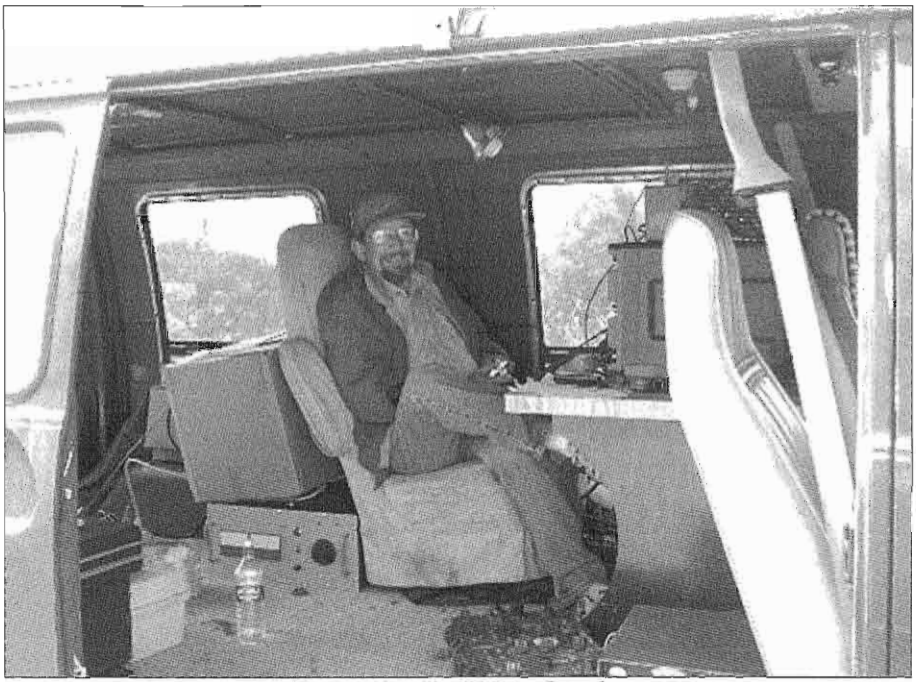
By Dave Jennings, WJ6W (Photos above and below)

"I set up in a park at the end of a street about 3 miles from my house. It is at the border of a state park in the Santa Monica mountains in Los Angeles. The antenna was an extended double zepp (on 40 and 20, cut for 75 meters) supported by a 25 foot "tower" made from PVC pipe screwed together and guyed. The rigs were the Gonset Twins, an SB-102 and an FT-817 for the modern touch. Power supplied by a Yamaha generator. Mike, KO6NM delivered breakfast and supplied the vehicle. Gary, W6GY rode his bike to my location and delivered a QSL card for the contact that morning. I had quite a few contacts even though the bands weren't great."





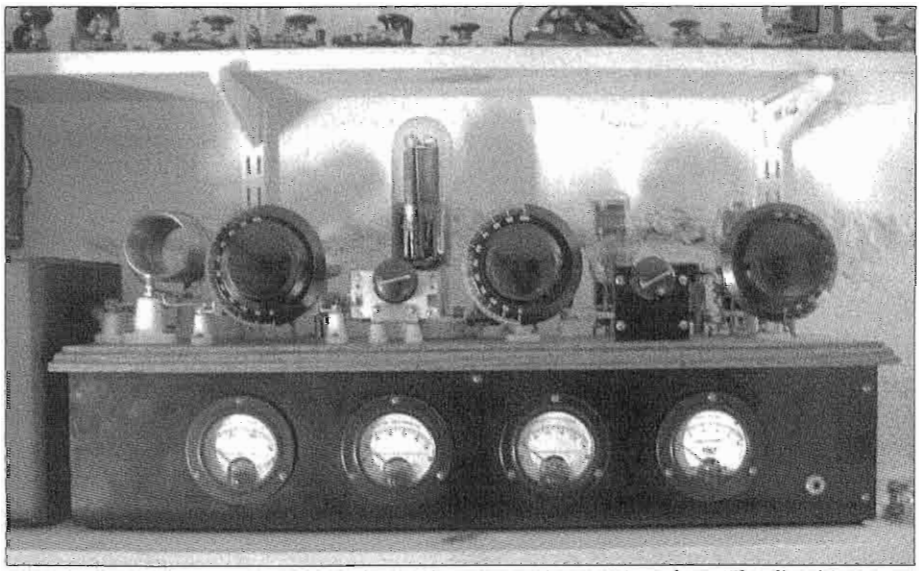
ABOVE: Tim Sammons (N6CC) operated Vintage Field Day ("Military Division") with his RS-6 on 80/40 CW and an SCR-284 on 75 AM. Conditions on 75 at night were poor but he had lots of fun on CW. Station was powered by PU-181 generator. BELOW: Dennis Duvall (W7QHO) operated from Fort MacArthur, CA, from his fully-equipped van.



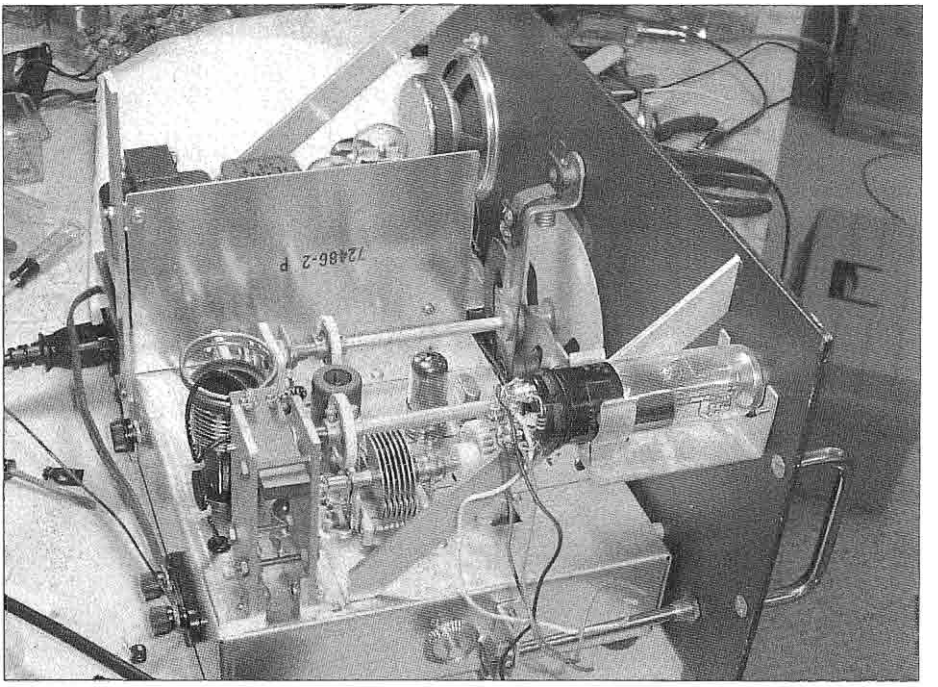
PHOTOS

The first gathering of AM'ers known as the "7290 GANGsters," Saturday, August 3, 2004 in Brookville, PA. From left to right are Tom Marcellino (W3BYM), Scott Mathewson (WA3FFC), Mike McElhinny (WN3B), Marty Greksa (W3MTG), and Frank Hagan (WC3E). A great time was had by all (Hams and wives) with great food, evening bonfire, and many tall tales.

Mike Wells (WØFD, on the right side), paid a visit to WAØGAG, Andy Kaufmanis' vintage shack in Grand Junction, CO, June 18, 2004. Both fellows are long-time AM'ers, and Andy's shack is well equipped with American-made radio equipment.

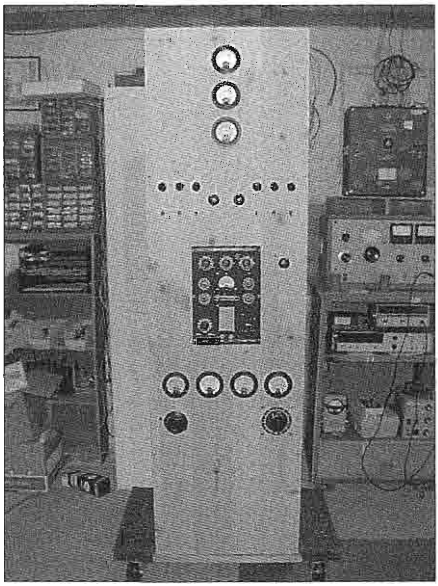


Ken Lopez (N6TZV) found this home brew 211 rig at a Hamfest. The final is a VT-4C, a war-surplus 211. It also runs a 47 and a 10Y. Ken is researching the history on this transmitter and any help would be appreciated.

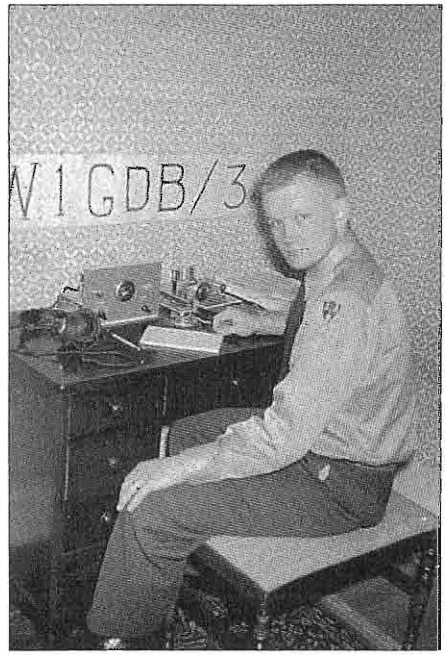


Ralph Fowler (W5UF) has recently completed work on a beautiful regenerative receiver that was inspired by Bruce Vaughan's (NR5Q) ER articles. As Ralph describes it, "...I recently completed the receiver from the inspiring series of articles by Bruce Vaughn, NR5Q. These articles were a rekindling of interest for me as my interest in hamming was waning at the time, and Bruce captured my attention and got the juices flowing for a good project. The result is this receiver. It is a delight to operate and listen to with a beautiful rich tone and brings back some wonderful memories. The receiver was constructed over a 6 month or so period. The tube lineup is a 6C4 regen detector, followed by two stages of audio (6SN7) and a 6G6 power out, along with a VR-150. The variable coupler is especially interesting and was a "take-off" from Bruce's design except it uses a modern vernier instead of the period-style cord-driven pulley design. The regeneration capacitance is adjusted with a homemade gear drive (right angle, no less) to place the cap exactly where it was needed and still keep a symmetric look to the panel knobs. The bandspread tuning is compliments of an ancient vernier from Ebay, complete with a switchable dial light—a truly wonderful piece of hardware I was fortunate to stumble onto. I made the cabinet out of wood scavenged from a local cabinet shop's dumpster, ½ in. plywood with solid mahogany as "banding" around the plywood

edges.The surface was finished in "Puritan Pine" stain and hand rubbed with a crumpled paper bag for a silky smooth surface (a technique learned from my wife Roxanne, who is a miniaturist and builds miniature furniture). It will someday (soon I hope) be accompanied by a transmitter of a similar style for a vintage station.

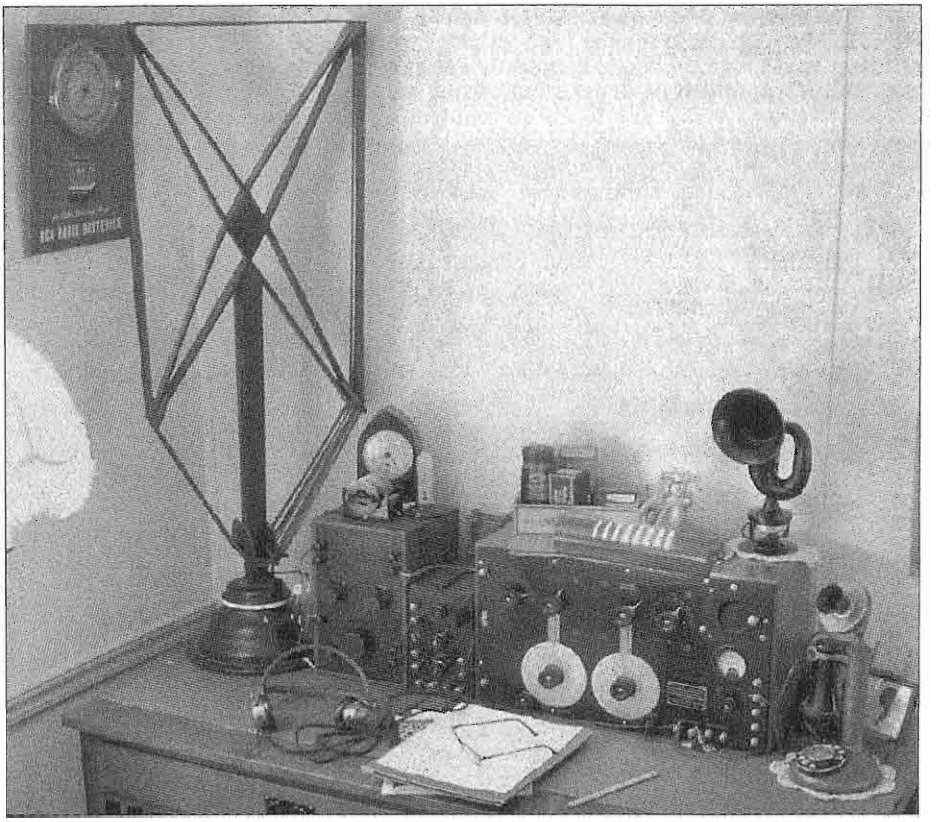


Cormac Thompson (W7JHS) has spent the better part of 4 years working on his home brew 100TH rig, nicknamed "Olde Woody" because of its hand-finished wooded panels.When this photo was taken, most of the panel finishing was done, but the tuning controls and the viewing window had yet to be installed. This is a great piece of work that everyone is looking forward to hearing on the bands.



