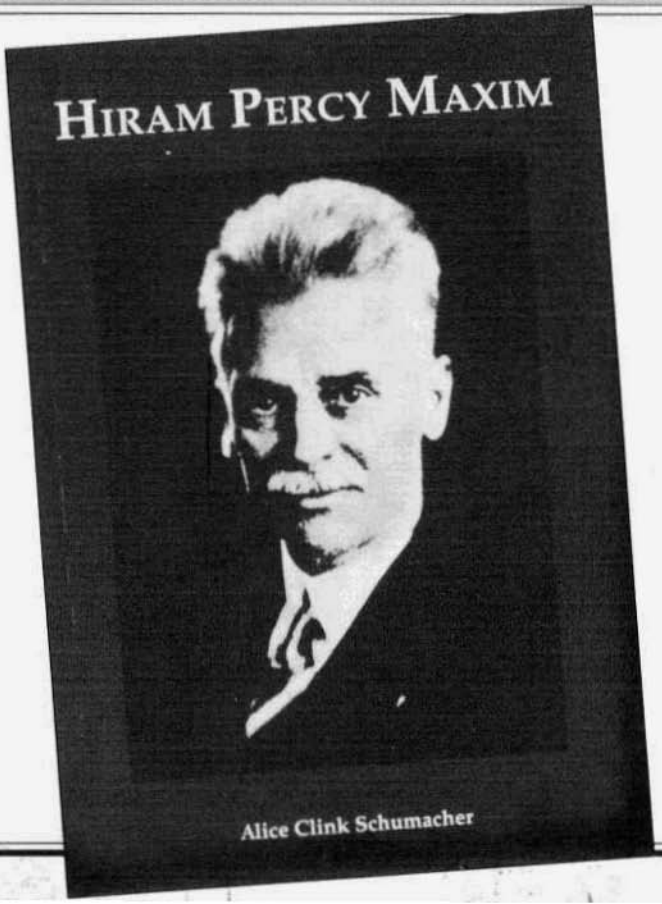
$2.50

ELECTRIC RADIO

celebrating a bygone era

Number 113 September 1998



ELECTRIC RADIO

published monthly by Electric Radio Press, Inc.
14643 County Road G, Cortez, CO 81321-9575
Second Class postage paid at Cortez, CO and additional offices

Authorization no. 004611
ISSN 1048-3020

Postmaster send address changes to: **Electric Radio**
14643 County Road G
Cortez, CO 81321-9575

Editor - Barry R. Wiseman, N6CSW
Office Manager - Shirley A. Wiseman

Electric Radio is published primarily for those who appreciate vintage gear and those who are interested in the history of radio. It is hoped that the magazine will provide inspiration and encouragement to collectors, restorers and builders.

We depend on our readers to supply material for ER. Our primary interest is in articles that pertain to vintage equipment/operating with an emphasis on AM, but articles on CW and SSB are also needed. Photos of hams in their hamshacks are always appreciated. We invite those interested in writing for ER to write or call.

Regular contributors include:

Walt Hutchens, KJ4KV; Bill Kleronomos, KDØHG; Ray Osterwald, NØDMS; Dave Ishmael, WA6VVL; Jim Hanlon, W8KGI; Chuck Penson, WA7ZZE; Dennis Petrich, KØEOO; Bob Dennison, W2HBE; Dale Gagnon, KW1I; Rob Brownstein, K6RB; Don Meadows, N6DM; Lew McCoy, W1ICP; Kurt Miska, N8WGW; Warren Bruene, W5OLY; Brian Harris, WA5UEK; Thomas Bonomo, K6AD and others.

Editor's Comments

I'm happy to announce in this issue that our latest publishing venture, the book "Hiram Percy Maxim" by Alice Clink Schumacher, has been completed. It's been over two years since we started editing and typesetting the revised and expanded edition of this book. Finally we're finished and we've received the books from our printer. We're very pleased with the way they have turned out.

I'm very proud and I feel honored to have had the opportunity to publish the only biography of Hiram Percy Maxim, "the father of Amateur Radio". He was truly a great man and all of us hams owe him a tremendous debt of gratitude. Without him Amateur Radio might not exist and without his legacy our hobby certainly wouldn't have thrived as it has over the years.

At some time in the future I'll have more to say about author Alice Schumacher but for now let me say that she has written a wonderful book that will live on for time immemorial and I'm very proud to have been associated with her. See her article on how she came to write the HPM biography on page 4.

Lately I've been pondering what T.O.M.("the old man" for any youngsters who may be reading ER) would think of what the ARRL has been proposing lately. Would he think that "dumbing down" the license requirements is a good idea? I think not.

I'm hoping that this new edition of the HPM biography will become widely read amongst hams. For new hams this book might become an inspiration for them to be good operators and for older hams it might provide them a renewed sense of just how wonderful our hobby is. "Hiram Percy Maxim" is now available from the ER Bookstore, see page 56 for ordering information. The price is $19.95 and for the time being I am not charging S&H.

Finally, I'd like to direct readers' attention to KW1I's AMI Update on page 3 and also to Letters on page 14. These two sections of this month's issue deal with ARRL's proposal for restructuring and with the latest NPRM (August 10) from the FCC. I think it's extremely important that we all become familiar with the issues presented and respond to the ARRL and to the FCC with our comments. N6CSW

TABLE OF CONTENTS

Cover: The book Hiram Percy Maxim by Alice Clink Schumacher.

A Remembrance of W1ICP's XYL Martha

by Barry Wiseman, N6CSW

I took this picture of Martha and Lew last year in their backyard garden.

W1ICP's wife Martha passed away September 3 at their home in Silver City, New Mexico. As Lew had told us in last month's ER, Martha had been diagnosed with brain cancer and the prognosis was not good.

Martha was 78 years old and she and Lew had been married for 60 years. They had two children, daughters, Sharon and Marsha.

Although Shirley and I had met Martha before, we really didn't get to know her until we spent a weekend with her and Lew about a year ago. We found her to be a very nice person and a wonderfully gracious host.

We all acknowledge Lew's contribution to Amateur Radio but I think we should also give some credit to Martha. She's always been at his side playing a supportive role and I'm sure that's been important to Lew.

On behalf of all amateurs everywhere we send our deepest condolences to Lew and his daughters. N6CSW

September AMI Update

by Dale Gagnon, KW1I, President

W2UJR Memorial Net Rescheduled

Look for the net on Saturday, September 19 at 2000 EDT on 1888 kHz. The net was previously scheduled for September 18, but many Buffalo area hams who knew Dick, W2UJR, have a previously scheduled radio event that evening and requested a reschedule so they can participate.

FCC Notice of Proposed Rule Making WT Docket No. 98-143

In the August AMI Update I reviewed the ARRL proposal to change the present Amateur Radio Service license structure. The most controversial aspect was the proposed lowering of CW requirements to 5 wpm for access to General Class privileges and the granting of General Class privileges to current Novices and Technician Plus license holders. The ARRL was trying to get a stake in the ground with the FCC before they came out with their own restructuring proposal. Sure enough on August 10 the FCC released a Notice of Proposed Rule Making (NPRM) covering license restructuring and a number of other topics. The complete document can be found on the web at **http://www.arrl.org/news/restructuring/98-143/nprm.html.**

Briefly, the NPRM proposes a change in the number of license classes from 6 to 4, proposes changes in the VE system, seeks comments on improving enforcement processes and seeks comments on the telegraphy requirements for the amateur radio service.

The FCC proposed license restructuring would eliminate the Novice and Technician Plus license classes. Current Novice and Technician Plus license holders would be "grandfathered" and would still have the opportunity to upgrade to General Class by taking the proper written and code testing elements. What the document does not explicitly point out is the remaining entry license to HF privileges would then become the General License with its 13 wpm code requirement.

The section of the NPRM on telegraphy seeks feedback on whether three levels of code speed are relevant or should they be reduced to one or two? And what should they be. Should additional questions on digital techniques be added to the written tests to replace code speed testing? Should the Morse code proficiency testing method be specified by the FCC, e.g. fill in the blank or copying one out of five minutes sent, or should the testing method be left up to VEs to determine.

The elimination of the 5 wpm entry point to HF amateur radio goes against the course of the whole history of amateur licensing. 13 wpm would be a significant hurdle for anyone newly interested in gaining access to these bands. What could the FCC be thinking? What they are thinking is lowering the General Class license code requirement! Gordon West, WB6NOA, well known amateur radio teacher is very clear on the meaning of this NPRM. Writing on the potential for the lower code speed requirement for the General license in the second August issue of Amateur RadioTrader he states, "If it goes to 5 wpm, currently licensed Technician no code operators would only need to take one additional General theory test, and could be grandfathered for their previously passed 5 wpm exam! If you are a Technician class operator reading this, now is your time to write the FCC with your comments and literally write your own "ticket" to the worldwide bands."

Why are we covering this topic in an AM column? This NPRM if adopted will bring an influx of amateurs into the lower frequency bands which will cause further crowding. Crowding leads to concerns about the width of emissions

continued on page 41

Evolution of a Biography

(how the biography of Hiram Percy Maxim came to be written)

by Alice Clink Schumacher
115 17th St. N
Great Falls, MT 59401

Since I have kept a diary for over fifty years, it is easy and reassuring for me to go back and substantiate activities and events. From this source, I have documented my son Peter Schumacher's development as a ham, and my progress as a biographer.

In the early 1950's, my son-in-law, Lloyd Sage of Kansas City, was serving with the U.S. Air Force in the Azores. His contact with the rest of the world was a little National SW-54 receiver, purchased at the BX. When Lloyd came home, he gave this set to son Pete who was then 13 years old. He was enthralled with it. He became utterly and completely involved with listening to foreign shortwave broadcasts and ham radio operators. It seems as if he spent his every waking hour listening to that radio.

About a year later in 1959, Pete and I attended the Montana State Fair in Great Falls, Montana. One afternoon while we were there, we got caught in a drenching rain and took shelter in the ham radio booth manned by Tom Newcomb, W7YLC. On the wall back of the rigs was a huge map of the world with markers all over it designating where contacts had been made that day. They included such distant places as Africa and Europe. For further exciting good fortune I was given a phone patch to anywhere in the United States. I opted to call my father in San Jose, California. Within minutes, a welcome visit was in progress. All this had a tremendous effect on Pete. Now he was absolutely determined to become a ham radio operator.

With Tom Newcomb, W7YLC, as his 'Elmer' Pete began to study in earnest for his ham radio tests and I spent countless hours helping him practice sending and receiving the code. He received his Novice license, KN7MOY in July, 1960.

Now he needed a transmitter to use alongside his little SW-54 receiver. The only rig that was even remotely within his financial range was a Heathkit DX-40 in kit form. The first step was to sell his beloved electric train set, a second-hand one with a few accessories. He put the sacrificial dollars into a shot gun shell box. There funds accumulated slowly from meager earnings and small gifts from family and friends.

Finally, there was enough money for the DX-40 kit and it was ordered. When it arrived and we opened the box we were shocked! The contents bore no resemblance to our vision of a ham radio transmitter. What we had was a box of parts—most of them very small—and some instruction sheets.

Undaunted, young Pete strung a rope above his father's basement tool bench, and clothes-pinned the pages of the construction manual to the line. He appropriated all my muffin tins, and began the tedious job of sorting out parts. To relieve the concentration, he set up a bare-bones ham shack in what had once been our home's coal bin. The wall got covered with plaster board, and electric outlets were installed. A garage sale offered two old flat-topped desks, scarred and stressed, but solid. The price was only five dollars each when the seller learned how they would be used.

Eventually, with a lot of help and

The 89-year old author writing at her kitchen table. Very western-oriented, her other avocation is writing cowboy poetry. ***Photo by Dan Nardinger.***

encouragement from his ham friends, and especially his Elmer, Tom Newcomb, Pete had the rig put together and ready for the big moment. But I fearfully warned, "Don't you dare plug in that apparatus until you've had one of your ham experts check it out!" Tom Newcomb came readily, and after a minor adjustment or two, Pete was on the air. His first contact was Dr. James Bulger, W7LRO, who lived just a few blocks down the street. After that came the excitement of QSL cards and new friends from many places.

But in time Pete was bitten by the DX bug and set his sights on a used single-sideband setup, a Central Electronics 20A transmitter and a Drake 1A receiver. He saw this gear at Electric City Radio Supply in Great Falls. (Great Falls was known as the "Electric City" because of all the hydro electric dams in the area.) He washed dishes for a year to pay for it. After that, all the walls and eventually the ceiling of his ham shack got stapled full of QSL cards. Pete studied avidly and passed tests going from Novice to General in a very short time. He progressed from his first crude antenna to a 3-element 20M rotating beam, atop our little 24' by 30' house! He exchanged signals with planes in flight, and even a submarine partially submerged.

But more importantly, Pete began learning about the founding father of amateur radio, Hiram Percy Maxim. Faithful Elmer, Tom Newcomb, provided back issues of QST, so we became familiar with T.O.M. and all the great history from the threatening days of World War I to the grand tradition of the Uggerumph, the Rettysnitch and the Wouffhong. We realized the indebtedness all hams should have to Hiram Percy Maxim.

Always a reluctant reader of books, Pete found making school reports on them tedious. His only ones of choice were biographies of inventors. When he had exhausted Edison, Bell and the Wright brothers, he began searching the libraries for a book about HPM. He was shocked to find that they didn't have one. Neither could their book researchers or library loan people discover one. He finally contacted the Library of Congress and learned that no biography of Hiram Percy Maxim had ever been published. Indignant at the oversight of his hero, Pete approached me.

"Mom, you're a writer. You've got to write a biography of Hiram Percy Maxim!"

So I, a writer of short stories, poetry and a novel on, of all things, figure skating, undertook the necessary research. This eventually involved nine years of work (part-time, as I was also a junior high language arts teacher full-time). I humbly began the project in April, 1961.

continued next page

When I started my research on Hiram Percy Maxim it was a pretty cold trail, as practically nothing developed from libraries' readers' guides. But I was able, through WHO'S WHO IN AMERICA for the appropriate years, to learn that he had a daughter and a son in Connecticut. I obtained their addresses from telephone books and achieved contact. I carried on detailed correspondence with Maxim's daughter, Percy Maxim Lee, in Farmington, CT. She graciously supplied me with the details I asked for. She had been very close to her father and shared his activities, dreams and aspirations. She wanted his biography to be written, but had certain concerns about who should do it. After reading samples of what I had done, she consented to let me undertake the project. To this end, she began organizing his notes, accounts and photographs.

Finally she invited me to come to her home in Connecticut, where I could continue my research on a personal level. But due to my financial restrictions, it was some time before I could arrange the plane trip. Finally, on June 24, 1968, I flew to Hartford. Percy met me, and took me to their rural estate.

I was awed by the large house, and what I recognized as superb antique furnishings. There were framed artifacts of Robert E. Lee (relative of her husband, John Glessner Lee). There was a silver tray engraved as a memento of her work with President Kennedy. (She was a former president of the American National League of Women Voters.) She and her husband kept getting frequent phone calls from famous old colleges, where they were serving on boards. And at meals, I was intimidated by the finger bowls. When I commented that I was overwhelmed at such gracious living, she responded that she had seen more "gracious living" at a historic Western hotel In Missoula, Montana. That eased my goose bumps somewhat.

And the Lees, for all their background, were amazingly down to earth. On our daily drives about the countryside (for interviews and observations) Percy stopped at roadside stands to personally select vegetables and fruits. I still remember the luscious strawberries!

On several evenings, we went down into the basement quarters to view old movies of HPM. These treasures provided information no other source could supply. They showed his vigor, curiosity and sense of humor. I saw how he walked, gestured and laughed. The Lees enjoyed reviewing the scenes. But Mr. Lee remarked that he hoped the projector lamp didn't burn out, as it was so old that another like it would be unobtainable. I fervently hoped so too.

Percy had assembled two six-foot shelves of books, bound notes and albums for me to consult. There were also old newspapers and magazines.

During the day, Percy drove me to see various HPM locations, and to meet people who had known him. We visited ARRL headquarters and saw Old Betsy and the Wouffhong. I spent almost an entire day in the Hiram Percy Maxim Memorial room in the Connecticut State Library in Hartford. There I reviewed old correspondence, including letters from FDR (then Secretary of the Navy), and Herbert Hoover, whose son was an enthusiastic ham. There were volumes of notes and several movie scripts. (HPM was active in that area too!) I was left alone there, with my note pads and my brief case, and the librarian's wistful comment, "I hope you don't take anything!"

Percy also arranged some family contacts for me. One evening she had her brother Hiram Hamilton Maxim and his wife to her home. She said he and HPM had never been very close and doubted if he would be of much help on my project. But amazingly, he opened up and revealed some interesting feelings. Percy said afterward she wished

Pete Schumacher, (now AE7C) in his boyhood hamshack. The gear consisted of a CE 20A transmitter and a Drake 1A receiver.

she would have had a tape recording. I had purposely decided against the taping of any interviews as I wanted unconstrained spontaneity.

On another evening we went to visit her son, Percy Maxim Lee. He surprised her with some interesting things he was able to remember as a small child about his grandfather.

All in all, this personal firsthand exposure provided me with a tremendous amount of information in a very brief span of time. It was a challenge to get it all included and organized. As soon as I returned home, I set about sorting and arranging my notes. I was grateful for Maxim's statement that "the most important thing on a piece of paper is the date."

In July, 1969, I began the actual writing of the biography. Meanwhile, my junior career novel on figure skating had been published. This project had been undertaken at the insistence of my two competition figure skating daughters. What a different scene!

My diary records that on October 18,1969, I had finished writing HPM, (in longhand). Then began the job of typing it! Within a week it was a quarter done, and by November 1, half done. The most difficult part of the story was the account of Maxim's death. It was a real grieving period.

I mailed the completed biography to Percy for her comments. She replied promptly, with very few suggestions, and wrote an introductory letter for me to include in the book.

I then tried to interest various editors in publishing my book, but none of them felt that enough people would be interested in reading about the father of amateur radio. This astounded me but I was not ready to give up on the project. On February 28, 1970, I made the difficult decision to publish Maxim's biography myself. This was a severe financial strain but a limited edition was ordered April 27, 1970.

On October 10, 1970, the jacket proofs arrived for the hardcover HPM biography. On December 6, 1970, the actual books were out. I sent copies to Percy Lee, and received a gracious card from her.

Self-publishing has many advantages, but the real stumbling block is marketing and I never was a good salesman. My usual method on school fund-raising assignments was, "I don't suppose you'd want to buy one of these, would you?" It became the family joke. But I was determined to make Hiram Percy Maxim's biography available to the public. I composed ads, and paid for as many as I could afford. Hams from all over the country who had bought the

continued on page 35

Designing the T-195 HF Transmitter

Part 1

by Fred Johnson
6202 Hilltop Trail
Sachse, TX 75048

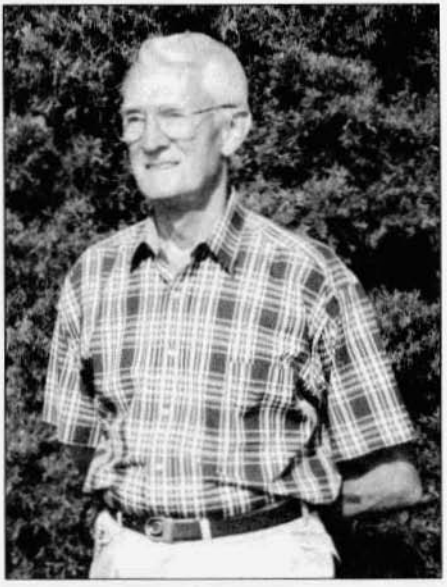
This article covers mechanical design aspects of the Collins T-195 HF transmitter. It is being written as a follow-on to a very well written piece on the T-195 by Dennis DuVall, WA3YXN. Dennis describes in good detail the functions and electrical performance of the T-195 transmitter. His article starts on page 4 of Electric Radio #104, Dec. 1997. Dennis has two operational T-195's on the ham bands and knows his T-195s inside and out.

I was the Collins Engineer responsible for mechanical design of the T-195. I thought it would be interesting to describe the T-195 design development from a mostly mechanical and personal point of view to fill in the story started by DuVall. Mechanical engineers were certainly a minority at Collins Radio, but the EE's were gracious.

In the course of preparing this article I contacted all but one deceased member of the original T-195 design team. I'll quote and paraphrase from them on several topics. Often, their words communicate the feeling better than anything I could write. They all contributed recollections of nearly 50 years ago. That helped prop up my memory of those days in 1950, 51.

Start Of The T-195 Development Program

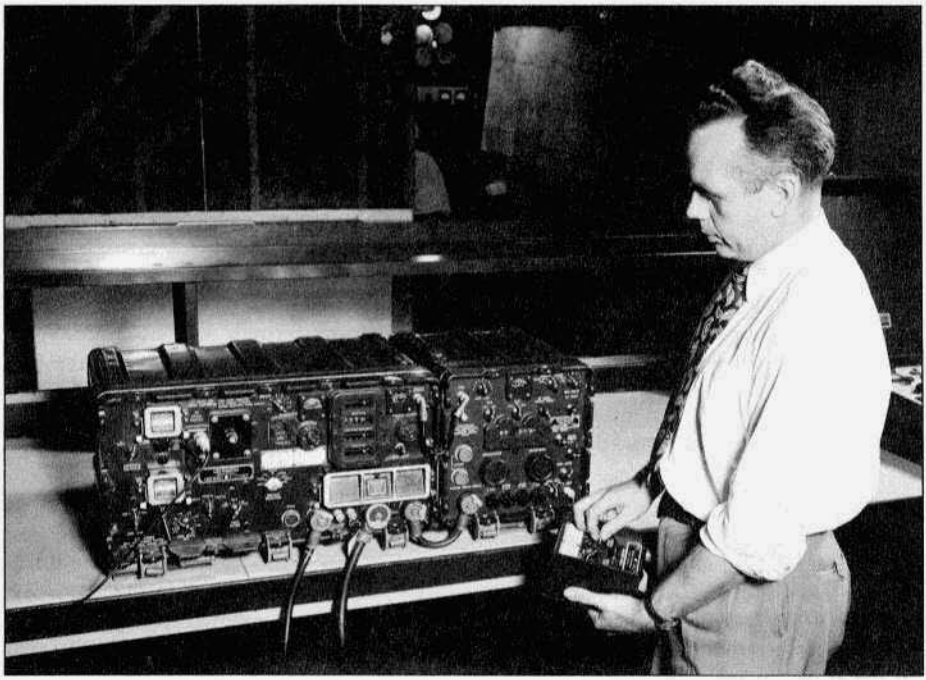
Recollections of the early origins of the T-195 design program have now faded. The development was in response to an RFQ (Request for Quote) from the Army Signal Corps. The Collins proposal, leading to the RFQ, and subsequent contract award, was coordinated by Ken Klippel (deceased) and others forgotten.



A 1998 photo of the author, Fred Johnson, who has contributed several articles to ER in the past. He worked for the Collins Radio Company from 1948 to 1972 (he continued working for Rockwell Collins until 1983) and did mechanical design work on the A-line, S-Line and many other Collins radio products.

The engineering team was assembled in a 6-story old warehouse-type building near the train tracks in downtown Cedar Rapids, Iowa. It was called the 3rd St. Building. Collins occupied all but the third floor. Hot in summer, cold in winter. Today a fashionable description for the congested space we occupied would be called, "co-located" for an "enabled" team.

The environment included liberal doses of diesel smoke and soot from



Stuart Morrison the T-195 Electrical Project Engineer is shown in this photo demonstrating the AN/GRC-19. The T-195 transmitter is on the left and the R-392 receiver is on the right. Stuart is holding the remote control unit.

nearby trains. Summer weather forced windows open, and the grime landed on our semi-stable Vellum layout paper. Our Vemco drafting machines also contributed to the need for constant checking and correcting. Lots of erasing to keep things legible and accurate.

The designs were done with carefully sharpened 9-H pencils. We used colors to identify layers and subassemblies. For layout measurements we used 6, 12 and 24-inch steel rules calibrated in 1/100 inch graduations. A few of us, with the good eyesight of youth, could read dimensions within .002 to .005-in. routinely. Thus we could keep track of metal thicknesses as they were involved with inside or outside dimensions of parts. We had a good record of model parts that were made to drawing tolerances actually fitting well when assembled for the first time. Upon design completion, we did a thorough drawing check for dimensions and detail callouts. The design layouts were maintained current throughout the design activity. They were scrupulously up to the minute with design changes.

A few other Collins product development programs were located with the T-195 crew on the fourth floor. As a result, we had easy access to others doing similar work. In this regard I must mention Dave Weber (deceased), a friend and mentor we all had, and who left a legacy of design excellence and clear thinking. Also, Warren Bruene, who is certainly known to all hams for his many contributions over the years toward making science out of the art.

What's A GRC-19??

If you mount a Signal Corps T-195 transmitter and an R-392 receiver side by side on a matching shock mount tray, you have a GRC-19 HF AM T/R system. Then, bolt the assembly in the

continued next page

rear of a Jeep and put up a 16-ft. "Green Weenie" whip antenna. Now you see the T-195 in the picture like everyone's seen. The green foam insulator on the antenna base accounts for the name. The mount for Jeep operation, and parachute drop requirements for the GRC-19, constituted formidable design requirements. More on this later. [see ER #38, June 1992, "The R-392—A Miniature R-390" by Gene Senti, WØROW]

The R-392 receiver was the mate to the T-195 and was under development at the same time. Its project engineer was Gene Senti, WØROW. Gene later became widely known for amateur equipment developments. The R-392 was an "all-28-V" design, filaments, plates, the works. The R-392 program followed the T-195 in both design and schedule. This saved duplication of design effort. Gene was pulled off the R-392 program before its finish by Arthur Collins who started him on the 75A-4. Gene also finished the design of the KWS-1 when its project engineer, Walt Zarris, left for greener pastures. A rare occurrence in those days.

The T-195 Design Team

Radio amateurs will recognize some of the names involved in the T-195 design due to those individuals having subsequent assignments for the design of Collins Amateur equipment – especially S-line products. Some of these engineers have written for QST, ER and other amateur publications regarding Collins products and their history.

Arthur Collins, WØCXX, was company President. He was aware of the T-195 (HF-AM) program but viewed it as somewhat of a distraction from his planned move of the company into the sideband era. Beyond that, his plans led into the digital world! "Digital" was just coming into being in those days, and the T-195 frequency readout was an early example of a customer requirement for digital display.

Bob Cox, now NØHSV, was Collins Chief Engineer. His role in the T-195 development was not at the day-to-day detail level, but is the subject of many interesting accounts. A few are detailed later. Bob left a legacy of good engineering design disciplines.

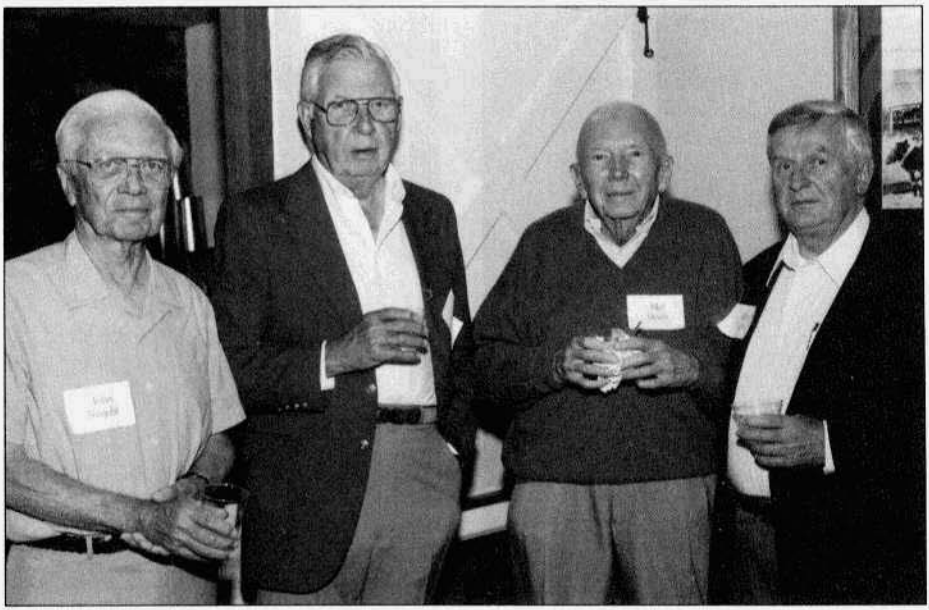
Ernie Pappenfus, K6EZ, was the Collins Engineering Division Head for the T-195 and all amateur products of that era. Ernie was a great "let's get it done" leader. He was the author of the question: "What are you going to know in two weeks that makes it better to wait?? Make the decision now!, if it's wrong we'll have that time to correct it". Some will recall that it was Ernie who originated the first "Green Room" at Collins. That term became legend at Collins, and beyond, and will be further explained later.

Stu Morrison was the T-195 Electrical Project Engineer. Before taking on the T-195 project leadership he had been working on another antenna tuning program. He did the coupler elements design plus the discriminator. In addition to personally doing overall T-195 design, he directed and supervised engineers doing design of the subassembly modules. He also had coordination responsibilities with Gene Senti. Gene was Project Engineer for the R-392, being designed concurrently.

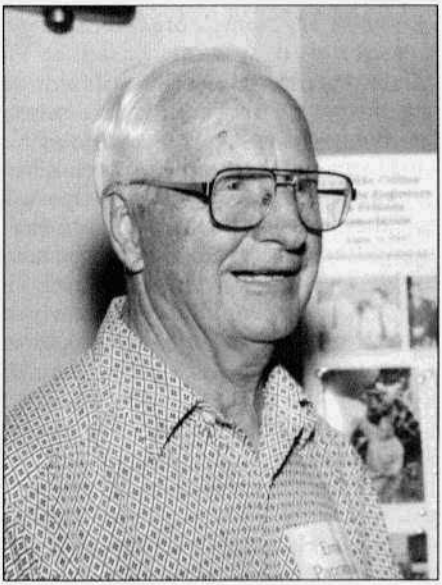
Elmer Schwittek, now K2LAF, was responsible for the T-195 exciter. Elmer helped Dale Carlson (deceased) with the modulator design plus assistance to other engineers.

Roger Bettin, now K4KC, came on the T-195 project mid-course and stayed on during production startup. Roger worked on many segments of the program and remembers wearing out the sidewalk between his office and the production floor. As history developed, Elmer and Roger went on to form RF Comm, a publicly held company.

Walt Zarris (ex-WØBMY) was responsible for the PA and its auto-tuning function. Walt worked with Stu and Elmer as a close team member. He went on to E.F. Johnson for a responsible job and later



A recent group photo, left to right: John Nyquist, head of manufacturing; Bob Cox, chief engineer; Mel Doelz, father of the mechanical filter and Bob Cattoi who went on to become chief engineer for all of Rockwell International.



Ernie Pappenfus, K6EZ, was the Collins Engineering Division Head for the T-195. He has produced several excellent articles on Collins history for ER over the years.

Elmer Schwittek, now K2LAF, was responsible for the T-195 exciter. Elmer helped Dale Carlson (deceased) with the modulator design plus assistance to other engineers.

continued next page

Roger Bettin, now K4KC, came on the T-195 project mid-course and stayed on during production startup.

Walt Zarris (ex-WØBMY) was responsible for the PA and its auto-tuning function.

joined Elmer and Roger at General Dynamics in Rochester, NY before they formed RF Comm. Walt credits Elmer with a good theoretical approach to all designs. Walt is presently President of CTS Corp, a crystal and frequency control company.

Dale Carlson (deceased) was Engineer responsible for the modulator. Dale served as liaison with Stromberg Carlson and Stewart Warner, co-producers of the T-195 under directed subcontract.

Arlo Meyer, WØLBK, was lead designer and master draftsman. Arlo's seminal role in the 30-L development later on makes his name one of the very familiar ones to Collins followers.

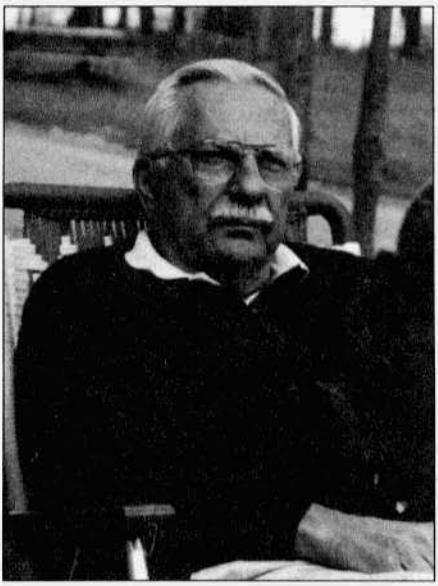
Fred Johnson (author), was responsible for mechanical design of the T-195 and subsequent amateur products into the S-line era. My earlier articles in Electric Radio describe the Collins environment in the heyday of amateur equipment development.

Art Pengally (deceased), was the Signal Corps Project Engineer for the T-195. His boss was Hal Meyer. Art was an extraordinary example of a dedicated and capable civil servant, based at Ft. Monmouth. He visited Cedar Rapids often. Stu says: "Art Pengally was easy to get along with and was always doing his best to make the project a success. When problems came up we could easily work together and solve them. Even when there was difference of opinion, Art was honorable and fair." Art was so "straight arrow" that he wouldn't even allow you to buy him a cup of coffee at break time.

An interesting sidelight is that all Collins T-195 engineers were from the Universities of Minnesota or Wisconsin.

Team Work

All of the design team recalls the program similarly. We were all working over our heads. However, we didn't realize it at the time. Arlo remembers it this way: "I thought the relations between everyone were like a big family. Everyone worked well together and were dedicated to getting the program done on time." Walt says: "It was an outstanding learning ex-



Arlo Meyer, WØLBK, was lead designer and master draftsman. Arlo's seminal role in the 30-L development later on makes his name one of the very familiar ones to Collins followers.

perience that has served me well over the years".

The office and lab areas were small but adequate. Thus, we had continuous daily contact among all team members. We were in close quarters and no one could get very far away. This kind of development environment keeps being rediscovered as an ideal setup for innovation and accomplishment. Today, there are fancy names for it. Offices were mostly shared by the EE's. However, much of the work was done in the lab right outside the few offices. Everyone understood and was helpful and appreciative of the overall goals.

The Project KickOff

There seems to have been no formal "kickoff" event for the program. In June or July of 1950 each of us was reassigned from other work and moved to the new area in what was known as the 3rd St. Building.

Elmer has this recollection: "While I was in Ernie Pappenfus' department at the main plant, Ernie handed me a spec for a transmitter and asked me if I would make a cardboard model of it. I readily agreed and came back to him later and said that I couldn't see any way that all that much electronics could be put in such little space. He said, "Elmer let me tell you the story about a king who asked his 100-man army to pull a cannon up to the top of the mountain. After trying very hard the men came back to him and said it couldn't be done. So, he had them stand in line and shot every other one. Would you believe that the remaining 50 got the cannon up the hill?" I went back and, as I recall, finished the cardboard model. I have forgotten if this model was for the T-195, but it may have been."

Your author's previous assignment at Collins was the mechanical design of an automatically tuned VHF AM transmitter for commercial aircraft, the Collins 17-L. Also the R-278 200-400 MHz UHF receiver. Stu likes to remind me that I designed farm equipment during two cold winters in one year at Fergus Falls Minnesota before coming to Collins in '48. Designing farm machinery gives one a keen appreciation for simplicity. Being "Mechanical" is a cross to bear in the electronic world where I spent the rest of my career.

Arlo recalls that the T-195 was the first contract for development and production let at the same time by the Army. According to Arlo: "We built something like 4,000 and Stromberg-Carlson and Stewart Warner built 4-6000 each under directed subcontract." The program closed out totally in '95 or '96. I believe there were other producers but have no further specifics. I have seen photos of stacks of T-195's in outdoor storage somewhere. Elmer mentioned that he had seen a partially gutted one about a year ago, but didn't buy it as a souvenir because some parts were missing. ER

Part 2 next month, ed.

LETTERS

Regarding the ARRL restructuring proposal
Dear ER

I hate to sound like a "prophet of doom" but as I read page 3 and the proposal suggested I cannot but think we are living in the "Twilight Zone" of amateur radio. (As we remember it and try to preserve it... against a lot of odds). It just seems that the "dumbing of America" has reached into all facets of life. Once there was great pride of accomplishment in obtaining and using the amateur license and privileges. Now it seems that too many want everything for nothing. No effort expended but all the privileges we worked for and were proud to have obtained. I wonder what "The Old Man" would say if he were here to see the path that Amateur radio seems to be travelling. "Rotten ideas" at least! I believe that what is now amateur radio will become simply "expanded CB" No code, very simplified or no testing and no "policing" of language or practices. Once we observed laws, now it seems that too many feel that "laws are made to be broken".

One only has to listen to some of the foul language used on the amateur bands today and compare with the self control of years ago. It is sad to think this way, but it seems that is the pathway amateur radio is taking. I hope I am wrong, but in this "PC" world, no one is supposed to fail. Everyone succeeds, regardless. Look at education [I am a retired teacher, public school] and it is sad to see where "learning" has been replaced with "self esteem" without real knowledge. Well, sorry to have gotten carried away but I really fear for the future of amateur radio as we have known it.

Howard Hartzell, Jr.

Letter to Dale Gagnon, KW1I, AMI President, regarding his comments on the ARRL restructuring proposal in the August issue of ER
Dear Dale:

I was an ARRL Director from January 1, 1998, through March 23, 1998, when I resigned. Since March I have had no contact with the ARRL, and the views presented here are my own. With that disclaimer given, I wanted to comment on your conclusions set forth in the August 1998 issue of ER.

I personally believe that your conclusions are correct. On page 53 of September's QST you will find the minutes of the ARRL Board Meeting. Please look at paragraph 14. It is a report from the ARRL Chief Financial Officer: "Balancing a shortfall in membership dues revenue were better than projected publication sales, less-than-planned operating expenses and the realization of significant gains from sale of certain League securities holdings by the Treasurer."

The key words are "shortfall in membership dues revenue." What this reveals is that ARRL membership is dropping. This is as a result of two things:

1. The average age of ARRL members is increasing each year by almost one year. In other words, in about ten years at least one-third of the current ARRL members will be SK's. The average age of ARRL members is in the late 50's.

2. The recruitment of Tech's to ARRL membership has not worked. A large number of Tech's who joined did not renew their memberships.

(3) Profits from stock market transactions will not go on forever.

So, ARRL membership is falling, while ARRL operating expenditures remain constant. A loss of membership will eventually translate into lower advertising revenues, lower publication sales and lower dues income. It will only take a loss of 30,000 members to decrease total revenues by 1 to 2 million

dollars, and that would make it necessary to make big changes in ARRL operating practices.

So, how do you increase ARRL membership or at least keep it from falling any more? Dale, you are the first person who seems to understand the import of the ARRL decision regarding the proposal on licensing. There are some who believe.... and this is important ... that because most ARRL members are HF qualified, if we give HF privileges to more hams, then there will be more ARRL members.

The same thought was in place when it was decided that because ARRL members are "Hams," if we had more hams (no-code Tech's), we will have more ARRL members. That did not come true. Just because the FCC says you are a "ham" doesn't mean that you will join the ARRL. Well, just because the FCC says you can operate SSB on the HF bands doesn't mean you will join the ARRL. But, the ARRL seems to be willing to roll the dice on letting our HF bands end up like CB in order to increase the "pool" of hams who are likely ARRL members.

These are only my opinions, but you can now understand why I resigned my position as director of the Great Lakes Division of the ARRL. I am still a member of the ARRL because I am a Life Member.

I urge you to inform the readers of ER to write directly to the FCC. I personally believe if the FCC gets about 20,000 letters opposing the code change it will listen. Don't rely on others (i.e., the ARRL) to transmit your true feelings to the ARRL. I believe that the FCC is simply going to count pros and cons. After all, we are dealing with a government agency. This is the same agency who said that they were going to put the code issue on the "fast track" then put it on the slow track. Got a few e-mail's I bet.

Also, write your congressperson. The FCC will be concerned if it gets letters from 50 or so congress representatives.
Joe Falcone, N8TI Past Director ARRL.

A copy of a letter to an ARRL Director regarding the restructuring proposal
Jim Haynie, W5JBP
ARRL West Gulf Director
Dear Jim,

I received my September QST Yesterday and was very disturbed by the article on page 48, "License Restructuring For The Future" as proposed by the ARRL Board of Directors.

Before I go any further I would like you to know that I have been a Licensed Amateur Radio Operator for forty two years plus. I worked in Radio Communications and electronics for the same period of time. Or as I like to say "I worked at my hobby". No one ever gave me anything for free, I earned it with hard work and dedication to learn more about my vocation every day. I retired from The BF Goodrich Company ten years ago. During my working years I served on the Board of The National Association of Business and Educational Radio as both a Director and as the Chairman of the Board. I am a Fellow in The Radio Club of America, Life Member of The QCWA and a Life Member of ARRL. I just moved to my present QTH about two and half months ago and that is why I am writing you, Jim, instead of the Great Lakes Director. Also, this is the first time I have ever written ARRL or a Director as I have not felt a need to do so, but this article really got my attention.

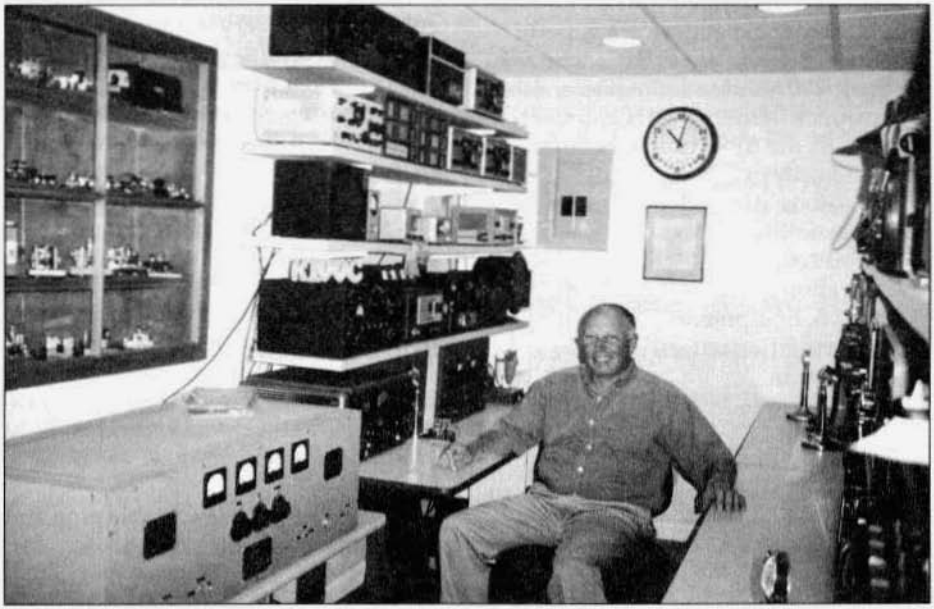
I have always felt a Licensed Radio Amateur was a step above the average person with a hobby as we had to earn the privilege by passing a written exam and passing a code test. Now ARRL is proposing that we open the hobby up to just anyone who can memorize and pass a written test and pass a 5 WPM code test to become a Class C Licensed operator, (General), and a Novice Ticket

continued on page 42

Mike Dorrough, KO6NM/9, at his operating position. The transmitter on the left is a Collins 820D2 and on the right is a 820D1. He uses these transmitters on 160 and 75 meters. Mike is well-known amongst AM operators for his superb audio. *Photo courtesy of Pat Keogh, WB9GKZ.*

Lynn Fisk, K5LYN (ex-WA5DUK), in his hamshack surrounded by some beautiful vintage gear. He's one of several AM'ers around the country who have been restoring Johnson Viking Invaders this summer.

Bob Login, AA8A, in his vintage hamshack. He and Jon Weiner (below) are longtime friends. They both attended Dayton this year where Bob says the buying got out of hand.



Jon Weiner, K1VVC, with his vintage gear.

REVIEW

Hammarlund SP-600JX Video

Hi-Res Communications, Inc.

by Les Locklear
1122 36th St.
Gulfport, MS 39501-7116

Many of you have already had a chance to check out the R-390A video. Now, another classic "Boat Anchor" the Hammarlund SP-600JX stars in its own video. Hi-Res Communications has produced a real gem again.

Having had sixteen of these fine receivers pass through my hands (actually fifteen, I've kept number sixteen), I believe the SP-600 is one of the all-time great receivers.

This is a 2 video set and each video is 2 hours in length. The camera work is beyond reproach. The close-ups, especially the replacement of the infamous black tubular capacitors are superb!

Chuck Rippel, WA4HHG, who was in the R-390A video set makes another appearance in this set. His approach to repairs of the SP-600 is very informative and orderly.

The set is divided into seven segments as follows;

1. Introduction
2. Operation
3. Tools & Equipment
4. Replacing Capacitors
5. Restoration
6. Modifications
7. Alignment

Each of these subjects is covered thoroughly and in a manner that one can go back and review the segments that are of interest to them.

Those who own an SP-600 and are planning on keeping it and are not familiar with the dozens of black tubular capacitors used throughout this receiver would be wise to take heed of Chuck's advice. If they aren't bad today, they will probably be tomorrow or very shortly thereafter. Also there is some very sound advice regarding the multi-stage electrolytic filter capacitor.

The section regarding restoration is full of more good advice as to cosmetic restoration. A fully restored SP-600 is, in my mind, one of the all-time classic receivers!

The section on modifications is short, but has some very good and quite simple modifications.

During the section on alignments, a unique "overlay" of the output meter is in the top right hand corner and is very effective in showing how much improvement was made when the receiver was re-capped and then aligned. A very effective technique!

Many of us who own these classic receivers are very familiar with the quirks and oddities of the various models. However, many of us are "novices" on certain receivers. What Floyd Soo, W8RO and Chuck Rippel, WA4HHG have done with this video set is bound to encourage those who might have hesitated to make some of these repairs. After viewing this video, hopefully many of the SP-600 owners will restore these receivers and give them a place of honor in their shack.

This 4-hour 2-video set is available from the ER Bookstore or from the producer, Hi-Res Communications, 8232 Woodview, Clarkston, MI 48348-4058. (248) 391-6660

Price; $89.95 plus $4.50 shipping and handling.

VINTAGE NETS

California Early Bird Net: Saturday mornings at 8 AM PST on 3870.
California Vintage SSB Net: Sunday mornings at 8 AM PST on 3835
Southeast Swap Net: Tuesday nights at 7:30 ET on 3885. Net control is Andy, WA4KCY. This same group also has a Sunday afternoon net on 3885 at 2 PM ET.
Eastern AM Swap Net: Thursday evenings on 3885 at 7:30 ET. This net is for the exchange of AM related equipment only.
Northwest AM Net: AM activity daily 3 PM - 5 PM on 3875. This same group meets on 6 meters (50.4) Sundays and Wednesdays at 8:00 PT and on 2 meters (144.4) Tuesdays and Thursdays at 8:00 PT. The formal AM net and swap session is on 3875, Sundays at 3 PM.
K6HQI Memorial Twenty Meter AM Net: This net on 14.286 has been in continuous operation for at least the last 20 years. It starts at 3:00 PM PT, 7 days a week and usually goes for about 2 hours. Net control varies with propagation.
Arizona AM Net: Meets Sundays at 3 PM MT on 3855. On 6 meters (50.4) this group meets at 8 PM MT Saturdays.
Colorado Morning Net: An informal group of AM'ers get together on 3876 Monday, Wednesday Friday, Saturday and Sunday mornings at 7AM MT.
DX-60 Net: This net meets on 3880 at 8:00 AM, local Michigan time, Sundays. Net control is Jim, N8LUV, with alternates. This net is all about entry-level AM rigs like the Heath DX-60.
Eastcoast Military Net: It isn't necessary to check in with military gear but that is what this net is all about. Net control is Dennis, WA3YXN but sometimes it rotates to other ops. Saturday mornings on 1995 at 0500 ET. Will move to 3885 for summer.
Westcoast Military Radio Collectors Net: Meets Sunday mornings at 0930 local on 3975 + or - QRM, except the 1st Sunday of the month when the net meets at 2130 local. Net control is Tom, WA6OPE.
Gray Hair Net: The oldest (or one of the oldest - 44+ years) 160-meter AM nets. It meets on Tuesday nights on 1945 at 8:00 PM EST & 8:30 EDT. URL: http://www.crompton.com/wa3dsp/grayhair.html
Vintage SSB Net: Net control is Andy, WB0SNF. The Net meets on 14.293 at 1900Z Sunday and is followed by the New Heathkit Net at about 2030Z on the same freq. Net control is Don, WB6LRG.
Collins Collectors Association Nets: Technical and swap session each Sunday, 14.263 MHz, 2000Z, is a long-established net run by call areas. Informal ragchew nets meet at 0100Z Tuesday nights on 3805 and on Thursday nights on 3875.
Collins Swap and Shop Net: Meets every Tuesday at 8PM EST on 3955. Net control is Ed, WA3AMJ.
Drake Users Net: Another relatively new net. This group gets together on 3865 Saturday nights at 8 PM ET. Net controls are Criss, KB8IZX; Don, WZ8O; Rob, KE3EE and Huey, KD3UI.
Swan Users Net: This group meets on 14.250 Sunday afternoons at 4 PM CT. The net control is usually Dean, WA9AZK.
Nostalgia/Hi-Fi Net: Meets on Fridays at 7 PM PT on 1930. This net was started in 1978.
K1JCL 6-Meter AM Repeater: Located in Connecticut it operates on 50.4 in and 50.5 out.
JA AM Net: 14.190 at 0100 UTC, Saturdays and Sundays. Stan Tajima, JA1DNQ is net control.
Fort Wayne Area 6-Meter AM Net: Meets nightly at 7 PM ET on 50.58 MHz. This net has been meeting since the late '50's. Most members are using vintage or homebrew gear.
Southern California Sunday Morning 6 Meter AM Net: 10 AM Sundays on 50.4. Net control is Will, AA6DD.
Old Buzzards Net: Meets daily at 10 AM Local time on 3945. This is an informal net in the New England area . Net hosts are George, W1GAC and Paul, W1ECO.
Canadian Boatanchor Net: Meets Saturday afternoons, 3:00 PM EST on 3745. For hams who enjoy using AM, restoring and operating.
Midwest Classic Radio Net: Saturday mornings on 3885 at 8AM Central time. Only AM checkins allowed. Swap/sale, hamfest info and technical help are frequent topics.
Boatanchors CW Group: Meets nightly at 0200Z on 3579.5 Mhz (7050 alternate). Listen for stations calling "CQ BA" or signing "BA" after their callsigns.
Wireless Set No. 19 Net: Meets the first Sunday of every month on 14.165 at 1900Z and 3760 at 2000Z. Net control is Dave, VA3ORP.
Beer Town Traders Net: On 3885, 5:30 Central Daylight Time on Saturdays.
Westcoast 40M AM Net: Sunday afternoons from 3-4 PM westcoast local time until 4-5 PM on 7160 +or- QRM.

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

My Encounter With an Eldico SSB-100

by Jim Hanlon, W8KGI
PO Box 581
Sandia Park, NM 87047
jthanlon@att.net

I grew up with ham radio in the halcyon days of CW and AM phone, getting my novice and technician tickets in 1952 and my general class in 1953. My older brother and I built "the world's largest 150 watt transmitter" which ended up in a pair of 809's modulated by a pair of 807's and which stretched over three Bud-Junior sized relay rack panels, a giant, mil-surplus rack power supply, and an outboard BC-457 VFO. By the time SSB was making real inroads on the bands, I was in college and had neither the time nor the money to fool with it. Graduation was quickly followed by marriage and three children and mixed in with full time work and graduate school. By the time I could come up for air again, it was 1968, I had just turned 30, and we were in a brand new, all electric house with a for-real job supporting it in Emmaus, Pennsylvania.

My dear wife, who had been my mainstay through the most intense years of our young lives, recognized that I had not had any "mad money" to spend on myself for seven years, so she gave me the $50 that she had gotten by selling our outmoded gas clothes dryer. That very evening I was looking in the Allentown Chronicle classified ads for firewood, and my eyes happened to stray onto an ad offering a Ham Single Sideband Transmitter for (coincidentally) $50! Not being one to let time or money sit around, I called the fellow and found out that he had an Eldico SSB-100 that had belonged to his deceased brother. A TV serviceman friend had looked at it and pronounced that it had a dead power transformer, so he was selling it cheaply. With visions of a couple of Fair Radio surplus power transformers cobbled out the back, I went over to take a look at it and of course brought it home.

Luck was with me, and the "burned out power transformer" turned out to be nothing more than a shorted filter capacitor. (Mental note not to call that TV serviceman!) The rest of the rig was in pretty good shape. Of course I couldn't resist running through the manual maintenance procedures and tweaking the adjustments, but it took very little before I was on the air with my brand new, 13 year old sideband transmitter!

Eldico of New York was a major advertiser in QST in the late 1940's. They had two well respected transmitter kit offerings, the $34.95 TR-75 featuring a 6L6/807 lineup and the $179.50 TR-1 that wound up in an 813 modulated by a pair of 811's. This was the era when TVI was becoming a serious threat to the ham community, and Eldico was at the forefront with a low-pass antenna filter and a "brute force" line filter for the amateur transmitter, a high-pass antenna filter for the TV receiver, and an absorption wavemeter and a grid dip meter to help diagnose transmitter harmonic and parasitic oscillation problems. They brought out TVI-proofed versions of their transmitters, the TR-75 TV in 1950 which changed to a 6AG7 driving a 1625 and was just in time to become a favorite with us new Novices in 1951, and the TR-1 TV in 1953 with a 4E27A/5-125B in the final.

As I mentioned in my earlier article[1], Eldico was the first commercial manu-

The SSB-100 as it looks today.

facturer to advertise an amateur SSB transmitter in QST, and probably anywhere else, when they brought out their version of Don Norgaard's "SSB, Jr." in February, 1951. Curiously, although Eldico continued to feature many of their products in full-page QST ads throughout 1951, they made no further mention of the SSB, Jr. until their ad in September 1952. The Eldico SSB, Jr. was shown one more time, in the Harrison Radio ad in February 1953, but by that time it had clearly been outclassed by the Central Electronics 10A which also first appeared in the September, 1952 QST. A year later in the September, 1953 QST, the Allied Radio advertisement featured the new, Eldico SSB-50, a 160 to 10 meter phasing rig which ran 50 watts to a 6146, included VOX, and which could be VFO controlled on 80 and 40 and presumably crystal controlled on the other bands. This new Eldico offering cost $199.95 in kit form less VFO, $279.50 wired and tested. The only other commercial sideband transmitter competition at that time—besides Central Electronics—came from the Elenco SS-75, a 5 to 6-watt output, 75 meter only exciter that generated its SSB signal using a 450 kc crystal filter. The SS-75 was reviewed as "new apparatus" in the December 1952 QST and was first offered for sale for $245 in January 1953 by Steinburgs, one of my favorite Cincinnati ham radio haunts, only a couple of blocks away from where I went to High School. (I remember seeing Steinburgs demo an SS-75 at the 1953 Cincinnati Hamfest. It was the first time I had ever heard "inverted speech," created by putting the receiver BFO at the top of the sideband rather than at the former carrier point.) At double the price or more of the 10-watt Central Electronics 10A kit, the 1953 Eldico SSB-50 and Elenco SS-75 weren't in the ball park. When Eldico revamped the SSB-50 to add an internal, all band VFO and upped the price to $429.95 for the kit and $549.95 wired and tested in 1954, it fell even further behind the Central Electronics 20A at $199.95 or the Lakeshore Deluxe Phasemaster Jr. at $194.50.

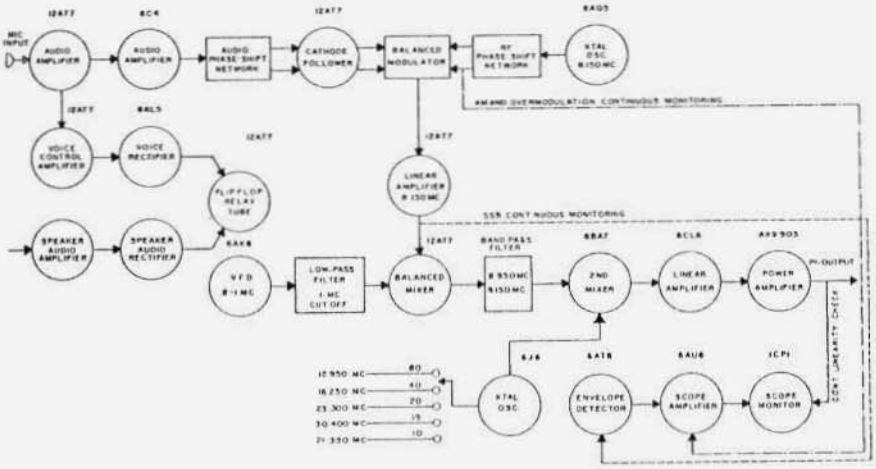
continued next page

By 1955, Eldico must have figured out that they weren't making headway in the lower cost, kit end of the SSB transmitter business. So they changed their approach and came out with the SSB-100, an upscale, 144 watt PEP, 80 through 10 meter, bandswitching transmitter that bore a vague resemblance to the Collins 32V/75A family and that sold for a mere $695! Eldico was not modest about their new achievement, saying in its manual, "The Eldico Model SSB-100 Exciter/Transmitter is the most complete and versatile piece of equipment ever built for the amateur. Together with a communications receiver, it provides plenty of talk power on the air to make a full size amateur station. Great pains have been taken to provide the utmost in convenience of operation, frequency stability, adequate suppression of carrier and unwanted sidebands, plus overall rugged construction for dependable operation. It is completely self-contained, virtually free of television interference due to its advanced design, and has talk power equal to transmitters of many times its size."

You know by now, since Eldico is not a familiar name among the surviving SSB rigs of that era, that the SSB-100 was not a commercial success either. By that time, Elenco had already come out with their new model 77, a 160 to 10 meter, 300-watt PEP, crystal filter rig for $595. Hallicrafters had their first offering, the HT-30, on the market. Central Electronics and Lakeshore were selling their phasing kits for a lot less money. B&W was offering their 51SB that could be added on to their 5100—and to a lot of other 150 watt AM/CW rigs of the day as well—to convert them to sideband. And Collins was just about to hit the market with their KWS-1, a rig that was as foolproof as it was expensive and which launched a whole new bunch of sidebanders onto the phone bands whose level of technical expertise was such that about all they could discuss about their rigs was where to set the audio gain control. Can you say, "appliance operator," boys and girls?

But this story is to be about my Eldico SSB-100, so let me get off my soapbox and on to my main tale.

First impressions about the SSB-100 are that it is big, heavy, black, full of tubes (20!) and built like a battleship. There are 5 modules inside, one each for the audio/SSB generator deck, the VFO (a linear, permeability tuned oscillator), the power supply, the oscillator/mixer/linear amplifier deck, and the oscilloscope. Everything is built up on 1/16" thick aluminum sheets and frames, wiring is routed in laced harnesses, and the individual modules are tied together through multi-pin, molded connectors. You can tell by that picture of the "insides" that the SSB-100 is solidly built and that it fills up most of the inside volume of its 12 1/2" high, 21" wide, and 13 1/2" deep cabinet. In size it is quite comparable to the Collins 75A-3, which is a good and contemporary matching receiver. It weighs a mere 85 pounds—nothing you would want to put on an upper shelf but fine for holding down the operating desk in case of earthquakes. Its 19" relay rack panel and its cabinet are basic black crackle, and all of the lettering, the meter and the VFO dial are also black and white. The only color accent is the green, one-inch CRT modulation monitor which lights up when the transmitter is on the air. It is bandswitched 80 through 10, but it covers only a 200 Kc segment of each band. In 1955 this was no problem if you were only interested in phone, since the only band that had more than 200 Kc allocated to phone was 10 meters and just about all of the SSB activity on 10 took place between 28.5 and 28.7 anyway. It is decidedly inconvenient if you also want to operate CW, something Eldico fixed in the 1956 SSB-100A revision which covers 500 Kc on each band. But even the SSB-100 will work



The SSB-100 block diagram.

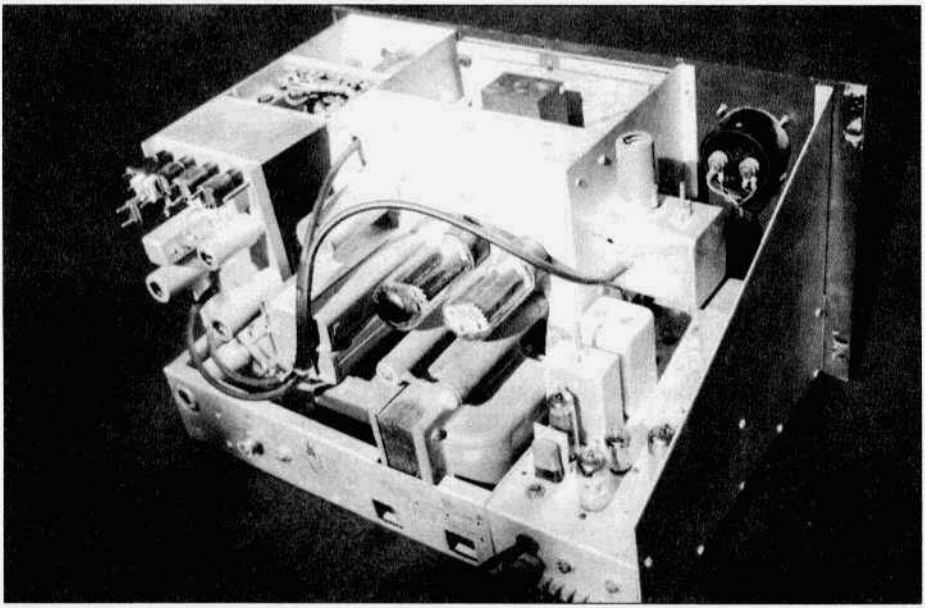
down in the 40 through 10 meter CW bands if I open it up and substitute other crystals in the band-selection oscillator. It doesn't make it on 80 only because the tuned circuit in the output of the second mixer isn't broad enough to cover the CW band.

The block diagram gives a pretty good picture of how the rig works. As Eldico explains, "Like some dual conversion receivers, the SSB-100 uses a variable low-frequency oscillator, a variable intermediate frequency, and a crystal controlled high-frequency oscillator. The SSB signal is generated at 8.150 mc, then heterodyned against the low frequency VFO in a balanced mixer. Since the VFO covers the range from 800 kc to 1000 kc (and the following Low Pass Filter attenuates vfo harmonics 60 dB or more), the sum frequencies come out between 8.950 and 9.150 Mc. These frequencies are fed through a band-pass filter, thereby eliminating all unwanted mixer products. After going through this band-pass filter, the signal is fed into a second mixer stage, together with the signal from the high frequency crystal-oscillator. The difference between the crystal oscillator output-frequency and the SSB-Signal coming from the band-pass filter gives the actual output frequency of the transmitter. The signal is then amplified in two linear amplifiers to the proper power level. The correct crystal/coil combinations are selected by the bandswitch from the front panel."

I can't miss the opportunity to point out that the 8.150 mc SSB signal generator is a Don Norgaard, W2KUJ, SSB, Jr. retuned from 75 meters. The crystal oscillator tube was changed from half a 12AT7 to a 6AQ5, and there's an extra 6C4 in the audio chain to give enough gain for a crystal microphone, but the same germanium diode balanced modulators, in this case 1N60's, are still there and the audio phasing network looks exactly like the one in the Junior—down to the same parts and board layout and the same audio alignment frequencies. The "most complete and versatile piece of equipment ever built for the amateur" in 1955 is still a gussied-up 1949 SSB, Jr. at its heart.

The audio input of the SSB-100 is designed for a high impedance crystal or dynamic microphone. As in most phasing rigs, the audio response is

continued next page



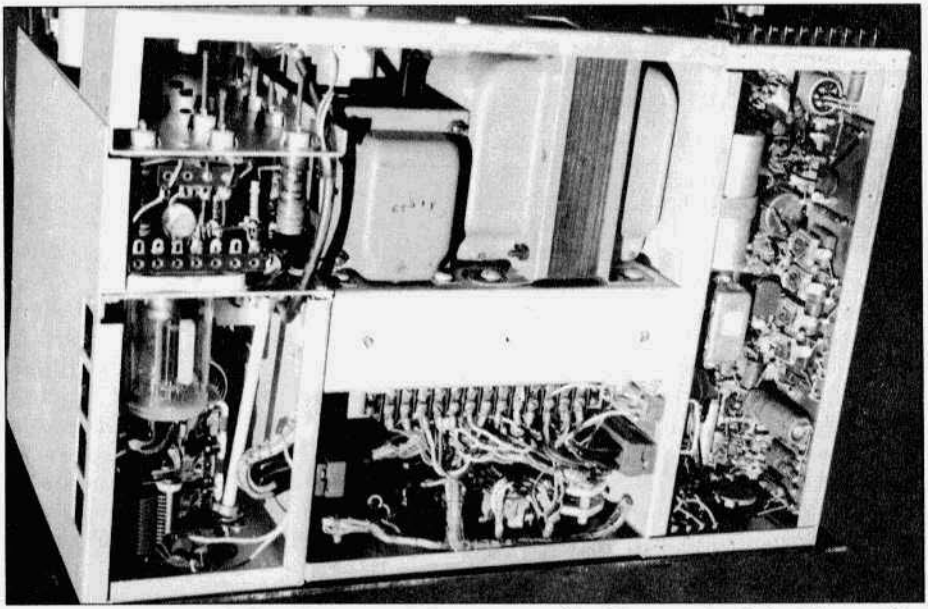
Rear view above decks. There's very little volume left unfilled.

"shaped to provide maximum communications efficiency with minimum bandwidth." Like the SSB, Jr., its audio alignment frequencies are 326, 490, 1306 and 1960 cps. Infinite attenuation frequencies where the phase shift difference is exactly 90 degrees are 440, 1225 and 2500 cps. Overall audio response is 300 to 3000 cps +/- 3 dB, and 40 dB down at 100 cps and 6000 cps. Noise and hum are 40 dB or more below PEP level. The rig easily attains full output with my Astatic D-104, JT-30 and model 200 crystal microphones. On the air reports say its audio sounds less "harsh" than that from more modern filter rigs with their more restricted audio bandpass.

The SSB-100 includes a voice break-in circuit using a one-shot multivibrator which the manual claims provides essentially zero attack time and a release time of 0.8 seconds. There is a "QT" input to be tied to your receiver's speaker which will prevent the VOX from triggering on receiver audio.

The RF balance pots for adjusting carrier suppression are accessible from the top of the audio/SSB generator deck inside the cabinet. At this point some 43 years after the rig was built, I sometimes have to tweak those pots, especially if I haven't had the rig on for quite a while. It's not difficult, but I do have to slide the chassis out of the cabinet a few inches and reach in with a long, skinny screw driver to get to them. Central Electronics did a much better job on the 100V, putting its carrier balance pots behind one of the front panel doors where they could be easily accessed and adjusted..

The final RF amplifier uses a dual tetrode Amprex AX9903/5894 as a class AB1 linear amplifier with a pi-network output circuit. The nominal output impedance is 52 ohms, but loads from 40 - 200 ohms can be accommodated. Power input in the SSB mode is rated at 144 watts PEP with 100 watts PEP output. Either USB or LSB can be selected on each band. AM and CW are also available and run at 60 watts carrier input. Spurious mixer products are rated to be



Under the decks of the SSB-100. The AX9903 final is on the left. The audio phasing board is located on the right chassis wall. Its mica trimmer caps still have the locking Glyptol varnish put on when they were adjusted in the factory.

40 dB or more down, third order distortion products 35 dB or more down, and carrier suppression 40 dB or more down. TV interference suppression is entirely adequate, with the second harmonic 40 dB or more down and higher order harmonics 60 dB or more down. The SSB-100 bothers none of the local Albuquerque channels, not even channel 2, when it is on 10 meters, on my portable TV with rabbit ears about 20 feet away.

The internal one-inch oscilloscope monitors linearity of all stages between the audio amplifier and the RF output and gives a positive indication of percentage of modulation on AM as well. Eldico and their contemporaries had yet to develop an AGC to keep the RF amplifiers operating in their linear range, but they did include a nice tool which allows the rig to be set up and operated properly. The scope pattern is intensity modulated by the audio level voice to give it good visibility and to prevent burning a spot into the screen when there is no signal.

That big slide rule dial has a rated accuracy of +/- 2 Kc. I find that the relative accuracy of the dial is dead on. There is a screwdriver adjusted calibration control on the front panel which can be tweaked to compensate for high frequency oscillator crystals which might be a little off. The rig is rated as having less than 50 cycles drift over any 10 minute period after 3 minutes warm up. My 1998 measurements indicate that it now drifts about 12 cycles per minute in the period from 3 to 15 minutes after turn-on. Stability this good in a 43 year old rig is certainly a credit to Eldico's well designed permeability tuned oscillator.

Thirty years have passed since I first brought the SSB-100 home. I still have the same, wonderful wife who has tolerated my bringing home many more pieces of radio gear, and who has countered lately by growing her own collection of sewing machines. The kids have

continued on page 41

Resurrecting The Bug

by Don Meadows, N6DM
1683 Daphne Lan
Yuba City, CA 95993

The term "Bug" was coined decades ago by the Vibroplex Company. The term became generic. Many derivatives of the design appeared over the years from other factories. Marketed for many years by numerous manufacturers as "speed keys," the Bug became a prestige item that adorned many ham shacks. Today, the electronic keyer and computer keyboard have pushed the Bug into the shadows. Yet it remains alive and well among many old-time CW operators. Vintage Bugs have become a hot collector's item and now sell for many times their original cost.

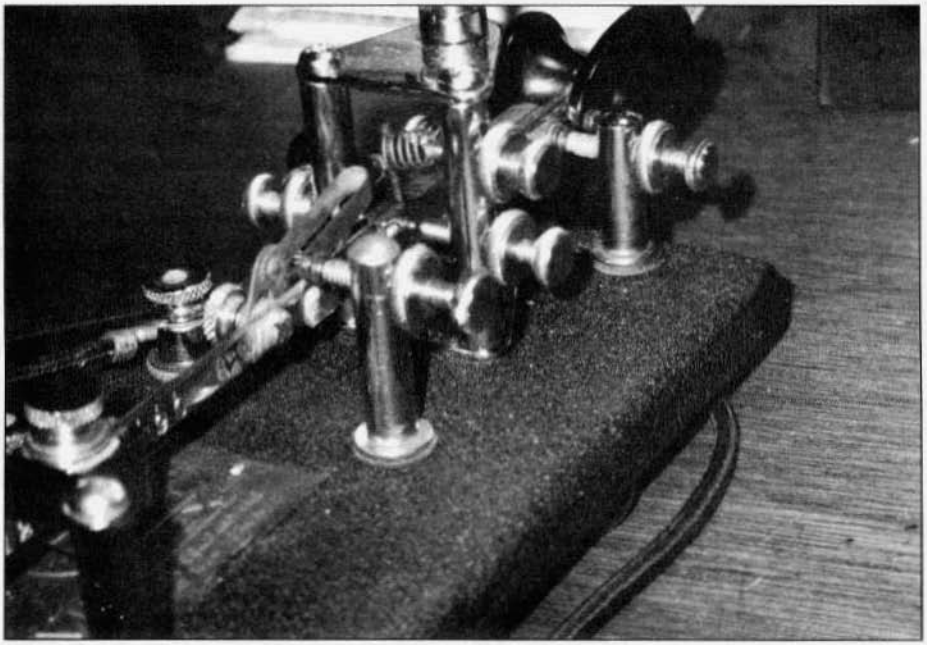
Today, a ham doesn't need to demonstrate any CW-sending proficiency at all in order to acquire even the highest class ham license. Hams of yesteryear knew their ability both to send and receive code would be tested at the FCC examining centers. During the vacuum-tube era most hams learned how to send CW with a straight key, the device whose use in the earliest days of telegraphy engendered the term "brass pounding." And many of these hams, having struggled to master sending and receiving 13 words per minute, decided not to let their efforts go to waste. They stayed with CW and not only became quite good at it but also grew to enjoy it as an adjunct to AM phone. Their secret desire was someday to replace their simple straight key with a Bug. Published photographs of advanced ham shacks during the vacuum-tube era often show an operating position where a microphone stands tall. Very often the device sitting close to the mic is a mechanical Bug.

The Bug was originally designed in the early days of radio to help out professional CW operators whose hours at the straight key produced muscular fatigue and sometimes ultimate paralysis. Real old timers know the term: the "glass arm." Tuning the CW bands today, one hears the usual electronic keyers and computer keyboards, often at high speeds, sending perfect code. In between, one can sometimes hear individual "fists" produced by straight keys or by mechanical Bugs. Minor timing faults may give these signals an individualistic sound, no way computer-perfect, yet these signals are being copied solid by the receiving operator. Some signals can still be heard where the mechanical Bug is hard to distinguish from its electronic counterparts. Such masters of this antique device are probably among the elderly who are slowly fading away—but their skill with the Bug need not become a lost art.

These old timers learned long ago how to adjust their Bugs to produce beautiful CW—fine music which the receiving operator could copy with ease. If mechanically complete, Bugs can send CW as well today as they did when brand new. But their proper adjustment has often been an exercise in trial and error. Therefore, the following adjustment steps may be of interest to hams who have a Bug but have never used one on the air. One should consider each of these steps as a starting point subject to the individual operator's fine tuning.

1. The Bug must always sit on a surface perfectly level. Otherwise, the dot quality can vary.

2. Adjust the vibrating arm (sometimes called pendulum) to barely make contact with the damper when the paddle is at rest. The damper on most Bugs is a metal



This photo shows the adjustment screws on an early Vibroplex bug.

wheel designed to arrest the vibrating arm's motion instantly when the paddle is relaxed.

3. Next, move the paddle to the right to make dots. Hold it there until the vibrating arm is completely still. Now adjust the stationary dot contact slowly to barely make electrical contact with its mate on the vibrating arm. Be sure the vibrating arm is absolutely motionless. Don't depend on your eyes for this; use an ohmmeter or keyed monitor. This is perhaps the most critical adjustment of all, both to set dot length and to avoid the problem of contact bounce, which can sound ragged on the air. An additional inward eighth-turn of adjustment may benefit some Bugs whose dot contacts are out of parallel alignment. Paddle travel to the right should generate at least five to eight dots before the contacts slur. This number will vary with each Bug, as it depends on the springiness of the vibrating arm.

4. Now move the paddle to the left to make dashes. Adjust the stationary dash contact so that the paddle travel equals that for making dots. With the vibrating arm and paddle at rest, the spacing between dot and dash contacts and their mates should about equal the thickness of a sheet of typing paper. This specification is approximate -- some Bugs may require slightly different spacings.

5. Next, adjust the spring tension on the dot and dash sides. As a starting point, the tension for dots and dashes should be roughly equal. Adjust to taste.

6. Now what about the weight? Its position on the vibrating arm, being the most obvious adjustment variable, has caused much frustration for beginning users over the years. Many newcomers to the Bug found that even with the weight at the extreme end of the arm, the dots still came much too fast. A common fix was to wrap lead solder around the weight to slow things down. Such acts were probably an insult to the Bug's original designers, who assumed the user would have the ability to balance the time of three dots to equal one dash. But the designers may have forgotten that many

continued next page

new Bug users had just come from a straight key and weren't professional operators. In short, just place the weight where you can comfortably make the time of three dots seem to equal one dash. Don't worry about dot speed; the dot-dash ratio is what's important in sending clean code.

7. The Bug is well suited to the Farnsworth method of sending code. For example, the letter F is sent as a unit, a lively di-di-dah-dit. The letter's four components together are considered as one unit of sound—not a lazy dit dit dah dit, or, worse, a plodding dot dot dash dot. Or worse yet, a thing misshapen in timing that is copied as dot dot (pause) dash dot—which spells the word "in." The time interval between Farnsworth sound units (each character) determines code speed. In other words, just form each individual character as fast as is comfortable. Then adjust the spacing between characters and words to establish the desired code speed. If the receiving operator doesn't ask for repeats, you'll know you're in the ballpark. Let your mind hear each character as a unique combination of long and short sounds. Two letters, E and T, define the short and long sounds. The time required to send one T should equal the time required to send three E's. All other characters (letters, numbers and punctuation) are built upon these two sounds.

8. If your Bug's CW sounds decent on your monitor, you are probably ready to let the Bug send on the air. However, if your confidence still wavers, there is one further test, a test which dramatizes each and every mistake. If you are so equipped, send with the Bug to your computer. Without looking at the monitor, send several lines of text at any convenient speed. Then check to see if the computer printed out the letters and words correctly spaced without garbage. If so, your Bug fist should hardly need further improvement. The computer almost always recognizes correctly-sent Farnsworth code at any speed, even with excessive spacing between characters and words.

We've been talking about adjusting and using this device called a Bug. Now let's talk about its physical health. Most Bugs resisted corrosion by using plated hardware mounted on a well-painted or plated base. They were designed to stave off the rusting ravages of time. Most of them exemplify yesteryear's American pride in quality for its own sake. Many surely were designed to outlast the career of their first user. If the Bug is mechanically complete, the only rehabilitation usually needed is to clean its electrical contacts. This is easily done in most cases, not with files or chemicals, but by simply passing a sheet of typing paper between the closed contacts a few times. Usual oxidation will rub off as a discoloration on the white paper and is quite visible. A few passes should restore the contacts to their original state. A water-based cleanser such as Simple Green often does wonders in removing some old Bugs' shroud of grease, dirt and scum of tobacco smoke, letting it glow again—after a thorough routine of application, water flushing and drying—as it glowed when it first left the factory. Avoid petroleum-based cleansers. They can attack the paddle and the painted base. They may also leave a residual film that can foul the electrical circuitry.

Some Bugs can exhibit a quirk when keying the cathode circuit of a transmitter. The dits and dahs are on slightly different frequencies, a slight difference, maybe just a few cycles, but enough to register on the eardrums of the old-time CW operator. This frequency shift is caused by a different resistance between the Bug's dot and dash contacts and the terminal posts, maybe just a few ohms, but enough to be noticeable, because the cathode bias of the keyed transmitter is being affected. Many Bugs used their base as part of the circuit, a

continued on page 42

Special Event at Radiofest Successful

by Harry Blesy, N9CQX

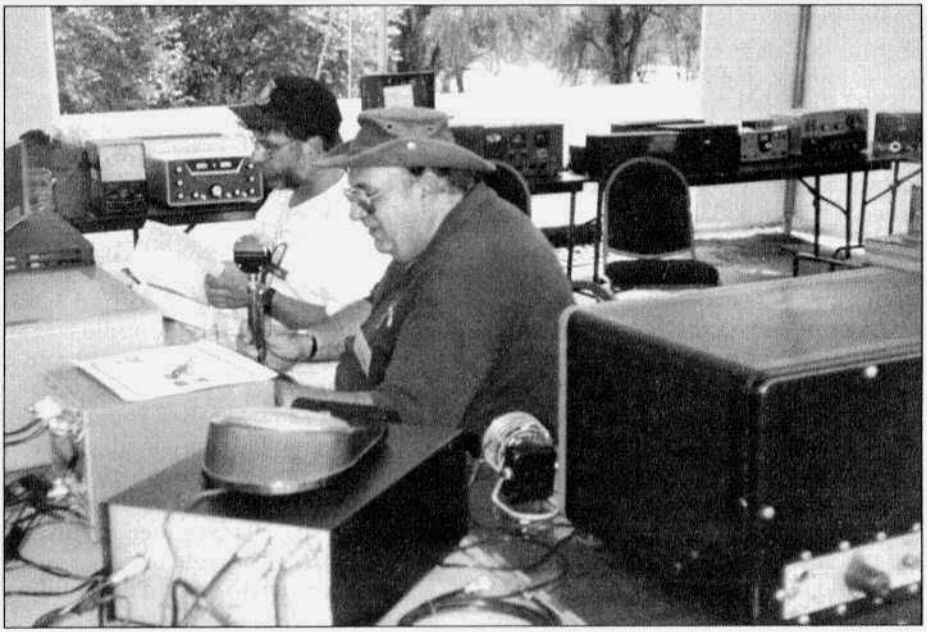
The Special Event, Vintage Ham Station which was on the air at Radiofest XVII (Antique Radio Club of Illinois) was a tremendous success. We operated mainly during the day on 80, 40 and 20 Meters, August 5, 6, 7 and til noon on the 8th. Even though we incurred three days of intermittent thunderstorms, we were still able to contact 47 states and Washington D.C. (we missed HI, WA and VT). We also talked to 15 countries, mostly Europe and South America.

For AM phone operation we used a Johnson Valiant and a Hallicrafters SX-88 and for sideband operation we used a Hallicrafters HT-37 with a Collins 75A-4. Three antennas were strung up at about 45 feet but we mostly used a center-fed Zepp with 450Ω ladder line and a Johnson Matchbox. All total we made 435 contacts, 40 of which were AM phone. Some of the stations who called us were:

The Space Shuttle SE Station, WB3HHP
The Houston Space Center, W5RRR
A New Mexico Tracking Station, KF8UN
The Smithsonian Institute, NN3SI

We talked to many operators who also had vintage gear, QRP stations, portables, mobiles and even a bicycle mobile. We enjoyed hearing from many 'old timers' and possibly the oldest was Ray, W9HAB who stated that he was 94 years old.

Thanks to all who visited our station in person and on the air. Thanks to all the guest operators, especially Dale, WA9ENA. And a very special thanks for all the help from my radio buddies: Bob, KB9BYW; Ron, K9ZZE and Jim, K9RJ. ER



Antique Radio Club of Illinois, vintage ham station, August 1998. Bob Kaminski, KB9BYW on the left; Dale Svetanoff, WA9ENA on the right.

A Sound Idea...

by Bruce Vaughan, NR5Q
504 Maple Drive
Springdale, AR 72764

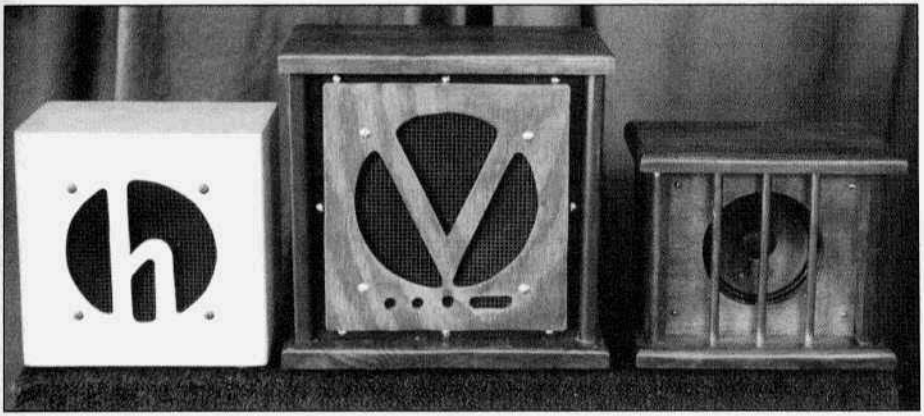
Not so many years ago hamfest tables creaked under the load of beautiful old Hallicrafters, National, and Hammarlund speakers. Often they were carried back home by their owner's because no one was willing to pay their asking price--probably less than $20.00. I remember buying a nice ten-inch National speaker for the grand sum of two dollars, a mint RME speaker for $6.00, and Hallicrafters speakers ranging in price from $15.00 to $25.00. No more! Today, speakers often sell for $100.00 or more--especially those beauties built by Hallicrafters. To be very honest Hammarlund speakers, in my opinion, added little in looks or sound to any ham shack, nevertheless, they command respectful prices today.

The supply of receivers today is far greater than that of speakers. I suppose it is because most hams, 40 to 60 years ago, had trouble enough saving money to buy a receiver--without adding another $15.00 to $30.00 for a "matching" speaker. Many, like the writer of this article, chose to 'scrounge' a speaker from other, less expensive, sources.

Once you have experienced the wonderful audio of receivers like the NC-183D, the HRO50/60, top end Hallicrafters receivers, and countless other descendants of the golden age of the vacuum tube, you know the importance of a better grade speaker. There is a tremendous difference between today's solid state receivers, and those grand old receivers using a pair of beam power tubes in a push-pull 12 watt output circuit. Even solid state receivers with their anemic audio output, and that often choked down by CW or SSB filters, often benefit from the use of a better speaker.

Last year, I answered an ad on the Internet and became the proud owner of a well-known modern transceiver with matching speaker and power supply. When I unpacked my new purchase I was delighted to see that the unit seemed to be in pristine condition. Anxiously I plugged it in and connected my R7 vertical to the PL-259 on the back panel. I tuned across the 14 MHz CW band. Signals sounded weak, and rather strange on this modern transceiver. My heart dropped to somewhere around my knees. "Another bad buy," I thought. I carried the transceiver and power supply to my shop and prepared to do battle with my new "lemon." As usual when I have audio problems I started at the speaker and worked my way backward. On a dusty shelf in my shop is an old beat up National speaker I use as a test speaker. Using an adapter, I plugged it into the modern transceiver. With a five foot piece of wire for an antenna, I was amazed to find I had good loud signals and the audio was all one could expect from the watt and a fraction output. I connected up the "matching" speaker. Bad sound! Weak audio! I removed the small elliptical speaker from its cabinet--there was nothing wrong. It was delivering all the sound a two dollar speaker in a tin and plastic baffle is capable of.

There is much to be said for building a solid wood enclosure around a moderate priced speaker. There is a quality of sound that comes from wood that is



Three homebuilt speakers in use at NR5Q.

difficult to explain--you must hear it to fully appreciate it. Only last week I bought a nice eight inch speaker from Radio Shack for twelve dollars. After installing it in a home built enclosure the sound was very close to that obtained from my large National speakers. If there is a difference, the scale would favor the home-built speaker. The actual cost to build a speaker may vary from under twenty bucks to more than thirty dollars--not bad considering the appearance, sound, and pride of accomplishment such a speaker will deliver.

I connected this 8 inch speaker (see illustrations--it's the one with the "V" in the grill) to my latest home brew regenerative. The sound is almost identical to that delivered by my SX-16.

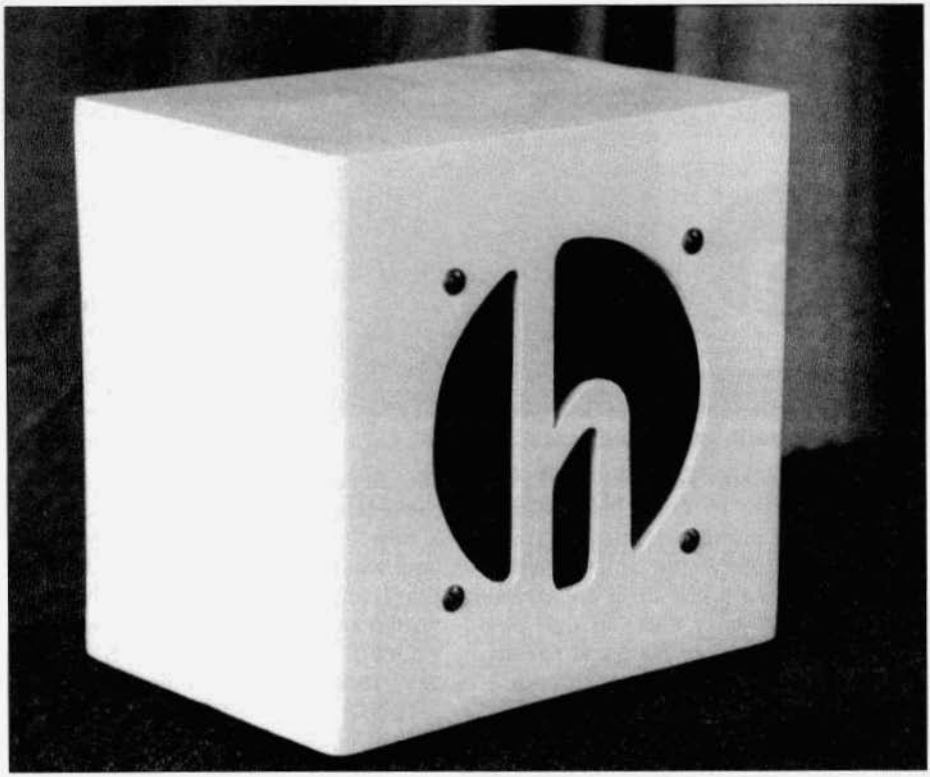
Most hams, the writer included, do not have access to a well equipped wood working shop. Is it possible to make an attractive speaker enclosure without the luxury of a table saw, jointer, router, and other power tools? Well, I'm happy to report that it easier than you might think. All the enclosures pictured in this article were made using nothing but very average hand tools, an inexpensive cordless drill, a small bench sander, and a jig saw. An small coping saw would have worked as well, though it is a little slower. I like to be as accurate as possible in my articles so I went to the home supply store and purchased a new, rather fancy coping saw. The cost was $4.50. I am pleased to report that I can cut out a grill almost as quickly with it as I can with the little scroll saw.

One thing that makes such projects easy today is the availability of nice, soft, 5/8 inch shelving material available at home supply stores. This material comes in a variety of sizes, shrink wrapped, clean, and easy to transport in the family automobile. An eight dollar sheet should yield enough for two speaker enclosures. I'm sure prices vary from city to city.

While at the store look for a 2 foot by 2 foot piece of 3/16 inch plywood. I like birch or oak--but there are others available. After building one enclosure, you will certainly try another, and another, eventually using up the ten bucks worth of plywood. This also makes great panels for home built receivers--see the July ER article, "The CW Special."

The finest thing I've found for grill 'cloth' is plastic screen used by those doing craft needlework. This screen is strong, and the mesh holes are approximately 1/8 inch square. Our local hobby store simply calls it plastic screen, but your craft store may call it something different. Wool yarn is pulled through the holes creating designs. Craft work-

continued next page



Close-up view of the "Hallicrafters" speaker.

ers make all sorts of things from it. I'm sure any clerk can direct you to the right product. It comes in various sizes and colors. A 16 inch square of the material costs about 35 cents. And, it takes spray paint very well.

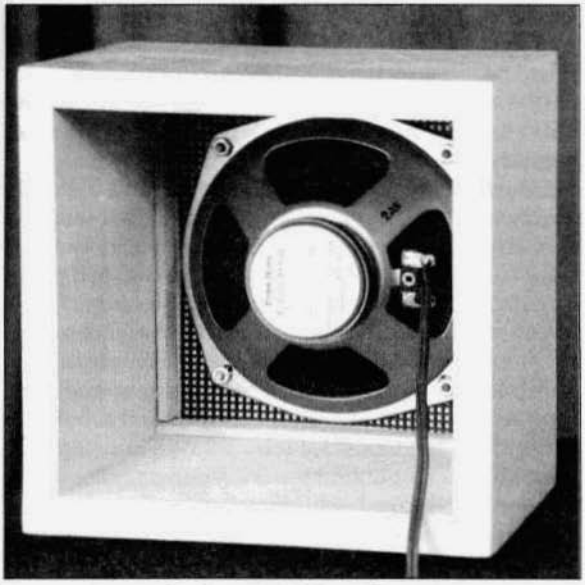
Here are the basic tools needed for construction.

Coping saw. You better go ahead and buy a couple of extra blades--they break easily.

Electric drill. Small carpenter's square. Sandpaper. Drywall screws..1 1/2 inch long. Wood glue. Plywood. Ponderosa Pine shelving or craft wood. Screwdriver tips for the electric drill. Oh yes, I almost forget, better get a can of wood filler. Even experts make a mistake now and then. If you doubt this, look around the doors and windows of new homes for sale. If it was not for wood filler the contractors would soon be out of work.

That's the basic items you will use. If you have a palm, or hand sander, so much the better. One word of caution--when using a vibrating hand or palm sander on edges of wood there is a tendency to 'round' the edges--something to be avoided when making butt joints. You can help eliminate this problem by clamping a piece of scrap wood on each side of the edge to be sanded. All three surfaces should, of course, be flush. This will give you a flat surface where it is desired while the scraps of wood get the rounded surfaces.

As we will use butt joints throughout, the key word is "Square." If the boards are not square, if the edges are not square, you are in trouble. This is not as difficult as it seems. A speaker



Rear view of the "Hallicrafters" speaker. Note grill material and flue strips for attaching the front grill or baffle.

cabinet consists of a base, a top, and two sides--plus the speaker grill. The base can be off a little and no one will know--so can the top--but the two sides must match. To make sure they do, nail the two sides together with two small wire brads. Make sure the edges match on at least ONE side. From this side, square and cut, or sand the other sides. When finished you will have two identical sides. Set the two sides, still nailed together, on edge on any flat surface. See if your sides are sitting perfectly vertical--in other words, square with the surface they are sitting on. If not, using a scrap piece of wood wrapped with sandpaper, dress down the edges until the boards are square. Carefully pry the sides apart, remove the wire brads and fill the holes with wood filler. Sure there is a better way--if you have a good table saw and a jointer.

Now with two identical sides, place them on the base and mark their position with a soft lead pencil. (Refer to photographs) Drill two pilot holes through the base and a short way into the sides--just enough to make sure the drywall screw starts where you want. Attach with screws but do not tighten too much--just snug. Check for squareness with base. I'm betting good money it will not be square. Mine seldom are. Not to worry at this point.

Now, attach the top--make sure the inside distance between the sides is the same at the top and bottom. Use small finish nails to attach top if the screw heads bother you. Personally, I think they look fine once they are flush with the wood surface. DO NOT attach tightly--just enough to make sure all surfaces are together.

Now, check for square again. If not square, apply pressure to spring the box into square. Hold in this position and nail a small scrap of plywood across the back to keep the sides square. Now, remove screws and apply wood glue to the top and bottom edges of the sides. Reassemble and tighten everything down firmly. Check for squareness again before the glue has time to setup.

Once this four-sided box is square and glued, we can cut the panel. Some cabinets seem to look better with a recessed grill, on others I use the grill flush with the edges--this is not a big decision. When placed inside, you will need a few glue blocks placed around the edge to secure the panel.

Recently, I have constructed several speakers where I 'borrowed' an idea from Hallicrafters and 'floated' a second grill a slight distance in front of the speaker grill. I use metal washers as spacers...

Now, here is the fun part. Once the

continued next page

panel has been cut to fit--either inside or flush across the outside--we need to cut a hole to let out the sound. If using a six inch speaker, the hole will be a little less than five inches--We have to allow for the mounting holes. Speakers used to come with templates, or at least drawings showing the dimensions. Few do today. So you better measure the speaker before cutting the hole.

Use your own ideas about the speaker grill. I find it helpful to start with a stack of scratch paper and work out a few sketches before getting serious about my final drawing. If you are using an initial and are not familiar with typefaces or fonts you can find a lot of ideas in magazines. If you own a computer you have it made.

Let your imagination soar--use your initial, CW (dots and dashes) or copy the logo of famous old companies. I recently made a small speaker for use with my Hallicrafters SX-100. While I was at it, I cut out grills for National and Hammarlund as well. I may need them some time. Are my grills perfect--not by a long shot but they are originals...no one else has one exactly like them.

Furthermore, my speakers are glued, screwed, and bolted. They do not vibrate, rattle or come apart at the seams--and they sound good.

About the back side and the inside. Sometimes I get ambitious and glue some deadening felt inside the cabinet--It looks good, but at reasonable room volume levels I really can't tell any difference. I have even made the enclosure airtight--air suspension yet. They sound good, but you better have plenty of audio to drive 'em. The efficiency of such enclosures is way, way low.

Most of the time I simply use a back cover with a bass reflex type slot. It sure don't hurt the sound, and it offers protection and adds to the appearance.

The final touch--add four padded feet to protect your prized antiques you might choose to set one of these speakers on. They are available in many sizes and types at home supply stores. For wood cabinets I like the metal feet that have a nice thick felt insert. Those feet will not mark anything.

When your cabinet is complete, do not get lazy and skip the final sanding. End up using a fine wet or dry sandpaper. I like to use a 150 or 200 grit paper until the wood feels good and smooth. Use the paper dry on the bare wood, and slightly dampened on painted or varnished surfaces. I recommend three coats of either. For your last rub down, go to a 3O steel wool. When using steel wool, make sure your speaker is removed--and covered well--before you start work. It's easy to get a bunch of steel dust between the voice coil and the magnet.

Recently, furniture stores have featured wood furniture finished half and half. That is, part of the piece is painted, while parts of the piece is stained and varnished. I tried the effect on a couple of speakers--I painted the sides with a Navy Blue Hammartone paint and stained the top, bottom, and front or floating grill an antique maple color. For these cabinets my last two coats were satin finish polyurethane varnish.

When sanding between coats, and for the final sanding keep in mind you are not trying to remove the paint--just smooth it up a bit. Gently--very gently--is the way to go.

I hesitate to mention products by name but if you really want your speaker cabinet to glow, give it a wax job with Kiwi shoe polish, neutral color wax. I have never found a furniture wax that is better. ER

Feel free to ask any questions you want...I'll try to answer them. My E-mail address is NR5Q@AOL.COM...If writing please enclose SASE.

Evolution of a Biography from page 7
book wrote me letters of appreciation and thanks. They gave me the courage to persevere until my edition was sold out. Then the Ham Radio Group Publishing Company in New Hampshire contacted me about bringing out a paperback edition. They offered me a royalty deal and promised marketing coverage. This arrangement continued for a number of years. Eventually it came to a close and even though I still got occasional requests from hams who had heard about HPM's biography, I was unable to accommodate them, as my supply had run out.

In 1996 my book (now over 20 years out of print) came to the attention of Barry Wiseman, editor/publisher of Electric Radio. He told me how much he liked the book and that he was interested in publishing a revised and expanded edition. I was delighted with his interest.

For the last two years I've been working on this new edition of the HPM biography. It contains all of HPM's T.O.M. columns from QST, all of his important writings that relate to amateur radio and some letters that have just recently come to light.

I think it is very fitting now, after a quarter of a century, for another edition, updated and enlarged, to come out so that a new generation of hams can learn about their founding father, and how much they owe to his genius, foresight and perseverance.

My son Pete continued his ham activities. As an Air Force sergeant, he was cited on Guam (KG6FAE operations) for providing holiday messages home for all who asked. As a civilian veteran, he attended Central Electronics Institute in Missouri. After operating his own business for a time, he became an electronics engineer, with several important patents to his credit in the area of image enhancement.

After years of activity, Pete is now located in Texas as AE7C. His hobby led to his career. He is on the air regularly from his car as his work takes him on long trips. He has received many public service awards. He has worked amateur satellites, and all modes of transmission, including TV. It has been a giant step from that SW-54 National and Heathkit DX-40, to the culmination of both a hobby and a career. All praise to Hiram Percy Maxim for starting and nurturing amateur radio. **ER**

RESTORATION TIP

I have just recently become the proud owner of two pieces of Johnson equipment, - A "Thunderbolt" amplifier and a "Ranger I" transmitter and am currently in the restoration mode. On both my pieces, the rubber stripping was missing or in real sad shape and I set out to find replacement material. After some searching a very suitable material was located at McMaster-Carr Supply Company who has an extensive catalog of hardware items, no minimum order value, takes credit card sales over the phone, and usually delivers next working day without additional fees.

They call this "Neoprene Rubber Edge Trim" and their catalog number is 8507K11 and the cost is $.39 per foot and can be found on page 2876 of their current book. They can be reached at (908) 329-3200.

I hope that this helps others with those finishing touches on those Rangers, Valiants, Navigators, etc.

Chuck Kembring, WB3LGG
kembring@epix.net

The R-390A RF Module...A New Approach

Jan Skirrow, VE7DJX
6508 Nevilane Dr.
Duncan, BC V9L 5S4
Canada
dma@islandnet.com

Working on the R-390A/URR is one of life's pleasures. It was designed and built to be repaired and for me that makes it a great Boatanchor. But I've been nervous of digging into the RF module--it's hard to get at and seems such a complex, almost mystical thing with all those moving gears and slug racks.

I recently bought a batch of the St. Julien's Creek radios, notorious for having been "stored" outside for a year prior to sale. They looked awful—front panels decorated with swipes of bright blue and black spraypaint and generally filthy. After removing the various modules, however, I decided that the radios had probably been in pretty good shape prior to their outdoor adventure, and should clean up and be restorable.

The worst mess was found in the RF modules. Old grease, now hardened and thoroughly mixed with sandy dirt, was everywhere in the complex mechanical assembly. Oily dirt covered many of the RF transformers, slug racks and metalwork. Luckily, the way R-390A modules are mounted on a central plate kept the insides of most of them pretty clean.

Some Boatanchor lore swears by the dishwasher approach to cleaning old radios. But I wasn't desperate enough yet to risk further damage to a classic. So out came the cleaning materials and several boxes of Q-tips and many hours later one deck was clean. Well, not really clean, but cleaner. There had to be a better way!

I'd noticed that the T207 cover (the first crystal oscillator transformer) could not be removed because of its location close under one of the cam shafts. Strange, given how accessible almost everything else is. I also noticed that the RF chassis had its own serial number, different from the one on the front of the mechanical assembly. One of my radios has a mechanical assembly and RF chassis from different manufacturers. Maybe these modules were intended to be separable. If the mechanical assembly could be removed as a single unit, cleaning and maintenance would be greatly simplified.

The manuals I have don't hint at this possibility, but despite my nervousness, it turned out to be quite simple. Photo 1 shows the separated mechanical assembly, all cleaned and ready for lubrication and reassembly. This operation isn't for the faint of heart, but it's not so difficult. What follows will be easier to understand if you have an RF module in front of you!

First remove the 2nd crystal oscillator chassis from the RF module as per the manual. Then remove the mechanical counter and all the slug racks. I use a dental pick to slip the springs on and off the racks. The plug-in transformers may not have to be removed, but do it anyway. The tabs that protrude slightly through the sides of the transformer cans stick out far enough that they can hang up on one of the cam shafts when the RF chassis is lifted away.

Remove the antenna trimmer shaft and the two 1/4-inch hex head bolts that fasten the antenna trimmer bracket to the mechanical assembly. On some

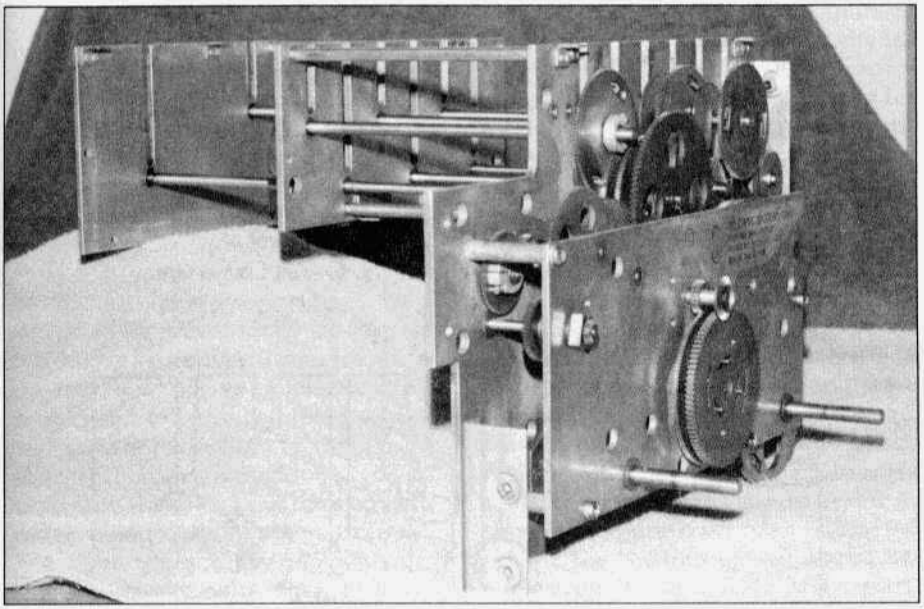


Photo 1. The separated mechanical assembly, all cleaned and ready for lubrication and reassembly.

units these may be Phillips screws. In Photo 1 the threaded holes for these bolts are in the upper left front, just below and to the right of the large antenna trimmer shaft hole.

There are two brackets that fasten the front one of the middle pair of vertical plates to the RF chassis. Remove the two Phillips screws that fasten these brackets to the chassis. The nuts are along the bottom of the large compartment, one just under the bandswitch and the other further right.

With the assembly turned upside down, loosen the collar on the bandswitch shaft gear and carefully slide the shaft towards the rear of the chassis until it clears the front panel. It may need a bit of persuasion, but be careful not to damage the bandswitch. Without the shaft in place, the gear and its collar just hang there, so remove them as well to prevent damage during later mechanical adjustment.

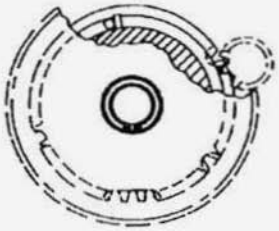
Remove the three 1/4-inch hex head bolts on the inside of the front lip of the RF chassis. These are easily seen in Photo 2 on the chassis lip at the top of the bandswitch. Then remove the three Phillips screws that fasten the rear plate to the rear of the RF chassis. In Photo 3, these are the single right and bottom two screws.

Be careful at this point, because there is nothing holding the assemblies together except friction. On the units I've disassembled, the fit is snug. It helps to loosen up the Phillips screw on the rear spacer rod.

One last thing may make separation difficult. The Megacycle Change has a detent spring that fastens with two Phillips screws. There is a clearance hole in the front lip of the RF chassis that allows one of these screws to stick through a bit. This is the hole on the right side of the front chassis lip. If the screw does extend through, it may hang up. Loosen this screw off through the access hole that is provided on the front plate of the mechanical assembly.

The main bandswitch gear has a shaft

continued next page



Intermittent Switch Drive
Viewed from Front

Gears Shown in
Loaded Position

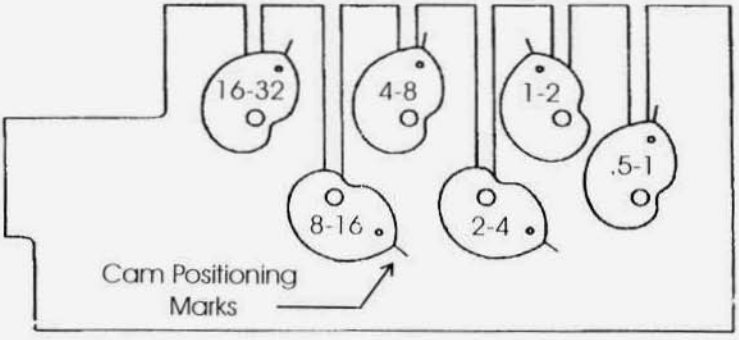


Figure 1. Cam & intermittent switch shown from front in 7+000 position.

sleeve that protrudes very slightly into the clearance hole left for it in the RF chassis lip. Make sure it doesn't slide backwards with the shaft, but keep it snug against the plate. If everything else is clear, it should now be possible to separate the two assemblies by gently easing the RF chassis upwards past the end of the shaft sleeve. It will be snug, but they should come apart with only gentle persuasion.

Now the mechanical assembly can be thoroughly cleaned using a strong degreaser. Don't be rough with it, as it is vulnerable to damage when separated. Once dry, any remaining grease can be removed easily with Q-tips or a cloth. The assembly should then be lubricated and checked for damage. The ones I've cleaned have all had mechanical problems such as missing screws, lockwashers, springs, spacers, broken shaft clamps etc. Anti-backlash gear loading may not exist in some split gears, and mechanical synchronization may be way off.

The slug racks should also be thoroughly cleaned and lubricated before reassembly. If the racks are really filthy, I remove the slugs from the racks to make it less likely that they will be damaged. Check each slug plate to be sure it is not missing the spring clip on the underside that applies friction to the tuning screw. Otherwise, get used to aligning the radio every time you bump it!

The RF chassis can also be cleaned easily. I've had RF deck problems due to corrosion on some of the plug-in transformer pins. I apply Deoxit to the pins and their sockets and disassemble each transformer to remove any residual dirt that's gotten inside. I also apply a tiny bit of Deoxit to the silver-plated ring that provides the rotor contact for

the trimmer capacitors. It is often corroded, and I've had alignment problems due to intermittent contact.

If you wish to check components in the RF chassis, this is the time to do it. The capacitors are rarely a problem, except for the brown tubular versions (some units will have had these replaced already). The resistors are often high in value, and some may need to be replaced.

Reassembly is essentially the reverse of the above procedure. Take care not to damage the rack springs. Nothing should need to be forced. Start all the screws and bolts, but don't tighten them until the RF chassis is positioned so that the main bandswitch shaft lines up with its sleeve and nothing seems strained. Then tighten them, starting with the front RF chassis bolts, then the rear screws, the middle screws and finally the antenna trimmer bracket bolts. The three bolts on the RF chassis lip can be difficult to start but all must be in place.

I have not suggested trying to preserve mechanical synchronization through this process. I'm not sure it's possible, and most of the decks I've worked on have been badly out of adjustment when I started. It didn't make sense to me to try to be careful about maintaining synchronization during disassembly.

Resynchronizing the main bandswitch, the second crystal oscillator switch shaft and the various camshafts is actually quite simple if you study the manual, use your common sense and don't panic! Almost everything can be set up independently.

This is how I've approached the problem. There may well be better ways, but this works for me. The challenge is to set the cam shafts to the positions shown in Figure 1 (none of the gears are shown in this drawing). The positioning marks on the 8-16 and 2-4 cams can be hard to see, but they are there! Photo 5 shows the RF module from the front with the counter removed. The three midsize gears lined up along the top are the 16-32, 4-8 and 1-2 MHz cam shafts respectively. The line of three gears under these (starting with the largest gear directly below the second slug rack slot) are the 8-16, 2-4 and 0.5-1 MHz cam shafts.

The only cam shaft that is not independently adjustable is the 8 to 16 MHz one, so start here. Loosen the shaft collar on the 16-32 MHz shaft and slide the gear back to disengage it from the 8-16 MHz shaft. Loosen the collar on the 4-8 shaft and slide it forward to disengage. Making sure that the Megacycle Change is firmly on a detent, set the 8-16 MHz shaft so that its cam is positioned as shown in Figure 1.

Now the frustrating part starts! Reengage the 4-8 and 16-32 MHz gears, being sure to provide a two tooth gear loading on the split gears. Once done, and checking that the 8-16 shaft has not changed position, set the 4-8 and 16-32 cams according to Figure 1 and tighten their collars. The remaining three cam shafts can be set by loosening each collar and setting the cam according to Figure 1. As long as the 8 - 16 MHz shaft doesn't shift, all of the other cam shafts can be adjusted to make up for any small errors in the process. Make sure the gear loading is maintained for the relevant split gears, and that nothing shifts until the next step is complete.

The intermittent switch drive assembly needs to be set according to Figure 1. The 8-16 MHz gear meshes with another gear assembly to its left. By loosening the collar on this shaft, the intermittent switch drive assembly can be set correctly. Now check that the camshafts and bandswitch gears all match the Figure 1 settings. Assuming you have removed the counter, set it to exactly 7+000 and reinstall.

All that remains to be done is to set the ten turn stops on the Kilocycle and Megacycle Change shafts. Turn the

continued next page

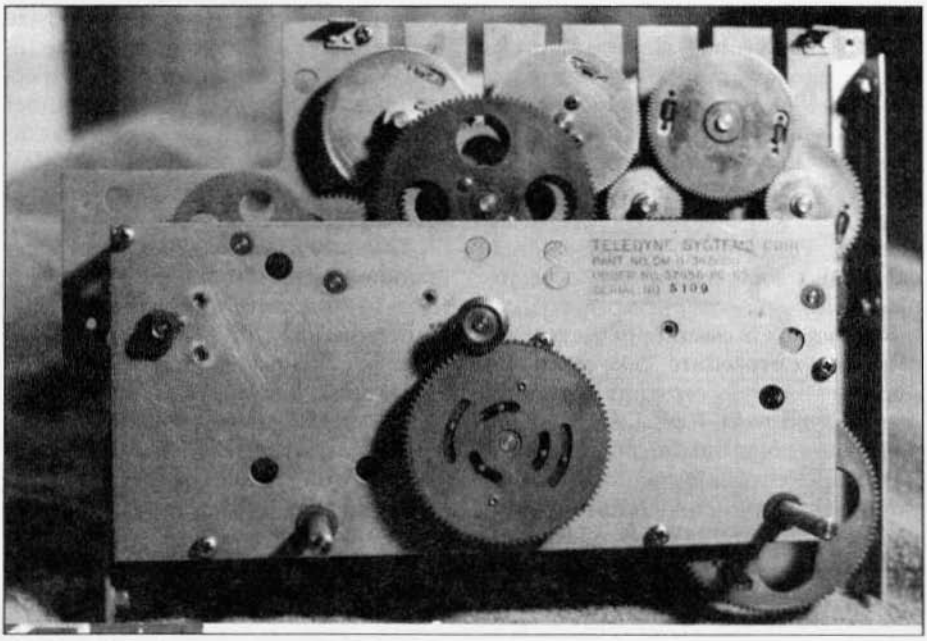


Photo 2. The large gear and dial lock on the Kilocycle Change shaft has been removed.

Megacycle Change shaft until the MHz counter shows 0. Then loosen the Megacycle Change shaft collar and turn the shaft only until it is against the lower limit of the ten turn stop. Rotate the shaft back a quarter turn or so and tighten the collar.

In Photo 2 the large gear and dial lock plate on the Kilocycle Change shaft has been removed. Turn the clutch assembly that meshes with it by hand until the kilocycle counter shows about -980. Turn the Kilocycle Change shaft until it is against the lower limit of the ten turn stop. Reinstall the gear and locking plate assembly on the Kilocycle Change shaft and tighten the collar.

At this point, the cam shafts should be in the Figure 1 positions at 7+000, and both Change knobs should be able to cover their full range. If the bandswitch gear and its collar were removed earlier, replace them now. With the counter set at 7+000, the bandswitch shaft should be slid forward into its collar. The manual instructions can now be followed to set the bandswitch and 2nd crystal oscillator shafts correctly before tightening their respective collars. It's useful to Deoxit both switches at this stage.

When you're done, and you've recovered your sense of equanimity, you should have a sparkling clean RF deck that you can tune with your pinkie! **ER**

A complete index of the entire 9+ years of ER is available for viewing or downloading at the following website:
http://www.qsl.net/n9oo

AMI Update from page 3

and an erroneous, but common chain of thinking points to AM as a problem because it is a wider emission. This can lead to pressure to phase it out as obsolete. In addition, if a large number of amateurs are introduced to the lower frequencies based on lowered licensing requirements, it will lower operating standards as well. This will affect the quality of amateur radio operations for all amateurs. The FCC has failed to enforce the regulations with the current amateur population. How will they deal with a higher violation rate on more crowded bands?

This issue will likely be decided based on the comment volume received by the FCC in response to this NPRM. Hopefully every reader of this magazine whether an AM operator or not will agree that this NPRM is not moving in the right direction. I hope each one will submit comments. Comments may be filed on or before Dec. 1, 1998. I think it is important to call for the retention of the 5 wpm entry level CW license and a 13 wpm minimum code requirement for a phone license for general low frequency privileges. I also recommend the FCC prescribe the CW test method that VE organizations use and that it be a solid minute of copy out of five minutes sent. Your comments do not have to be lengthy. They should also be right to the point. I don't believe it does any good to scold or accuse the FCC. It may make you feel better, but it could cause them to ignore your more worthwhile comments. A page is as good as a book when the FCC is counting comments.

Talk to your friends and your club members. Everyone stands to lose. Even Technician Plus license holders. If they don't put the extra work in to get the low band privileges they will never have that extra measure of enjoyment of having worked hard for it and making the grade. Opposition to the NPRM does not display prejudice against anyone. Everyone has the opportunity to earn an amateur radio license the same way you did.

Comments can be filed via the Internet at http://www.fcc.gov/e-file/ecfs.html. This site will accept file transfers and/or brief typed in comments. Instructions for e-mail submissions can be obtained by sending mail to ecfs@fcc.gov. Include the following in the body of your message "get form <your e-mail address>." A sample form and directions will be sent in reply. Hard copy comments must be filed with the original and four copies. Filings must be sent to Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, 1919 M St. N.W. Room 222, Washington, DC 20554. In each case refer to Proceeding or Docket No. 98-143. ER

Eldico SSB-100 from page 25

grown up, left home (change the locks!) and two of them have 3 children of their own. We moved from the house in Emmaus to one in Columbus, Ohio and finally to our present New Mexico home in the shadows of the Sandia Mountains. And the SSB-100, recently resurrected from its attic resting place, with its resident NM mouse evicted, cleaned up quickly and went back on the air yet a second time with little trouble. Gee, I've had a wonderful time being a radio ham! ER

1 - "The Beginnings of Amateur Single Sideband," Hanlon, ER Aug. 1998, pp 20 & ff.

Letters from page 15
holder to a Class C (General) without a written test and the 12 WPM code test for anyone wanting to become a Class A License Operator (Extra Class) from 20 WPM is a slap in the face to those who have earned it. How many of you at ARRL remember what happened to the 11 Meter band when the FCC dropped licensing altogether? Well I think a lot of these people will pass the written and the 5 WPM test. Then they will be able to use the expensive amateur radio equipment they already have on the General portions of the band. We have more of this type of 11 Meter operation going on the bands today than at any time in the past. The language, the jamming, and lack of any courtesy is the rule rather than the exception today. I can only image what it will be like if ARRL's proposal goes into effect. The FCC cannot handle the flagrant violations that go on daily because of the lake of staff due to funding. What do you think it will be if we open the bands up to more of these types of operators? I have met and tried to help some of these bad operators who memorized and passed the current exams, and yes some were Extra Class Licensees who had no idea what or how the equipment they bought even worked. What I found was that they were for the most part very intelligent people in other fields that needed a "elmer" who could bring them up to speed with a little technical and hands-on training.

I think silent keys like Barry Goldwater, K7UGA and Fred Link, W2ALU who gave so much to Ham Radio and electronics in general would roll over in their graves if they heard what is being proposed. So I think out of respect for people like Barry and Fred, the Board needs to give a lot more thought to what they are proposing. Let's keep our hobby a step above all of the other hobbies and not give our privileges away. Propose something that will still require a little effort. If the current proposal is to help the manufactures sell more equipment, that ARRL will increase its membership and we want to turn our "ham bands" into another 11 meter band, then go for it, because that is where we will be heading.

I thank you for your time and consideration and please accept my apologies for this long letter but I felt I had to say something on behalf of a "Hobby" that I owe a lot to. Thanks for the memories. **73, John, W8DKI**

Resurrecting The Bug from page 28
heavy iron mass, solid and stable, but not too conductive. The solution to this problem is easy. Just use copper jumper wires where necessary directly between the dit or dah contact posts and the Bug's terminals. This can be done easily without damaging the Bug's integrity. Most Bugs were assembled with screws into threaded holes or into nuts. My Vibroplex, which I purchased new back around 1950, shows only one soldered connection: the dot contact screw to the vibrating arm. Lugged copper jumper leads can be placed under the proper screws and tightened, and the problem disappears.

Many old mechanical Bugs out there still await a home with a respectful nostalgist who's willing to help them sing again in their own way. Whether resurrected from a swap meet, or from a forgotten junk box, the mechanical Bug will prove to be a loyal companion to a skilled and understanding master. If you own or acquire one of these antique devices, think about maybe running some CW with it on the air. If it's adjusted correctly, it can be a direct extension of its user's mind and skill. It contains no electrical support, no computer programs—nothing to play tricks on the user, beginning or advanced. It is a simple servant. But it is also a basic tool in the history of radio communication. **ER**

CLASSIFIEDS

Advertising Information

Subscribers receive 1 free - 20 word- ad per month. **Extra words are .20.** 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 20 words send payment for the extra words.**

Non-subscribers: $3 minimum for each ad (up to 20 words). Each additional word is .25. **Please call or write for display rates.**

VINTAGE EQUIPMENT ONLY

ER
14643 Road G
Cortez, CO 81321-9575

Phone/FAX (970) 564-9185
e-mail: er@frontier.net

DEADLINE for the OCTOBER Issue: OCTOBER 1

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

FOR SALE: "AM FOREVER" quality Haynes T-shirts, grey, blue, green & red. Sizes M, L, XL - $15 shpd. Rick, K8MLV/Ø, 1802 W. 17th St., Pueblo, CO 81003. (719) 543-2459

FOR SALE: R-390A Orig. Maint. Manual,TM11-5820-358-35,189 pgs - $28 incl. Dom Priority Mail. Aben, POB 4118, Jersey City, NJ 07304. avidov@aol.com

FOR SALE: Radio books, magazines, catalogs, manuals (copies), radios, hifi, parts. Send 2 stamp LSASE. David Crowell, KA1EDP, 40 Briarwood Rd., North Scituate, RI 02857-2805. aq253@osfn.org

FOR SALE: Western Electric 715A tube w/socket - $45, 705A - $8; Heath HW101/PS, like new - $165; Bernie Doermann, WA6HDY, 300 James Way, Arroyo Grande, CA 93420. (805) 481-6558.

FOR SALE: Heathkit HX-10 Marauder, very good, matching mic, HD-10 keyer, SB-300 very good. Bill, K4AJ, VA. (540) 989-2081, 6-9 PM, dotdashs@roava.net

FOR SALE: Collins 32V3 - $500; National HRO50T1, A-F+AA coils, calibrator, spkr - $500. Both exc, working. Steve Scott, KI3W, 712 Pine Hill Rd., Lititz, PA 17543. (717) 626-0991.

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 20176. (540) 822-5643.

FOR SALE: Hallicrafters, RME, Gonset, others. Also some military, test equipment, VHF/RF amps, more. LASE, Don Jeffrey, POB 1164, Monrovia, CA 91017.

FOR SALE: Tubes, Penta Labs, 811A- $20.; 572B- $55.; 3-500Z- $170.; ZG also avail.(these are Amer. made); NOS 811A- $35.. Many other US NOS. VISA/MC. Dee, W4PNT, VA (540) 249-3161, soundnmind@rica.net

FOR SALE: Heathkit Warrior - $400; Apache - $250, both beautiful condx. **WANTED:** C- Line. Bob Ryals, KI0GF, 3390 Blodgett Dr., Colorado Springs, CO 80919. (719) 265-9950, rryals@pcisys.net

FOR SALE: Collins 32S1/75S1 in exc shape - $600; 75S3 w/ CW filter - $435, both w/ manuals. Fred W6YM, CA, (209) 296-5990, fhonnold@juno.com

FOR SALE: 51J4 (NW); 75A2 (NW); HRO-60, 4 coils, spkr; RACAL RA-17, 3 Transoceanics (NW); Yaesu FTDX-560. Carter, VA, (804) 979 7383.

FOR SALE: UTC CVM4 , 300 W .813 modulator deck - $350. Don, NY, (914) 739-5843, WA2EWI%JUNO.COM

Vintage Manuals Available
Step way up to the finest replicated and original vintage manuals available. Get new Catalog 7, three $.32 stamps. Pete Markavage, **The Manual Man**, 27 Walling St., Sayreville, NJ 08872. (732) 238-8964, manualman@juno.com

WANTED: QST, CQ, Radio Craft & Radio News magazines, 30s, 40s, 50s. Advise price + shpg. Beni Fernandez, KP4DN, 1674 Atlas St., Summit Hills, PR 00920.

WANTED: Collins - Amateur catalogs, sales literature, manuals, promotional items & Signals. Richard Coyne, POB 2000-200, Mission Viejo, CA 92690.

WANTED: Howard radios of any type. Andy Howard, WA4KCY, 105 Sweet Bay Ln, Carrollton, GA 30116. wa4kcy@usa.net

WANTED: E. F. Johnson Co. HAMALOGs, unusual photos and information 1923-70. Bruce Hering, 41120 State Highway 13, Waseca, MN 56093. (507) 835-5619. bhering@efjohnson.com

WANTED: Homebrew xmtrs and rcvrs or parts, working or not. George, N1TNQ, (401) 724-5516

WANTED: Top dollar paid for Winchester Radios and Winchester related items. Donald Daggett, 122 Hall Rd., Grahamsville, NY 12740. (914) 985-7249, wc2e@webtv.com

WANTED: German W.W.2. military radio/avionics gear. Clandestine sets all periods. Cash or swap. Rag Otterstad OZ8RO. Hosterkobvej 10. DK 3460 Birkerod, Denmark, otterstad@inet.uni2.dk

WANTED: Specs, circuits, or other info on 6BN6 gated beam tube. David Ringo, WD6AF, 199 Brookside Dr., Portola Valley, CA 94028. maggihouse@aol.com

WANTED: Owners of the John Leary, W9WHM, re-engineered Hammarlund SP-600 rcvr, seeking info and serial number of rcvr. Bill Mills, KC4AA, (912) 452-2957, wmills@gmc.cc.ga.us.

WANTED: Galaxy V accessories (F-3, DAC-35, SC-1, RV-1, etc); cabinet for 600L. Tom Hoitenga, K8NGV, GA, (770) 426-8682, hoitenga@bellsouth.net

WANTED: HRO-5 coils J (50-100 kc) and H (100-200 kc), wood coil box, misc HRO-5 stuff. Don, (616) 541-9874, fsmv34a@prodigy.com

WANTED: Large turnbuckles for tower guys; AM6154; ARC-2 rack. John Freeman, POB 1773, Pinehurst, NC 28370.

WANTED: Heath DX-35 xmtr in restorable condx. Hoyt E. Ray, WD4GUA, 2388 Hwy 36 E, Milner, GA 30257.

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

WANTED: Vintage AM equipment for personal use, must be collector quality or mint. Prefer Collins, will consider others. Bob Tapper, K1YJK, 5 Polo Club Dr., Denver, CO 80209-3309. (303) 740-2272, FAX 777-6491

WANTED: Collins 310A-1 &/or 310A-3, any condx; 30J, 30K-(any); 302C-1, 312A-1. **FOR SALE:** SC-101 lamp hoods & grills. Butch, KØBS, MN, (507) 282-2141

WANTED: HeathGear, unassembled kits, catalogs and manuals. Bill Robbins, 5339 Chickadee Dr., Kalamazoo, MI 49009. (616) 375-7978, billrobbs@net-link.net

WANTED: Books by Thomas Adams published by Howard W. Sams in the Basic Electronic Series, circa 1961. Dan Langston, KO4RA, (912) 453-9066, danman@accucomm.net

WANTED: Historical info on development of 12AT7, 12AU7 and 12AX7. Which of these was first, when, production info, etc. Tech info not needed. Kurt Miska, 3488 Wagner Woods Ct., Ann Arbor, MI 48103. (248) 641-0044 (w), Fax 641-1718, khm@tir.com

WANTED: Variometers. Steve Gross, W9OJI, 602 W. First St., Mt. Morris, IL 61054. (815) 734-4255

WANTED: UTC LS-47X audio xfmr. James Owens, NWØO, 1363 Tipperary St., RR#3, Boulder, CO 80303-1621. (303) 673-9019

WANTED: Restoring TBY-2. Need headset, antenna sections, cables, transmit power receptacle. Joseph W. Pinner, KC5IJD, 201 Ruthwood Dr., Lafayette, LA 70503. kc5ijd@sprintmail.com

WANTED: Supreme AF100 or Temco 75GA post WWII desktop xmitters. Robert Perlstein, W1IV, POB 642, Old Orchard Beach ME 04064. (207) 934-9206 , perls@compuserve.com

WANTED: Call-letter automobile lincense plates for collection, will repay you for postage. Thanks, Marvin 2957 Gaffney Rd., Richmond,VA 23237. (804) 275-1252, wa4toj@juno.com

WANTED: Operating instructions/manual for CV-591A. Also, Hammarlund HK-1B electronic keyer and SPC-10. Ed, N5BFW, TX, (817) 222-5355 days, ecuevas@juno.com

WANTED: Tuning knob for BC-375 or BC-191 rotary inductor. Needed for restoration project. WAØNUH, CO, (970) 493-5543 or wa0nuh@juno.com

WANTED: Meter for Hallicrafters HT-32A or B. Will buy entire xmtr if necessary. Ron Henderson, K3NFS, Rd1 Box 201A, Perryopolis, PA 15473. (724) 736-0944

FOR SALE: Genuine new surplus: Unused R-390A cabinets #CY-979A/URR w/shock supports and misc hardware package - $305; top and bottom cover sets - $75. Mac McCullough, TX, (214) 324-4849, Fax - 324-4844

FOR SALE: Hallicrafter's manuals, copies starting at $5, some Johnson, WRL, others. SASE for list. DSM Diversified, 909 Walnut St., Erie, PA 16502.

FOR SALE: Vintage radio owners, retire the variac, new solid state SofStart available SASE. Rick Paradise, KE4OCO, 515 Wood Forest Ct. NE, Marietta, GA 30066-3519.

FOR SALE: National RCK rcvr, no ident plate, works, w/manual and other info - $100 plus shpg. Dennis, KE0QM, KS, (913) 782-9092, wbfim@sound.net

FOR SALE: Ranger I, exc, manual (copy) - $200 plus shpg. Call after September 20th. Carleton T. Rand, W1PZI, 85 Black Hall Rd., Epsom, NH 03234. (603) 736-9695.

FOR SALE: The super-long K7FF Super-List has even more amateur super-parts and super-stuff (some vintage) than ever. Get the Super-List by e-mail by request at <k7ff@inreach.com>. Derek, K7FF.

FOR SALE: Ameco 6M converter model CN (Nuvistor), model CB6 (tube), Model PS1 supply - $20 each, all $50 postpaid. Dave, W1DWZ, MA, (508) 378-3619, w1dwz@AOL.com

FOR SALE: SX88 - $975 + shpg. Ed Sauer, KC9SP, 787 N.Peterman Rd., Greenwood, IN 46142. (317) 881-1483.

FOR SALE: Nice Heath IG-82 sine-sq wave generator w/book; military LM-13 freq. meter w/book. Fred Clinger, OH, (419) 468-6117 after 6 PM EST.

FOR SALE: Interference Measuring Set NM-20B by Stoddart Electro Systems, w/90780-2 pwr sply & pwr cables, no antennas or manual, exc condx - $170 + shpg; Interference & Intensity Meter NM-22A, covers 15 to 30 MHz, horizontal rack-mount, no pwr sply, manual or cables, good condx - $70 + shpg; similar set by Singer as made for Air Force, w/manual, pwr cord & extra tuning unit but w/out antennas - $180 + shpg. Bob Simpson, NØNTC, 9570 Haney Dr., Houston, MO 65483. nØntc@train.missouri.org

FOR SALE: NC-400, collector quality! See it's photo in ER#76, Aug '95, extremely rare - $2200 firm; BK Precision (HAMAG) 2625 spectrum analyser 400kc-1gHz, like new, w/box & all manuals - $1600; (Replacing with a Tek 492). P. Jay Spivack, N7JDT, 325 S. Washington Ave. # 244, Kent, WA 98031. (253) 859-2680 or pjpilot@aol.com

FOR SALE: HQ-120X, HX-10 Marauder - $145; GPR-90 & spkr - $600. PU Phoenix, AZ. W7RBF, AZ, (602) 864-9987.

FOR SALE: WACO-5NWX telephone filters. Just plug in. 1/$13.95, 2/$25, 3/$34. Money back. Cecil Palmer, 4500 Timbercrest Ln., Waco, TX 76705. (817) 799-5931, w5nwx@juno.com

FOR TRADE: Two good RCA 833As for one Taylor 833A; also looking for Taylor 803, 813, 875A. John H. Walker, Jr., 16112 W. 125th St., Olathe, KS 66062. (913) 782-6455, jh.walker@alliedsignal.com

FOR SALE: Join SPAM, the society for the promotion of AM. Lifetime certificate $1, SASE. W4CJL, 202 Baker Dr., Florence, AL 35630.

ANNOUNCEMENT: Sept 23-27 - Hope, AR, "Sentimental Journey to Southwestern Proving Ground" includes a Warbird Airshow and a get-together show-&-tell for military radio collectors. Info: Jim Haynes, 1535 W. Cleveland, Fayetteville, AR 72701. (501) 443-9339, jhaynes@alumni.uark.edu

FOR SALE: British WW2 Telegraph key, No.2 MKIII - $25 + shpg. George Rancourt, K1ANX, MA, (413) 527-4304.

FOR SALE: Galena xtal radios parts & free info on how to make your own. L. Gardner, 458 Two Mile Creek Rd., Tonawanda, NY 14150. (716) 873-0447

FOR SALE: Old scvrs: Heath, MWW-14A, very good - $25; KAAR-37 - $18; Apelco AE 16M - $18, w/2+4 Mc xtals, 6 or 12 volt sply - all for $45. Mervyn Ellsworth, 2309 N. 25th St., Boise, ID 83702. (208) 345-6878

FOR SALE: Nearly mint Collins 75A4, serial# 3144, gear reduction knob, two filters - $1300, firm; also, TMC 1kw linear w/spare PL172 tube, excellent commercial quality construction, less pwr sply - $500 or will consider trade. P. Jay Spivack, 325 S. Washington Ave. # 244, Kent, WA 98032. (253) 859-2680 or pjpilot@aol.com

FOR SALE: Collins 30L1 owners new Cetron 811A's - $19; 32V owners Raytheon 4D32 - $19; major credit cards accepted. Don, W4GIT, FL, (352) 475-3306.

FOR SALE: NC-300 w/calibrator & spkr - $300; SR-160, works - $150; parts unit - $75; (2) QF-1 Q-mult - $35 ea; RME-4350 - $150; SB-33 w/DC sply - $175; HQ-170A - $250; Swan pwr sply - $50. All + shpg. Ken, K8TFD, MI, (734) 522-8645

FOR SALE: Heath TX-1 Apache xmtr, very good condx - $200. Robert Braza, N1PRS, 23 Harvard St., Pawtucket, RI 02860. (401) 723-1603

FOR SALE: Signal Corps BX-4 battery box from SCR 178/179, equipment clean, holes - $20, includes shpg. Louis L. D'Antuono, 8802 Ridge Blvd., Brooklyn, NY 11209. (718) 748-9612

FOR SALE/TRADE: Manuals for B&W, Elmac, Gonset, Heath, RME, Conar, B&K, Harvey Wells, Morrow. NI4Q, POB 690098, Orlando, FL 32869-0098. (407) 351-5536 or ni4q@juno.com

ELECTRON TUBES FREE Catalog, over 2,000 types in stock. **Electron Tube Enterprises,** Box 8311, Essex, VT 05451. (802) 879-1844, FAX (802) 879-7764

FOR SALE: T-Shirts w/Johnson Viking logo - $15, state size. Viking Radio Amateur Radio Society, POB 3, Waseca, MN 56093.

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

FOR SALE: Strong steatite antenna insulators. Lengths from two to fifteen inches. SASE for list. John Etter, W2ER, 16 Fairline Dr., East Quogue, NY 11942. (516) 653-5350

FOR SALE: Dial/clock covers. Send bezel, old or drawing, make/model, guaranteed satisfaction - $10 ppd. William P. Turner, WAØABL, 1117 Pike St., St. Charles, MO 63301. (314) 949-2210

FOR SALE: Free info on many topics related to vintage amateur radio equipment & operations at http://www.mnsinc.com/bry/hamlynx.htm Everyone welcome. Brian Carling, G3XLQ/AF4K

FOR SALE: New Ranger I, Valiant I & Navigator plaster dials, 160-10 freq no's in green, w/all holes like orig - $17.50 ppd. Bruce Kryder, 4003 Laurawood Ln., Franklin, TN 37067. (615) 794-9692

FOR SALE: Collins meatball lapel pin - $5.95 + $.75S&H. George Pugsley, W6ZZ, 1362 Via Rancho Prky, Escondido, CA 92029

FOR SALE: RME 69, exceptional, man copy, non-orig spkr - $195; NC183D, spkr, man, scratches on lid, otherwise perfect - $325; 75A4, works good, scratches on lid, 2 filters - $600; NC173, spkr, man, scratches on lid otherwise perfect - $195; SX99, man, near perfect - $125; NC300, spkr, man, works well, calibrator, some dings & wrong RF knob - $150; SP600JX-17, in big grey non-orig cabinet, works exc, man - $225; Yaesu FT501 w/matching PS/spkr, man, rec great, xmtr very low output - $200. All + UPS. Dick Dixon, W7QZO, 16032 Lost Coyote Ln., Mitchell, OR 97750. (541) 462-3078

FOR SALE: Heath CP05, HD16, (2) HD1416, HD1416A - $15 ea; R.S. DX 150 rcvr - $49. + shpg. H. Mohr, W3NCX, 1005 W. Wyoming, Allentown, PA 18103.

FOR SALE: Hammarlund HQ150 - $285; Heath W-16, exc - $125; VF-1 - $60; Hallicrafters plug-in calibrator - $50; HT-40, exc - $125; Gonset 2 mtrs, needs work - $30. Free List. Richard Prester, 131 Ridge Rd., W. Milford, NJ 07480. (973) 728-2454

FOR SALE: Magazines, manuals, surplus books, some surplus xfmrs, & other parts. Call your needs. Vic Edmondson, W4MYF, RT 1 Box 2599, Lee, FL, 32059. (904) 971-5580

FOR SALE: Collins 516F-2 bias mod, parts/instr - $12, ppd/US. Cory, N2AQS, 1000 E 14th/178, Plano, TX 75074-6249. hinec@ccgate.dl.nec.com

MESSAGE: Flyer 198. For details send 2-stamp LSASE to: Olde Tyme Radio Company, 2445 Lyttonsville Rd. Suite 317, Silver Spring, MD 20910.

FOR SALE: Sell/Buy/Wanted/Trade: Vintage equip at the "K8CX Ham Gallery." http://paradox2010.com/ham/ a free service.

FOR SALE/TRADE: Transmitting/rcv'g tubes, new & used - 55¢ LSASE for list. I collect old & unique tubes of any type. **WANTED:** Taylor & Heintz-Kaufman types & large tubes from the old Eimac line, 152T thru 2000T for display. John H. Walker Jr., 16112 W. 125th St., Olathe, KS 66062. (913) 782-6455 or johnh.walker@alliedsignal.com

FOR SALE: FT101E - $125; HT37 - $100; both GC & working. 1 pack, U shp. Thomas N. Berbari, 870 Wales Ave. NE, Massillon, OH 44646.

FOR SALE: DX-40 xmtr es VF-1, VFO - $50 for both + shpg. Bill, TN, (931) 433-7453.

FOR SALE: Collins: 75S3; 32SI; 312B4; 516F2; 180S1 antenna tuner; almost mint 32SI front panel; Vibroplex bug. Bill Coolahan, 1450 Miami Dr. NE, Cedar Rapids, IA 52402-2933. (319) 393-8075

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

FOR SALE: Motorola type antenna plugs - $1 ea; Powerstat var.auto xfmr, 240V in at 2.25A, like new - $20; SW-3 coil forms - $7.50 ea; Pilot Super Wasp coil forms - $6.50 ea; 4, 5, 6, or octal coil forms - $6 ea. All above + shpg. James Fred, 5355 S. 275 W, Cutler, IN 46920. (765) 268-2214

FOR SALE: Two Selsen motors, 120 VAC - make offer; Toroid coils, hermetically sealed - $3 ea. Frank S. Law, W8SET, 1 Wildacre Rd., Charleston, WV 25314. (304) 343-0415

FOR SALE: HT37 - $175; KWM2/516F2, very good condx - $675; SB400 - $150; SB300 - $195; SB102 w/cw - $375. Cliff, AI7Y, POB 1233, Goldendale, WA 98620. (509) 493-8203

FOR SALE: Communications, military & test equipment. Send long SASE for revised list w/lots of new items. No sales until you have received my list. Ray Chase, 1350 Marlborough Ave., Plainfield, NJ 07060. (908) 757-9741

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

FREE SAMPLE: Transistor Network Magazine for collectors of regular & novelty transistor radios, & related items. Articles & ads. Subscribers get a free 50-word ad monthly. Subscription: $17 (US); $28 (Canadian); $36 (Foreign). POB 43, Live Oak, FL 32064-0043. Visit our Web Site at: http:www.suwanneevalley.net/~rmorison/

FOR SALE: Military and commercial communications items: www.maxpages.com/murphyjunk. For up to date lists: murphy@cfcs.com. Mike Murphy's Surplus, 401 N. Johnson Ave., El Cajon, CA 92020. (619) 444-7717

FOR SALE: 72 issues QST, 1930 thru 1935 - $250 gets them to you via UPS. Clarence Filley, W7KE, 1109 S. 2nd St., Hamilton, MT 59840. (406) 363-1946

FOR SALE: NOS Heathkit front panels VF-1 - $10; SB-10 - $18; HW12-22-32 - $15; HW12-22-32 dials - $8 ea; DX35, DX40 front panels (some scratches) - $8 ea; Galaxy 300 front panel - $18; Hallicrafters S53 & A dial glass- $10. + shpg. Boyd, K0LGG, NE, (402) 551-3085.

FOR SALE: New KWM II square mtr 0-400 mA + S units - $40; Collins ant relay R-83 - $35. Joe, W6CAS, CA, (916) 731-8261.

FOR SALE: Collins 51J series drum overlay - $10 ea, specify which. Ron Hankins, KK4PK, 555 Seminole Woods Blvd., Geneva, FL 32732. (407) 349-9150

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

FOR SALE: R-390A Repro nameplates - $9 shpd. N5OFF, 111 Destiny, Lafayette, LA 70506. trinit696@idt.net, (318) 989-3430

FOR SALE: Ameco TX-86 - $45; J-37 key - $30; Heath AC-1 tuner - $85; 1956 Handbook - $22. Larry Wright, N4QY, 170 Heritage Ln., Salisbury, NC 28147. (704) 633-3881

MESSAGE: Would the gentleman who called from Florida in response to my Sept ad for CRI xtals please call again. Phone number was copied wrong. Thank you. Robert Martin, 111 Bancroft Dr., Rochester, NY 14616. (716) 663-4182

FOR SALE: Pamona high voltage meter-probe - $15. **WANTED:** Manuals: TS413, Olson KB147, Sams CB11. Bill, KE7KK, 6712 Lake Dr., Grand Forks, ND 58201. (701) 772-6531

FOR SALE: Power sply for your big military gear & dynamotor run xmtrs; PP-1104 24V@50A 12V@100A NIB - $185, PU northern CA. Henry Engstrom, POB 5846, Santa Rosa, CA 95402. (707) 544-5179 ph/fx

TONY'S LIST AT LAST!!

Tony Snider has finally compiled his complete list of vintage/military gear.

The list can be accessed at the webpage below. Just click on the button that says "online classified". It has "Marine", "Communications" and "Test Equipment" sections. It will be updated every 2 weeks with new items and people can sign up for a e-mail update right on the page.

http://www.meob.com

WANTED: Hallicrafters Village/Hamlet radios TR-5/TR-20 & Gonset Civil Defense 6m radios/accessories, manuals also. Daniel Cahn, 3444 Greenwood Ave., Los Angeles, CA 90066. Fx/msg (310) 398-7159 or danielc411@aol.com

WANTED: Japanese WW2 Chi 4 radio plugin coils. Yes, Chi 4 not Chi Ichi. Stan, JA1DNQ fwgf8431@mb.infoweb.or.jp

WANTED: Command sets ART-13's; Collins radios & all accessories top $ paid; most radios repaired reasonable. FCC licensed. W1DEJ, MA, (781) 485-1414 eves, hobfact@tiac.net

WANTED: ARC type 12 control units C-44, C-53, C-56, 2 foot mechanical link cable. David Boardman, 10 Lemaistre, Sainte-Foy, Quebec G2G 1B4. Canada. (418) 877-1316

WANTED: Pwr sply for ART- 13 or set of connectors; Johnson VFO. M. Romero, KR4VM, 4508 S. Gilead Way, SLC, UT 84124. (801) 424-2461

WANTED: EV638, 641, 605; Shure 520/707/CR41, CR88, 705; Turner VT-73; Astatic UT-48, JT-30/40, T-3. Tom Ellis, Box 140093, Dallas, TX 75214. (214) 328-3225 or tomsmics@flexcomp.com

WANTED: Electrical connectors, military MS type (olive drab color), unused, any quantity. **FOR SALE:** Tubes of all kinds, Send SASE for list. Typetronics, POB 8873, Ft. Lauderdale, FL 33310-8873. (954) 583-1340, Fx 583-0777

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

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

WANTED: Military survival communications equip: radios, beacons, manuals, books, historical info/photos. Daniel Cahn, 3444 Greenwood Ave., Los Angeles, CA 90066. (310) 398-7159, danielc411@aol.com

WANTED: Any military entertainment radio (Morale rcvr), manuals, accessories, or data plates. Henry Engstrom, KD6KWH, POB 5846, Santa Rosa, CA 95402. ph/fx (707) 544-5179

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

WANTED: WW II Japanese, German, Italian radios & communication equip for display in intelligence museum. LTC William L. Howard, 219 Harborview Ln., Largo, FL 33770. (813) 585-7756, wlhoward@gte.net

WANTED: Copy of MIL-T-27A spec, RCA, Gates, Langevin B'cast gear. R. Robinson, 868 S. Main St., Plantsville, CT 06479. (860) 276-8763, richmix@erols.com

WANTED: RCA 140, 141, AVR5A. GE K80, K80X, K85. Any condx. James Treherne, 11909 Chapel Rd., Clifton, VA 20124. treherne@erols.com

WANTED: Broadcast gear; tube or solid-state, compressors, limiters, equalizers, microphones, consoles, micpreamps, recorders. Mike States, Box 81485, Fairbanks, AK 99708. (907) 456-3419 ph/fax or mstates@polarnet.com

WANTED: National HRO 500 & LF10; Hammarlund SP600-JX21A; Johnson AN/FRT-505. Ric, C6ANI, POB N4106, Nassau NP, Bahamas.

WANTED: Drake 1A spkr (1AS) & Kenwood R599 spkr (S599). Pay reasonable price. San, K5YY, AR, (501) 756-5010, weekends only.

WANTED: Vibroplex Zephyr bug; Collins 4A or pre-war xmtr. Brian Roberts, K9VKY, 130 Tara Dr., Fombell, PA 16123. (724) 758-2688

WANTED: E.H. Scott Philharmonic rcvr. EA4JL, Contact in the States, Kurt Keller, CT, (203) 431-6850.

WANTED: WW-2 Japanese military radio of any kind. Takashi Doi, 1-21-4 Minamidai, Seyaku, Yokohama, 246 Japan. Fax 011-8145-301-8069 or taka-doi@kk.iijtu.or.jp

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

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

WANTED: Test equipment & tube audio amplifiers. Mike Nowlen, WB4UKB, 2212 Burgee Ct., Reston, VA 20191. mike@3dnet.com

WANTED: McKay Dymek radio literature & info. Gene Peroni, KA6NNR, POB 58003, Philadelphia, PA 19102. (215) 665-6182.

WANTED: Collector/builder seeks lge & small vacuum tubes & vacuum tube collections, sockets, etc. Will pay good prices. Please call Marc, OR, (800) 330-2004.

WANTED: Keys - keys - keys - keys - keys - keys - keys - keys - keys - Jim, KØYLW, KS, (785) 364-3989

WANTED: WW-2 Japanese military radio of any kind. Takashi Doi, 1-21-4, Minamidai, Seyaku, Yokohama, 246 Japan. Fax 011-8145-301-8069 or taka-doi@kk.iij4u.or.jp

WANTED: Cash for Collins: SM-1, 2, 3; 55G-1; 62S-1; 399C-1, 51S-1; 75S-3A, C 32S-3A; any Collins equip. Leo, KJ6HI, CA, ph/fx (310) 670-6969, radioleo@earthlink.net

WANTED: Page two of General Description Johnson Match Box Antenna Tuner (dated 2/58). F.J. Lidd. W9EQK, IL, Fax (708) 447-3361.

WANTED: Collins 32V-3, would like to pick up within a reasonable distance of my QTH in S. Louisiana. Keith, KK5FE, 31 Claudia Dr., Covington, LA 70435-9513, (504) 892-4538 kk5fe@communique.net

WANTED: Knobs for SX100; need mode, band, calibrator, ant/trim knobs, will consider parts radio. Harold Sullivan, 15300 Prairie Rd., Andover, MN 55304-2625. (612) 434-3003.

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

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

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

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

WANTED: Navy xmtrs: MQ, TCA, TCF, TCN, TCX, TDE; rcvrs: RAW, RAX, RBD, RBJ. Steve Finelli, 37 Stonecroft Dr., Easton, PA 18045. (610) 252-8211. navrad@enter.net

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

WANTED: Information-WW2 TCS Radio System: Design, Manufacturing & Operation for article. Any help appreciated. Thanks. Greg Greenwood, WB6FZH, POB 1325, Weaverville, CA 96093. (707) 523-9122 (message) greg6fzh@aol.com

WANTED: Door knob caps; Sprague "Black Beauty" caps; buy-sell unused tubes. Send SASE for list W+. Typetronics, POB 8873, Ft. Lauderdale, FL 33310-8873. (954) 583-1340, fx 583-0777

WANTED: Tektronix memorabilia & promotional literature or catalogs from 1946-1980. James True, N5ARW, POB 820, Hot Springs, AR 71902. (501) 318-1844, Fx 623-8783, james.true@ibm.net

WANTED: Drake SPR4 & SW4A rcvrs, very good/exc conds; AL4 loop antenna. A.C. Wies, Steinstr 12, D-48465 Schuettorf Germany. Fax/Phone +49.5923.5761

WANTED: Two 1600 kc IF xfmrs; also R77/GRC-9 rcvr. This is the rcvr from the AN/GRC-9 Radio Set. Walt Tukkanen, POB 254, Koza, Okinawa, Japan 904-0021

WANTED: TMC GPT-750, TAC Tuner, GPR-90/92 & GSB-1. Alan Gray, W3BV, PA, (215) 795-0943.

WANTED: 1963 WRL catalog. Will trade old Allied, Lafayette, WRL, BA, Walter Ashe catalogs. NI4Q, POB 690098, Orlando, FL, 32869-0098. (407) 351-5536, ni4q@juno.com

WANTED: Technical manual for RCA Direction Finder model AR-8712. Al Kaiser, W3LEQ, 713 Marlowe Rd, Cherry Hill, NJ 08003-1551. (609) 424-5387

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

FOR SALE: 38 issues of ER, 1995 thru 1998, shpd to your door - $46. Cliff, W3LVC, MD, (410) 796-1070.

FOR SALE: Collins 75S3 & 32S3 w/matching pwr sply in spkr case, very clean & nice - $625. John J. Kistler, KC8DEY, 60803 CR 9, Newcomerstown, OH 43832. (740) 498-6193

FOR SALE: RCA-CR-88 - $500 firm; Viking matchbox - $75; Turner + 2 mics - $35; tube CB's. Gerald Perkins, RFD2 Box 34, Milo, ME 04463-9605. (207) 943-8742

FOR SALE: AN/MS, rack panel, blue ribbon connectors, hardware, meters, relays, xfmrs, manuals, list - $1. Joe Orgnero, VE6RST, Box 32 Site 7 SS1, Calgary, AB T2M 4N3, Canada (403) 239-0489.

FOR SALE: National NC109 & NC125, all working - $150 ea. Noonan, SC, (843) 726-5762.

FOR SALE: BC-348, S-meter mod - $45. **WANTED:** BC-614 speech amp, HRO-60 coils. Bruce, N9KGR, WI, (920) 693-3247.

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

FREE: Encyclopedia of Amateur Radio Equipment. Hundreds of photos & descriptions spanning over 80 yrs. http://www.aade.com/hampedia/hampedia.htm

HAMFEST: 42nd Annual York Hamfest - Oldest Continuously Held Hamfest in Penna., September 20, 1998, Exit 6E off I-83, York, PA. TI 146.97, (717) 764-8193 http://www.yorkhamfest.org

FOR SALE: Microphones: Silver Eagle D104; (3) D104; (3) DCM MSA 3000 lo z noise cancelling, Model 300 Shure, Model 556S Broadcast. W7MXM, ID, (208) 522-5854.

FOR SALE: Scientific Atlanta 1600 manual - $20 ppd; E&E Surplus Conversion manual Vol III - $19 ppd; Hallicrafters R-47 spkr - $45; URT-33 Beacon - $20; Marconi TF-995 signal generator, needs work - $25. More, LSASE for list. Geoff Fors, WB6NVH, POB 342, Monterey, CA 93942. (831) 373-7636

FOR SALE: (2) ea Hallicrafters SX-28 rcvrs, spare tubes, both work, Repro inst book, one w/cabinet - $125; one rack mt - $100; (1) Hallicrafters BC-610 TX speach amp, tests good, spare tubes, shock mt, schematic, new carbon mic, both factory patch cords; (1) Hallicrafter BC-610 TX pwr sply deck, late model w/potted xfmrs/chokes, has dual 120 volt main HV xfmr, can be used w/120/240 volt sply; B&W T-368 TX exciter w/all tubes inc 5000 output tube; B&W T-368 TX modulation deck, all tubes inc spare set 4-125A output tubes. This deck has factory pwr sply for T-368 exciter, schematic; (anyone needing schematic for any of the above send SASE to me. If convenient inclose one of your signed QSL cards for my grandsons QSL collection) I have 4 pieces test gear supplied w/the old National radio institute home study radio/TV course including nice tube tester. **WANTED:** Johnson Invader 2000. I only need the high pwr section but will take the complete unit w/or w/out pwr splys, patch cords (non working unit OK); Kenwood TS-820S xcvr; 1 to 6 6146 tubes; 1 to 6 12BY7 tubes; tubes must be new. Please call after 6PM CST week-days only. Joe Davis, WE5I, POB 375, Hardy, AR 72542. (870) 257-2839

FOR SALE: Classic gear - SASE for list. **WANTED:** Vintage rigs. The Radio Finder, Joel Thurtell, 11803 Priscilla, Plymouth, MI 48170. Tel/Fax (313) 454-1890

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

FOR SALE: Watkins Johnson 235-1000 mc rcvr - $300; March 1939 Japanese 0-200 milliampmeter, ec - $200. Gary, WA9IYF, 3429 Gaddy Ct., Falls Church, VA 22042.

FOR SALE: Electronic Designers Handbook by Landee, Davis, Albrecht - $8 ppd. R.J. Eastwick, N2AWC, 224 Chestnut St., Haddonfield, NJ 08033. (609) 429-2477

FOR SALE: Heath HW-2036 2-meter FM rig - $45; Heath SB-614 monitor scope - $110; Heath rare 160 meter rig HW-18 - $100; Simpson 260 multi meter - $40. Marty, NJ, (609) 466-4519.

FOR SALE: 51S1F, EC, very late WE s/n 46XX, RE PTO, cherry panel, clean chassis, works FB - $1400 OBO, u-ship. Brian, KA9EGW, (815) 759-9277, lurch@theramp.net

MESSAGE: David Haeffner, Bloomington, MN please contact me, thanks. Tom Berry, 1617 W. Highland, Chicago, IL 60660. (773) 262-5360 or 262-0016

FOR SALE: Coil sets: 6-Bruno, 6 contact coils & forms - $25; 3-set NIB Twin Coupler Co Air Core RF coils - $15; 4-Hammarlund 4 prong coils like Comet Pro, mostly hand wound - $24; 2-40 meter BC-610 final coils, good - $18 ea; 2-hand wound 610 & 1 blank - $10 ea; Western Electric tube data: 1933 Ham tubes, 52 pgs starts w/101D - $10; charts 404A-437A 46 pg - $8; summary charts 101D-355 inc CRT & CC tubes - $5; PH meter, LPN #7663 circa '50s in wooden case - $30; VLF loop antenna for WWVB, rugged military style, shielded 40 inch diam - $45; xmtg tubes-write or call needs; Attn Ham AM buffs mint Millen 90800 60 watt xmtr, lge box full of coils, inc Collins 32RSI pwr sply (100W), UTC CVM-2 60W mod xfmr, 3 meter rack panel & short 25" rack to hold above - $295; Turner 251 ham mic in box - $35. **WANTED:** Circular & 20 inch slide rules, Harvey Radio Labs xmtr FT-30 (FOS p257) reward + $1000; National dog-house pwr splys; Echophone EC-2; Sky-Buddy w/boy picture; lge old hand telegraph keys; Twin-Arm cable keys. Robert Enemark, W1EC, POB 1607, Duxbury, MA 02331. (781) 934-5043

FOR SALE/TRADE: AM/1178/GRC amplifier, multiplier C-band - $150, will trade for R-1401, AN/FRR/21, AN/SSR13A; DY-134 - $35; LS-144 - $25. Ronnie, N1UDI, CT, (203) 371-6691.

FOR SALE: (2) NOS Sylvannia 210 xmtrg tubes, 4 digit serial numbered - $130 + shpg. L. Schimmel, POB 1234, Spanaway, WA 98387.

FOR SALE: QST's: Any issue 1930 to date - $6, ppd; Bakelite panels & straightened lengths of #10,#12,#14 tinned wire - SASE for info. Parker, W1YG, 87 Cove Rd, Lyme, CT 06371.

FOR SALE: Boatanchor paints; Heathkit Tech Journal Subscriptions; phone filters - call or write for free catalog. R&R Designs, 202 Midvale, Marshall, WI 53559. (800) 372-4287

FOR SALE: Convert any wattmeter to read PEP! Perfect for AM/SSB - $19.99 ppd for complete kit! HI-RES, 8232 Woodview, Clarkston, MI 48348. (248) 391-6660, hires@rust.net

FOR SALE: RIT for KWM-2 and S-Line. No modifications for KWM-2. $59.95 tested / 42.95 for kit. SASE for details and order info. John Webb, W1ETC, Box 747, Amherst, NH 03031.

FOR SALE: 75S3B, RE, 1.2 & .8 filters, exc FOB - $500. Bob French, KB9BY, 852 Sunrise Dr., Salina, KS 67401. (785) 823-8455

FOR SALE: Books, all electronics related; 200 titles; SASE. Paul Washa, 4916 Three Points Blvd, Mound, MN 55364. wotok@email.msn.com

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

FOR SALE: R4C, spkr, T4XC, AC sply, manuals & MN4 tuner - $395 + shpg; NOS 6AH6 - $2; 6AQ6 - $1; 2C39 - $10; 6CA7 - $10; 12AU7 - $2; S824 (25L6) - $6; others SASE state your needs. Don Dillard, 5106 Red Oak Dr., Amarillo, TX 79110. (806) 352-4776

FOR SALE: Our new 54 pg 1999 catalog of WWII military communications items - $3. Sam Hevener, W8KBF 'The Signal Corps', 3583 Everett Rd., Richfield, OH 44286-9723. (330) 659-3244

FOR SALE: Hickok 600A tube checker, real good condx - $65 + UPS. Ken, TX, (254) 772-7307.

W5PYT ESTATE SALE

OZONA, TEXAS

RECEIVERS
TRANSMITTERS
TEST EQUIPMENT
PARTS

BY APPOINTMENT ONLY

FOR INFORMATION CONTACT
Lorelei at (915) 392-3488 or e-mail LMROZO@ aol.com
or
Debbi at (915) 392-5209

The Radio Finder

"Classic Radios That Work"
Mailing address: 11803 Priscilla, Plymouth, MI 48170
Shipping address: 975 Arthur St., Plymouth, MI 48170
TEL/FAX 1-734-454-1890, e-mail: finder@radiofinder.com
Large stock of vintage ham equipment
WANTED: Good classic radios
See photos and descriptions on our web page:
www.radiofinder.com

WANTED: Keyer paddles of all kinds. Cap, WØXC, CO, (970) 247-0088. capallen@frontier.net

WANTED: Needed for restoration: 51J4 manual, CV-157URR (R-390A SSB adaptor) manual, 75A or 32V cabinet, Collins screws (various) for 32V series; BC Band Command Set w/D/M. Pete Patton, WØEWQ, MN, (612) 362-4794 or peter.patton@lawson.com

Please remember to count the words in your ad and if you're over 20 words send 20 cents for each extra word.

WANTED: BC454, ARC5 rcvr. A good one. David L. Muse, 510 Minturn Ave., Hamlet, NC 28345.

WANTED: EF Johnson Viking 500. I will pay a good price for this xmtr in VG condx. Will PU. Jeff Kyle, KF6WX, 4268 FM 36 S, Caddo Mills, TX 75135. (903) 527-4196, jeff.kyle@pg.airtouch.com

WANTED: BC191 or BC 375, any condx. Charles R. Lackey, W4QBE, HC10 Box 567, Lakemont, GA 30552. (706) 782-3670

WANTED: 861 tube; BC-610E or earlier, repairable OK; T-368. Rian, W6SVU, CA, (562) 421-7213

WANTED: Heath 6-meter &/or Heath 10-meter xcvr, similiar to the Twoer. David Childers, 452 Seabreeze Rd. E, Mobile, AL 36609. sainte@usa.net

CONVERT YOUR WATTMETER TO READ TRUE PEP FOR LESS THAN $20! The PDC-1 will convert your Average Reading wattmeter to Peak Power! Even works on the Bird 43!
$19.99 postpaid in the USA and Canada
HI-RES COMMUNICATIONS, INC.
8232 Woodview, Clarkston, MI 48348
(248) 391-6660 or hires@rust.net

WANTED

Collins promotional literature, catalogs and manuals for the period 1933-1993. Jim Stitzinger, WA3CEX, 23800 Via Irana, Valencia, CA 91355. (805) 259-2011. FAX (805) 259-3830

NEW HQ-129X FRONT PANELS

Photo Available
Ron Hankins
555 Seminole Woods Blvd.
Geneva, FL 32732 407-349-9150
rh8421@usa.net
www.bitstorm.net/rh8421/

DR. RADIO

***Repair & Restoration of Vintage Equipment**
*** Reasonable Rates & All Work Guaranteed**
Steve Trimble, K5DJH
Box 73, Weston, TX 75097-0073
Call Toll Free: 1-888-73-K5DJH

WANTED: Hallicrafters S-2, S-33, S-35; HT-2, -3, -8, -12 (old series); AC p/s for HT-45; BC-669 or parts; complete BC-729. **Chuck Dachis, WD5EOG, "The Hallicrafters Collector"**, 4500 Russell Dr., Austin, TX 78745. (512) 443-5027

WANTED: Condenser, carbon and other early broadcast microphones; cash or trade. James Steele, Box 620, Kingsland, GA 31548. (912) 729-2242

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

WANTED: Tube type shortwave converters, preferably pre-war. David L. Muse, 510 Minturn Ave., Hamlet, NC 28345.

WANTED: Western Electric sound reenforcement equipments - mics, amps, tubes, spkrs, horns. Barry Nadel, POB 29303, S.F., CA 94129. (415) 346-3825

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

Mil-Spec Communications

R-390, R-390A, R-388 & other military receivers
Sales - Service - Manuals - Parts
Box 633, Englewood, FL 34295-0633
941-474-6818, Fax - 941-474-7874
"Since 1985"

ELECTRON TUBES: All types - transmitting, receiving, obsolete, military-- Large inventory. **Daily Electronics Corp.**, 10914 NE 39th St., B-6, Vancouver, WA 98682. (800) 346-6667, (360) 896-8856, FAX (360) 896-5476

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

WANTED: Collins S-line, KWM2A, 30L-1, etc. Mark pays the most for clean gear. WD4AAS, FL, (954) 776-5996 (d), 566-0014 (n).

WANTED: National coils, dog house pwr splys & NIB parts. I love National. Sylvia K. Thompson, N1WVJ, 33 Lawton-Foster Rd., Hopkinton, RI 02833. (401) 377-4912

WANTED: Hallicrafters SX-28 clutch/brake for main tuning knob. Desperately needed for my restored radio. James B. Geer, WB5LXZ, 1013 Overhill, Bedford, TX 76022-7206. voice mail, (800) 986-8155

WANTED: Manuals H-P 331A Distortion Analyzer; 8602A Generator-Sweeper. Weber, 4845 W. 107th St., Oak Lawn, IL 60453-5252.

WANTED: Collins 310B3, spare 70E8A linear glass scale, Bud JEL coils, any band; Chicago 500W CMS-3. Jerry, W8EGD, CO, (303) 979-2323.

WANTED: BC-348 rcvr in operating condx. **FOR SALE:** HQ-110 - $80, Viking II, 122 - $200. Al Jenkins, WA1RWB, POB 1162, 5 Daley Ct., Nantucket, MA 02554. (508) 325-7122

WANTED: HQ100A or HQ110, HQ145, HQ160; dead HF tube rcvrs, xmtrs. Prefer complete. John KF7OM, NV, (702) 727-8171.

WANTED: Will pay up to $600 for Canadian WS29 (CDN) A set. Leroy E. Sparks, W6SYC, 924 W. McFadden Ave., Santa Ana, CA 92707-1114. (714) 540-8123

WANTED: For HRO-50R1 5 mtr (NC125OK) coils AC AD EFG xtal calib. Jim, K7BTB, POB 50355, Parks, AZ 86018. (520) 635-2117

WANTED: National SW-3, model 1 version 3 (uses 32-32-30 tubes). Dean Showalter, W5PJR, 72 Buckboard Rd., Tijeras, NM 87059. (505) 286-1370

ELECTRIC RADIO STORE

BACK ISSUES

All back issues are available at $34 per year or $3.25 for individual copies. Buy the entire first 9 years (#1-#108) for $240. This price includes delivery in the U.S. Foreign orders please inquire.

COMPENDIUMS

Collins 75A-4 Modification Compendium- all the factory modification bulletins from Collins Radio Co., all the articles printed in CQ, Ham Radio, QST and ER, 85 pages- $20 plus $3 S&H

Service Modification Compendium for the S-Line, KWM-1/2/2A series - 260 pages - $45 plus $4 S&H

Service Modification Compendium for the KWS-1, 32V and 75A series - 42 pages - $15 plus $3 S&H

T-SHIRTS

The front displays the logo from the cover of ER (the tube outline, Electric Radio, and 'celebrating a bygone era'). The back has "Real Radios Glow in the Dark" (used with the permission of Classic Radio). The T-shirts are U.S. made by Hanes and come in S-M-L-XL-XXL. The color is just a little lighter than the cover of ER - $15 del. ($16 for XXL)

BOOKS

Vintage Anthology - Book 1 by Dave Ishmael, WA6VVI.....$14.95

The First Fifty Years: A History of the Collins Radio Company and the Collins Divisions of Rockwell International $49.95

Fixing Up Nice Old Radios by Ed Romney.....$24.95

Communications Receivers, The Vacuum Tube Era: 1932-1981 by Raymond S. Moore.....4th Edition $19.95

Oscilloscopes, Selecting and Restoring a Classic by Stan Griffiths.....$19.95

McElroy, world's champion radio telegrapher by Tom French $19.95

The Pocket Guide to Collins Amateur Radio Equipment 1946 to 1980 by Jay H. Miller, KK5IM.....$19.95

Heathkit A Guide to the Amateur Radio Products by Chuck Penson, WA7ZZE.....$24.95

Heath Nostalgia by Terry Perdue, K8TP.....$14.95

Radios By Hallicrafters by Chuck Dachis.....$29.95

Transmitters, Exciters & Power Amplifiers by Raymond S. Moore.....$21.95

The Cathode-Ray Tube, Technology, History and Applications by Peter Keller.....$29.95

Receivers Past and Present, Communications Receivers, 1942-1997, 3rd Edition, by Fred Osterman, ...$24.95

Hiram Percy Maxim by Alice Clink Schumacher.....$19.95

Please add $3 S&H for one book and $1 for each additional book.

Three or more books shipped free!

ER Parts Unit Directory

If you need a part for a vintage restoration send $2 and an LSASE (.32 postage) for a list of parts units. If you have a parts unit, consider putting it on the list.

ER, 14643 County Road G, Cortez, CO 81321-9575

Subscription Information

Rates Within the U.S.

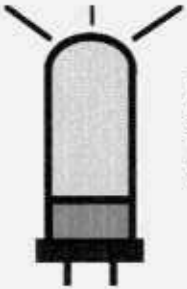
$28 per year 2nd class
$38 per year 1st class, with envelope $42

Canada (by airmail only) - U.S. $42

Other Foreign Countries (by airmail only) - U.S. $54

Electric Radio
14643 County Road G
Cortez, CO 81321-9575

Phone/FAX (970) 564-9185
e-mail: er@frontier.net



ELECTRIC RADIO
14643 County Road G
Cortez, CO 81321-9575

FIRST-CLASS MAIL
U.S. POSTAGE
PAID
MAILED FROM ZIP CODE 81321
PERMIT NO. 23

FIRST CLASS

TO: