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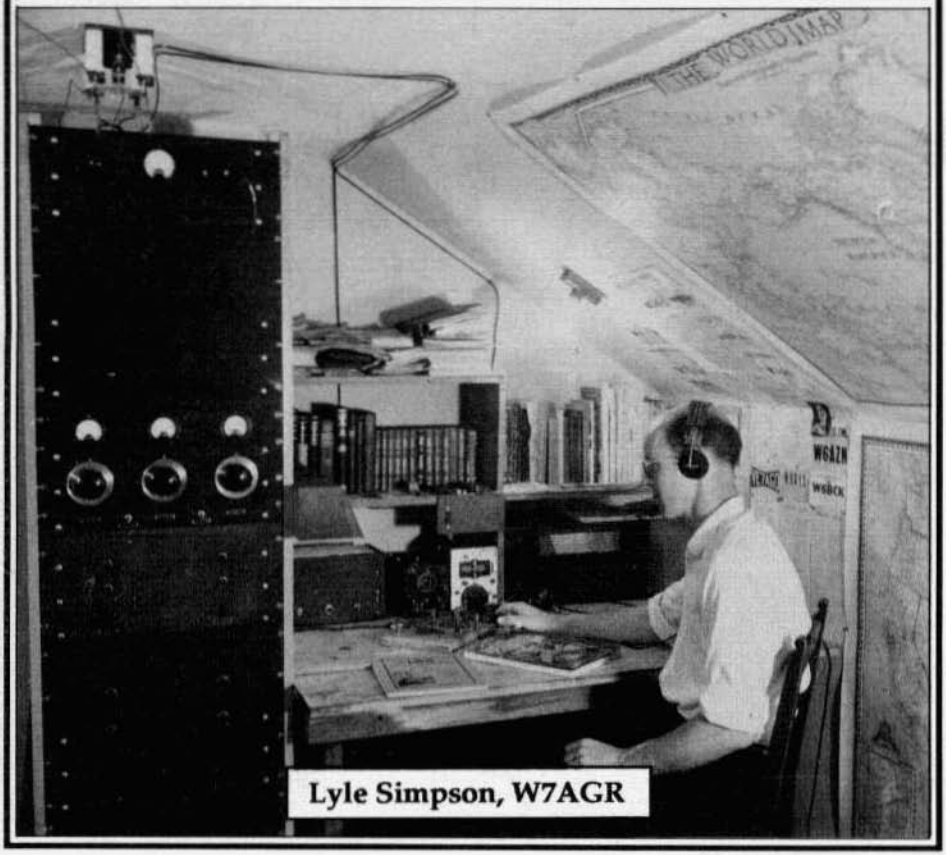
ELECTRIC RADIO

celebrating a bygone era

Number 41 September 1992



Lyle Simpson, W7AGR

ELECTRIC RADIO

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WALT HUTCHENS,KJ4KV.....ELECTRIC RADIO IN UNIFORM
FRED HUNTLEY,W6RNC.....REFLECTIONS DOWN THE FEED-LINE
BILL KLERONOMOS, KDØHG.....VINTAGE PRODUCT REVIEWS
DALE GAGNON, KW1I..... AM REGULATION UPDATES

Electric Radio is published for amateur radio operators and others who appreciate the older tube type equipment. It is hoped that the magazine will stimulate the collecting of, and interest in, this type of equipment.The magazine will provide information regarding the modification,repair and building of equipment. We will also work to-wards a greater understanding of amplitude modulation and the problems this mode faces.

Electric Radio Solicits Material

We are constantly searching for good material for the magazine. We want articles on almost anything that pertains to the older amateur equipment or AM operation. From time to time we will also have articles and stories relevant to the CW operator and the SWL. Good photo's of ham shacks, home-brew equipment and AM operators (preferably in front of their equipment) are always needed. We also welcome suggestions for stories or information on unusual equipment. For additional information please write us or give us a call.

EDITOR'S COMMENTS Barry Wiseman, N6CSW/Ø

In the August issue of QST in his "It Seems to Us" column, David Sumner, K1ZZ, Secretary of the League, writes about on-the-air indecency, and what the FCC is going to do about it. He had some good news for us.

For years we've all been frustrated with this problem. Tune across any band at any time of the day or night and if the band is open, you're probably going to hear profanity, obscenity and indecency. If you're like me you're going to feel a little offended and sometimes embarrassed that you're a part of this hobby; particularly if you're demonstrating/promoting ham radio to someone at the time. Up until now, there didn't seem to be any answer to the problem. Because of First Amendment rights and other legal issues, the FCC was reluctant to get involved.

Now, because of recent court decisions (see Sumner's article for more information) the FCC is getting involved. Here's what Sumner said in his column, "The FCC also has adopted new guidelines for the assessment of monetary forfeitures for rules violations. Under these guidelines, transmission of indecent/obscene material merits a $5000 forfeiture per violation, per day. Repeated violations will up the ante to as much as $10,000. Not only is this serious money, it's also enough to get the US Attorney interested in collecting it if it isn't paid. He concludes by saying, "If this were a word to the wise, it would be sufficient."

I'm sure that an accidental 'expletive' isn't going to get us fined; I don't think anyone sees any sense in that. The only people that should live in fear of this new "FCC guideline" are those that are chronically profane, obscene or indecent on the air. This new regulation (or is it enforcement of an old one?) can only be beneficial to ham radio and should be good news to about 99.9% of the ham population. Three cheers for the FCC.

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Cover: Lyle Simpson, W7AGR, from a 1951 QSL card sent to me by Rudy Lazzazero, W2ZIA. I contacted Lyle and he's still active and still operating vintage equipment at the age of 82! Maybe we'll have more on him in a future issue.

Reflections Down the Feedline

Kenrick Ellis
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Sierra Madre, CA 91024

Old timers vividly remember the great depression of the early thirties. And of course this includes hams. Most of us were out of work and could not afford much in the way of new equipment. But hams are ingenious and resourceful and expert scroungers and traders. Many hams were also kind and helpful to each other in donating parts and assistance.

This photo of an early thirties home-brew transmitter exemplifies many of the traits of the rigs of the time. The three chassis were made of Masonite pressed wood panels and solid wood ends, all painted flat black. The rack of shelves was also solid wood and the top panel was pressed wood. Look closely and you'll see the many cost cutting stratagems common in those days. The dials are from old BC receivers - so what if they don't match? The plug-in coils are hand wound and fit into Amphenol tube sockets - except for the final, wound on a commercial ceramic form.

Meters were expensive so the one small meter was fitted with a cord ending in a phone plug to fit into the jacks to measure each stage's plate and grid current as well as final plate voltage and even double-button microphone current. Another Amphenol socket accepted the Bliley and home-made crystal holders for home-ground crystals.

The line up? Bottom chassis holds two power supplies with filament and plate ON-OFF switches and pilot lights, and fuses consisting of dial-light bulbs in series with the negative high-voltage leads. One of the filament transformers is an electric toy train transformer!

The next up chassis holds the speech amplifier and modulators, all transformer coupled: 256 into 256 tubes into two parallel 250s as Heissing modulators. Note room for expansion into four '46s in Class B.

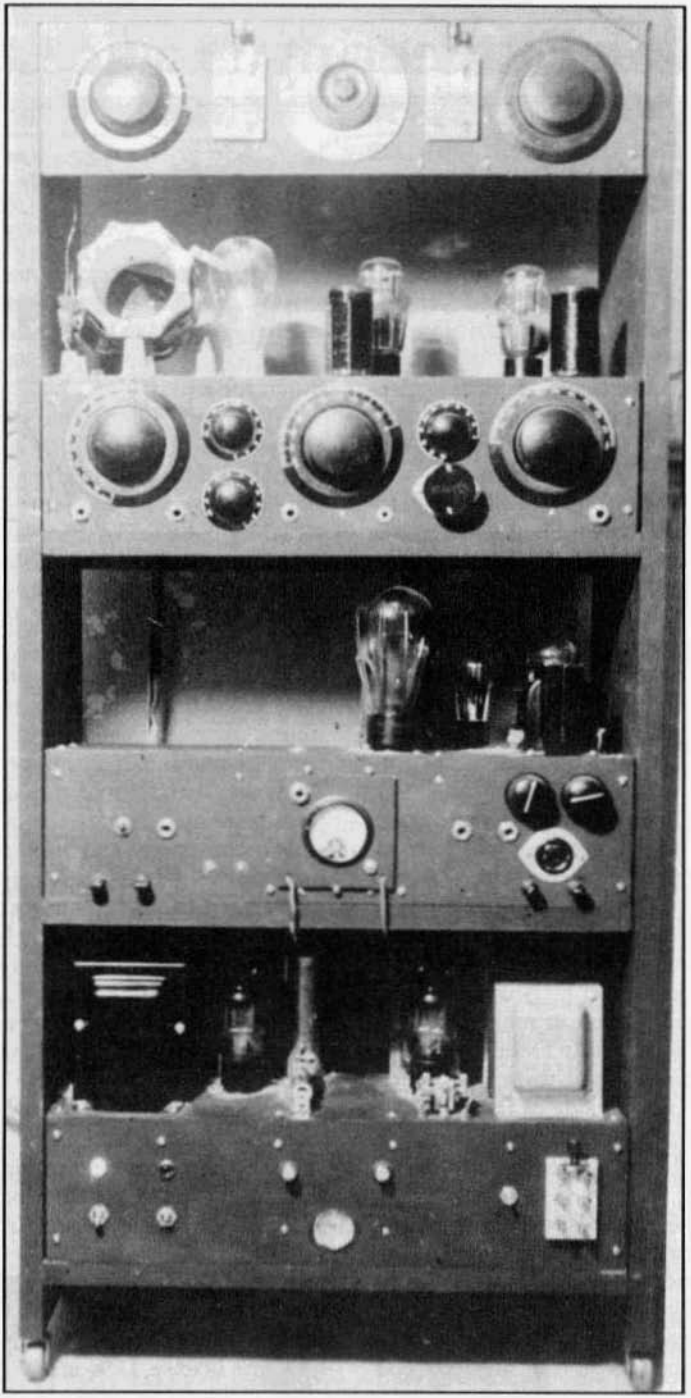
The next up chassis is of course the RF string: '47 crystal oscillator, '46 buffer-doubler, Taylor 825 triode final amplifier, 60 watts input.

The top panel houses the antenna tuner, link coupled to the final amplifier tank coil below. Switches provide connecting the output to a dummy antenna made up of two electric heater coils.

Where is this dinosaur today? Right here in my radio room, and it works perfectly - into the dummy antenna since I gave up my Class A license several years ago. Memories are strong of many good QSOs on the then busy 160 meter band and also 75 phone, 40 CW, and even 10 meter phone by doubling in the final. All crystal control of course, no VFO then.

Maybe I should renew my license, put up an antenna, and fire up the old rig to join the growing AM gang! ER

Editor's Note: Fred Huntley, W6RNC, who originated this column in Issue #1, is on sickleave. Until he returns we'll have others filling in for him.



Early '30's homebrew transmitter.

The Pioneering Novices

by Jim Musgrove, K5BZH
4217 Buckeye
Fort Worth, TX 76137

Sit back in your easy chair and let me tell you of the Pioneering Novices. If you experienced this period, you'll love recalling the events. If you are one of the newer hams, most likely you'll enjoy letting me share some of the history with you.

The setting is back in the early fifties, from July 1951 through 1956. This period covers the first five and half years of the Novice license. Now folks, back in those days the transistor was an infant. The Raytheon CK-722 was in the hands of a few experimenters. Repeaters, packet radio, and personal computers didn't exist. The hams still had 11 meters. Spark gap had been outlawed for years. AM was still king; however, sideband was beginning to roll.

During this time frame amateur radio had a sense of equality that really stood out. Hams tended to come from many different backgrounds. Company presidents, congressmen, generals, sergeants, janitors, farmers, doctors, professors, students, engineers, technicians, salesmen, and others all helped to make the total ham population. It didn't seem to make a lot of difference if you were wealthy or lived on the wrong side of the tracks. If you were a ham, you shared a common bonding, and were treated as a brother or sister.

Beginning hams looked to their seniors to provide guidance. The majority of the old timers accepted that responsibility graciously by setting examples of good operating practices and providing technical assistance as it was needed. The youngster was usually able to get help with a home project when it was needed.

The Novice license came into existence in July of 1951. Before proceeding any further, it needs to be explained that the conception for the Novice license began much earlier.

After World War II, changes to the frequency allocations were being discussed and many folks were in favor of widening the HF phone bands. Some hams were violently opposed to this movement.

One group of CW diehards formed "The Society of American Radio Amateurs" in 1946. Their objectives included preventing expansion of the phone bands and increasing the code requirements for a class A license, which was required for phone operation on 75 and 20 meters, from 13 words per minute to 20 wpm. They also wanted to create a new short term beginner's license that had relaxed code requirements and offered CW privileges only. SARA placed their proposals before the FCC in September of 1948.

The American Radio Relay League was favoring a 16 word per minute requirement for new class A licenses, expanding the 75 meter phone band, requiring a one year apprenticeship period for new hams before allowing them to use HF phone, and a 100 Kc "CW only" segment on 6 meters.

The Federal Communications Commission released Docket 9295 on April 21, 1949. The ARRL printed it in the June 1949 "QST." This was the document that proposed the Novice license along with the Technician license. The Class A license would be replaced with a new Extra Class license. Docket 9295 contained other proposals such as 50 Kc in the 75 meter band that limited the transmitter

Ads like this one which appeared in the January 1953, issue of QST were directed at the growing Novice market.

bandwidth to 3 kilocycles which effectively established a SSB subband. This document really created a stir due to its various proposals.

The 1949 document proposed that the new Novice license would have allocations for radio telegraph operation in the 80, 20, and 10 meter bands. Crystal control would be required for the transmitters in these bands. The proposed frequencies were 3700-3750 Kc, 14100-14150 Kc, and 28.0-28.5 Mc. Novices would be allowed to use VFO's and voice on 2 meters (145-147 Mc).

After several revisions to Docket 9295, the Novice, Technician, and Amateur Extra licenses were authorized. The Novice and Technician authorization was to take effect on July 1, 1951; however, examinations weren't administered until July the second due to the first falling on a Sunday. The Extra Class didn't take effect until January of 1952. The existing Class A (Advance) license would last for only another year and then would be eliminated except for renewal.

The theory portion of the Novice exam consisted of 20 multiple choice questions. The code portion consisted of both receiving and transmitting parts. Five minutes of code would be sent and at least one minute of perfect copy was required. The examiner then had the candidate send with a key to determine the sending ability. If one failed the examination, they had to wait for a 30 day interval to pass before they could take another Novice exam.

The new Novice license was a beginner's license. The term was one year and it was nonrenewable. Portions of three bands were initially authorized. Novice subbands fell in the 80, 11, and 2 meter bands. Power was limited to 75 watts input, which resulted in approximately 50 watts output. The transmitter's oscillator had to be crystal controlled.

Apparently the Federal Communications Commission was out to attract the youth. By offering a new entry level license that required Morse capability at 5 words per minute, many could look forward to "on the air training" that would lead them to the necessary 13 words per minute for the next step.

Novice call signs contained a "N" to designate the class of license. This idea may have come from a proposal the ARRL was working on in 1947 for the creation of a class D (no code) license for the little

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used microwave bands. They suggested that a class D license holder could be issued a distinctive call sign that contained an extra letter which could be dropped easily upon upgrading to a higher level.

Interestingly enough, the FCC inadvertently issued a couple of 2 letter Novice calls. John Nagel of St. Paul, Minnesota, received the call WNØBT in 1953. A few people really received a collector's item when they received his QSL card. Later the FCC corrected their mistake and issued him the call WNØQBT.

Initial frequency allocations were 3700 to 3750 Kc, 26,960 to 27,230 Kc, and 145 to 147 Mc. Phone operation was allowed on 2 meters; however, VHF did not have the popularity in the fifties that it enjoys today, and consequently very few Novices operated in the two-meter band.

The forty meter band was opened to the Novice effective February 20, 1953, (Docket 10073). They were allowed to operate from 7175 to 7200 Kc. This was a move by the Federal Communications Commission to further encourage Novice operation.

Effective March 28, 1953, fifteen meters was opened to the Novices (Docket 10188). They were allowed operation from 21,100 to 21,250 Mc. At the same time the 11 meter Novice band was withdrawn.

It was announced in the April '55 issue of "CQ" that Docket 11263 proposed to expand the 40 meter Novice band from 7175-7200 kilocycles to 7150-7200 kilocycles. The term kilohertz didn't exist in those days. It was introduced later to honor Heinrich Hertz, the discoverer of radio waves.

Thinking of terminology, the term capacitor wasn't in use either. The device was a condenser. A small condenser might have a value of 30 mickey mikes (micromicrofarads) instead of 30 picofarads. Headphones were called cans. A bug was a semiautomatice code key, not something wrong with your computer program. By the way, people had 'handles' and absolutely no one had a 'personal'.

The typical Novice station of the early fifties consisted of a Hallicrafters S-38 receiver and a homebrew transmitter that had a 6AG7 oscillator driving a 6L6 final to a power of about 25 to 35 watts input. A J-38 was often found in use for the telegraph key.

J-38's were being sold surplus for about 98 cents. Some dealers offered them at 69 cents. Today they command around $25 at hamfests. I wish that I had bought a bushel basket full of them.

TVI was not much of a concern to a lot of us. My family did not have a television set in those days. Or our nearest neighbors who were a quarter of a mile away. Some of the fellows operating on 15 meters with nearby TV sets did have problems though. The rumor was that television IF strips were susceptible to interference.

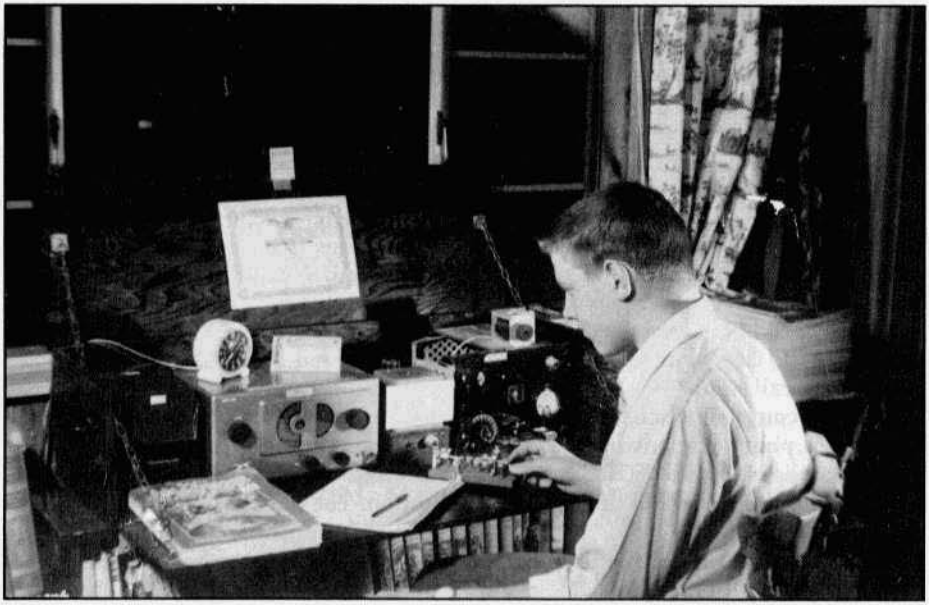
Many rigs were ran "high, wide, and handsome." It's a wonder that half of us weren't electrocuted. My rig, an Eldico TR-75TV, was run without covers and the B+ voltage of 550 VDC was definitely exposed. This made it easier to change the coils when moving to another band.

Novices of the early fifties took issue quickly with those that bad mouthed their inexpensive Hallicrafters S-38's and National SW-54's. A lot also pointed out that low power (10 to 25 watts) did indeed "work out." They were a proud lot.

During the pioneering days, it was standard operating practice for the Novices to tune several kilocycles around their calling frequency to listen for stations calling them, due to the fact that they were all "rock bound." It was not unusual for two stations in a QSO to be 10 kcs apart.

QSL cards were a big thing to the new hams. It was indeed a rare Novice QSO that did not contain at least one "pse QSL." Most hams used thumb tacks and displayed the QSL cards on their walls. Ham shacks of those days seemed to have a lot more character.

One of the nice things about that period of time was that the QSL cards could be



This is a typical Novice station consisting of a S-38 receiver and a 6L6 transmitter that was derived from military surplus. This is the first station of John Thompson's (K6OHM). He was licensed as a novice (WN8SAQ) in 1954.

mailed for pennies. The addressing methods must have driven a few postmen to drink. The typical formats were something like: Amateur Radio Station "KN5BZH", Chief Operator "Jim", Route 2 Goldthwaite, Texas

Some variations were "Chief Bottle Washer", "Chief DXer", "Chief YL Chaser", and the like. Fortunately my mailman, Mr. Julian Evans, was fascinated with ham radio and looked forward to the cards that were directed to me.

QSLcards were available from many printing firms. Most Novices were not affluent, so alot of them purchased simple cards that were offered at attractive prices from companies like Walter Ashe and World Radio Laboratories (WRL).

These Novices all had a "N" in their call sign which they hoped to drop very quickly. The surplus of new QSL cards left over from the Novice days couldn't be discarded, so new Generals did things like cover the "N" with a piece of tape. Some learned that the "N" on a Walter Ashe card could be rubbed out with an eraser. Several of the printers, realizing the problem, used a small "N" in the callsign to make it easy to mark out. A few of the Novices simply purchased cards without the "N" and just inserted it with a ball point pen.

In the early days, the higher class of license holders were not restricted to Novice power limits when operating in the Novice bands. During the middle fifties many Novices complained that General Class license holders should run no more than 75 watts when operating in the Novice bands.

The American Radio Relay League ran many excellent articles in "QST" that were directed at Novices. One of their best, "Your Novice Accent," by Keith S. Williams, W6DTY, was published in November of 1956. They were trying to help the Novices establish good operating practices.

"CQ" established the "Novice Column" in 1951. The first editor was Carl Durmm,

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W2CJV. Unfortunately he became a silent key after his first column. Herb Brier, W9ECQ, took over the assignment with the January 1952 edition. Herb's last column apppeared in the July 1955 issue and then Walt Burdine, W8ZCV, assumed the duties as the Novice editor with the August 1955 issue.

A wealth of historical information is contained in the "Novice Column" of "CQ." Some of the typical concerns were hams that didn't send QSL cards and Novices that called CQ twenty or so times before giving their call sign.

The 1953 complaints seemed to be VE (Canadian) phone stations operating in the Novice bands. Typical 1955 complaints centered around kilowatts operating in the Novice bands.

Homebrew transmitters were as common as fleas on a dog's back. Novice's favorite bottles were 6AG7's, 6L6's, 6V6's, 807's, 1625's, and 6146's. Perhaps it should also be mentioned that some of the older Novices had a fondness for cold 807's (beer).

Many construction articles appeared in "CQ" and "QST." My favorite appeared in "QST." The title was "The Novice One Tuber." Donald Mix, W1TS, was the author. The first part was published in May of 1951 and the second part followed in June. The rig was a 6AG7 oscillator that was built on a wooden chassis. A dial lamp was used for the tuning indicator. The power supply was also built on a wooden chassis. The on/off switch was a round wall switch. A complete parts list was included. The oscillator could be built for $15.84 including the crystal. The power supply cost another $9.92.

The young hams also drooled over construction articles in the ARRL handbook and longed for the opportunity to own a big rig such as a 500 watt 813, complete with 811A's in the modulator. Some scanned the pictures of stations in "CQ" and "QST" with the hope of someday owning an impressive rig such as a KW-1 and 75A-3.

Mail order houses provided the source for a lot of the parts that Novices used. Catalogs from Allied Radio, Burstein-Applebee, Walter Ashe, World Radio Laboratories, and other wholesalers were common around a hamshack.

Many of the old timers had well stocked junk boxes that the Novices were welcome to invade. Some Radio-TV repair shops let the new hams "rob" the power transformers and other parts from scrapped radio and TV sets.

Manufacturers realized that it was a pain in many cases for someone in Podunk Hollow to locate all of the necessary parts to build a rig. They offered kits as an option. The new ham still had to do the assembly, however, he didn't have to worry about cutting holes in the chassis for a tube socket, or trying to determine how to make a part substitution. The Heath AT-1, at a whopping $29.50, certainly played a big part in reducing the number of homebrew transmitters in the Novice shacks around the country.

The vast majority of the antennas were home spun. Doublets, zepps, long wires, and windoms accounted for most of them. The windom seems to be a thing of the past. This popular miltiband antenna of the early fifties used 300 ohm twinlead for the transmission line and fed the antenna about 16 percent off center.

I've seen all kinds of material used for feedline on antennas in those days. AC zip cord found its way on more than one or two antennas. No telling what its characteristic impedance was. I recall a version of twinlead that was 75 ohms. Coaxial cable was used by many.

Crystals were rather expensive, in the order of $3 from a commercial manufacturer. Surplus "rocks" were much cheaper, but only a few Novice frequencies, such as 3735 Kc, were available and lots of folks were on these frequencies. Using a surplus crystal meant you had to wait your turn and QRM was terrible. To alle-

This is one of the kits popular with hams in the early '50's. Note that everything was supplied, even the key.

viate this problem, some resorted to getting a flat piece of window glass, a little valve grinding compound, a bottle of alcohol and proceeding to use a process known as grinding a crystal. Surplus crystals could be moved up in frequency with just a little sweat. An application of pencil lead could be used to lower the frequency slightly.

Our stations were pathetic compared to the sophisticated transceivers that today's new ham uses to announce his arrival. Most of us didn't realize what a disadvantage it was to have a receiver that did not have single signal selectivity. Calibration markers every 5 Kc would have been excellent. Collins Radio offered receivers with 1 KC calibration, but very few Novices could afford them. I would have been pleased with 10 Kc calibration marks. My Hallicrafters S-40B had an uncalibrated logging scale. There was a good reason for the FCC to require crystal controlled transmitters.

We had a lot of fun. It was a fair game as most of us suffered from the same hardships. We tended to appreciate any improvements that we could make such as adding an antenna relay to the transmitter. The addition of a Q-multiplier to an old receiver to get a little selectivity was definitely helpful.

The majority of the pioneering Novices upgraded. All of us looked forward to VFO control. It usually didn't take long for us to experience "mike fright." After a little phone operation, a lot of us realized that CW was still a neat way to communicate.

Most of us will always have fond memories of those days. That Novice ticket provided some of us with not only an entry into a wonderful hobby but an entry into a career. Many of the pioneering Novices were so ingrained with the hobby that they tailored their education around electronics and entered the professional world as technicians, engineers, and scientists.

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The Collins 75A-Series Receivers: A Legacy of High Quality

Part 1

by Ray Osterwald, NØDMS
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Imagine what it must have been like to be employed as a design engineer at the Collins Radio Company in early post-war Iowa, and to spend your days working on commercial radio products. It is challenging work; you are good friends with the boss. There have been chances during the war to do some original research and design, but not nearly enough to satisfy your intrinsic desire to create something really special. The Collins plant seems like a fairly good place to work, in spite of long hours, and especially with a recessionary job market just ahead. If this picture comes to mind easily, then also imagine what it must have been like to have the imposing figure of Art Collins show up unannounced in your work area, call you aside, and describe a project to you which he has in mind. As the details of his plan unfold, it turns out that you will be given your own work area and tooling. You will be charged with the goal of making the best communications receiver possible, without any restrictions or deadlines. As both you and Mr. Collins are licensed amateur operators, the prospect of having unlimited resources and an unlimited budget to develop the ultimate radio receiver must have sounded like text from a serialized "Radio Boys" adventure you might have read as a teenager. This is the situation Engineer Roy Olsen had in January of 1946.

In 1946, there was no clear idea of what the post-war world would be. Industry was changing gears - converting from war production to more civilian manufacture. In radio, as in everything else, people wanted new products, and they wanted to quickly distance themselves from the Great Depression and from WW II. The only way radio manufacturers had to establish some market share was to offer pre-war designs in shiny new cabinets, or to wait until technical ideas developed during the war could be incorporated into new products.

On the business side of radio, the pre-war style amateur market really no longer existed. The thousands of men and women who were exposed to radio communications during the war got home to find an exciting new hobby in amateur radio, and began learning time-honored techniques with the key and microphone. After a trip to the FCC district office, they added to the ranks of licensees who were active before the hostilities began. The raw material restrictions enforced later on during the Korean War had yet to take their effect, and manufacturers were generally optimistic. However, as Roy Olsen (WA6THD) points out, even though there was a prime market for radio gear right after the war was over, there were "too doggone many other pieces of equipment in the market that became surplus" to make manufacturers willing to take too much of a risk with tooling for untried equipment designs.

Excepting the Collins Radio Company, with their large staff of scientists and engineers and years of research, nobody else was in a position to really accept the risk, and to design and build the unique receiver which became the 75A. It would be best, at this point, to let the man who was there tell the story of the steps which lead to the Collins 75A-series receivers.

As Roy Olsen described it to me, "I had

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THE COLLINS 75A
AMATEUR RECEIVER

80, 40, 20, 15, 11, 10 meter bands
straight line tuning
dial calibrated directly in frequency
50 db image rejection on all bands
crystal filter—variable selectivity
high sensitivity
automatic noise limiter
double conversion (triple detection)
signal strength meter
permeability tuned
self-contained power supply
high signal to noise ratio
three i-f amplifiers
extremely high stability
separate oscillators for mixers
mvc—avc—cw

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known Art on the air, 9CXX, there in Cedar Rapids, all the time that he was on. He was ahead of me by a few years, but not many. I had talked to him lots of times, and when he went into the business of becoming the Collins Radio Company, I was just graduating in 1934 as a Senior at Iowa State College in Electrical Engineering, and he knew that. As things would happen, he offered me a job. Nobody was getting a job from my graduating class, so I simply grabbed it. That's how it all started.

"The 75, without calling it A or B or anything else, was something I did actually design, electrically and mechanically. I was surprised; the 75A, at the time that I was working on it, had a proposed sales price of 375 dollars, and it was proposed to be a release of 200 units. Art was rather perceptive as to market desires. When you get right down to the capability of the receiver, it was very good in terms of frequency calibration. Its sensitivity was about as good as you could get.

"At Collins, the precursor to the 75A was the fact that I did about a year and a half to two years of study on the subject of permeability tuning, and collaborated extensively with Ted Hunter in oscillator design.

"I had a lot of fun with the 75A project, but there was a background even before that receiver. There was a 51H-1 that I built prior to the 75A. There was only one engineering prototype, and I have no idea what ever happened to it, and I don't think any others were built. Its primary purpose was to be a military general purpose communications receiver. It used a crystal-controlled first local oscillator, and a permeability-tuned second oscillator just like the later ones did. During the war, I made a presentation to the Joint Radio Board, consisting of representatives of the radio people from all the allies. They never did buy any because the end of the war came. It was a different kind of a receiver than the 75A, because it was general coverage. The 51J, and other units which came along after it, were general coverage units, and had the same frequency plan as the original I used in that first receiver. Because the 51H-1 was general coverage, it was not a receiver that the 75A could be said to be exactly patterned after. Except with the point of view of the amateur bands, basically, it became the 75A.

"For the 75A, the background came after the war when Art said 'Roy, I want you to build an amateur receiver (unspecified as to type at that time) that is the best that can be built. I don't care anything about price, and there is nothing about a schedule in terms of your ability to do it for a price, so just do it!' That's always nice when you have that kind of an option. We did already have, from the military efforts, the permeability tuning oscillators which went over the 2 to 3 megahertz range, so this gives you the option of being able to work out a calibration system that goes by whole megahertz, which is what you want anyway on a receiver dial. So that's how it all began, that's the start of it.

"That receiver, one of which I designed and made, Art grabbed the day after I had finished it. I finished up on a weekend, on a Saturday, and took it home with me on Saturday night to try out. Sunday morning at 10:00 AM, Art came over to my house and said, "Roy, where's that 75A? I want to put it on the air!" I never saw it again. That's typical of Art by the way. Following that, I left the company and other people carried on with what became 75A-1, 2,3, and 4. The basic design I did lay out, I did do, but I really never saw, or even used, any of the other ones after that. I don't think the 75A ever became a widely spread thing, although the initial release on it was 200 units. I think the actual development on the receiver itself took about six months."

I asked Roy how Art Collins came up with the 75A designator, as we all have been wondering about this for years. His answer was pretty much to the point:

"You'll never know, and I'll never know. Numbers like that came out of Art Collins' head and went to the Great Beyond with him. Sometimes, of course, for military equipment like ART-13, there was a clear derivation of military nomenclature itself, but otherwise, who knows? I didn't know 'a number' during all of the development of the 75A, until it was structurally and physically 'in being', and Art came over and grabbed it."

The Invention of Linear Tuning

One who is new to thermionic technology might well wonder what's so darn unique about Collins receivers. There are two words, stability and accuracy, which best define the receiver Roy Olsen built from his 51H prototype.

Stability in a high-frequency crystal oscillator is relatively easy to achieve. Also, stability in a low-frequency VFO is commonplace. It's one of those ideas where one might say "how come nobody thought of that before?" when Roy Olsen married the two. He included into the design a high-Q RF preselector, a high-Q tuneable first IF, and linear permeability tuned and precisely-tracked RF stages. These unique features made the 75A series receivers the revolutionary success that they were. Even today, although HF communications equipment is controlled by more complicated circuits, most of them follow the conversion scheme laid out by Roy Olsen for his 75A with a crystal-controlled first IF.

Because of the linear, permeability tuned VFO, and its unit-to-unit uniformity, a receiver could have, for the very first time, a dial with readout accurate to less than one kilocycle. Because of Collins' advanced manufacturing techniques and attention to detail, calibration was retained year after year. For the first time, an operator knew where he was listening, without guesswork. He knew, just by looking at the dial, if both of his sidebands were in a legal area.

Aside from the idea of using a crystal-controlled first IF to establish overall receiver stability, the real heart of the 75A was linear permeability tuning. Roy Olsen invented it, and had patents granted in several areas. The concept came out of two years of research at Cedar Rapids, but I'll let Roy tell the story, as it was related to me:

".... I knew Ted Hunter very well. I worked with him for years. Ted was a hard worker and a fine engineer and was the person who did the first of the pressurized permeability tuners, but the idea of making a linear tuning system came from me.

"Mostly, permeability tuning was something that I didn't know how to do theoretically. I still don't know anybody who knows how to do it theoretically, but I found the technique as a result of thousands and thousands of tries. I finally developed the idea of a linear ratio of a 2:1 in frequency change. In fact, the idea went into several of the prototype Collins receivers. The problem was that we wanted to operate, usually, over one megahertz simply because the oscillator went in a 2:3 ratio. I had to use multipliers of the same ratio as the frequency went up. As long as I kept that initial ratio and multiplied the oscillator source frequency by the same ratio, the oscillator and the coil tuning, which is usually the antenna tuner, or RF tuning, would track. That was the original concept for the system. Initially, I took a core with the frequency characteristic needed, and a coil with a 2:1 length-to-diameter ratio; that's the first requirement. Then, take a core that fits in that coil, with a diameter ratio that depends only on how wide a frequency range you want to cover, excepting that you can't do it over more than about 2:1. Then, you take a similar core and intrude it into the back end of the coil. If the motion of the slug is limited to approximately one half of the total possible penetration, then the core may be moved back and forth until a very, very close approximation to linear frequency response can be found, with a uniformly wound coil. The real problem

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On The Air With Vintage Homebrew SSB

by Mike Bohn, KG7TR
903 N. Shannon Circle
Mesa, AZ 85205

For several months now I've been checking into the Vintage SSB net with my homebrew 50-watt filter rig. Since I get so many questions and comments about it, I thought I'd send in some photos and a brief description of it. I built this rig in two different configurations from about 1968 to 1973 when I was in my early twenties. It started out as a phasing rig using a B&W 3502Q4 for a phase shift network and two 6AL5's as balanced modulators, along the lines of W2EWL's "Cheap and Easy SSB" (described in an early version of ARRL's "SSB for the Radio Amateur"). I used it for about a year like that and it worked quite well.

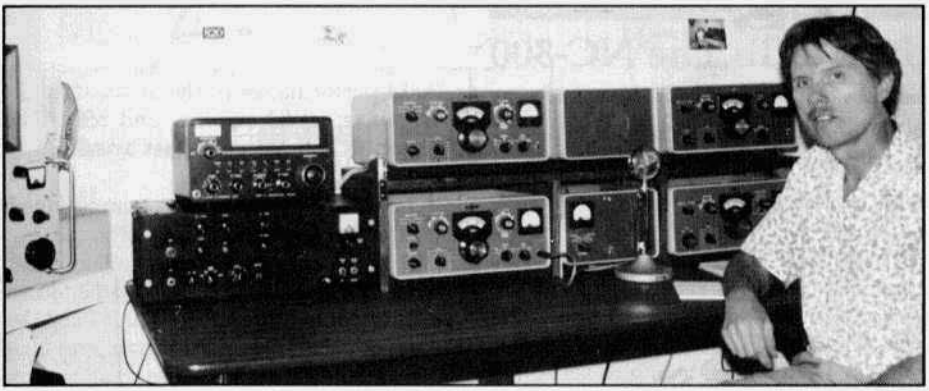
Then I got promoted to 1st Lieutenant (USAF), my pay increased, and I decided to spend a few bucks for one of the 9 Mhz SSB filters and some crystals and give that a try. I rebuilt the rig using much of the circuitry from W6PZV's "Filter-Type 100-Watt-Output Sidebander" (described in a later version of ARRL's SSB book). My rig uses only one 6146 in the output, and covers 80, 40, 20 and 15 meters.

In its current configuration, the rig uses twelve tubes as follows: 12AX7 audio amp, 7360 carrier osc and balanced mod, 6C4 cathode follower to drive the xtal filter, 6BA6 9 Mhz IF amp, 7360 first mixer, 6AH6 VFO, 6BA7 second mixer, 6AB4 heterodyne xtal osc, 6CL6 driver, 6146 PA, and (2) 0B2 voltage regulators. The power supply is solid-state and uses an old TV transformer. The crystal filter is a 9 Mhz unit with a 2.8 Khz bandwidth that was made by an outfit called ESEL (Excelsior Springs Electronic Labs). I doubt that they're around any more. Anyway, it's similar to the McCoy or KVG units that were around then, and it was a little cheaper (38 bucks with carrier crystals as I recall).

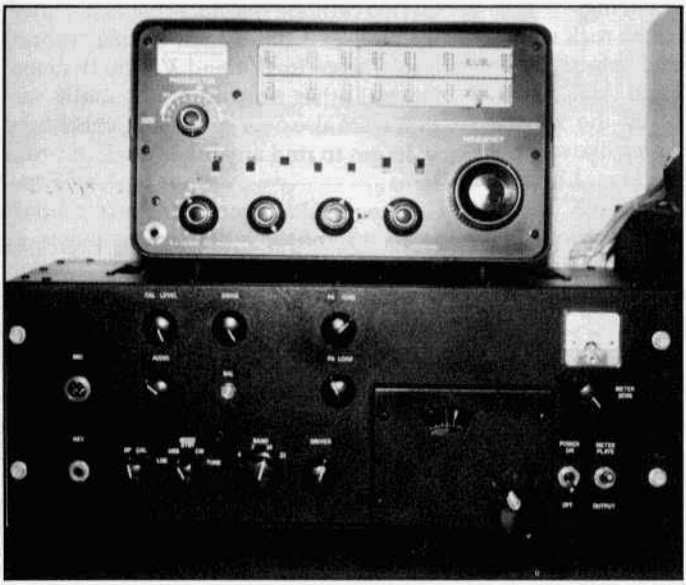
The VFO uses the coil, shield, variable capacitor and gear drive from an old ARC-5 transmitter, the one that covered 4.0 to 5.3 Mhz. I added some capacitance so that it would cover the necessary 3.5 to 4.0 Mhz, and reinforced the chassis for the VFO components with a .125" piece of aluminum plate from an old relay rack panel. The VFO is quite stable after about 30 minutes warmup, and the dial is almost linear with about 20 Khz per turn of the knob.

The VFO feeds a balanced mixer that produces a 12.5 to 13.0 Mhz bandpass output with a 9 Mhz SSB input. This is heterodyned to the desired signal frequency using a crystal oscillator. The VFO tunes backwards, so that on 80 meters the signal is at 3.5 when the VFO is at 4.0. The balanced mixer keeps the VFO out of the signal, and there is only a negligible "birdie" at 3.75 Mhz on 80 meters. The rig covers 80 thru 15 with a single bandswitch knob, and puts out 50 watts PEP on 80, 40 and 20. Output on 15 is only 10 or 15 watts for reasons I have never been able to figure out, so I figured trying to get something out on 10 meters would be hopeless. I think the 6BA7 mixer grid just loads the xtal oscillator too much on the higher frequencies.

After much experimenting with the 7360 circuits used in this transmitter, I'm convinced that this tube was not everything it was cracked up to be. When used at the higher frequencies like 9 Mhz, unless extraordinary measures are taken, so much carrier leaks through that you never get the 60 dB of suppression that was advertised. As a self-excited carrier oscillator, it's impossible to keep out all the carrier. In retrospect, with this disappointing performance it's just not worth the extra circuit complications to use this tube.



The author with his hombrew transmitter on the left below a Drake 2B receiver.



Closeup view of the HB SSB transmitter.

Anyway, I stopped using this rig around 1975, and it sat in the basement or garage until I discovered the Vintage SSB net. This gave me an excuse to dust it off and put it back on the air. The great signal reports that I get are most gratifying.

I got my Novice ticket in 1961 when I was thirteen, and built a 1625 homebrew transmitter that same year. I used to really enjoy building electronic equipment, and I think a lot of other hams did too back in the days when the radios glowed in the dark. Back in the '40's and '50's Popular Science, Popular Mechanics, and even the Boy Scout Manual had everybody making radios. I think it's really kind of sad that electronics has become so complicated these days that no one builds anything anymore, especially the young kids. Ham periodicals no longer have construction projects for anything substantial. Even Heathkits are a thing of the past. These trends have had a definite impact on our hobby. A lot of hams today buy a solid-state rig, take it home, plug it in, and probably don't know or care what the electrons inside are doing. The things are too complicated to understand and too miniaturized to work on.

Building this rig required an awful lot of time and effort. I don't think I'd have the patience, eyesight, and steady hands to do it now. But it was definitely a labor of love at the time. No one could ever pay me enough to take it off my hands. I'll probably keep it forever. **ER**

Update To The NC-300

by Dennis Petrich, KØEOO
6419 Berwickshire Way
San Jose, CA 95120

This article started as a search for a good SSB and AM receiver for my Invader 2000 Vintage SSB/AM linear station. Something other than the 75A-4 or NC-303. I have been trying to set something up for the Vintage SSB net (on 14.295)that will break through the QRM that we have been experiencing.

The receiver needed to be rock stable, have good sensitivity and selectivity as well as excellent audio and AGC action for SSB work. And, oh! by the way, it couldn't cost an arm and a leg like some of the good receivers these days. I had an NC-300 that exhibited poor AGC action on SSB and serious audio distortion. CW and AM performance were just fine and of course the stability and dial calibration were excellent.

The NC-303 fixed many of the '300's problems and would make a fine addition to my station except they are hard to find and are expensive. The 300's are plentiful and have the potential to be a great all around receiver. So, I set out to see what I could do to upgrade my NC-300 to something usable on today's bands by us throwbacks.

My rules were simple: "No holes" or changes which would blemish the essence or resale value of the NC-300 as one of the best AM/CW receivers around. I also tried to make sure I only addressed those serious issues as mentioned above, leaving things like switchable AGC action and more degrees of SSB selectivity alone. The performance of the NC-300 in this area is quite adequate with the crystal filter, which by the way, I find easier to use than the Q-multiplier on the '303.

Consequently, here are the changes I found to be necessary to improve the NC-300's performance in the areas of audio response, CWO stability and SSB AGC action at full RF gain (fast attack, slow decay).

First, my problem was compounded by the fact that unbeknownst to me, my '300 had audio distortion problems that would only show up on SSB. In the course of this update I discovered and fixed the problems. So, first, go through your NC-300 and measure all of those small bumpy resistors used in a lot of the gear of the time. I finally found my audio problem to be two cathode resistors that had drifted up by 2 to 3 times their normal values. These were for V4 and V5 the IF amps. Several other resistors in the audio section were also over spec. Next, check tube voltages to find any other obvious problems.

I then read all I could find on modifications to the NC-300 in the pages of QST,CQ, 73 and ER magazines. The following are modifications I discovered in my search:

1) QST April '58 W1VRK Eugene H. Hastings

2) CQ May '59 W1FSN Robert J. Murry

3) 73 April '66 W6HOG Eric Hansen

4) ER March '92 KY8I Thomas E. Jurgens

5) QST April '59 Product review for NC-303

These were all good articles. I took and tried the ones that addressed the issues I mentioned above. I also referenced the NC-303 diagram for official NC changes.

The changes are simple and required the least amount of disturbance to the existing circuitry. Before I get started I must mention, I found the circuit of my '300 did not follow the schematic diagram I got with my rig. In fact it more closely followed the diagram for the NC-303. Consequently, some of the changes I will be listing may already be in your '300! See figure 1 for details.

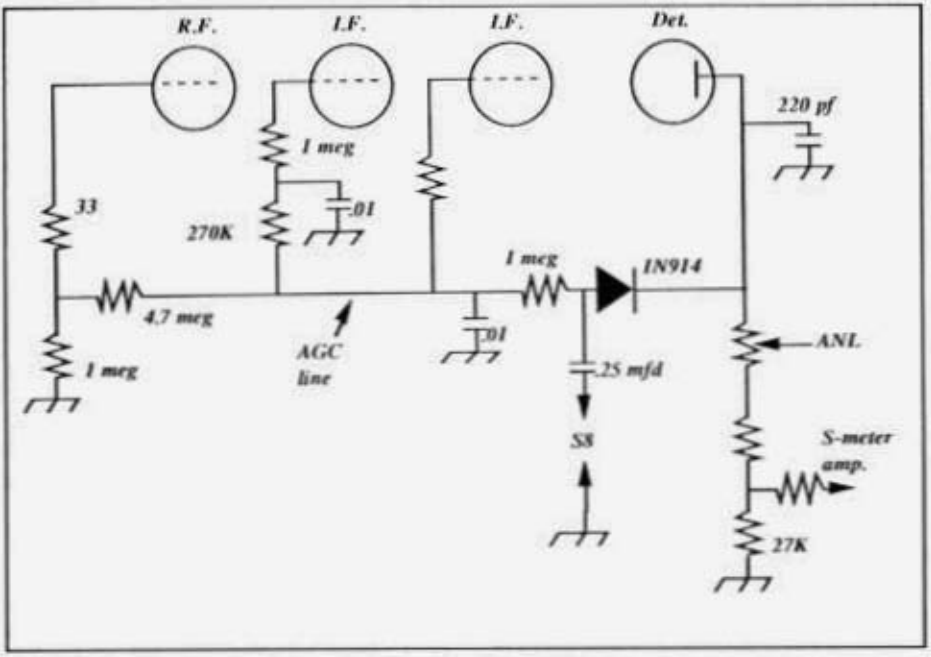


Figure 1

Modifications to NC-300

All resistors are 1/2 watt, all capacitors are 300 volts or better.

1) Change R30 from 68K to 27K, sets S-meter gain.

2) Add 100 ohm resistor between pin 1 of V8 and Pin C of T6. CWO stability.

3) Disconnect wire from pin A of T6 and add 120 ohm resistor between pin A of T6 and the disconnected wire. CWO stability.

4) Add .1 mfd cap from pin A of T6 to ground. CWO stability.

5) Add 1 meg resistor from pin 5 of V10 to pin 1 of V9, improves audio quality. (I did not add the R45 bypass capacitor, mentioned in the CQ article, to increase the negative feedback of the 1st audio stage. There is plenty of audio gain without it.)

6) Add diode such as 1N914 or 1N1692 in series with R24, (cathode to pin 2 of V6). Isolates AGC from ANL and S-meter circuits.

7) Add .25 mfd capacitor for medium decay AGC or 1.0 mfd for slow decay AGC between junction of diode and R24 and the open contact of Mode switch S8 which grounds the AGC line for CW. This switches in the capacitor for SSB operation only for fast attack/slow decay operation. It was nice of National to leave that extra terminal on S8. (This pin may be open or have, in my case, an orange wire connected to it that went under the chassis to a terminal strip near the power transformer. I went from that tie strip to pin 6 of the calibrator socket X1 with the .25 mfd capacitor and ran a wire up to the junction of R24 and the diode.)

8) Add 1 meg resistor from the 33 ohm resistor connected to pin 1 of V1 to ground.

9) Change R1 from 1 meg to 4.7 meg resistor.

10) Change R22 from 560 ohms to 150 ohms. V5 IF amp gain.

11) Change R3 from 330 ohms to 150 ohms. RF amp gain.

12) Change R18 from 1 meg to 270K ohms. AGC action.

13) Make sure R17 is its correct value! Caused my SSB distortion!

continued on page 35

Collecting/Repair/Restoration ...Tips

Fused AC Plugs

Recently I put a Johnson T-R switch and a Hallicrafters HT-40 on line in my station. I was concerned because neither unit has any type of fusing in the power supply. Then a friend reminded me of the fused ac plugs that came on rigs such as the Johnson Viking series transmitters. These plugs use 2 of the 3AG type fuses and can easily be added to the ac cord in lieu of mounting fuse holders internally.

I started looking at hamfests, but found these gems aren't as popular as they once were.

Finally I found the fused ac plugs right under my nose! Seems they are still a popular item in the electric fencer section of many local farm supply stores. They generally cost under $3.00 each. Most of the plugs I see are DARE 1624's. These are nice plugs but for the purist, the words Hong Kong in small print may be a concern. I have been lucky to find a few labeled ELMENCO which have USA marked on them.

Joe Eide, KB9R

Bristol Wrenches

If you need Bristol wrenches they are available from Jay-Tronics, 124 N. Rockton Ave., Rockford, IL 61103. Their phone no. is (815) 965-8786. The part no. is 5028 and the price is $7.79.

Jerry Kethcart, WB9YMT

A Feedline Test For Transmitter Parasitics

(From GE Ham News Jan.-Feb., 1960)

Transmitters that are stable under CW or no-modulation conditions sometimes break into parasitic oscillation or other instability when amplitude modulated. The test described here has proved useful in checking for instability during modulation peaks.

Ideally, transmitters should be tested feeding dummy loads before on-the-air operation. If such a test is made, one simple additional test permits a simultaneous check for parasitics. This modification consists of shunting the dummy load with a parallel-tuned circuit. If tuned to the operating frequency and having a moderate Q, the added circuit is electrically invisible at the desired frequency but very much in evidence at other frequencies.

Thus a standing wave ratio (SWR) bridge will indicate a normal standing wave ratio if only a pure modulated output wave is present. If parasitics or off-frequency oscillation occurs during modulation, the SWR meter will kick because the tuned circuit (L-C) is not resonant at other frequencies. The test circuit used successfully at WA2ANU is shown, Fig. 1.

If an antenna system is matched to a low standing wave ratio and resonant, the SWR meter by itself may be used to show the presence of spurious output on the feedline.

This test is mainly useful to check massive errors and should not be considered a valid check for very low power parasitics and harmonics.

D.T. Geiser, WA2ANU

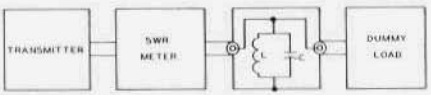


Fig. 1 Block diagram of parasitic test circuit. Tuned L/C is tuned to the operating frequency. Capacitor C should be about 5 mmf per meter (400 mmf for 80 meters; 40 mmf for 10 meters). Off-frequency emissions are shown up by an indication of reflected power on the SWR meter.

Editor's Note:

If you have a tip that you'd like to pass along to the rest of us vintgage restorers/builders/collectors please send it in. We'd all appreciate reading it.

AM FREQUENCIES

2 Meters - 144.4, calling freq., activity in most cities; **6 meters** - 50.4 calling freq. **10 meters** - 29.0-29.2 operating window; **12 meters** - 24.985 calling freq.; **15 meters** - 21.400 - 21.450; **17 meters** - 18.150 calling freq.; **20 meters** - 14.286 for the nightly SPAM net starting at 5:00 CA time; **40 meters** - 7160, 7195, 7290 are the main freqs. Westcoast SPAM net every Sunday afternoon ,4:00 PM on 7160; **80 meters** - 3870, 3880 and 3885 are the main freqs. Westcoast SPAM net Wednesdays nights, 9:00 PM on 3870. AM Swap net Thursday nights, 7:30 PM on 3885; **160 meters** - Gray Hair net every Tuesday at 8:00 PM EST on 1945. Mostly sporadic summer-time activity but during the winter signals can be heard anywhere on this band.

From the Editor:

15-Meter Week

Although I have no 'official authority' to do so I'm declaring the week of September 27-Oct. 3 to be "15-meter week". The purpose of my doing so is to bring attention to this band as an alternative to 10-meters for AM activity. I propose that we concentrate our activities above 21.400, doing our best to avoid interfering with nets, phone patches and other scheduled activities.

Let's all try to get on 15 as much as we can during "15-Meter week". It should serve to kickoff the fall/winter season and hopefully establish a level of AM activity never before seen on this band.

We've had several contests on 15 over the past couple of years, and they've always been well received. Maybe even better than the others on other bands. I remember the first one back in '89 was so 'well attended' that a clear spot to call CQ was hard to find. There were heterodynes from one end of the band to the other. And the AM activity didn't seem to create any problems either. Most of the sidebanders switched to AM and joined in the fun. But after the contests the level of activity always declined to almost zero. This could have been due to the fact that 10 was open and everyone returned there.

This year I don't think 10 will be open and I hope that after "15-meter week" there will still be a high level of activity there. We'll see.

For those of you who would like to make it a contest here are the rules: The contest is from Sunday Sept. 27 to midnight on Saturday Oct. 3, EST. All logs must indicate equipment, antenna, names, QTH and time. We'll acknowledge the scores of all those that submit logs.

Vintage RTTY Net

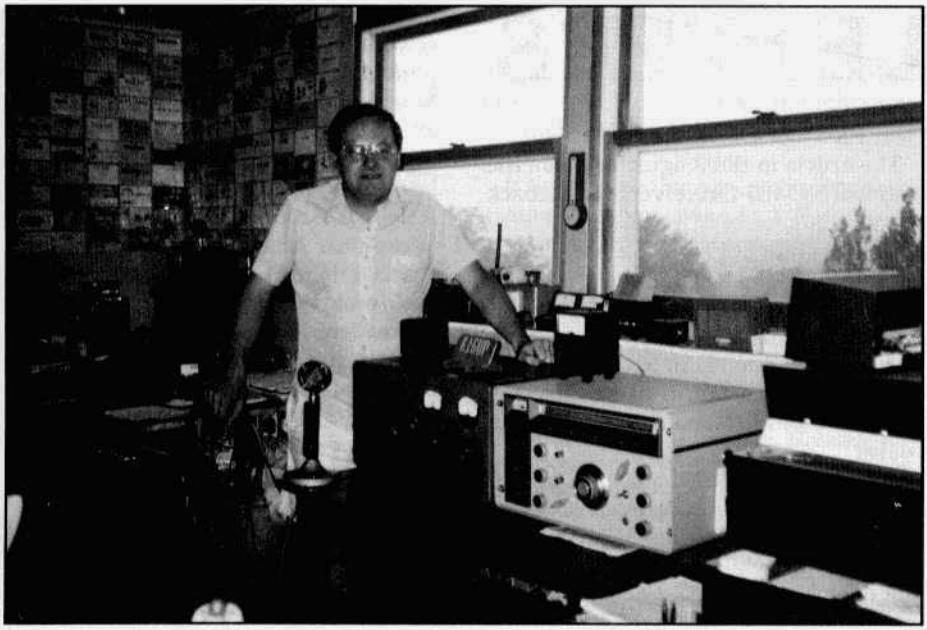
I have received quite a number of letters regarding my comments about Vintage RTTY. Most of the letters came from old-timers who go back to the days when RTTY was just getting started in the ham bands.

As soon as I get my station here set up and operating smoothly I'll announce some times and frequencies and the Vintage RTTY net will get started. At the moment I'm having some problems with my Teletype Model 19. It receives just fine but for some reason it will not transmit. Actually I'd like to find a Model 28, which is a much better machine. If anyone has one, that they'd like to sell, within 300 miles of Durango, I'm interested. The '28 has many advantages over the '15; it's quieter, the keyboard is easier to type on and I think it's a better all around machine.

If anyone needs paper or tape, let me know, as I have a large quantity of both. It's available for the cost of shipping.

Marla Banuelos, KD6LZI and Dennis Cody, KD6LNG, with their collection of vintage equipment. Marla and Dennis have just recently acquired their ham licenses. Previously they were SWL'ers who spent most of their time listening to the AM'ers, particularly the 3870 group on the west coast.

Bob Warmke, W6CYX, with a Collins S-Line. He also owns a 75A-1 and 32V-1 that he operates on AM.



Jerry Burns, K1GUP, with his Johnson 500 and National NC-300 (or is it a '303 ?). He says he spent most of his time this summer on 15-meter AM. He also checks into the Vintage CW net.

Mitsugu Shigaki, JA6IBX, a Japanese AM'er/Restorer/Collector. His main interest is restoring military and 'classic' AM rigs. He says there are many people in Japan with this same interest. Mitsugu has worked in the U.S. as an engineer and has many friends here.

LETTERS

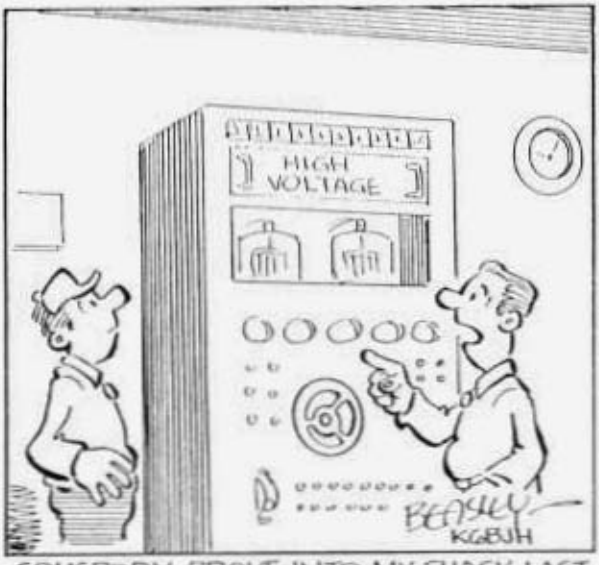
Dear ER

The article in the August issue on the National NC-183-D receiver brought back pleasant memories of its designer, Harry Paul. I met him in 1970 while working as a test technician at RCL Electronics here in Manchester, NH. I had recently graduated from technical school and had more than a casual interest in RF communications but no one to talk to on the subject as I was the only degreed technician on board!

Harry came in one Monday morning to start work in the same department. Seems he just wanted something to keep himself occupied with while in retirement. I found him to be a pleasant, soft-spoken gentleman who had a wealth of knowledge about RF and audio. Harry was friendly but no social butterfly, one had to seek him out. He usually had lunch in his car with his slide rule and a book or two.

In one memorable conversation he told me about his experience designing receivers at National Radio. I had not given it much thought until I read your article. Your readers might be interested to know after he left National he worked at Browning Laboratories in Laconia, NH, where he designed the original Browning Eagle series of CB radios. This unit consisted of a separate receiver and transmitter with a characteristic feedback howl upon initial key down. When I asked him about what I considered to be a defect in design, he politely replied that the first units had mistakenly gone through the factory with an 8 uF electrolytic capacitor at the receiver end keeping some juice on the B + just long enough to cause feedback until discharged. When he corrected the problem, customers complained they no longer had that Browning "ping" (which had become a status symbol of the air) so he restored the cap! He then left Browning and started his own company manufacturing another famous brand of high performance CB transceivers, Tram. These transceivers were known for their flat and undistorted transmit audio characteristics which was due in part to Harry being a devoted audiophile. He once told me about a large woofer he installed which used his attic as a baffle! When asked how he arrived at the name Tram he replied it really had no special meaning but he later told me it stood for Transmit Receive AM. Wishing to expand his business and needing more capital, he took on partners who later voted him out of his own company and that's when he went into semi- retirement. After a year, I left RCL and that was the last I heard of Harry until his obituary appeared in the Manchester Union Leader sometime last year.

Gerry Lemay, WA1VWL



SOMEBODY BROKE INTO MY SHACK LAST NIGHT, BUT FOR SOME REASON HE DIDN'T STEAL THIS

Dear ER

I really enjoyed the write up on the NC-183D by Ray Osterwald, NØDMS. Nice job! Was the radio originally as dark as it appears to be from the photo? I liked the history Ray presented and design description. These brought up a couple of questions.

I have a NC-2-40D which I believe to be about the same vintage as the NC-173. My manual dated 4-47 says a "New Universal Communications Receiver". I would like to know more about this model's history. Perhaps I could someday do an article for "ER". I would disagree with Bob, W5PYT, and say that the NC-2-40 was the "band switching HRO". The six bands A thru F and the four BS ham bands (10 bands total) are identical in coverage to the HRO coil sets of the same letter and are front panel selected by pulling out and turning the tuning knob. A custom cast aluminum tray contains the individual shielded coil sets. This lives under the chassis and the band in use is moved and plugged in by the tuning knob. The coil set in use is directly under the ganged tuning cap. The knob-to-tuning-shaft gear ratio is the same as the HRO (type PW). The case is machine gray enamel in color. The 2-40D is single conversion, but with a multi-pos. capacitor coupled xtal filter. The dial calibration and performance are amazing for its age. Component quality is excellent including the ceramic tube sockets. I would like to see its specs derived from a modern bench test and compare them with other radios from the same period. I was told by Gary, W7FG, that the "D" suffix meant dual tube (push-pull) audio. I don't know of any communications type receivers from any manufacturer that had P-P audio before the '2-40? My oldest handbook, a 1946, shows a NC-2-40C. It appears identical to my set except mine has a square S-meter. Do you have any idea when these first came out and their production history? Thanks again for your fine article.
Mike Maloney, AC5P

Dear ER

As I sat here with nothing at the moment to do but thumb through my complete set of ER magazines, a thought came to mind, so I decided to put it down on paper and send it to you.

It is my hope that you never stop publishing your magazine and, if someday you feel that you can't carry on, that someone will take over the job. I always carry the latest publication with me in my van. When things are not going well or I am getting tired, I look through it and get a feeling of serenity and remember back just for a moment into my past, to when I first became a ham in the late 50's. Not only has your magazine rekindled that spark in so many of us of that era, but it has also brought back a time which I think most of us have long forgotten.

AM was not just a modulation mode. It was a way of life, a relationship to your fellow man that is not seen on the hambands today. It is in this fast paced world a refuge into a slower form of communication, where one person makes a transmission and then another makes one. The AM ham knows the technology behind those knobs and has had his hands on most of it.

Your magazine has restored life into old equipment long since put over in a corner or high on a shelf. Now, with new paint jobs, new tubes, and some under the chassis work, the old equipment has come back to life. Once again, it puts a beautiful AM signal out across the airways to be enjoyed by all who choose to listen with receivers that have long been silent.

You and your magazine have raised the ashes of companies of long ago and made us all feel like we were there. It has done something even greater than all of the above. It has sparked the interest of new hams just starting out, who have decided to restore some of the old equipment. Perhaps someday in the future they will reflect back on these times, remembering the warm glow of a radio that really lights up inside and out, and will be able to say that they truly have an Electric Radio.
John A. Warren, W9BFO

Lee Faber, W7EH...Radio Pioneer

by Barry Wiseman, N6CSW/Ø
4 Aspen Place
Durango, CO 81301

Part Five

Lee continues:

"To get the JK Company back on its feet we needed all the good fortune we could get. A lot of it came our way. I remember that the Motorola company - with whom we had established a very good relationship during the war - approached us in '46 or '47 with a proposition that was a big help to us. They wanted us to fill an order that none of the other companies wanted. They said if we would help them out they would help us build our business back up to a sizeable enterprise. I said that I'd sure do that; I'd do anything. They were good enough to advance us money for the bakelite moulding and ceramic parts that were needed to fill their order. They even sent a man out to the plant to get us started on this new design. They were awfully good to us.

"Another bit of good fortune came to us when a gentleman from Western Electric called and asked if we would be interested in some used crystal manufacturing machinery. I said that we would, but it would have to be awfully cheap. He said, "Would you pay for hauling it away?" The next day I went out to a plant they had near Chicago and got some of the most beautiful tooling that you can imagine. Overnight we had some of the best machinery and equipment that was ever made for crystal manufacturing.

"Another company that helped us a great deal was Collins Radio. I knew Art Collins very well and considered him a personal friend. I think that if we didn't supply all of the crystals he used we came very close to it. I had great admiration for Art and the gear he manufactured. Starting with the 75A and 32V-1 in about '48 I bought everything he produced right up to the KW-1. Ted Hunter, an engineer at Collins, was another good friend. We used to make crystals for him to use in his design work.

"During those few years after the war I tried to sell crystals everywhere I could. Some of the companies became good customers while others got their crystals somewhere else. E.F. Johnson was a company that just bought a small amount from us during those years. Later when they got into the CB business they became a big customer. Hallicrafters was a small customer and didn't buy much from us, although Bill Halligan was a very good friend of mine. Heathkit bought a few, we used to manufacture crystals with their name on them; but Heathkit was extremely price conscience. Allied Radio was another customer but we didn't make a lot of profit with them because we had to dropship their orders. But they gave us exposure in their catalogs and we thought that was important. Phillips of Canada was a big customer. They used some in their manufacturing in Canada and sent a lot to their other plants in Europe. RME bought all their crystals from us. They weren't a real big outfit but every bit helped. We also supplied a lot of crystals to the broadcasting industry. Gates was a big customer, and of course Collins and also RCA to a certain extent.

"We sold a lot of special crystals that were used in lab equipment and such but I don't recall exactly whom they went to. I remember once we got a tremendous order from Bell Telephone for filter crystals. They came out to the plant and got us started. We had to solder two plates together side-by-side. When they were

James Knights and Lee Faber with the new company plane, a Navion, in 1946.

excited they generated a 4044 cycle tone. That kept us busy for months. Gradually the business was building back up. I think we probably added about 50 employees a year from war's end 'till 1950.

"In '46 we bought a Navion aircraft. I think we were the first crystal company to use an aircraft. It was a tremendous asset to us. The Navion cruised at about 150 MPH and I could fly it for about $12 an hour, that worked out to about 10 cents a mile. I used to fly buyers and prospective customers out from Chicago to Sandwich and they were very impressed. Without the Navion or some other sort of plane we would have been at a distinct disadvantage being out in the boondocks as we were. I think I put about 2500 hours on that Navion, in the few years that we had it.

"While I was handling the business end of things, my partner, James Knight, was doing good work in running the plant and handling day to day operations. Although I was President of the company and Jim was Sect. Treasurer these titles didn't mean much. We always operated as partners and we each did what we could in every area.

"Jim was really a great stabilizing influence on the plant. He was steady, reliable and always used good judgement. He was also very well liked by the employees. Where I was more action orientated, Jim was slow and deliberate. I remember that when we were faced with a problem he used to say,"Lee, everything will work out, don't worry". My feeling was always that you had to make everything work out.

"I built my last transmitter around '46 or '47. I went all out on this one, I even chromed all the chassis and parts, like transformers. I installed it in two nice rack cabinets. It had an 813 in the final and operated on 20, 40 and 80 meters. I wonder where it finally wound up?

"When Art came out with the 75A receiver I bought one and it was vastly superior to the RME-69 I was using then. From that day on I always stayed with Collins receivers. When the 32V-1 transmitter came out around '48, I bought one of those and it was a great rig. When the '2 and the '3 came out I upgraded to them and finally to the KW-1. I gave up building primarily because I had just had done

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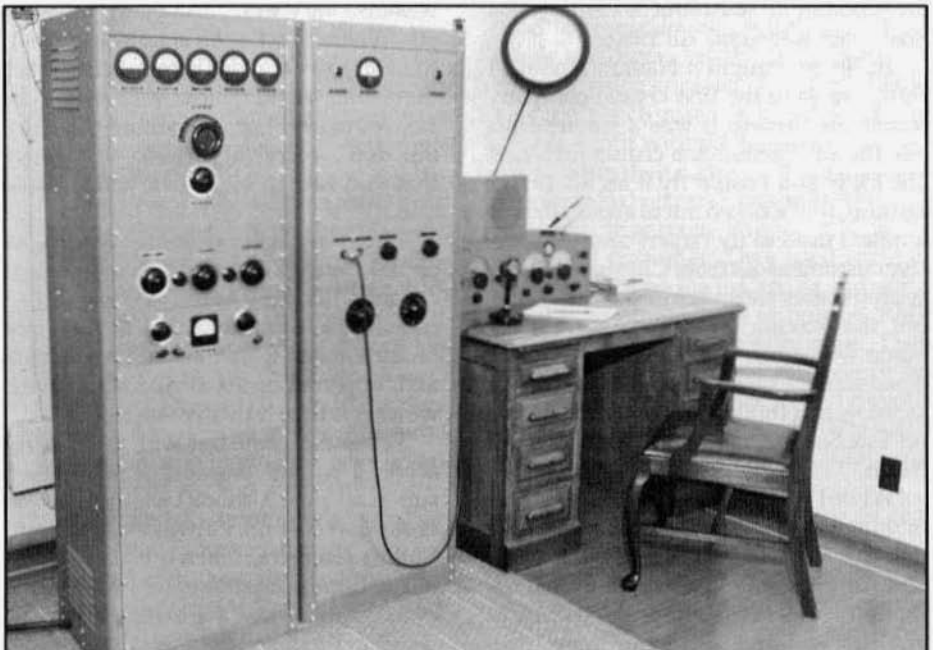
Inside the James Knights Company plant in 1948



The last transmitter that Lee built in 1947. It had an 813 in the final and operated on 20, 40 and 80 meters.

Lee Faber from page 25
enough of it. Maybe I did so much building in the earlier years because what I wanted just wasn't available. And of course I had to keep my ham radio costs down as much as I could. I was also developing other interests.

"By 1950 we had the James Knight Company firmly established as a crystal manufacturing company. We were back up to about 250 employees, we had good engineers and a good sales force. At this time we had an opportunity to branch out and against the opinion of some of our advisors we purchased the rights to manufacture a farm water hydrant. With that deal we also acquired a salesman by the name of Ed Aberdeen . He sold the hydrant for us - very successfully I might add - and as he became more familiar with crystals he sold those for us too. He was a fine man and he and Jim worked very well together. Several years later when we sold out the hydrant business - and it had been very profitable to us - Ed Aberdeen left and went with it.

"Neither of my two boys, Bart or Jerry, showed any interest in the crystal business, but my daughter Beverly was always around the plant from the time she was just a youngster. By the time she was in highschool in the late '40's she really knew the business. When visitors came to the plant we would always have her show them around.

"In 1950 I decided to put up a mast higher that anything I had to that time. I was thinking of something around 60 feet. I called a friend of mine at Graybar Electric. He told me they did not have a 60 foot pole but that they did have a 125 foot one that he could cut in half for me. I said,"My God, don't cut it off, wait 'till I get there". I jumped in the company truck and drove out to their plant which was in a suburb of Chicago about fifty or sixty miles from Sandwich.The pole was as straight as a string with a 5 inch top and about a 16 inch base. Just exactly what I wanted. So I made a deal to buy it for a dollar a foot and it cost me about a dollar a foot to get it delivered. It was delivered on a Sunday when traffic was light with a motorcyle escort in front and in back. There was a two wheel trailer clear at the back and the top of the pole rested on the bed of the truck. They arrived successfully and put it approximately where I was going to erect it in my back yard. The mast had originally come from Washington state on 3 railway flatcars. It was Washington Fir. The Graybar company had given it a coat of creosote which I later covered with aluminum paint to improve its appearance.

"I decided to put up 36 elements on 10-meters. I was a big fan of ten meters. The band was still good although on the downside of that cycle.

"I built the booms from 2-1/2" aluminum tubing and mounted them on an aluminum framework. These were bolted to the mast with stainless steel bolts that went completely through the mast. The antenna elements were surplus U.S. Army tank whips that came copper plated and painted.

"I decided to rotate the whole mast so it was necessary first of all to build a tower that would support the mast to about the 35 foot level. Then I had to come up with a means to rotate the mast. This I accomplished with a milling table powered by a 3/4 hp motor.

"The day we put it in the air was like a Fourth of July celebration. Over 100 hams from all over showed up to help besides all our neighbors and friends from Sandwich. I don't know how many people were there in total. They brought their wives and kids and we provided soft drinks and sandwiches. By late afternoon, with the help of two winch trucks we had the antenna pole locked into the supporting tower, resting on the milling table rotator.

"I started out with 600 ohm feed-line but I could never get it exactly matched. I later purchased some 50 ohm gas-filled transmission line from the Andrew Corporation. I got the standing waves down with that.

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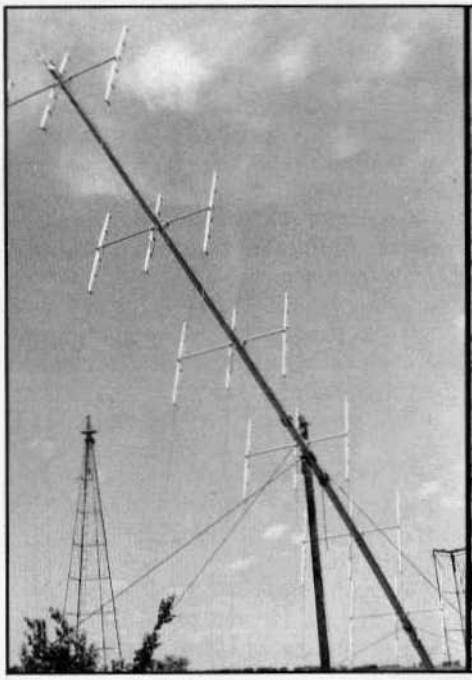
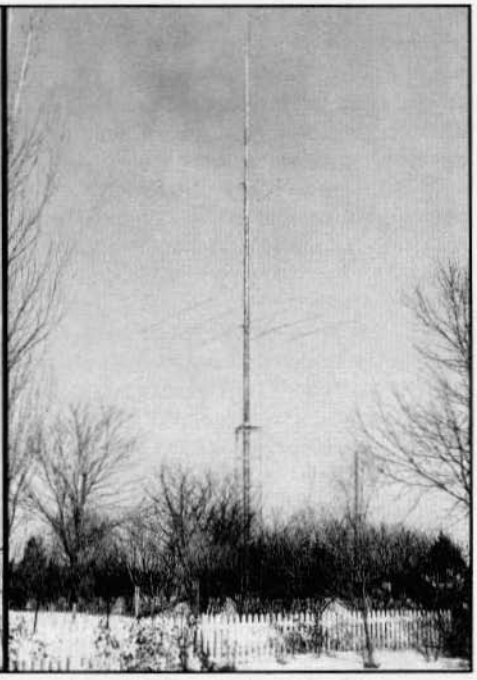


The 125'mast with 36 elements on 10 meters being raised into position. It went inside the 35' tower in the lower right hand corner of the photo.



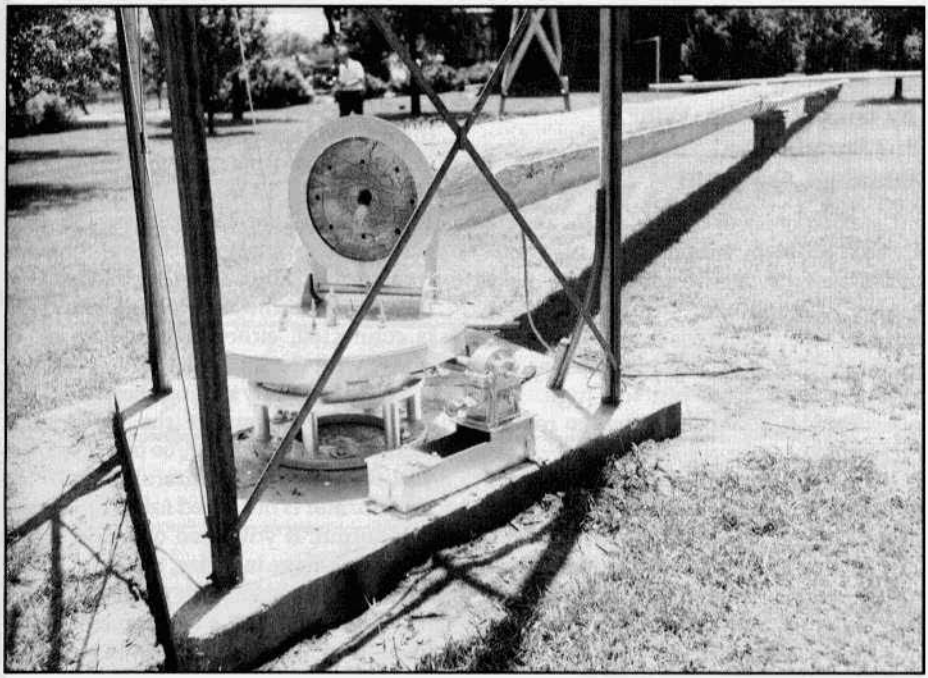
Lee installed yagi's for 10 and 20 meters on the tower in 1951

The results of all this effort and expense were phenomenal to say the least. It was an absolutely incredible antenna. I could work DX (using a 32V-3 running 100 watts out) just like I worked locals. I was using it with good results a year after the band was thought to have gone out! I remember working so many African stations that they could recognize me just by the strength of my carrier. They said I was much, much stronger than any other signal coming out of the U.S. About a year later I put up a single 10-meter beam with 2 stacked 20-meter beams below. That was all a great experience.

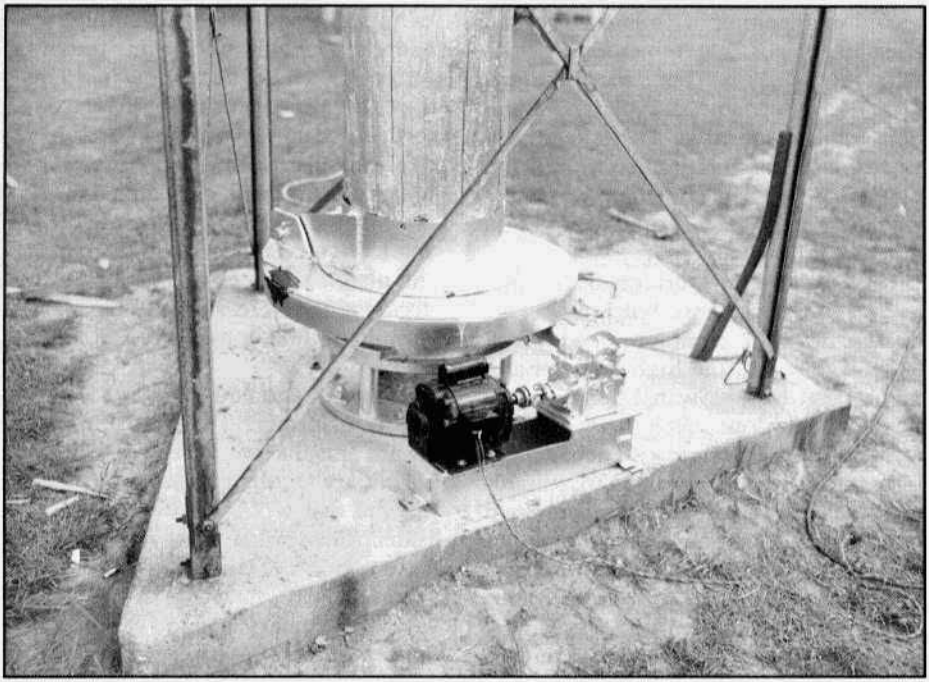
Around about this time we hired John Silver who had formerly worked at Motorola. He came aboard and reorganized a lot of the company; particularly the engineering department. He proposed a lot of expansion that would require borrowing large amounts of money. I found borrowing very distasteful and stressful. When I showed my reluctance to go along with the expansion and borrowing a group that included John Silver, some of our employees and some outside investors bought out my 50% interest in the company. 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.

I sold my home, with the towers, to a person from Sandwich and moved the family out to Arizona. A couple of years later I learned that the fellow that had bought my house took the towers down. He hired someone to climb the mast with a chainsaw and cut it off piece by piece from the top. **ER**

Editor's Note: Those interested in reading more about Lee's antenna should find an October, 1950, issue of QST. Lee produced an excellent article for this issue called "T-Day in Sandwich". Next month we'll have the final installment in this series.



The base showing milling machine bed used as a rotator.



The mast installed inside the supporting tower with 3/4 HP motor installed on rotating mechanism.

Transformers For Broadcast Transmitter Restoration

by Dick Houston, WØPK
159 Sortais Road
Durango, CO 81301

I was recently asked by an ER reader about a problem with a broadcast transmitter that he was restoring. The plate high-voltage power transformer was missing and an otherwise suitable replacement that he had located produced a voltage that was close, but too high. The question was about some way to reduce the voltage.

Plate transformers such as he needed are not easy to find. Peter Dahl Company in El Paso makes replacements for broadcast equipment, and at very reasonable prices – for commercial operations. But what is reasonable for business use can be out of reach for a ham. So if, as my friend had, you have found a near replacement, you may need to adapt it to your use.

You might think of voltage-dropping resistors, or possibly inductors, in series with the AC line. These could indeed drop the voltage, but the voltage regulation would be terrible! As plate current varied with modulation, so would the plate supply voltage. But there is a simple way to drop the primary voltage that you may not think of at first.

High-voltage transformers are not easy to find in the catalogs, but low-voltage transformers are common. Control circuits, IC devices, and higher-power amplifiers that don't glow in the dark (intentionally!) use low voltages, and transformers for their purposes appear regularly in the surplus catalogs. A suitable low-voltage transformer can be connected into the circuit in a simple way to reduce the line voltage applied to the primary of the plate transformer. Figure 1 shows how.

The low-voltage transformer's primary is connected across the AC line and its secondary is connected in series with the AC line feed to the plate transformer primary. It's easy to see that if, for example, the line voltage is 120 volts and the low-voltage transformer delivers 10 volts, the 10 volts will add to or subtract from the 120 volts to give 130 volts or 110 volts across the primary of the high-voltage transformer. Subtraction or addition depends on how the low-voltage secondary is connected, either in phase or out of phase with the line voltage.

We're generally talking about reducing the voltage output of the plate transformer. It can, however, be increased, but you will have to be careful because the transformer is insulated for its rated voltage output. If you need only five or ten percent voltage increase, the safety factor built into the insulation would probably handle the situation, but you're on your own - don't say I recommended it!

Figure 2 shows how you can determine which way to connect the low-voltage winding without involving the high-voltage transformer until you determine proper phasing. The voltmeter will read the line voltage plus or minus the transformer secondary voltage. Mark or tag the leads that you tie together to get the lower voltage output (assuming that this is what you want). Then you can connect the low-voltage transformer setup into the plate voltage circuit with no risk of accidentally increasing the plate transformer output voltage to a dangerous value.

Now how do you select the low-voltage transformer? The first thing to be aware of is that whatever its voltage, the secondary winding must be rated for the current that will be drawn by the plate transformer primary. So you'll probably have to look for a fairly high-current transformer.

The secondary voltage can be calculated based on the percentage reduction (or possibly increase, as mentioned earlier) you need in the plate voltage. If, for

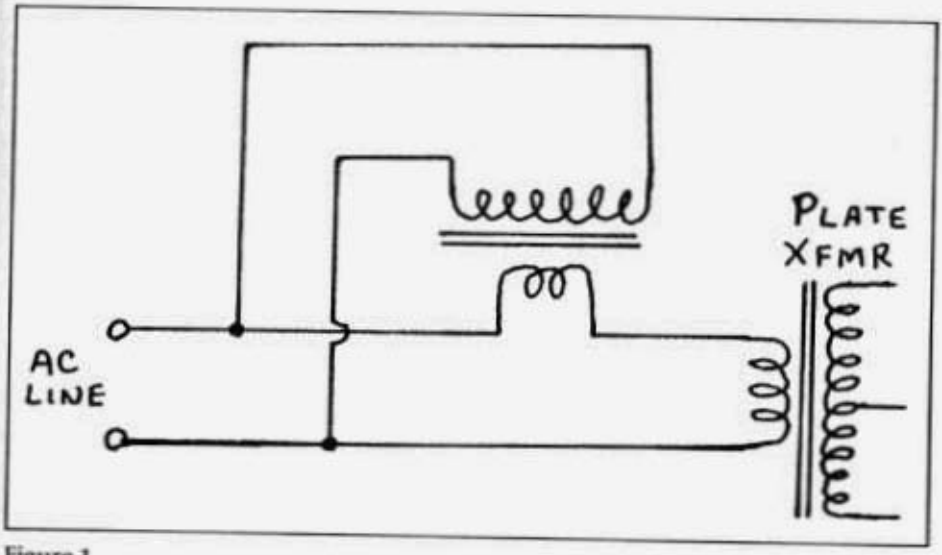


Figure 1

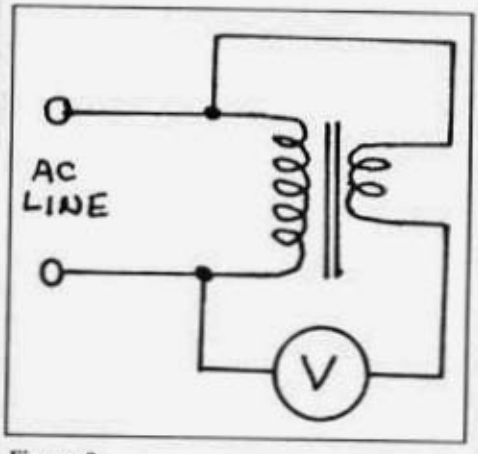


Figure 2

example, you need to reduce the plate voltage by 10%, you will need to reduce the plate transformer primary voltage by the same 10%. Therefore the low-voltage transformer must subtract 10% from the line voltage. For a 120-volt line, the low-voltage transformer would then have a secondary voltage of 12 volts.

You don't need to go through any mental gymnastics - just use this formula:

$$V(xfmr) = V(line) \times \left(1 - \frac{V(reg)}{V(rated)}\right)$$

in which V (xfmr) is the required secondary voltage of the low-voltage transformer, V (line) is the power line voltage, V (req) is the plate transformer voltage that you need, and V (rated) is the rated plate transformer voltage. This formula is set up for voltage reduction. If you enter a higher required voltage, the answer will come out negative. That just means that you should connect the low-voltage transformer to add to the line voltage.

You may not be able to find a transformer with the exact voltage you need, but a look at a surplus catalog will show you a wide variety to choose from. Just considering common filament voltages and solid-state device supply voltages, plus the fact that many such voltages are center-tapped, you can easily come up with voltages such as 3.15, 6.0, 6.3, 12.0, 12.6, 18.0, and 24.0. Many others are available. Some transformers have primary taps for a small range of line voltages, and these can be used for even a greater variety of secondary voltages. Consider also that a transformer rated for 240 volts on the primary but used on 120 volts will deliver half of the rated secondary voltage(s). With all of these possibilities you should be able to come close to what you need! ER

The Pioneering Novices from page 9

I am proud to have been a member of this group of hams. My age group never got to experience the spark gap. The nearest that I got to it was using an E.F. Johnson buzzer to learn Morse code. It was a wonderful,meaningful, experience that set the direction for the remainder of my life. **ER**

About The Author

Jim Musgrove, the author, was first licensed as a Novice in July of 1955. He is employed by the Semiconductor Products Sector of Motorola at Austin, Texas. Jim now holds an Extra Class license and his main interest in amateur radio is restoring vintage equipment and researching material to write historical articles about amateur radio. His HF operation is typically on 40 meters. Jim also operates VHF/UHF SSB and CW.

Special Thanks To:
Sanford Musgrove, W5FIT
H. Stevens, WA5IGW
Don Winfield, K5DUT

REFERENCES:

"It Seems to Us", QST magazine, March 1947

"It Seems to Us", QST magazine, March 1949

"It Seems to Us", QST magazing, June 1949

"Happenings of the Month", QST magazine, June 1949

"Happenings of the Month", QST magazine, July 1949

"It Seems to Us", QST magazine, September 1949

"It Seems to Us", QST magazine, November 1949

"It Seems to Us", QST magazine July 1950

"We Have New Regulations", QST magazine, March 1951

"The Novice One-Tuber", Part 1, Donald H. Mix, W1TS, QST magazine, May 1951

"The Novice One-Tuber", Part 2, Donald H. Mix, W1TS, QST magazine, June 1951

"How To Pass the Novice Examinations", QST magazine, June 1951

"Novice Column", CQ magazine, January 1952 through December 1956

"A Novice 35-Watter", Lewis G. McCoy, W1ICP, QST magazine, January 1953

"Happenings of the Month", QST magazine, February 1953

"Happenings of the Month", QST magazine, March 1953

"Let's Listen", Lewis G. McCoy, W1ICP, QST magazine, March 1953

"Novice 80- an 40-Meter One-Tube Rig", Lewis G. McCoy, W1ICP, QST magazine, November 1953

"Strays", -John Nagel issued WN0BT-, QST magazine, p10, January 1954

"Strays", -W1WPO earns "WN" Worked All States, WN0BT among cards-, QST magazine, p49, March 1954

"40 Watts on the 7- and 21-MC. Bands", Lewis G. McCoy, W1ICP, QST magazine, December 1954

"Q-Multiplier", Wilfred M. Scherer, W2AEF, CQ magazine, January 1955

"More Power with the AT-1", Lewis G. McCoy, W1ICP, QST magazine, October 1955

"The Novice Q5'er", Donald L. Stoner, W6TNS, CQ magazine, January 1956

"Your Novice Accent", Keith S. Williams, W6DTY, QST magazine, November 1956

Such A Deal ! by Skip Green, K7YOO, "The Ultimate Scrounger"

Skip Green, K7YOO, at a fleamarket in Bogota, Columbia. He has just purchased the Collins 51J4 for "thousands" of pesos.

It has been a busy summer and the ham radio activities have taken a back seat to a busy work schedule but I have still managed to squeeze in a little mischief. Two weeks ago while I was in beautiful Bogota, Colombia, I had the experience of attending one of the local fleamarkets. This was an interesting event in that an entire 5 or 6 block section of a main street was blocked off and vendors had set up tables or spread out blankets to display their wares. The street formed one large aisle with displays on both sides.

I was with another individual who kind of "sprung" this surprise on me and had no idea that I had an incurable case of fleamarket disease. We proceeded to wander down the street perusing the tremendous variety of handmade jewelry, blankets, local food, trinkets, castoffs, books, and radios. Wait a minute, radios? You can imagine my surprise when I ran into a small but interesting assortment of electronic items. Then my mind became utterly boggled when I spotted the unmistakeable form of a 51J Collins receiver mixed in with a bunch of "antiques" of dubious value. I casually (don't believe it) walked over and checked it out. It turned out to be a dirty but quite intact grey panel 51J4 that even had the AM filter still in place. The lettering on both the front panel and the dial drum were in excellent condition and all of the basic vital signs said "buy me". After giving a long deliberation to the logistics of bringing this relic back from Central America on the airplane (about 2 1/2 seconds) I proceeded to ask the vendor "Que precio?" and the negotiations were on. I won't divulge the final price but it cost me thousands (of pesos). After consummating the deal I realized that I was only about a third of the way into the fleamarket and had to carry the receiver the rest of the way. Needless to say my arms are now about 3 inches longer from carrying the 51J4 by its rack handles. To conclude the story I did manage to get it home and to my amazement it actually worked when I plugged it in. Such a deal! ER

Collins 75A-Series Receivers from page 13
with linear tuning is just the same as it is with many others: you have a concept that you can make a system quite linear, but it is never quite as linear as you'd like to have it.

"It's very interesting that even on a ceramic form, it's difficult to fire a changed-pitched coil in order to make it linear. There is grain to the structure of even the best ceramics, and even much more so on coil forms that are phenolic in any form. The problem became, quickly, one that you had to identify what the change in frequency would be resulting from using one or another type of coil form wound with different materials, or whether just the rotary orientation of the coil form was producing the error. It gets pretty tough to make these coils in quantity production, and it was Ted who brought that to real fruition.

"Ted developed an idea of using a stack of washers that had a cam running on them which gave us the corrections for a few hundred cycles of oscillator error, and that was incorporated into the series of permeability tuned oscillators. The real problem up to then was stability. It was Ted who did all the hard work as to the temperature coefficients of all the pieces, the capacitors, inductors, and metals.

"I had the same problem, exactly, in the oscillator on the ART-13. On that one, it was solved by Collins having girls who had all the measuring equipment necessary to display the curves of the oscillators as they ran back and forth over the compensation washers. They got so good at it that they could just watch the cam that was doing the correction and adjust the washers with their fingers.

"The other problem is how do you make a tuning shaft that is, in parts per million, accurate? We found that answer, eventually, in an imported Swiss lathe. I didn't have anything to do with that particular part of it, Ted did all that. He should be given credit for every part of it excepting the fact that I designed and had been making linear tuning elements."

(America's competitive edge will be lost forever if we can not find a way to educate more outstanding engineers like Roy Olsen.)

Production of the 75A

Now for the hard question: Were there ever any Collins 75A receivers actually produced?

As nearly as I can determine, the answer is that there were. Roy Olsen has said that the initial release was 200 units. I feel that this initial figure was cut way back, and that far fewer than 200 were actually produced.

I researched back issues of QST, looking at product announcements, and for anyone who might have had one for sale in the ham ads. The original product announcement came out in October, 1946. There are photos of 75As in the Collins ad for February, March, May, and June of 1947. Included in these photos is Clyde Hendrix (WØHBG), Art Collins' friend, at his brand new 75A/30K station in the May ad. The ARRL lab had a sample, and it was reviewed for the September 1947 issue. Photos of the receiver chassis in the ARRL article match photos in the Collins 75A sales brochure. Suddenly, they stopped mentioning the 75A. Nothing was said of any receiver until November, when it was announced that Collins has "reinstated direct sales", and showed a 75A-1 in the equipment list. All of the various dealer ads after November, even though they call out a "75A" receiver, have photos of the 75A-1. The only QST "ham ad" for a 75A I could find (I searched until mid-1953) was in May 1947 when a "Craig" in Salem, Oregon, began to advertise, wanting one. He found it, as he had it for sale again in "new condition" in September of that same year. If you are out there Craig, please contact Electric Radio Magazine!

In discussing this matter with Gene Senti, I learned that it was typical for Art Collins to send about two dozen units of a new production model to his best dealers and personal friends for evaluation.

There is photographic evidence of a few differences between the 75A and the 75A-1. I feel that Art Collins probably held off on full production until the results of the evaluations could be built into what became the 75A-1. Next month, when the 75A-1 is discussed, we'll get into these differences, so that maybe some sharp-eyed reader may be able to actually find a genuine Collins 75A. **ER**

Update To The NC-300 from page 17

14) Items 1, 2, 8 and 9 were already installed in my NC-300.

The fast attack/slow decay modification is not quite as fast as the '303's because R24 is in series with the AGC line. With R24 shorted out AGC action is the same. But, the circuit I show here is only a few milliseconds slower and can be made without any other major modifications. There are no pops or blasting evident in the audio and a side by side comparison between the NC-303 and the updated NC-300 showed no discernible difference in any mode SSB, AM, or CW strong or weak.

The only other modification I didn't add to my '300 was to replace the 2295 Kc 2nd conversion oscillator with a xtal oscillator. This can be done in your NC-300 if you're experiencing drift in your rig. I understand in humid areas this is a problem. See the CQ article above for details. My NC-300 was just fine.

This completes the changes I found necessary to make my NC-300 perform much like the NC-303 on SSB while not affecting the AM or CW performance.

The SSB reception is now excellent, just what I need for a vintage SSB/AM station. The NC-300's can be purchased very reasonably compared to the NC-303. Stability is the same in both rigs and, in my estimation, with this update the '300 is as good as the '303 for SSB audio quality.

Good luck, see you on the vintage SSB net. **ER**

Classic Radio Exchange

Scheduled for 2000 to 0400Z September 27 and 28, the Classic Exchange (CX) is a celebration of the older commercial and homebrew equipment that was the pride of our ham shacks just a few, short decades ago. The object of the contest is to restore, operate and enjoy older equipment with like-minded amateurs. A "classic" radio is at least 10 years old, an advantage but not required to operate CX. You can use anything, although new gear is a distinct scoring liability and not as much fun!

Exchange: Exchange your name, RST, QTH, receiver and transmitter type (homebrew send final amp tube or transistor) and other interesting conversation. The same station may be worked with different equipment combinations on each band and each mode. CW call "CQ CX"; phone call "CQ Classic Exchange." Nonparticipants may be worked for credit.

Suggested frequencies: CW-up 60 kHz from low band edges; phone- 3880, 7290, 14280 and 21380; Novice/Tech - 20 kHz up from low band edges. 7060 and 3560 tend to be the most popular CX frequencies.

Scoring: Multiply total QSOs (all bands and modes) by the following sum: total number of different receivers and transmitters worked on each band and mode plus the total number of states/provinces/countries worked on each band and mode. Multiply that total by your "classic multiplier": the total age in years of all receivers and transmitters used, three QSOs minimum per unit to qualify. If equipment is a transceiver, multiply age by two. If homebrew, count as 25 years old unless actual construction date or design is older.

Awards: Certificates are awarded every now and then for the highest score, exotic equipment, the best excuse, and other unusual achievements.

Logs: Send logs, comments, anecdotes and pictures to Jim Hanlon, W8KGI, P.O. Box 581, Sandia Park, NM 87047 or Marty Reynolds, AA4RM, P.O. Box 13354, Atlanta, GA 30324. Include SASE for the next CX Newsletter.

CLASSIFIEDS

Advertising Information

Subscribers receive 1 free - 25 word- ad per month. **Extra words are .15.** Here's how to count the words in your ad: the heading - For Sale, Wanted, etc count as **1 word.** Your name, call, address and telephone number count as **6 words.** Hyphenated words count as **2 words. Please count the words in your ad and if you're over 25 words send payment for the extra words.**

Non-subscribers: $3 minimum for each ad (up to 20 words). Each additional word is .20. **Please call or write for display rates.**

VINTAGE EQUIPMENT ONLY

ER
P.O. Box 57
Hesperus, CO 81326 **Phone/FAX 303-247-4935**

DEADLINE FOR THE OCT. ISSUE: OCT. 3

FOR SALE: Repair and restoration on all vintage equipment; 35 years experience. Barney Wooters,W5KSO, 8303 E. Mansfield Ave., Denver, CO 80237. (303) 770-5314

FOR SALE: Johnson Navigator - $150, Adventurer - $75, KW Matchbox - $200. Plus UPS. W6RNC, POB 478, Nevada City, CA 95959.

FOR SALE: Military tech manual listings, largest stock in the world, over 50k - $5 refundable with first order. SASE for inquiries. Lee Frank, POB 60011, Harrisburg, PA 17106-0011.

WANTED: Clegg Zeus 6&2 xmtr/ps; Clegg Interceptor-B 6&2 rcvr in exc./clean cond.; Knight R-100 rcvr in exc./clean cond. Mike, KC8CU, (207) 525-4421

FOR SALE: Collins S-Line aluminum knob inlays: small (exciter/PA tuning) - $1; 30L-1 - $2; spinner/plain (main tuning) - $3. Charlie, K3ICH, 13192 Pinnacle Lane, Leesburg, VA 22075. (703) 822-5643

FOR SALE: CUE 860 tubes - $35 each; RME-69, DB20, spkr - $150; 1937 "Hints and Kinks" - $15. Steve Harmon, N9HGF, 4340 N. Congress Ave., Evansville, IN 47711. (812) 474-0842

WANTED: Any bug with sheet-metal base and frame. Also early Mac-Key with brass nameplate. Tom French, W1IMQ, "The McElroy Collector", 120 Great Road, Maynard, MA 01754. (508) 897-2226

FOR SALE: Johnson SSB adapter - $125; RME I-II rcvr - $40; RME DB-22 preselector - $35; RME VHF-152 converter - $35; Collins tank col #181E-1 - $25; Vacuum variable, 365 pF - $50. Ben, W6FDU, 933 Robin Lane, Campbell, CA 95008. (408) 374-0372

FOR SALE: R-388 - $375; SX-71 - $125; Howard 438 - $100; G-43 - $75; NC-300 - $250; NC-66 - $100; several AM xmtrs. Don, K5DUT, 6080 Anahuac Ave., Fort Worth, TX 76114. (817) 732-3976

WANTED: Schematic for B&W sideband generator, repro OK; also want BC-610. Ken Kinderman, WB9OZR, 362 Echo Valley Lane, Kinnelon, NJ 07405. (201) 492-9319

WANTED: QSL cards - I collect them. Also want General Radio Experimenter, radio books and magazines. Please write: Joe Holstein, N8EA, 1515 Sashabaw, Ortonville, MI 48462.

CLASSIFIEDS

FOR SALE: Used technical books - radio, electronics, military, test equipment, catalogs, etc. List- $1 (stamps ok). Softwave, Dept. ER, 1515 Sashabaw, Ortonville, MI 48462

FOR SALE: AN-GRC-109A Special Forces Radio Set, 10-15 watt CW xmtr, rcvr, ps, built-in key, manual, neat rig - $100. WANTED: Heath HG-10B vfo. Frank Vardeman, N4SUY, 4612 Eddy Dr., Tampa, FL 33603. (813) 871-2134

WANTED: Eldico TR-75 xmtr. Don Temple, AFØC, 5405 S. Florence Ct., Englewood, CO 80111. (303) 779-0923

WANTED: HRO-60 coils type C/J/AA/AB and pre-1950 ARRL Handbooks. B. Nadel, Box 29303, San Francisco, CA 94129. (415) 346-3825

FOR SALE: Heath HW-101 ps; Drake RV-3; Heath SB-301. All mint. Marty, (817) 497-6023

FOR SALE: Synchronous detector for 455 khz IF rcvrs. Dramatically improves AM: Reduces fading distortion, selectable sideband cuts interference. Kit: $139, Built/Tested: $199, Info: $3. Steve Johnston, POB 3420, York, PA 17402-0420.

WANTED: Military airborne TV cameras and equipment models ATK, ATJ, ATD, etc. Also I buy early radar equipment, pre-war oscilloscopes and pre-war CRTs. Allen Weiner, 14 Prospect Dr., Yonkers, NY 10705. (914) 423-6638

FOR SALE: Lafayette radio operating and service manuals, schematics etc. If I don't have it,they never printed it. Pete Markavage, WA2CWA, 27 Walling St., Sayreville, NJ 08872. (908) 238-8964

WANTED: Old books; magazines; Handbooks; White's Radio Log; first callbooks; old writings on early radio; issues of "Radio Magazine"; De Forest stock certificates; pictures of De Forest, Armstrong and Marconi. Call, write or FAX. Please do not throw them away. I pay shpg. Call, write or fax. Donald R. Boland, N1FYX, 28 Faulkner St., Malden, MA 02148. (617) 324-5362, FAX 322-8412

WANTED: Need osc. and final plate coils for Hallicrafters HT-6. If you won't part with yours I would appreciate construction data so I can restore this classic. Also need a junker unit. Thanks. R. Haworth, W2PUA, 112 Tilford Rd., Somerdale, NJ 08083. (609) 783-4175

FOR SALE: 75A-4 ; National NCX-3 w/ps, spkr, manual; SX-117. WANTED: Collins 75A-1; calibrator for 75A-2/3; coils for HRO-5. Carter Elliott, WD4AYS, 1460 Pinedale Rd., Charlottesville, VA 22901. (804) 980-7698 (d), 979-7383 (n)

WANTED: Citizen Radio Callbook magazine for 1920, 1921 and 1922; Amateur Radio Callbook magazine (flying horse cover) for 1925 and 1926. Bob Arrowsmith, POB 166, Annandale, VA 22003. Collect (703) 560-7161

CLASSIFIEDS

WANTED: Manual for HP600B; 3TF7 tubes; meters for R390A; TEK 465 or 475 scope, must be in very good cond. Clark Hatch, WØBT, 2546 SE Peck Rd., Topeka, KS 66605. (913) 235-2721

FOR SALE: Johnson Matchbox w/directional coupler and indicator - $100 plus UPS. Have lots of other goodies for sale. Roland Matson, K1OKO, RFD #1, Box 2943, Kennebunk, ME 04043,

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WANTED: Buy and sell all types of electron tubes. Harold Bramstedt, C&N Electronics, 6104 Egg Lake Rd., Hugo, MN 55038. (800) 421-9397, (612) 429-9397, FAX (612)-429-0292

WANTED: Ampex PR-2230 Instrumentation Magnetic Tape Recorder/Reproducer. Complete or parts units. Prefer machine for 1" tape with 1-7/8 to 120 IPS tape speed but may take 15/16 to 60 IPS and/or 1/2" tape. Condition or presence of heads or signal processing electronics not important. Premium price paid for NOS machine. These units were used in many military hospitals and may turn up in areas around them. **FOR SALE:** Dynamotor DY-17/ART-13, PE-94-C - $45; Control Box C-87/ART-13 - $27.50. All NOSB. Also **WANTED:** Mounts FT-185, FT-253, Dynamotors DM-41, DM-43, DY-96/VRC, DY-142/VRC, PE-103, PE-135; Tube 307A/VT-225; Generators GN-45, GN-57; Cord CD-501; Vibrators VS-3, VB-5, 500C. Robert W. Downs, WA5CAB, 2027 Mapleton, Houston, TX 77043. (713) 467-5614

WANTED: Schematic for a Maas-Rowe Carillon model 500 tube-type organ amplifier. It uses 4-6L6's. Victor Gregowski, WD8DWR, 3635 Orvall Dr., Fort Gratiot, MI 48059. (313) 385-9479

FOR SALE: R-390A service, module repair to complete remanufacture, cosmetic restoration, 20 years experience, expert service, 1 week turnaround, very reasonable, any cond. accepted. Rick Mish, (419) 726-2249

FOR SALE: First user friendly circuit on early BC-348s. Most comp. values on 2 sheets 8-1/2 x 14, reads left to right. Send $2 + (2) $.29 stamps. Ray Larson, 12241 1/2 Gorham Ave., W. Los Angeles, CA 90049-5214.

ELECTRON TUBES FREE 1992 Catalog, over 2,000 types in stock. **Electron Tube Enterprises,** Box 311, Essex, VT 05451. (802) 879-0611, FAX (802) 879-7764

FOR SALE: Radio tubes; repair and restoration of all vintage amateur and commercial radios, 25 years experience. Herbert Stark, 321 N. Thompson St., Hemet, CA 92543. (714) 658-3444

WANTED: Western Electric AM xmtr, audio equipment, mics, loudspkrs, catalogs, etc. Ron Steinberg, K9IKZ, (800) 279-8324 (w), (708) 773-3583 (h) or FAX (708) 773-0822

FOR SALE: Two 851 tubes in orig. crates (1944), size 17x17x27", wt 12 lbs ea. - $50 ea; (2) ARC 12994 female plugs LN - $5 ea. Alan Dale, W9ZPP, (812) 424-5208

FOR TRADE: My Collins 32S-1 xmtr for your 75S-1, 2 or 3 rcvr. Wayne Beeson, K8WB, 5261 Jane Way, Las Vegas, NV 89119. (702) 795-2652

WANTED: National HRO-60 coils - E,F or G. Willing to pay top dollar, or will trade A,B,C or D coils. Dennis Gibbs, 3863 Beech Down Dr., Chantilly, VA 22021. (703) 631-8539

WANTED: Hunter Bandit- 2000. Please reply with model, cond. and price. Russ Hunt, W9HZD, 2242 - C- Via Puerta, Laguna Hills, CA 92653. (714) 859-6428

FOR SALE: NC-125 w/Select-Ject, manual and spkr, VGC - $150. TRADE: SP-600-JX-17 w/manual in VGC for R-388 in similar cond. Clyde M. Sakir, N7IOK, 4243 E. First St., Tucson, AZ 85711.

WANTED: BC-610 tuning unit, glass cap; HT-32B in very good cond. Uncle Joe's Ham Shack, WB5ZPQ, (919) 779-5659

WANTED: Clean Drake equip. - 2B, 2C, R-4B, T-4XB, acc. for any of these. Byron, WA5THJ, 1920 Maxwell, Alvin, TX 77511. (713) 331-2854

CLASSIFIEDS

WANTED: Globe King series; homebrew 1500 W tube tx; broadcast tx's; broadcast tx's; broadcast mics. Call, write or fax: Donald R. Boland, N1FYX, 28 Faulkner St., Malden, MA 02148. (617) 324-5362, FAX 322-8412

FOR SALE: Johnson Ranger, works and looks good - $125. Evan Haydon, 4308 N. 15, Lincoln, NE 68521. (402) 435-4083

WANTED: Good working Drake 2B, 2BQ & manual; matched pair of Sylvania 6HF5 tubes; McIntosh 1700 rcvr; 1969 WRL catalog. Sumter Hickman, KB5QHD, 1008 West 10th St., Plainview, TX 79072. (806) 293-5809

WANTED: ARRL Handbooks - 1st, 5th, 6th, 8th, 16th editions. **FOR SALE:** ARRL Handbooks, 1927 to date; many other books, LSASE for list; Hallicrafters S-38A-B-C-D-E's - $50shpg included; KWM-2 filter F455A2.1. Parting: BC-610, B&W 5100 & SSB, HT-40, S-40, S-38's, NC-33. Bob Schafer, WA7IHN, POB 442, Aumsville, OR 97325. (503) 749-1149 eves.

FOR SALE: QST's 1928 to present, complete and in good cond. - BO or swap for Collins (especially 75A-2, 3 or 4), Johnson (especially mint Ranger I/II) or other vintage gear. Alan, W3VL, (215) 295-6331

WANTED: WE 19C audio oscillator, 242, 252, 284, VT-52 tubes; accumulations of Radio Electronics and Radio & TV News from the 40's and 50's; WE 7A autotransformer. Joe Roberts, N4WQC, Box 19302, Alexandria, VA 22320. (703) 256-2468 voice/fax

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FOR SALE: Russian mech. filters, 600 Hz bandwidth at 500 khz, for rcvrs like 75A-1, 51J, etc. - $62 ppd. Joel Thurtell, 11803 Priscilla, Plymouth, MI 48170. (313) 453-8303

CLASSIFIEDS

Western Heritage Museum Omaha, Nebraska
"a magnificent home for your equipment"

Leo Meyerson, WØGFQ, (founder of WRL) in concert with QCWA, needs donations of gear and related materials for the amateur radio exhibit at Western Heritage Museum in Omaha, Nebr.

This permanent display is the only one of its kind in the country and is something that all hams can be proud of. We expect 50,000 visitors annually.

Your tax deductible donation will be permanently noted on a plaque that will be prominently displayed.

For more information contact Leo at (402) 392-1708, May-Nov.; 619) 321-1138, Nov.-May.

WANTED: Books on the history of the General Radio Company. Also want early wireless items and old radio books. Frank R. White, KBØTC, POB 3283, Olathe, KS 66063.

FOR SALE: GE oil transmitting filter caps: (2) 6 mFd @ 3000 VDC - $10 ea., (2) 10 mFd @ 600 VDC - $7 ea. Plus shpg. Bill Riley, W7EXB, 863 W. 38th Ave., Eugene, OR 97405. (503) 345-2169

WANTED: Johnson Desk KW, 500, Ranger II, Viking II, 10 watt audio amp, 275 watt Matchbox, Valiant, swamping attenuator, power reducer, low pass filter, TR switch; Globe King 500; Eico 751 AC supply; Heath Cantenna. Mack Fairley, AB4ZF, 506 Tallyrand Ave., Monroe, NC 28112. (704) 283-5146

FOR SALE: Rare KW Electronics (England) twins, KW-202, KW-204, w/matching spkr and manuals, AM/SSB/CW - $600; Johnson 275 W Matchbox w/coupler - $90; HQ-110 w/spkr - $100; Allied rcvr A-2516 - $90. U ship. Richard Lucchesi, WA2RQY, 941 N. Park Ave., N. Massapequa, NY 11758. (516) 798-1230

WANTED: For Collins 75A-4: L2, L8, C13 and C28. Ray Osterwald, NØDMS, 10679 W. Dartmouth Ave., Lakewood, CO 80227. (303) 571-2644 (w), 987-3836 (h)

WANTED: I buy broken or dead Swan linear amps, 1500W, 1200W, 1500Z, 1200Z and Swan Mark I, Mark II. Gene, (214) 736-2391

WANTED: Espionage equipment. Historian purchases spy radios, code and cipher machines and any equipment, devises or manuals pertaining to the world's intelligence organizations. Keith Melton, Box 5755, Bossier City, LA 71171. (318) 747-9616

FOR SALE: Drake R-7, R-4C, SPR-4, PS-4. All in good to exc. cond. w/manuals - offer/trade. Levy, 8 Waterloo, Morris Plains, NJ 07950. (201) 285-0233

WANTED: HQ-145, HQ-160 or National NC-140 or NC-190 in good wkg cond. Vern Snyder, 3712 Amber Trail, Duluth, GA 30136. (404) 381-6636

FOR SALE: KWM2A, late W/E with PM2 - $600; 75S3, W/E - $285. **WANTED:** 62S1, 55G1, DL1, 32V2/3; Johnson 500. Michael, WM1O, (914) 834-7678, 6-10:00 PM EDT

WANTED: Chimneys (2) for 3-400, must be 3-1/2" tall. Have trans. chokes, caps, many tubes, much more, will share. Lonnie Neal, N6TSI, (619) 365-7224

WANTED: RCA AR-88, VLF or ELF rcvr; tube CB's; SB-301; SB-401; SB-110; SB-200; SB-101; SB-310; Harvey-Wells; Sonar; Lettine; Gonset; Lampkin; Philco; Arrow; B&W and Bendix. Donald R. Boland, N1FYX, 28 Faulkner St., Malden, MA 02148. (617) 324-5362, FAX 322-8412

CLASSIFIEDS

WANTED: Intelligence museum wants German, Japanese, Italian, Russian and Chinese communication equipment and any British or U.S. spy radios. LTC William Howard, 219 Harborview Lane, Largo, FL 34640. (813) 585-7756

FOR SALE: 312B4 - $75; 312B5 - $275; 180S1 tuner - $150; Collins suitcases - $50 ea.; 75S3C, R/E - $695; PM-2 pwr sply - $50; KWM-2A - $395; 30L-1 - $495; 516E2 pwr sply, DC - $25; T-67/ARC-3 - $25; BC-348L - $20; tube tester T-177B, w/MX949 A/U - $40; G-110A Temco VHF rcvr - $85. K5GIT, (713) 331-1074

FOR SALE: 108-126 Mhz Lear rcvr; Weston 779 VOM; IM-10 VTVM; Heath GL-1; 6-Q leather case battery portable; Drake 1-tube Q-Xer - all $15 each. Radiola 17 w/tubes and pwr sply - $35; SX-71 and Zenith Royal 3000-1 Transoceanic - $50 each. A-600 Transoceanic - $85; HQ-180C w/spkr - $115. All postpaid. Eric Jones, N4TGC, RR 11, Box 492, Florence, AL 35630. (205) 764-0675

FOR SALE: HV capacitors, parts, crystal calibrator kit. At prices you'll like. $1 brings catalog and coupon. Thanks. NW2F, Two Fox Electrix, POB 721, Pawling, NY 12564. (914) 855-1829

FOR SALE: New Collins parts: 30L-1 blower motors - $35; 51S-1 PTO osc., 70K-7, P/N 522-2918-000 - $200; silver plated 30S-1 tank coils - $7. Dennis Brothers, WAØCBK, HC 84, Box 1, Potter, NE 69156. (308) 879-4552

WANTED: Later model Hickok tube tester, laboratory or portable, w/manual and adapters; Hallicrafters SX-28/28A. Hal Waite, K4GFI/7, 2941 Sorrel St., Las Vegas, NV 89102. (702) 362-8136

FOR SALE: Elmac AF-67 - $60; BC-221 - $30. Pick-up only: Collins, for rack mounting, 108-152 Mhz, single channel AM, 4X150A final, 6146 modulators, 242F-3 RF and ps/mod units, 51M-7 rcvr - $250; Eldico SSB-1000 linear, 10-80, built-in scope, pair 4X250B finals, 3 watts drive - $350. **WANTED:** HRO low freq. coils. All units have manuals. C.L. Richter, K6AQB, 5256 West Avenue L, Quartz Hill, CA 93536.

FOR SALE: B&W BL-CL coils, 160-10. Vance Gildersleeve, K5CF, 206 Michelle Dr.,Poteau, OK 74953. (918) 647-9044

WANTED: Schematic for Heathkit SB-220, also list of mods. Richard Evans, WA3FOQ, POB 491, Souderton, PA 18964. (215) 257-8906

CLASSIFIEDS

WANTED

Collins promotional literature, catalogs and manuals for the period 1933-1983. Jim Stitzinger, WA3CEX, 23800 Via Irana, Valencia, CA 91355. (805) 259-2011. FAX (805) 259-3830

FOR SALE: Collins 75A-4 filters: 6 pole ceramic for high quality AM. 3 bandwidths available: 4, 6, or 9 Khz - $83.50 ea.; single pole CW crystal filters - $88 ea. 10% discount for two filters. Money back guarantee. Calif. residents please add sales tax. Vector Control Systems, 1655 No. Mountain, Ste. 104-45, Upland, CA 91786. (714) 985-6250

WANTED: "Broadcast News" (RCA), "Pick Ups" (W.E.), other broadcast literature and catalogs of the '30's - '50's. Sam Thompson, W6HDU, 1031 San Antonio Ave., Alameda, CA 94501. (510) 521-1429

FOR SALE: Equipment, parts, magazines, books, manuals, data books, long list - $1. **WANTED:** Collins SM-1/2 or 3 mic; any Collins literature. U.J. Orgnero, VE6RST, Box 32, Site 7, SS 1, Calgary, AB T2M 4N3 Canada. (403) 239-0489

FOR SALE: 5 pads of NOS ARRL "Radiogram" forms, unused - $10 ppd; Heathkit Q-Multiplier, nice cond. - $10 plus $3.50 shpg; Hallicrafters S-120, Knight Star Roamer, Heathkit (looks like AR-1, 4 bands, Fabricoid covered wood case), any of 3 above sets, as is - $25 ea. plus $5 shpg, for an additional $25 I will restore them to orig. playing cond.; Precision E-200 signal gen. in good wkg cond. - $40 plus $5 shpg; Bendix model 55L2U, nice wkg cond. - $35 plus $5 shpg; Eico 232 peak-to-peak VTVM, like new - $35 plus $5 shpg. James Fred, R1, Cutler, IN 46920. (317) 268-2214

WANTED: Main tuning knob for the Hallicrafters HT-37 xmtr. Cal Eustaquio, N6KYR, 1747 Pescadero Dr., Salinas, CA 93906. (408) 443-0649

WANTED: Johnson 122 vfo and Adventurer; FT-243 xtals for 80/40 mtrs. Bob Braeger, WA6KER, (714) 682-5084

FOR SALE: Transmitting/Receiving tubes, new and used. LSASE for list. I also collect old and unique tubes of any type. Looking for Taylor and Heintz-Kaufman types and large tubes and sockets from the old Eimac line; 250T through 2000T for display. Maybe you have something to trade? John H. Walker Jr., 16112 W. 125th St., Olathe, KS 66062. (913) 782-6455

FOR SALE: 32S1, 75S1 and pwr sply - $475. Joel Levine, WB2BMH, 67 Derby Ave., Greenlawn, NY 11740. (516) 757-7641

WANTED: MN-28 control box and flexible tuning cables for MN-26 radio compass; cases for RBA rcvr and pwr sply. Tom Brent, Box 1552, Sumas, WA 98295. (604) 826-4051

FOR SALE: Collins KW-1 w/extra parts and manual, good cond. All offers considered. SASE for info and photos. Greg Kordes, WA6EEB, 17220 Newhope, #201, Fountain Valley, CA 92708. (714) 921-7222

WANTED: Shortwave loop antenna (Zenith shortwave magnet) for Zenith model 8G005YT Trans-Oceanic. Joe Ursini, 20667 Miller Ave., Euclid, OH 44119. (216) 531-5111

FOR SALE: Exact reproduction drum overlays for most Collins rcvrs. $10 postpaid. 75A2/3, 75A4, KWS-1, 51J3-4. David Knepper, Box 34, Sidman, PA 15955. (814) 487-7468

FOR SALE: R-390A squelch modication: small external add-on module, super sensitive, works great on AM and SSB, 15 minute installation, instructions included - $25. Rick Mish, (419) 726-2249

ELECTRIC RADIO PARTS UNIT DIRECTORY

At this point the directory has over 230 units in it. If you need a part for a vintage restoration send $2 and an SASE (.52 postage) for the list. If you have a parts unit, consider putting it on the list. Your dead unit can help bring others to life!

CLASSIFIEDS

WANTED: Machine shop work. Knobs shafts bushings, etc. made to your sample or drawing. Reasonable. Jim Dill, Box 5044, Greeley, CO 80631. (303) 353-8561 evenings.

FOR SALE: Repair & refurbishment of older tube-type amateur equipment. Fully FCC licensed; 35 years experience. Chuck Banta, N6FX, Claremont, Calif. (LA area) (714) 593-1861

WANTED: Pre-WW II HRO rcvrs and Collins xmtrs such as 45A, 32C, etc. Bob, KD9B, 1025 North Vine St., West Lafayette, IN 47906. (317) 743-4053

FOR SALE: Want to share hard to get radio equipment, parts, tubes, etc. Cdr. Glenn W. Richey, USN Ret., W7SAB, 219 Naval Ave., Bremerton, WA 98310. (206) 373-9631

FOR SALE: HV capacitors, parts, crystal calibrator kit. At prices you'll like. $1 brings catalog and coupon. Thanks. NW2F, Two Fox Electrix, POB 721, Pawling, NY 12564. (914) 855-1829

FOR SALE: Collins 32V-1, SN #1 - $2500 OBO. Jim Cunningham, K4DEE, 1045 Fairway Dr., Winter Park, FL 32792. (407) 679-8086

WANTED: TMC GPR-90 tuning/bandspread knob. Will pay reasonable price. Jerard Andrews, WB3BDM, 1813 Rocky Glen Dr., Frederick, MD 21702. (301) 696-1934

FOR SALE: ART-13, new - BO; T19/ARC-5, new - BO; R27/ARC-5, exc., unmodified - $30; BC-659 xcvr - $25; RAL-7 - $85; HRO-60 - $300; HRO-50 - $275; 4 coil each; Hallicrafters SX-100 w/R-46B spkr, good cond. - $175. **WANTED:** A-D coils for HRO-5A's, 50's and 60's, will consider junker w/coils; National racks for HRO's; NBFM adapter; also very old or unusual HRO's. Cash or trade. John Orahood, 5819 Miller Valley, Houston, TX 77066. (713) 440-5598

WANTED: Instruction book/schematic for Clegg Thor 6 (6-meter AM xcvr); also interconnect cable for Thor 6 ps/mod. Brian Hemmis, K3USC, 7575 Hamot Rd., Erie, PA 16509. (814) 866-2585

WANTED: Tuning units for ATD WW II xmtr; control box for ATD; also R-1444/UR rcvr. Leroy E. Sparks, W6SYC, 924 W. McFadden Ave., Santa Ana, CA 92707. (714) 540-8123

WANTED: All types of military electronics, especially RDF and radar items, manuals too. Also need URD2 antenna. William Van Lennep, POB 211 Pepperell, MA 01463. (508) 433-6031

WANTED: E.F. Johnson miliammeter; Speed-X bug; Collins vernier drive; info on Collins users group; Collins spkr. Brian Roberts, K9VKY, 3068 Evergreen Rd., Pittsburgh, PA 15237. (412) 931-4646

FOR SALE: RBB-1 w/ps - $100; RBC-2 w/ps - $100; 27 uh high power roller inductor - $35; turns counter - $10; Hallicrafters S-20R - $40; dual capacitor 150 pf/section, 0.125 spacing - $20; tubes - CWL-860 - $15, CWL-861 - $35; TEK 53/54 plugin, TEK 'D' plugin, LM-18, LM-21, LP-5 - $25 each; Measurements 560FM - $50; HP-200AM audio osc. - $30; Ballentine 310A VTVM, HP-410BR VTVM - $20 each; Atlas 210X w/mobile mount - $225. Shpg extra. George, WA7HDL, (208) 756-4147

FOR SALE: Racal RA117E HF communications rcvr with RA218 ISB/SSB adapter, 19" rack mounting, all tube, diecast chassis, built for British gov't to a very high standard, very clean and in good wkg cond. - $600. I pay shpg in continental U.S. Nigel, KC4TLV, (404) 949-1097 (h), 994-3900 (w)

FOR SALE: Measurements 80-400 mh generator - $80; Morrow II FC-20, 10-meter AM xcvr - $60; military AM 494/GR 2-meter amp - $75; HP 200CDRM audio gen. - $38. Richardson, W1SD, 1040 Cleveland, Stephensville, TX 76401. (817) 968-3365

FOR SALE: Very clean Collins 75A-4, w/ matching spkr and manual; Johnson Ranger w/new tubes, great audio. Bob, NØATW, (612) 427-3171

Please remember to count the words in your ad. If you are over 25 words, please send 15 cents for each extra word.

CLASSIFIEDS

WANTED: Units or modules - PRC-47, PRC-74 esp. P.A., 618T, KWT-6, ARR-41, R-1051B. Byron, WA5THJ, 1920 Maxwell, Alvin, TX 77511. (713) 331-2854

WANTED: All types of military electronics, especially RDF and radar items, manuals too. Also need URD2 antenna. William Van Lennep, POB 211 Pepperell, MA 01463. (508) 433-6031

FOR SALE: SAMS for hams. Photofacts of vintage ham gear. We also buy used SAMS. A.G. Tannenbaum, WA2BTB, POB 110, East Rockaway, NY 11518. (516) 887-0057

WANTED: Still looking for parts and information relative to the Hallicrafters HT-4B, circa 1938. Especially need original speech amplifier, HT-5. Also need tuning unit TU-61, and coil unit C-454 (BC-610 parts will work). Need plug-in air-padder for tank circuit. Need several HR-2 or HR-3 heat dissipating connectors (these fit the grid pins on 100TH). Any information that might help me would be greatly appreciated. Barrie, KF7VA, 125 Ben Hogan Dr., Missoula, MT 59803. (406) 549-1921 eves and wknds. 728-7637 wkdys.

WANTED: Drake T-4XC, C4, MS-4, L-4B, TR-4C, RV-4C, SW-4A, NB-4, MN-2000. Please state price and condition. Ted Silva, KD6AIP, 901 Statler St., San Pedro, CA 90731.

FOR SALE: Complete electronics suite from decommissioned U.S. Navy aircraft carrier. 1960's vintage equipment. Collins URC32A (500 W HF xcvr); Westinghouse WRT-1s and 2s (1 KW multimode xmtr); Collins R390A rcvrs; Magnavox WRR3A rcvrs; radar sets; ant. couplers; teletypes etc. Call for details. Bob Mantell, W6VQT, 3135 N. Ellington Dr., Los Angeles, CA 90068. (213) 851-2786

FOR SALE: Johnson 275 watt Matchbox, exc, orig. manual - $75; body mount, heavy duty, chrome ball, mint, never used - $20. Bob, K8HVG, (313) 928-6658 after 6:00 PM

MESSAGE: "The Vail Correspondent": New quarterly journal by and for key collectors. Published by W1IMQ. Sample (October issue) $2. TVC, Box 88-E, Maynard, MA 01754

WANTED: I will trade a BC-222, a TBY and a No. 19, MK II for a BC-191. Ted Bracco, Quincy College, 1800 College Ave., Quincy, IL 62301. (217) 228-5213

CLASSIFIEDS

FOR SALE: Working antique Hickok RF-AF generator - $65. **WANTED:** Sylvania 6JB6 tubes and working Ranger, preferably Ranger II. Rick, K8MLV/Ø, 1802 W. 17th St., Pueblo, CO 81003. (719) 543-2459

FOR SALE: Hammarlund HX-500 xmtr, orig. box and manual - $300; WRL Globe linear amp LA-1 w/manual - $125. Franklin Young, KH6CDO, 2816 Poelua St., Honolulu, HI 96822. (808) 988-7474

FOR SALE: Hallicrafters SR-150; WRL Duo-Bander 84; Collins 310C-2; Hallicrafters SR-42; Central 'A' slicer; Heathkit: sig. gen., condenser checker, antenna impedance meter, 100 khz calibrator; Triplett signal gen.; BC-221/N; TS-175 C/U (VHF/UHF BC-221); Central 100V plate xfmr, choke; Johnson 500 mod xfmr; Collins 8R-1 calibrator;; Johnson TR switch; GE 5DY81AB dynamotor (14 v to 515/1030/2/8/). Joe Thurtell, 11803 Priscilla, Plymouth, MI 48170. (313) 453-8303

FOR SALE: ARRL Handbooks 1927 to date, plus many old books, LSASE for list; Hallicrafters S-38A/B/C/D/E's - $50 includes schkmt, shpg; KWM-2 filter F455a2.1; parting BC-610, B&W 5100 & SSB, HT-40, S-40, S-38's, NC-33. **WANTED:** ARRL Handbooks - 1st, 5th, 6th, 16th editions. Bob Schafer, WA7HN, POB 442, Aumsville, OR 97325. (503) 749-1149 eves

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FOR SALE: B&W 5100 - $140; Harvey-Wells TBS-50D - $75; Swan 350 - $160; HRO-Jr, modified, working - $50; German tank rcvr - BO. **WANTED:** Mint Drake R-4A, Lafayette HE-10 (KT-200) rcvr. Jim Jorgensen, K9RJ, 1709 Oxnard, Downers Grove, IL 60516. (708) 852-4704

WANTED: Viking II, 122 vfo, Heath DX-100 and Ranger. Todd Zelasko, KA8GEF, 9401 Grand Division, Cleveland, OH 44125. (216) 883-5134

FOR SALE: HT-37, excellent, - $150; SX-110 - $100; HQ-110 - $40; Heath mobiles - MR-1, MT-1 & AC pwr sply - $100. U-ship. **WANTED:** Books by Bill Orr, specially late '30's, '40's and '50's handbooks; small well-built key; manual for National SW-54. Larry Howe, KBØHIB, 1333 S. Airwood, Springfield, MO 65804. (417) 882-1682

WANTED: Clean BC-348 ID plate, any model. Dave, WA6VVL, 1118 Paularino Ave., Costa Mesa, CA 92626.

FOR SALE: Racal RA6217 rcvr - BO; Thor 6M AM/CW xcvr - $80; Heath Cheyenne - $23; Tener - $15; parting HT-32B. Joe Sloss, K7MKS, (206) 747-5349

FOR SALE: Set of 4 Collins mech. filters - 2,4,6 and 8 khz. Can be used in 75A-4, etc - $80; Conset G-74, w/12 v pwr sply - $175. Larry Asp, VE3RF, (416) 722-5853

FOR SALE: National Radio model RAS-3 rcvr w/6 tuning units, spkr and pwr sply, good cond. - $200. Charles Stinger, W8GFA, 404 Ross Ave., Hamilton, OH 45013. (513) 867-0079

FOR SALE: 51J-4 - $325; R-388 - $250; R390A - $125; 51J-4, rough - $125; R-388, rough - $100; 32RS1, S-Line rack mount supply - $70; SP-44 panadaptor - $100; HQ-110 - $55; S-40B - $60; Collins PTOs - 147A-1 and 70E-3 - $15; BC-603/BC-604 - $75; BC-429 - $35. Mark Hovda, NØJWI, POB 10091, Cedar Rapids, IA 52410. (319) 364-4048 7-9 PM

WANTED: Schematic & part values for BC-348Q and/or BC-453B (Q5'er); copy of QST article, Jan., 1948, p. 40. Mike, AC5P, POB 33, Bartlesville, OK 74005. (918) 333-2795

WANTED: Any information, schematics, probes etc. for Precision Apparatus Co. oscilloscope, series ES500A. All replys responded to. Thanks! Ed Turner, KB8MPR, 730 East Martin St., East Palestine, OH 44413. (216) 426-4968

FOR SALE: Drake 2A; Hallicrafters S-27, S-36 and Harvey-Wells Senior. Roger, W8CRK, Cincinnati, OH (513) 451-1096

WANTED: Original manual for Johnson T-Bolt; schematic for Johnson TR switch, Squires-Sanders SS-1R spkr and noise silencer. Pete Markavage, WA2CWA, 27 Walling St., Sayreville, NJ 08872. (908) 238-8964

FOR SALE: Estate sale for Len East: Elmac AF-67 xmtr; HP 524 freq cntr; BC-221-F freq meter; HP 512B wave meter; Meissner 150 xmtr w/exciter; 30 ft. windcharger tower; Astatic D-104 mic NIB; Balentine dynamotor 6/12 in - 500 out; 2 Pioneer dynamotors 18 in - 400 out; Aircraft Radio Corp. ADF receiver; Raytheon microwave xmtr,rcvr, set (4 units); 2 Philco KA147 microwave xmtrs; (2) 4 ft microwave dishes (1 hail dome). Taking bids until Oct. 16. All in good physical condition, elect. cond. unknown. PU only. Gary A. Reiss, Rt 1, Box 141, Wilcox, NE 68982. (308) 995-5541 (w), 263-3231 (h)

FOR SALE or TRADE: Johnson Rotomatic 138-112; RCA limiting amp M11201; B&K 501A curve tracer. Bruce, W9QAH, (715) 344-9099

FOR SALE: AN/PRT-4, w/tech. manual and schematic - $15 plus shpg. Lee Frank, POB 60011, Harrisburg, PA 17106-0011.

FOR SALE: NOS 810's - $100/pr; NIB 4-400Cs - $80 ea. Pat Keogh, WB9GKZ, (414) 434-9016

FOR SALE: RME-45, 84, 99 and 4350, good condition - make offer. Jim Barrows, W7BCT, 15121 41st Ave., SE, Bothell, WA 98012. (206) 337-4880

FOR SALE: DX-100B, nice - $175; 3253, exc. - $585; BC-348 - $85; BC-342 - $85; Gonset G-28, nice - $160. Cliff Fleury, 64174 Tumalo Rim Dr., Bend, OR 97701. (503) 382-9162

FOR SALE or TRADE: NC-183D; TS 352U; AN/URM-43B; DPM-3. Ray, 4521 Whitfield Ln., St. Louis, MO 63134-3821. (314) 428-1963

WANTED: Manual or schematic for RCA Radiomarine AR 8516 communications rcvr. John Hurst, KU6X, 2512 Euclid Crescent E, Upland, CA 91786. (714) 981-6759

FOR SALE: Original Q5'er BC-453B, unmodified w/knob - $20 plus UPS. K6UU, 700 Neil Creek Rd., Ashland, OR 97520. (503) 488-1506

WANTED: 19" rack panels; HT-32/SX-101 type cabinets; DX-100B for parts; Central Electronics stuff (other than 20A etc.) Tom Hoitenga, K8NGV, 3170 KennesawView, Marietta, GA 30064. (404) 426-8682

FOR SALE: Johnson Adventurer w/122 vfo - $75; Johnson 275 w/matchbox & coupler - $120; Nems-Clarke 200-3 spectrum display unit (panadapter) - $50; Hickok 534 tube tester - $75; USM-25F signal gen. w/manual - $75. Ron, KC6WTG, (707) 539-8319 noon - 9:00 PM Pacific

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FOR SALE: Spotless clean CE 200V, works great - $550; exc./clean NC-303 - $250. Don, K9TWO, (317) 788-4337 (w), 241-1010 (h)

FOR SALE: Military monitoring antennas: broadband VHF/UHF discones, biconical types, 30 - 1000 Mcs, shipboard construction, 'N' connectors, preamps, antenna multi-couplers, cables and accessories. Rick Mish, (419) 726-2249

WANTED: Hallicrafters HT-32A. Must be in exc. cond. Bill Brossman, K9IUF, 547 Lake Connie Rd., Carrollton, GA 30117. (404) 834-0460

FOR SALE: WW II aircraft rcvr RAX-1, 7-27 Mcs, operates - $65. Sam Hevener, W8KBF, "The Signal Corps", 3583 Everett Rd., Richfield, OH 44286. (216) 659-3244, leave message.

WANTED: WRL Globe modulator, model LM-1. Bob Mattson, KC2LK, 10 Jane Wood Rd., Highland, NY 12528-2907. (914) 691-6247

Reward: FOR INFO ON WEST COAST WIRELESS: WANTED: Anything and everything written or recorded about Wireless (commercial, amateur, maritime, military and naval) on the West Coast between the years 1899 and 1920, for an article in progress. I will pay for originals or copies, especially photos and drawings and diagrams, articles from old magazines, stock certificates, licenses and color photos of wireless gear. For your response, the Reward is an autographed copy of "America's Wireless Spies". Everything is appreciated, including references to already published materials (I have "Electronics in the West" and most of the books (e.g., Aitken, Douglas, Mayes)). All materials will eventually go to the Electronics Museum of the Perham Foundation (former Foothill Museum). Correspondence is invited: Bart Lee, 327 Filbert Steps, San Francisco, CA 94133. Call collect. (415) 956-5959 (days), 788-4072 (eves). Thank you, 73

WANTED: Will pay your price for Hallicrafters SX-88; RCA CR-88B. I have equipment for trade. Shane Ward, N1DMX, 14 Pond St., Amesbury, MA 01913. (508) 388-9716

FOR SALE: Hallicrafters S-38 rcvr, excellent cond. electrically and cosmetically - $60. Howard Kraus, K2UD, 372 Callodine Ave., Amherst, NY 14226-2971. (716) 838-2406

FOR SALE: Kenyon swinging choke, 4/24 H, 500 mA, 50 ohm - $15; 6 H, 500 mA , 60 ohm choke - $15; new Collins herm. sealed, 6 H, 150 mA, 100 ohm - $10; Freed 8 H, 38 mA, 300 ohm - $4. 120 v relays, contacts 5 & 10 amps, new - $8; pulse xfmrs - $5; large quantity of HV caps and other parts for builders. Joe, W6CAS, (916) 731-8261

FOR SALE: Pre-WW II GF-12 aircraft xmtr, w/ all coils, acc., connectors, shockmount, new - $150; TU-5, 1.5-3 mHz - $30; T-368 exciter - $40; 160M 3-1000Z HB amp, w/Dahl HV xfmr, full metering, variac control, in 5' rack cabinet - $750; filament xfmrs - new Triad F-28, 7.5v/25 amp - $35; (2) 5V/30 amp/10 KV insulation - $20 ea; lge tube sockets NIB - call; giant roller inductor, 30 mH, silver plated, new - $85; - NIB 814s - $15 ea; RF deck w/pr. of 100THs in 19" rack - $200; speech amp/mod. w/pr. of 811As - $100; HV pwr sply, 1700V @ .5 amp - $100; Peter Dahl swinging choke, new - $125; Measurements model 59 grid dip meter for parts. James Owens, NW0O, 1363 Tipperary St., Boulder, CO 80303. (303) 673-9019

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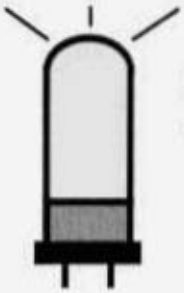

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