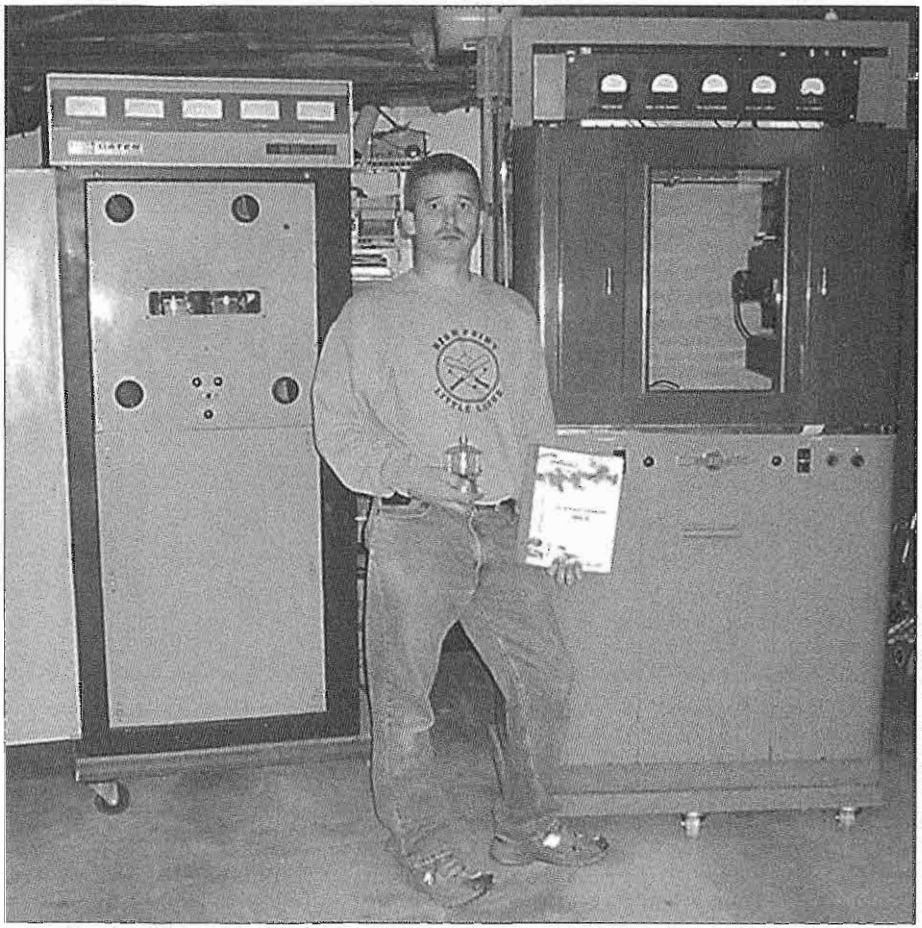
Whitey Doherty (K1VV) was operating W1GDB/3 in 1957 while stationed at Fort Meade, MD, during 1957. He is shown operating his original "Mighty 4 Watter."

"...We were stationed at Ft. Meade, MD, married and lived off base in Washington, DC. This is in the apartment. We had a 40 meter dipole which ran around the apartment at the top of the wall near the ceiling. In the barracks we had a 40 meter dipole hung from the over head on the second floor and worked from Maine to Georgia and west to Illinois. The RX was an Allied Radio Ocean Hopper kit, cost $10.80. The TX cost about the same, and the complete station less than $25.00. I was a radar operator in the Wash-Baltimore air defense system, originally trained as an intermediate speed (18 WPM) radio operator at Ft. Dix, NJ.



This is how ER reader Ward Kremer describes his classic LF SWL shack: "...From left to right, a BC-138 tuner is hooked into the SE 143/IP 500 receiver #558. On the right top, is "The Detecto" by Kremer Kraft (homemade detector). This is being fed into a Kennedy 525 two-stage amp. Headphones are "Baldy C's". I have tried various detector tubes and the outstanding winner is a UX 112A. This tube performs extremely well in the NDB range on one volt! On AM I usually use about 8 volts. Filament current is not critical with this tube. Antenna system is a 100 foot north/south inverted L often joined to a 60 foot east/west inverted L. Ground is a bit extraordinary. I use my 503 foot water well! I grounded to the 750 foot power feed ground to the well, and I also provided multigrounding along the wire route. The performance of this WW I era radio is nothing short of amazing. I have logged four NDB's at one setting. These are from south to north, CZM 330 kc; Cozumel, MX, FIS 332 kc; Key West, FL, HEG 332 kc; Jacksonville, FL, and QT 332 kc; and Thunder Bay, Ontario, Canada. Interesting that the FAA would have both Key West and Jacksonville on the same wave length. I wouldn't want to be a pilot in a storm and have to cypher the Morse code signals in a noisy aircraft! Other interesting logs are BR 382 kc; Egilisstadhir/Breidavad, Iceland, TL 379 kc; Tallahassee, FL at the same spot as BRA, 379 kc, in Asheville, NC. It's important here to add many thanks and a note of recognition to Kevin Casey and his wonderful "Beacon Finder" without which I would've been lost trying to ID the aforementioned! The set also does very well on low end AM. At 530 kc to 560 kc it's typical to pick up a minimum of three stations at one setting, often six or more! I have logged Radio Lima, Radio Brazil, Radio Chile, Caracas, VZ, and Cartegena,

COL. The farthest AM logs are KVOK 560 kc, Kodiak, Alaska, KPIA 620 kc, Hilo, Hawaii. I would like to see the look on a station manager's face when a guy shows him a request for QSL from Newport, TN and they double take when they see the age [WW1] and type of rig being used for the DX!

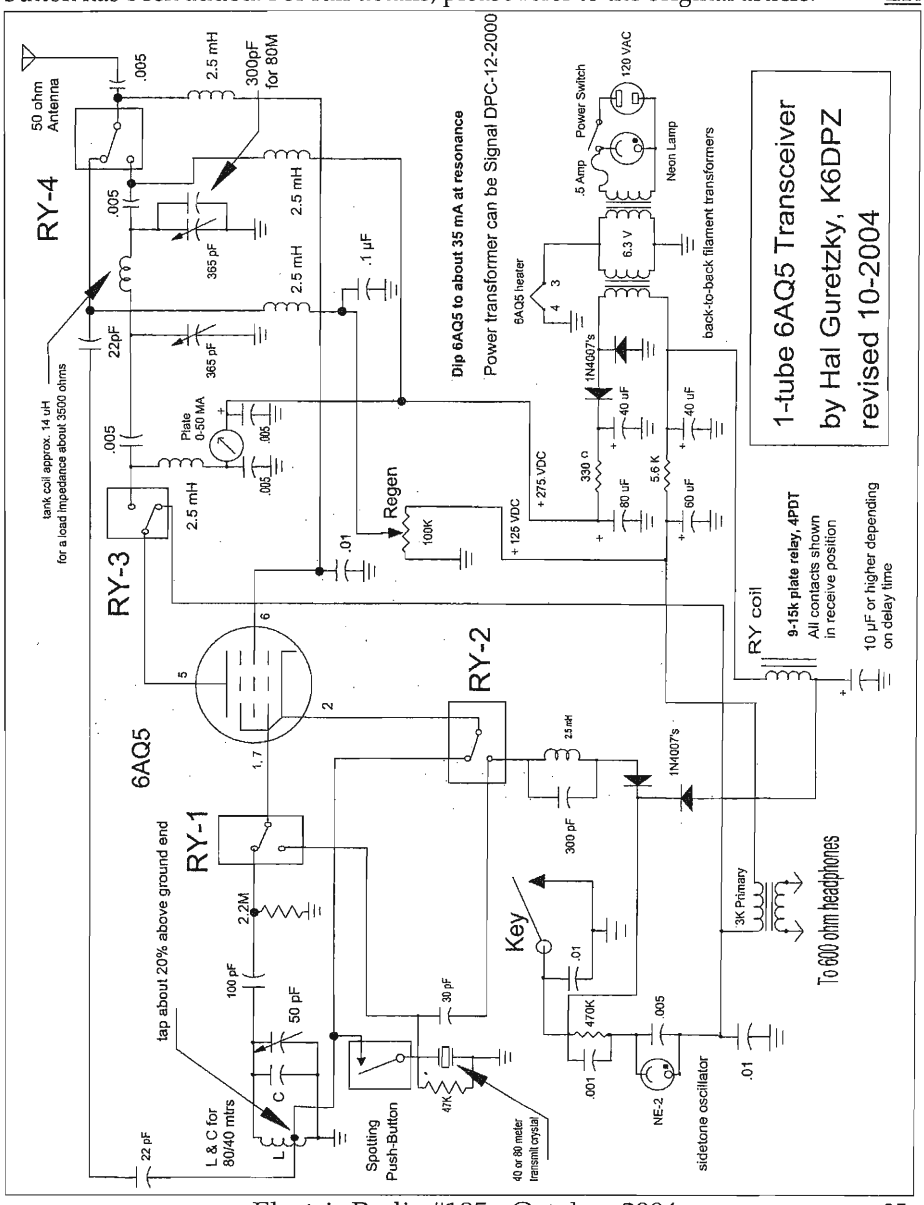


Heavy Metal is still popular too! Here, Chris Horne (W4CKH) is standing in front of his Collins 20-V. Here is how Chris describes his latest project:
"...Radio's "golden age" was in the '50s and '60s which included many late nights listening to KDKA, WWL, etc. This era also included some beautiful AM transmitters, especially the Collins line (20 V, 550A, KW-1 etc). Ever since I saw the tubes glowing at WMFR in 1978, I was fascinated with wireless. To make a long story short, I have attached a photo of my Collins 550A, identical to the 20V, with ½ the power output. The Collins 20V/550A is one of those machines that transcends time and space equivalent to a Rolls Royce or maybe a '57 Chevy. There is as much pleasure at gazing at one of these as actually making them work. Well, I hope to make the 550A work on one of the Ham bands, probably 1900 kHz. The wife is a little concerned now that I have two broadcast transmitters!" ER

1-Tube K6DPZ 6AQ5 Transceiver Update

By Hal Guretzky, K6DPZ
95-15 108th St.
Richmond Hill, NY

I have updated my 1-tube transceiver that was described in ER #169, June, 2003. The control relay has been redesigned to use a more common 4PDT type, and a spotting button has been added. For full details, please refer to the original article. **ER**



The Restoration of my BC-610E Part 1

By Bill Feldmann N6PY
n6py@arrl.net

Last December, a fellow military radio collector friend of mine informed me that he had obtained two BC-610Es and would like to sell one. It came with a BC-614 speech amplifier and a BC-939 antenna tuner, along with a complete set of tubes. The tuner and speech amplifier were in excellent cosmetic shape but the BC-610E was very dirty and had been modified at one time with the addition of a plug and switch on its control panel. Also, there was some rust and dents in its cabinet along with many extra holes from previous modifications. But everything seemed to be there so I was the proud owner of a second BC-610E, which is shown in **Figure 1** after restoration, with my modified BC-939 mounted on top.

The BC-610E was the most common of what I call the early BC-610s—the last model built during the Second World War, and used in the Army SCR-299 mobile communications system. I already have a later BC-610F, which is what I call one of the late BC-610s. The F through I models were redesigned for easier maintenance and reduced cost. They were used during the Korean War and up into the 1960s until SSB transmitters entered army service. Electronically the early and late BC-610s are nearly identically. The main difference is in packaging. I wrote an article about my BC-610F that was published in the March, 2004, issue of Electric Radio, which you should review and that I'll reference in this article. That article also describes the mechanical packaging and the differences between the early and late BC-610s.

In my previous article I made some erroneous conclusions, which I'll correct in this article. They were concerning the BC-614 speech amplifier and the BC-610s internal VFO. I have now found that the BC-614 speech amplifier can deliver excellent audio, with a few simple modifications. I also found the source of the hum on the carrier of both my BC-610s and an easy cure for it. So read on and I'll talk about these subjects along with a few more interesting things I learned since my last article on my BC-610F. Additionally, my copy of the army service manual, TO-31R2-3SCR388-21, that I used for my F model also is good for the E model. Don't attempt to work on a BC-610 without an applicable manual; I obtained my copy from www.w7fg.com [1-800-807-6146].

Disassembly, Inspection and Repair

The first task after getting my BC-610E home was to clean it up, and evaluate what was needed to get it working. I partially disassembled it by removing its top cover, control and power panels and the exciter and final amplifier assembly. The top cover is easy to remove by unscrewing the four wing nuts and lifting it off.

I removed the control panel as a unit by unplugging the two wiring harness plugs going to it along with the wiring to each of its meters. I labeled each wire to aid in reconnection when installing the panel. I then labeled and removed all the wires going to TB-1 and the wiring harness to the modulator assembly. I also labeled and removed the B+ wire at the

Figure 1: The restored BC-610E in service at N6PY.

modulator relay on the modulator chassis. I loosened the final tuning capacitor's coupling to gear box screws so the gearbox could be removed with the front panel. I removed the capacitor screws and nuts securing the exciter/final amplifier assembly to the transmitter. Finally, I lifted the complete exciter/final assembly off the transmitter for inspection and any required work.

Finally, I removed the power panel located on the lower front of the transmitter. I started by removing the capacitor screws and nuts securing the panel to the transmitter's side panels and power supply chassis. This was not an easy job

and required a long reach and a good set of socket wrenches. The screws and nuts between the bottom of the panel and the power supply chassis were the hardest to reach. I was lucky that a previous owner had fitted rollers to the bottom of the transmitter, giving me access to the nuts under the power supply chassis without having to lift this heavy transmitter. I then tipped the top of the panel forward giving access to the panel's wiring. It was easiest to keep track of all the wiring connections by removing the four power control switches as an assembly and leaving them connected to the transmitter's wiring. I did the same with the CW/Phone switch, reset switch, and the screw-in fuse sockets. The only wires I had to label and unsolder were the ones going to the two smaller fuse receptacles, FS4 and FS5. Then, I removed the panel, which gave access for cleaning, inspection of the wiring, and removal of some modifications.

I cleaned the outside and inside of the transmitter along with the top cover and front panels using a 50% mixture of Simple Green® in water and then water from a garden hose to remove the dirt and cleaning solution. On the exciter module, I used compressed air to blow what was mostly dust from under the exciter chassis and then cleaned the outside and around the final using the Simple Green® solution and water. I kept the underside of the chassis as dry as possible since this area was only dusty. I apply the cleaning solution with a sprayer and scrub any real dirty areas with a paintbrush. Then, I completely wash the solution off of all surfaces and out of any crevices because any solution left can cause corrosion with time and moisture.

Then, I was able to inspect the wiring and condition of my BC-610E. I found that the wires that were in the worst shape were the high voltage wires from the power supply modulator chassis up to the final amplifier. I decided to replace them with black non-resistive or inductive copper stranded automotive spark plug wire, which I found at a local automotive parts store. I understand shops that repair and supply neon signs also have a high voltage wire that can be used for high-voltage supply wires. I cut the length of the replacement wires and soldered lugs onto them using the old wires as templates. The rest of the wiring was still in fairly good shape. The old rubber and cloth insulation was still good but a little stiff. I decided not to build new harnesses and to just be careful not to bend the existing wires any more than necessary. One problem with these old wires was that the color coding was faded badly, and it forced me to trace wires using an ohm meter when troubleshooting.

Using my manual schematic and practical wiring diagrams, I was able to remove modifications to the exciter chassis. A previous owner must have intended to use this transmitter as a CW-only rig. A plug went to the exciter keying line, which was disconnected from the plug for the speech amplifier. Someone had wired a jumper around the CW/phone relay so the transmitter could not be used on phone. I started checking switches and wiring using my manual. I also checked the high power and modulation transformers using my ohm meter and they appeared to be fine.

When checking switches I found that three of the four large power control switches did not make contact when closed. I discovered that the back of these 1930s style house wiring switches could be removed by removing a clip on each switch. On two switches, by just cleaning their contacts with DeoxIt D5®, I got them working [Caig Products Company, from Newark Electronics, Antique Electronic Supply and others]. On the last switch, a disk with copper contacts was

badly burnt. I had some spare switches given to me by a friend who had some BC-610 parts. The bad switch was almost impossible to remove from the hardened steel mounting rail that all the switches were crimped into. So, I disassembled one of the spare switches to obtain a replacement disk. I'm glad I checked these switches before reassembly of the transmitter; it would be almost impossible to work on these switches with the transmitter assembled.

One modification I decided to leave in was one where a previous owner had converted the final coil's output link shorting relay to a TR relay. This relay is only needed when using receivers with separate antennas near the transmitter antenna, as in the SCR-299 system. This 115-VAC relay is activated only when the HV supply is powered up for transmit. Someone had removed the antenna's insulated terminals. He had wired one plug for the final output link to ground and the other to one of the NO contacts of one pole of the relay. The NC contact was wired to a BCN receptacle for a receiver's input. The swinging contact was wired to a HF receptacle for the antenna tuner input, on the side of the transmitter. The other pole of the relay had its NC contacted wired to a RCA plug receptacle between the receiver and antenna RF outputs. The swinging contact was connected to ground, which will ground the mute line of a receiver during transmitter standby. The NO contact is wired to the NC contact for the receiver's antenna input to ground the receiver's antenna input during receive for protection. After cleaning up the wiring of this modification, I find it works very well as a T/R and receiver-mute relay.

I went to work on the exciter chassis next. I replaced all the capacitors in the oscillator, doubler and IP amplifier circuits that were labeled as "paper" in the manual's parts list. These old paper capacitors are very likely to fail. One Ham I met on the air, who worked as an instructor in the repair of BC-610s during WW2, said these paper capacitors were even failing during the war when they were new. So, 60 years later, I'm sure I don't want to trust them. I replaced most paper capacitors with disk ceramics with a 1-kV rating. However, the oscillator blocking capacitor, C1, was replaced with 6000-pf, dipped silver mica. I had hoped replacing the paper capacitors would help cure the hum problem, which I had experienced with my BC-610F using its internal oscillator. Unfortunately it didn't, and I'll discuss this a little later.

I also checked and replaced all exciter resistors whose values had changed more than 15%. Additionally, I made sure all grounds were tight and secure. Later, on my BC-610F, I found some grounds connected to the mounting screws holding the Bakelite board for the exciter module connectors were loose. Those I moved to other screws that were not going through any soft material.

Cosmetic Restoration

As I mentioned earlier my BC-610E was not very nice to look at. I first went to work with my body and fender hammer repairing many of the dents. Some I had to fill in and do a lot of block sanding to get the panel surfaces flat. I filled the holes with "JB Weld®" epoxy by placing a small steel patch behind the hole for reinforcement and countersinking each hole's outside edge to further improve bonding. "JB Weld®" is the only filler I've found that will successfully fill small holes; Bondo® will always come loose with time. The problem with using "JB Weld®" is that it's much harder to sand than Bondo®, but with a little elbow grease and care when applying it, it will make a good repair. For filling small imperfections or scratches in the metal I used automotive spotting putty available from auto parts or paint stores. One large

problem was that someone had cut two large meter holes on each side of the control panel. One hole on the left side had a 0 to 3kV meter installed but not wired. There was nothing in the second hole on the right side but was most likely for a modulator current meter like used on the A to D models of the BC-610. These holes were too large to fill without welding. In the box of spare switches and parts I got from my friend were two plastic bezels from a BC-610D for the meters mounted in the same position as these holes in my cabinet. I found a nice 300-mA meter in my spare parts that matched the BC-610 meters. I decided to leave the kV meter on the left side as a final voltage meter and install the 300-mA meter as a modulator current meter. I just had to build a set of series resistors on a small terminal board to calibrate the 3-kV meter, which I mounted just under the meter. You can see these meters on each side of the control panel in **Figure 1**, page 27.

The next problem was how to finish my BC-610E's cabinet. Mine is a very late WW2 example that was not painted like most BC-610s in black wrinkle, but was painted in semi-gloss black. I thought about having it powdered coated, but that was impossible because of the epoxy "JB Weld®" hole repairs. I considered painting it using black wrinkle paint. However, you really need to heat the parts to do a good job of painting with wrinkle paint and I didn't have a good way of heating these large parts and also didn't want to completely disassemble the exciter and rest of the transmitter. So, I decided to stay with the original semi-gloss black finish. I had a local auto paint store mix me a quart in acrylic enamel. I wet sanded the control panels, exciter outer surfaces, side panels and top cover using #360 wet emery paper. I repaired any rust by sanding and sealing any bare metal with Krylon primer and metal sealer. After a final inspection and repair of any nicks or scratches with spotting putty and sanding, I painted the entire exterior surface of the transmitter and under the top cover in its original semi-gloss black using an automotive spray gun.

After allowing the paint to dry for two weeks, I reassembled the transmitter in reverse of how I disassembled it. I also cleaned and checked the calibration of all the meters on the control panel along with cleaning and lubing the gears for the plate tuning capacitor drive before assembling this panel. There were a few scratches in the Plexiglas® lens over the plate current meters, which I polished out using Blue Magic® Plexiglas® cleaner and scratch remover available from Pep Boys.

One large problem I had was restoring the ¼ inch high lettering on the control and power panels. This lettering was in bad shape before I refinished the panels but I photographed the lettering for future reference. I located a source of kits containing white ¼ inch electronic words, numbers and letters on the Internet from Ocean State Electronics at www.oselectronics.com [1-800-866-6628]. Datak Corporation makes these kits; they also sell two types of sealer to place over the letters. I ordered two electronic/Ham word kits and an audio kit of words and letters. I found that the clear Datakoat® sealer that is brush applied worked best on the black semi-gloss surfaces. The matt spray finish would require the whole transmitter to be coated with it since it changes the paint's surface finish.

When applying the words and letters I made a mistake. Because I was impatient to test my BC-610, I had already assembled and tested it before obtaining the word kits. I then had to work on vertical panels with knobs, lights, fuses already installed. If I ever did this again,

I would do all the dry transfer work with nothing installed on the panels, and with the panels lying horizontally on a desk. Even doing it the wrong way, with lots of planning and care, I was able to do a lettering job that looked better than original. The original job looked like it was done using rubber stamps around each hole and not with a silkscreen. I used the 3M blue masking tape to make guidelines without leaving a residue on the painted surfaces. I needed some words that were not in the kits, so I constructed them from parts of other words. A few words I did have to construct from letters. I then sealed this artwork using the clear Datakoat® sealer with a small artist's brush by applying it only over the words or numbers. After it dried I couldn't see the sealer, and only knew it was there by rubbing a finger over it. The important thing is to plan ahead for the placement of the graphics to keep things straight and centered.

Testing My BC-610E

After reassembly of my BC-610E and installing the same type of three-contact grounded power receptacle as I used on my BC-610F from McMaster-Carr, I conducted a complete resistance test on all terminal strips per Table XIV in TO-32R2-3SCR399-21, the BC-610 service manual. After all resistances were found to be within their specified values, I installed the set of tubes I had gotten with the transmitter. I started to power up the transmitter using the same procedure described in my previous ER article. I noticed the 250-TH final and one of the 100-TH modulator tube filaments were cold. I removed both tubes and found corrosion on the socket's filament contacts. These I cleaned with very fine sand paper and DeoxIt D5®, which cured the cold filament problems.

I had a full set of final coils and exciter modules for the 160 through 20 meter bands, which were repaired per the procedure in my March, 2004, Electric Radio BC-610F article. I then continued the procedure of my previous article to burn in the tubes, check the exciter and final amplifier outputs into a dummy load on 160 through 20 meters, and then neutralize the final amplifier.

During neutralization of my BC-610F, I had been able to get near-perfect neutralization with the capacitor nearly open, indicated by less than a 3ma change in grid drive when adjusting the final tuning capacitor through resonance. However, on my BC-610E, I could not get the dip less than 10ma even with the capacitor fully open at minimum capacitance. Initially, I left the adjustment at this setting and proceeded with checking the transmitter. However, during full power with 100% AM modulation on 40 meters, occasionally there would be an arc across the neutralizing capacitor. I noticed the construction of the plate of the 250-TH tube in my E was different from the one in my F model. I tried the tube from my BC-610F in the E and repeated the neutralization procedure with less than a 3-mA dip just like in the BC-610F. I continued testing of the transmitter with the tube from the F with no problems. Later, when I tried the original tube, I again had arcing problems. Since the neutralization procedure is done with no plate power, I hooked a small 5-pf capacitor in series with the neutralization capacitor to reduce its minimum value and was able to get less than a 3ma dip. I constructed a high voltage capacitor, about 5 pf, using a 1 inch piece of RG-219 coax with the center conductor forming one plate of the capacitor, and the shield making the other plate. I installed it in series with the existing capacitor. Then my BC-610E could be neutralized with both tubes and no arcing problems. The tube I got with the E must have a lower grid to plate capacitance than usual and the added 5-pf capacitor now allows it to

be neutralized. If you run into the same problem, this may save looking for a replacement tube.

After getting a good clean carrier on all bands, and at least 50 mA of final grid drive, I connected my home brew speech amplifier with my Symetrics 528 audio system to my transmitter. I discovered a problem when I first talked into my mike. I had lots of downward modulation and not much upward modulation on the scope. I looked at the modulator tubes and noted one tube's plate was very red and the other's was cold. The one with the cold plate most likely was weak. I removed this tube and adjusted the modulator bias current to 20 mA for the remaining tube. I removed the good tube and plugged a spare tube into the socket the weak tube was in. I turned on the plate power and noticed that the bias current was still nearly 20 mA, indicating that the replacement tube would match the good tube in cathode emission. I plugged the good tube back in, adjusted the modulator current to 40 mA and checked the modulation on the HO-10 scope under full carrier power. It showed just a little more upward modulation than downward which is normal for a male voice. My AM signal on my receiver using headphones also sounded excellent. At this point I knew the audio, modulator, and final circuits were working fine on 75 meters. I then repeated these audio modulation tests on 160 through 20 meters being careful to set the modulator idle current at 40 mA when changing bands.

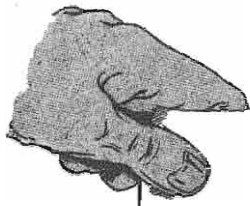
During these tests I noted a second problem. Occasionally, under full AM modulation, the current overload relay system would trip. At first I thought dust somewhere in the power supply was causing an arc tripping the overload system. When the problem continued, I became concerned and decided to see what the overload system was set for. Under full power, I detuned the final capacitor for a very short period of time so as to not damage the final, and found that when the plate current meter reached a little over 350 mA the relay would trip. It should have been set for 670 mA. I decided to leave it at 350 mA for increased protection, but to keep instantaneous current surges from tripping it. I added a 10-µf, 50-V capacitor across the relay coil to accommodate these surges and also to prevent another known problem on some BC-610s, audio talk-back of the relay coils. This solved the tripping under full modulation problem with increased protection in case of a serious failure.

During audio testing, when using the internal variable oscillator, I decided to listen for the hum I had experienced with my BC-610F. While transmitting into the dummy load, I listened in the AM mode with my 75A-4. Tuned to the exact frequency as I was transmitting on, I heard no hum at all and there was no ripple on my HO-10 scope. However, as I tuned off frequency and when the carrier started to approach one side of my 6 kc receiver filter, I heard some hum just like I had heard on my BC-610F. When I tried my transmitter on the air I got excellent audio reports, like my BC-610F. Some stations reported hum when I was on the internal oscillator, but not when I used my HP-3586B as an external VFO. I was very disappointed because I had hoped replacing all the paper capacitors in the oscillator circuit would cure this.

[Next month, Bill continues the BC-610E restoration story with some all-new electronic techniques to cure the infamous hum problem that have never been in print before....Ed.]

ER

Mailbag



To:
Electric Radio
PO Box 242
Bailey, CO
80421

Home-Owners Associations, Covenants, and the Amateur Radio Operator

By Mike Grimes, K5MLG
3805 Appomattox Circle
Plano, TX 75023
grimesm@flash.net

Most Radio Amateurs do not realize the importance of this issue. I believe "Nothing poses as big a threat to Ham radio as HOAs (Home Owner's Associations) and CC&Rs (covenants, conditions, and restrictions) —not spectrum grabs, not no-code licenses, not even the Internet, or Broadband over Power Lines." I believe the average Amateur, and ARRL badly underestimate the threat. This issue has proliferated into each new housing development (even some of the older ones) as CC&Rs, replicated by each new land development. Far more hams are affected than we realize. It came on slowly but now has generated great momentum!

Antenna restrictions pertaining to CC&Rs by builders, developers and HOAs in residential neighborhoods, impose unfair restrictions with respect to the antennas and towers. Many single out "radio antennas: not permitted." These restrictions effectively remove the heart of Amateur Radio and place the hobby, mostly inactive. Yes, I can always work the repeater!

We have not taken corrective action soon enough. To this extent we are handicapped and it will be very difficult to undo, or reverse the trend.

For about a year, my wife and I have been trying to relocate to a new home with certain requirements, such as provision for a tower. We have spent many hours reading the CC&Rs of the desired developments. The experience has been very discouraging. The trade off comes down to choosing between Amateur Radio and our appropriate housing requirements. The look on the real-estate agent's face when you discuss your requirements, says it all: "you are not welcome." They suggest: "get out of town." Perhaps we have done a bad job of promoting Amateur Radio as a hobby. Perhaps too many bad experiences have gone unattended.

Yes, I have tried inside antennas; so called "compromised" antennas, and "stealth" antennas and they "work" to a

fashion. But it is not the same as a good outside beam or wire. Besides, many of the CC&Rs do not permit any "transmitting, Ham radio or outside antennas." Period.

Radio is important because it can influence young would-be scientists. I was introduced to Amateur Radio at an early age and it created a life long passion for science, learning and school. I made science my life's career. It is difficult to influence and mentor youth with radio without demonstrating its capability to generate excitement. Youth in our neighborhood will not easily be exposed to radio because of these restrictions. And I could go on....

The FCC has not demonstrated the courage to set minimum standards for Amateur Radio operators' antennas and override the CC&Rs. The FCC has deferred this issue to Congress. No one wants to "upset" the land developers. And the land developers have a lot of clout making this a difficult issue for us to tackle.

HR 1478 has been introduced to the House which would require private land-use regulators such as homeowners' associations to "reasonably accommodate" Amateur Radio antennas consistent with the PRB-1 limited federal preemption. HR 1478 has been referred to the House Subcommittee on Telecommunications and the Internet. Some State legislatures have taken up the issue but it is not a priority. Jim Haynie has said that if we do not get involved "it will not see the light of day."

I encourage you to write your Congressional representative(s) about this bill, get involved, and promote the positive. Changing the law through State and Federal legislation seems to be our only alternative. It deserves our immediate attention. The survival of our hobby is at stake.

Please refer to www.arrl.org/govrelations/hr1478 on WEB and Fred Baumgartner's, KGØKI's, excellent articles in the March and April, 2004, issues of *CQ* magazine.

ER

Subcutaneous Excitation or Long-Delayed Echoes Again

By Chuck Felton, KDØZS
PO Box 187
Wheatland, WY 82201

As in ionospheric propagation through air dielectric, reflecting between discontinuities of ionized layer and earth, there is another situation below us which also has discontinuities bordering a dielectric. Quartz is used as a high dielectric constant medium in microwave design. The higher the dielectric constant, the slower the propagation. Heat and pressure deep in the mantle, which is mostly molten quartz, will slow propagation even further. As the signal approaches the lower reflecting surface, the molten iron core, it will travel slower and slower. As the reflected signal travels back up through the mantle (molten rock under heat and pressure) it will increase in velocity untill it encounters another discontinuity, the mantle-atmosphere interface. This interface is complex because it is occupied by the crust which varies greatly from place to place. The crust is why long delayed echoes are not universally experienced. But, when experimenters start looking for them, and experimentally determine optimum coupling locations, and transmitting angles and frequencies, communications may become routine through the "other" medium. Path loss appears, in the recorded examples played by Art Bell on his radio show, to be from transmitter output power to receiver noise floor, or about 180 dB. This is a bunch, but I'm sure experimenters will improve on that. And what's the path loss to the moon and

back? How about the 175-kc experimenters band, or 160 meters?

Or... just in case you ever wondered where half or more of the radiated signal from your horizontal dipole goes. Or...when you see a beam pointing down, it may not be broken.

Hopkinton Hoss Traders, 2004

By Mike Murphy, WB2IUD
38 N Reading ST
Manchester, NH 13104

The weather was glorious on Friday and a little dreary and wet on Saturday morning, but not too bad. I got to catch up with Dale, KW1I, and Chris, AJ1G.

Here is a snap taken Saturday morning at the Hopkinton NH HossTraders 2004. Shown is one of our favorite New England AMers, Steve Russell WA1HUD in a typical comic pose. Steve can make anybody crack up - even in the sprinkling rain.

Steve is ogling a **BC-342**.

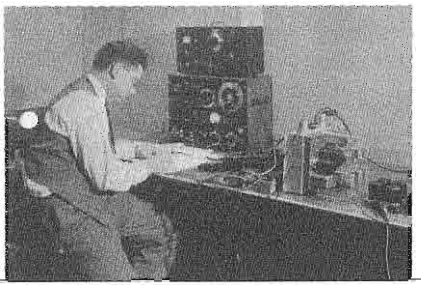
The radio to the left is the interesting and also common Hallicrafters **R45/ARR-7** Intercept Receiver. R45/ARR7 WWII Receiver, 6 bands, 12 tubes. Receives AM and CW. Bands: .55 - 1.6 MHz; 1.6 - 3.0 MHz; 3.0 - 5.8 MHz; 5.8 - 11 MHz; 11 - 21 MHz; 21 - 42 MHz. IF =455kHz, BFO, X-tal filter, output jack for Panoramic Adaptor. The circuit is essentially an SX-28! Appearance 100% Military Aircraft. 8" X10 1/2" X20" deep, 36 lbs, plus power supply 14 lbs. Production late WW2.

The picture was taken at Vans (military collector who has ads in ER and is not a Ham) tailgate. He had several nice sets for sale.

ER

Steve Russell (WA1HUD) at the Hoss Trader's Hamfest

The Restoration Corner



The Restoration Corner can run only if your restoration topics are sent in to Electric Radio!

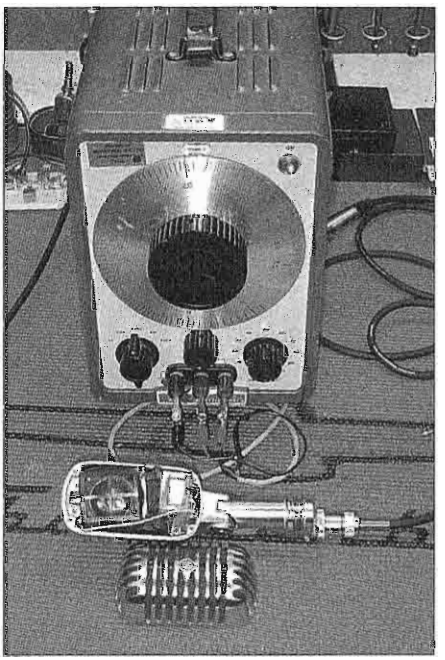
Dynamic Microphone Troubleshooting Tips

By Tom Marcellino, W3BYM
13806 Parkland Dr.
Rockville, MD 20853

For the past several months I've had an intermittent problem with my Shure 55 dynamic microphone. It has been very annoying to have the mic stop working during a QSO. Most of the time, it can be brought back to life with a heavy rap on the side from my hand. I've had the mic apart several times and wiggled and jiggled all the internal parts. I could never finding anything that would be the cause of the intermittent.

At a recent gathering of several 40 meter AMers, I brought up my microphone issue. Scott (WA3FFC), suggested connecting the mic to an audio oscillator and repeating the internal inspections. I thought this was a great idea and worth a try since my HP audio generator has a 600-ohm output, and the Shure 55 also has low impedance.

With the mic connected to the generator, the mic now acted like a speaker. A 1000 Hz note was easy to copy with the element sitting on the bench. The defective wire connection to the element was soon discovered as the audio from the Shure "speaker" stopped while tugging on the wire.



Simple clip-lead connections turn the mic into a temporary speaker to aid in finding intermittent connections in the old wiring.

W1AW de W9BSP
After 62 Years the Magic Returns

By Larry Rosine WØOG
13719 Alhambra St
Leawood, KS 66224-9664

On December 6, 2003, almost 62 years to the day W9BSP pulled the big switch when Pearl Harbor was bombed, the call was heard again and the first contact was with W1AW. MEMO, the Marshall Ensor Memorial Organization, has resurrected the call, silent for all those years, and placed it back on the air in the same small room in the Olathe, Kansas, farmhouse where it has been located since 1917.

The mode now is SSB, unlike the original spark transmitter used in '17. So you say, there are a lot of old calls resurrected from the past. What makes this one different?

W9BSP, Marshall's call and W9UA, licensed to his sister Loretta Ensor, were well known for years. In February, 1939, QST, an article "Eight Years Before the Mike" is subtitled "W9UA-W9BSP ARRL's Leading Code Practice Volunteer." Marshall Ensor was a shop teacher and Ham radio enthusiast at Olathe School. His Master's Dissertation from Pittsburgh (KS) College was titled "Teaching Radio by Radio". And that is exactly what he did.

In fact, he taught radio over the air so well that it is estimated thousands of hams were licensed after listening to his broadcasts of theory and code. He assembled the transmitter and housed it in a classic wood case with glass side panels. The rig, a robust kilowatt on 160 meters, used MCW to broadcast code and the theory was amplitude modulation. The choice of 160 meters allowed his audience to alter broadcast receivers to tune up to 1900 kcs and MCW code eliminated the need for a BFO.

Was he successful? You bet. In QST, July, 1940, Marshall appears again in "W9BSP Is 1940 Paley Award Winner." For you youngsters, William S. Paley was the founder and long time chief of CBS, the Columbia Broadcasting System. The modernistic silver award was for the amateur radio operator significantly contributing to the art. It is displayed in the museum-farm home where the station now operates.

At the age of 44, Marshall enlisted in the Navy and served as Chief Radio Officer in the Seattle Navy Depot. He returned to Olathe and continued teaching and Ham radio. The change in call areas and the initiation of the zero district placed the old 9 identifiers in limbo. The rig was altered to 75 meters as 160 was limited in power, operating times and available frequencies. The old transmitter will hopefully be restored and operational in the future.

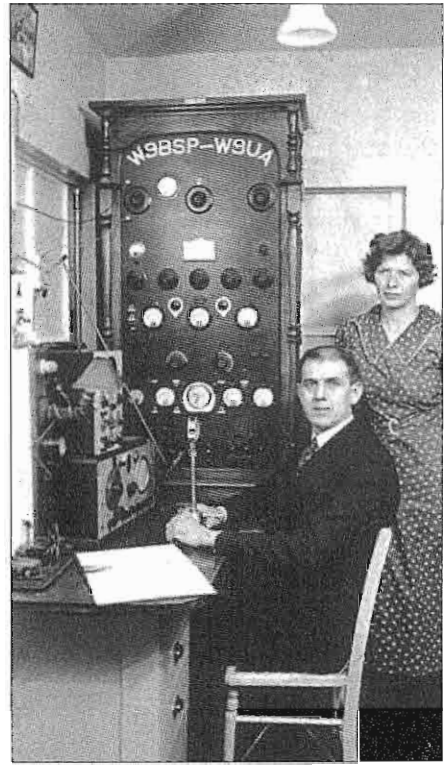
Marshall and his sister Loretta are both

silent keys. I had the privilege of meeting Loretta some years ago. While she was no longer active in Ham radio, she graciously passed out QSL cards to visitors in her home.

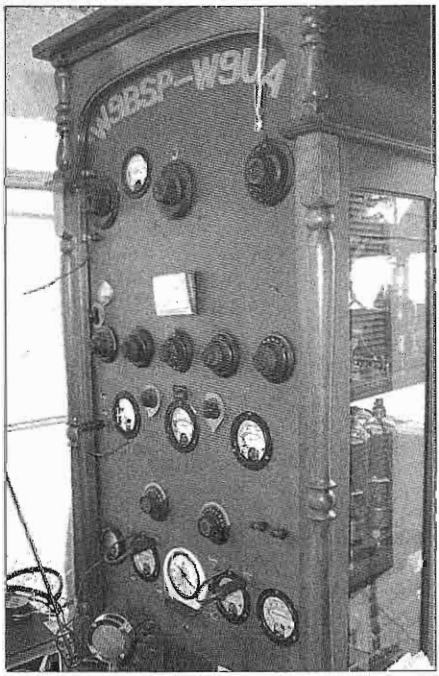
The home, farm, shops, barns and radio equipment were left in trust and are now being operated and refurbished by the MEMO organization. If you are traveling through the Kansas City area this coming summer, please contact Larry, WØHXS, for information on visitor's hours.

Many of us have had an Elmer who assisted us in getting into Ham radio. Few Elmers have had so many followers. If you listened to W9BSP's broadcasts and were influenced by them, we would certainly appreciate hearing from you. Contact Larry Woodworth, club president, at larryw0hxs@kc.rr.com. Also, there are numerous articles and photos on the internet. Just search on W9BSP.

ER

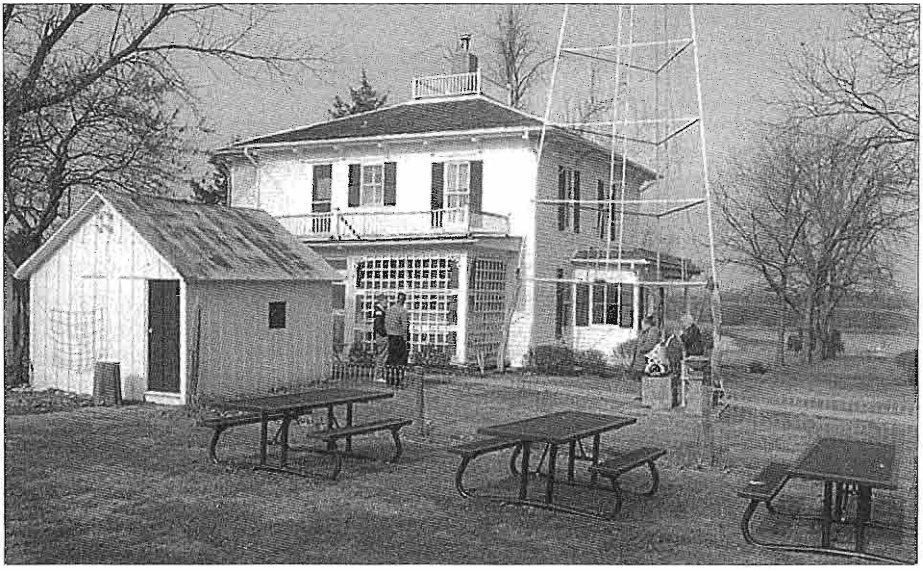


Above is an early QSL card from the Ensors. It was captioned as follows: "This station is located at our home 6 miles south of Olathe, Kansas. The transmitter runs 1KW to pair of 822, modulated by a pair 822 class B, Thordarson 30 watt speech amplifier, The receiver is a Super Skyrider SX16 - Dumont Oscillagraph, The aerial is a horizontal Hertz, Zep fed, 246 ft long, 75 - 100 ft high. 73's, Marshall H. - Loretta Ensor oprs."

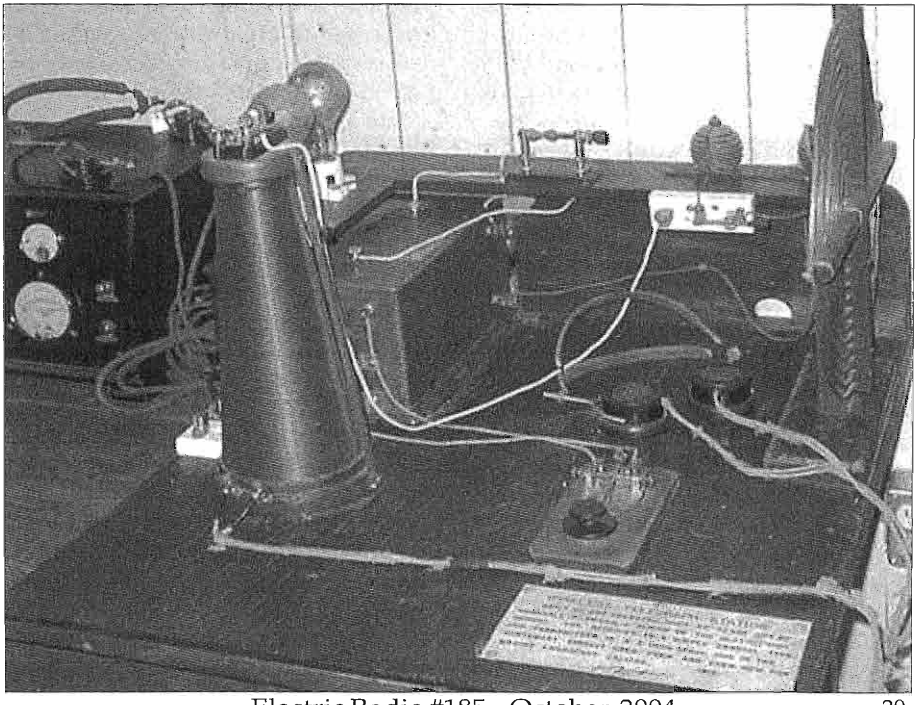


To the left is a present-day photo of the wooden-cased rig pictured in the early QSL above. Little has changed with this transmitter in 60 years! (Photo by Larry Rosine, WØOG)

To the right is Marshall Ensor's preserved 1917 spark station which may be viewed at the museum.



The photo above shows the museum grounds and the pleasant setting a visitor will experience when visiting W9BSP. The site was listed on the National Register of Historic Places on February 27, 2004. Current hours of operation are May, June, September, and October, Saturdays and Sundays from 1:00 to 5:00 PM.



A Versatile PTT for Vintage Transmitters

By Stewart D. Lyon, W6CUX
19943 Arminta St.
Winnetka, CA 91306
W6CUX@earthlink.net

Over the years, various techniques have been employed to add push-to-talk capability to AM transmitters. The most common approach was to use a high resistance (plate) relay powered by 250 VDC, or so, and switched directly by the PTT switch on the microphone. Since the back-EMF snubber used was either somewhat ineffective or nonexistent, a high level of stress was applied to the PTT switch. Apparently those old D104s and similar mics were able to handle it. As plate relays became scarcer, 6 and 12-VDC relays were used which lowered the open circuit voltage across the PTT switch, but increased the switching current.

The PTT circuit of **Figure 1** overcomes many of the disadvantages of previous designs in that it operates from the 6.3-VAC filament supply; provides Darlington transistor buffering to limit the PTT switch current to less than 2 mA; and uses readily available, off-the-shelf components. A half-wave voltage-doubler operates "below ground" to provide -17.5 VDC from the 6.3-VAC transmitter filament supply. Switching is done by pulling the NPN transistor's base "high" by the PTT switch ground, causing collector current to flow and operate the relay. Fast turn-on is assured by the initial 17.5-VDC over-voltage on the nominal 12-VDC relay. The regulation of the power supply is such that the holding voltage will to drop to about 10 VDC in 35 ms, which will reduce the relay drop-out time. However, the back-EMF diode (CR3) tends to slow the relay, and drop-out times of 100 ms are estimated.

A DPDT relay is shown which is suitable for most "Big-Switch" transmitters such as the Viking II and Heathkit Apache and DX-100. On these rigs, the relay contacts are wired in parallel with the front panel PLATE switch. Also available are 4PDT relays (RS 275-214) to control "wafer-switched" rigs, such as the DX-60, which usually require more circuits be switched. Most of these vintage rigs use a single-circuit mic jack which must be changed to a 2-circuit jack to pick up the PTT line. A ¼" stereo phone jack could be used which would mount in the existing mic jack hole. For the purist who doesn't want to make any internal mods, the PTT can be mounted in a mini-box as shown (circuitry goes inside the box). Suggested connections to the accessory plug of the Heathkit TX-1 and DX-100 are shown in **Figure 1**. The DX-100 interface will require a jumper between the 6.3-VAC source (point X on the DX-100 schematic) and the point opposite the modulator take-off at pin 7 of the remote socket.

The major components of the PTT were all available off-the-shelf at three local Radio Shack stores. **Figure 2** shows a possible method of construction. The components are mounted on two 5-tab terminal strips (RS 274-688) which are held down by a single screw. There is about a 30-db power margin on the transistor, and a heat sink is not required. The relay is held in place by half of a 1x1 inch 3M Mounting Pad.

Although I do not currently own an AM transmitter, and the PTT circuit described is pretty much a paper design, I did put together a prototype to check out the pull-in and drop-out times of the relay. I also measured the open and closed

PTT switch volts/amps which were –15 VDC open and 1.6 mA closed. A warning: if your mic uses an active switch (as one of mine does), it is probably set up to switch a positive voltage and may have a problem switching this circuit.

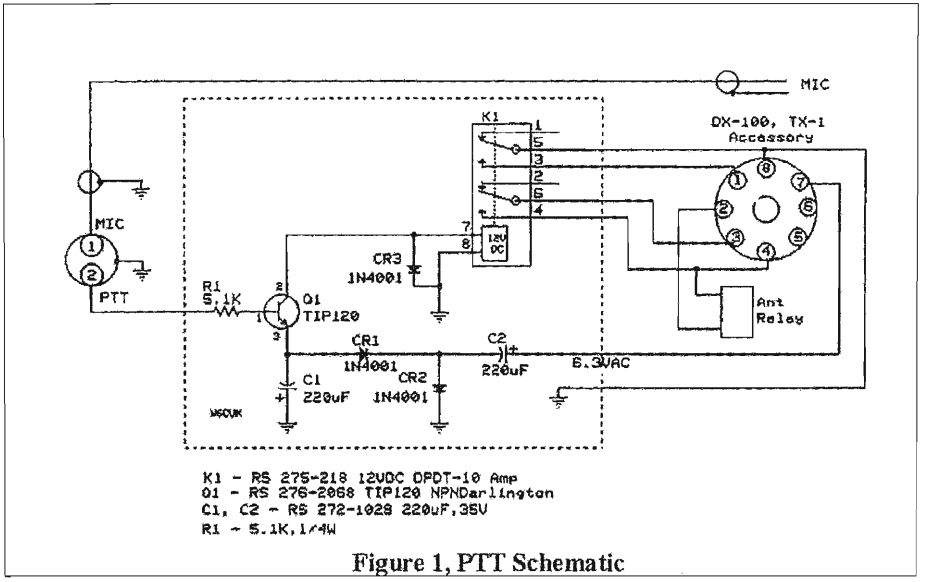


Figure 1, PTT Schematic

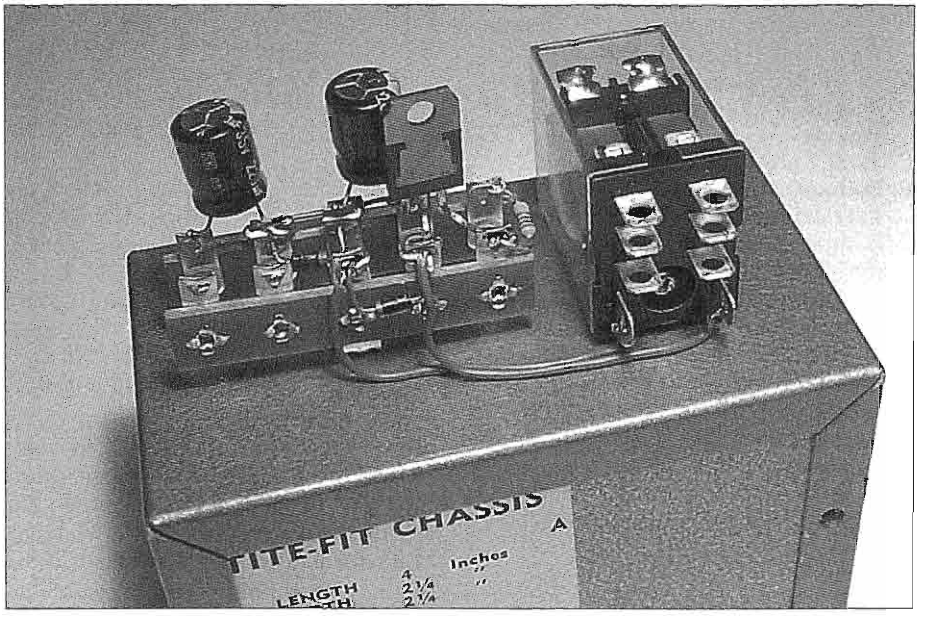


Figure 2: The prototype PTT circuit easily fits a small mini-box.

ER

Installment 16

W. J. Halligan
Newspaper Reporter and the State of Radio 1923-1924, Part 5
Amateur Radio State Of The Art, 1923-1924

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

Full Outline of Part 5*

A. General Happenings
   Calling CQ
B. The American Radio Relay League (ARRL) at work
   ARRL Conventions
   Transatlantic Receiving Tests and Contest
   1-MO–French 8AB Two-Way Contact
C. The Silent Period and the Crises of Interference at Every Turn
   Prevalence of Interference
   Silent Period: Practices and Regulations
   In Defense of Amateurs
   Legislation–The White Bill
D. WNP ("Wireless North Pole")
   Macmillan's Expedition to Arctic Regions
E. Irving Vermilya, 1ZE
F. Epilogue: Introduction
   1. Traffic Handling and Calling CQ
   2. Intermediate/Interval Sign "U" Supplants "DE"
   3. Amateur License Regulations and Frequency Allocations
   4. Silent Periods and the White Bill
   5. The Hoover Cup Awards
   6. Transatlantic Receiving Tests
   7. The Second ARRL National Convention
   8. The 1MO–French 8AB Two-Way Transatlantic Contact, November 27, 1923
   9. WNP ("Wireless North Pole")
   10. Irving Vermilya, 1ZE

*Topics formatted in bold are covered in this installment.

Epilogue Introduction

A discipline of inquiry, known as hermeneutics, for deriving meaning from past occurrences, has achieved prominence in the contemporary social sciences. The term "hermeneutics" is taken from the name of "Hermes," a messenger of the gods in Greek mythology, whose responsibility it was to interpret and communicate the desires of the deities to mortals. An outcome of hermeneutical inquiry is an interpretation put forth to grasp the intelligibility of an occurrence by revealing the meaning that it had to persons who were involved in it. I have utilized the hermeneutical ideology here to interpret the meaningfulness of occurrences [identified synonymously below as "events" and "happenings"] important in amateur radio, especially during 1923 and 1924, when Bill Halligan reported on them for the Boston Telegram.

Sometimes significant happenings during a period are prohibitively difficult to configure because they are intertwined. For example, when the editorial staff of the American Radio Relay League (ARRL) reviewed in 1964 the history of amateur radio, starting in 1914 with the founding of the ARRL, it proclaimed that the period most interesting during the fifty years of the review was from late 1921 through 1924. The editorial staff stopped short, however, of analyzing the excitement and drama engendered within amateur radio during this period. As the staffers put it: "even if unlimited space could be allotted, it is doubtful than any chronicler could recapture the spirit of adventure that pervaded the amateur ranks at

the time" ("American Radio Relay League," 1965, pp. 46-47; see also Preamble, Installment 1, ER #170, July, 2003).

Activity in amateur radio during the period, 1921-24, nonetheless, is well documented. Bill Halligan captured in print many facets of the history. He wrote his columns for the Boston Telegram, and given space limitations, he chose items of ongoing news that he believed were important. Halligan thus conveyed to his readers, who were living in the here-and-now of 1923-24, an array of exhilarations and disappointments associated with myriad occurrences in amateur radio.

All too often, however, a surface reading of a Halligan vignette comes across as obtuse to contemporary readers. Our mental processes enable us to transmute ourselves partially into his time and place, but now and again we are confronted with alien terminology associated with unfamiliar issues that have long since been resolved, negated by new circumstances, or superseded by more effective solutions. Nevertheless, if we are to understand why certain occurrences were significant and meaningful in 1923-24, we must heed Bill Halligan's sensitivity to them. Specifically, we must interpret those occurrences about which he tells us, from his perspective and from the perspective of other involved people.

I survey in Part 5 the state of amateur radio primarily in 1923-24. I have sorted Bill Halligan's vignettes on the topic into five main headings: general happenings, the ARRL at work, silent periods, Macmillan's expedition to the Arctic with amateur radio on board, and Irving Vermilya, 1ZE, a "larger than life amateur." On the assumption that the vignettes that he published were emblematic of his priorities, and therefore, that his choices reflect the relative significance of occurrences during 1923-24, I have used my classification of his vignettes to form a guide or blueprint for selecting the following ten topics for extended discussion:

(1) Traffic handling and calling CQ

Bill Halligan's [11/13/23] statement: "Let folks know who you are while you are on the air so they can fasten onto you if a flimsy is on the hook for you," inspired this topic. How did an amateur let other stations know that "you" were available in case they had a message that "you" could handle? An explanation follows from my exploration of relations between calling CQ and traffic handling.

(2) Intermediate/interval sign "u" supplants "de."

Bill Halligan [12/14/23] remarked offhandedly: "Notice the great number of ambitious amateurs using the intermediate 'u' in all their calls." What on earth did he ask his readers to observe? To extrapolate the meaning inherent in his observation, I discuss why the call designations of amateur stations worldwide up until the late 1920s lacked prefixes by which to identify their nationalities. My focus is on the Herculean effort of the ARRL to solve the dilemma.

(3) Amateur license regulations and frequency allocations.

Bill Halligan wrote reverently of amateur stations whose call suffixes started with either X or Z. What special privileges complemented these elite stations? An understanding of concessions to them leads hopefully from my review of amateur license regulations and wavelength (frequency) allocations.

(4) Silent periods and the White Bill.

For a time during 1923-24 amateurs were not permitted to transmit during peak BCL listening hours. Bill Halligan argued, however, that other sources caused most of the interference attributed to amateurs. I examine the evolution of "silent periods" and review Congressional hearings on the White Bill to better understand reasons for his consternation and to appreciate the diligence of the ARRL as it dealt proactively with interference problems.

(5). The Hoover Cup awards.

The Department of Commerce sponsored a competition yearly between 1921 and 1924 for a "Hoover Cup", which it named in honor of its secretary. Applicants competed each year for the honor of having shown the most initiative in constructing their stations. Surprisingly, Bill Halligan never mentioned the award program in his columns. Nonetheless, it contributed considerably to the excitement and drama of amateur radio while he worked as a print reporter. Therefore, I explore the rationale behind the award program for the Hoover Cups, and I acknowledge the amateurs who won them.

(6) Transatlantic receiving tests.

The ARRL generated intensely focused activity among North American and European amateurs during its four transatlantic receiving tests, which occurred between early 1921 and early 1924. Bill Halligan supported the tests enthusiastically. An understanding of the motivation of amateurs on both sides of the Atlantic to make the tests successful helps explain the heightened meaningfulness of the tests to the world of amateur radio in 1923-24.

(7) The second ARRL National Convention.

The Convention, which was held from September 11 to 15, 1923, in Chicago, proved to be an amazing event. Bill Halligan [9/11/23], who longed to go but lacked money for making the trip, anticipated a great convention when he said that while it may signify "little or nothing" to newer amateurs, to "'the old timers,' the men who have seen radio progress from the first experiments of Hertz to its present stage know that in that gathering of amateur radio experimenters will be found many who are directly responsible for the great strides that have been taken within the past few years." I have thus endeavored to highlight especially newsworthy aspects of this truly, first national gathering of amateurs and to describe its significance to distinguished guests, prominent speakers, and devoted delegates.

(8) The 1MO-French 8AB two-way transatlantic contact.

After years of transatlantic tests, amateurs finally bridged the Atlantic Ocean on November 27, 1923. The occasion ranks generally as one of the more remarkable events in the history of amateur radio. Bill Halligan [12/21/23] exulted that even Guglielmo Marconi congratulated Fred Schnell, 1MO, and Leon Deloy, French 8AB, the amateurs who succeeded in making the first two-way, transatlantic contact. However, my assessment of the achievement suggests that in retrospect it seems to have been somewhat anti-climatic, given technological advances, careful preparations, and significantly, special permission to operate on a shorter wavelength (higher frequency) than nearly all other amateurs in the United States.

(9) WNP ("Wireless North Pole").

Nothing intrigued amateurs of 1923-24 more than the possibility of working young Don Mix, 1TS, who served as radio operator on board the schooner, Bowdoin, while it was frozen in ice off the far-north coast of Greenland. Bill Halligan captured in his columns the essence of the expedition. I have followed up with a chronological account of it that emphasizes the commitment and expectations of the principal actors associated with WNP, who struggled valiantly to maintain wireless contact between the Arctic and amateur stations throughout the United States.

(10) Irving Vermilya, 1ZE.

Bill Halligan regarded Irv Vermilya in 1923 as a man who possessed a larger-than-life image among amateurs. He said that "Hiram Percy Maxim, president of the American Radio Relay League, characterized Vermilya as 'amateur number one.'" Vermilya was surely a highly respected personage in amateur circles because of the feats that he accomplished. His claims to fame and his interactions with members of the amateur commu-

nity warrant interpretation and clarification.

The contents of Bill Halligan's 1923-24 columns provide an excellent blueprint for delimiting the ten topics described above—partly because he possessed an uncanny awareness of the breadth of dramatic events transpiring in amateur radio. However, his insights into nuances foreshadowing changes were inevitably narrowed by inexperience. First, he was only 25 years old and his only previous employment had been that of a commercial, wireless telegrapher. Second, he was a politically powerless observer. He was basically an outsider standing on the perimeter looking into an incredibly dynamic universe! He had no entrée for obtaining relatively precise clues as to how and why the powerbrokers, who were influencing the future of amateur radio, were making decisions on his behalf and on behalf of amateurs generally.

Detailed accounts of occurrences, and their implications for amateur radio, fortunately, were appearing in print on the same time-frame as Halligan's columns. Notable leaders in amateur radio were writing in the pages of QST, the monthly journal of the America Radio Relay League, about (a) how they personally were affecting specific courses of action, and (b) why their decisions and methodologies were intended to benefit amateur radio. The notables or powerbrokers to whom I refer controlled the administrative structure of the American Radio Relay League. They functioned as insiders looking outward as they sought to protect the domain of amateur radio from commercial and government marauders and as they surveyed prospects for its future.

Hiram Percy Maxim and Clarence Tuska, along with several Hartford amateurs, established the League in 1914 primarily for the purpose of relaying messages by amateur radio throughout the country. Other amateur radio organizations were in nascent stages of organization at the time, but none emphasized, as well as comradeship, an important, high-demand, public service. Sending free messages swiftly across the country was a service that citizenry from all walks of life appreciated.

As amateurs flocked to join the ARRL, and to merge into the ranks of traffic handlers, the political clout of the ARRL to represent amateur interests evolved appreciably. Maxim, especially after WWI and the turmoil wrought by broadcasting, made frequent trips to Washington D. C. as a consultant to Hoover and to heads of other agencies. While Maxim served as point man for the ARRL during the early 1920s, two staffers in Hartford, performed pivotal roles in presenting in QST a detailed record of current events. Fred Schnell, 1MO, ARRL Traffic Manager, developed operational policies regarding traffic handling and contests. Kenneth B. Warner, 1BHW, ARRL Secretary, Business Manager, and significantly, Editor of QST, provided commentary ranging across every conceivable issue that faced amateur radio, from the agendas of international radio meetings to the agendas of ARRL conventions, from ARRL resolutions to government solutions for problems of broadcast program interference, etc.

More importantly, Warner's critical acumen, apprehensions, and anticipations, were clearly revealed in his treatises and essays. His outlook on matters thus became integral to each of the ten topics that I address, and I have drawn upon his discourses extensively in my efforts to interpret occurrences during 1923 and 1924.

The Reference section of the Epilogue shows that I have cited twenty-seven of Warner's essays. Moreover, I have cited him as a source of insight and information on dozens of occasions in my text. I expect that, while he was writing articles and editorials for QST, he never anticipated that more than three-quarters of a

century later his material would be scrutinized, probed, and interpreted with the intent of explaining the drama of early amateur radio. I have read and reread Warner's material, and as I developed the topics below, my rapport with the historic past of amateur radio increased immensely. I am indebted to him for the inestimable legacy that he assembled for our perusal.

Traffic Handling and Calling CQ

Bill Halligan exalted venerable operating practices among amateur operators as sacred privileges—not to be profaned in any way. Thus, he condemned violations whenever he heard them. Specifically, from July 13, 1923 to November 13, 1923, he railed in his columns at amateurs who broadcast CQs interminably. He was perturbed chiefly by operators who neglected to identify themselves for minutes on end.

Schnell (1924c, p. 20), ARRL traffic manager, was even less charitable than Halligan toward amateurs who abused the role of CQ. He mourned that "CQ has come to be regarded as a nuisance on the air." He believed that its proper use in amateur radio had been forgotten and he classified the amateurs who were using it as "DX-card Hounds." According to Schnell, CQ meant to many amateurs: "I want some DX cards . . . will somebody please answer who is at a distance greater than 2000 miles so I can tell him 'drp crd cul 73 gn.'" He worried that the meaning of CQ had sunk so low that some amateurs either avoided using it or refused to answer stations calling CQ. Others boasted that they never sent out a CQ.

Schnell (1924c, p. 20) described CQ "as a signal used to indicate that a station wishes to communicate with another station. Broadly speaking, that means the calling station has traffic for some other station." He argued that calling CQ, if done properly, could fulfill an important purpose in traffic handling.

Bouck (1923) and Dreher (1924), both of whom were astute observers of amateur-radio activity, also agreed that proper use of CQ was important in traffic handling. Both authorities, however, chose to dwell on "ability in traffic handling" as a critical prerequisite to employing CQ effectively. Bouck (1923 p. 20) suggested that every neophyte amateur join a progressive radio club, become a member of the ARRL, and learn for a year the thoughts, language, and abbreviations of amateurs. He urged that each beginning amateur become "a psychological amateur before he is one in ability!" Bouck noted that amateur activity is expanding and that experienced "amateurs are becoming less tolerant of those inexperienced ones who do not live up to their traditions." Thus, "a clumsy, faltering, twelve-words a minutes fist . . . will arouse antagonism toward the operator." He believed that amateurs should neither key up a transmitter nor consider handling traffic until they have mastered both sending and receiving at twenty words per minute.

Dreher (1924), a pioneer amateur operator, who in 1924 was engineer in charge of two major broadcast stations in New York City, WJY and WJZ, went so far as to state that an amateur transmitting license should not be issued unless a candidate can send clearly 20 words per minute. Dreher, who deplored the state of traffic handling among amateurs, said that "for every good operator among the amateurs there are, however, ten bad ones." He conceded, nonetheless, that an appreciable number of amateurs handled their keys as well as commercial operators. Perhaps, he said, the percentage of poor commercial operators is as great as the percentage of poor amateur operators, but at least, the former can be fired or have their licenses revoked by the Department of Commerce. An amateur, on the other hand, is free to send a string of CQs endlessly, and "to send the code with such misspacing and mangling of the characters that reading his traffic is simply guesswork" (Dreher,

1924, p. 296).

Schnell (1924c, p. 20) ignored the intangibles associated with code skills, largely because it was his responsibility as ARRL Traffic Manager to encourage amateurs to participate in traffic handling. He knew that many traffic handlers were inexperienced and he subscribed to the principle that "practice makes perfect." Consequently, he functioned more as mentor than critic when he described two traffic-handling scenarios in which calling CQ would be appropriate. He used a conversational approach in his commentary to give his readers the impression that he was speaking directly to each of them: The first scenario arises when "your hook is clear of traffic but that you are ready to relay messages from other stations and you want to let other stations to know that you are on the air." Schnell stated that it is necessary to listen initially and to ascertain the nature of activity underway. If stations are busy relaying messages, announce "your" presence by calling CQ three times and signing three times. Repeat the sequence three times. If no one responds, repeat the same routine in no less than 15 minutes.

The second scenario occurs when traffic is on "your hook and you wish to clear it." Schnell recommended sorting the traffic into files, for going north, east, south, and west, or by names for going to particular cities. Thus, for traffic to the north, for example, an operator should call "CQ North" three times and sign three times. The sequence may be repeated three times. Stations hearing the CQ will know that a definite request for a particular contact is being made. As Schnell's illustrations indicate, he reiterated Bill Halligan's assertion: no station should ever use the bad form of calling CQ more than three times without signing the same number of times.

[Next month, Bob continues the epilogue to Part 5...Ed.]

ER

[...Comments, from page 1]

mode of operation. There were no apparent West Coast stations participating last year and I believe it was due to the single-band (80 meters) operation. This year, 20 meters will be included, and 80 meters as well, to be used in the later evening hours.

This year's event promises to be even more popular, and the RCA Club station is going to be activated. Look for club members on 20 meters, USB, and 80 meters, LSB.

Frequencies of operation start at 14280 KHz , USB, beginning at 4 PM EST, then 8PM EST, switching frequencies to 3910 KHz, 80 meters, LSB, for the evening. Call "CQ RCA" and give your call. Non members just call "CQ RCA" and give your call to initiate a QSO. Work member and non-member stations and send your log to Mike, W2ZE. Member stations will ID with "RCA" following their call sign. Remember, this is not a contest, just a great gathering of members and non-members with common interests. SWL's may participate by listening sending logs.

For the radio/wireless industry, the RCA brings professionals together, provides educational materials, grants scholarships, promotes scientific advancement, preserves history, and recognizes excellence. Please contact the RCA if you wish to join, contribute to its scholarship funds, etc.: The Radio Club of America, Inc., 732- 842-5070.

Send logs to Mike Raide, W2ZE
21 Canandaigua St.
Shortsville, NY 14548
e-mail; mrraide@cbs.com

To Join AM International, send $2.00 to AM International, PO Box 1500, Merrimack, NH 03054. AMI is our AM orginazation and it deserves your support!

VINTAGE NETS

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

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

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

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. Informal ragchew nets meet Tuesday evening on 3805 kc at 2100 Eastern time, and Thursday on 3875 kc. West Coast 75M net is on 3895 kc 2000 Pacific time. **10M AM net starts 1800Z on 29.05 Mc Sundays, QSX 1700Z.**

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 Mike (N8ECR), with alternates. The net is all about classic 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*, 14.293 Mc, 1:15 PM EST/EDT. *Saturday*, 7280 kc, 1:00 PM EST/EDT. *Wednesday*, 14.315 Mc, 6-8:00PM EST/EDT. Control op for all nets is Duane, W8DBF.

Heathkit Net: Sunday on 14.293 Mc 2030Z right after the Vintage SSB net. Listen for W6LRG, Don.

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 on 3870 kc 3PM to 5PM winter, 5-7 PM summer, local time. 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.

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 1900Z-2030Z 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 Brian (NI6Q), Skip (K6LGL), 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

Advertising Information

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. Non-subscribers: $3.00 minimum for each ad up to 20 words. Each additional word is 25 cents. Email ads are fine.

Please call or write for display rates.

VINTAGE EQUIPMENT ONLY!

ER
PO Box 242
Bailey, Colorado 80421-0242

Telephone: 720-924-0171
FAX (call first): 303-838-3665
NEW email: 1editor2@indra.com

Deadline for the November, 2004 issue: Friday, October 30

SERVICE 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

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

FOR SALE: BC-611, $300. BC-191F w/ TU-6, TU-10, no tubes, $450. BC-625 mine detector set, no tubes, $75. SCR-543 = BC-669 w/wood chest, $750. BC-312, $125. BC-652 rcvr, $75. 2 mF 4kV = 1000 S36 WWII modified $25. I-177 tube tester, $140. Hickok 532, $140 + ship. Steve Bartkowski, 4923 W. 28 St, Cicero, IL 60804 1-708-863-3090

FOR SALE: Tektronix scopes 545 $100, 555 $150. Deluxe classics w/ modules, not tested w7isj@juno.com 520-886-3087 Box 18436, Tucson, AZ 85731

FOR SALE: Hammarlund HQ-129, restored by Bill Neeley, K7INK. Mike, KA6OIO, 225 Adlena Dr, Fullerton, CA 92833, 714-871-6665. treehuggermike@sbcglobal.net

FOR SALE: McMurdo Silver #903 Wavemeter. Pristine. Six coils, spare bulb, original packing and carton. Instruction sheet some insect damage, easily readable. $29 ppd. R. Wheaton, W5XW, 16015 White Fawn, San Antonio, TX 78255 210-695-8430.

FOR SALE: R390A EAC s/n 3507 very good stock condition, in daily use, no meters or ballast tube, manual repro included. $400 plus shipping. Carl E. Wolfe, W2IQK, Slate Hill, NY, 10973 845-355-1596, eaglewing10@juno.com

FOR SALE: Old books: Electronics and other subjects. Send SASE for list. John Martin, POB 14, Paloma, IL 62359 217-455-3003.

FOR SALE: Clean Johnson Desk KW, with desk. Pick-up only in southeast Utah. Walter Linstruth, K7AMI, 435-587-2872, wally@qnet.com

FOR SALE: Johnson Ranger I, S/N 60619, cosmetic excellent, no dings/scratches, loads up, copy of manual, price plus shipping $300. Johnson Ranger 2 manual copy, $20 shipped. Johnson 250-23-3 Matchbox with coupler and meter, copy of manual, good operation, scuffed and scratched, price shipped $125. Johnson Viking VFO with original manual $20 shipped. Heath SB-614 Station Monitor, with manual, excellent cosmetically, $135 shipped. Two D-104 mics, grip to talk, $50 ea., shipped. One 1941 Style D, D-104 mic Model E1 s/n 72898, price shipped $25. MFJ-259 SWR Analyzer freq 1.8-170 Mc $210 shipped. MFJ-912 W9INN Remote Balun Box, new in box, $40 shipped. MFJ-1312-B Transformer, new in box, $12 shipped. 40 meter dipole, 25 ft, 100 ft ladder line, new-never used, $45 shipped. Hammarlund HQ-170 receiver with matching Hammarlund speaker, clean, no dings or scratches, copy of manual, $325 shipped. John McCollum, W8VBQ, 6015 Scotch Pine Dr, Milford, OH 45150, Najomccollum@aol.com

The Collins Radio Association

Supporting the restoration and preservation of Collins Radio, now the world's largest Collins organization. Join today and receive the *Collins Journal*, bimonthly for only $20.00, now in its 11th year of publication. Help Support the CRA.

The No. 1 Collins website is still at www.collinsra.com

FOR SALE: Collins T-195/GRC-19 transmitter with cables, mic, handset, manual, tube box, mount, & ME-165/G power meter. $275. Mike Forgensi, Rocklin, CA. 916-630-0932. Pick up only please.

FOR SALE: Hallicrafters SX-101A (with 160M). Excellent condx, $200. Pick up only. Two Radio Shack model 21-527 SWR/wattmeter. One is N.I.B. $75 for both. Herman Gibbs, KD8PD, 802 W. Liberty St., Wooster, OH 44691. 330-263-2212.

FOR SALE: Collins S-Line: 32S-1, 312B-4; 75S-1; 1st year production. Bill Beard, K5WJB, 705 Sharon, Humble, TX 77338. 281-540-9866. ($1050, negotiable)

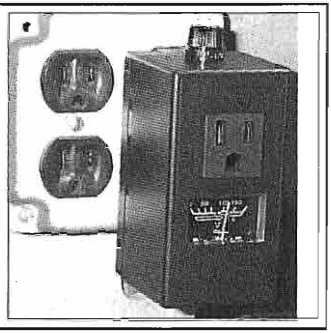
FOR SALE: James Millen Type 90651 Grid-Dip Meter $50. Heath GD-1A Grid-Dip Meter $50 + shipping. Al Jenkins, WA1RWB, 508-325-7122

FOR SALE: HRO model RAS-1 S/N 113 US Navy with 7 matched coils. Power supply and Speaker mounted on 31 inch rack cabinet. 190kc -30mc. A collector's gem, $350, pick up only. John Walsh, W3GCE, 577 1st Street, Whitehall, PA 18052. 610-264-4645.

FOR SALE: TMC SBE-2 , exciter and power supply, manual with factory addendum, in original very good condition, $22.50 shipped Jim, K4DEE, 864-855-9570 or k4deejim@ aol.com

FOR SALE: Bud chassis, one-11"x17"x2" w/bottom cover, one-11¾"x17"x3", one-13"x17"x2", one front panel 10½"x19". Make offer. John, W2PRR, 585-671-4228, jandjm130@juno.com

Inrush Current Limiters are now available from the Electric Radio store! These inrush limiters were reviewed in the September, 2004 issue of Electric Radio and are available in two versions:



ModelAB-1M (With Voltmeter) $34.95
Model AB-1 (With Pilot Light) $29.95
Priority Shipping $4.95

The Inrush Limiter provides a gentle, slow startup for your vintage equipment in the 150 watt range, and also reduce the line voltage to original design values. They come with a full money-back guarantee.

FOR SALE/TRADE: Murch UT-2000 tuner $120. Drake TR-4/AC-4 xcvr $250. RT-66/GRC xcvr $100. **WANTED INFO:** RCA/ Radiomarine T-408/URT-12/USCG. Sam KF4TXQ PO Box 161 Dadeville, AL 36853-0161 stimber@lakemartin.net 256-825-7305

FOR SALE: Tek scopes 310A, 317 and 547, letter plugins, good condition, moving - email mike46@shaw.ca Mike, VE7MMH

FOR SALE: National coil boxes; 3-hole, exact mechanical and dimensional reproductions; 1-coat water-based paint; very limited quantity. $55 ea plus $5 shipping. Kelley, W8GFG, 9010 Marquette St., St. John IN, 46373, 219-365-4730

FOR SALE: QRP transmitter kits. Step-by –step instructions. Wood model, up to 5 watts 40/80M $15. "Tunatin" one watt 40M $10. You furnish crystal and power. Robert Larson, 1325 Ridgeway, Medford, OR 97504 W7LNG@arrl.net

FOR SALE: R-390A's, R1051's, Harris RF-550's, URM-25D signal generators, military 28VDC gas generators, AS-2851 antenna kits. Call, Lots more stuff! S. Daniels, 636-343-5263

FOR SALE: 3-year old colonial home on 2 acres of land, 3,500 sq. ft. zoned for tower, finished basement with station and shop area, both wired for 120/240 volts. Near IBM in Poughkeepsie, NY. Asking price 495,000. Call Charlie, WB2ZKS, for additional details, or to arrange a visit. 845-223-8392.

FOR SALE: 100+ NPN transistors $15 postpaid. Len Gardner, 458 Two Mile Creek Rd., Tonawanda, NY, 14150. email: radiolen@att.net

FOR SALE: Electronic T/R switch, 1968 handbook, p. 571, preselector works, other function untested. $20 postpaid. Louis L. D'Antuono, 8802-Ridge Blvd., Bklyn, NY 11209. 718-748-9612 AFTER 6 PM Eastern Time.

FOR SALE: General Radio 619E Heterodyne Detector, coil drawer, cal charts, $200. Fred Clinger, 417 Beechwood Dr., Galion, OH 44833 419-468-6117 after 6 PM.

FOR SALE: General Radio lab equipment, over 250 pieces, manuals, write wants, SASE. Stuart T. Carter II, W4NHC, 680 Fernwood Dr., Melbourne, FL 32904, 321-727-3015

WANTED:

McMurdo Silver 14-15
Sargent 21-AA
Sargent 21-MA
Sargent WAC-44
Sargent 51-AK

Please contact:
Hardy Trollander
3 Aspen Court
Yellow Springs, OH 45387
937-767-4551

FOR SALE: Johnson Messenger III CB w/ mic, no pwr cord, no damage, $25. Superior tube tester, Model TW-11, oak case, roll chart needs to be refastened, @9,(condition) $45. National NC60B (NC60 Special) no cabinet damage, all original, plays, dial string broke, $50. Hallicrafters, A5R10A, needs recapping, static, a/o ("All Original"), $40.Bernie Samek, 113 Old Palmer Rd., Brimfield MA, 01010, 413-245-7174, FAX 0441. Bernie@samnet.net

FOR SALE: National Plate Chokes, NOS: R-152, $25, R-154, $14, R-154U, $14; Drake W-4 Wattmeter, $70. Richard Prester, 131 Ridge Road, West Milford, NJ 07480. 973-728-2454. rprester@warwick.net

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

feltondesign@yahoo.com

FOR SALE: FT243 Crystals: 1815, 1822, 1885, 1945, 1985, 3535, 3560, 3579, 3875, 3880, 3885, 3890, 7035, 7045, 7050, 7143, 7280, 7285, 7290, 7293, 7295, 8400, 10106, 14286 kHz. Many others available. See list at: http://www.af4k.com/crystals.htm or call Brian, AF4K on 407-323-4178

Mil-Spec Communications
R-390, R-390A, R-388 & Other Military Receivers
Sales - Service -Manuals - Parts
Box 633, Englewood, FL 34295-0633
Please call us at: 941-474-6818
FAX: 941-474-7874
milspec39Ø@aol.com
"Since 1985"

REPAIR!: Radio repair reasonable charges. Manuals for sale. I buy Radios. J. Dan Rupe 998 Whipple Ave, Grayland, WA 98547 360-267-4011 W7ddf@yahoo.com

PARTS FOR SALE: Request free vintage flyer. USA only. 50 years of mail order electronics. Bigelow Electronics, POB 125, Bluffton, OH 45817-0125

FOR SALE: Countermeasures receiving set AN/WLR-1D, 50-10750 MHz, 9 bands, simultaneous display of frequency, spectrum, and modulation info on dual displays, manual, 1200 lbs., $4,500. Carl Bloom, 714-639-1679, carl.bloom@prodigy.net

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

FOR SALE: Radar Analyzer TS-1019/APR-72a. Excellent condition. Gary, 952-496-3794, K7ADF@aol.com

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

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

REFURBISHED TEST EQUIPMENT
DC-26GHZ Bought and Sold
A-Comm Electronics
303-770-4855 303-770-6266 Fax
Sales List: http://www.a-comm.com

TUBES FOR SALE: Tested good globe 201A $14, 226 $15, 227 $10 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

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

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

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

JOHNSON PARTS 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

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

BOOKS FOR SALE: Used technical books: radio, electronics, math, military, magazines, etc. List: $1 (stamps OK). Softwave, 2 Dept. ER, 1515 Sashabaw, Ortonville, MI 48462

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

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

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

TUBES FOR SALE/TRADE: Transmitting/Receiving tubes, new & used. $0.55 & LSASE for list. I collect old & unique tubes of any type. **TUBES WANTED:** Taylor and Heintz-Kaufman types and large tubes from the old Eimac line; 152T through 2000T for display. John H. Walker Jr., 13406 W. 128th Terr. Overland Park, KS 66213. PH: 913-782-6455, Email: jhwalker@prodigy.net

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

MISC FOR SALE: Vintage equipment at the K8CX Ham Gallery Classified Ads section. Visit the largest Antique QSL Card Gallery http:/ /hamgallery.com

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

PARTS FOR SALE: Strong steatite antenna insulators. Lengths from two to fifteen inches. SASE for list. John Etter, W2ER, 16 Fairline Dr., East Quogue, NY 11942. 631-653-5350

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

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

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

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

SERVICE 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

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

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

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

TUBES 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

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

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

PARTS FOR SALE: Ships radio room clock repros, boatanchor mugs and t-shirts, more. http://www.cafeshops.com/amradio,amradio2 1-877-809-1659

COLLINS PARTS FOR SALE: Collins reproduction items available through the CRA on www.collinsra.com. Join the CRA and subscribe to the Collins Journal. Dave, W3ST

SERVICE 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

SERVICE 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, w4pnt@highspeedlink.net

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

WANTED: Hallicrafters HT-40 transmitter. Must be mint, original knobs, no scratches. Prefer factory assembled. Bob, KD9GI, 1095 Ingram Rd. Rockford,IL 61108. KD9GI@MSN.COM

WANTED: WW1 and early 20's hi-end sets and lit for same: IP 500/143; SE 1420/501; 950, 1950; National 239; Marconi 106; Kennedy 110, 220; Grebe CR 18. Also amps: SE 1000; Kennedy 525; similar. Want to buy: Grid dip meter to read low frequencies; knobs: Westinghouse RA/DA type, 1", also 1 & 3/8". Have Federal RFT's and AFT's for type 61 for trade. Aslo, trade radios, what-have-you or cash. Always looking for vintage broadcast mics and tube compressors, pre-amps, by RCA, Sony, Western Electric, etc...WW II era spy radios and related stuff. E-mail best way to contact, but if you use telephone, don't be bashful, leave a message! Ward Kremer, 1179 Petunia Rd., Newport, TN 37821; Ph/Fax: 423-625-1994, email: witzend99@earthlink.net

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

WANTED: A few 1945-46-47 CQ's. Richard Petersen, 1940 Grand Ave, Marion, IA. 319-377-9126, dottielee526@juno.com

WANTED: RF-301, RF-301A, RT-902/GRC-165, complete or for parts. davidwbr549@yahoo.com

WANTED: Sonar CB transceiver model J23 mobile set. Ed, WA7DAX, 1649 E. Stratford Ave., Salt Lake City, UT 84106. 801-484-5853

WANTED: Two ceramic tube sockets, two plate caps for the 701A. Phil Whitehouse, PO. Box 527, Hampden, ME 04444 w1gee@yahoo.com

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: TCS & TBY Navy radios. Ken Kolthoff, K8AXH, PO Box 215, Craig, MO 64437. Work #913-577-8422.

WANTED: Yaesu FTDX-570, clean ART 13, Frank, KBØW. 916-635-4994; fdellechaie@sbcglobal.net.

WANTED: CE 600-L, Hallicrafters HA-20, P-2000, SR-400A, anyting Eldico. Dennis Gehrke, KC7VXD 208-333-8711 kwmssb@cableone.net

WANTED: Teletype Model 28 Compact, UCG-20 or 25. CQ Anthology 1, CQ Anthology 2, AWA Review 1, 3, 4, 9, 12. George Rancort, K1ANX, 82 White Loaf Rd, Southampton, MA, 01073. 413-527-4304

WANTED: PYE, Fairchild, Syncron,Langevin. Richard P. Robinson, PO Box 291666, LA CA 90029 323-839-7293 richmix@erols.com

WANTED: ARC-5 rcvrs, racks, dynamotors. Jim Hebert, 900 N. San Marcos Dr. Lot 15, Apache Junction, AZ 85220

WANTED: For SCR-178 Generator GN-37, Insulator IN-85, Lamp LM-18, Insulator mounts, leg supports, other parts. Robert Forte 518-696-2400, rvforte@frontiernet.net

WANTED: Audio amplifiers, tubes. 6V6 or similar, condition not critical. Bogen DB-110s lost your phone, address. Charles Graham, 914-666-4523. 4 Fieldwood Dr., Bedford Hills, NY 10507

WANTED: RCA communications receivers, ACR-175, ACR-111, CR-88, AR-8516, CRM-R6A, SRR-13. Dan Gutowski, 9753 Easton Rd, Dexter MI, 48130. 734-718-7450, dg16ms26@msn.com

WANTED: A Collins R-389 LF rcvr to complete my SWL shack. Have quality trades/pay cash. Dan Gutowski, 9753 Easton Rd, Dexter MI, 48130. 734-718-7450, dg16ms26@msn.com

WANTED: Scott Special Communications rcvr. EA4JL, please call Kurt Keller, CT, 203-431-9740, k2112@earthlink.net

WANTED: Technical Materials Corp. model DCU combiner, DVM monitor, LPP patch panel, LSP speaker, DCP power panel VOX V.F.O., CFA converter, and PSP-1 power sply. K8CCV, Box 210, Leetonia, OH 44431-0231, 330-427-2303.

WANTED: ANY Harvey-Wells speaker, aircraft unit, or military surplus component. Will answer all. Kelley, W8GFG, 9010 Marquette St., St. John IN, 46373, 219-365-4730

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

WANTED: Collins 310B-3, basket case OK, 70E-8A PTO per 1948. Chicago CMS-2, pair of Taylor T-21. Jerry, W8GED, CO, 303-979-2323.

WANTED: James Millen coils 42080, 42040, 42015, 43015. Navy SE2511/SE2512 rcvr, SE2513 coil set. Gary Carter, WA4IAM, 1405 Sherwood Drive, Reidsville, NC 27320. Phone: 336-349-1991. Email: gcarter01@triad.rr.com.

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

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

WANTED: QSL card from my Grandfather, W9QLY, from before 1957. Also seeking original National Company logos from Ham or military equipment. Don Barsema, KC8WBN, 1458 Byron SE, Grand Rapids, MI 46606. 616-451-9874. dbarsema@prodigy.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!
Add $5.95 each for the first two videos for shipping and handling in the USA, additional videos are shipped free.

Produced by Floyd Soo, W8RO (ex-KF8AT)

ER BOOKSTORE, PO BOX 242, BAILEY COLORADO, 80421-0242
Now Available on-line at WWW.ERMAG.COM

WANTED: Top prices paid for globe shape radio tubes, new or used. Send for buy list or send your list for offers. Write or 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

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

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: 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: 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: Looking for information on radio and radar equipment aboard the Navy PB4Y-1. Warren, K1BOX, NC, 828-688-1922, k1box@arrl.net

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

WANTED: Books about flight simulators, aircraft instruments, panel meters, or tube computers. Chris Cross, POB 94, McConnell, IL 61050.

WANTED: JOHNSON RANGER CABS & or BEZELS. Or the whole cab set. Dee Almquist, W4PNT 540-249-3161 (msg). Cell: 540-480-7179 Virginia. Willing to trade. w4pnt@highspeedlink.net

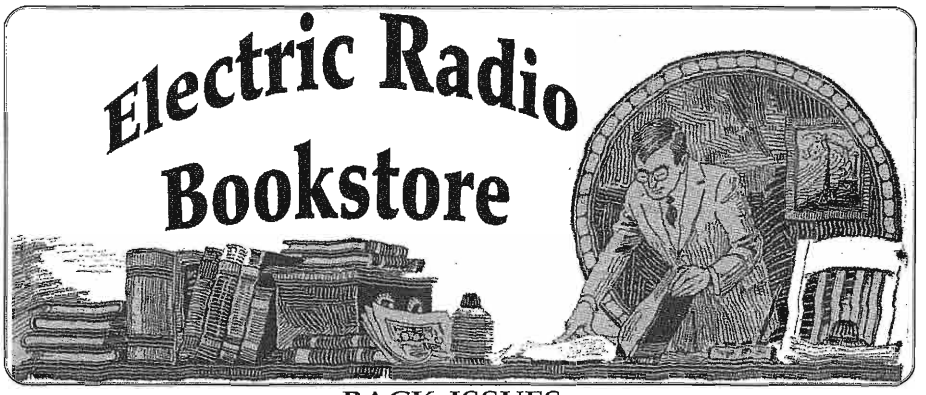
WANTED: Westinghouse MW-2 Transmitter (RF Unit, Modulator, Power Supply, Coils, Transformers, Parts). Will pickup anywhere. Gary, WA4ODY, Seabrook, TX. 281-291-7701, myctpab@earthlink.net

WANTED: Unmodified, good condition, Heath AT-1, VF-1, AC-1, Hallicrafters S38D, 5R50, 51,52, Tom Root, wb8uuj@arrl.net, 810-659-5404

WANTED: *Coils Forms for National FB-7 and preselector.* Mike Sanders, 18169 Hwy 174, MT Vernon, MO 65712-9171 k0az@arrl.net

WANTED: Regenerative ham receiver from the early 20's; 110VAC electric motor from the teens or 20's about 1/8th hp and 3400 rpm or thereabouts; early glass plate condenser. Gary, WA9MZU, 209- 286-0931 or email ghal@ix.netcom.com.

NOTICE: Expert HRO-500 alignment done with modern test equipment (HP, TEK, etc.) www.nortrex.net or nortrex@bigplanet.com. Ph. 650-529-9180



BACK ISSUES

All Electric Radio back issues are available at **$38.00 per year** (or any 12 issues), or **$3.75 for single** copies. Buy the entire run of Electric Radio from #1 for **$375,** a 55% discount. **Special deal on any four years (or any 48 issues): $100.00.** These prices *include* delivery by media mail in the USA. Foreign orders please inquire for shipping rates.

COMPENDIUMS

Collins 75A-4 Modification Compendium: All the factory modification bulletins from Collins Radio Co., and all the articles printed in CQ, Ham Radio, QST and ER over the last 45 years, 85 pages, **$20.00 plus $4.00 S&H.**

Collins S-Line, KWM-1, KWM-2, KWM-2A Service Modification Compendium: 260 pages, **$45.00 plus $5.00 S&H.**

Collins KWS-1, 32V series, and 75A series (A1 thru A-3): 42 pages, $15.00 plus **$4.00 S&H**

BOOKS

A. Atwater Kent, The Man, the Manufacturer and His Radios: This 108 page paperbound book describes Atwater Kent's biography, and his rise from a saleman and inventor of electrical equipment to become one of America's foremost radio manufacturers and a household name. There are historic photographs and diagrams on nearly every page, and color plates with vintage AK advertising, by Ralph Williams and John P. Wolkonowic. **-- $25.95 - 10% = $23.35**

A Pictorial History of Collins Amateur Radio Products: Jay Miller's (KK5IM) classic volume describes the amateur radio products produced by the Collins Radio Company. It has high-quality historic photographs on nearly every page, and the text is backed up by Miller's personal research. ---------- **$39.95 - 10% = $35.95**

A Family Affair, The R.L. Drake Story: The complete story of the R.L. Drake story, as told by John Loughmiller, KB9AT. 273 pages all about the history of the company, product descriptions, technical repair tips, and great shack photos make a must-have volume for Drake users and collectors. ---------- **29.95-10% = $26.95**

Arthur Collins, Radio Wizard: 394 pages by Ben Stearns tell Arthur Collins biography from his early years until retirement. Stearns is a professional journalist and was employed by Collins from 1962 to 1977. Many historic photographs and stories from former employees.
---------- **$18.95-10% = $17.05**

Miller's Collecting Science and Technology: 160 pages of high-quality color photographs from museum collections make this hardback volume an excellent introduction to this new collecting field. Written by Lindsay Sterling ---------- **$29.95-10% = $26.95**

Communications Receivers, The Vacuum Tube Era: 1932-1981: This is the classic136 page volume that has much invaluable information about vintage receivers in one handy volume. By Raymond S. Moore, 4th edition ---------- **$19.95-10% = $17.95**

NEW! **Heathkit, A Guide to Amateur Radio Products:** This is the new revised second edition including some 30 additional products, a tube chart, sales data, a separate ER article index, a completely new introduction, and a new section devoted to Heath's CB equipment. The book is 75 pages larger than the original. By Chuck Penson, WA7ZZW----------**$29.95-10% = $26.95**

Heath Nostalgia: Written by Terry Perdue, K8TP, an ex-Heath employee, this 124-page book is a great history of Heath and the Heathkits that we all remember. ---- **$14.95-10% = $13.45**

SPECIAL DEAL! Heath Nostalgia *and* Heathkit, The Early Years CD both by Terry Perdue
---------- **$27.00**

Heathkit, The Early Years CD: By Terry Perdue, high quality scans of documentation from

Heath publications, plus a voice recording of Gene Fiebich. ----------**$18.95 - 10% = $17.05**

Hiram Percy Maxim: Published by Electric Radio, this is the complete biography of HPM, the famous founder of ARRL, by Alice Clink Schumacher, 216 pages. ----- **$19.95-10% = $17.95**

The Collector's Vacuum Tube Handbook: This is a 205 page book that is full of unique, hard-to-find information on tube types that were released before 1934. Includes company histories and good photos. ---------- **$25.95-10% = $23.35**

Radio-Craft: 50 Years of Radio by Gernsback: This is a high-quality reprint of the March 1938 edition of Radio-Craft magazine and is about the first 50 years of radio, and contains hundreds of vintage advertisements. ---------- **$15.95-10% = $14.35**

Radios by Hallicrafters : High-Quality photos, descriptions, approximate values, and short histories of nearly everything made by Hallicrafters. By Chuck Dachis -- **$29.95-10% = $26.95**

Radio Tubes and Boxes of the 1920s by Fathauer: If you appreciate the rare and colorful vacuum tubes and advertising art from the early days of radio, then this great 104-page book will be very interesting and informative. ---------- **$26.95-10% = $24.95**

Shortwave Receivers Past and Present, Communications Receivers 1942-1997, 3rd edition:
NOTE: This volume is out of stock and out of print until 2005. Fred Osterman is working on the 4th edition. The ER bookstore will carry it when it becomes available.

The All-American Five Radio: Although this book is about classic American 5-tube broadcast receivers, it also contains a wealth of accurate information on vacuum tube receivers, proper trouble-shooting, and alignment and is recommended for experienced repairmen and novices alike. 92 pages by Richard McWhorter ---------- **$21.95 - 10% = $19.75**

Transmitters, Exciters & Power Amplifiers : This is the companion volume to Moore's communication receiver book, by Raymond S. Moore, 144 pages. ---------- **$21.95-10% = $19.75**

Tube Lore : This is one of the best vacuum tube reference books ever published. All types of information is included, such as tube date code information and production history. 173 pages by Ludwell Sibley ---------- **$16.95-10% = $15.25**

Tube Testers and Classic Electronic Test Gear:Written by Alan Douglas, a retired engineer, the bookis packed full of valuable information about test equipment, including hard to find calibration data. 166 pages. ---------- **$29.95-10% = $23.35**

NEW! **Vintage Anthology, Revised Edition**: by Dave Ishmael, WA6VVL, is a revised and updated version of Dave's popular book. 209 pages of great information especially valuable to radio builders. ---------- **$21.95 - 10% = $19.75**

Zenith, The Glory Years, 1936 to 1945: 244 high-quality pages all about classic Zenith radios. Hundreds of high-quality color photos, and history from the Zenith company archives, never before available. If you like beautiful Zenith consoles, you will like this book! by Cones, Bryant, and Blakenship ---------- **$34.95 - 10% = $31.45**

Zenith, The Glory Years, 1936 to 1945, Illustrated Catalog and Database: A companion volume to "The Glory Years," this one has 151 pages of reproduced Zenith advertising and full serial number, chassis number, and production data that has never before been available in one reference manual, or to the public. 151 pages by Cones, Bryant, and Blankenship.
---------- **$29.95 - 10% = $26.95**

Four or more books are shipped free for US or Canadian orders!

Please add $4.00 shipping and handling for one book and $1.00 for each additional book

T-Shirts

The front displays the logo from the cover of ER (the tube logo, Electric Radio, and "celebrating a bygone era"). The back has "Real Radios Glow in the Dark" (used with the permission of Classic Radio). The T-shirts are 100% cotton and come in Small, Large, X-Large, XX-Large. The color is slightly lighter than the cover of ER. $15.00 delivered, $16.00 for XXL.

NEW! Lightning Guard 100V by Electronic Specialty Products is now available by mail order from the ER Bookstore or at www.ermag.com for $80.00 plus $8.00 shipping by priority US mail.

Electric Radio, PO Box 242, Bailey, CO. 80421 720-924-0171 or now on-line at:
WWW.ERMAG.COM

Announcing the Felton Electronic Services R390F High Performance HF Receiver

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

Audio: 2 watts hi-fi audio, low-distortion Class A stages with all low-level stages reworked for lowest distortion and noise. Three new audio filters are front-panel selectable: 4 kc LP, voice only 250-2700 cps, or CW at 250 cps BW.

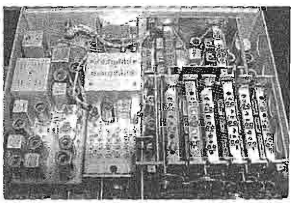
Enhanced sensitivity and large signal handling: This includes installation of a new 6BZ6 RF amplifier and a linear diode detector. Minimum discernable signal is at least -145 dbm.

All-new AGC system: No overshoot, pumping or distortion. Many advanced features, characteristics are optimized for AM and CW-SSB.

Line audio channel reworked to drive your low-impedance headphones through a stereo panel-mounted headphone jack.

Hand-selected Eminence loudspeaker for precisely defined music and voice.

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



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

Subscription Information

Published Monthly

Rates within the US:

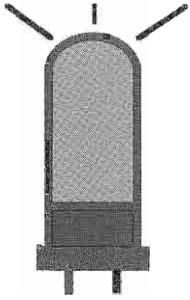
1st Class: $42 (mailed in envelope)
2nd Class: $32

Rates outside the US, by airmail only:

Canada : US $48
All other countries: US $60

The Electric Radio mailing date is posted monthly at www.ermag.com

Electric Radio
PO Box 242
Bailey, Colorado 80421-0242
Office Hours: 9:00 AM to 5:00 PM MT, Monday to Saturday
Subscriptions and renewals may now be purchased on-line at WWW.ERMAG.COM
Visa, Mastercard and American Express, PayPal
Telephone: 720-924-0171
FAX Line: 303-838-3665
email: 1editor2@indra.com



Electric Radio
PO Box 242
Bailey CO
80421-0242

PERIODICAL

TO: