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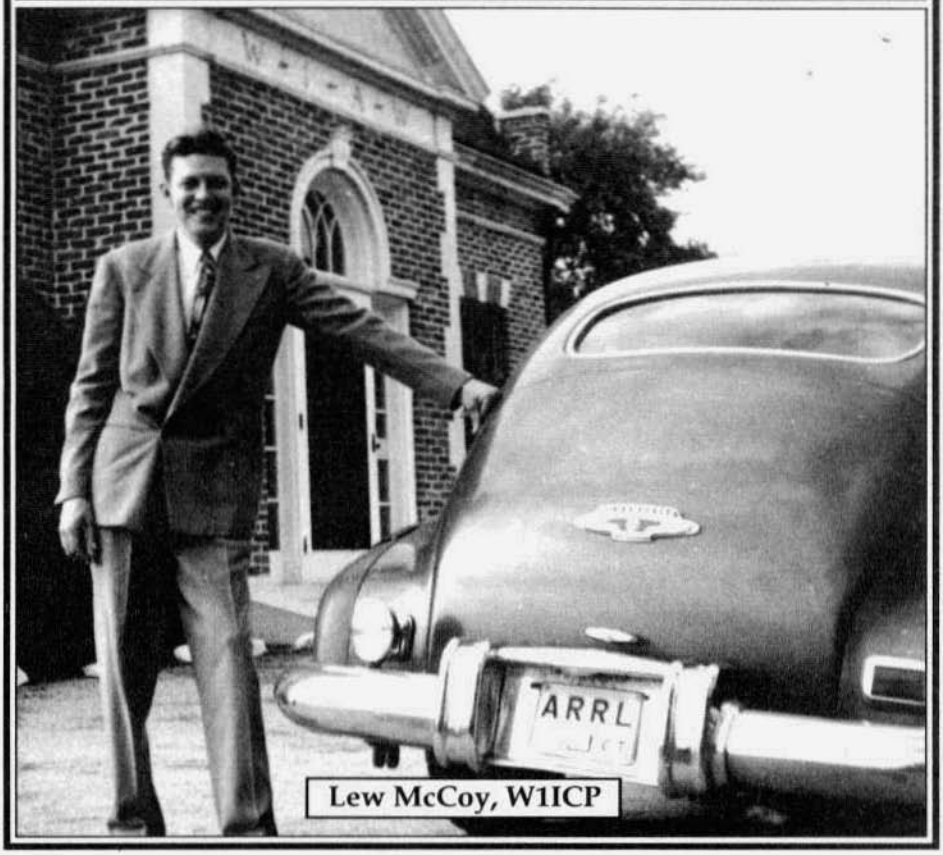
ELECTRIC RADIO

celebrating a bygone era

Number 100 August 1997



Lew McCoy, W1ICP

ELECTRIC RADIO

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Electric Radio is published primarily for those who appreciate vintage gear and those who are interested in the 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/operating with an emphasis on AM, but articles on CW and SSB are also needed. Photos of hams in their hamshacks are always appreciated. We invite those interested in writing for ER to write or call.

Regular contributors include:

Walt Hutchens, KJ4KV; Bill Kleronomos, KDØHG; Ray Osterwald, NØDMS; Dave Ishmael, WA6VVL; Jim Hanlon, W8KGI; Chuck Penson, WA7ZZE; Dennis Petrich, KØEOO; Bob Dennison, W2HBE; Dale Gagnon, KW1I; Rob Brownstein, K6RB; Don Meadows, N6DM; Lew McCoy, W1ICP; Kurt Miska, N8WGW; Warren Bruene, W5OLY; Brian Harris, WA5UEK and others.

EDITOR'S COMMENTS

This month we hit another milestone - issue number 100. It's fun for Shirley and me to think back to how it was in the beginning. It was truly a great adventure. How wonderful it was that we could be brave enough (or naive enough) to think that we could start a magazine. We had very little money (and that's the most vital ingredient if you're starting a magazine) and absolutely no experience. Looking back now I can see that what we had was a recipe for disaster. But we persisted. That's what we should get credit for - pure persistence. And gradually because so many good contributing writers came to ER and our subscribers were so loyal we became successful. Success for us has meant being able to go on and to make a living at what we like to do. I think that's something everyone should shoot for. We've achieved that and we're very thankful.

Documenting history - that's something that I'm proud of too. Last month (July 8) Lee Faber, W7EH, passed away. In order to put together an obituary (see page 9) I reviewed the 6-part article I did on him starting with issue Number 37, May 1992. It wasn't a bad article, in fact, I think that that article will remain the definitive history of that man. Maybe other magazines could have done it better, but they didn't. ER did and I'm proud of that. A hundred years, or a thousand years from now that history will be still be available to be enjoyed by 'vintage enthusiasts'. Lee Faber and ER will live on.

Our plans for the next 100 issues are to just keep doing what we've been doing; but hopefully we'll be doing it better. We have no shortage of good contributing writers and our list of loyal subscribers just keeps growing. Our energy hasn't waned either and we're young enough to be here in 2005 for issue Number 200. I hope we can make it. N6CSW

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Looking Back

by Lew McCoy, W1ICP
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I have received many nice letters about my column here in Electric Radio and I want to tell my readers I really appreciate the kind words. I have to say it is a fun thing to think back to those 'good old days'. In any event, I received an absolutely charming letter and it brought back many memories to me. The letter was so good I called the writer and asked him if I could use it for my column. I am sure that many of you remember Harv Adams, W1YJ and his recollections are worth passing on. So here goes the letter in its entirety. I hope you all enjoy it as much as I did. W1ICP

240 Skysail Road
Salisbury, NC 28146-9481
6-26-97

Mr. Lew McCoy, W1ICP
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Silver City, NM 88061

Dear Lew,

Your March Electric Radio column "Looking Back" perhaps should be retitled "Carry Me Back", because that's what it does, in grand style. As a former Nutmegger with 63 years in Hamdom, the mere mention of those league personalities conjures instant images of earlier times that formed and supported our marvelous hobby. It's a heritage obviously focused by ARRL and QST. In the past I've rubbed shoulders briefly with a couple of the league personalities and thought you might enjoy a few more kernels of info.

But first, due to your prompting, allow me to digress into my pool of school

W1ICP in 1950.

boy memoirs and fondly remember some of the typical neighborhood hams that influenced me. At a recent flea market a fellow was selling old QSL cards. As I leafed through the pack, out popped one W8IVA from the town of Butler, PA, where I was born and lived until 1934. His license was new at the time and a few of us prospective young squirts were privy to his exciting first contacts and homebrew triumphs. Others from the local walks of life were: W8OE, a prominent dentist; W8EPZ, a crane operator at the ARMCO steelmill; W8KTY, a newly-licensed black man named Davey Jones who was a career doorman/porter at the town's Willard Hotel; W8IZW (late W5CX), my schoolmate chum whose shoulder I peered over as he put together his first HB super. His push-pull 210's final amp always lit up the nearby porch light. Would you believe a contraband, loop-modulated oscillator (for test purposes, of course)?

Chuck, W8EPZ, was a special case. He lived down the block and had, literally, an honest-to-God outdoor, tar-paper ham shack in his backyard, complete with potbelly stove and Zepp feeders. (For a suitable likeness, see April 1930 QST cartoon cover by Gil, W1CJD.) One day I watched it burn down, feeder spreaders blazing, but he salvaged

enough charred boards to rebuild, size reduced. We continued to sit around the same potbelly and listen to him churn the air with his peculiar 40M swinging CQ. He always sent V after CQ, never DE. "Looking Back" must take the blame for renewing that glowing aura! Whoops! I'm getting deviated by the early nostalgics.

(At that point, I had second thoughts on this letter and laid it aside. But then your latest June ER column again tweaked my excitation level - all those league names....)

To resume, in 1934 my family moved to Baltimore where I immediately became W3EMD. Then on to Penn State as a freshman EE in '36. There my first look into the broader life was the college amateur radio station, W8YA. It was nothing short of heaven to this green kid. It featured its own building (next to the power plant) surrounded by three huge oil-derrick, wooden antenna towers in a triangular layout, with three single-wire-fed dipoles strung between them. Strictly postcard. A railroad siding ran next to the towers, and when the smoke from a passing steam locomotive (hauling coal to the power plant) passed up thru the wires, we got static discharge across our lead-in ground switches.

Inside were more unbelievables. Three separate rigs, one each for 20-40-80, hung on the wall above the operating table. All were vertical breadboards with their HV connections frighteningly exposed. I had never seen anything like it. The awesome finals for 40 & 80 were horizontally-mounted 204-A's, with an 852 serving for 20. Rx was an FB-7, later upgraded to the newly-introduced NC-101X (station ops had to chip in to help pay for this one). In a separate room at one end of the shack was the HV MG set, and I can still hear its lovely whine. The set was abruptly braked to a halt when the rig was turned off.

Beyond a partition at the other end was our crystal grinding area, complete with muck saw to produce the blanks. In 1936, being able to grind your own xtal was a big thing. Making an 80M rock was relatively easy, but producing a good 40M xtal called for patient grinding skills on the glass plates flooded with abrasive slurry. Keeping these thin 40M wafers oscillating as you ground down to the desired frequency was pure trauma. If you "slid by" there was no return. During this process we had a small, low-power test oscillator right at the grinding table to check xtal activity. Once we used it to play a prank on one of our more "gullible" members. He was calling CQ in the next room and my friend and I got the mean idea to answer him with a fake DX call from the test oscillator. He bit and never got suspicious, and enjoyed a few days of notoriety for working 'China'. Sheepishly, my cohort and I relented before things got too far out of hand.

The chairs in the shack were oak, straight-back castoffs. Diabolically, one of them was specially rigged with a Ford spark coil and battery hidden beneath the seat, embedded in which were two finishing nails (barely noticeable to the unknown) connected to the coil. A pendulum arrangement energized the coil whenever an unsuspecting occupant leaned backward. Ops wised up right away, always taking pains to avoid pulling the 'hot chair' up to the operating table. Anyone neglectful enough to be sitting in that no-no at the operating position was liable to experience "turn-on" by a brother ham's innocuous jiggle of the pendulum with a yardstick from behind. Most of us, in our languid moments, never completely escaped this blatant camaraderie.

Before a new op could gain unlimited access to this wireless mecca he had to demonstrate satisfactory prowess in tuning the rigs, switching procedures, connecting patch board cables, etc. Once qualified, he would be given a key to

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ELECTRIC RADIO IN UNIFORM

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The BC-441 Transmitter Receiver

At the outbreak of WW II a frantic call went out for civilian sets already in production which could be quickly adapted for military use. Probably the most well known example here is the Hallicrafters HT-4 which became the famous BC-610 (albeit with some serious ruggedizing upgrades). This article will cover another Hallicrafters product which was also drafted into the War effort, the HT-12 which served as the BC-441, the major component of Radio Set SCR-281.

Description

The BC-441 is an AM radiotelephone transmitter and receiver which was designed for operation on coastal and harbor vessels or in land stations for communication with such vessels. The set consists of a transmitter, receiver and shared power supply housed in a single 16 X 16 X 10 in. (HWD) cabinet. A Western Electric handset and cradle are mounted on the LH side and a speaker is included on the front panel (see Fig. 1). The unit weighs in at a hefty 98 lbs. The BC-441 along with the attached handset, mounting brackets, crystals and tubes (installed and spares) made up the complete SCR-281.

Frequency coverage is 1700 to 2700 kHz. Four crystal controlled send/receive channels may be switch selected within this range, and the receiver can provide continuous tuning coverage as well. Primary power requirements are 115VAC, 60-cycle at 5 amps and power output is approximately 25 watts.

The receiver is a six tube superheterodyne covering 1700 to 2700 kHz in a single band. A 6K7 RF amplifier is followed by a 6L7 mixer stage. A separate 6C5 local oscillator is included which may be either crystal controlled or continuously tuned (see above). A single 385 kHz if stage (6K7) is followed by a 6Q7 AVC-detector-first audio stage followed, in turn, by a 6K6 second audio amplifier. BFO and noise limiter circuits are not included. Circuitry is conventional for the period (late 1930s) except for the somewhat unusual IF frequency and an involved AVC system that applies control bias to the first audio tube as well as to the RF and IF stages. These two features were carried over into the successor BC-669 system (see below and Note 1).

Front panel receiver controls are minimal and include only tuning and volume along with crystal/manual and speaker on/off switches. There is no separate RF gain control and the AVC circuit is always engaged.

The transmitter RF section consists of an 807 crystal oscillator driving two more 807s in parallel. The shunt fed amplifier tank and loading circuit consists of a single, large vertically mounted coil surrounded by an assembly of eight sliding contacts each of which can tap any turn on the coil (see Fig. 2). Four of these are labeled as "P" slides and serve to select the total tank inductance for each crystal controlled frequency chan-

Fig. 1. Author's BC-441D. The large dial is RECEIVER TUNING. The three knobs in a row below this are (L-R) CRYSTAL SELECTOR (4 pos.), receiver CRYSTAL/MANUAL switch, and receiver VOLUME. The power on-off switch is on the left side of the front panel and speaker on-off is on the left. The four transmitter tuning capacitors are behind the fold-down door on the left, and the PA CURRENT milliammeter is lower right.

nel. These slides are connected to the amplifier plate circuit through one section of the Crystal Selector switch on the front panel of the unit (see above). Another section of this switch selects a screwdriver adjusted tuning capacitor, one for each channel. These capacitors are 100 pF each and an additional fixed 100 pF shunt capacitor is included on all channels. The remaining four "A" slides provide the antenna tap for each frequency and are connected to the output connector through another section of the Crystal Selector switch and the antenna change-over relay.

The transmitting and receiving crystals are mounted in large, three pin holders similar in appearance to those used in the TCS equipment. The BC-441 holders, however, each mount two crystals, one for the transmitter and another offset by 385 kHz for the receiver. This offset may be either higher or lower than the transmitting frequency. Sockets are provided for four holders (see Fig. 2.). The receive/transmit crystal pairs are selected by the "Crystal Selector" switch on the front panel which performs a number of other functions as well, see above. In the crystal controlled mode the receiver tuning dial must also be set to the selected frequency (i.e., tuned for maximum noise).

The transmitter final amplifier is plate

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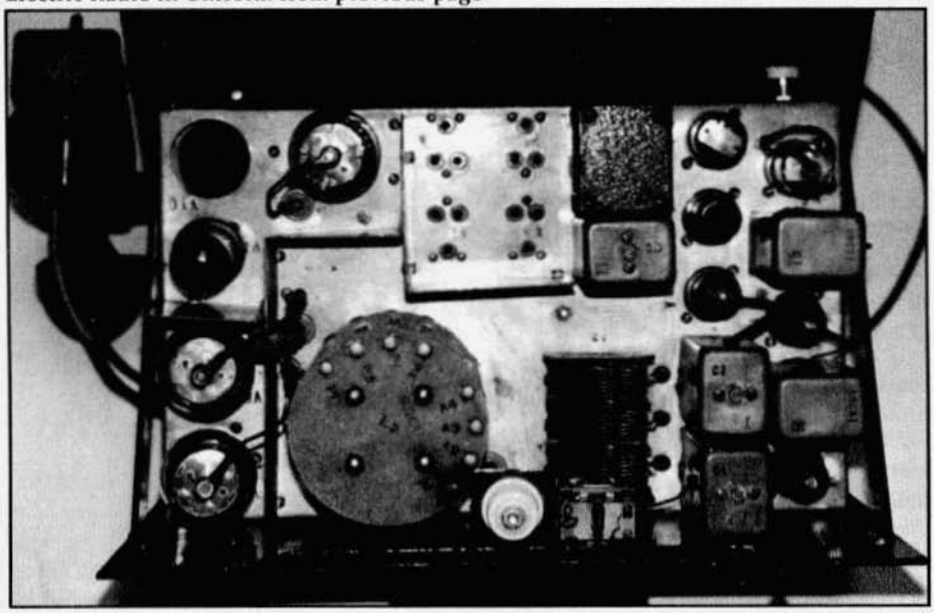

Fig. 2. Top view of the main chassis. The transmitter section is on the right and the receiver is on the left. The four crystal sockets can be seen center rear. The PA 807s and tank coil with its sliding contacts are on the right next to the front panel.

modulated by a pair of 6L6 tubes operating AB1. The p-p modulator grids are driven by the carbon microphone in the handset directly through a step-up transformer. Bias for the carbon mic is tapped off the cathode resistor for the 6L6s.

The transmitter and receiver share a common power supply. A single plate transformer provides both 220VDC for the receiver and 460VDC for the transmitter side. This is done by the send/rec. relay which switches between taps on the primary of the plate transformer, i.e., to a higher step-up ratio when in the transmit mode. A second set of contacts switch the B+ between the transmitter and receiver. A separate transformer provides 5VAC for the two 5Z3 rectifiers and 6.3VAC for the rest of the tubes in the set.

The "push-to-talk" button on the handset first energizes a DC relay which, in turn, energizes the 115VAC coils of the B+ control relay described above and the antenna switching relay.

A power on/off switch is provided on the front panel and an interlock switch disables the B+ supply when the cabinet is opened. Primary fuses on both sides of the AC line are mounted in a pair of clip holders on the power supply chassis.

All transmitter and receiver components are attached to the front panel of the set, which is hinged at the bottom and folds outward to provide internal access (see Figs. 2 and 3). Power supply components are on a separate chassis mounted in the bottom of the cabinet. All cabinet and chassis metalwork in this set is heavy gage steel. The cabinet is not splash or dust proof and the unit would appear to have been intended for use in protected environments only.

The manual recommends use of a single wire end fed antenna. The optimum length is listed as being 85 ft.

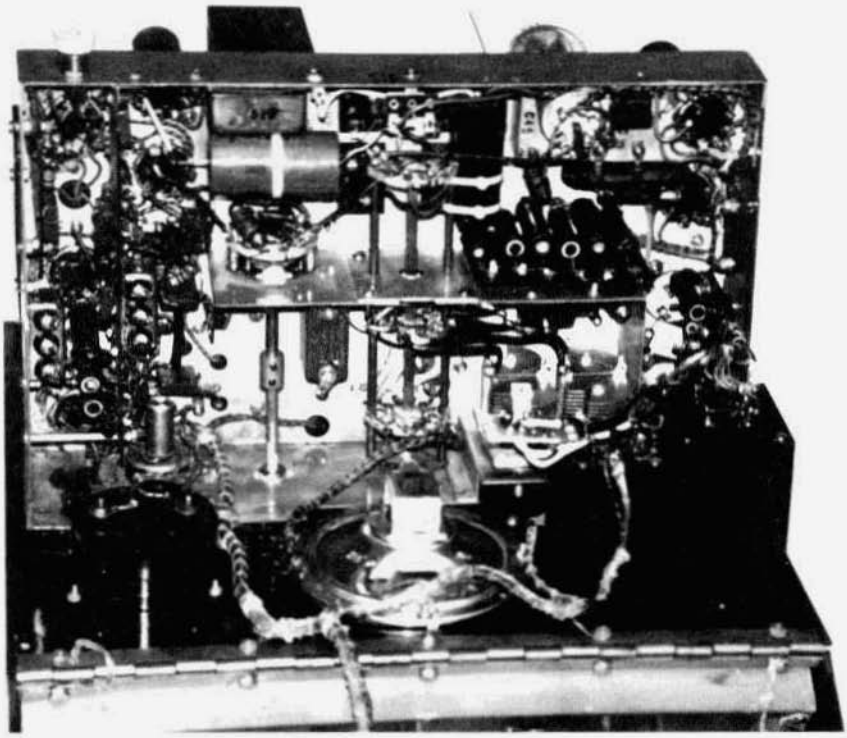

Fig. 3. Under-chassis view. The modulation transformer is the black box on the right

including the lead-in. For land installations, a water pipe ground or 6-8 ft. driven rod was recommended. An auxiliary antenna tuning unit, the BC-619A was also provided to match the output of the 441 to a 34-35 ft. whip antenna (AN-44-A or equivalent). The tuning unit operated on any one of four frequencies within the 1700 - 2700 kHz range, and the selection of preset matching inductance and capacitance values was done by four 115VAC relays controlled by yet another section of the crystal switch (see above). The recommended ground system here consisted of eight 25 ft. bare copper-wire radials buried to a depth of at least 6 inches.

History

The HT-14 was commercially introduced in 1940 and was immediately drafted into Army service. The BC-441 was produced in A, B and D models which differed only in a few minor circuit details and component changes in the receiver and power supply. I have no information on production quantities or operational deployment. My manual is dated 1945 (see Note 2).

The HT-12/BC-441 was subsequently adapted by Hallicrafters for Army field use in the form of the BC-669 (see Note 1). Hallicrafters marketed this later design after the War as the HT-14.

On-the-Air With the BC-441

My set is a BC-441D and was acquired from a Pennsylvania collector three years ago. The unit arrived without crystals but was otherwise complete and in quite good condition. Initial power-on produced no smoke and the receiver came to life immediately. The only problem that was encountered initially was

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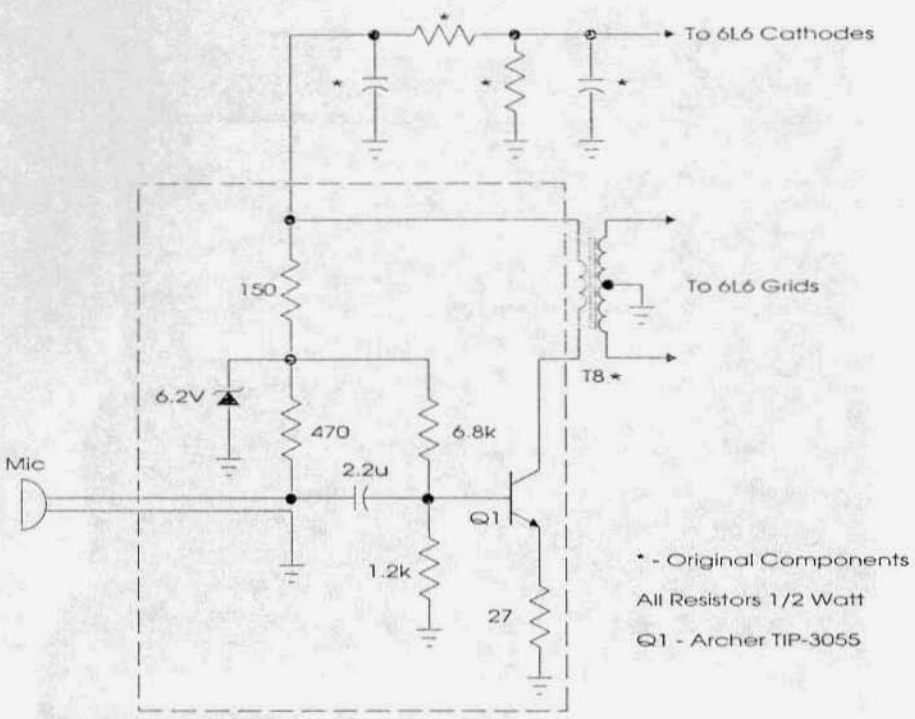

Fig. 4. Transistor speech amplifier discussed in the text. I also use this circuit in my TCS-15.

with the DC relay that is the first link in the keying circuit (see above). This was an old open frame "plate sensitive" relay with a (bad) 10K ohm coil. The supply voltage for this relay was derived from the B+ supply through a voltage divider. I replaced this with a modern 6VDC unit supplied by a half-wave rectifier off the 6.3VAC circuit.

Tuning and loading adjustments of the transmitter are a matter of first finding the right "P" tap that gives resonance at the operating frequency with the associated tuning capacitor at approximately half mesh (see Fig. 4). The "A" tap is then moved up from the ground end of the tank coil until the dipped plate current reads 125-130 mA. For operation on 1885 into a 50 ohm load, the "P" tap on my set is 3 turns down from the top (plate end) of the coil and the "A" tap is 6 turns up from ground. For 1995 kHz, the taps are 7 turns down and 5 turns up respectively.

As with other sets that feed the output from a carbon microphone directly to the modulator grids without benefit of a speech amplifier, one is required to yell into the BC-441 to achieve a significant modulation percentage. I have added a small transistorized amplifier (see Fig. 4) to my set that overcomes this problem completely. I don't normally use the handset but rely instead on the front panel speaker and a Motorola TMN 1000A "dispatcher" microphone or a T-17.

The little receiver in this set is surprisingly selective considering the single IF stage, and has more than enough sensitivity for 160 meter use. The transmitter puts out about 25 watts

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Lee Faber, W7EH, Silent Key

February 2, 1900 - July 8, 1997

On July 8th Lee Faber, W7EH, became a Silent Key at the age of 97, after a short illness. Amateur Radio lost another pioneer. Longtime ER readers will remember Lee from a six-part article I did on him in issues #37 (May '92) through #42 (October '92).

Lee was born in Paw Paw, Illinois in 1900. He became interested in radio around 1913 and from that time on it remained a big part of his life. He got his first amateur license in 1917 - 9EH - and at the time of his death was licensed continuously for 80 years. Not many hams achieve that. It's also interesting to note that this year he was successful in renewing his driving license.

He started grinding crystals around 1932 when crystal controlled transmitters were a rarity. His first crystal company was called Faberadio Electric Company. At the start of WW II along with his friend James Knights he started the James Knights Company. This company grew and prospered through the war years and beyond and will be what Lee will be most remembered for.

As a ham he was a notable builder - building at least ten BIG transmitters. He also built an antenna that was featured in the October, 1950 issue of QST. The tower (which rotated) was constructed from a 125 foot wooden pole. On the pole he had stacked 10-meter yagis that had a total of 36 elements. Needless to say he was 'Top Gun' on 10 with that antenna.

Almost 40 years ago Lee sold his interest in the James Knights Company and retired to Arizona. He summed it up this way, "I was 58 years old, I'd worked hard all my life, I was financially secure, so I was ready to take it easier. I wasn't up to taking on any more stress." From my knowledge Lee enjoyed his 40 years of retirement and there wasn't much stress.

I think I came to knew him as well as anyone from all the time I spent in going through his archives and talking with him on the telephone. I liked Lee very much - I also envied him very much for the life he had lived - and I respected him. He was a good person.
N6CSW

Lee Faber, W7EH, (center) receiving his QCWA 80-Year award from Chapter 16 President Ralph Barr, WØDNO (left) and Gerry Higgins, W7ES, Chapter Sec/Treas, at the January 25th regular Chapter meeting in Surprise, Ariz. ***Photo by Patricia Higgins.***

The Cosmophones - Part Three

Dave's 1000

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Fun Time

Wouldn't life be great if everyone's hobby could double as their career? As an electrical engineer, my work has always been far removed from amateur radio, so I find it difficult to imagine being given the responsibility to develop a top-of-the-line ham band transceiver. That is precisely what Steve Miele, W2MRM, was asked to do in 1959. His project was the Cosmophone 1000, Cosmos Industries' last Amateur Radio offering.

Apparently the demands of radio amateurs changed drastically from 1955 to 1959. When Cosmos Industries ran their teaser ad for the SSTR-1, the response was much greater than expected. By early 1959, much of the feedback they received from customers, dealers and sales reps suggested the Cosmophone 35 was great, but a version with higher power was needed. Since the Cosmophone 35 was not exactly breaking sales records, Cosmos' president Hal Goodman decided once more to give the amateur community what they wanted.

Cosmophone 35 designer, Gerald Harrison, already proved he could fit a single 4CX300A in the Cosmophone cabinet. Rather than settle for 300 Watts output, Steve would attempt to fit a pair of 4CX300A's inside, so the rig could achieve the legal limit. This seemed feasible since the original design was supposed to have two 6146's and a 4CX300A didn't require much more space than a 6146.

Morphing

Rather than building Cosmophone 1000's from scratch, ten Cosmophone 35's from inventory were chosen to be "morphed". One of the ten was Steve's prototype and would remain in-house. Since this new transceiver was hoped to be the answer to the Cosmophone 35's disappointing sales, the other nine were targeted to be sent to dealers and sales reps for demonstration purposes so the ham world could see, touch and operate them.

Because the Cosmophone 35 worked so well and time-to-market seemed critical, the intent was to keep the balance of the original circuitry intact. Like most engineers, Steve would leave his mark on more than just the final amplifier. Replacing the 6146 and the power limiting MB-40L tank circuit with two ceramic tetrodes and a pi network was not, by itself, a monumental task. The original 6146 operated in class AB1, as would the 4CX300A's, so a tremendous drive increase would not be needed. As it would, the Cosmophone 35 used two 6CL6's as a balanced mixer followed by a single 6CL6 driver. I always felt the 6CL6's were a bit of an overkill as balanced mixers. Apparently Steve did too, for he elected to use both sections of a 12AT7 as a balanced mixer in the Cosmophone 1000. This stage, in turn, feeds a pair of paralleled 12BY7 drivers. I suspect the 12BY7's were chosen over paralleled 6CL6's because their higher gain better suits the limited output of the 12AT7 mixer. Perhaps their sharp

cutoff behavior was crucial to the built-in ALC loop.

To effect these changes, the RF decks were removed from the rigs, stripped of their components and sent out for additional machine work before being rebuilt according to the new design. Because of the significant changes in

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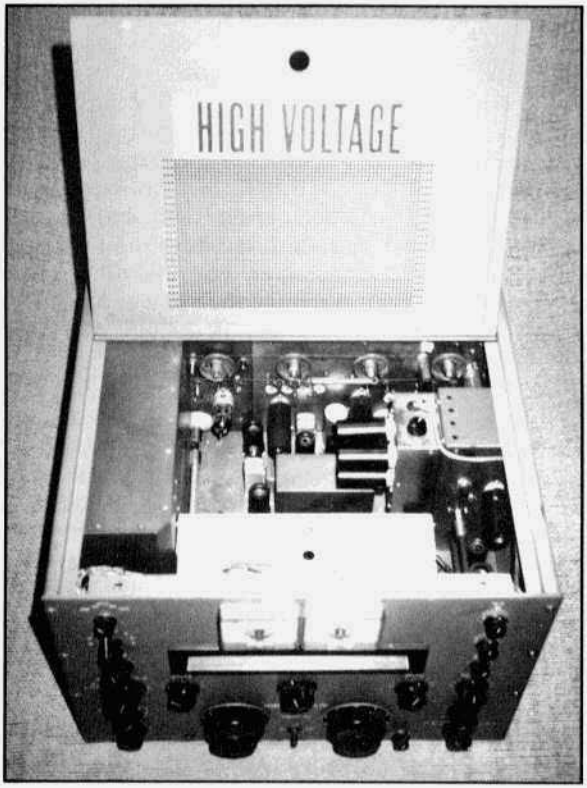
the final, over one-third of the left side of the original RF deck was sliced off, to be replaced with an entirely new chassis. Due to space restrictions, smaller pulleys were required on the bandswitches. Another noteworthy change was the removal of the Q-multiplier and the addition of a T-notch filter. This filter was built in the existing Q-multiplier sub-chassis. Capable of 40 dB of rejection, it could be tuned over the 3.1 KHz passband of the Collins 455 KHz mechanical filter. With more than adequate receiver sensitivity, the peaking capability of the Cosmophone 35's Q-multiplier would not likely be missed. Besides including a knob on the carrier insertion pot, another welcome addition was a 100 KHz crystal calibrator that was activated by pulling out on the VOX sensitivity knob.

Along with the numerous internal changes, the exterior was changed slightly. The most visible difference was the addition of a final screen current meter. The meter was unusual in that it rested at two/fifths of full scale, allowing swings of +30 mA and -20 mA. Metering of this nature is advisable in any amplifier with tubes that are sensitive to negative screen current, like the 4CX300A's. New front panels were apparently used because there was no hole for the dial alignment control included in the Cosmophone 35 and excluded in the Cosmophone 1000. Since there were several control changes, a new silkscreen was also required.

Because the 4CX300A's require forced air cooling, a squirrel cage blower was appended to the left rear of the cabinet. For ventilation, a large rectangular section was cut from the cabinet's left panel. This was replaced with a sturdy stamped steel grill and screen combination. The formerly open final section was neatly boxed with sheet metal, causing the heated air from the finals to exhaust out the left side, keeping it away from sensitive components and preserving the Cosmophone's excellent VFO stability. Space constraints caused by the final tank compartment forced the elimination of the dial alignment con-



Overhead view of the author's '1000. Note the cool HV warning sign. The rightmost subchassis is the T-notch filter; the VOX subchassis attaches to the left side of the T-notch filter chassis; the other little copper box is just a cover for the VFO selection relays; the 100 kHz crystal is just to the left of the rightmost pulley on the vertically mounted RF deck in the rear. Note the wire and big spring for the bandswitching chain. That wire passes through the large copper box that seals the final compartment. The aluminum piece in the front is a cover for the frequency dial and the VFO capacitors; it also holds the panel lamps.

trol. This was unfortunate considering the newly added crystal calibrator. As the original bandswitch shaft ran from the front panel to the rear-mounted RF deck and passed directly over the final area, it was easy to remove a section of the shaft and insert a switch to select the appropriate pi network tap. A similar method was employed in two of my Cosmophone 35's that were "treated" with pi networks.

Several changes were made to the rear of the cabinet. The microphone connector was wisely moved to the right side, where the original receive antenna connector was, far away from the final amplifier section. An internal antenna relay was added. This would allow a single SO-239 to be installed where the microphone connector had been. A high voltage connector was installed in the space previously occupied by the transmit antenna connector. Besides the rectangular port for the fan, two additional holes were punched for connectors that provided fan power and access to the high voltage power supply. The silk screened '35' next to 'Cosmophone' was scraped off and a '1000' was handwritten with white paint.

Cosmos Industries spent $5000 to produce 150 copies of the Cosmophone 35 manual. Part of this expense was the outside technical writer they employed; the rest was printing costs. Because the Cosmophone 1000 was not a production item, they were not about to make the same mistake again, so a formal manual was not printed. If the new model proved to be successful, the Cosmophone 35 manual would be appropriately edited.

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Delta V

To satisfy the increased high voltage requirements, a separate power supply was designed. It was similarly styled and over twice the size of the slightly modified version of the original Cosmophone 35 power supply with which it would work. Along with supplying the plate voltage for the finals, this new unit also provided their screen voltage through a dropping resistor off the high voltage. A trio of VR tubes provided regulation. Although this method is definitely not "green", should the high voltage supply fail, the screen supply would too, thereby protecting the delicate screens of the 4CX300A's. Contrary to the CQ review (October '59), this power supply did not provide any bias voltage. Full wave rectification was accomplished with a pair of 816's followed by a choke input filter. To add to the chorus of the now seven transmit-activated relays in the transceiver, an eighth, controlled by the PTT/VOX line, applied AC power to the plate transformer that Steve Miele found in the surplus market. A ninth relay was used to insure the high voltage could not be energized unless the transceiver's fan was correctly plugged in. Mounted on the front of the chassis were four fuses (screen current, filament transformer, plate transformer and plate current), along with two large lamps (red for HV, green for AC) and a three-position toggle switch (Tune-Off-Operate). Locating this important control on the power supply rather than on the transceiver almost forced the power supply to be placed on the operating desk rather than the floor. So much for compactness.

Flash in the Pan

In spite of the many changes, the development process did not take long. As best I can determine, Cosmos Industries began advertising the Cosmophone 1000 in October 1959 (CQ). Heavy advertising would continue through December 1960 (QST), with eleven ads being distributed almost equally between CQ and QST. In addition to the magazine advertisements, the Cosmophone 1000 was shown, along with a Cosmophone 50, at the 11th ARRL convention held in Galveston, Texas.

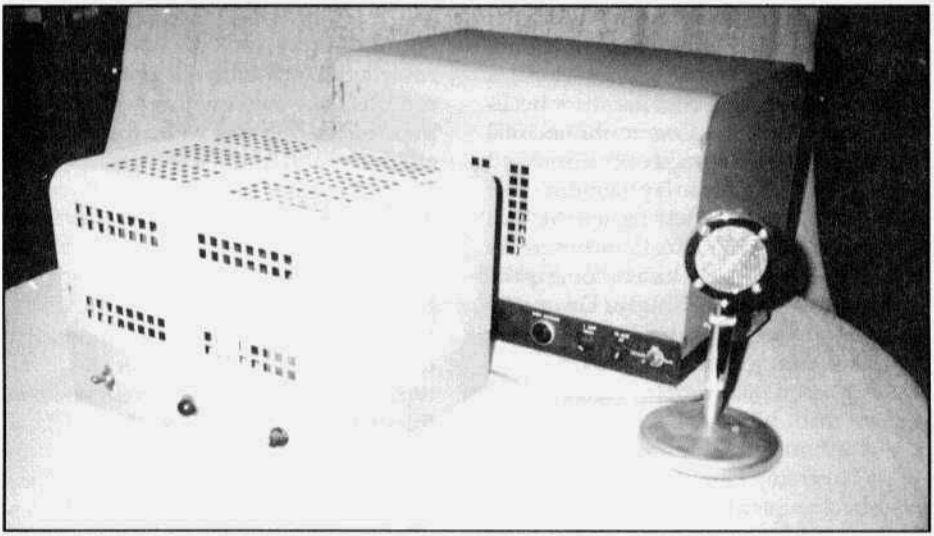
The Cosmophone 1000 has the distinctive honor of being the first kilowatt transceiver. The only other transceiver claiming that power level was the Hallicrafters SR-2000, which came along seven years later. Other rigs with respectable power, like the Galaxy GT-550, Yaesu FTDX-560 and Swan 500, were introduced from 1967 to 1970, but none of them enjoyed the construction quality of the Cosmophone 1000 and all of them used sweep tubes.

Unlike the Cosmophones 35 and 50, which at least sold minimally, the Cosmophone 1000 did not. Therefore, it never went into production and no additional units were built. Why did the Cosmophone 1000 not sell? Although there is no single answer, surely the hefty price tag ($1550) prevented the majority of hams from remotely considering its purchase. Perhaps most hams then were not yet totally comfortable with the idea of a transceiver. Separate transmitters, receivers and amplifiers were still enjoying record sales, perhaps because they didn't have to be paid for all at once.

Although the desired sales never materialized and production status was never achieved, the Cosmophone 1000 represents the high watermark of vintage transceivers.

Against the Odds

By the end of 1994 I had accumulated a few Cosmophone 35's, but I had yet to see anything other than a picture of a Cosmophone 1000. Since serious collectors typically don't rest until they have every model or variation of their particular passion, I was determined to find one. Considering the extremely small build of ten, this seemed an al-



Low voltage supply in front, high voltage supply in back. Note how few ventilation holes the HV supply has. The D-104 is for size comparison.

most impossible goal. To be successful, however, I was willing to do nearly anything.

In spite of my networking, advertisements, letters and phone calls, the only firm lead came again from information provided to me by Bob Carlson, K6VOI. One member of the Cosmophonist society had been a sales rep for Cosmos Industries and was very much a Cosmophone advocate. Dave Ellis, W6KJE, was directly and indirectly (through dealers) responsible for all Cosmophone sales in California. Most of the Cosmophone 35's and 50's were originally purchased in New York or New Jersey, which makes sense since Cosmos Industries was located in Long Island City, NY. But, there were also many purchased in California. This is a testimony to the sales efforts of Dave Ellis, specially considering the company had difficulty getting them to California in working condition. It seems the president didn't want to pay the price of proper shipping containers.

In the early 70's, Dave told Bob Carlson about a Cosmophone 1000 he had stored safely in a warehouse. As a Cosmophone enthusiast, Bob was very much interested in it and tried several times to buy it. Dave would have no part of that transaction. In fact, he refused to let Bob even see it! Knowing this did not give me high hopes of seeing, let alone acquiring Dave's 1000, if indeed it really existed.

The first of the many phone conversations I would have with Dave was on January 4, 1995. During this conversation he told me of his Cosmophone 1000. In the short year and a half before he became a silent key, we developed an interesting friendship. We talked on the phone often, sometimes for hours at a time during the OJ trial. After writing several letters to him and sending pictures of my Cosmophone collection, I eventually flew to California just to meet him. Of course, I hoped to see the Cosmophone 1000, but that was not to happen. We ended up meeting at a bar. After spending several hours in a vain attempt to consume the bar's entire supply of martini makings and beer, I had to depart.

Dave was well aware that I wanted his Cosmophone 1000, but then so had

continued on next page

The Cosmophones - Part Three from previous page

many other hams through the years. Looking back, I suspect he was testing me. Apparently I passed, for about a year after our first conversation he finally conceded the Cosmophone 1000 would best be in my care. We discussed price and came to an agreement. The only problem was that he lent it to a very good friend more than ten years earlier and that friend had become quite attached to it. Accordingly, Dave was reluctant to ask for it back, although it was not being used. Unfortunately, Dave passed away before I saw him again and before I could get the Cosmophone 1000.

As I built my friendship with Dave, I also became acquainted with his wife, Margaret. An appropriate time after Dave's passing, I contacted her to discuss the Cosmophone 1000. True to Dave's wishes, she arranged for the friend to return the radio. Within days after it was in her possession, I was aboard another flight to California to personally pack and accompany the Cosmophone 1000 to its new home in Texas. Although I paid for the rig, in my mind it will always be - Dave's 1000.

As may be the case with all Cosmophone 1000's, this one (#62) was a demo unit and was never sold. Rather, Dave just kept it when Cosmos Industries threw in the amateur radio towel. During its demo life, he lent it to a variety of dealers in California and showed it at several ham radio events throughout the state, but it only saw use for a few years before being put in storage. So, except for a broken dial cord that rotates the frequency drum and three missing cables, it was in excellent condition, as were its two power supplies.

Having only recently obtained the connectors to build replacement cables, I have not yet begun restoration of the Cosmophone 1000 and therefore cannot report on its operation. Other than Dave, who testified to its impressive performance, the only other person I know that used the rig was Bob Alexander, WA6GCR. Bob once borrowed the rig from Dave for several months. Having owned two Cosmophone 35's, Bob was well aware of their attributes and recalled the Cosmophone 1000 performed equally well, if not better. He also remembered the ease with which it could easily be loaded well past the legal limit!

Disappearing Act

Are you wondering what happened to the other eight demo units or the prototype? The company's president was confident they never sold any of them, however, a Cosmos Industries' technician did recall accompanying one to Eastern Maryland. Unfortunately, he did not remember if it was a demo or a sale. If the demo units were returned to Cosmos Industries when they exited their Amateur Radio business, they were likely scrapped as surplus (Ouch!) before the business was closed in the mid-eighties. As I have yet to determine the existence of any others, the Cosmophone 1000 is by far my rarest acquisition.

My Final

For those readers with patience sufficient to withstand my rambling through all three installments, this article series has been my attempt to consolidate and share the results of three years of research. In doing so, perhaps the Cosmophone history will not disappear with time.

Of course, I am anxious to hear from anyone concerning Cosmophones. If you have one and need assistance with it, don't hesitate to ask. Any Cosmophone owners that would like to become part of the very elite "Royal Society of Cosmophonists" may contact me for a certificate.

Last, I want to sincerely thank everyone that helped so willingly with my Cosmophone endeavors. Without your assistance, I would still be scratching my head in wonder. ER

AMI Update - August

by Dale Gagnon, KW1I, President

Announcing AM International Discovery Weekend, September 5-8

This annual operating event is designed to give AMers "back to school" spirit and get as many of us as possible populating the amateur bands all at one time. I hope that many other amateurs will "discover" how many AM ops are really out there and how much fun we are having. As we swap our certificate numbers some AMers will "discover" AM International for the first time. I end up awarding a few dozen award certificates each year following this weekend. The award fits nicely in a 5" x 7" frame. You can qualify for this unusual distinction by spending just a few hours on the air:

Level 1: Make 20 or more AM contacts on 160, 75 and 40 meters during the event period.

Level 2: Make an AM contact on 14.286 +/- mHz. Look for AM activity starting at 4:00 PDT (7:00 EDT) each evening.

Level 3: Make an AM contact on 15 or 10 meters (or one of the VHF bands) during the weekend. Look for AM above 21.400 mHz and 29.000 mHz.

Send a copy of your log to AMI Headquarters, Box 1500, Merrimack, NH 03054-1500.

Participant certificates will be awarded to Level 1 achievers. Participant-Plus certificates will be awarded to stations reaching Level 1 and either Level 2 or Level 3. The coveted Participant-Primus certificates will be awarded those stations achieving all three levels.

You do not need to be a member of AMI to participate.

The event starts when you get comfortable in your shack after sundown on Friday, Sept. 5 and ends at midnight local time on Sunday evening. KW1I

Three New Videos

Floyd Soo, W8RO (ex-KF8AT), HI-RES Communications, has recently produced three more excellent videos.

The first two videos that feature Butch Schartau, KØBS, deal with the Collins KWS-1 transmitter and the 75A-4 receiver - the "Gold Dust Twins". In both videos - 2 hours for the KWS-1 and 4 hours for the 75A-4 - KØBS takes you completely through the set. He covers all facets of repair, maintenance, alignment and operation.

The third video, on the R-390A, featuring Chuck Rippel, WA4HHG, is 7 hours long and contained on 4 video cassettes. This is a way for everyone to become knowledgeable about this receiver that has become universally accepted as the best "boatanchor" value around. This video totally dispels all our anxiety regarding the electrical and mechanical complexity of this receiver. I'm sure it's the fastest way to become knowledgeable about the R-390A. I think that anyone that watches this video (just once) will be capable of repairing, aligning and restoring their own set. One thing that I appreciated about the R-390A video was the credit that Chuck Rippel gives to other R-390A experts like Ray Osterwald, NØDMS (mostly for his PTO articles in ER); Bill Kleronomos, KDØHG (for his audio mod also published in ER) and to others who have published good articles in the Hollow-State Newsletter and other magazines.

All three videos are excellent learning tools. I think that generally most of us can learn faster from the kind of 'hands on' closeness that a video provides. As time goes on I think we'll see more and more educational material on video somewhat displacing the printed page.

All three of these new videos are now available in the ER Bookstore. See page 52 for ordering details. N6CSW

From the "Second Annual Colorado AM Morning Group Campout" held near Taylor Reservoir (at about 10,600 feet elevation) from July 17-July 21. Front row from left to right: 'Jonesy', W3DHJ; Mike, WØFD (holding the D-104) and Fred, KFØOW. Back row L-R: Mike, KCØAOT and Musser, WØAS. *Photo by WØAS*

Keith Heitzmann, KK5FE, with some of his vintage gear. The two stations he operates mostly consist of the NC-173/Valiant pair on the lower left and the HQ-170/Ranger pair on the lower right.

VINTAGE NETS

Westcoast AM Net: Meets informally, nightly on 3870 at 9:30 PT. Wednesday at 9:00 PM PT they have their formal AM net which includes a swap session. Net control rotates.
California Early Bird Net: Saturday mornings at 8 AM PST on 3870.
California Vintage SSB Net: Sunday mornings at 8 AM PST on 3835
Southeast Swap Net: Tuesday nights at 7:30 ET on 3885. Net control is Andy, WA4KCY. This same group also has a Sunday afternoon net on 3885 at 2 PM ET.
Eastern AM Swap Net: Thursday evenings on 3885 at 7:30 ET. This net is for the exchange of AM related equipment only.
Northwest AM Net: AM activity daily 3 PM - 5 PM on 3875. This same group meets on 6 meters (50.4) Sundays and Wednesdays at 8:00 PT and on 2 meters (144.4) Tuesdays and Thursdays at 8:00 PT. The formal AM net and swap session is on 3875, Sundays at 3 PM.
K6HQI Memorial Twenty Meter AM Net: This net on 14.286 has been in continuous operation for at least the last 20 years. It starts at 3:00 PM PT, 7 days a week and usually goes for about 2 hours. Net control varies with propagation.
Arizona AM Net: Meets Sundays at 3 PM MT on 3855. On 6 meters (50.4) this group meets at 8 PM MT Saturdays.
Colorado Morning Net: An informal group of AM'ers get together on 3876 Monday, Wednesday Friday, Saturday and Sunday mornings at 7AM MT.
DX-60 Net: This net meets on 7290 at 2 PM ET, Sundays. Net control is Jim, N8LUV. This net is all about entry-level AM rigs like the Heath DX-60.
Eastcoast Military Net: It isn't necessary to check in with military gear but that is what this net is all about. Net control is Dennis, WA3YXN but sometimes it rotates to other ops. Saturday mornings on 1995 at 0500 ET. Will move to 3885 for summer.
Westcoast Military Radio Collectors Net: Meets Sunday mornings at 0930 local on 3975 + or - QRM, except the 1st Sunday of the month when the net meets at 2130 local. Net control is Tom, WA6OPE.
Grey Hair Net: The oldest (or one of the oldest!- 43+ years) 160-meter AM nets. It meets on Tuesday nights on 1945 at 8:30 PM EST & EDST. Call-up at 8 PM.
Vintage CW Net: For CW ops who enjoy using vintage equipment. This is not a traffic net; speed is not important. The net meets on 14037 Sundays at 7 PM Eastern. Net control is Tracy, WB6TMY.
Vintage SSB Net: Net control is Andy, WB0SNF. The Net meets on 14.293 at 1900Z Sunday and is followed by the New Heathkit Net at about 2030Z on the same freq. Net control is Don, WB6LRG.
Collins Collectors Association Nets: Technical and swap session each Sunday, 14.263 MHz, 2000Z, is a long-established net run by call areas. Informal ragchew nets meet at 0100Z Tuesday nights on 3805 and on Thursday nights on 3875.
Collins Swap and Shop Net: Meets every Tuesday at 8PM EST on 3955. Net control is Ed, WA3AMJ.
Drake Users Net: Another relatively new net. This group gets together on 3865 Saturday nights at 8 PM ET. Net controls are Criss, KB8IZX; Don, WZ8O; Rob, KE3EE and Huey, KD3UI.
Swan Users Net: This group meets on 14.250 Sunday afternoons at 4 PM CT. The net control is usually Dean, WA9AZK.
Nostalgia/Hi-Fi Net: Meets on Fridays at 7 PM PT on 1930. This net was started in 1978.
K1JCL 6-Meter AM Repeater: Located in Connecticut it operates on 50.4 in and 50.5 out.
JA AM Net: 14.190 at 0100 UTC, Saturdays and Sundays. Stan Tajima, JA1DNQ is net control.
Fort Wayne Area 6-Meter AM Net: Meets nightly at 7 PM ET on 50.58 MHz. This net has been meeting since the late '50's. Most members are using vintage or homebrew gear.
Southern California Sunday Morning 6 Meter AM Net: 10 AM Sundays on 50.4. Net control is Will, AA6DD.
Westcoast 40-Meter Sunday Net: Net control varies. The group meets on 7160 starting at 4PM PT.
Old Buzzards Net: Meets daily at 10 AM Local time on 3945. This is an informal net in the New England area. Net hosts are George, W1GAC and Paul, W1ECO.
Canadian Boatanchor Net: Meets Saturday afternoons, 3:00 PM EST on 3745. For hams who enjoy using AM, restoring and operating.
Midwest Classic Radio Net: Saturday mornings on 3885 at 8AM Central time. Only AM checkins allowed. Swap/sale, hamfest info and technical help are frequent topics.
Boatanchors CW Group: Meets nightly at 0200Z on 3579.5 Mhz (7050 alternate). Listen for stations calling "CQ BA" or signing "BA" after their callsigns.

Nets that are underlined are new or have changed times or frequency since the last issue.

Are Radios More Expensive Today? A Response

by Jim Hanlon, W8KGI
PO Box 581
Sandia Park, NM 87047

In "Are Radios Move Expensive Today? They say Grandpa got a better deal..." published in February 1997 QST, Matt Minney, N8PGI, compared popular, mid-priced and mid-featured radios from several eras by adjusting them for inflation using the Consumer Price Index. Matt's conclusion is that as time has moved along radios have become better in quality without a real increase in price and that in many cases the price has dropped.

Well, without arguing about the CPI, which some of our politicians are now telling us has been inflated over the years and needs to be adjusted itself, I would contend that Matt missed an important part of the overall picture. Being now a "Grandpa" myself, who started off as a Novice in 1952, I would have to say that while the price of middle range equipment may not have changed all that much, we in 1997 no longer have available the wide range of alternatives for getting on the air at relatively low cost that a great many beginners of my era made use of.

Between World War Two surplus, reconditioned used gear, homebrew, kits and low-end commercial equipment, the enterprising young novice of the 50's and 60's could and often did get on the air for what he could earn in a few weeks of cutting grass, washing cars and shoveling snow. I knew because I was there, and I'll gladly demonstrate it for you young squirts, like Matt, who've only been licensed in the last few years and who may have your doubts.

I was first licensed as WN4VIV in March of 1952, the year I was in the eleventh grade. This was an era when the pages and classified ads of QST and CQ and also the three local radio stores serving hams in nearby Cincinnati were full of opportunities. One could buy a war surplus BC454 "Command Set" receiver that covered 3 to 6 megacycles (megaHertz had yet to be discovered back then), including of course our 80 meters Novice band, for $4.95 and a matching BC457 transmitter for $3.95. No, they didn't have power supplies, but there were plenty of obsolete radios and even some first generation TV sets around that I could get for free, so I never had to pay anything but sweat for a power supply. Somewhat more upscale options were offered by Leo Meyerson at World Radio Labs, Bob Henry, Walter Ashe and Allied Radio, not to mention those local radio stores, all of whom took older radios in trade, refurbished them, and sold them again as guaranteed used equipment - much the same as today's auto agencies sell their trade-ins as used cars. Heath didn't crash the amateur market with their $29.95 AT-1 kit until 1953, but we could get an Eldico TR75 kit for $44.95 or a Johnson Viking I kit for $209. And QST advertiser Niagara Radio Supply Corp had put together a kit form of Don Mix's 6AG7 novice rig[1] for $25.85 that included the power supply, antenna kit, and key. A crystal cost another 99 cents. Or you could buy the rig by itself for just $15.95, get a 125 foot spool of phosphor bronze antenna wire from Steinburgs in Cincinnati for 90 cents, insulators at the dime store for 10 cents and boost an old radio for its power supply for nothing. There were also lots of war surplus parts and assemblies available for next to nothing that many of us used to "homebrew" our gear,

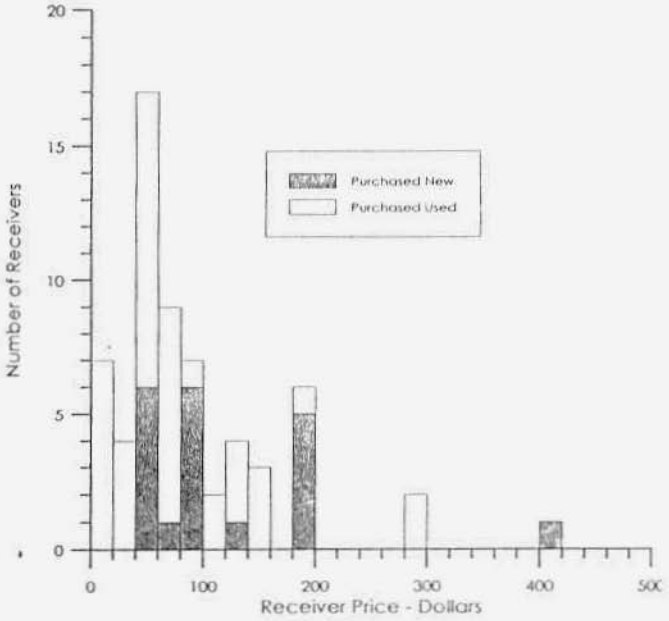


Figure 1 - Price Distribution of 1952 Novice Receivers

Let's start with receivers. All but 2 of my QSL's listed commercially manufactured receivers, so I was able to date and price 61 receivers for this survey. Figure 1 shows their breakdown by cost, and Figure 2 their breakdown by mean age. I used information on their manufacturing span to differentiate between receivers purchased new and used, also shown in the two figures. Some very interesting trends emerge from this data.

especially our transmitters. My own 80 and 11 novice rig sported a 6AG7 tri-tet crystal oscillator followed by a brand new 6146 amplifier. I built it into a surplus BC375 tuning unit.

To take this out of the realm of fond recollections and quantify just what was actually going on among beginning hams in 1952, I dug out 63 QSL cards that I received from other novice stations whom I worked as a novice between March and December of that year. From these QSL's I compiled a list of the receivers and transmitters these guys were using. And then from several references, including Raymond Moore's books, Communications Receivers: The Vacuum Tube Era, and Transmitters, Exciters and Power Amplifiers, and from the WRL, Henry Radio, Allied Radio, Columbia Electronic Sales, Niagara Radio and Walter Ashe ads in QST and CQ from 1951 and 1952, I garnered information on the age and 1952 selling price of each of those receivers and transmitters. The accompanying figures summarize what I found.

Seven stations were on the air using receivers that cost $20 or less. Six of these were Command Sets, and the other was an eleven year old Howard 435A that I personally helped a school buddy of mine acquire for $10. The single most popular price range, $40 to $60, is made up of a variety of types including 6 new and used members of the Hallicrafters S38 family and 2 National SW54's, all very basic five or six tube superhets, 4 war surplus BC348's (2 RF's, 3 IF's and a crystal filter), 2 pre war NC100's (1 RF, 2 IF's and a crystal filter), and 2 Hallicrafters S20R's, and an S40A, pre and post war versions with 1 RF, 2 IF's and no filter. The most popular receivers were: the S38 family with a total of 8 representatives; the S40 series at 7 plus two more pre-war equivalent S20R's; the Hammarlund HQ-129-X at 6, selling for $199.50 new and $129 used in 1952; the war surplus BC454 Command Sets at 5, and the war surplus BC348 series at 4. Overall, 45% of the receivers being used by novices in 1952 cost $60

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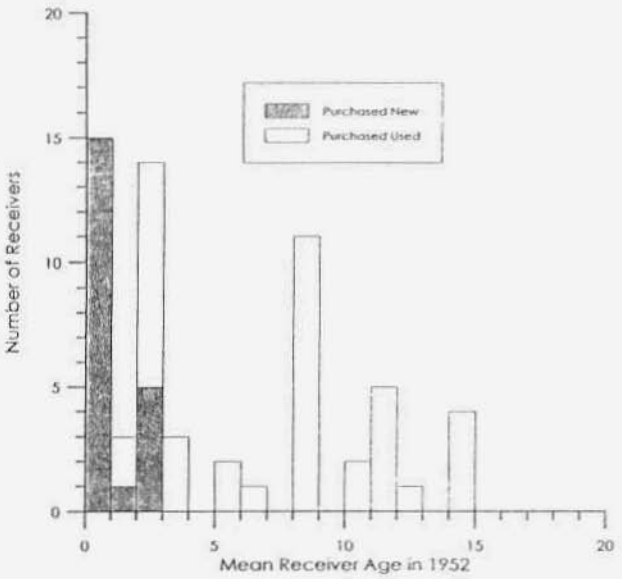


Figure 2 - Mean Age Distribution of 1952 Novice Receivers

or less, 85% were less expensive than the "modest" SX43 ($169.50) and 98% below the "very popular" Collins 75A1 ($375) that Matt Minney used for his 1950 benchmarks.

Agewise, Figure 2 shows three groupings. Units from 0 to 7 years old, comprising 62% of the population, were manufactured after the war. 18% of the units are in the 8 to 9 year slot and are war surplus Command Set and BC348's, along with two basically pre war SX25s that fall here because they were also made in 1946. Finally, 20% of the receivers were 10 or more years old, all amateur receivers made before the war. So it is quite apparent that many of these brand new novice licensees in 1952, my estimate is 67% of them, were availing themselves of the bargains available in used or surplus receivers.

Now for the transmitters. It is considerably more difficult to make plots of age and cost distributions for the 1952 novice transmitters, because a full 2/3 of them were homebrewed! An additional 12% were war surplus Command Sets, leaving only 22% as commercially made ham transmitters. And of those, 40% were purchased as kits (Eldico TR75's and Viking I's). This is certainly a major contrast to 1997 where virtually every new station going on the air uses a transceiver that is factory assembled.

I was able to price the commercial transmitters from my source material, and I estimated the cost of the homebrew rig on the basis of that single tube 6AG7 rig and power supply advertised by Niagara. I valued any single tube transmitter at that $16 figure and a two tube rig at twice that amount. I guessed that half of the home brew rigs and Command Set transmitters would use power supplies "scrounged" from old radios and TV's and the others would use power supplies purchased at the Arrow $10 cost for a 1 tuber or at $15 for a two tuber or a Command Set. As a reality check, this puts the price of a two tuber plus power supply at $47, versus $45.95 for the Eldico TR75 which is a two tuber plus power supply kit complete with TVI shielding. With these assumptions, I was able to arrive at the transmitter price distribution of Figure 3.

From Figure 3, we can see that 6% of the novice transmitters, Command Sets with scrounged power supplies, cost their owners less than ten dollars. A full 85 percent cost lest than fifty dollars. The higher priced categories were occupied by six Harvey Wells TBS50 Band-

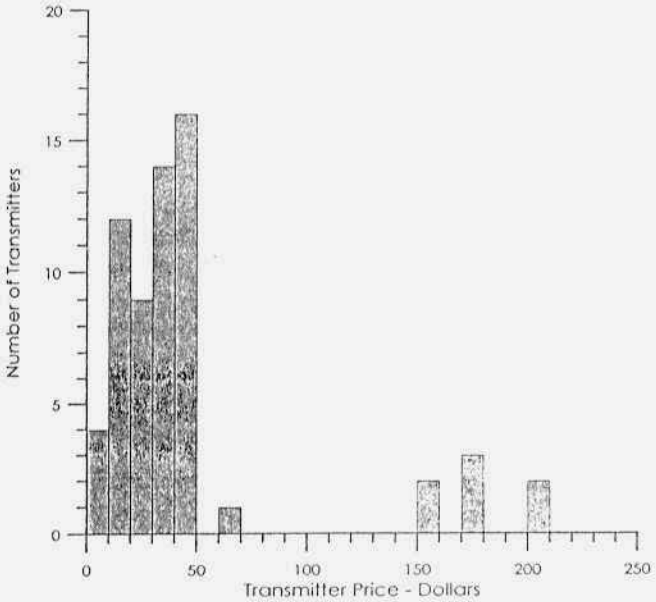


Figure 3 - Price Distribution of 1952 Novice Transmitters

masters which covered all bands from 80 through 2 meters and allowed their novice owners to operate on 2 meter phone, one homebrewed 813 rig which I valued at the $179.50 cost of a comparable Eldico TR1, and two Viking I kits at $209.50. Compare these to Matt Minney's benchmark transmitters, the $209 Viking I kit and the $349 Hallicrafters HT-9 and you see that only 3% of the novices were using transmitters that Matt listed as typical.

Putting the least expensive receiver and transmitter alternatives together, a 1952 novice could acquire a Command Set receiver and transmitter pair for $9, free power supplies from old radios, an antenna for $2, a J-38 key for $1, a crystal for $1, surplus phones for around $3, and any miscellaneous parts that couldn't be stripped from the old radios for $4 on the outside. Putting all this together adds up to a very adequate, 80 meter CW station that would run at least 50 watts for twenty 1952 dollars! Adjusting to 1997 with Matt's CPI multiplier makes that equivalent to $108 today.

There are a lot of differences in ham radio from 1952 to 1997. There is no more war surplus gear, except for perhaps that hiding in a few dusty boxes under the tables at the less traveled hamfests. There is no longer a ready market in used equipment. Virtually no one home brews any more, and QST no longer runs articles on how to build your own simple novice transmitter. Many cities no longer have even one ham radio store. Most beginners start now with a five year renewable codeless technician license rather than my one year, non-renewable novice ticket, and they purchase a VHF transceiver for their first rig. Many of those who do learn the code and upgrade think of CW as a hurdle to be overcome rather than as something to actually be used on the air. They learn how to receive code, but they would be lost if they had to send it. Their first rig is a very fine, multiband, multi-mode, solid state transceiver, most often new, that costs a thousand dollars or more. And there's nothing being published in 1997's QST to help the kid turn his odd job money into a beginner's station.

Is it any wonder that so few young people choose Amateur Radio for their hobby in 1997? **ER**

1. The Novice One-Tuber, Donald H. Mix, W1TS (Assistant Technical Editor, QST), QST, May and June, 1951.

The Globe 755 - A Very Good VFO

by Rob Brownstein, K6RB
3881 Winkle Ave.
Santa Cruz, CA 95065

Just over five years ago, on the verge of mid-life crisis, I found myself compelled to buy an old Viking Valiant. Soon after, I was sending a check for an NC-303. Then, of course, I had to have a Ranger. And, if you have a Ranger, you need an HQ-170. But it was when I bought my Viking Adventurer and Globe King 500 that I faced my first VFO dilemma. Should I buy a Viking 122, a VF-1, a KnightKit VFO, an Eico 722, or a Globe 755? Complicating my decision was the fact that I planned to do an extensive amount of CW operating. Let's face it, if your vintage interest lies primarily in AM operation, even a drifty old VF-1 is stable enough in most instances. But for CW, a slow excursion of only 100 Hz can easily send you right out of someone's filter passband.

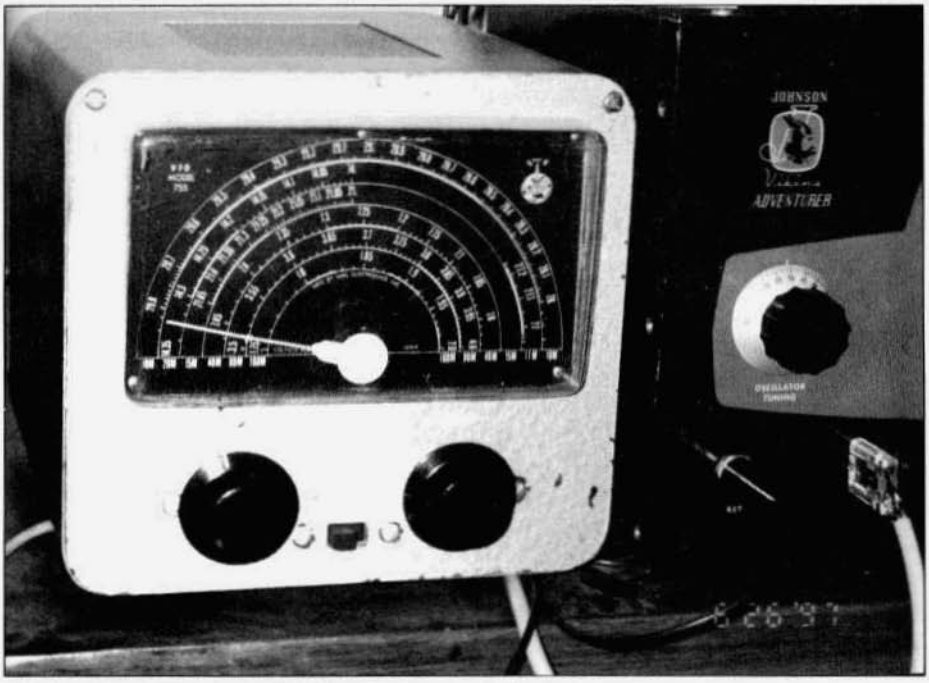
I had used a Viking 122 with my original Adventurer for over 12 years. It was a bit chirpy, and a bit drifty, so I decided to forego both it and the VF-1. Instead I opted for an Eico 722 VFO. It was self-contained (i.e. it had its own power supply) and had a buffer amplifier stage for better isolation between the oscillator and driven stage. In fact, I bought two Eico 722s, one for the Adventurer, and one for the Eico 720 I had acquired. Both worked reasonably well, offered adequate drive, but neither covered 160 meters, which was important for use with the Globe King. And, to be honest, I hated the feel of the tuning knob. It was a dull, inertia-less, design using a string and pointer like an old table radio.

So I put in a "want" ad in Electric Radio for a Globe 755. My good friend, Don, KI5DT, called me soon after and said he thought he had one somewhere in his garage. He told me to wait a minute, and went to check. Sure enough, in the midst of his treasures there was a dirty, scratched, but complete Globe 755. A few days later, it came via UPS. And, except for a loose solder connection, it worked right out of the box.

I put it to work with the Globe King and was surprised to find that it was much more stable than I had anticipated. I found the "Recent Equipment" article on the 755 in the March 1956 issue of QST, and discovered that temperature compensation was a key design factor. In fact, the Globe 755's instruction manual says, "A very important point in the operation of the VFO is to always keep the cabinet in the normal horizontal position. Tilting the cabinet in any direction will degrade the frequency stability to a considerable extent. This is due to the fact that the special temperature-sensitive components are placed exactly, and tilting the cabinet will cause the heat to flow around the compensating components in a manner other than that which will give best stability."

In the months that I used the Globe 755 and Globe King, I worked a lot of CW on all bands, 160 through 10. Naturally, the drift was exaggerated most on 10 meters where the fundamental 7 MHz output was quadrupled, including the fundamental drift. But even on 10, after a reasonable warm up (about 30 minutes), the VFO settled down to excursions of well below 100 Hz. On 160 and 80 I was accused of being "rock bound." And I liked the tuning mechanism much better than the Eico's.

So, I sold one of the Eico 722s and began searching for a second 755 for the



The '755 paired up with the Johnson Adventurer.

Adventurer. I answered an ER ad and took delivery of a cosmetically "near mint" model. Comparing the two I noticed that the colors of the slide switches were different (one was red, the other black), and the silk screening colors were different, too (one was black on gray, the other white on gray). Inside there were some differences, too. The older one (KI5DT's) had an aluminum chassis; the newer one used a copper chassis. But the circuits were identical. And, their operations were indistinguishable. Like the first one, the second one settled down very quickly, and was very stable thereafter. I had to conclude that Globe designed a stable VFO.

The Circuit

The Globe 755 uses a series-tuned Colpitts (or Clapp) circuit. The oscillator is the popular 6AU6 (used in practically every other VFO of that era). A 6CB6 tube is used as a buffer amplifier, and its output stage features slug-tuned inductors for matching tube output to cable length and transmitter input characteristics to achieve optimal output.

One has to get used to the 755's tuning procedure. The band switch turns on the power and selects among 160 and 80 meters; 40 and 10 meters; and 20, 15 and 11 meters. Tuning is clockwise from low end to high end of 160 and 80 meters, but counter-clockwise for the other bands. So once you get used to turning the knob one way on 160 and 80, you have to turn it the opposite way on the other bands. Also, the low ends of 20 and 15 are located about half-way from the dial ends. But once you get used to these little idiosyncracies, the VFO is quite easy to use.

My Modifications

I made only one modification to my two 755s. While looking at the schematic of the Globe King 500B, I noticed that the VFO circuit was identical to that of the 755 (no surprise there) but that the power supply to the VFO was slightly different. Instead of a capaci-

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Vintage Field Day in Kalamazoo

by James Buchanan, K8WPI
9549 N. 17th St.
Kalamazoo, MI 49004

WD8AXA-AM station, operated by Chuck Agosti, WD8AXA and Charlie Pfister, WD8AXB.

The emergency powered vintage military station operated 80 and 40 meters. A Federal T-195B 100W transmitter complemented an R-390A receiver. The pair worked well together, even though the '390 was taken to the site as a spare. Separate inverted V antennas were used on each band. The primary receiver failed before the start of the contest.

Just for fun, but not counted in contest points, a AN-GRC-9 CW transmitter was fired up for a while. The "smoky-putty" two cycle gas powered DC generator matching the rig offered not only flawless operation, but doubled as a mosquito screen. There is no doubt the "smoky-putty" was the favorite rig used at the site.

K8WPI-CW station, operated by Jim Buchanan, K8WPI and Doug Burke, WB8CFV.

The CW station consisted of an NC-300 receiver, Ranger II transmitter, and a good selection of keys and keyers, including the elusive 1949 Mon-Key. Harvey-Wells and Johnson antenna tuners were used to couple the open wire fed 270' flat-top and 137' inverted V antennas.

More technical problems than you can shake a stick at kept us from making many contacts. We were amazed at how poorly our antennas worked. Good training for next year.

In addition to the contacts logged and submitted, two additional cards were received within the week after the contest. It seems the Ranger caught the attention of not one, but TWO OO's who felt obligated to send us their report. I don't know if these guys are some of the new No-Code Extras, or if they take their appointment far too seriously. However, OO notices for a chirpy rig, on a vintage field day weekend seems a bit much. Actually, we could have used their sections, South Carolina and Kentucky, if they would have fired up their rigs.

All in all, a great time was had by all, with lots of visitors to the site.

The Site

The Field behind Doug Burke's house was mowed a week prior to the event. This provided about 3 acres for separation of sites. Along with the AM and CW stations, this was the ARRL VHF contest weekend and the site was shared with NK8X and N8QOH, who erected a 50' tower supporting a 6 meter yagi. Jim and Art generally kept to themselves at the East end of the field.

Although there was some temptation, we did not connect to Doug's rhombic, which no doubt, would have solved our antenna problems!

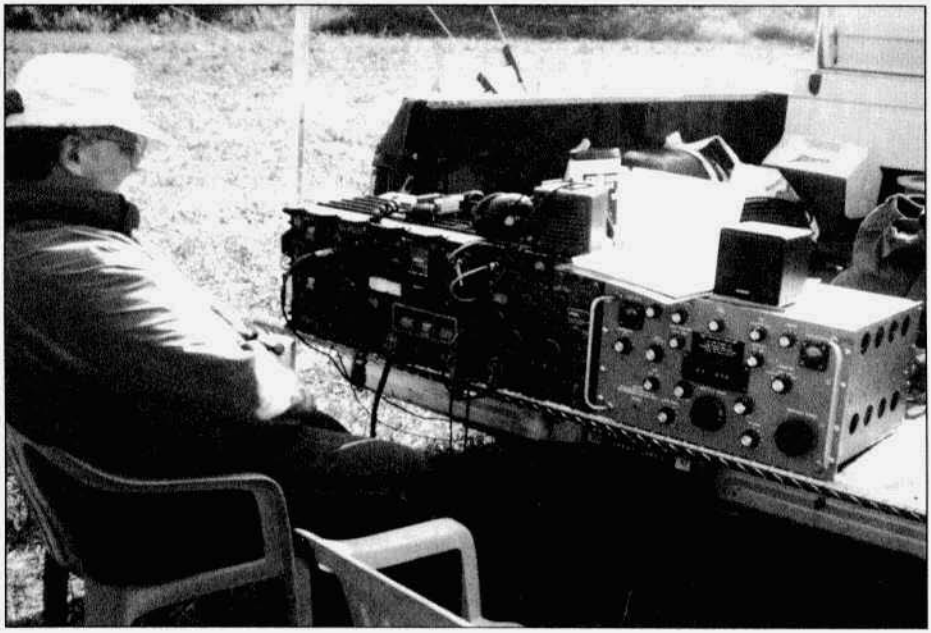
The Event

A great time, however some changes are in order for next year. Bad weekend, pick something not a holiday, please!

More publicity, we had to explain to everyone what we were doing. A little more formality in the rules will be accepted. Keep up the good work, thanks for the opportunity.

The Score

It appears the Phone station, WD8ADA totaled 36 points, while the CW station acquired 26. Whew! A good time was had by all, even if very few contacts were made. **ER**



Chuck Agnosti, WD8AXA, absorbing heat from the rigs, trying to warm up enough to talk! It was a beautiful weekend, but overnight temps dropped into the 40s, and even Sunday AM was cold.

The author, K8WPI, striking a confident pose at the CW station before reality set in.

Revisiting The 304TL

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

The name Eimac is now history. One Eimac tube, the 304TL, brings back many memories. For several years following WW II, this war-surplus item, at around a dollar each, was often the only Eimac tube that many young hams could afford. Four homebrew 304TL amplifiers built over the years have taught me some things about this tube - things generally learned "the hard way."

Recently, I recalled a fine article on this tube published some years back in ER. Being the proud owner of a complete file of ER, I was able to find the original article in minutes. It was the 304TL amplifier project described by Bill Kleronomos, KDØHG ("A Kilowatt Class RF Deck", ER, # 10). The article, by the way, was a nice reminder that grid-driven Class-C power amplifiers are still being homebrewed. Such amplifiers still have a place among us nostalgists who run AM and/or CW. Bill covers all the salient points in describing his 304TL amplifier. However, I should like to address in detail two areas which deserve further attention in the design of these nostalgia amplifiers: parasitic suppression and bandswitching.

VHF parasitic suppression in such amplifiers has usually been an empirical ritual, a last necessary step, the final housebreaking of one's pet personal layout of a rather simple circuit. VHF parasitics were once a bug that engineers killed through pragmatic gimmicks. They found that little coils, often shunted with capacitors and/or resistors, placed in series with grid or plate leads - sometimes both - would make their design stable. I've found that the elimination of VHF parasitics in grid-driven power amplifiers can be part of the original design on paper and need not be based on trial-and-error hardware adjustments. VHF parasitic suppression in modern cathode-driven "grounded-grid" linears is another matter and lies beyond the scope of this discussion.

Historically, the VHF parasitic problem in ham power amplifiers seems to have focused on how to abort them - not how to prevent their conception. Old-timers will recall the many Class-C grid-driven power amplifier designs published in the handbooks of yesteryear where a small choke or parallel-tuned circuit was placed in series with either the grid or plate lead, sometimes both. The ham was advised first to fire up the parasitic and then to tune or adjust these devices until the parasitic disappeared. Many published vintage schematics show no parasitic-suppression devices at all. The ham was expected to add them later, should the need arise. Sometimes the ham would luck out if the layout accidentally placed the stray VHF resonances in the right places.

Think back on the drama of those bygone days. You fired up your new homebrew grid-driven power amplifier (hopefully with reduced plate voltage) and it likely took off immediately on its own the instant you reduced the bias and/or drive. Fortunately, those good old Eimac triodes could stand the stress. Maybe you then added a small parallel-tuned circuit in series with grid and/or plate lead and tried again. You quickly twiddled the capacitor shunting the parasitic chokes until things

EITEL-McCULLOUGH, INC.

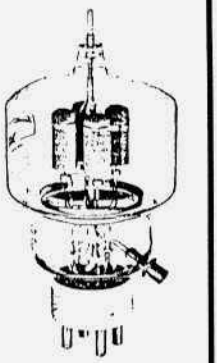
SAN BRUNO, CALIFORNIA

304TL

LOW-MU TRIODE
•
MODULATOR
OSCILLATOR
AMPLIFIER

The Eimac 304TL is a low-mu, power triode having a maximum plate dissipation rating of 300 watts, and is intended for use as an amplifier, oscillator or modulator, where maximum performance can be obtained at low plate voltage. It can be used at its maximum ratings at frequencies as high as 40 Mc.

Cooling of the 304TL is accomplished by radiation from the plate, which operates at a visible red color at maximum dissipation, and by means of air convection around the envelope.



GENERAL CHARACTERISTICS

ELECTRICAL

Filament: Thoriated tungsten	
Voltage	5.0 or 10.0 volts
Current	25.0 or 12.5 amperes
Amplification Factor (Average)	12
▶Direct Interelectrode Capacitances (Average)	
Grid-Plate	8.6 $\mu\mu$f
Grid-Filament	12.1 $\mu\mu$f
Plate-Filament	.8 $\mu\mu$f
▶Transconductance (i_b = 1.0 amp., E_b = 3000 v, e_c = —175v.)	16,700 μmhos
Frequency for Maximum Ratings	40 Mc.

MECHANICAL

Base	Special 4 pin, No. 5000B
Basing	RMA type 48C
▶Mounting	Vertical, base down or up
▶Cooling	Convection and Radiation
▶Recommended Heat Dissipating Connectors:	
Plate	HR-7
Grid	HR-6
Maximum Overall Dimensions:	
Length	7.625 inches
Diameter	3.563 inches
▶Net weight	9 ounces
▶Shipping weight (Average)	2 pounds

AUDIO FREQUENCY POWER AMPLIFIER AND MODULATOR

Class B (Sinusoidal wave, two tubes unless otherwise specified)

MAXIMUM RATINGS

D-C PLATE VOLTAGE	3000 MAX. VOLTS
MAX-SIGNAL D-C PLATE CURRENT, PER TUBE	900 MAX. MA.
PLATE DISSIPATION, PER TUBE	300 MAX. WATTS

▶TYPICAL OPERATION, CLASS AB,

D-C Plate Voltage	1500	2000	2500	3000	Volts
D-C Grid Voltage (approx.)*	—118	—170	—230	—290	Volts
Zero-Signal D-C Plate Current	270	200	160	130	Ma.
Max-Signal D-C Plate Current	572	546	483	444	Ma.
Effective Load, Plate-to-Plate	2540	5300	8500	12,000	Ohms
Peak A-F Grid Input Voltage (per tube)	118	170	230	290	Volts
Max-Signal Peak Driving Power	0	0	0	0	Watts
Max-Signal Plate Power Output	256	490	610	730	Watts

*Adjust to give stated zero-signal plate current. The effective grid circuit resistance for each tube must not exceed 250,000 ohms.

▶TYPICAL OPERATION, CLASS AB,

D-C Plate Voltage	1500	2000	2500	3000	Volts
D-C Grid Voltage (approx.)*	—118	—170	—230	—290	Volts
Zero-Signal D-C Plate Current	270	200	160	130	Ma.
Max-Signal D-C Plate Current	1140	1000	900	800	Ma.
Effective Load, Plate-to-Plate	2750	4500	6600	9100	Ohms
Peak A-F Grid Input Voltage (per tube)	245	290	340	390	Volts
Max-Signal Peak Driving Power	78	87	95	110	Watts
Max-Signal Nominal Driving Power (approx.)	39	44	48	55	Watts
Max-Signal Plate Power Output	1100	1400	1650	1800	Watts

*Adjust to give stated zero-signal plate current.

(Continued on Next Page)

▶PLATE MODULATED RADIO FREQUENCY AMPLIFIER

Class-C Telephony (Carrier conditions, per tube)

MAXIMUM RATINGS

D-C PLATE VOLTAGE	2500 MAX. VOLTS
D-C PLATE CURRENT	700 MAX. MA.
PLATE DISSIPATION	200 MAX. WATTS
GRID DISSIPATION	50 MAX. WATTS

TYPICAL OPERATION (Power input limited to 500 and 1000 watts)*

D-C Plate Voltage	2000	2000	2500	2500	Volts
D-C Plate Current	250	500	200	400	Ma.
Total Bias Voltage	—500	—500	—525	—550	Volts
Fixed Bias Voltage	—410	—275	—300	—300	Volts
Grid Resistor	3000	3000	12,500	5000	Ohms
D-C Grid Current	30	75	18	50	Ma.
Peak R-F Grid Input Voltage	615	690	620	715	Volts
Driving Power	18	52	11	36	Watts
Grid Dissipation	3	15	2	9	Watts
Plate Power Input	500	1000	500	1000	Watts
Plate Dissipation	90	190	75	170	Watts
Plate Power Output	410	810	425	830	Watts

*The figures are for convenience in obtaining a 500 or 1000 Watt carrier input per tube to the modulated amplifier. The output figures do not allow for circuit losses.

TYPICAL OPERATION*

D-C Plate Voltage	1500	2000	2500	Volts
D-C Plate Current	520	525	450	Ma.
Total Bias Voltage	—370	—500	—550	Volts
Fixed Bias Voltage	—160	—260	—440	Volts
Grid Resistor	2800	3000	2000	Ohms
D-C Grid Current	75	80	55	Ma.
Peak R-F Grid Input Voltage	545	695	720	Volts
Driving Power	41	55	40	Watts
Grid Dissipation	13	15	10	Watts
Plate Power Input	780	1050	1125	Watts
Plate Dissipation	200	200	200	Watts
Power Output	580	850	925	Watts

*The figures are for one tube operating at maximum plate dissipation as a plate modulated Class C amplifier. The output figures do not allow for circuit losses.

continued next page

Revisiting The 304TL from previous page

calmed down or until a fuse blew. Or maybe you just tried adding a little choke in series with the grid lead, because many published circuits did this. No luck? You next added an additional little choke in series with the plate lead. Still no luck? You then removed the choke from the grid lead and the parasitic disappeared. No one seems to have asked two basic questions: Where do these gremlins come from? Can't we make them predictably unwelcome in our basic circuit design?

Well, the answer to both these questions for grid-driven power amplifiers has been available since the publication in 1943 of F.E. Terman's Radio Engineers' Handbook. 1943 was a war year. Hams weren't on the air. Many were serving their country. When peace returned, ham radio authorities continued to echo prewar findings into the 50s, when hams were still homebrewing Class-C grid-driven power amplifiers. Professor Terman's information could have spared many, including myself, much anguish. His work is still considered a classic reference in radio physics, excluding solid state. But his book was addressed to electrical engineers, not hams. And the price of a copy published by McGraw-Hill even in later printings was not peanuts.

One asks, what does Terman say about parasitics in grounded-grid linears? The answer is, nothing. He was addressing the state of the art in 1943, when Class-C grid-driven power amplifiers still were king. We nostalgists who still play with these amplifiers, the old-time powerhouse for CW or high-level plate modulation, can still learn from him. On page 501 he points out that VHF parasitics are a tuned-grid tuned-plate oscillation which depends on the plate circuit being tuned to a slightly higher frequency than the grid circuit. To eliminate them, all one needs to do is make the plate circuit resonate at a lower frequency than the grid circuit for VHF. At VHF, the tank capacitors look like a short circuit across the tank coils. The leads to the grid and plate tank capacitors are the critical elements. These leads look like inductors at VHF. Terman recommended placing a small inductance in the plate lead or making this lead a bit longer than the grid lead. With our modern dip-meters, this VHF resonance measurement takes only minutes.

My homebrew grid-driven 304TL amplifiers have never had VHF parasitics. Well, that's not quite true. My first one, built before I'd read Terman's advice, had a juicy parasitic that sometimes came to life unpredictably when I keyed the amplifier. I can still hear the power supply's groan just before the fuse blew, when the 304TL suddenly pulled plate current far in excess of its design limits. Later on, thanks to Prof. Terman, I learned how to manage things. In series with each plate lead, I design in a parallel-tuned circuit that resonates around 47 MHz, below the TV band. Thus circuit is adjusted with a dip-meter before power is applied to the tube. It should never need readjustment unless the physical layout is changed. VHF grid circuit resonances, regardless of physical layout, have always been found to lie between 60 and 80 MHz and are disregarded. Such stray VHF grid and plate resonances would probably be at a somewhat lower frequency in bandswitched designs.

Now to the subject of bandswitching. One's design philosophy can follow the old-timers who either used plug-in coils or built a separate final for each band. I've tried both approaches and both are quite practical. Mechanical bandswitching of a grid-driven Class-C triode power amplifier is a problem that KDØHG's design solves fairly well. But the reader will note that his design requires grid neutralization in order to permit the bandswitching convenience

of a pi-network switched plate tank. He concedes that grid neutralization is not a miltiband sure thing. It must often be tweaked from band to band. If one wants the full story on grid neutralization, one can find it in Henney's Radio Engineering Handbook, Fifth Edition (1959), page 18-27.

With all grid-driven triode power amplifiers the bandswitching option is troublesome, both electrically and mechanically. Most triode power tubes have a grid-plate capacity of between 2 and 15 picofarads, more than enough to let the amplifier self-oscillate when the grid and plate tanks are tuned to the same frequency. To prevent this oscillation, these amplifiers always need neutralization. Plate neutralization will hold from band to band, but bandswitching is mechanically cumbersome because the plate tank must be balanced to ground. Grid neutralization also requires a tank circuit balanced to ground, but it is mechanically much easier to handle. Unfortunately, one neutralization adjustment will not usually hold over an entire band.

My grid-driven 304TL amplifiers for multiband use always feature plug-in coils. The main advantage is mechanical and electrical simplicity. No bandswitches are required. Plate neutralization is used, which is adjusted once and holds from band to band. The trade-off with plug-in coils is reduced operating convenience. It takes longer to QSY to different bands, because one must violate shielding integrity to change coils. This also exposes one to possible electrocution if one's mind wanders. One first turns off the high voltage. Then one shorts the amplifier's plate to ground to discharge filter capacitors in the power supply. All this takes time. Changing bands can thus take at least a couple minutes - much more if one hasn't previously logged the control settings.

If one dislikes changing plug-in coils, the other bandswitching option is to use a separate final for each band, which makes band-to-band QSY both faster and safer. I've also used this approach. One needs only to manipulate external switches. During an operating session, the high voltage is applied to all finals simultaneously. But only the filament of the active final is lit. At least one ARRL Handbook design confirms this principle. Drive and antenna coupling are switched to the active final. Changing bands thus requires manipulating only three switches. The trade-off for this convenience is, of course, a much greater demand on both hardware resources and space in the shack.

The 304TL tube was originally designed by Eimac, but versions by RCA and Westinghouse (I think) also appeared on the surplus market. The original data sheet from Eimac shows that the tube is a low-mu triode (mu of 12) with a 300-watt plate dissipation. It contains two separate filament structures, each rated at 5 volts at 12.5 amps. These can be connected in parallel for 5 volts at 25 amps, or in series for 10 volts at 12.5 amps. The 304TL's socket is a special 4-pin design that has always been rather hard to find. The tube's grid-plate capacity is rated at 8.6 pF. This rather high value requires an uncommon neutralizing capacitor. One must use a homebrew piston-cylinder design to conserve space if original capacitors by E. F. Johnson can't be found. Apart from KDØHG's article, I can recall only one other published design using the 304TL. This was in the Radio Handbook, 13th Edition. This design neatly sidesteps the neutralizing capacitor problem - it uses the 304TL as a grounded-grid amplifier.

The 304TL works well as a cathode-driven ("grounded-grid") class-C amplifier (I've tried this, too) if one has the necessary 200-250 watts to drive it to a kilowatt input. But grid-driven, the 304TL will easily take a kilowatt or more

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2nd Annual MRCG Gathering

by Cal Eustaquio, N6KYR
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For the information of all hands, the Military Radio Collectors Group (MRCG) held its second annual gathering at San Luis Obispo, California on 24 May 1997. This time, the group met at the NCO club at historic Camp San Luis Obispo. Camp San Luis Obispo was for many years the training ground for the California Army National Guard. And how appropriate! The entire site dates from World War II, the era in which many of the celebrated radios discussed during the meet were developed.

The first part of the meet was an initial informal get-together for the bunch, kicking off a fest that dealt solely with surplus military gear and related items. About 0830 hours, the swap meet adjourned and the meeting for the military equipment enthusiasts began with Henry Engstrom "emceeing" the event.

The first seminar was presented by Hank Brown, W6DJX, on the development and description of the aircraft set RU/GF. Photos of the parent aircraft of the RU/GF were shown and described. During that phase of discussion, Hank had an excellent restored and working set to show how the RU/GF would have operated aboard the aircraft during those years.

The second topic covered the venerable BC-348 receiver. Ken Corwin, a veteran of discussing the -348, gave his sage advice and knowledge on the RX. He pointed out certain characteristics of the various incarnations of the receivers, describing at the same time the B-17 aircraft's development for which the BC-348 was designed.

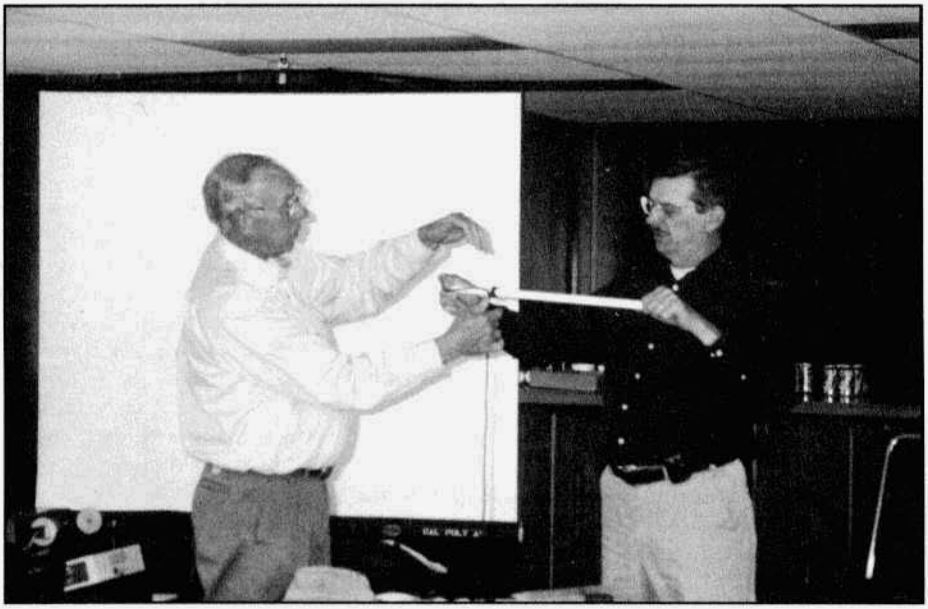
Tom Horstfall, WA6OPE, gave his talk on the strange evolution of the SCR-511 cavalry radio (known more popularly as the "pogo stick"). Originally developed as a rig for horse-mounted operations, the radio served primarily with the infantry in WW II.

There was a lunch break and a delicious Central Coast Tri-Tip meal was catered to the group. Much camaraderie and joviality was experienced during this time.

After lunch, the popular topic of discussion (that just about all had participated in) was restoration techniques. Henry Engstom started off the discussion with techniques on how to make a wrap for harnessing cable. But the topic of most interest was refinishing or restoring that wrinkle paint commonly found on many of these surplus radios. Suggestions ranging from use of various solvents and cleaners, to Krylon wrinkle paint and powder-coating were thrown in the fray. Also, various other subjects of restoration (too numerous to mention) were discussed.

The final presentation included a slide show that discussed Mike Hanz's extensive WW II aircraft equipment collection. Mike, a longtime Herndon, Virginia military equipment collector, wowed the group with his ongoing project of a "combat information center" style display. Vintage communications, radar, and ancillary equipment, ranging from the common to the rare, were sprinkled throughout the slide show.

In closing, the group decided to meet again next year at Camp San Luis Obispo. And three members volunteered their efforts. That included yours truly, for Public Affairs; Dave Ragsdale,



Henry Engstrom, KD6KWH, (left) demonstrating cable lacing.

A 'Central Coast Tri-Tip' meal was catered to the group.

KF6BOM, for Site Facilities Coordination; Andy Miller, KD6TKX, for Events Coordination; and Ed Zeranski, for E-mail/Electronic Communications.

For those who are interested, a video tape was made to record the events of this year's MRCG. It is available for $10 from Hank Brown, W6DJX, 4141 West L-2, Lancaster, CA 93536. And for further information in general, please feel free to e-mail me or write to me at the above address. ER

continued next page

The Pierson Holt KE-93 Communications Receiver

by Howard Hood, WA7QQI
5670 SW 44th St.
Port Orchard, WA 98367

Introduction

Mobile radios were not high on my interest list in the late 1950's. I was just getting into ham radio and like the rest of my highschool buddies, it was the big rigs that got my attention. I had a Hallicrafters S38B and I thought that was small.

In the early 1970's I met Eskil Holt, W7DGT, and we became good friends. Over the next 18 years we made many trips to swapmeets together looking for those big rigs I could now afford. Conversation on these trips centered around early radio, antennas, and AM broadcasting. During one of these trips Eskil mentioned that he had been in the radio manufacturing business at one time. We discussed some production problems and the conversation drifted on to other subjects. I assumed he was referring to BC radio production and didn't pursue the matter.

A few swapmeets later I was astounded to hear a seller ask if Eskil would be interested in purchasing one of his mobile receivers. This was my first look at a Pierson Holt KE-93. Do I need to mention that the conversation on the way home had only one topic?

It was at this point that I started my search for a KE-93 (photo 1). The newer Pierson KE-93's by Automation Electronics can be found with a little work but the P&H version is more elusive.

My first receiver was found while in San Diego for a convention. It looked like it had caught fire and the seller made me take the mobile power supply along with it. The flight attendant needed two hands to lift my bag into the overhead rack on the way home. Ads in Electric Radio netted me more basket cases, nobody wanted to part with good working KE-93's. A 110 volt power supply was said to be in bad shape. An understatement! Parts of the case were missing, the S-meter was smashed, and almost every wire was cut, however, it was a Pierson Holt. I had a start on a power supply. I ended up with quite a pile of parts for my restoration project. (photo 2)

The Pierson Holt

The KE-93 mobile receiver is 5-1/8 inches high, 6-1/8 inches wide, 9 inches deep and weighs in at 10.5 pounds. The receiver can be fixed or mobile depending on the type of power supply chosen. The receiver uses seven bands to cover a frequency range of 550 kc to 30 mc.

The first thing you notice about the KE-93 is the turret assembly used to house the RF, mixer and oscillator coils. The coil strips can be removed by pressing down on the strip and against the end plate. A screw driver can then be used to pry up the strip. Care must be used not to damage the coils during removal. It is not necessary to remove the strips for alignment, adjustments can be made through holes in the RF deck.

The circuitry is straightforward dual conversion construction (Fig.1). The first IF is 2.2 mc and the second IF is 265 kc. Per the manual "Image and spurious responses are negligible down 80 dB or better. Sensitivity is well under 1 microvolt (3 dB plus noise to noise) on all bands with the exception of broadcast, where a sensitivity of 5 microvolts is purposely employed. The selectivity provides a 3 kc band width with a shape factor of better than 2.3."

A few circuit modifications were made to improve mobile operation. The

Photo 1

Separate AC and DC power supplies were provided for the KE-93. Voltage provided to the receiver is 225 volts at 85 milliamperes. The DC supply could run on 6 volt or 12 volt systems at 8 and 4 amps respectively. The AC supply also housed a S-meter and speaker.

There were some variations in the KE-93 over the years. Very early versions show no ballast in the power supply section. Later versions, like mine, have the tube as does the Automation Electronics version. I am still looking for one of the early versions of the Pierson KE-93.

noise silencer is a modified Lamb circuit. Where the original Lamb circuit used DC coupling between the noise rectifier and the controlled IF amplifier, the KE-93 used AC coupling. In the original Lamb strong adjacent channel carriers could lock up the IF. Using AC coupling allows only pulses to the grid of the IF stage. To prevent driving the grid of the IF amplifier positive a 6AL5 is used as a damper. With this system you have very little effect on your received signal and ignition type noise is gone.

The layout of the circuitry has improved with time. The point to point wiring was changed to component mounting strips. Larger wire was used in the harness and routing was much improved.

I have one example that would seem to indicate development of the KE-93 continued up to the time it was sold to Automation Electronics. This radio came from the estate of Eskil Holt and has a small S-meter mounted on the front panel. To the best of my knowl-

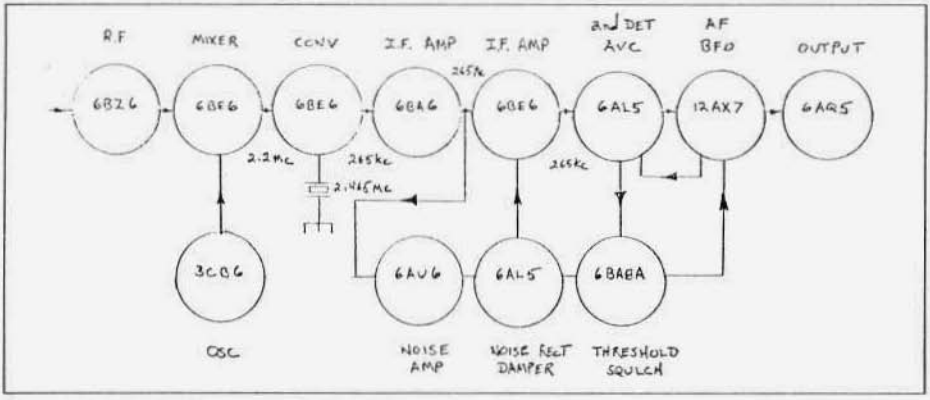


Figure 1. Block diagram of the KE-93

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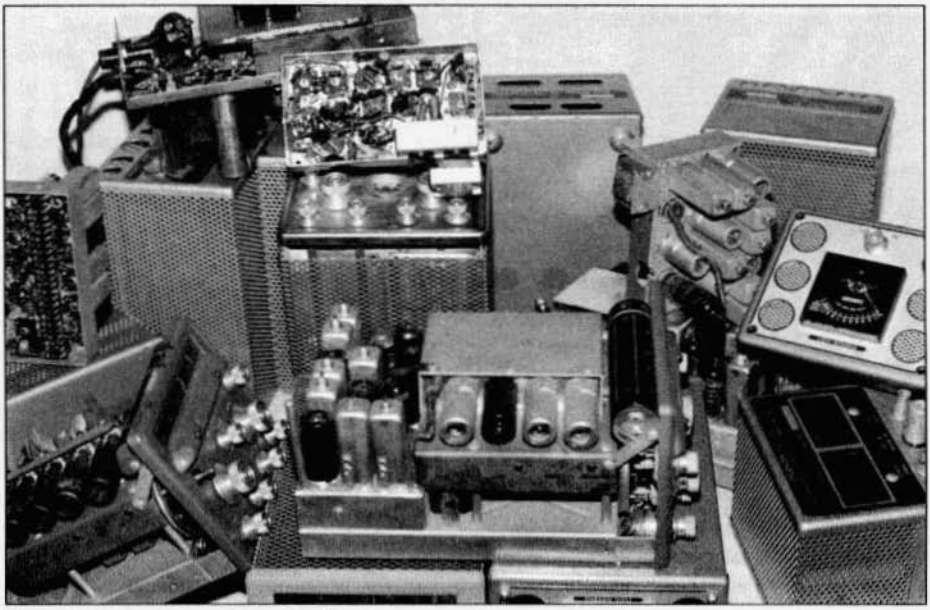

Photo 2. KE-93 receivers and power supplies awating restoration.

edge no production units like this exist. Unfortunately this prototype is not complete. Almost all of the circuitry is missing. However, the controls are all in place and the chassis layout is complete. In most of the receivers the controls are mounted on the front panel. In the S-meter version some of the controls are extend to the rear of the chassis. Lastly the side of the chassis is stamped EXP. Experimental?

Vice President and Design Engineer

Eskil Holt was born in 1909 and had a long and varied career in electronics. As with a lot of hams he started out with crystal sets, then built BC sets, and ended up as W6NNE in the later half of 1930.

One of his first jobs was that of Chief Engineer at KFSD in San Diego in 1939 (photo 3). While employed primarily as Chief Engineer, he would fill in as announcer or sound effects man as the conditions required.

In WW II Eskil served in the Army and again was involved with AM broadcasting. While stationed in India he helped set up AFRS station VU2ZY. The Portable Radio Broadcast Transmitter TWT PB-50A was used. Frequency range was 1,100 to 1,500 kc with a max output of 50 watts.

Not content to be just on the technical side, Eskil volunteered to fly on combat missions and make wire recordings of the bombing mission. These recordings would then be sent back to the States and played on broadcast stations, allowing America to hear what the war was really like.

Following WW II it was back to Southern California and work as Chief Engineer at both KGB and KSON. He continued his engineering education and received an MS in Electrical Engineering and an Honorary Doctorate in Science.

In 1955 while working as a Senior Design Engineer with Hoffman Radio Labs, Eskil met Karl Pierson. Karl and Eskil formed a corporation called Pierson Holt Electronics. Karl served as President and Eskil was Vice President and Design Engineer. The idea at

Photo 3. Eskil Holt, Chief Engineer at KFSD about 1939.

Pierson Holt was to start with the KE-93 and follow it with new amateur products. The Pierson Holt KE-93 was officially announced in the May 1955 issue of CQ magazine. Trouble was starting about this time for the amateur industry and Pierson Holt was no exception. By early 1957 the finances were running out and a hard decision was made to sell. Automation Electronics became the new manufacturer of the Pierson KE-93.

Eskil moved on to RCA Service as a Systems Planning Engineer, Karl Pierson stayed on with Automation Electronics and produced the Pierson KE-93 until 1960. Eskil and Karl remained friends and kept in touch by radio and the land line until Karl passed away.

After RCA Eskil held Engineering positions at Scripps Institute of Oceanography, Conic Corp and finally retired in 1971 from an electronics design position with the Dept. of the Navy. Eskil Holt, W6NNE/W7DGT passed away in January 1993.

Restoration

Since I only had one Pierson Holt KE-93 in my pile of radios, there was no choice on which chassis to restore.

First the radio was checked to see what was missing, damaged, or added on. All modifications were removed along with suspect capacitors and resistors. I was lucky and had several ballast tubes in the restoration pile. Cost of a 7HTF3 these days runs at least $25. A final continuity check was done before power up.

The last job to tackle was the front panel and the cabinet paint. The cabinet turned out not to be a problem. Metallic Gray Hammertone paint from Antique Electronic Supply was a perfect match.

The front panel was another story. The Pierson Holt KE-93 front panel was silver plated and sulfide finished, which tended to highlight the lettering. As I mentioned earlier my KE-93 looked like it had been in a fire, and was in sad shape. I decided to do like the later Automation Electronics versions and air brushed it a light gray. I am sorry I did that now and wish I had attempted to restore it. Maybe another project?

All that remained was to watch for smoke while slowly bringing up the power, check the alignment and enjoy.

I had anticipated that this article would be completed rather quickly. Such was not the case. New information kept coming to light and the article gradually changed from what I had envisioned. However, it did turn out to be a fun project and a nice way to remember an old friend.

continued next page

KE-93 from previous page

For those who may have a KE-93 in their collections, I have a limited number of original flyers on the KE-93. If you would like one of these four page flyers, please send a dollar and a 10 x 13 SASE to my address. Be sure to indicate if you want the Pierson KE-93 or the Pierson Holt KE-93. I can also assist with copies of the schematics or manual. A few original manuals may still be available.

Last but not least, I would like to thank Helen Holt for her kind assistance in making parts of this article possible. ER

The Globe 755 from page 25

tive input filter with a resistive series element, the 500B used a choke. I reasoned the substitution of the more costly component was in an effort to further reduce the ripple. So, I found a pair of 15 henry chokes in the Fair Radio catalog with dimensions small enough to fit right in the cabinet. To mount them, I removed the electrolytic capacitor can and its mounting, and installed the choke in its place. Then I used two new axial electrolytics and placed them under the chassis. I noticed that the CW note, particularly on the Adventurer, was closer to a true "T9." In addition, I disconnected and removed the original selenium rectifiers and replaced them with a pair of silicon diodes.

The cleaner of the two 755s came with a broken slug-tuned inductor for the 7 MHz output of the 6CB6. Rather than trying to find a matching part, I measured the range of inductance on the good one in the first 755, then rummaged around in my junk box looking for one that was a close fit. In fact, I found one that was practically identical. It was a spare 7 MHz local oscillator coil from my old HW-100. After I replaced the broken one with this one, I compared the outputs of the two VFOs on 40 meters while driving the Adventurer's 6AG7. When both were tuned to maximum, the grid current reading on the Adventurer was practically the same.

In Operation

Both the Globe King 500 and the Adventurer are cathode-keyed transmitters. Rather than key the VFO and transmitter simultaneously (a good way to achieve a distinctive chirp), I turn the VFO on continuously during transmit using the transmit/receive relay, and key the transmitters as I would if I were crystal controlled. Obviously, this will not work for full break-in unless you are transmitting on one frequency and listening on another. But I do not operate any of my vintage equipment using QSK. Instead, when I transmit, I place the receivers in standby mode and monitor my sending with a keying monitor. I check frequency stability, though, by occasionally lowering the gain and briefly monitoring the signal on the receiver.

A Good Choice

Based on my experiences with the VF-1, Viking 122 and Eico 722, I believe the Globe 755 is the best choice of the bunch. It is compact, self-contained, and stable. World Radio Laboratories came out with a 755A version that, I believe, replaced the series power-supply resistor with a choke, as I have done. Later on, when WRL began repackaging its Globe Chief and Globe Scout transmitters in those shiny aluminum cabinets (ugh!), it repackaged the 755 in a similar vein. Gone was the circular dial. Gone was the nice hammertone finish. But, I borrowed one of these from a friend, and they still offer solid stability. My guess is that there are far fewer of the shiny ones than there are of the older models. But whichever model you should come across, it is certainly worth considering for use with those VFO-less transmitters. ER

Looking Back from page 3
come and go at will, day or night. The burden of safety rested entirely with the individual. The checkout for this coveted privilege was usually administered by a senior - in my case one Charles M. Kearns, soon to begin employment at Hamilton Standard in CT. There he early on made a name for himself in propellers. I am told he achieved later notoriety both as a VP and by building a new home in Wethersfield facing the wrong way. Charlie was a technical man, and rarely, if ever, did I see him operate. A direct "counterpoise" in the group was one George Hart, W1NJM (a speed merchant), then a mature, smooth, liberal-arts upperclassman who exuded condescension to us slowpokes. He owned a dirty-blue, open Durant roadster (I would have been delighted to own it) which he always drove right up to the door of the shack. A big MARS operator, GEO put W8YA on the high-speed traffic map as WLMA, first alternate to WLM. He was held in high regard by our mentor professor, Gilbert Crossley. However, his operating talents and Charlie Kearn's ideas didn't exactly meld. Charlie went on to Hartford and GEO eventually graduated. There were other personalities, but none as diverse.

Time passes. I went to work for GE in Schenectady in '45, then in '54 relocated to Trumbull Electric in Plainville, CT. I took up residence in Simsbury, CT on Bushy Hill Road. Neighbor hams were Tom Evans, W1DCE (now W1JC); Joe Ogle, W1LSS; Bob Smith, W1LLF, the latter two now SK. To you, familiar territory.

I never had occasion to get to know the ARRL HQ gang, but of course knew who was what. Except for one visit to operate W1AW to renew my license in '54, the closest I got to HQ was to walk thru the alley next to their old brick office building on LaSalle Road when I went shopping in W. Hartford. One day I did drop in on W1HDQ at his home QTH in the Canton hills. After showing me around, we didn't find much to talk about - my not being a VHF man.

I knew ARRL GM Dick Baldwin because we went to the same church. In December 1976 he ran a QST ham-ad to sell an old HRO receiver, and being an antique radio buff, I bought it. It turned out to be an early edition "G" series, circa June-July 1935, complete w/two sets of coils. He said it belonged to ARRL's Al Budlong, the GM that scowled at you for the 'Blue Grotto' caper. Apparently Budlong considered that receiver the greatest thing ever. It was not in great condition when I got it, however. Its storage years claimed a heavy toll. Birds, mice or both got into the cabinet via the antenna terminal opening and laid waste to the chassis. I've never restored it beyond stripping and repainting the cabinet. The chassis is still a formidable project that may get done if I live long enough. No matter, the set is very special just to have. I would like more history on how Budlong got it.

You and I met only once, at your yard sale in Granby shortly before you departed for NM. However, your continuing gift with the printed word keeps Lew McCoy no stranger. I retired to NC in 1981 and follow your always-welcome contributions whenever they appear. I hope your Dayton face-flattening is now history and you're eager for the next challenge. Thanks for listening.

73,

A. Harvey Adams, W1YJ

P.S.

In 1984 I revisited the Penn State campus and asked to see the amateur station, now W3YA. The towers and original shack were, of course, long gone. The real estate was obviously too valuable. I never did get to see the relocated station, which at that time was not operational nor available for inspection. ER

ER in Uniform from page 8

of carrier and full, 100 percent modulation is easily achieved with the audio modification described above. I used the 441 to good effect during the 1994 Electric Radio 160 Meter contest. Unfortunately, deteriorating band conditions the past couple of years have made it tough going on 160 with the 441 and my other low power rigs.

When switching from transmit to receive the receiver circuits are exposed to the higher transmitting B+ voltage for a few milliseconds while the filter caps discharge. In an apparent design response to this, the bypass caps in the receiver are all "bathtub" units rated at 600 volts. Nevertheless, I have lost two of these capacitors on "key-up" over the past three years of operation. I have also replaced a couple of tubes but have experienced no other failures or problems with the set.

I have managed to scrounge up transmitting crystals for the most commonly used AM frequencies on 160 meters, but have also found it convenient to use my Globe 755 VFO with this set. Connecting this up required minor circuit changes to the 807 oscillator stage and the addition to a keying line out to the VFO. The only other modification I have made is the addition of a modern three wire AC line cord.

Conclusions

This is a simple, straightforward piece of equipment. I have no doubt it performed well in the role for which it was intended. **ER**

Notes:

1. Hutchens, Walt: "Electric Radio In Uniform, The BC-669 Transmitter-Receiver," Electric Radio, Number 30, October 1991.

2. TM 11-244, War Department Technical Manual, "RADIO SETS SCR-281-A, B, AND D" dated April 1945.

Revisiting The 304TL from page 31

with a 100-watt exciter's output. If one can find the socket, a suitable filament transformer, and a way to handle neutralizing, the 304TL is still a good candidate for homebrew RF amplifiers.

Hams also once used this tube as a modulator. A pair of them in Class AB1 will easily plate modulate a kilowatt. The Eimac data sheet says that at 1500 plate volts the maximum-signal output is 256 watts. At 3000 plate volts, the output is 730 watts. This should give one an idea of the tube's potential in push-pull as a linear amplifier with zero grid driving power.

The data sheet also says that the tube operates at "a visible red color at maximum dissipation." My experience indicates that the color is closer to bright orange. By the way, these old Eimac triodes were cooled by "convection and radiation," according to the data sheet. They didn't need noisy fans to force air across them. For me, at least, the name Eimac lives on, not only in their later tube designs, but most of all in the good old 304TL. **ER**

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FOR SALE: Military: BC-654 WWII Crosley TX/RX, looks nice, one capacitor missing, no accessories - $215; SCR-284/BC-654, FM-41 vehicle mount, key, dyno, many accessories - $780; brand new VRC-34 w/GRC-9, DY-105, many accessories - $200; BC-223-AX, no tubes, looks great - $140; TS-323 freq meter, 1945 date, nice - $40; RT-5009 & RT-5010 (Canadian PRC-9, PRC-10) w/battery boxes & antennas, both - $90. Don, N3RHT, PA, (412) 234-8819 EDST wkdys. 71333.144 @compuserve.com

FOR SALE: AN/GRC-109 Spy Radio, Viet Nam era HF xmtr, rcvr, pwr sply (see ER May '97) manual - $150. Dave, W1DWZ, MA, (508) 378-3619.

FOR SALE: Repair! Radio repair, tube or solid state, reasonable rates. Jim Rupe, AB7DR, Western Amateur Radio Repair Co., (WARRC), 998 Whipple, Grayland, WA 98547-0697. (360) 267-4011

FOR SALE: Vintage tubes, (833A, VT4C, etc.); assorted radio/wireless telegraph books & magzines, 1880-1935. SASE list. Jan Perkins, 524 Bonita Canyon Way, Brea, CA 92621.

FOR SALE: Collins repair: FCC Licensed Technician, we repair the Collins Gray Line i.e. S-Line, KWM-2/2A etc. & other select models. Merle, W1GZS, FL, (352) 568-1676.

FOR SALE: Magazines: Loose singles, some complete years: QST 1934-1969; CQ 1948-1972; Ham Radio 1968 - 1975; 73 Magazine 1960-1975; Heath manuals & catalogs; much more. Send 2-stamp LSASE or e-mail for list: Don, N3RHT, 47 Hazel Dr., Mt. Lebanon, PA 15228. 71333.1446@compuserve.com

FOR SALE: Heath: HA-1410 keyer - $30; HM-102 SWR/pwr meter - $30; Cantenna - $20; Bliley 100KC frequency standard - $25; EICO 710 GDO w/coils, book - $17; 100+ assorted panel meters - $125; 6 - 30 volt, 30 amp regulated sply - $50; 2" modulation monitor scope foundation - $12. U-ship. WA7HDL, ID, (208) 756-4147 after 2330Z.

FOR SALE: Roberts 720 7" reel tape recorder w/mantial, exc condx - $95. Neil Webster, POB 1065, Guttenberg, IA 52052. Tele/Fax (319) 252-3786

WANTED: Very early Hallicrafters and Hallicrafters/Silver Marshall equipment including Skyriders with entire front panel dull aluminum color, S-30 radio compass, S-33 Skytrainer, S-35 panadaptor, wood console speakers - R-8 & R-12, HT-2, HT-3, BC-939 antenna tuner, parts, advertising signs, paper memorabilia of Hallicrafters. Also want RCA model AVR-11 airport tower receiver. Chuck Dachis, WD5EOC, "The Hallicrafters Collector", 4500 Russell Dr., Austin, TX 78745. (512) 443-5027

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

WANTED: WW II Japanese, German, Italian radios & communication equip for display in intelligence museum. LTC William L. Howard, 2194 Harborview Ln., Largo, FL 33770. (813) 585-7756

WANTED: JW Miller RF coils, IF trans, chokes. Buying JW Miller & Millen parts, esp. need Miller B-727, B-727C, S-27, 912-C2, 912-C4, 912-C5. WA5THJ, Rt9 Box 163, Alvin, TX 77511. (281) 331-2956.

WANTED: AR-88, CR-88, CR-91 w/manuals, junkers or parts OK. David Boardman, 10 Lemaistre, Sainte-Foy, Quebec G2G 1B4 Canada. (418) 877-1316

WANTED: Collins 310B-3 parts or parts set; need antenna tuner parts & coils; final parts & coils; Browning Labs preselecter; other pre-1950 ham gear. Dean Showalter, WA6PJR, 72 Buckboard Rd., Tijeras, NM 87059. (505) 286-1370

WANTED: Standard D104, no preamp or bar, straight stand & head in A1 condx. G. Liccione, W2TPL, 118 Hiawatha Trail, Liverpool, NY 13088. (315) 457-7928

WANTED: Armored, steel braided cable, 1/2" OD, 30" long, # of conductors not critical, cable assys OK, aluminum storage box, CY-2134/GRC14, 9-1/4 x 7-5/8 x 11-9/16, has screw down knob in lid. Wes Gladhart, 84 Oaklawn Dr., Metairie, LA 70005. (504) 834-4584

WANTED: Band selector knob for Hallicrafters S76; S meter dial or complete meter for Hallicrafters SX28, must be in good condx; AVC BFO knob for SX28; SK matching xfmr for Hallicrafters R46 spkr. John Strachan, N1EG, 7495 Gunter Rd., Pensacola, FL 32526. (904) 944-6563

WANTED: Copy of spec sheet for UPC Unique Wire Tuner & Lafayette SWR/pwr meter #99-26411; rarity info on Hammarlund HQ-215. KA1ZQR, CT, (860) 535-1286.

WANTED: BC-610 parts unit or BC-610 **TRADE:** RAL-6 rcvr. W7RBF, AZ, (602) 864-9987

WANTED: Kleinschmidt teleprinter models: 311, 321, (AN/FGC-40, AN/GGC-16, AN/UGC-39...) Tom Kleinschmidt, 506 N. Maple St., Prospect Hts., IL 60070-1321. (847) 255-8128

WANTED: GPR 90, 91, 92; Hallicrafters SX-88; Eddystone rcvr's. James B. Geer, 1013 Overhill, Bedford, TX 76022-7206. (817) 540-4331

WANTED: Catalogs: Walter Ashe 1947; WRL 1952, 1953, 1956, 1963; BA 1958, 1959, 1960. Al, NI4Q, POB 690098, Orlando, FL 32869-0098. (407) 351-5536

WANTED: Old tube amps & xfmr's by Western Electric, UTC, Acro, Peerless, Thordarson; Jensen, JBL, EV, Altec, WE spkr's. Mike Somers, 2432 W. Fargo, Chicago, IL 60645. (312) 338-0153

WANTED: CB radio equip. I am looking for all types of old/vintage CB radio, amps, manuals, magazines, mics etc. Walter, CA, (818) 297-7249 **WANTED:** Valiant II, Swan 600R Custom; Hammarlund SP600-JX21A; TMC GPR-92. Ric, C6ANI, POB N4106, Nassau NP, Bahamas.

WANTED: Tubes: 866 & 872 (not-A's); WE-101F; WS-262B; 56 mesh plate; WE-272A; VT-62/pr; 801/pr; 826; 35TH; 808. Robert, WB6DPU, CA, (562) 928-8820. rrjlife@earthlink.net

WANTED: Mics: Shure 705, CR88, CR80, 520/440, 707A, EV638/641/605, Astatic T-3; parts & elements. Tom Ellis, POB 140093, Dallas, TX 75214. (214) 328-3225, fx 328-4217. 74053.316440Compuserve.com.

WANTED: AM modulation monitor, solid state for 19" rack. Will pay cash. P. Jay Spivack, N7JDT, 325 S. Washington Ave. #244, Kent, WA 98032. (206) 859-2680. pjpilot@aol

WANTED: Nonworking SX-71 for parts. Joseph R. Forth, 321 Long Vue Acres, Wheeling, WV 26003. Ph/Fx (304) 277-3154, Schematic1@aol.com

WANTED: RCA WC-528B quicktester. Louis D'Antuono, 8802 Ridge Blvd., Brooklyn, NY 11209. (718) 748-9612 after 6 PM.

WANTED: Manual rcvr type R1451A/WLR-6 & R1414/URR. Weber, 4845 W. 107th St., Oaklawn, IL 60453-5252.

WANTED: Manual/accessories for National HRO-5A rcvr. James Cavan, 6 Timberline, Norfolk, MA 02056. (508) 528-0908

WANTED: Tubes: Taylor 2032, Ampex ZB120, 45, any brand, new or used; National SW-3 first model, 2 volt version, uses 32-32-30 tubes, knobs for SW-3; other pre-1950 ham gear. Dean Showalter, WA6PJR, 72 Buckboard Rd., Tijeras, NM 87059. (505) 286-1370

WANTED: Junker National 1-10 rcvr for parts. Pat Stewart, W7GVC, 1404 Ruth Ave., Walla Walla, WA 99362-3558.

FOR SALE: Transmitter, audio, industrial tubes. Dee, W4PNT, 534 W. Main St., Waynesboro, VA 24431. (540) 249-3161, Fax 249-5064, http://home.rica.net/soundnmind/

FOR SALE: New list -hundreds of manuals, schematics and service information. Send 2-stamp LSASE. David Crowell, KA1EDP, 40 Briarwood Rd., North Scituate, RI 02857-2805. (401) 934-1845

FOR SALE: National NC-300, very nice - $300. **WANTED:** Collins 32V-3, 312A-1; Johnson Desk Kilowatt. Dennis, KC7VXD, ID, (800) 891-1990. leeid@ix.netcom.com

FOR SALE: Hallicrafters xcvr the Tornado SR-500, HF on 20-40-80 meters, solid 170 watts output, orig. manual, exc condx - $300 + shpg. R. Kevin DiPeri, 324 St. James Ave., Woodbridge, NJ 07095-1622. (908) 855-5453

FOR SALE: Rare pair, Conar 400 xmtr, 500 xcvr, exc condx, w/orig manuals - $110 shpd. Tom Jurgens, KY8I, POB 324, Bridgeport, MI 48722. (517) 777-2334

FOR SALE: WW II Japanese field radio, exc condx, slight wear of silk cord, batteries has readable paper w/no tears - $900. Marc Jones, 824 8th St., Ramona, CA 92065.

FOR SALE: Collins SM-3 mic, brand new in factory sealed package - $ make offer. Rich, KD6VK, 2720 Twin Palms Circle, Las Vegas, NV 89117. (702) 222-9941 richard@wizard.com

FOR SALE: New Collins 500 kHz filters 2.75 kHz wide, plugs into 51J-4 for extra 12 dB gain - $125. Walter M. Chambers, K5OP, POB 241371, Memphis, TN 38124-1371. (901) 761-9381

FOR SALE: Hundreds of books: ARRL; Rad; Lab; RCA, Receiver Design, 2-stamp SASE for list. Charles Brett, 5980 Old Ranch Rd., Colorado Springs, CO 80908. (719) 495-8660

FOR SALE: Galena xtal radios &/or parts to make your own. Len Gardner, 458 Two Mile Creek Rd., Tonawanda, NY 14150. (716) 873-0447

FOR SALE: New Release: Send 2-stamp LSASE for Olde Tyme Radio's latest flyer NO. 197 to: Olde Tyme Radio Co., 2445 Lyttonsville Rd., Ste 317, Silver Spring, MD 20910. Ph/Fax (301) 527-5280

FOR SALE: Ancient (30s - 40s) neons, one watt 110V, size 1-1/4 inch globe - $5 ea, 7 50 for two, etc. Request info. Charles Graham, 4 Fieldwood Dr., Bedford Hills, NY 10507. (914) 666-4523

FOR SALE: RCA AR88LF rcvr - $225; ARRL Handbooks, 1936, fair - $15; 1947, VG - $20; 1967 VG - $15; The Radio Handbook, 5th edition, fair - $20. Larry, VE3RF, Box 509, Ayr, ONT N0B 1E0, Canada. (519) 632-7921 eves, EST

FOR SALE: Collins 32V3, nice, 70E8A PTO. Jerry, WBEGD, CO, (303) 979-2323.

FOR SALE: Collins KW-1, 30K-1, 30FXC, 32RA, 32RS, 32V, 75A, 310, etc. For list: Norm, W6CC, CA, Fax (619) 698-6786, Nrmjhnsn@aol.com

WANTED: Collins KWM2-A labeled on chassis Collins Radio Co of Japan; early KWM2 serial No. below 100. Bill, KD4AF, NC, (910) 699-8699.

WANTED: Anything related to Tecraft & Ameco, cheap stuff only; Tecraft pwr sply & manuals. Bud Fritz, N3SFE, 104 2nd St., Montgomery, PA 17752.

WANTED: Military sets WS #29 Canadian A set; US DAS-2 Loran rcvr-indicator. Leroy Sparks, W6SYC, 924 W. McFadden Ave., Santa Ana, CA 92707-1114. (714) 540-8123.

WANTED: Collins R389, 30K-, 310-, 399C-1, KW-1, HF80 i.e. HF8014, 851S-1, Hallicrafters SX-115. Richard, WAØAKG, NE, (402) 464-8682.

WANTED: SP400, Scott rcvrs, only in very good condx. EA4JL, contact in the States, Kurt Keller, CT, (203) 431-6850.

WANTED: R-388 rcvr, complete or partial knob set. Dave Sundheimer, WØNBZ, 13020 Lakeview Dr., Burnsville, MN 55337. (612) 890-1844.

WANTED: CW 47135 2000-2500 kc; CW 47138 3675-4525 kc tuning units for GF-11 xmtr. Pete Hamersma, WB2JWU, 87 Philip Ave., Elmwood Park, NJ 07407.

WANTED: Vibroplex Zephyr McElroy bug; early Collins Radio equip, memorabilia, promotional items; Signal magazines. Brian Roberts, K9VKY, 130 Tara Dr., Fombell, PA 16123. (412) 758-2688.

WANTED: Lionel J-36 identification plate from parts unit or loaner for reproduction. Robert Baumann, 1985 S. Cape Way, Lakewood, CO 80227. (303) 988-2089.

WANTED: Type A coil set, GC 14.0 to -30 mc ,BS 27.0-30.0 mc, for any National HRO rcvr except HRO-60. Doc, W9VUN, MN, (218) 586-2952.

WANTED: International xtal 80-40 mtr xmtr & assembly manual for Heath EK-2A regenerative rcvr. Gary Wagner, K3OMI, 11124 Oak Hollow Rd., Knoxville, TN 37922. (423) 690-4217 dys.

WANTED: Huge Navy equipment: shipboard & shore radio, radar, & sonar, mint thru junkers. William Donzelli, 304 S. Chester Ave., Park Ridge, IL 60068. (847) 825-2630, integrat@usr.com

WANTED: Military electronics, RDF, radar, communications, test, manuals, literature, etc. What have you got? William Van Lennep, POB 211, Pepperell, MA 01463. (508) 433-6031.

WANTED: Watkins-Johnson or Communications Electronics Inc. info, catalogs, manuals or equipment. Terry O'Laughlin, WB9GVB, P.O. Box 3461, Madison, WI, 53704-0461, 608-244-3135.

WANTED: Globe King 500, A, B or C xmtrs, any condx., reasonably priced. Terry Collins, KB9AUP, 18 N. Tomahawk Ave., Tomahawk, WI 54487. (715) 453-3707 d, 453-4633 eves.

WANTED: In pristine condx.: Collins 32V3, 75A1, 30S1, 270G-1, 32S3A (RE), 310B3, 30K1, mech filter adapters. Lee, W9VTC, IL, (847) 439-4700 d, 726-1660 eves.

WANTED: Hallicrafters HT-1, HT-9, HT-31, S-T, SX-11, SX-17, SX-25; Howard rcvrs; Harvey xmtrs. Ken Seymour, KA7OSM, 9115 SW 176th Ave., Beaverton, OR 97007. (503) 306-7439 24 hrs. ken.seymour@attws.com

WANTED: Info/history on WW2 TCS radio system for article. Your help appreciated. Thanks. Greg Greenwood, WB6FZH, Box 1325, Weaverville, CA 96093. gregbfzh@aol.com

WANTED: Cash for Collins: SM-1, 2, 3; 312A-1, 2; 55G-1, 625-1, 399C-1; 51S-1; 302C-3; KWM-1; KWM-380; also buy estates. Leo, KJ6HI, CA, Ph/Fax (310) 670-6969.

WANTED: Manuals, manuals, manuals for radio-related equipment to buy or swap. Catalog available. Pete Markavage, WA2CWA, 27 Walling St., Sayreville, NJ 08872. (908) 238-8964.

WANTED: Broadcast gear, compressors, limiters, old mics, consoles, EQ, tube recorders, thanks! Mike States, Box 81485, Fairbanks, AK 99708. (907) 456-3419 ph/fax.

WANTED: Repair manual, schematic for Precision Apparatus Model 88 VTVM. Robert Harding, KC5LHR, 1321 Monte Largo Dr. NE, Albuquerque, NM 87112. (505) 291-0950. Robert.Harding@abq.com

WANTED: Looking for main tuning knob for Hallicrafters SX-100. Original manuals amateur and audio. Pete Markavage, 27 Walling St., Sayreville, NJ 08872. (732) 238-8964.

WANTED: Medical Doctors Hobbist of Amateur Antique radio, Test Equip. Alan Mark, POB 372, Pembroke, MA 02359.

WANTED: Squires-Sanders SS-1R, SS-1T, SS-1V, SS-1S, see my web page tulsa.oklahoma.net/~wd5jfr. Hank, WD5JFR, OK, (800) 364-4265.

FOR SALE: R-442 used - $180; w/mount & cable - $200; PSM-13 batt tester NOS - $25; GPM-55-PRC-25 module tester - $40; URM-120 wattmeter - $140; DY-105 - $45; AT-271 whip - $10; RL-39 reel crank NOS - $25; URM-25D for parts - $20. All + shpg. Tartan Electronics, POB 36841, Tucson, AZ 85740-6841. Fax (520) 577-7207, Ph 577-1022.

FOR SALE: Dual HR multicoupler side by side in rack mount, each has one input & 4 output w/built preselector 2-30 MHz no insertion loss, unit has multifunction test meter comm too, both couplers, grtd, exc, - $175 + UPS. Tony Snider, VA, (757) 721-7129.

FOR SALE: RCK revr VHF complete, good shape w/depot level spare parts kit, not tested, easy restore job - $150 + UPS. Tony Snider, VA, (757) 721-7129.

FOR SALE: O-scopes TEK 454 - $75; TEK 453 - $60; HP 180 w/50 MHz plugs, unchecked, good but not perfect looks - $60 + UPS. Tony Snider, VA, (757) 721-7129.

FOR SALE: R-390A & CV-591A SSB converter both remanufactured to like new condx by Rick Mish of Miltronix. R-390A his Longmont Audio Labs Super Audio Chassis installed but separate stock audio chassis is included along w/2 complete sets of new tubes for both units, beautifully mounted in a new Premier Metal Products DCR-18170 desk cabinet rack - $1500. Please call prior to noon Colorado time. Jeffrey Hopkins, WA2DPK, 2482 Remington Rd., Elizabeth, CO 80107. (303) 646-0139.

FOR SALE: R-390A tags, reproduction. Reads: Receiver, Radio R-390A/URR, Designed By Collins Radio, Cedar Rapids, Iowa, For Signal Corps, U.S. Army" Also reads NSN &voltage info. 1" X 2.5" etched aluminum - $9 ea, two for $16, five for $35, shpd. Tom Marcotte, N5OFF, 111 Destiny, Lafayette, LA 70506.

FOR SALE: Harris RF 3466 HF data modem 39 tone type for use w/RF-590 or any like HF xcvr, automatically selects best baud rate according to atmospherics, modern technology, would require 2 for link, w/instructions & hook up data - $175 + UPS. Tony Snider, VA, (757) 721-7129.

FOR SALE: RME 4350, works good, looks fair - $125; Morrow rcv converter - $40; Hughes Mitchell exciter w/pwr sply - $75; Johnson Challenger - $150; Collins 310B-1, very clean - $375; Johnson KW lowpass - $35; EDICO kw low pass - $35; Electro voice speech clipper - $35; DeWald 6-meter w/mic - $30; Lafayette external BFO - $15; Collins orig manual for 75A2 - $35. All + shpg. **WANTED:** Manual or copy for Collins KWS-1. Donzil, WS0F, AZ, (520) 772-1297.

FOR SALE: Xtals 7010 kHz, type CR-1, NOS military - $2 ea, quantity pricing available. WA5THJ, Rt 9 Box 163, Alvin, TX 77511. (281) 331-2956.

FOR SALE: 1 in 10 out, 2-30 MHz multicoupler 100 kc-30 MHz w/tiller removal rack mount 115 VAC w/multi function test meter for input, individual output & pwr sply levels, exc, grtd - $200 + UPS. Tony Snider, VA (757) 721-7129.

FOR SALE: Viking 2 w/122 VFO, GC - $175; NC-173 fair - $60. PU only. Jim Miccolis, N2EY, 126 Summit Ave., Upper Darby, PA 19082. (610) 352-5247.

FOR SALE: National HFS revr parts set - $45; Drake 34PNB NB for TR4 - $90; Gonset Monitone (see ER879) - $40. All + shpg. Richard Wayne, W4LN, 1201 Hanover Dr., Concord, NC 28027. (704) 788-4487.

FOR SALE: Drake TR4 CW AC & DC ps, RV-4C, spkr, noise blanker & extra finals - $425; National NC-300 w/calibrator & matching spkr - $225; Vibroplex orig standard bug - $110; Ameco 2 meter converter - $25; Knight X-10 xtal calibrator - $30; Heaths: AC-1 antenna tuner - $90; HD-20 xtal calibrator - $25; PM-2 mobile tuning meter - $25; 400 Hz xtal filter - $45. Shpg extra. All w/manuals. Larry Wright, N4QY, 170 Heritage Ln., Salisbury, NC 28147. (704) 633-3881.

FOR SALE: DX-100 for parts - $45. PU only. Clem, W8VO, MI, (810) 795-4670, dys.

FOR SALE/TRADE: For a good R390A my B&W antenna tuner BC-969 serial #267 that was designed for a BC610 - $200 PU only. Clyde M. Denton, K4UXX, 2538 Country Club Ln., Columbia, TN 38401-5811.

The Radio Finder©

11803 Priscilla, Plymouth, MI 48170
TEL/FAX 313-454-1890
e-mail: thurtelljh@aol.com

AUGUST SPECIALS

AMATEUR TRANSMITTERS: COLLINS KW-1; 32S-1; 30L-1 amp; 516F-2 AC; **GLOBE** King 500-B; **JOHNSON** Invader 2000; Valiant, Thunderbolt, Ranger; Johnson mobile VFO; ; **HEATH** DX-100; **CENTRAL** 100-V; 200-V; **HALLICRAFTERS** HT-32B; HT-32; HT-37; **MULTI-ELMAC** AF-67; AF-68; **HARVEY WELLS** TBS-50 Bandmaster Deluxe w/PS & VFO

AMATEUR RECEIVERS: COLLINS 75A-4; 75A-3; 75A-2; 75A-1; R-388 w/prod det; R-388 stock; 75S-3B; 75S-3; Rare 399C-1 speaker/PTO; 312B-4 console; S-line speaker; CP-1; 270-G-2/3 speakers; **DRAKE** R-7; **HALLICRAFTERS** SX-88; SX-73; SX-62A; SX-101A; SX-28; SX-17; S-40B; R46/R46B speakers; **HAMMARLUND** SP-200; HQ-170; HQ-129-X; **NATIONAL** HRO-500; HRO-60; NC-300; NC-183; RAO WW II Navy receiver, National speaker; **SCOTT** SLR-F "anti-submarine" receiver

MILITARY RECEIVERS: R-390; R-390-A; complete R-391, R-392; **MILTRONIX** R-725, R-389, R-390, R-390-A; R-1051B; R-1051E; CEI 354; **WATKINS-JOHNSON** DMS-105A

TRANSCEIVERS: ROCKWELL-COLLINS KWM-380; KWM-1; 516F-1 AC; 516E-1 DC; 312B-1 speaker; **HALLICRAFTERS** SR-150; SB-100; HW-16; Tweet; **NATIONAL** NCX-1000; SBE SB-34; **YAESU** FTDX-560; FT-101-EE accessories: remote VFO, monitor, Landliner, digital readout

FILTERS: CW for 75S-3; 75S-3B/C; 51S-1; 75A-4 – 6 khz; ; 75A-3 – 6 khz, 800 hz; Drake R4C – 250 hz

Radio Finder website: http://www.radiofinder.com

Check The Radio Finder's web page – listings updated weekly

FOR SALE: Heath HG10-B VFO - $50; B&K Precison 10 MHz, dual trace oscilloscope w/manual - $100 + shpg. Jim, WØJJL, 2207 Madison Ave., Norfolk, NE 68701-4534. (402) 371-3477

FOR SALE: Large selection of mic's, broadcast & general purpose. SASE for list. Stuart T. Carter II, W4NHC, 680 Fernwood Dr., Melbourne FL 32904. (407) 727-3015

FOR SALE: Collins, 62S-1 transverter. **WANTED:** 6386 tube. Rudy, W2ZIA, NY, (716) 937-9279.

FOR SALE: Collins mechanical filter plug-in adaptor w/301 kHz filter for HRO-60; also same w/1.2 kHz CW filter - $140 ea. Bill Smitherman, KD4AF, 9401 Hwy 67, E. Bend, NC 27018. (910) 699-8699

FOR SALE: Plate xfmr UTC commercial grade CG-302 1900V CT 360 mA, 22 lbs - $35. Jim, OH, (614) 927-2592.

FOR SALE: Drake 1-A, serial #10, face clean, few scratches, works, freq shift on CW, copy of the manual - $250 + shpg. Marc Boogaard, WA8IIK, MI, (616) 364-7700.

FOR SALE: HT-32, orig owner, clean - $275. PU Joe, W6CAS, CA, (916) 731-8261.

FOR SALE: Heath VFO SB-644A - $35; station counsel SB-634 - $60. Ken Kolthoff, 8967 Scott Dr., Desoto, KS 66018. (913) 585-1196

FOR SALE: Tube list, new & used, wide variety audio, ham. Recently expanded. SASE 52¢. Bill McCombs, WB0WNQ, 10532 Bartlett Ct., Wichita, KS 67212-1212.

FOR SALE: GSB-100 - $200; NC-173, clean - $135; Valiant, nice - $325; TR3 RV3 & ps 3, nice - $200; Measurements sig gen mod 65B - $30; EICO 753 - $100; Communicator IV, 2mtr, clean - $75. **WANTED:** ARR41 rcvr or parts unit; Globe King 500B modulator deck or parts unit. Herb Reich, KØUBK, 1201 8th Ave. S., S. St. Paul, MN 55075. (612) 455-7898

FOR SALE: Books, Modulation Theory by Black, Radio Manual by Sterling - 2-stamp SASE. Charles Brett, 5980 Old Ranch Rd., Colorado Springs, CO 80908. (719) 495-8660

FOR SALE: B&W 6100 xmtr, exc conds, works on all bands, highest bidder - $1000 + shpg minimum, bidding closes 9/1/97. c/o GNARC, 97 Southwood Dr., New Canaan, CT 06840

FOR SALE: Two Eimac 450TLs; two H&K Gammatron 4E27s. Call after 6 PM. Gary Peterson, K0CX, 3288 Sandstone Ln, Rapid City, SD 57701. (605) 343-6739

FOR SALE: Hallicrafters SX-101A - $200; Heath DX-60 & VFO - $75. **WANTED:** Central Electronics 100V. Robert Braza, N1PRS, 23 Harvard St., Pawtucket, RI 02860. (401) 723-1603

FOR SALE: Collins repair. I specialize in S-line equipment. Reasonable, & work guaranteed. Steve, N6HK, Box 1136, Goleta, CA 93116. (805) 967-7466

FOR SALE: Harris RF-675 antenna coupler used w/Collins KWM-2A; Collins 30L-1 linear, & 75A-4 rcvr w/spkr. Send SASE for Collins literature list. Bill Mills, KC5PE, GA, (912) 452-2957 after 7PM EST. wmills@gmc.cc.ga.us

FOR SALE: Thousands of tested tubes w/ warranty! Buy xmtr, rcvr or audio spare tubes for your unit. Tubes are used, tested at about 1/3 of new, many are around - $1. Bunches of octal, 7 & 9 pin tubes. All tubes are tested on TV-7D/U tester & then boxed. 30 day replacement or refund warranty. Send wants or SASE w/two stamps for list. **SERVICES'** Repair/calibration of TV-7 tube testers. Contact for arrangements. Repair starts at - $45 + shpg. Daniel Nelson, 1025 E. Desert Ln., Phoenix, AZ 85040. (602) 243-7421 machine/eves. djn@goodnet.com

FOR SALE: Moving forces sale of some of my prized radios: Swan: TV-2B 2 meter transverter, exceptionally nice - $200; Swan 250C, 6 meter xcvr (no supply) exceptionally nice, - $175; Swan 500CX parts unit, complete except for covers and one knob - $75; Johnson Valiant parts unit, complete except for HV xfmr - $125.; Dentron, very rare AF-1A audio processor - $85; even rarer W2-PEP lighted HF PEP wattmeter - $125; Dentron MLA-2500 linear w/brand new 8875's up to 2500 watts output, mint - $1000 firm; sweep tubes, new 6LQ6/6JE6C's - $60 per pair; very rare 8950's - $90 per pair. Craig Pitcher, WA9HRN, IL, (847) 367-1599 eves & wkends, 390-2948 weekdays 9-5 CST

FOR SALE: RCA AR-88, gray panel, cabinet not orig, exc working condx w/manual repro, spare new tuning condenser & new gear train - $250 + shpg or U PU. Ken, WB9OZR, 50 E. 79th St., New York, NY 10021. (212) 512-1866 d, 288-1310 eves, Fax 288-3070.

FOR SALE: Collins 28V mobile ps - $50; Heath 2M hand held model parts unit & charger - $25; Autronic keyer w/orig paddles - $65; TO keyer - $75; Heath DVM IM-2260 in kit form - $90; Johnson rig, Sentry in orig box - $45; new Collins cabinets, KWM-2 - $75; 30L-1 - $75; 325 or 75S - $75; Heath CR-1 xtal set - $75. Marty, NJ, (609) 466-4519.

FOR SALE: New orig. PJ-068 mic plugs for Collins S-line/KWM-2A/HF-380 shp'd in USA - $8 ea. Clint Hancock, KD6H, 6567 Ashfield Ct., San Jose, CA 95120-4502.

FOR SALE: KWM-2 fan bracket - $15 ppd. Dave Ishmael, WA6VVL, 2222 Sycamore Ave., Tustin, CA 92780. (714) 573-0901

FOR SALE: 2152 page MIL-HDBK- 161 of 1959, almost new; over 3700 pg MIL-HDBK, 172 - $200; J-4 filters - $150. Walter Chambers, K5OP, POB 241371, Memphis, TN 38124-1371. (901) 761-9381

FOR SALE: Modulation xfmr for 810's made by Peter Dahl. PRI:2000-2250 VDC @ 12K, SEC: 300-340 Ma @ 6.7K - $150. Brian, KI5SG, OK, (918) 494-6823.

FOR SALE: SCR-211 TM (1942); SB-300 pwr xfmr; Allied Catalogs 1966, 1967; Radar Electronics (1944); Radar Systems (1944); 1953 ARRL Handbook - $5 ea; SB-300 cabinet, exc - $20; Skyrider Jr., VGC, nicely repainted - $18; + shpg. Patrick Marineau, K9HF, 6300 Kingsway Dr., St Louis, MO 63123.

FOR SALE: Hal SX43, needs restoration - $59; Globe 6 & 2 meter VFO - $35. + shpg. H. Mohr, 1005 W. Wyoming St., Allentown, PA 18103

FOR SALE/TRADE: Atwater Kent 20C w/horn spkr, Crosley 51 special. Robin Chesnutt, WA5YGR, 1407 Country Club Dr., Perry, OK 73077. (405) 336-3175

FOR SALE: Fisher 400 tube stereo, wood case manuals - $325; Fisher 500B tube stereo, manuals - $350. N1FRX, ME, (207) 834-6273 eves/wkends.

FOR SALE/TRADE: Stewart Warner xmtr, 225-400 Mc, T2820D/GR & Collins pwr sply/mod, MD129A/GR w/some cabling. Wes Gladhart, 84 Oaklawn Dr., Metairie, LA 70005. (504) 834-4584

FOR SALE: Used 807 tubes, tested OK, guaranteed - $5 ea + $3 priority mail. James T. Schliestett, W4IMQ, POB 93, Cedartown, GA 30125. (770) 748-5968. imq@bellsouth.net

FOR SALE: BC-610E, new 250th, spare tubes, substantial paperwork - $595; SX-28A, very nice - $295; Apache - $175; Viking II - $175; SX-101 - $195; everything works well. I've moved & just don't have enough room for all this gear. Vern, WØVV, Box 187, Redding, IA 50860.

FOR SALE: Ham Radio Magazine from issue 1, Mar '68 thru Dec '69, 22 copies - $20 + UPS; QST from Jan '60 thru Nov '72, 155 copies - BO. Dan Knipe, W7IGE, 3750 Highgrove Ln., Nampa, ID 83687. (208) 888-9575

HISTORY: I would like to correspond with anyone who can help provide information on the history of the National NC-100 series & variants. Please write, call or e-mail: Larry Ware, 7436 Fieldcrest Ave., Winter Park, FL 32792. (407) 679-6975, lrware@pipeline.com

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FOR SALE: Rare 1930 National SW-5 Thrill box (before SW-3) - $400. **WANTED:** Nice SX-88, have several very rare 1928 National SW-2 sets w/ cabinets & coil sets in the box to trade. Greg Gore, WA1KBQ, 11528 Watermoss Ln., Charlotte, NC 28262-9231

FOR SALE: R1051G 2-30 MHz ,military rcvr FSK, SSB, ISB, AM, CW, 115V, solid state except 2 tube front end current navy use rack mount, exc condx, guarenteed - $575 + UPS; R1051B earlier version of 1051G, exc, grtd - $295 + UPS. Tony Snider, VA (757) 721-7129.

FOR SALE: URM-25D 10 kc-50 Mc signal generator unchecked complete but no dust cover - $35 + UPS. Tony Snider, VA, (757) 721-7129.

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FOR SALE: Copies: Hard to find schematics for radios, also kit radios 1922-1950; manuals: test equip.ham gear.Contact me for prices, availability. Duane Ballew, KB7QZK, 6813 152nd St. Ct., NW, Gig Harbor, WA 98332. (206) 851-4505

FOR SALE: Vintage Heath test equip, parts, more! 2-stamp SASE or $1 for list. Jim Miccolis, N2EY, 126 Summit Ave., Upper Darby, PA 19082. (610) 352-5247

FOR SALE: Transmitting capacitors fixed & variable, Cardwell, Hammarlund, Centralab, etc; varity of tube sockets, Eimac, Johnson, etc; magazines of 30s & 40s, QST & Radio handbooks also. SASE for lists of interest. Dave, W3KDD, 5129 Avoca Ave., Ellicott City, MD 21043. (410) 465-3884

FOR SALE: Heath SB101, SB200, SB630 console, SB600 spkr/PS, set only - $400; Drake TR4-CW w/PS - $295; Hallicrafters SR-160 - $90; AEA ET-1 300 watt tuner - $75; RELiant, 7561 clone, revr - $100; Allied/Knight T-50 xmtr w/VFO - $75; GRC-109, T-784, R-1004, PP-2685 - $175; teletype equip - call. All + shpg. Jack, WA2HWJ, NJ, (973) 927-7784 wkends only.

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FOR SALE: KWM-380, exc & loaded; 1 to 18 service bulletins; self study training manual & cassettes. Bill Coolahan, 1450 Miami Dr. NE, Cedar Rapids, IA 52402-2933. (319) 393-8075

FOR SALE: Variac w/knob, new, General Radio Company 115 VAC, 10 amp - $50. Frank S. Law, W8SET, 1 Wildacre Rd., Charleston, WV 25314. (304) 343-0415

FOR SALE: Manuals GRC-106, BC-611, BC 603/604 - $25; ARRL Handbooks, 1955, 1968 - $25. SASE for list. Gary, W8MFL, MN, (612) 496-3794.

FOR SALE: SP-600 JX-1 w/manual. Bill Coolahan, 1450 Miami Dr. NE, Cedar Rapids, IA 52402-2933. (319) 393-8075

FOR SALE: Bretting 12 w/manual, restorable - $165; National FBX (FB-7X) w/160 & 20M coil sets, plus B, C, E, F & 80M osc coils, manual, no PS, restorable - $250; Heath GD-1B grid dip w/7 coils - $25; AM-2 & HM-2 SWR pwr meter, both for - $25; Waters Co w/manuals, hybrid coupler - $25; compression amp - $15; Wire Chief type wall mounting, scissor extender w/old telephone - $150; homebrew 10 meter converter in National SRR case w/gold vernier dial - $30; Gallaxy 5 Mark 3 pwr sply - $50; Raytheon LF, RDF, model GM-114A, has built in loop, needs alignment - $30; GR 1212A Unit Null detector, manual, no ps - $30; pwr RF tube 4-1000A w/fil. xfmr, socket, chimney & fan - $200; Selsyns type 5, 120V, pair - $25; Infinity dual coil, 10" woofers, never used - $80; Electrovoice 12" woofer, T type tweeter & x-over - $55; Rawson mirror scale Lab meters in walnut boxes, type 501 volts to 100, amps to 15 in 5 ranges - $35; type 502 AC/DC thermovoltmeter, 8 ranges to 100 volts, needs bolometer - $30. All + packing & UPS. **WANTED:** Harvey Radio Labs FT-30 xmtr, see FOS, pg 257, $1000 + finders fee; toy or very small, old electric motors, toy & cereal box mic & antenna eliminators. Will pay well for large, old telegraph & spark keys. Robert Enemark, W1EC, POB 1607, Duxbury, MA 02331. (617) 934-5043

FOR SALE: Heath HW-16, needs work - $50; HW-16, good - $85; Hallicrafters S-120 - $50; Collins 516F-2 case, needs paint - $15; 70E-2 & 70E-3 PTO set, used - $25; Grundig 88U, mint but incomplete $18; Western Electric 396A antique chest mics, unused, less harness - $10 ea; Singer FM-9 service monitors, repairable - $65; w/FC-3 extender - $95. All + UPS. Geoff Fors, WB6NVH, POB 342, Monterey, CA 93942. (408) 373-7636

FOR SALE: Hallicrafters HT-37 xmtr, in good condx w/book; HA-1 keyer, nice; S-41-G Hallicrafters rcvr, fair condx. Fred Clinger, WA8KJJ, OH, (419) 468-6117 after 6 PM EST

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FOR SALE: New Collins parts: 30L-1 xfmrs - $90; 6AZ8's - $3.50; 6082WB's - $4.50; 4D32's - $29. Lowell, K6KC, CA, (209) 227-1605, k6kc@lightspeed.net

FOR SALE: GRC 109 w/6 VDC & AC sply, manual; BC 610 mod xfmr. Joe, K2QPR, FL, (561) 220-7362.

FOR SALE: R-390A, meters, no covers, refurbished by Chuck Rippel, manuals, xtra pwr sply - $700 + shpg. Fred Stachel, 861 Matadero Ave., Palo Alto, CA 94306-0206. (415) 493-4261

FOR SALE: Collins 51S-1 w/312B-3, 75A-3; KWM2/516F-2; 312B-4; 75S3B w/2.1/1.5 & .8 filters, 312B-3; 30L-1; DL-1. All w/orig manuals. John Boyle, VE3PMA, Box 68, Portland, Ont., K0G 1V0 Canada. (613) 272-2941

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WANTED: Xmtg tube sockets, 813s, etc. Send SASE for list 4 tubes & socket extenders. Typetronics, POB 8873, Ft. Lauderdale, FL 33310-8873. (954) 583-1340, fax 583-0777

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WANTED: Looking for main tuning knob for Hallicrafters SX-100, orig manuals, amateur & audio. Pete Markavage, 27 Walling St., Sayreville, NJ 08872. (732) 238-8964

WANTED: To buy or trade military surveillance & countermeasures rcvrs & jammer or related gear 1960 - present. Tony Snider, VA, (757) 721-7129.

WANTED: Mint HRO-500; CE100V; HT-33B; HT-44. Bob Struk, CA (408) 991-3747, bob.struk@sv.sc.philips.com

WANTED: Compressor amplifiers & other pro-audio gear: mics, preamps etc-tube or solidstate. Mark Linett, CA, (818) 244-1909.

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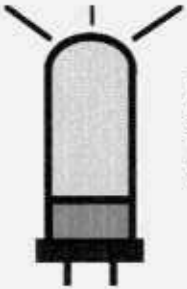

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