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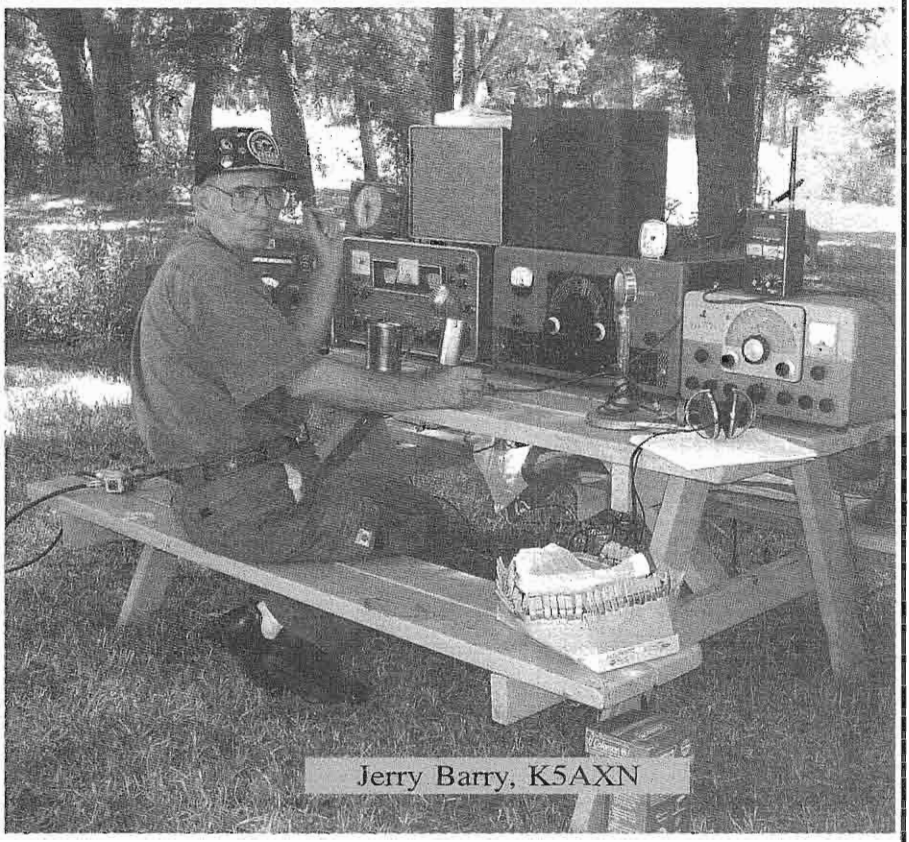
ELECTRIC RADIO

celebrating a bygone era

Number 174 November 2003



Jerry Barry, K5AXN

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Editor
Ray Osterwald, NØDMS

Editor Emeritus
Barry R. Wiseman, N6CSW

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

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

Regular contributors include:

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

Editor's Comments

Fall 2003 AM Events

The fall radio season has finally arrived, and barring any more major solar events as seen during the last week of October, we all should be able to enjoy some fine operating events over the next few months. The first event I'd like to announce is the Thanksgiving AM Jamboree, and Dale Gagnon (KW1I) has sent in a notice about this popular annual AMI event:

Thanksgiving AM Jamboree

The Jamboree is scheduled for November 28-30. The event begins Friday evening and ends late Sunday evening. Participating stations should leisurely exchange Thanksgiving greetings, signal reports, transmitter in use and AMI certificate numbers (if they have one). AM contacts on any amateur band count. You can work the same station on more than one band, but not more than once on the same band. Each contact is one point. Multiply your total contacts by the number of bands used for AM contacts. Multiply again by the number of different AM transmitters worked. Major transmitter variants count, e.g. Ranger I and Ranger II, but not both T368 and T368A. Record the final and modulator tube types for homebrew transmitters. If you work more than one homebrew transmitter with the same RF/Mod tube configuration, only count it as one transmitter multiplier. Certificates will be awarded to any station submitting a 1000 point log, e.g. 4 bands, 25 contacts, 10 transmitter types. Use this weekend to fire up your rare old boatanchors to provide multipliers, as well as points! Please calculate your point total at the end of your log for faster processing at AMI Headquarters. Send logs to AMI, Box 1500, Merrimack, NH 03054. Send requests for lost AMI numbers to aminternational@earthlink.net.

Thanksgiving Day AM Bash

Also, KØOJ in Greeley CO will be running his annual Thanksgiving Bash on

[Continued on page 6...]

TABLE OF CONTENTS

2 The 2003 AM International and CCA BBQ N6PY
4 The Rest of the Story W7EGN
8 W.J. Halligan, Newspaper Reporter and the State of Radio: Installment 5 ..... K7AK
15 Smith Chart Fundamentals W4CKH
19 Mailbag
24 A Speech Amp and FM Receiver Combo W3BYM
28 Heathkit HO-10 Power Transformer Modification K6DPZ
32 What's a Lysco Transmaster 600? WQ8U
36 Repackaging a Variable Selectivity FL8-A Audio Filter WA2CBZ
39 Modifying the Swan 500 for AM WB6VMI
43 Boatanchor Equipment AC Power Distribution ..... WBØIQK
44 Vintage Nets ..... ER Staff
45 Classifieds ..... ER Staff

Cover photo: Jerry Barry (K5AXN) operated his third Vintage Field Day from Cibolo Creek in Marion, Texas. Jerry made 9 QSO's this year, but not until after 7 PM because of the band conditions. He also had 20 visitors at the site.

The 2003 AM International and Collins Collector's Association BBQ

by Bill Feldmann, N6PY
n6py@qnet.com

On Saturday, September 20th, fifty-nine West Coast AM International (AMI) and Collins Collectors Association (CCA) members gathered at Wayne (W6IRD) and Sharon Spring's home for a great get together. Both groups have, in past years, individually held an annual get together but since most of the CCA and AMI members here on the West Coast belong to both groups, it was decided to have a get together for both groups at the same time and place. September 20th was chosen for this event because many of us would also be in the area for the monthly Pomona swap meet, which is a great source for vintage radio gear. Most of those attending were from Southern California. However, Foster (W4HCX) drove in from Nevada; Joe (N6DVD) came down from the bay area; Damon, (W7MD), his XYL, and Bill (N7OTQ) drove over from Arizona. However, the longest commute was by Bob Heil (K9EID) who drove all the way from St. Louis.

This event was a chance for all of us to meet in person those that we have had QSO's with and exchange ideas. There was also a great flea market held in Wayne's garage where many of us found or sold parts for AM rigs or vintage Collins radios. Wayne also served a great BBQ lunch consisting of burgers, side dishes and soft drinks. I found some spare tubes and connectors for my Military AM radios. Having an event for both groups also enhanced the amount of gear available at the flea market and further stressed the common objective for both groups of promoting the operation and restoration of vintage radios.

About 10 XYLs and YL's attended. They had a great time meeting each other, along with sharing their experiences having significant others wrapped up in vintage radio. Some of them donated great side dishes for the BBQ. Also a number of these ladies have amature radio tickets. It's very important for us to consider our significant others by keeping them involved and making sure they enjoy these events.

I was especially impressed with the high level of interest and many discussions about vintage AM military radios. Here on the West Coast there seems to be a very rapid growth of interest in this aspect of our hobby. Wayne demonstrated his very nice T-368 military AM transmitter. There were also many members of the West Coast Military Collectors Group present. Those included this group's president Dennis (W7QHO), Tom (K6LQI), Ryan (W6SVU), and myself. We are all regulars on the Saturday night net at 9:00 pm on 3982 kc.

We also had a very interesting tour of Wayne's shack and shop where he does an outstanding job of repairing and restoring Collins radios. Wayne has complete facilities for machining and fabrication of metal parts for Collins and other vintage radios, he can be found as an excellent source of parts and service on the CCA web site, www.collinsradio.com

Many thanks go to Wayne and Sharon Spring for hosting this very successful event.

Wayne Spring (W6IRD) is facing the camera in this photo during the tour of his fine shop. Some of the Collins gear he repairs and the machinery for making parts is shown.

Wayne had a flea market in his garage, and pictured here from left to right is Don (W6BCN), Dennis (W7QHO), and Mickey (WA6FIZ) looking over the gear for sale.

Members and their XYL's enjoyed a great BBQ lunch and drinks along with rag chewing on Wayne's patio.

ER

The Rest of the Story

by Tom Park, W7EGN
516 Wapiti Loop
Hamilton, MT 59840

In the spring of 1944, after thirteen months of intensive and excellent schooling in the Navy Radio Tech program, I was on my way to the Philippines aboard the "SS Sea Partridge." A civilian freighter on loan to the Navy, the ship had the unusual arrangement of two Captains, one Navy and the other Merchant Marine. I was the Radar Tech in an advance base unit scheduled to set up a tower and SG radar on the shores of Tokyo Bay when we invaded the Japanese mainland.

Only a couple of days out of the Golden Gate it became clear that the voyage to Subic Bay would be a relentless pursuit of the two basics, eating and sleeping. The heat in the sleeping quarters below decks was already unbearable and we were nowhere near the tropics. The alternative was to stretch out topside and the only thing we had to soften the steel deck was a solitary G.I. blanket. If one finally did doze off you were rudely awakened at 5 AM by "Now, hear this! Clean sweepdown fore and aft" and here came the deck crew with their brooms and hoses.

It was probably just as well that we were roused at this ungodly hour so as to get into the slow-motion breakfast chow line. The galley on the Sea Partridge was scaled to handle the usual complement of a civilian freighter, and a couple dozen crewmembers at the most. Now it was struggling to feed about six hundred hungry sailors and you soon found out that once you finally had breakfast it was best to get into the lunch line and, upon completion of that meal it was a wise idea to queue up for supper. I wasn't deliriously happy at the prospect of this routine for the thirty days it would take to reach our destination! And then, on day five of the voyage, a miracle! A Bos'n from the ship's crew spotted the Radio Tech insignia, which I had crayoned on my tropical pith helmet. He asked me if I knew anything about radio and I assured him that I had written the book on the subject so he growled, "Follow me", and I shortly found myself on the bridge in the presence of the two ship Captains!

After a flurry of salutes, the Navy Captain got down to business and "made me an offer I couldn't refuse". One piece of equipment on the bridge was a Scott marine receiver and the Captain wondered if the ship could be wired so that he could tune in the Armed Forces Radio Service short wave station in San Francisco and pipe the music throughout the ship for the passengers' enjoyment. He informed me that, if I could do the job, I would be made "ship's company", which meant sleeping on a mattress in comfortable quarters and eating in the crews' mess hall with no more standing for hours in chow line! I didn't hesitate for a moment to accept the offer although I hadn't the foggiest idea how I would pull it all off!

The deal made, the Captain's Mess Steward was called to fetch the three of us Coca Colas that we drank to seal the transaction. Amazing! An hour ago, who could have imagined that I would be on the ship's bridge, bending elbows with the top brass and quaffing an ice-cold coke!

I hauled my sea bag to the crews' quarters and was assigned a bunk in a cabin with the two ship's radio operators. Then I set out on my project. I now had free access to any part of the ship and began to look for a way to accomplish my task. I located an unused wiring system, which ran throughout the ship and had been intended to be used to call the steward in peacetime. This I appropriated for my loudspeaker distribution network. Next, I found a crate of bullhorn speakers in ship's stores. Then, I went down to the engine room workshop to bend up mounting brackets for the speakers from scrap metal. While I worked, I could watch the interesting activity in the engine room where the turbines whirred away as they drove the ship's propellers.

I hung the speakers at various spots throughout the ship wherever I could access the wiring system. Then I tackled a really tough problem. The wiring to the bridge had never been installed and to gain access I would have to drill a hole through the steel decking in the bridge.

I had only an "eggbeater" type hand drill but, fortunately, there was a plentiful supply of sharp drill bits so I started cranking away to drive a hole through the steel decking. It looked like an endless task!

I had been drilling for about half an hour and was tiring a bit when there was a tap on my shoulder and the Navy Captain motioned for me to move aside and hand him the drill. Peeling off his jacket, he kneeled down and started cranking away, working up a sweat with his exertions. He seemed to be enjoying the diversion from the pressure of running the ship and we spelled each other off until the drill finally broke through the deck.

Now I was able to hook up the speakers and turn on the receiver. I tuned in the AFRS station, which was still coming in quite well and playing big band dance music. Then we switched on the speakers and "The Jersey Bounce" boomed out all over the ship. The Captains grinned and shook my hand as we heard a cheer rise from the listening sailors. Another round of cokes and I was offered another project, this time a real challenge! I would be trying to make something out of nothing but I would try anything to avoid going back to the boredom and discomfort for the fifteen days remaining in our voyage.

Before starting on my new challenge I decided to touch up the alignment on the Scott receiver, as it seemed as little lacking in sensitivity. The coils I had to adjust were in a metal shield box with the lid fastened down by a bunch of screws. I removed the lid, adjusted the coils for peak performance and then penciled my name, rank, Ham call letters, date and ship's name inside the lid and replaced the cover.

Now... the Captain's new project. Contact from ship to ship in our convoy was by TBS (Talk Between Ships) a very low power transceiver. The low operating power reduced the chances of the signal being picked up by the enemy but its shortcoming was that it had no speaker so had to be manned around the clock by a sailor with headphones.

The Captain wanted to know if they could just plug a speaker into the headphone jack. I explained that there just wasn't enough power to operate a speaker. Then he wondered if there was any way to increase the power and I replied that I would try.

Once again, the treasure hunt. I found a spare tube in the TBS repair kit and a loudspeaker in the radio room. An empty gallon fruit tin was salvaged from the galley and taken down to the engine room shop. I cut and bent the tin to make a little chassis to fit into an empty space in the IDS cabinet. No tube socket was available so I just drilled a hole in the chassis and taped

the tube in place and wrapped wire around the exposed pins. Resistors were cobbled up by pencil leads rubbed onto cardboard strips. Capacitors were rolled up from cigarette package tinfoil. All finished, I went up to the bridge with my contraption and installed it in the IDS. I held my breath, turned it on, and nothing blew up. I had the Captain call another ship in the convoy and back came their reply through the speaker! The Coca Cola flowed again and the last few days of the passage I lolled about feeling smug as I watched the rest of the passengers standing in the chow lines and trying to sleep on the deck. So, I had a "luxury" cruise and had been too busy to be bored...

And now... the rest of the story...

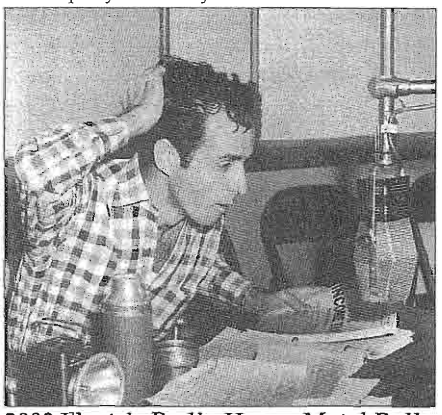
In 1965, twenty years later, I spotted a Scott receiver in the city dump in Paradise, California. I haggled the price down to $1.50, took it home, and set it aside for a couple of years. The appearance of the frame grid tube prompted me to build a front end to use the Scott as a tunable LF. It worked well and I decided to give this one a tune-up as I had the one on the ship. I opened the coil box and... Inside the cover was the inscription I had penciled twenty years ago! It was the same receiver I had worked on aboard the "SS Sea Partridge". Incredible!!

I would suspect that, postwar, the receiver had found its way to and was later discarded by the local Naval Reserve unit.

ER

[...Comments, from page 1]

November 27, Thanksgiving Day. He will start at 6:00 AM MST on 3875 kc. This is at least the 10th year for the Bash, and the number of check-ins grows every year. Everyone is invited to stop by and say hello.



2003 Electric Radio Heavy Metal Rally

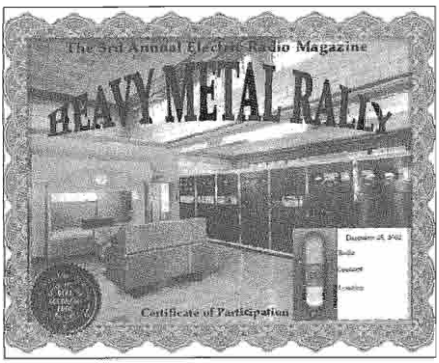
Bill Kleronomos (KDØHG) has announced the annual Heavy Metal Rally. It will be held on Saturday, December 27, and will begin at 2400Z, or 7:00 PM Eastern Standard Time. As in years past, this is not a traditional Ham radio call sign echo contest. It is a night for friendly AM QSO's using restored broadcast or military equipment. Here are this year's Heavy Metal Rules:

Suggested Frequencies: 1885 Kc east of Mississippi, 1900 Kc West; 3830 Kc, 3870-3890 Kc, nationwide, 7290 Kc.

Scoring: 1 point per contact on each different band. If you work the same station on both 80 and 160 it counts for two points. 1 point for each different state worked. 1 point for each letter or e-mail received from Hams or SWLs with positive comments about a station's signal or sound quality. So, if someone works 20 stations in 10 different states, the score is 20 contacts + 10 states = 30. If two emails are received complaining that "KØXYZ" broke their S-meters but sounded darn good doing it, that's 32 points total.

Bill is going to award the traditional

Heavy Metal trophy again this year. The trophy winner is the top scorer that is running a rig weighing 250 pounds and/or running at least 250 watts. If the top scorer is running a rice box with a linear, the trophy goes to the next person down. You *can't* win a trophy unless you're running a Heavy Metal rig- NO exceptions! This is Heavy Metal night! Logs by e-mail only to heavymetalrally@earthlink.net



All participants sending in their logs will receive a nice participation certificate from Electric Radio which will be similar to the 2003 certificate pictured above.

Dynamotor Night

We are going to run the Electric Radio Dynamotor night at some point during January 2004. I will make the full announcement next month in December ER. Again, this is not a traditional Ham contest, but it is a chance to have fun with a lot of vintage equipment on the air powered by dynamotors. I hope it will be more successful than it was in the summer.

Keep those filaments lit and those dynamotors spinning!

73, Ray, NØDMS

Installment 5

W. J. Halligan
Newspaper Reporter and the State of Radio 1923-1924, Part 3
The Broadcast Phenomenon

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

Full Outline of Part 3:

A. Radio Programs
B. Broadcasting Technology on the March
C. Vignettes Inspired by the Culture of Broadcasting
   1. Applause Cards
   2. General Vignettes
D. Epilogue
   1. The Initial Purpose of Broadcasting
   2. Bearing the Expenses of Programming
   3. Sources of Revenue
   4. Rebroadcasting as Precursor to a National Broadcasting System
   5. Transatlantic Tests

A. Radio Programs

Scenes from Channing Pollock's play, "The Fool," will be broadcast Friday evening at 11:15 from station WNAC. "The Fool" is now enjoying a successful run at the Selwyn. [3/6/23]

Radio entertainment held at the auditorium of the High School of Practical Arts last night was well attended. Entertainment was under the auspices of the Roxbury School Center Radio club. [3/12/23]

On March 14, WNAC will broadcast a transcontinental test. The program will include concert selections given under the direction of the Elks. The broadcast will begin at 9:30 p.m. and will continue until 3:00 a.m. [3/12/23]

Everything is in readiness at WNAC for the all Elk transcontinental test which is to be held at that station tonight. The program will begin at 9:30 p.m. and will continue until 3 o'clock tomorrow morning. Instrumental and vocal numbers will be contributed by the Elks of New England, under the direction of Joseph M. McDowell, of Woburn, and Joseph N. Schafer, of Newton. [3/14/23]

Little Jackie Huber, boy soloist of the famous Paulist Choir will sing at 3 o'clock this afternoon for the New England radio fans. Station WGI has arranged this special number in which the young singer will render "Little Gray Home in the West," Mighty Lak a Rose" and "O Dry Those Tears." [4/5/23]

WNAC will, on Saturday, broadcast a special concert by the Musical clubs of the Phillips Exeter Academy. The concert will be under the direction of Roy R. Shrewsbury of Exeter, N. H. [4/5/23]

Those who prefer jazz to opera, radioicaly speaking, will be entertained April 14 with selection by the Original Dixieland Jazz Band. One of the features of the concert will be the playing of the "King Tut Strut," latest New York dance hit. [4/5/23]

"Sun Temple," the Tech show of 1923, will be broadcast from WNAC on Friday night, between 8 and 9:30 p.m. [4/11/23]

Senator David I. Walsh will be heard over the radio from WGI, on Saturday, the 21st. He will talk on the coal situation. This address will be the third of a series of discussions of business problems by WGI, under the direction of the New England Business magazine. [4/11/23]

The radio as a means of dissemination of information to American Legion posts and as a possible opportunity for Legion members to hear the utterances of the national officer is growing in favor. On the first visit of the Legion head to Detroit he has been invited to use the well known "WWJ" station of the Detroit News as the means of addressing legionnaires in that section. This is another of the country's most powerful stations. [4/12/23]

The new dramatic club at WGI is well received by the local fans. According to one enraptured listener to "the voice of the air," the work of WGI "is becoming better day by day—in every way." [4/25/23]

All out for the five-pound box of chocolates. All the contestants need know is how some of the older melodies run. The broadcast will be Saturday night through WNAC from the Copley Plaza. Mr. Raco will offer a prize of a five-pound box of chocolates to the fan who will submit to the hotel a correct list of the selections played. [5/3/23]

High voltage sparks will feature the entertainment which is to be given by the AMRAD (WGI) club at the K. of C. hall, Somerville, Monday evening, June 4. The AMRAD club is composed of the various broadcasting units at Station WGI, Medford Hillside. The entertainment will include a minstrel show and a sketch by the Amrad Players and dance club. The proceeds are to be used in aiding the extension of the work of these clubs. [5/17/23]

Of course everybody enjoyed the Pop concert last night from WNAC. A great variety is offered the vast BCL audience as is to be seen from the following: Tuesday night at 8 p.m., Eugene Cowles, bass soloist and Miss Mildred Fye Cook, accompanist. At 8:30 a musical program given by the pupils of Mme. Emilla Ippolito Vocal school. Wednesday, 9 to 10 p. m., a special Memorial Day concert broadcast direct from the Copley-Plaza hotel by the Copley-Plaza orchestra; 10 to 11 p.m. dance music direct from Copley-Plaza hotel. Thursday at 8 p.m., program by the Waltham Musical club. Friday at 8 p. m., Everett City band concert by request. Saturday, 9 to 11 p. m., dance music by the Copley-Plaza orchestra, broadcast direct from Copley-Plaza hotel. [5/29/23]

Nate Goode and Jim Sweeney, two local boys, are broadcasting every afternoon at WGI, Medford Hillside. Nate, who was formerly with the late Gaby Deslys, is singing National Broadcast association hits while Jim Sweeney is at the piano. [7/30/23]

WGI, the Medford Hillside station, has received word from Arnold H. Cave, St. James Hotel, Victoria, B.C., Canada, a distance of 3000 miles, stating that he picked up a piano solo broadcast by the local station. This reception has been verified by a careful check. In view of the usual adverse receiving conditions for this time of year, this is regarded as a record. [9/12/23]

No reason now for the crystal set fans to be depressed for WNAC has announced the Dempsey-Firpo fight returns will be broadcast from that station Friday night. [9/12/23]

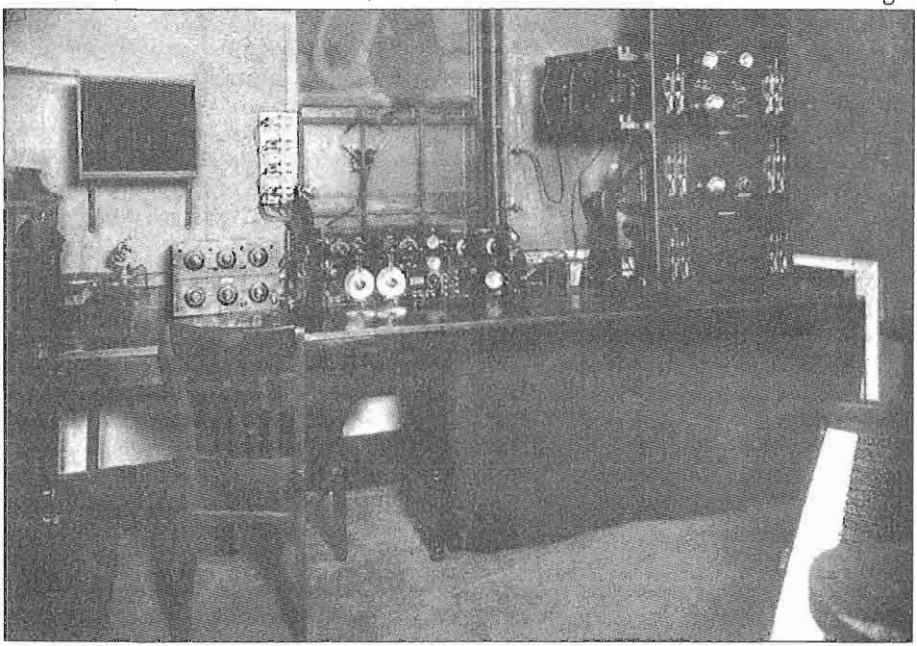
Followers of WGI will enjoy a program given by Miss Isabelle Doherty, soprano, and Miss Dorothy Colton, organist and pianist, Sunday afternoon. These artists have appeared at other broadcasting stations, and are known to most of the listeners-in of the east. [10/18/23]

Both WNAC and the "Mary Jane McKane" company are to be complimented on the splendid broadcast of the first act of the capital musical comedy. Thousands of radio fans who heard the broadcast will join us in this. [11/19/23]

A DX test will be staged at AMRAD, WGI, beginning at 10 o'clock tomorrow night. The program which has been arranged for this occasion includes talks by various newspapermen, each of whom will spend about five minutes talking on his particular hobby. They are in order of their appearance: Bert Ford, Boston American, war correspondent; Norman Ritchie, The Boston Post, cartoonist, known as "Norman"; Paul Waitt of the Herald, special feature writer; A. J. Philpot, The Boston Globe; Henry T. Clause, The Boston Transcript, reporter; Franklin Collier, Herald-Traveler, reporter; W. J. Halligan, Boston Telegram, reporter; Joe Toya, Traveler, reporter. At about 10:30 p.m. Uncle Eddie will be let loose for about 10 or 15 minutes, and if the piano holds out he may play longer. We can expect anything from Uncle Eddie from "Carmen" to "Yes, We Have No Bananas." [12/27/23][1]

KDKA appears to be coming in louder and clearer these nights, as is WDAP [Chicago] and one or two other stations. [12/29/23]

One of the features of the evening's



[Reproduced from "Radio Broadcast" for April 1923, the studio at WGI, the American Radio & Research Corporation's station at Medford Hillside, Massachusetts is pictured. The 100-watt transmitter to the far right on the desk was heard in Kansas, Texas, and Cuba. In the lower right corner is an upright piano for use by visiting musicians. In the center of the table is the station receiver, which looks to be a type SE-1420 or IP-501. These were built in large numbers during and after WW1 by the Wireless Speciality Apparatus Company in Boston. The unit to the right of the SE-1420 may be a wavemeter. There are two TRF tuners to the left of the SE-1420. For spinning 78's, there is a small desktop Victrola to the left and a large floor-mounted Victrola in a cabinet at the far left. -Ed.]

program at WGI, Medford Hillside, will be a concert by the choir of West Medford Baptist church. The choir will be directed by Charles E. Dockrill, who is also a member of the Calvary male quartette. [12/29/23]

Tonight, beginning at 8 o'clock the glee club of the Dennison Manufacturing Co. of Framingham will entertain fans of New England with vocal and instrumental selections, broadcast from WNAC, the Shepard stores. This feature program will last for more than an hour. Following this, several popular song hits, recently released by the National Association of Broadcasters, will be broadcast through WNAC from Loew's State ballroom by Lambert Brothers' orchestra. [1/3/24]

William A. Brady's $600,000 musical comedy "Up She Goes," with a record of one year in New York, and opening in Boston Jan 7, with a superb company headed by Nancy Welford and Richard (Skeets) Gallagher will be broadcast by Station WNAC, the Shepard Stores, Boston, at 8:15 p. m. on Monday, Jan. 7. This is a real musical comedy and not a comedy with music. It holds the attention and admiration of all those who see and hear it from start to finish. Radio listeners who are given this splendid opportunity to judge good shows are to be congratulated for the opportunity to listen to this. The book "Up She Goes" was written by Frank Craven, the music by Harry Tierney, and the lyrics by Joseph McCarthy, composers of "Irene." This broadcast will be given direct from the Wilbur theatre. [1/4/24]

Miss Marjorie Drew, secretary of the AMRAD Big Brother club, made a speech to the members of the club over the radio last night. During her talk she said: "I hope to receive lots of letters from the club members as well as big brother." Here's your chance, all you big brothers. [1/10/24]

WTAT, the Edison Light broadcasting station, appears to be here, there and everywhere. First the station will be heard broadcasting from some exhibition in East Boston. Then it will next be heard in Newton. A little later its concerts will be received from Dorchester. But the outstanding characteristics of the station are always the same: the programs are always of high quality and not too long to be irksome. [1/16/24]

Station WTAT, the Edison Light, will tonight broadcast addresses from the 100th anniversary dinner and meeting of the Franklin Typographical society which will be held at the Copley Plaza hotel. The principal address will be made by Mrs. William Lowell Putnam, who will talk on "Calvin Coolidge, spiritual descendant of Benjamin Franklin." [1/17/24]

Who has heard the new song "Listen to WNAC?" Some who have been fortunate say its so good that it is bound to go over big. The new song will be broadcast from Shepard Stores at 10:30 p. m. by Jack O'Brien. [1/19/24]

The Boxing Commission, Y.M.C.A., and other important athletic organizations completed arrangements with station WLW to broadcast the results of athletic contests in Cincinnati. [1/22/24]

Radio fans hereabouts have for a long time watched with interest the development of "The AMRAD Big Brother Club." Juvenile radio fans have made it their habit to tune every evening at 6:30 and hear Big Brother at WGI read letters from club members and tell of the many club activities. In this connection it is interesting to note that the first actual get-together of club members will take place Saturday afternoon at WGI studio. There will be more than 300 kiddies present and many prominent manufacturers of goodies have made donations which promise to make the event a memorable one. The meeting of the club will be broadcast at 3

o'clock. [1/22/24]

"Up She Goes" and radio broadcasting are becoming nearly synonymous, it seems. Nancy Welford, star of the show, will exchange greetings by radio tonight with the western company of "Up She Goes" now playing in Chicago. Miss Foy will begin at 12:05, Eastern time, broadcasting from KYW, Chicago, and will sing and talk. When she is finished Miss Welford will repeat the same program from WNAC, the Shepard stores, here. As the licenses of the two stations do not allow point to point converse, there will be no direct conversation; but Miss Welford will listen in with thousands of others to what Miss Foy has to say, and will then broadcast so that Miss Foy can hear her. [2/9/24]

Boston college grads and undergrads all over the country are tuning up their radio sets in preparation for Boston College Radio night which will be observed from Station WNAC, the Shepard stores, tomorrow between 8 and 10 p.m. No more enthusiastic or interested young men are to be found anywhere than the boys on the "Hill," who announce they are prepared to put on a complete musical program with not a dull moment in it. [2/26/24]

The International Bible Students' association of Brooklyn, N.Y., is going into the radio broadcasting field to transmit not only Bible talks and lessons, but educational and other helpful features. It will have two equipments, one in Class A, to be station WBBR, and the other in Class B, not yet named. [4/2/24]

Charles E. Erbstein, famous Chicago attorney, has offered his broadcasting station, WTAS, about four miles east of Elgin, Ill., as official station of the American Legion. Formal announcements will be broadcast twice a week, and the rest of week will be given over to musical entertainment.[4/28/24]

B. Broadcasting Technology on the March

Permanent telephone lines direct from the Copley Plaza to station WNAC are now being installed. By the last of the week everything will be in readiness for the broadcasting of concerts and all musical events at the hotel. [3/6/23]

Providence now has four licensed broadcasting stations. Three more are under construction. With all seven in operation, Providence will be way in advance of some of the larger cities. Asst. U. S. Radio Inspector Walter Butterworth has been spending the past few weeks looking the territory over. [3/7/23]

In reply to J. G. Medford:—WKAQ is a 500 watt, 101A Western Electric radiophone transmitter, located at San Juan, Porto Rico. This station broadcasts on Thursday and Saturday evenings, beginning at 7:30 p.m. eastern standard time. WKAQ is an exact duplicate of PWX, Havana, Cuba. [3/12/23]

If, as everyone says WTAT is getting better everyday, and they were headliners when they started, it must be unanimously agreed that Edison Light is operating SOME station. [2/12/24]

Political campaigners must pay $100 for every ten minutes of talking, if they seek to use the microphone at WEAF, New York. [3/20/24]

Hastings, Neb., has won worldwide fame through station KFKX, which has been rebroadcasting concerts from KDKA in Pittsburgh. [3/20/24]

Plans have been made by the committee in charge of the Memorial day celebration in San Francisco this year to have the address of Commander Owsley on that day relayed by radio from a station there. [4/12/23]

A new "network" of large broadcasting stations is being contemplated for Europe, America and the Far East. The first has already been completed at

Saigon, French Indo-China. It can communicate direct with Bordeaux, a distance of 6000 miles, with the Himalayas in between. [4/25/24]

The United States bureau of standards is keeping the broadcasting, amateur, and commercial stations standardized as to their wave lengths by transmitting special signals of standards frequencies twice each month. Transmitting apparatus is adjusted by these signals. [5/4/24]

Relaying broadcast programs by radio is going to take another step forward, when plans for listening in on Los Angeles from London are completed. The Los Angeles station will begin speaking, and its speech will be relayed by a New York station to London. After this, an attempt may be made to connect London with Australia by the relay system [5/12/24]

The orient is going to get two more wireless broadcasting stations with the erection of these soon in Sumatra, by the Netherlands Indies government. There is only one high-powered station there at present. [5/12/24]

The transcontinental radio chain across Canada will be completed with the erection of broadcasting stations in Winnipeg, Saskatoon, Regina, Edmonton, and Calgary. The chain will be operated by the Canadian National railways. [5/17/24]

C. Vignettes Inspired by the Culture of Broadcasting

1. Applause Cards

Radio broadcasting stations throughout the country are now engaged in the greatest beneficial project the world has ever know. It is not particularly easy for these stations to prepare programs lasting for several hours. And right here is where the encouragement comes in. Letters are received by the stations, true enough, receive letters but even at that a sufficient number of them is not coming in. Fans write a single encouraging letter and then consider their duty done. But it isn't. The encouragement must continue if the good work is to be kept at its present high standard. [3/6/23]

Following are excerpts from the annual report of the Radio Corp. of America concerning broadcasting: "In the last year the number of broadcasting stations has grown from less than 20 to almost 600. The art itself is advancing very fast, and the ultimate effect of broadcasting upon the economic, social, religious, political, and educational life of the country and the world, is comparable only with that of the discovery of printing 500 years ago. Today, broadcasting stations are sending out news, music, lectures, concerts, crop reports, weather reports, time signals, religious services as well fire and police warnings. Systematic broadcasting of educational matter is also being experienced with in many places.

Broadcasting has appealed to the imagination as no other scientific development of the time. Thousands of letters have been received at the broadcasting stations, some of them expressing profound appreciation for the services rendered, some of them commenting upon the quality of the service and the programs rendered. These letters show that the successful station manager, in order to satisfy the public, must in some measure be an interpreter of public tastes and opinion, a musical critic, a spiritual adviser, a statesman, and an expert upon education.

The value of broadcasting to any individual or community is in proportion to the difficulty of getting this same thing by any other means, and radio's greatest service, next to the saving of life at sea, will be through broadcasting to those people who are confined to their homes or live in remote communities. [4/2/23]

Apropos of the "written applause" appeals made by local broadcasting stations, Frank Wilson of Glenville

Ave., Dorchester makes the suggestion that the stations furnish printed post cards (without the stamp) to all who ask for them. He says that he for one would be glad to report on the quality and other points of each evening's program, but he finds it easier to turn in after the show's all over than to sit down and write a letter lauding the artists for their remarkable work. [9/13/23]

Great quantities of written "applause" have been received by the directors of station WTAT, Edison Light Co., on the quality and the brevity of their broadcasts. The feature of tomorrow night's broadcasts will be a program of vocal and instrumental selections by Bob Mulcahy and his Edison orchestra. [1/3/24]

A real radio novelty has been introduced in Chicago in the form of radio applause cards which are distributed free by all the leading stores. All that need be done is to make check marks beside the sentences intended, direct the card to the station, place a stamp on the card and drop it in a mail box. The reverse side of the cards have printed sentences which summarize almost all the things a listener would want to say concerning a concert. [1/7/24]

The gradual increase in mail coming to the radio broadcasting stations shows that the radio stations have taken the place of the movie stars who formerly received such large quantities of mail. The type of letter received from the radio fan is of a higher order than that usually received from the follower of the movies. [1/22/24]

Is radio to be undermined by the most despicable of pests, the anonymous letter writer? Broadcasting and amateurs, in fact, everyone connected with transmission of radio signals, have sometime or other been serenaded by missives from these pests. Those who maintain transmitting stations, welcome criticism, if it is the kind that will tend to improve the radio science, but there is no necessity for malicious letters which flow from the pens of persons too cowardly to sign their names. [1/25/24]

Charles Driscoll, of Glenville ave., Allston, is one fan who appreciates broadcasts and who believes in showing his appreciation. Every night while listening in to concerts from different parts of the country, this fan is in the habit of arming himself with a fountain pen and a stack of stamped "applause cards." As soon as the program is finished Driscoll addresses a card with comment to the broadcasting station.

There is no doubt but that this practice is beneficial to the entire radio science. Hundreds of fans are doing the same thing, but even then of the millions who nightly enjoy the broadcasts, these are but a small minority.

Driscoll and the other fans who do as he is doing find that the expense of post cards is negligible when compared with the enjoyment derived from the broadcasts. And the time required to make some slight comment on programs received amounts to little or nothing. It may not be generally known to all fans, but regular "applause cards," on which are printed all needed comments, are now sold at low prices. [1/31/24]

[Editor's note: Part 3 continues in the December 2003 issue of ER.]

ER

Smith Chart Fundamentals

by Chris Horne, W4CKH
3401 Hillside Dr.
High Point, NC 27265

Introduction

The Smith Chart is one of the most useful tools in radio communications but is often misunderstood. The purpose of this article is to introduce you to the basics of the Smith Chart. After reading this article you will have a better understanding of impedance matching and VSWR that are common parameters in a Ham radio station.

The Inventor

Phillip Smith
(photo courtesy the Smith Chart Society)

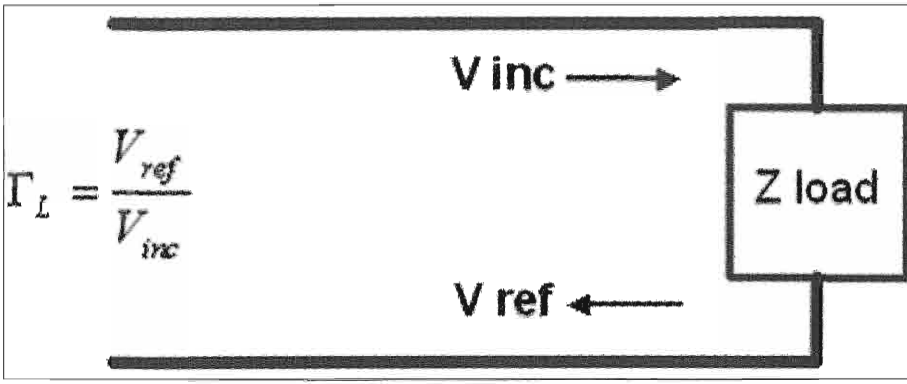
The Smith Chart was invented by Phillip Smith who was born in Lexington Massachusetts on April 29, 1905. Mr. Smith attended Tufts College and was an active amateur radio operator with the callsign 1ANB. In 1928 he joined Bell Labs where he became involved in the design of antennas for commercial AM broadcasting. Although Mr. Smith did much work in antennas, his expertise and passion was transmission lines. He relished the problem of matching the transmission line to the antenna; a component he considered matched the line to space.[1]

Mr. Smith developed the first graphical solution in the form of a rectangular plot from his measurements of the maxima and minima voltages along the transmission line. He used a thermocouple bridge and voltmeter to make the measurements. The first graphical chart was limited by the range of data so he came up with a polar plot which was a scaled version of the first plot. According to his biography his impedance coordinates were not orthogonal, which means perpendicular, and there were no true circles but the standing wave ratio was linear. This chart closely resembles the chart we see today.

What is a Smith Chart?

Although there are many computer programs[2,3] and network analyzers that can solve impedance matching problems for you, complete understanding of the Smith Chart is highly beneficial in understanding the nature of transmission lines. There is some algebra involved with understanding the basic transmission line equations but once you understand how to move on the graph, you can forget the math and just read the chart.

The Smith Chart is a polar plot of the



$$\Gamma_L = \frac{V_{ref}}{V_{inc}}$$

Figure 1: Impedance at the load.

complex reflection coefficient, Γ, for a normalized complex load impedance Zn = R + jX where R is the resistance and X the reactance.

A Smith chart is utilized by examining the load and where the impedance must be matched. Sometimes instead of considering the load impedance directly, you express its reflection cofficient, Γ_L ,which is used to characterize a load (such as admittance, gain, and transconductance).

We know the reflection coefficient is defined as the ratio between the reflected voltage wave and the incident voltage wave as shown in Figure 1 above.

The reflection coefficient, Γ, is related to the load impedance Z_L and the system impedance, Z_O as:

$$\Gamma = \frac{Z_L - Z_o}{Z_L + Z_o} = \frac{Vrefl}{Vinc}$$

There are resistance circles from 0 to 1.0 to ∞ ohms. The reactance curves on the top half of the chart are inductance curves; most notable are the 0.9 and 1.0 curves at the top that curve down to the right-right hand center. Polar means there is a real part, the magnitude of the impedance point, or ,the phase $\Gamma_L$the impedance. On the smith chart the phase is actually the distance in wavelengths along the transmission line, the outermost curve. Once you plot the impedance point, other parameters like Voltage Standing Wave Ratio (VSWR) or return loss can be read off the Smith Chart.

The center of the chart (r = 1.0 and x = 0) is always a "perfect match", at least for a desired 50 ohms but can be any impedance you want. For the common 50 ohm system the center of the chart would be "normalized" to 1.0 units. All impedances are scaled relative to whatever impedance value you are working with.

VSWR can be depicted as a circle centered around the chart center (at "1.0"). One revolution around the VSWR circle is a one-half wavelength. The reason once around is only half a wavelength is due to the addition of two waves, the forward and reflective wave on the transmission line. For example, your transmitter sends a forward signal, V_{inc} and some of this signal is reflected back from the load as V_{refl}. Hence, the notion of "standing waves" comes from these two voltages. The smaller the SWR circle, the lower the return loss, and the better the impedance match. Understanding this principle proves that VSWR is constant along the transmission line. However, the resistive and reactive ratios do change along a line. Line loss increases VSWR by increasing the resistive com-

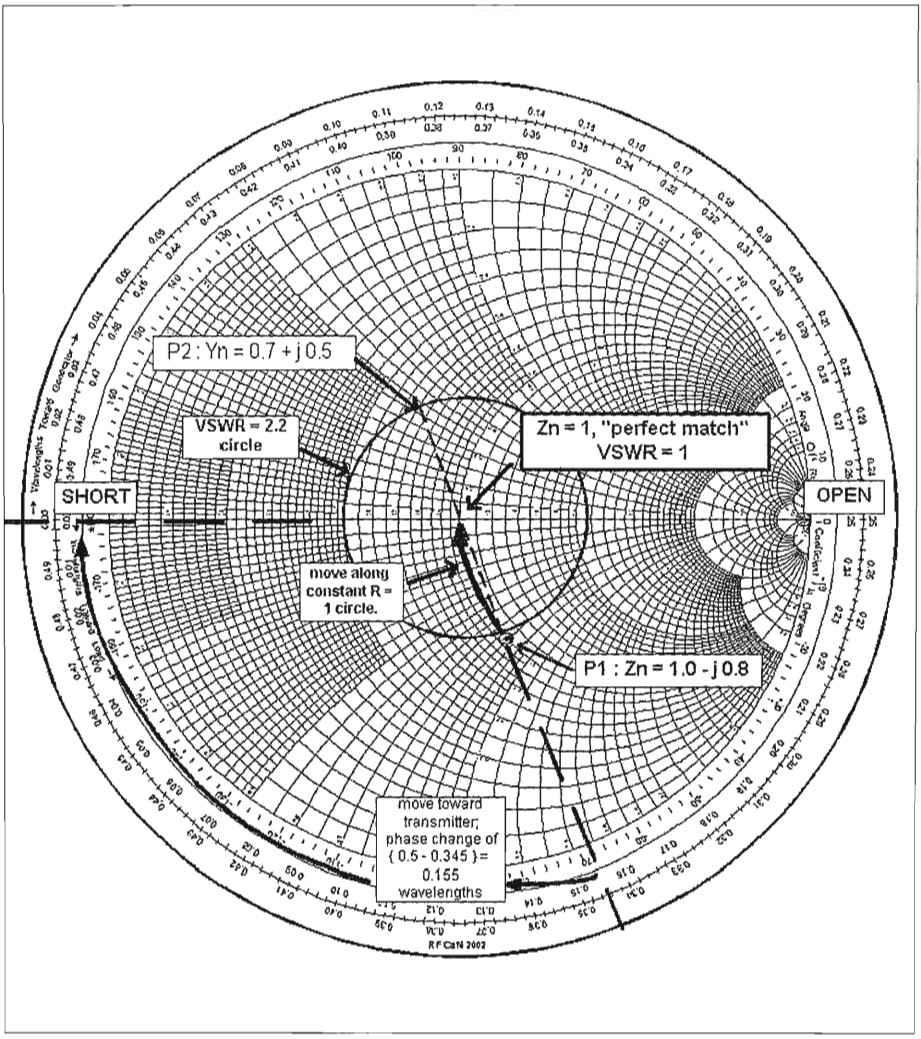


Figure 2: Smith Chart showing antenna load impedance, "P1", admittance point "P2" and path "P1-to-center" for a series inductor to obtain "perfect match" at center point.

ponent. This too is covered by the chart; read off the values by transcribing a line down to the scales at the bottom in decibels (dB) or voltage.

There are four other important points on the Smith Chart. Two of them represent an "open": far right where resistive component is infinity, as well as a short: far left where resistive component is zero. The other two key points are at the extreme top and bottom points. At the top you can see a "1.0" which represents an impedance of +j*1.0, a pure inductor. At the bottom you can see a "1.0" which represents an impedance of -j*1.0, a pure capacitor.

Every point in between represents the various combinations resulting

from a mismatched condition and shows how far you are from the desired impedance, usually the center, and how to form the conjugate matching circuit. Simply plot the impedance of a load, an antenna for example, then traverse the correct curves to reach the center (50 ohms).

Example: Impedance Matching With the Impedance Chart

The following example is for an antenna with an input impedance of 40 - j40 ohms, a 50 ohm transmission line and a transmitter whose desired output impedance is 50 + j0 ohms. A plot of the antenna load impedance is shown in Figure 2. The normalized load impedance is 0.8 - j0.8. The desired normalized impedance is then 0.8 - j0.8 +j0.8 = 0.8. Using a compass, you can draw a circle centered on 1.0 with radius extending to the point P1. From the real axis and the intersection of this circle draw a vertical tangent line to the SWR scale at the bottom of the chart. In this case the SWR is approximately 2.2.

The following is very important procedure in using the Impedance Chart: Movement along constant resistance circles in the clockwise direction means you are adding series inductance. Movement along constant resistance circles in the counter-clockwise direction means you are adding series capacitance. In this example, we can reach the center point, a perfect match, by adding a series inductor. How do we determine the inductance value?

The equation for inductive reactance is $X_L = 2 * \pi * F$
where F is the frequency of operation. In the case of 21 MHz,
$X_L = 2 * \pi * 21 \times 10^6 * L * 50 = 0.8$
and by rearranging terms we arrive at L = 0.12 nH.

It is important to point out that the impedance chart can be used with admittance points. The point "P2" in Figure 2 represents the load admittance of 0.6 + j0.5. It is obtained by traversing the SWR = 2.2 circle one-half revolution and drawing a line bisecting the circle. You can move from P2 to the other points as well but you will be adding shunt elements rather than series elements in your matching circuit.

Impedance and admittance curves are used interchangeably when dealing with series and shunt circuit elements. The contours of constant resistance and reactance can now be interpreted as normalized conductance, G, and susceptance, S. In an admittance chart, movement along constant conductance circles in the clockwise direction means you are adding shunt capacitance. Movement along constant resistance circles in the counter-clockwise direction means you are adding shunt inductance.

Conclusion

The advantage of the Smith Chart is that it can solve transmission line problems very quickly and forces you to understand how to match a load to the transmitter. If you practice using the Smith Chart to solve antenna or transmission line matching issues, you will be comfortable at all sorts of related problems. The Smith Chart can be applied other RF devices including tank circuits, filters, transistors, microstrips and other microwave elements where a specific parameter like impedance, power or line loss is needed for the RF system.

References:

(1) "Phillip H. Smith: A Brief Biography by Randy Rhea , Noble Publishing
(2) The ARRL Radio Designer also has a Smith Chart utility.
(3) Smith Chart computer program written by The Berne Institute of Engineering. A demo version can be obtained at http://sss-mag.com/zip/smith_v191.zip.

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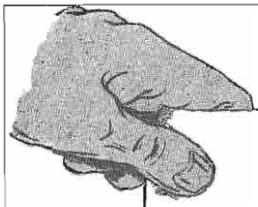


Mailbag

To:
Electric Radio
PO Box 242
Bailey, CO
80421

from Walt Hutchens (KJ4KV)

I want to respond to Bruce Vaughan's provocative article, "Ham Radio's Future," in ER #173.

Comparing our hobby to others is a useful and interesting way to get ideas about where we are and what might help. However, I think that the decisive factors will be specific to ham radio. Let me describe the view from here.

What might the death of our hobby look like? Obviously it would be dead if our licenses were all revoked, but that's not at all likely. It's conceivable that we could lose all or most HF bands (and indeed the ARRL has been bleating for decades about the possibility) but with a couple of exceptions we've gotten *more* spectrum in recent years. I think that situation reflects an economic fact: there's just not much demand for HF spectrum these days — too few channels there, and propagation is irregular. The RF comm workload has shifted to VHF and above, particularly to satellite modes with orders of magnitude more capacity and far better day-to-day reliability.

The number of hams could dwindle to the point where you couldn't make an HF contact and contests faded for lack of participation. But with the steady removal of requirements for getting a license, there seems little chance of that during the lifetime of most of us who would care. Where we actually seem to be headed is death by CB-ization. It'll still be called ham radio, but the license will come in the box with a type-accepted transceiver and a one-piece all-band antenna. The enclosed 'Ham Radio Quick Start!' card will be printed in five languages.

Will it matter? Many other hobbies have risen and in their time faded away. For example, my wife and I breed whippets. A century ago, they were raced for sport by British coal miners — they were considered the 'poor man's race horse' and every mining town had an active schedule. That hobby is gone although a handful of enthusiasts participate in occasional fun races. When small boats and horses were part of everyday life for most people, they too were the stuff of many sports and hobbies — all of them either gone or nearly so. Pigeon racing was an active hobby when carrier pigeons were among the fastest ways to send a message from one place to another. And so on ... how many of us mourn the loss of these? Is our country actually poorer because they're gone?

If you are among the large majority who believe that ham radio offers little that isn't being replaced by the cell phone, steadily advancing emergency comm systems, the Internet, and so on, then you may be unconcerned about the future. However, I'm not in that

happy group.

First, ham radio offers a chance for ordinary reasonably bright people to make real things that actually *do* something — and then use those things. It's computer programming as it would be if programs were hardware, auto repair without bloody knuckles, gasoline, or dirty hands. This type of activity is good for you, and far less common than in the past.

And second, our world is turning out to be uglier than even most of us old guys thought — and far, far uglier than has been recognized by younger folks or those who make our national policy. Way more people hate us than we thought, and increasing numbers of them have the means to do something about it. We don't yet have a clear idea how we're going to change that — check the news from Iraq for the details of what we *don't* know. At the same time, we're headed willy-nilly toward a day when all our communications goes through satellites that can't be defended from any nation that has a missile program — maybe even from well financed terrorists. Cell phones and much emergency comm gear depend on towers that are unprotected and need the power grid. Ham radio offers an essential backup system — as long as it continues to exist and there are enough trained operators.

If we ever did lose satellite communications, there'd suddenly be a demand for broad practical technical skills as well, to jury-rig whatever is left and begin building alternate systems. There too, hams could have a job to do.

However organized development of both technical and operating skills requires a critical mass of hams who want those skills. If our future is indeed 'ham radio in a box' then essentially all the skilled emergency traffic handlers, 50 wpm CW operators, and technicians who could sketch a working transmitter and receiver in half a minute and build them in half a week are already past middle age.

You'd expect our only major national organization to be fighting the good fight, but my impression is that the ARRL is largely responsible for the spot we're in and will continue actively making things worse.

From the days when coherent oscillators began to replace spark, the ARRL has steadily encouraged hams to be technologically up-to-date. One can hardly argue that we shouldn't have adopted vacuum tubes and put the spark sets out to pasture, or even that crystal control shouldn't have been promoted as the replacement for TPTG modulated oscillators. But while these changes helped solve severe interference problems and thus let us get more from our bands, there came a time when keeping up to date began to render hams dependent on manufactured equipment. We could build one or two tube sets, nearly all of us could build several-stage transmitters with crystal oscillators, but very few of us could build an effective SSB transceiver. Beginning at that point — roughly the 1960s — modest improvements in the capacity of our bands due to more advanced gear were purchased by reducing the justification for our having those bands as we became steadily less technically able.

I believe the ARRL too, become dependent on manufactured equipment. In particular, the revenue stream from advertising became too important to ignore in decision making. And as decisions had to be made about quantity vs. quality of ham licensees, they were uniformly made in the direction of more hams, regardless of skill.

That caused a regenerative effect. With an influx of 'anyone can do it' hams, the attractiveness of the hobby as a place to gain and display both technical and operating skills was diluted and we became less likely to re-

cruit people who wanted those things. Although logically we could have been 'up to date' *skilled* operators of manufactured gear, it's my impression that once we stopped requiring them, all forms of skill declined together.

I cannot find an example in my ham career when the ARRL went for quality. From incentive licensing, to the VEC system, to releasing the question pools so that meeting the technical requirements for a license became just a matter of memorization, they went for the numbers every time or did not object when others did so. Mr. Vaughan is right — the ARRL will back scrapping the code requirement as soon as that's an option.

We should understand that this is not 'evil people' but a standard organizational problem. When an executive has to choose between growing the organization, and shrinking it in favor of quality, he'll always go for the former. Personal power and often personal income come from growth — they are almost invariably lost by going for quality at the expense of growth.

It's not obvious to me that growth would have been compromised if the ARRL *had* aimed for quality. Leaders of vision could have promoted technical and operating skill with contests, a graduated series of well-thought-out construction projects and activities, and so on. They could have made the hobby steadily more interesting to exactly the people we wanted, rather than simply opening the gates to anyone who'd stagger in off the street. Why didn't we have those leaders? You only need look at the requirements for becoming an ARRL director to see the problem — the process strongly favors good-ol' boy types, with a firm handshake and a low wave-making potential.

This too is a standard organizational problem. Directors (who set policy and protect the interests of the members of a non-profit organization) are chosen by a process set out in the organization's constitution and bylaws. Very likely we simply never changed the rules that delivered go-along-to-get-along directors in the organization's early years when the job was primarily representing geographic groups of hams.

"Returning to our roots" as Mr. Vaughan suggests is indeed what would be needed, but such changes very rarely happen unaided. The organization that should provide the necessary leadership has been leading us in the wrong direction for its entire life. Old organizations reverse direction only when top officers are replaced; in the case of the ARRL that would require replacing at least several directors. I'm not optimistic.

A grassroots revolt from a ham population increasingly tilted toward earnest CB operators isn't likely and accordingly I believe the ham radio we love will continue to decline. Our great-grandchildren won't much miss what they never saw — unless our country someday has practical needs that skilled hams might have met.

from Chris Bacon (KA2IQB)

While I cannot disagree with many of the sentiments Bruce Vaughn expressed in "Radio's Golden Age—Episode 26, Ham Radio's Future" (E.R. Number 173), I believe the comparisons he makes between his various hobbies actually foretell a brighter future for ham radio than its doom.

For example, the types of sports cars that were popular in the 1950s and '60s disappeared from American roads largely because of government regulation, not because American automakers copied European designs. In particular, US anti-smog standards left many post-1971 engines sluggish and difficult to maintain, and bumper height requirements killed "sports car handling." But modern technology has restored high performance to engines

while meeting modern standards for fuel economy and emissions. Bumper height regulations have been dismissed and tires have gotten a lot better, making for some really sporty offerings from German and Japanese automakers today. Some new sports cars do not cost any more, in terms of adjusted dollars, than their predecessors, and clubs and groups dedicated to them are springing up. So the sports car hobby might have had some bleak years, but it now appears to be on the rebound.

As for private aviation, it was Federal regulations and insurance companies that kept fixed-wing, light aircraft from becoming a mainstream hobby. Even the smallest light plane can be a serious hazard to other air traffic and people on the ground. Consequently, the government started placing strict requirements on private pilots and planes about 70 years ago. It takes a considerable commitment of time and money to obtain a general aviation license today, which keeps many from considering it. And since the 1970s, court litigation has been liberalized, resulting in hefty judgments against airplane makers in accidents caused by pilot error or improper maintenance. The result is that a staggering part of the cost of a new light plane is product liability insurance, putting the price of new small planes out of reach for many. However, as anybody who lives near a small airport knows, private aviation remains an active hobby for those willing to pay the price.

In the case of amateur radio, it is true that the number of hams has declined, and fewer young people than ever are interested in entering the hobby. But is this a serious challenge for ham radio, or is it due to some unusual circumstances in the past, which are only now catching up with us?

The busiest years for amateur radio were those following World War 2. Thousands of people had been trained as radio operators by the military. After the war, military personnel were encouraged to take surplus equipment home with them in the hopes that they would stay active, and remain a national resource. Whether or not one was in the military, there were also huge amounts of surplus radio equipment dumped on the market for many years after the war, which could be adapted to amateur use. And manufacturers who had done well during the war years saw opportunities to sell new, attractively packaged equipment to those who did not want to go the military surplus route.

But the inevitable passage of time has thinned the ranks of World War Two radio operators, and circumstances have changed for younger generations. In today's so-called service economy, America cannot afford the same standard of living it once did, and leisure time is one area that has been hit hard.

For young people, the pressures are extreme. Getting through school with marketable skills and finding a good career is top priority. At one time, an amateur license offered tangible advantages in certain fields because it indicated knowledge of electronics and at least a degree of technical skill. But while an amateur license is still a good thing to mention on a resume, there are far fewer good jobs available that require these kinds of knowledge and skill. Familiarity with computers and related topics is more likely to gain favor nowadays on a job interview than amateur radio. However, once young people become established in their careers, some of them eventually turn to ham radio for a hobby, which is not tied to the same software and operating systems that they deal with at work.

I do not know what the future holds for amateur radio any more than anybody else does, but I believe—and hope—that this hobby will continue to

exist for those who have a genuine interest in it. The notion that something is wrong when there is no growth is a misapplication of Wall Street thinking, where no growth means no increase in value. But nothing ever grows indefinitely, and more generally, things adjust themselves to the times. For my part, I'd be happier in a smaller cadre of serious amateur radio enthusiasts who are dedicated to the study of electronics and radio wave propagation than I'd be in a large mob of appliance operators stepping all over each other trying to rack up points in the latest contest!

from Ralph DiMuccio (KC4ALF)

AM Made No Friends Today

Today was the Boy Scouts of America 46th annual Jamboree on the Air, JOTA, and I was honored to be asked by Boy Scout Troop 68 of Bloomery, W.VA if I would operate a station for this event and help the scouts in gaining their communications merit badge. I was more than pleased to help, and a station was set up along the Appalachian Trail consisting of some vintage and modern equipment, in hopes that the scouts would get bitten by the boat anchor bug. The scouts were very help full in the set up of station and antennas and had many questions about Ham radio but especially the vintage gear.

We were to operate on 40 meter LSB at 7.290 kc, and yes I know the organizers should have picked a better Freq. than this one in the AM window, but this was the assigned freq. for the event in 40m. I explained as we were setting up about the difference in SSB, AM operating procedures and explained about the AM window, but said not to worry, that we in the AM community exhibited the true attitude of the ham operator, professionalism and gentlemanly conduct, and that our brethren would move on up the band a ways or would even participate in the QSO'S about to take place.

The first QSO was an enjoyable one with a station in Michigan, which allowed their scouts and ours a brief chance on the air, and then the "gentleman" from Northeast Ohio came roaring in to explain that this was the AM window and that he was going to call CQ. It was explained to the elderly gentleman of the JOTA event and that it had been published well ahead of time, and that yes, again a better freq. could have been chosen, but would he move on up the band. His response, to start calling CQ and inviting other of the AM community to QSO and that they would simply increase power and did not care, he and several others then engaged in deliberate interference until continuing the event on 7.290 was impossible.

The conduct of my fellow AM'ers was simply a disgrace! I sat there red faced after telling the scouts and their leader what gentlemen we of the AM community were. The day was an embarrassment and a total wash, even after moving to 20M the scouts had already had their fill of the "gentlemanly" conduct exhibited.

It is highly unlikely that I will be asked to participate in any further events, and more than one scout that might have been interested was turned off today.

With CW about to go the way of the DoDo (and I do not agree with eliminating the code requirements) and the resulting narrowing of the CW windows it would behoove my fellow AM'ers that the majority of the Ham Slop Bucket community has it in for us, and that future behavior could be pointed to as an excuse to eliminate the AM window in the future. Band space is at a premium.

So in closing, congratulations to all of the Lids on the east coast that made a memorable day for AM and the Boy Scouts. Evidently age does not bring wisdom. **ER**

A Speech Amp and FM Receiver Combo

by Tom Marcellino, W3BYM
43806 Parkland Drive
Rockville, MD 20853
w3bym@fastdialup.net

If you run out of things to do in this great hobby you can try this fun project. The basic building block is a vintage garden variety FM Stereo receiver. Just add a few components and you have a speech amp and FM receiver combination that will really drive the socks off a pair of 813 modulators or fill the shack with pleasant FM audio.

The use of a solid-state speech-amp isn't anything new but again it is something that I had never tried. A quick look through my pile of lifetime treasures revealed just what I needed - almost. What I found was a model SA-5070 Technics by Panasonic. It was an AM - FM Stereo Receiver, probably circa early 70s. I remember when and where it was purchased. Back in my working days, and in the market for such a device, a fellow worker offered this one for the sum of $35. It sat in our den many years giving faithful service for the job for which it was intended.

For the past ten years it has sat in the treasure pile with the hopes of someday becoming the entertainment center for the R&D Lab, A.K.A workshop, pantry, laundry room, and vintage car part storage area but that never happened. This unit is ideally suited for use as a speech-amp, having two channels rated at 20 watts each, Bass and Treble controls, a HiZ phono input and a total harmonic distortion of less than 0.8%. So not having any entertainment center in the shack, I though this would make a good dual-purpose unit. Yes there are times, like right now as I'm banging on this keyboard, that no Ham gear is turned on and nice soft background music helps ease the path from gray matter to fingers to keyboard.

This project was slated to operate in the Big Rig 813 transmitter, ER February 2002. The original cathode follower speech-amp was not malfunctioning or inadequate, but now with the success of this project, it will become a backup unit. With this as the target, the receiver had to be modified for rack mount. This was accomplished by removing the solid wood case. Boy, I sure hated to discard such a nice piece of woodwork, but it was just too wide for the rack.

Since I wanted to have FM Stereo in the shack, there had to be room for a couple of small speakers. OK, I know the fidelity isn't the greatest with such small units, but there was limited space. So, back to the treasure pile, where I had saved a pair of 4 inch Kenwood speakers with nice heavy magnets and matching grills just for a project such as this. The pair was tested and all was fine.

A large opening was cut into the 19-inch panel to accept the receiver and then the two speaker openings were cut. As you can see in the photo, several other smaller holes were drilled and filled with switches and jacks. Most of them had no purpose at the time of construction. I like to drill and mount additional parts in panels at the time of construction for future usage. You may label this practice as poor design, and whether they are eventually used or not doesn't matter. What matters is the

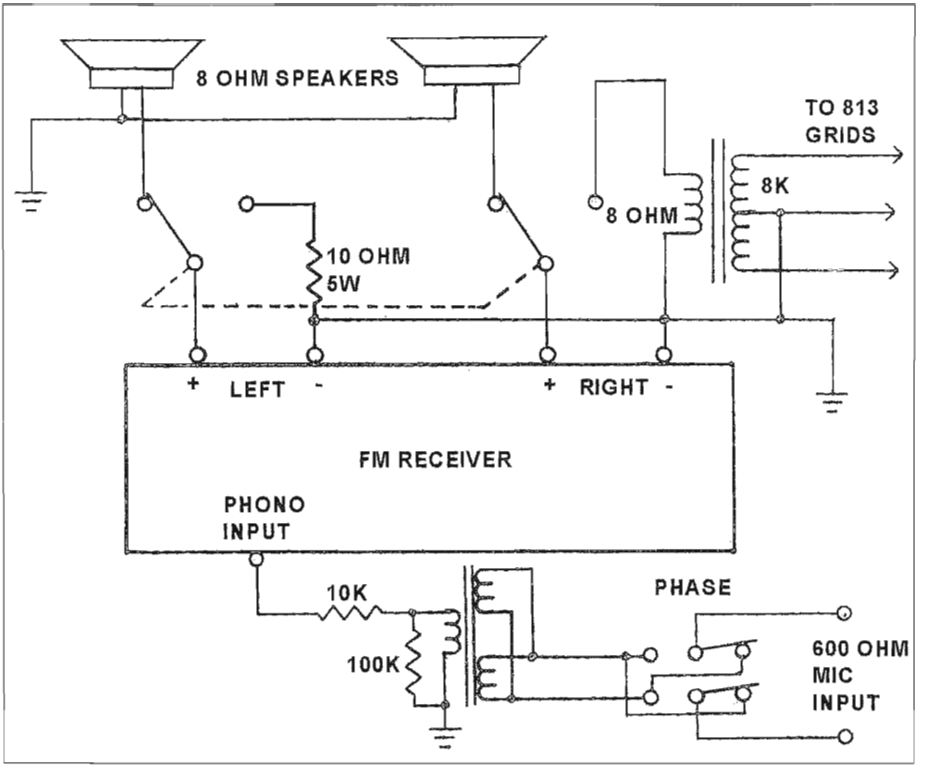
The front view of the combo shows the extra RCA and 1/4" jacks. The heavy support for the output transformer is visible on the left side.

prevention of metal drilling particles falling into the electronics. Of the various jacks and switches shown, only two switches are currently in use, one for audio phasing and one for transmit - FM receive.

Remember I said the receiver was almost ready for speech-amp use? It only lacked two matching transformers; one for the mic to grid (phono input) and one for the output to directly drive the 813-modulator grids. So, what do you think I did now? Yes, another trip to the treasure pile. This time I came up a little short. I had a nice mic to grid transformer that was plugged into the original speech-amp that I could borrow, but a good quality output transformer was not to be found. Once again Mike (WN3B) came to the rescue by providing a multi-tap UTC Linear Standard transformer. A requirement for the output transformer is a center tapped HiZ winding. This is needed to provide a ground return for the 813 grids. The FM receiver output, which is typically 8 ohms, drives the 8 ohms winding and the HiZ 8K ohm winding drives the 813 grids directly. Simply put, the output transformer is reversed from its normal hookup.

With the wooden case gone, the receiver electronics were now exposed to dust and the casual dropping of a screwdriver on the PC board. This was corrected with a custom fit thin aluminum cover. The mic transformer was mounted with an 8 pin octal socket in a small aluminum box. The large and heavy output transformer needed more substantial mounts. This was accomplished with thick aluminum plates and angles.

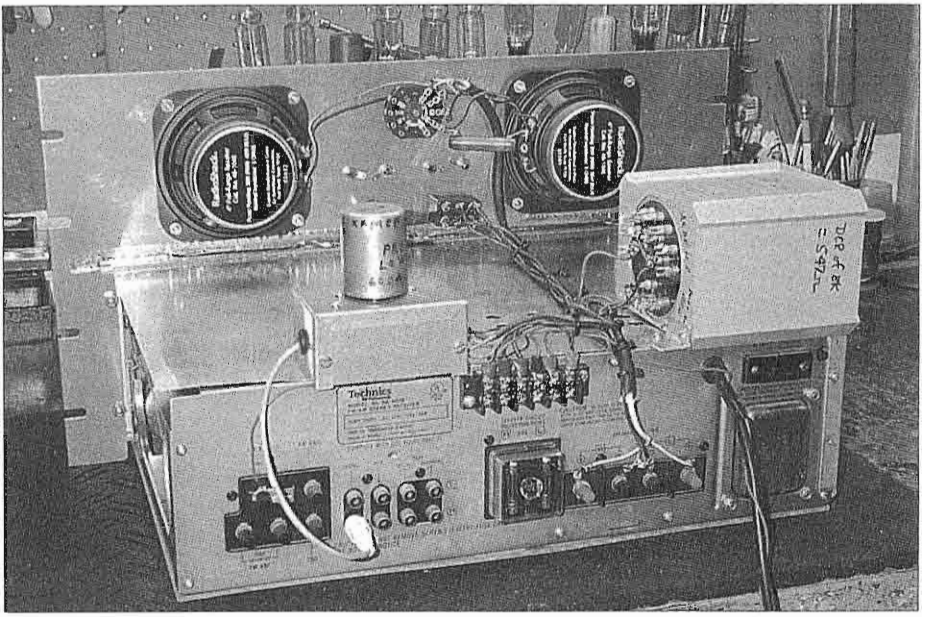
The unit was first pre tested as an FM receiver, and yes, there was a serious problem. Remember those nice Kenwood speakers that were saved for a special project? Well guess what? One now had developed an open voice coil. OK, now realize my situation. The



This schematic layout shows the electrical connections for the speech and and FM receiver combo. The mic transformer I used has no ID plate.

speakers were installed which meant holes were cut, mounting holes were drilled, and I had one bad vintage speaker. So, I set out looking for a replacement speaker. On a whim, I thought that maybe my local Radio Shack store had something that I could use. I had visions of having to toss out this panel and start all over again. I guess lady luck was on my side that day, because they had in stock the exact speaker. The specs were the same, as were the mounting holes. I guess there is something to say for standardization. Taking no chances, I purchased two and tossed the one good Kenwood back on the pile. Maybe I should just toss this one into file 13 to avoid problems down the road.

The project has been completed and installed for several months. The on-the-air reports have been great. Remember in the beginning I said this setup would really drive the socks off a pair of 813 modulators? Well, I wasn't kidding. I use a 0-500ma meter in the cathodes of the triode-connected modulators, and with normal speech it hangs in the upper two thirds of the scale and sometimes pegs - you can do the math. The FM receiver is a nice addition to the shack and works well with about three feet of hookup wire wound around the AC power cord. I've seen this receiver and similar ones at hamfests and on ebay. The typical hamfest price is ten dollars. So, if you want to try this method on your transmitter, the cost would be minimal. If your treasure pile of iron is lacking, you



Here is the rear view of the chassis. This view shows the transformer mounts and the dust cover installation.

probably will dig deeper in your pocket for the transformers than the receiver.

As this project unfolded, and during construction, I pondered whether to write it up for ER or not. The subject matter wasn't particularly new but the combo idea was unique. Then it hit me. Of all the decks in the Big Rig transmitter, the biggest time consuming part was the speech amp. Much time was spent in tube selection, design and critical layout and the lengthy fabrication including single point grounding and transformer orientation.

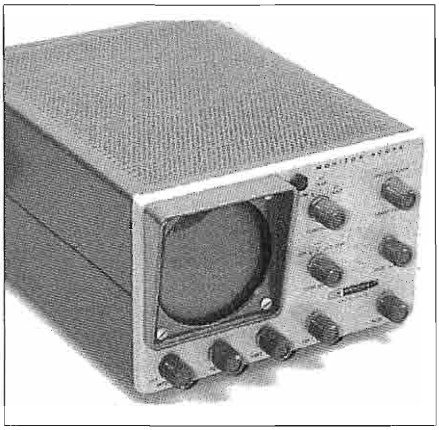
Now this project comes along with a ready-made receiver, and all I had to do was add two transformers and the job was done. There was virtually no design time and the construction took about a day. The end result was actually a plug-and-play speech amp deck with only a bad speaker detected during checkout.

ER

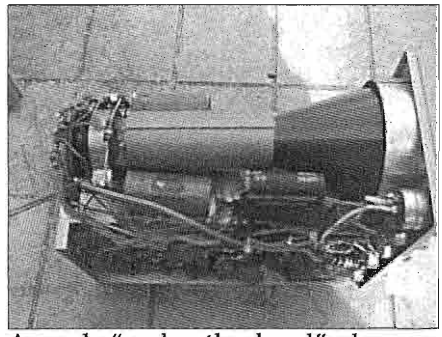
Heathkit HO-10 Power Transformer Modification

by Hal Guretzky, K6DPZ
Land Air Communications
95-15 108th St.
Richmond Hill, NY
11419

This is a modification I designed to be used on the Heathkit HO-10 monitor scope. Many of the Heathkit monitor scopes are common sights at flea markets, Hamfests, on ebay, and elsewhere. Sometimes you are told that it either hasn't been plugged in or hasn't been used, or that it works well. When you get the scope home and plug it in, you find out that it doesn't work. This happened to me, and when I opened the cabinet up and looked at the electronics, I found out that the "famous" power transformer was no good because it was internally shorted. What happens to the Heathkits of this vintage is that the transformer had a multiple high voltage and two filament windings, and a medium voltage winding. The high voltage winding tends to break down after a long period of time, and there is a big problem now with these transformers. New transformers are available, but are over $125.00. I decided that there was no way I was going to spend that much money for



The classic Heathkit HO-10 Monitor Scope was produced from 1962 to 1966 and had just about everything needed to make all kinds of tests and adjustments in one affordable package. Included by the designers was a built-in two-tone audio generator for testing SSB transmitters and linear amplifiers. The tones were available directly at mic level. To prevent the CRT phosphor from burning, a clamp circuit deflects the electron beam when there are no input signals present. For AM transmitter adjustments, it gives an excellent, sharp trapezoidal pattern. The HO-10 was repackaged to match the SB series about 1966 and was renamed the SB-610.



A peek "under the hood" shows a compact, yet accessable component layout. It is serviceable without an investment in extensive test equipment. An additional feature is the ability to monitor a receiver's IF in the 500 kc range.

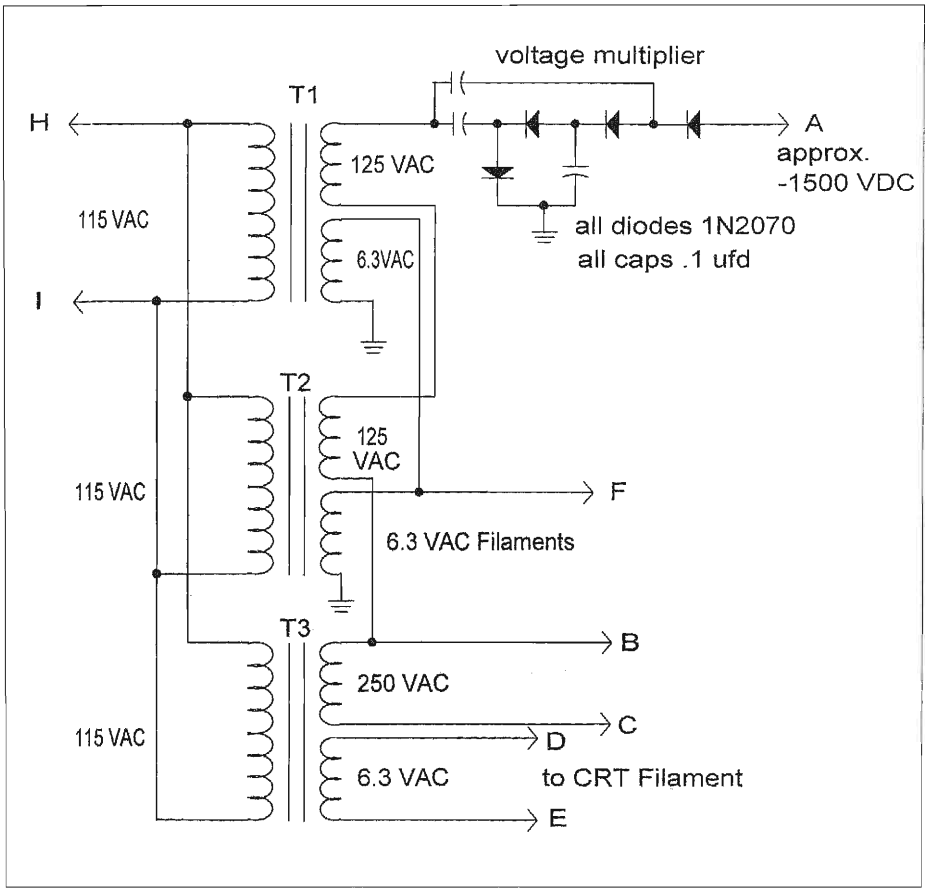


Figure 1: This is the complete power supply schematic for the HO-10 as described in the text. T1, T2, and T3 can be filament transformers that are 110/220 volt and which use one of the primary windings as a sceondary. They should be rated at no less than 1 amp. Point "G" is not shown, but is connected to chassis ground.

that type of transformer, so I sat down and designed a way to replace the transformer with inexpensive, commonly available filament transformers and a voltage multiplier.

How It's Done

I removed the old transformer, leaving the 1V2 tube socket in the scope, as there is no need to remove it. As shown in Figure 3, I installed three small transformers. Two of the transformers have 115-volt primaries and 6.3-volt secondaries, and the third is a 115-volt primary, 250-volt center tap/6.3 volt secondary. On an oscilloscope, you need an isolated filament winding for the CRT because the filament and cathode are brought way above ground potential. Referring to the schematic, Figure 1, I am using T1 and T2 with the filament windings in parallel to supply filament power for all of the tubes in the scope. On T3, there is another 6.3 VAC winding which supplies the CRT filament. The scope requires about 250 volts DC for the B+ supply, so I used T3 with 125 volts each side of the center tap and fed it to the half-wave doubler

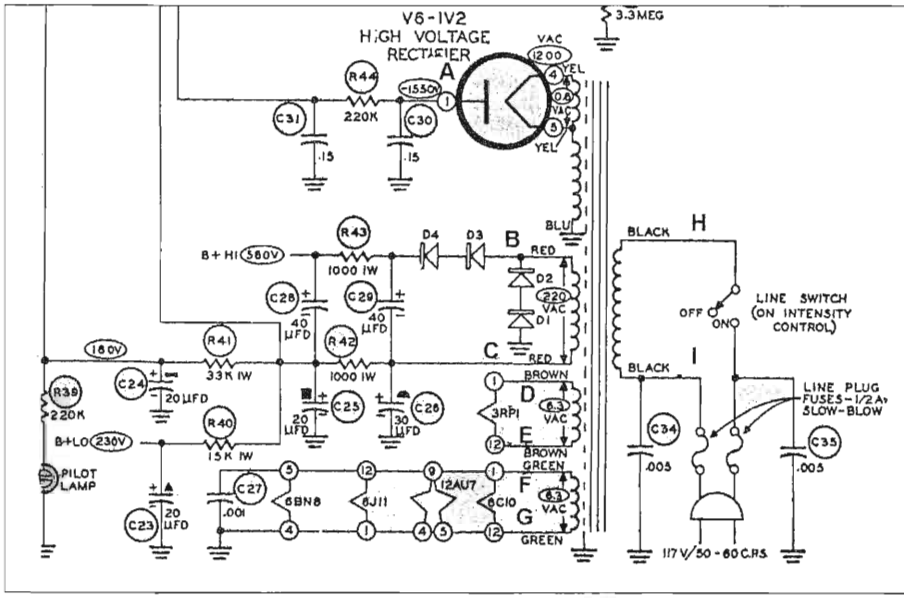


Figure 2: This is a partial schematic for the HO-10 monitor scope. The capital letters "A" through "I" have been added, and show where the components in Figure 1 should be installed by matching up the letters.

at points B and C to get the basic B+ voltage for the operation of the scope. I also needed about –1500 volts for the CRT. I got the high voltage by adding the 250 volts from T3, adding it to the two 125-volt windings on the T2 and T1 secondary windings, which equal about 500 volts. I built a standard voltage quadrupler that is shown on the schematic going to point A. The capacitance in the multiplier is not very high, so the efficiency of the multiplier won't charge up much over –2000 volts DC, but in my circuit it came out at about –1500 volts which is about right for the 3RP1 CRT. Point A is where the original 1V2 was used to rectify the high negative voltage for the CRT. The original filter circuit consisting of C30, R44, and C31 is retained.

When I completed the modification and put the scope back together I found out that it works very well, and I spent less than $25.00 on parts. It took a little bit of time, but now I have a monitor scope that will last a long time.

There were a lot of scopes made by Heathkit that used the same concept for the power supply. The HO-13 and SP-620 panadapters used the same basic power supply. The SP-610 used a voltage doubler; so instead of the quadrupler shown here, use a doubler. This is a conceptual way of repairing this style of power supply, and is applicable to many types of scopes or homebrew monitor scopes. There are thousands of these monitor scopes around and many have bad power supplies. Now there is a way to bring them back to life and use them for many years to come. All you need to do is heat up your soldering iron and get busy!

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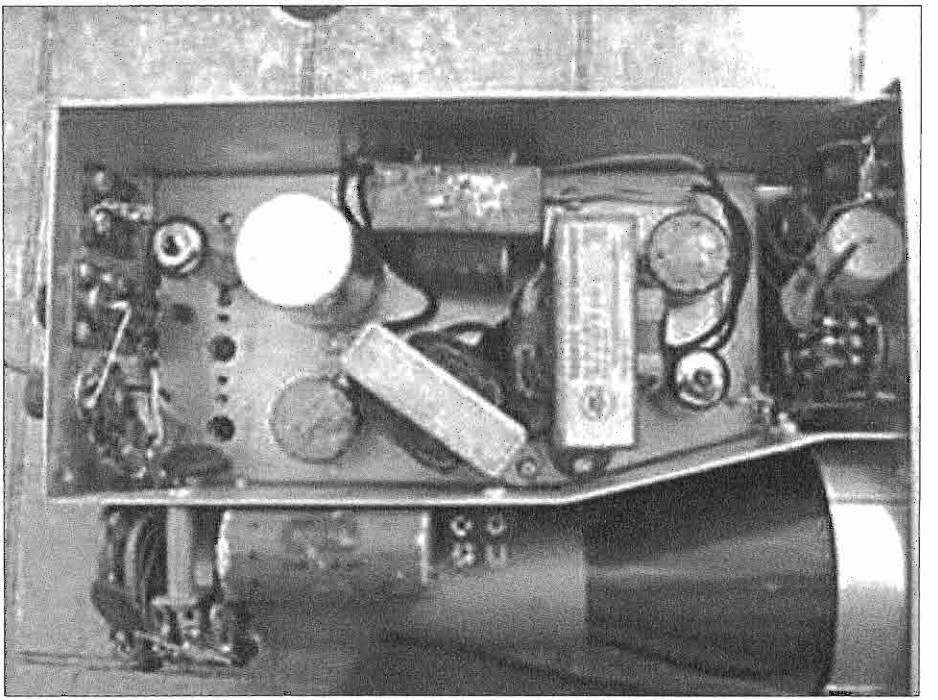

Figure 3: The replacement transformers fit snugly into the chassis in the position formerly occupied by the 1V2 high-voltage rectifier.

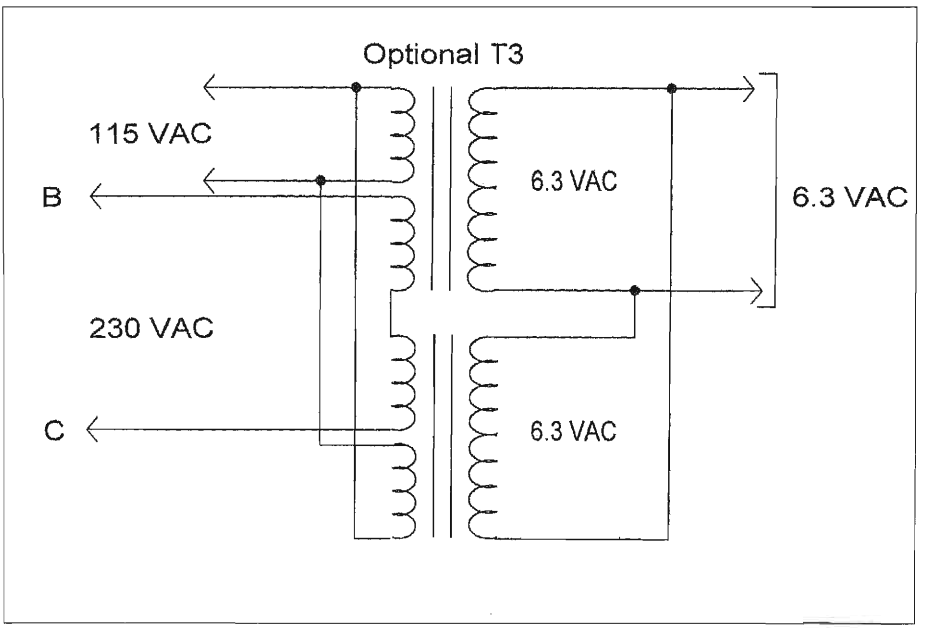

Figure 4: An optional configuration for T3 using different transformers.

What's a Lysco Transmaster 600?

by J. D. "Mac" MacAulay, WQ8U
6235 Wooden Shoe Lane
Centerville, OH 45459-1557
WQ8U@ARRL.NET

The Lysco Transmaster 600 is a true classic 1950s ham transmitter. It covers 160 through 10 meters, has an internal VFO and an 807 final. It is solidly built and has impressive styling; see Figure 1. Al Hayes, W2BFY, summarized it in his August 1950 review of the rig in CQ Magazine[1], as "a mighty attractive little unit."

But it is more than a classic rig; it has a history intertwined with the Classic Exchange (CX). That history begins with Stu Stephens, K9SJ (SK) [2] a founder of the Nostalgia Exchange, which has become the CX. Stu used a Transmaster 600 as his anchor rig then and it was featured in his December 1976 QST article: "What's a Lysco Transmaster 600? Or The First Nostalgia Radio Exchange."[3]

In the February 2003 CX, I worked Jim (W8ZR), who was operating a Transmaster 600. It was a great sounding little rig and, remembering the QST article by Stu, it immediately went on my "Nice to have one some day" list. Don't we all have lists like that? The fates smiled on me at the 2003 Dayton Hamvention; there was Jim with that very rig for sale. After a little negotiation, it was mine. Since then I have had the pleasure of learning about the simple beauty of it, undoing some of the "Why in the world did he do that?" modifications made by previous owners (not W8ZR), and receiving positive comments while operating it.

Lysco Manufacturing Co. was located in Hoboken, NJ, in the 1950s and produced a variety of ham gear including

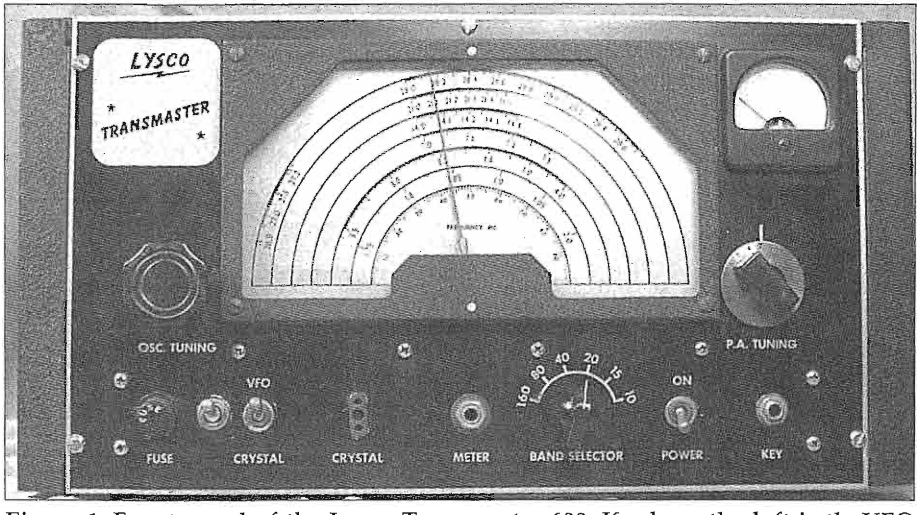

Figure 1: Front panel of the Lysco Transmaster 600. Knob on the left is theVFO tuning control and the knob on right is final tuning. "Meter" jack is for an external grid current meter.

code practice oscillators, grid dip meters, single band fixed and mobile transmitters, multi band transmitters, and companion modulators. The Transmaster 600 was part of a series that baselined with the Model 500, then added TVI filtering to become the Transmaster 600 and added an internal a clamp tube modulator to make the 500S or 600S. All in the same impressive external configuration – the antenna and microphone connections were inside the cabinet! The August 1950 QST carried an ad from Leeds Radio in NYC offering the Transmaster 600 for $119.95. This is a good price considering other 807 final transmitters such as the Harvey-Wells Bandmaster Senior were selling for $111.50 with modulator but without VFO or power supply.

The Transmaster 600 circuitry consists of a 6AG7 Colpitts variable frequency oscillator, a 6AG7 buffer-doubler, and an 807 power amplifier. The transmitter has single knob band switching; the only controls required for operating are the VFO and the PA final tank capacitor. There is a 0-150 MA meter showing the 807 plate current. The oscillator operates on 160, 80 or 40 meters; the buffer is untuned on 160 and 80 and has broadly tuned circuits for the four higher bands. The final operates Class C and is straight through on all bands. The 807 operates with 430 VDC on the plate at 100 MA. The output through the low-pass filter is a nominal 50-ohm with coax connector, which is seen on the top of the chassis in Figure 2.

Lysco was one of the early leaders in addressing the TVI problem that was the bane of Ham radio in the 1950s. The upgrade of the Transmaster 500 to a 600 primarily consisted of adding a filter at the AC power input to keep RF off of the power line and adding a low

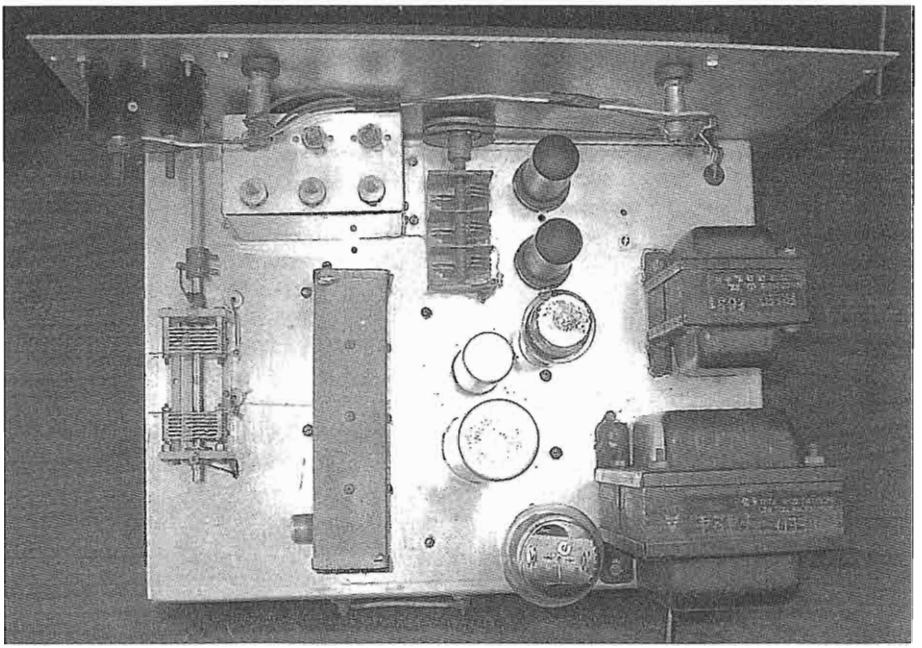

Figure 2: This top view shows the adjustments at top left that set the VFO calibration. The long box contains the output low pass filter. The VFO tuning capacitor is on the right, and the final output tuning is to the left.

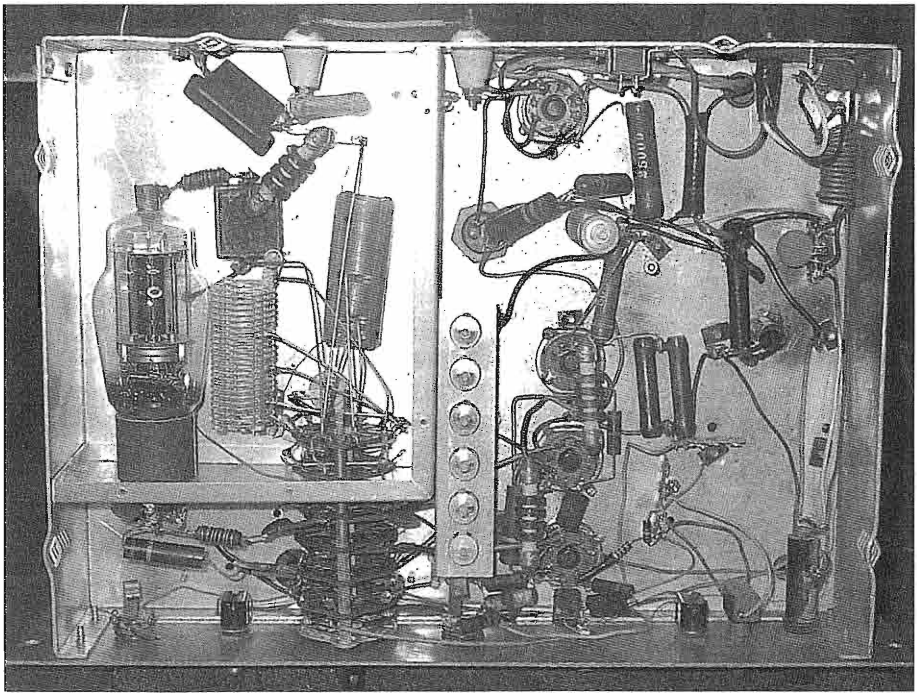

Figure 3: Bottom view of the Transmaster 600. The compartment on the left holding the 807 amplifier and its output circuit coils is normally covered with a solid metal plate. The adjustments to the right of the 807 compartment are 6AG7 buffer/doubler tuning. Note the B+ link on the back apron.

pass filter to the RF output to keep TVI harmonics off the antenna. The basic design had already enclosed the 807 in a shielded enclosure that controlled radiation from the amplifier, so the mechanical configuration of the Transmaster was unchanged in the upgrade.

There are a number of peculiar features that made the Transmaster 500/600 family special. The oscillator can also be crystal controlled. That offered the answer to a 1950s Novice's prayers – the crystal could be "rubbered" with the VFO. I have measured several crystals and typical results are: Crystal frequency: 3706 Kc. Maximum pull: 3697 Kc. Beyond that 9 Kc. shift, the oscillation stops. This is more than enough to get you out from under a California KW when needed. With frequency multiplication to the higher bands, the frequency pulling increases as expected.

Another peculiar feature, which is a mixed blessing, are the two ceramic terminals on the rear apron that are the jumper for the B+ going to the final. In normal operation these two are wired together to get the B+ out of and back into the rig. If you want to use an external plate modulator, it is easily connected to these terminals. The down side, unfortunately, is that 430 volts are waiting for you behind the transmitter; there is a significant shock hazard.

A third peculiarity is the mechanical design for the 807 circuits. The grid and plate circuits are well isolated to avoid the need for neutralization of the stage. The 807 is laying on its side

under the chassis, along with the coils and band switch, all in a metal enclosure. It obviously gets really hot in there because the plastic supports between the turns of the AirDux coils become brittle and disintegrate over the years. Figure 3 shows the bottom of the chassis and the 807's hotbox.

The instruction book, all four pages plus schematic and parts list, is written for the entire Transmaster 500, 500S, 600, 600S line and even includes calibration instructions. The only difference is the model number rubber stamped on the cover! Also, a single schematic provided is for all four configurations. Both of these prove that, contrary to modern day experience, manuals and schematics can be simple, clear and comprehensive.

The modifications made by prior owners are always a source of amazement and astonishment when opening older rigs like the 600. As an example, this transmitter had a small DPDT relay added to switch 110 VAC to a newly added socket on the back apron; the relay was controlled by a newly added toggle switch on the front panel and, one suspects, was to control an antenna change over relay requiring 110 VAC. The interesting aspect is the internal relay coil requires 110 VAC so one wonders, why use the relay? I removed the relay and changed the wiring to use the new switch for VFO spotting.

The bottom line is the Lysco Transmaster 600 is a simple and capable little rig that is easy to work on, fun to operate and looks great next to a vintage receiver. Mine will be on the air in the next Classic Exchange. Listen for it on 40 or 80 CW and join in the Lysco experience.

Footnotes:

1 – "CQ Tests The Lysco Transmaster, Hayes, CQ Magazine, August 1950

2 – "What's a Lysco Transmaster 600? Or The First Nostalgia Radio Exchange", Stephens, QST, December 1976.

3 – "Stu Stephens, K8SJ, Silent, Key", Hanlon, Electric Radio Magazine, July 1996

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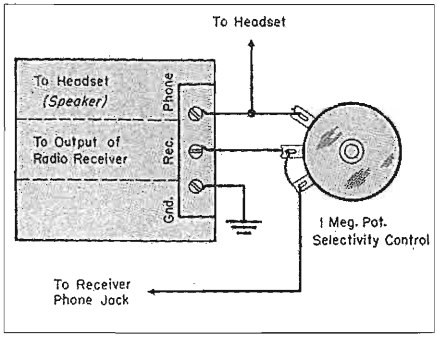
Lysco ad from QST, August 1950

Repackaging a Variable Selectivity FL-8A Audio Filter

by Louis L. D'Antuono, WA2CBZ
8802 Ridge Blvd.
Brooklyn, NY 11209

Many years ago, I borrowed a few bound volumes of *CQ Magazine* to browse through. In one of the volumes, I came across an article on constructing a variable selectivity audio filter. The basis for this unit was an FL-8A Radio Range Filter that had been used by the military during World War II as a radio beacon audio filter. It came with a variable bandwidth switch, but this would not be nearly adjustable enough for convenient CW reception. The article described how a potentiometer wired into the circuit of the unit would resolve this deficiency. The control was mounted on a metal plate that was itself mounted on the audio filter housing. When I saw the picture showing this method of fastening, it did not seem decorative enough for my operating bench. I decided to repackage all of the components into a 3 x 5 x 4 aluminum minibox. Audio cable was used for all of the connections. I even utilized the original phone plug that was attached to the original FL-8A filter. Rubber feet were attached to the enclosure to inhibit scratching. I then used dry transfer labels on all functions to give the project a more refined and finished look. I recommend that any builder get a copy of the original article before commencing.



The original FL8-A wiring diagram from May, 1950 CQ Magazine.

Operating this unit was quite simple. It plugs directly into the high impedance jack on a receiver, and the operator's headphones plug into the unit. Depending on how the potentiometer was wired, turn the control knob completely clockwise or counterclockwise to allow full reception without any audio filtering. Tune into a strong CW signal. Then turn the knob in the appropriate opposite direction and the audio filter circuit will be slowly engaged. The operator will then take notice that the background noise and adjacent signals will drop off and the desired signal will be clearer though it will lose some of fits original signal strength. As the control is rotated further in the same direction, more of the effectiveness of the audio filter will be noticed until there is a ringing sound in the headphones. At this point the operator should now turn the control in the opposite direction until the optimal usefulness of this unit is obtained. For some time this will be a process of trial and error. The limitation of this audio filter is that there is no amplification of the signal at the output. In the past, similar filters have been wired into the first audio stage of a receiver to allow the second audio stage to amplify only the filtered signal. This pro-

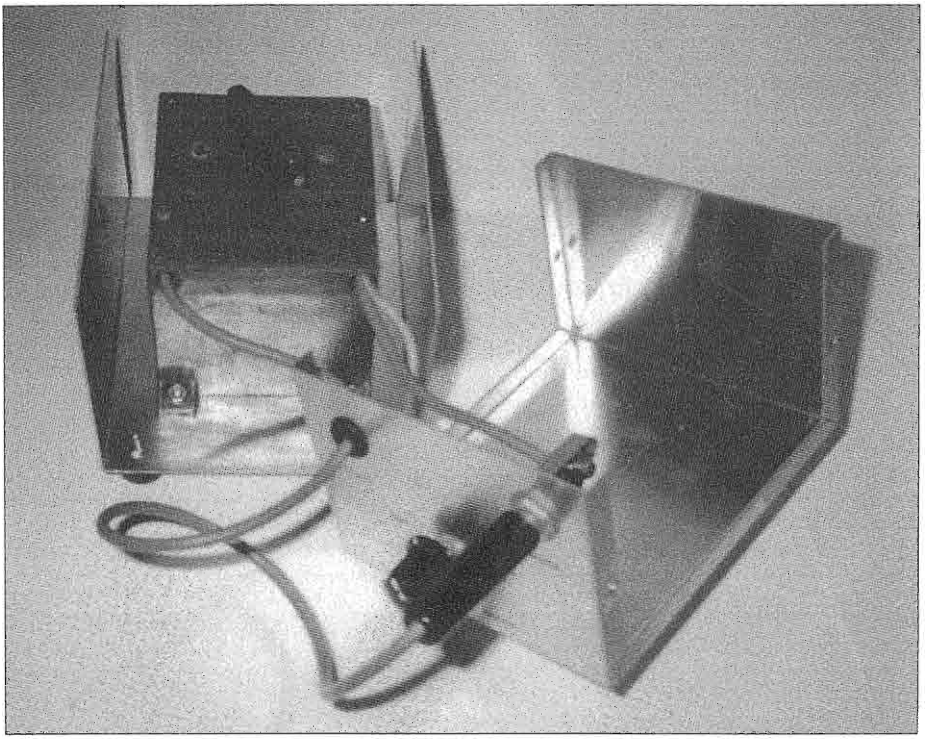
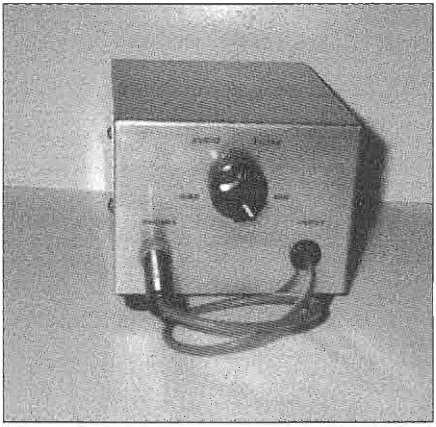


Figure 1: This is how I repackaged my FL8-A filter into an aluminum minibox in order to make a more attractive station accessory. Rubber feet on the bottom prevent scratching my operating table.

cess was used in the Navy's RAL and RAB regenerative receivers during World War II. Some of these audio filters were adjustable in steps but not continuously variable with a potentiometer as described earlier in this article. Using this modified audio filter with my BC-342 receiver has been very promising. The BC-342 contains a crystal filter as a standard feature connected to a phasing control to vary its bandwidth. Combining these different types of filters presents a challenge for an amateur operator. As a matter of practice, operators usually adjust the phasing control on the BC-342 to get the lowest noise figure and a clear signal Consequently, this results in severe attenuation of the desired station. In the past, many ideas have been proposed to rectify this shortcoming. These range from moving the shorting bar on the phasing control to rewiring the stage completely. I have devised a method to circumvent the inherent deficiency in this control. This involves turning the phasing control to the point of greatest selectivity. Then turn the knob slightly to the left or right of this point to get a louder signal, which will include more background noise and interference. At this point, I will now engage the modified FL-8A unit, but in this case it will have a dual effect. First, it will cut down the background noise. Secondly, it will allow a narrower and clearer signal to reach the headphones. This is because the crystal filter has been slightly bypassed but the signal is still filtered. Undoubtedly, the signal



When the minibox is assembled, the complete filter makes a small, attractive package.

strength will be somewhat diminished, but the resultant signal to noise ratio will be greater, allowing for greater comprehension.

Bibliography

Conklin, E. H., Commander, W3JUX, "Improving Receiver Selectivity," *CQ Magazine*, March, 1946.

Evenson, R. C., Beach, O.R., "Converting the BC-342 Receiver," *Surplus Radio Conversion Manual*, #1, Second Edition, 1948.

"The BC-312 and BC-342 Series Receivers," *Surplus Radio Conversion Manual*, Volume #3, William I. Orr, Ed., 1960.

Tyakewicz, John P, WIHXU, "Variable Audio Selectivity with the Surplus FL-8 Filter," *CQ Magazine*, May, 1950.

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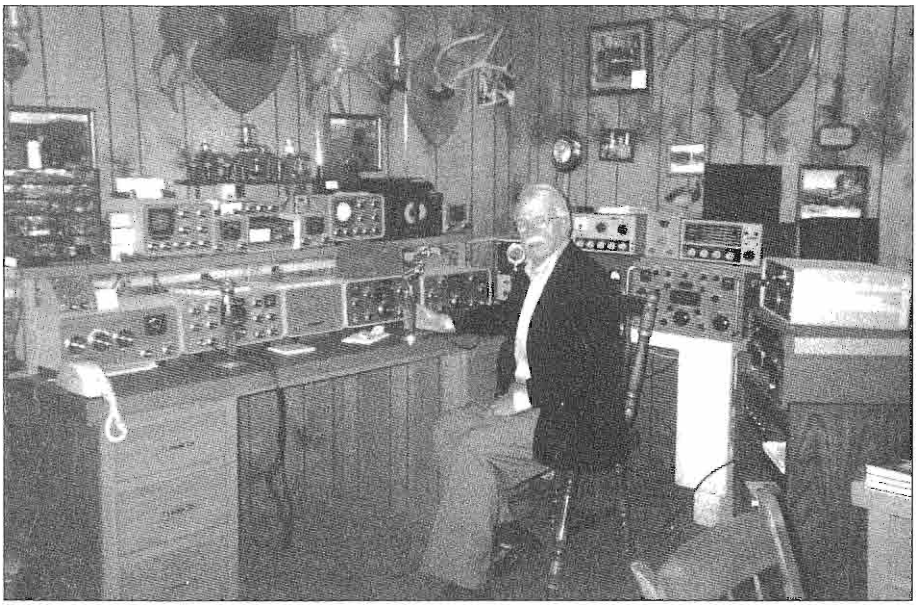


Bob Speckhals (WBØDMC) is on the air from Faribault, MN. Bob was first licensed in 1971 as a Novice, and currently hold an Extra ticket. Heath equipment is a favorite of Bob's, and here we see some of his classic equipment that includes an SB-102, SB-200, a monitor scope and scanalyzer, an SB-300 and SB-400. The shack has many non-Heath pieces, such as a Central Electronics 100V, a Viking II and its 122 VFO, Hallicrafters S-76, S-38, and S-85. He also runs an R390A. Bob says that "Radio is truly 'magic' and AM has restored the magic for me." We couldn't agree with you more, Bob!

Modifying the Swan 500 for AM

by Robert Burger WB6VMI
jrb@csun.edu

The goal is a classical tube-based multiband transceiver for AM that also works for CW and SSB. Unfortunately, original Swan audio is restricted to single sideband (with carrier) in the range from 300 Hz to 2.7 kHz. The modification below achieves greatly improved double sideband AM using a method similar to that used in my TMC GPT 10K.

The conversions below are intended to be reversible. They involve two micromini switches, one for AM transmission, and one for AM reception that may be mounted on the side panel. These switches enable miniature relays under the chassis for push-to-talk control.

You will need a working Swan and a manual with schematic (It is assumed that you will not touch any of the internal calibration adjustments during the conversion). You will need an audio generator for the microphone jack (with a method to activate the push to talk), an oscilloscope, a pickup coil to monitor the output waveforms, and a dummy load for the RF output. These modifications are well worth the effort, because they result in noteworthy AM while retaining original features of the Swan 500. Care must be taken with other types of Swan because they may use different schematic references. Initially it is mandatory to unplug power, and to disconnect the plate and screen grid voltages from the RF power tubes to avoid accidental overload.

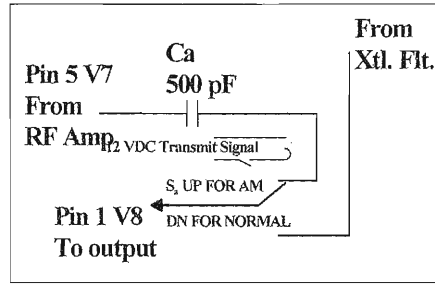
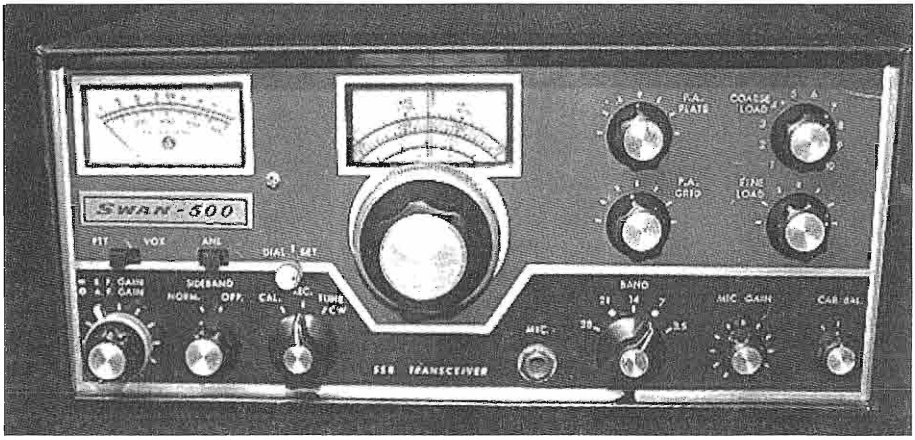


Figure 1: Switch S_a is up for AM transmission and down for normal Swan operation.

Step 1. Connect S_a and a DPST relay to bypass the SSB filter as in Figure 1. Shielded wire is employed to avoid stray coupling that can partially by-



pass the filter in narrow band (SSB or AM reception) position.

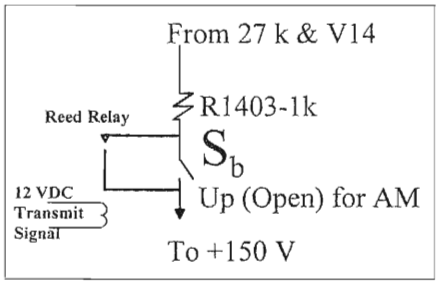


Figure 2: S_b is up for AM reception, and down for normal Swan operation.

Step 2. For AM reception, connect S_b and a reed relay to remove voltage from the BFO as in Figure 2.

Inspecting The Carrier

With S_a set for AM, the purity of the carrier may be checked. If any noise is evident V13, the 7360 tube used for carrier balance, needs to be replaced with a better modulator.

Step 3. In place of the 7360 use a 12AU7A. The 12AU7A may be used if R1106, the 120 W, is opened from the circuit. The 12AU7A is connected for 6.3 VAC, so pins 4 and 5 are connected together while pin 9 is grounded. (Note that the 12AU7A takes 0.3 A and is in parallel with V15, which also takes 0.3 A. This parallel combination is in series with V11 which delivers 0.6 A). Make sure the tubes light up properly.

Step 4. Install a cathode follower for the audio as in Figure 3. Note that Re is connected to the –110/0 VDC to cut off the audio for CW/receive. The cathode follower maximum audio output will be about 1 V p-p.

Step 5. Install an amplifier for the carrier oscillator as in Fig. 4. The tuned circuit was placed near the carrier balance control. Ck should be easy to reach; it was connected to the 12AU7A with shielded wire in an attempt to minimize radiation of the 5.1 MHz signal. Once working, the amplifier delivers over 10 V P-P.

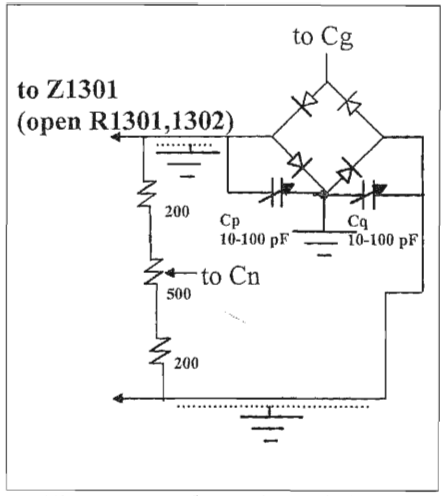


Figure 5: Balanced modulator

Step 6. Install the balanced modulator as in Figure 5. This may be accomplished on a small terminal strip soldered to a ground point over V17, the 100 kHz calibrator. A 500 ohm pot replaces the existing carrier balance control. The two wires from the carrier balance control were shielded. Cp and Cq should be easy to reach.

Adjustment Procedure

Employ the oscilloscope to watch the signal on Ck and tune Lj and Ck to resonance. Do this before coupling Ck to the 500-ohm pot, which greatly lowers the sharpness of the tuning.

Activate the push to talk with no audio and use the oscilloscope to watch the carrier level to the grids of the finals. Begin with Cp and Cq set to minimum capacitance. Adjust the 500 ohm pot to null the carrier as best as possible. Then, while nulling with the 500 ohm pot, increase either Cp or Cq to null the carrier to absolute zero (one of these is left at minimum capacitance).

Increase the carrier level slightly and apply a small amount of audio. You should observe AM. Ck, Cp, and Cq are available to ensure 100% modulation.

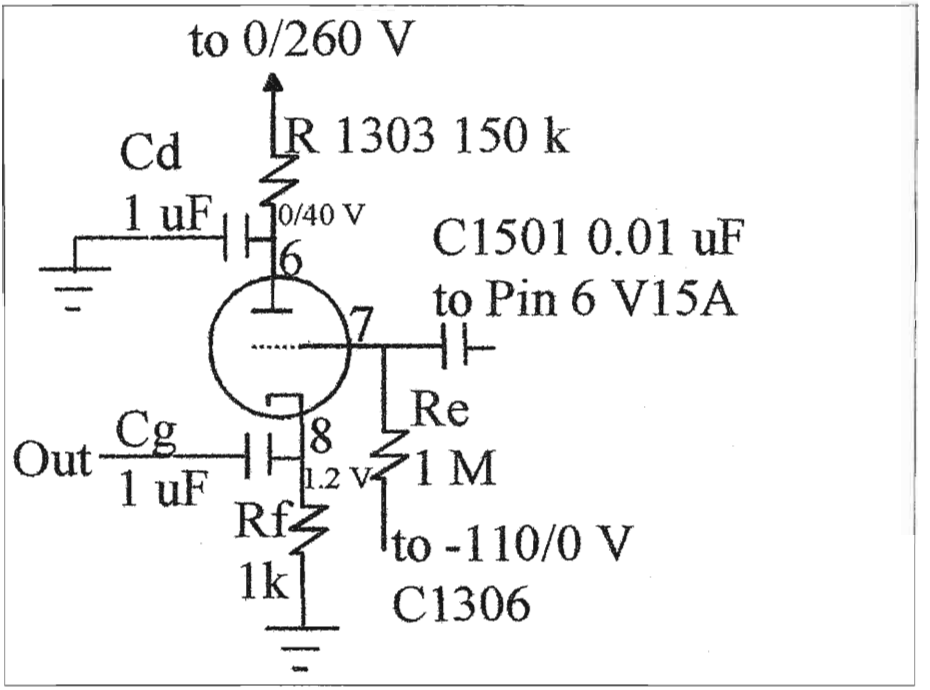


Figure 3: Cathode follower circuit

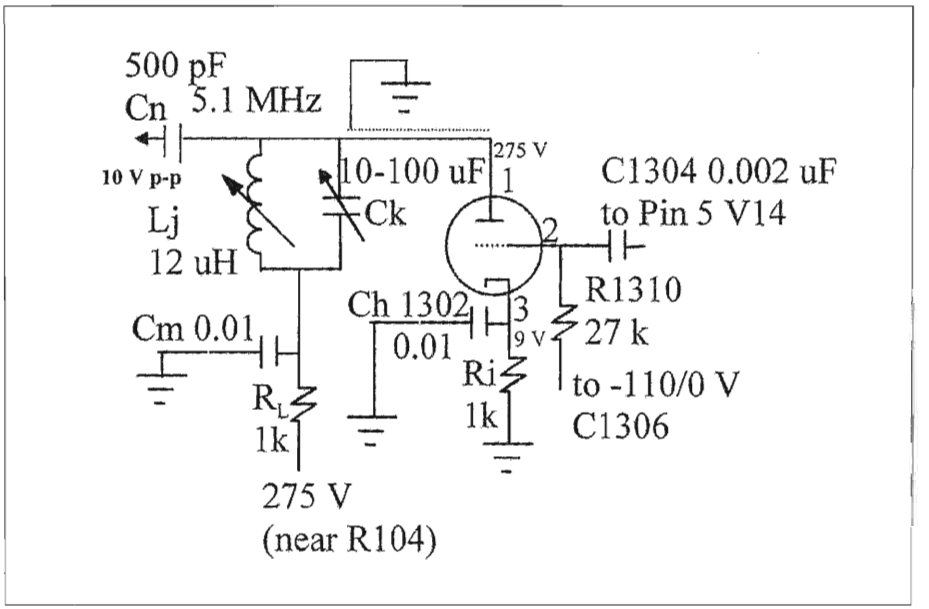


Figure 4: Crystal oscillator amplifier

Do not use the CW/Tune switch until the conversion is completely done, using only push to talk. Reconnect the final tubes and a dummy load, making sure that audio and carrier are nulled. Repeat the above adjustments with the output tuned for about 20 watts of carrier. Since the diodes are not matched exactly, a change in operating conditions will change performance slightly, although not significantly.

Table 1 is the parts list. It is suggested that you order extra parts in case a friend wants you to do the conversion.

The author brings out a wire from the antenna relay in the Swan transceiver to drive an external receiver for better AM fidelity.

Carrier power for the Swan at 100% AM modulation can be 50 W or more, although operation in the 15 W range is suggested. A linear amplifier rated for AM is recommended.

Table 1 Parts list.	
Ca, Cn	500 pF
AM Relay	DPST miniature
Reed Relay	SPST miniature
Sa, Sb	micromini DPDT switch
Cd, Cg	1 uF unpolarized
Re	1 Meg
Rf, Ri, RL	1 k
Lj	12 uH (approximate)
Ck, Cp, Cq	10-100 uF Variable
Cm	0.01 uF
4 Diodes	germanium
500 Ω Pot	0-500 Ohms Variable
Rx, Ry	200 Ohm

Table 1: Parts list for the Swan 500 AM Conversion

Transmission audio bandwidth was measured to be 50 Hz to 10 kHz, better than many boatanchors. Distortion in a typical plate modulated rig has been measured in the 5-10% range, although audio feedback lowers it to the 1-2% range[1]. For that extra ounce of fidelity, the author employs appropriate audio feedback[2]. In conclusion, the Swan is more fun than before, plus it sounds much better.

The TMC GPT 10K whose modulator inspired this project may be viewed at www.qrz.com under WB6VMI.

Footnotes:

1. Measuring Distortion in AM Transmitters, ER #78, Oct. 1995.

2. Communications SSB to Quality AM Using Audio Feedback, ER #140, Jan. 2001.

ER

An on-line index to the entire run of Electric Radio Magazine may be found at: www.qsl.net/n9oo/ersearch.html or under the "Links" tab at www.ermag.com.

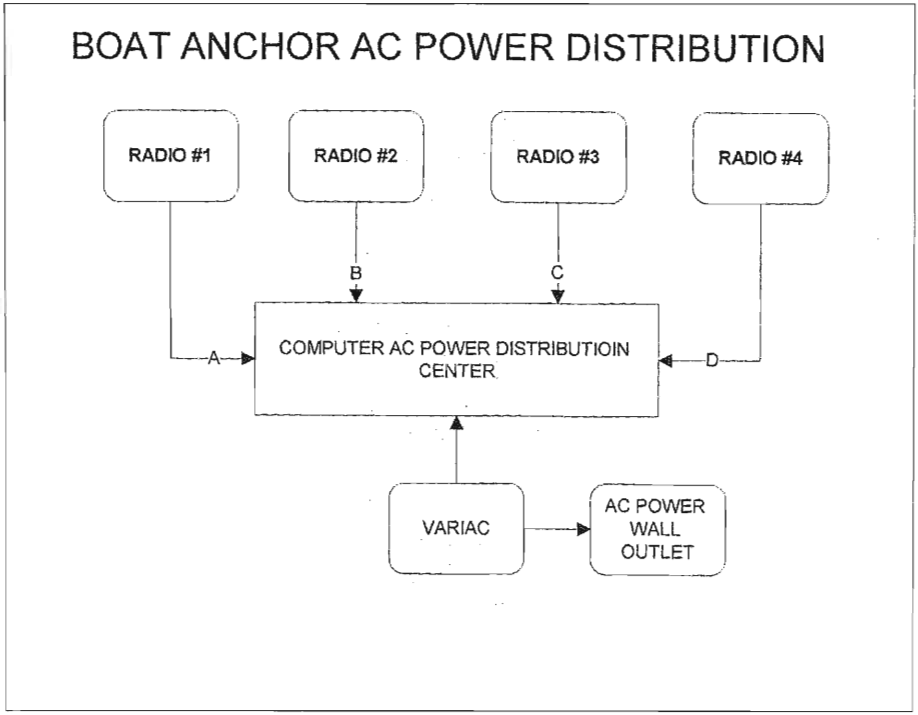
To join AM International, send $2.00 to AMI, PO Box 1500, Merrimack, NH.

Boatanchor Equipment AC Power Distribution

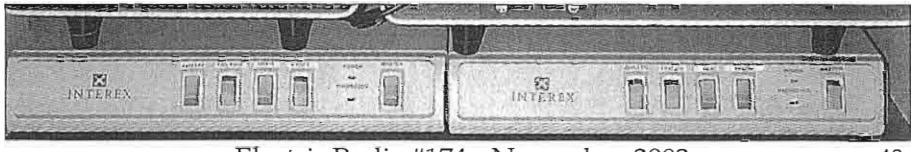
by Mark Gilger, WBØIQK
11827 Fraze Rd.
Doylestown, OH
44230

I've heard it more than once; "The power on/off switch on my boat anchor failed and it's so old I can't find a replacement."

I decided long ago that I was never going to be caught saying this. What I did was purchase several computer AC power distribution centers. I positioned them on my operating table to handle all the AC power needs of my equipment. The power switches on the radios are left in the 'ON' position. The distribution center switches are what get cycled on/off. It works great.



The drawing above is a wiring distribution diagram that shows how easy it is to install the power distribution equipment, and below is a photo of the actual "Interex" units that I used. Similar control boxes are available at nearly every computer store.



VINTAGE NETS

Arizona AM Nets: Sat & Sun: 160M 1885 kc at sunrise. 75M 3885 kc at 6 AM MST. 40M 7293 kc 10 AM MST. 6M 50.4 mc Sat 8PM MST. Tuesday: 2M 144.45 7:30 PM MST.
Boatanchors CW Group: QNI "CQ BA or CQ GB" 3546.5, 7050, 7147, 10120, 14050 kc. Check 80M winter nights, 40 summer nights, 20 and 30 meters day. Informal nightly net about 0200-0400Z.
California Early Bird Net: Saturday mornings at 8 AM PST on 3870 kc.
California Vintage SSB Net: Sunday mornings at 8AM PST on 3860 +/-
Colorado Morning Net: An informal group of AM'ers get together on 3875 kc Monday, Wednesday, Friday, Saturday, and Sunday at 7 AM MT.
Canadian Boatanchor Net: Meets daily on 3725 kc (+/-) at 8:00 PM ET. Hosts are AL (VE3AJM) and Ken (VE3MAW)
Collins Collectors Association Nets: Technical/swap sessions meet every Sunday on 14.263 mc at 2000Z. Informal ragchew nets meet Tuesday evening on 3805 kc at 2100 Eastern time, and Thursday on 3875 kc. West Coast 75M net is on 3895 kc 2000 Pacific time. **10M AM net starts 1800Z on 29.05 mc Sundays, QSX 1700Z.**
Collins Collector Association Monthly AM Night: Meets the first Wednesday of each month on 3880 kc starting at 2000 CST, or 0200 UTC. All AM stations are welcome.
Collins Radio Association nets: Mon. & Wed. 0100Z on 3805 kc., also Sat 1700Z on 14.250 mc.
Drake Technical Net: Meets Sundays on 7238 kc, 2000Z. Hosted by John (KB9AT), Jeff (WA8SAJ), and Mark (WBØIQK).
Drake Users Net: This group gets together on 3865 kc, Tuesday nights at 8 PM Eastern Time. Net controls are Gary (KG4D), Don (W8NS), and Dan (WA4SDE)
DX-60 Net: This net meets on 3880 Kc at 0800 AM, Eastern Time on Sundays. Net control is Mike (N8ECR), with alternates. The net is all about classic entry-level AM rigs like the Heath DX-60.
Eastern AM Swap Net: Thursday evenings on 3885 kc at 7:30 PM Eastern Time. Net is for exchange of AM related equipment only.
Eastcoast Military Net: Check Saturday mornings on 3885 kc +/- QRM. Net control station is W3PWW, Ted. It isn't necessary to check in with military gear, but that is what this net is all about.
Fort Wayne Area 6-Meter AM net: Meets nightly at 7 PM Eastern Time on 50.58 mc. This is another long-time net, meeting since the late '50s. Most members use vintage or homebrew gear.
Gray Hair Net: The oldest (or at least one of the oldest at 44+ years) 160 meter AM nets. Net time is Tuesday evening on 1945 kc at 8:00 PM EST and 8:30 EDT. Also check www.hamelectronics.com/ghn
Hallicrafters Collectors Association Net: Sunday on 14.293 mc, 1730-1845 UTC. Control op varies. Midwest net Sat. 7280 kc 1700Z. Control op Jim (WB8DML). Pacific Northwest net Sunday 7220 kc at 2200Z. Control op Dennis (VE7DH).
Heathkit Net: Sunday on 14.293 mc 2030Z right after the Vintage SSB net. Listen for W6LRG, Don.
K1JCL 6-meter AM repeater: Operates 50.4 mc in, 50.4 mc out. Repeater QTH is Connecticut.
K6HQI Memorial Twenty Meter Net: This flagship 20 meter net on 14.286 mc has been in continuous operation for at least 20 years. It starts at 5:00 PM Pacific Time and goes for about 2 hours.
Midwest Classic Radio Net: Meeting Saturday morning on 3885 kc at 7:30 AM, Central Time. Only AM checkins are allowed. Swap and sale, hamfest info, and technical help are frequent topics. Control op is Rob (WA9ZTY).
MOKAM AM'ers: 1500Z Mon. thru Fri. on 3885 kc. A ragchew net open to all interested in old equipment.
Northwest AM Net: AM activity is daily 3 PM to 5 PM on 3875 kc. The same group meets on 6 meters at 50.4 mc. Times are Sundays and Wednesdays at 8:00 PM. 2 Meters Tues. and Thurs. at 8:00 PM on 144.4 mc. The formal AM net and swap session is on 3875 kc, Sundays at 3 PM.
Nostalgia/Hi-Fi Net: Started in 1978, this net meets Friday at 7 PM Pacific Time on 1930 kc.
Old Buzzards Net: Daily at 10 AM local time on 3945 kc in the New England area. Listen for net hosts George (W1GAC) and Paul (W1ECO).
Southeast Swap Net: Tuesday at 7:30 PM Eastern Time on 3885 kc. Net controls are Andy (WA4KCY) and Sam (KF4TXQ). Group also meets Sunday on 3885 kc at 2 PM Eastern Time.
Southern Calif. Sunday Morning 6 Meter AM Net: 10 AM on 50.4 mc. Net control op is Will (AA6DD).
Swan Nets: User's Group meets Sunday at 4 PM Central Time on 14.250 mc. Net control op is usually Dean (WA9AZK). Technical Net is Sat, 7235 kc, 1900Z. Net control is Stu (K4BOV)
Vintage SSB Net: Sunday 1900Z-2030Z 14.293 & 0300Z Wednesday. Net control Lynn (K5LYN) and Andy (WBØSNF)
West Coast AMI Net: 3870 kc, Wed. 8PM Pacific Time (winter). Net control rotates between Skip (K6YKZ), DJ (K6RCL), Don (W6BCN), Bill (N6PY) & Vic (KF6RIP)
Westcoast Military Radio Collectors Net: Meets Saturday at 2130 Pacific Time on 3980 kc +/- QRM. Net control op is Dennis (W7QHO).
Wireless Set No. 19 Net: Meets the second Sunday of every month on 7270 kc (+/- 25 Kc) at 1800Z. Alternate frequency is 3760 kc, +/- 25 kc. Net control op is Dave (VA3ORP).

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

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FOR SALE: QST, 1944, 1945, 1949, 1953, 1954, 1955, 1956, 1957 $10 each year + shipping. Alan Lurie, W9KCB, 309-682-1674, 606 E. Armstron Ave., Peoria IL 61603

FOR SALE: Meissner exciter unit, type 02433, Signal Corps (drawer for coils), Hallicrafters Sky Champion. Paul Recupero, 1-401-847-8589

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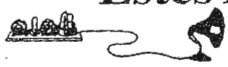

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Some of the radios are a McMurdo Silver Masterpiece V, Leutz C with Antenna Tuner, Ultradyne 9 Tube, Scott World's Record 10, Receptrad 8 Tube with Glass Case, Crosley Pup, Browning Drake 5 Tube, Infradyne w/Remler and Camfield Parts, Infradyne w/Pilot and A-K Parts, R. Jones 1919 Crystal Set, RCA AR 1496, E M Sargent Regen. Shortwave, Hallicrafter SX-9 (Early). Many more Battery Sets, several more Super Hets, Zenith GD 312 Glass Rod, Zenith Chairside, Wood & Bakelite Table Radios.

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FOR SALE: For Sale: NCX-3 and PS-$115, Large, nostalgic Mercury "Drug Store" type tube tester with charts-$ 75, works great. Wanted: Hickok 752A manual.,Carter WD4AYS, 434 979 7383, CElliott14@aol.com

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FOR SALE:GR 1192 frequency counter, manual copy, $45. GR 1666 Kelvin bridge, manual copy, $225. Bach-Simpson wave/ modulation meter, $35. Sencore filament tester, $15. 7&9 tube pin straightener $3. Ross Wollrab, 229 N. Oakcrest Ave, Decatur, IL 62522-1810. rewollrab@aol.com

FOR SALE: Signal Corps Frequency

Meter, Philco, model BC-221-N, 125-20K KHZ; $100; Mike Grimes, K5MLG; 3805 Appomattox Cir; Plano, Texas, 75023, (972) 867-6373. Email:grimesm@flash.net>grimesm@flash.net>

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FOR SALE: Tube Collectors RCA 6181 1KW UHF tetrode and RCA 5820 image orthicon. Norman Hall, W6JOD, 661-399-4101, w6jod@aol.com

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FOR SALE: ARC Type-12 parts. Two radios, mounts, control boxes and connectors. Mike, 510-732-0932

FOR SALE: QST's for sale. Postcard/ phone for list. Many one DOLLAR. First $5, next 4, next 3, etc. Charles Graham, K2GVE, 4 Fieldwood Drive, Bedford Hills, NY. 10507. 914-666-4523

FOR SALE: National NC270, Heath SB303, Hallicrafters Civic Patrol S 94 (30-50 mc) General Radio LP3 signal generator [10 kc-55 mc] Meissner Freq. Standard Drake SPR4 Zenith Royal 1000 transoceanic Johnson matchbox no SWR meter Motorola FM-AM 10 meter mobile W2OQI@OPTONLINE.NET, 17 Inwood Rd, Center Moriches, NY 11934 631-878-1591

FOR SALE:.Eldico SSB100F Nice condition. Full output. All original. S/N 0108. W7FG manual. $400 Rich Dixon W7QZO 541 462-3078 richdix@prinetime.net

FOR SALE: Collins 75A-4 with two filters $1285. 516-F2 supply $265. Joel W4SLH 337 Compass Point Dr, Oriental, NC 28571 252-249-2344

FOR SALE: Heath Sale—QF-1 Q mult; AM-2 SWR; CPO code; HD-15 patch; IT-12 audio. $15 each + Shpg. H. Mohr, W3NCX, 1005 W. Wyoming, Allentown, PA 18103-3131

FOR SALE: Collins KWM-2 & "S" Line repair, Fast service. All work guaranteed 281-351-4953 WB7DYW@EV1.NET http://users2.ev1.net/~wb7dyw/index.htm

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

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

FOR SALE: Lafayette HA-410 AM transceiver, $125; Tecraft Criterion II 6 & 2 meter converters, $100 both. Richard Prester, 131 Ridge Road, West Milford, NJ 07480. 973/728-2454. rprester@warwick.net

FOR SALE: Military whip antennas, 1938 Webber signal generator, make offer. Bruce Beckeney, 5472 Timberway Dr., Presque Isle, MI 49777, 989-595-6483

FOR SALE: Tested good globe 201A $14, 226 $15, 227 $10 and others. Slightly weak tubes guaranteed to work in early radios ½ price shown. Write or e-mail: tubes@qwest.net for a new price list or see www.fathauer.com. George H. Fathauer & Assoc., 688 W. First St. Ste 4, Tempe, AZ 85281, 480-968-7686. Toll Free 877-307-1414

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

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

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

FOR SALE: Tube collectors: 1944 Jennings uranium glass capacitor. Mint in original carton. $20 ppd. Bob Ryan, 1000 S. Gilbert St., Apt 132, Hemet CA 92543-7065

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

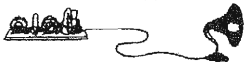
FOR SALE: Your old QSL card? Search by call free, buy find at $3.50 ppd. Chuck, NZ5M, NZ5M@arrl.net

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

FOR SALE: New Ranger 1, Valiant 1, & Navigator plastic dials, freq numbers in green, with all the holes just like orig. - $17.50 ppd. Bruce Kryder, W4LWW, 277 Mallory Station Dr., Ste. 109, Franklin, TN 37067. bak@provisiontools.com

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

Estes Auctions



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Preview: Dec. 12, 4-8 pm and 8-10 am Day of Sale

at the "Expo Auction Center"
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Estes Auctions will sell the excellent radio collection of the late Kenneth Spriggel of Akron, Ohio. Ken was a devoted RCA Collector, an electronic whiz and a very caring and helpful individual. Ken was also secretary of the BARPC Radio Club. We are combining his collection with that of the late Kenneth Blakeman of Fulton, New York.

Some of the items in this collection are a Scott 30 Tube Philharmonic, Scott Sweet Sixteen, Radiola Grand, Radiola IV, Radiola V, Aeriola Sr., Radiola R-S, Model 25, Model 28, Model 20, Model X, Radiola Special, Philco 90 Cathedral, Philco 18, Philco 20, Crosley Ace, Crosley 51, Zenith Console, Philco 70 Cathedral, Radiola 26, 17, 20, 16, Majestic Grandfather Clock, Philco Play Time, Majestic 50, Horn Speakers and other types. Also, a Model 10 Atwater Kent Breadboard.

Lots of Tubes, Parts, Books, Magazines, RCA Console Radios.

Everything in this collection is in Excellent Condition. Ken was a very discriminating collector and the quality of this collection shows it.

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

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

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

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

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

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

FOR SALE: Treasurers from the closet! Go to www.cjpworld.com/micromart to find some unique items many hams would lust for! Gus, WA, 360-699-0038 gus@wa-net.com

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

NOTICE: T-368 Registry. For info w2zr@ao1.com Subscribe to the T-368 & BC-610 reflector at http:/ / groups.yahoo.com/group/T-368_BC-610

FOR SALE: Lots of old radio & related

books. Eugene Rippen, WB6SZS, www.muchstuff.com

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

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

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

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

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

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

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

FOR SALE: Convert any wattmeter to read PEP! Perfect for AM/SSB-$24.95 ppd for complete kit! HI-RES, 8232 Woodview, Clarkston MI 48348, 248-391-6660, info@hi-rescom.com

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

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

feltondesign@yahoo.com

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

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

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

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

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

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FOR SALE: Aluminum heat dissipating plate and grid connectors for all 3, 4 and T series Eimac tubes including 3-500Z, 4-1000, 304T's and others. Alan Price fixr7526@cs.com

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

FOR SALE: Radio tubes, free list. Pair of 45's, used, $50. Galena crystal radios or parts. Len. Gardner, 458 Two Mile Creed Rd., Tonawanda, NY, 14150. email: radiolen@aol.com

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

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

FOR SALE: Yaesu FT-101E good condx with manual $225 Bob W1RMB, work # 508-261-8231 or Robert.Braza@Tycohealthcare.Com

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

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WANTED: Fully functional with manuals: Johnson AN/FRT505 transmitter, Swan F51 and FC76. Contact Ric at C6ANI@arrl.net

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WANTED: Powermaster and Antenna remote switch for Drake C4 Console. Contact Ken Iluk, Kelowna, BC., Canada 250-7648286 or e-mail VE7EHB@rac.ca.

WANTED: For Breting Model 9 general coverage rcvr: Any data, at least a schematic. Ed Allison, 5525 20th Ave, Sacremento CA, 95820

WANTED: ARC-5/T19 Transmitter (3 to 4MC) in mint unmodified condition, single-xmtr. rack, and mount. James Owens, NWØO, 1363 Tipperary St., Boulder, CO 80303, 303-673-9019 (evenings)

WANTED: Please, help me in my NC-183D restoration. Need: S-meter, knobs, toggle switches, bottom covers, L40, T12. If needed, have contact in USA for shipping purposes. NC183D Winter Project: http://jvgavila.com/nc183d.htm. Thanks! JOSE <eb5agv@ctv.es>

WANTED: Desperate... Need Johnson Valiant I or II L.V. Xformer. Thanks! Gary, W5UUO, 450 Cunningham Road; Celina, TN 38551. 931-243-5323 **garynanita@twlakes.net**

WANTED: Two Thordarson T20C53 (or equivalent)chokes. 12 Henry 90 ma 1500V insulation. Brian Roberts K9VKY, 130 Tara Drive, Fombell, PA 16123 724-758-2688 k9vky@arrl.net

WANTED: Book for RCA Master Voltohmyst model WV-510A, will pay fair price. K1MBI, 21 Freestone Ave., Portland, CT 06480

WANTED: The 16 pin power plug P101 for the Bendix TA-12 series of transmitters. Ted Bracco, WØNZW, 203 East Main St., Teutopolis, IL, 62467. A.C. 217-857-6404 X306, braccot@hotmail.com

WANTED: Hammarlund SP200/400 pwr sply interconnect cable. R4C/T4XC original interconnect cables. Richard George, 15245 Lynn Terrace, Minnetonka, MN 55345, 952-934-3839, igeorge@isd.net

WANTED: Stancor transmitter, any model. Jim Schliestett, W4IMQ, 420 Lakeview Dr, Cedartown, Ga 30125 770-748-5968 lmq@Bellsouth.Net

WANTED: RME 45 case, or case 101/2" X 19" by approx. 11" deep. Buy junker. Robert Hawworth, W2PUA, 112 Tilford Rd., Somerdale, NJ 08083 856-783-4175

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

WANTED: Diversity panel to hook up two Hammarlund SP-600-JX's in diversity mode. K8CCV, Box 210, Leetonia, OH 44431-0231, 330-427-2303.

WANTED: Manual/Technical Info For Navy LS-518A/SIC Intercommunication Station. Jim Cavan, 603-487-5284, Jcavan56@Aol.Com

WANTED: Stancor transmitter, any model. Jim Schliestett, W4IMQ, 420 Lakeview Dr, Cedartown, GA 30125 770-748-5968, IMQ@BELLSOUTH.NET

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

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

WANTED: Collins IF transformer coil assy T1 #276-1712-00 for S-line series. Cliff Fleury, AI7Y, POB 1541, White Salmon, WA. 98672. 509-493-8203

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

WANTED: Cabinet for Drake TR-4. I restored the rig, works great, but now can't find a cabinet! Steve Johnston WD8DAS, 11723 W. Jenilyn Ct. Boise ID 83713. sbjohnston@aol.com

WANTED: WW2 Navy MBF transceiver, hopefully unmodified. John Svoboda, W6MIT 530-672-0903 or svoboda@directcon.net

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

WANTED: HQ129X cabinet. Condition not important since I can strip and repaint if necessary. Joe Fell, W3GMS, e-mail joseph.fell@Unisys.com or phone 610-648-4425.

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

WANTED: R-1051/URR top condition top price. IZ1FID federico.baldi@virgilio.it fax +390384672219

WANTED: Info/schematic on RCA Transcription Turntable Type 70-C-1 MI-4871-G. Denny Reeves, reeve06@texas.net, (512) 258-8473.

WANTED: Correspondence with others (am incarcerated) on Military (especially R-390's & backpacks) and tube rigs. Also looking for copies of old surplus catalogs postwar thru 90's. W.K. Smith, 44684-

083, FCI Cumberland Unit A-1, POB 1000, Cumberland, MD 21501.

WANTED: #33A and #35 Universal SW-3 coils for cash or other coils. Hank Bredehorst 2440 Adrian St Newbury Park, CA 91320. 805 498-8907 quailhill@earthlink.net

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

WANTED:. Hallicrafters SX-25 and speaker, most any condx considered. Ken Kolthoff, K8AXH, POB 215, Craig, MO 64437. Work #: 913-577-8422

WANTED: 23 channel tube-type CB radios for 10-meter conversions. Also tube-type 10-meter linear amplifiers. Ed, WA7DAX, 1649 East Stratford Ave., Salt Lake City, UT., 84106. 801-484-5853

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

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

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

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

The Collins Video Library

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

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

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

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

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

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

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

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

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

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

Purchase three or more videos and get 10% off of the retail price!
Add $5.95 each for the first two videos for shipping and handling in the USA, additional videos are shipped free.

Produced by Floyd Soo, W8RO (ex-KF8AT)

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

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

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

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

WANTED: Collins R-389 LF receivers, parts, documentation, anecdotes, antidotes. W5OR Don Reaves, PO Box 241455, Little Rock AR, 72223 501-868-1287, w5or@militaryradio.com, www.r-389.com

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

Announcing the Felton Electronic Services R390F High Performance HF Receiver

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

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

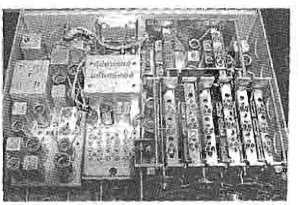
Enhanced sensitivity and large signal handling: This includes installation of a new 6BZ6 RF amplifier and a linear diode detector. Minimum discernable signal is at least -145 dbm.

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

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

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

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



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

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

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

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

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

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

WANTED: Top prices paid for globe shape radio tubes, new or used. Send for buy list or send your list for offers. Write or email: tubes@qwest.net See WWW.Fathauer.Com or send for catalog of tubes for sale. George H. Fathauer & Assoc., 688 West. First St., Ste 4, Tempe, AZ 85281. 480-968-7686, Call toll free 877-307-1414

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

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

WANTED: Western Electric horns, speakers, amps, and mics. Barry Nadel,

POB 29303, San Francisco, CA 94129. museumofsound@earthlink.net

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

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

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

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

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

WANTED: Searching for RME CT-100 or 3R9 xmtrs and info about them. David Edsall, W1TDD, 156 Sunset Ave., Amherst, MA 01002. 413-549-0349, dedsall@crocker.com

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

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

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

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

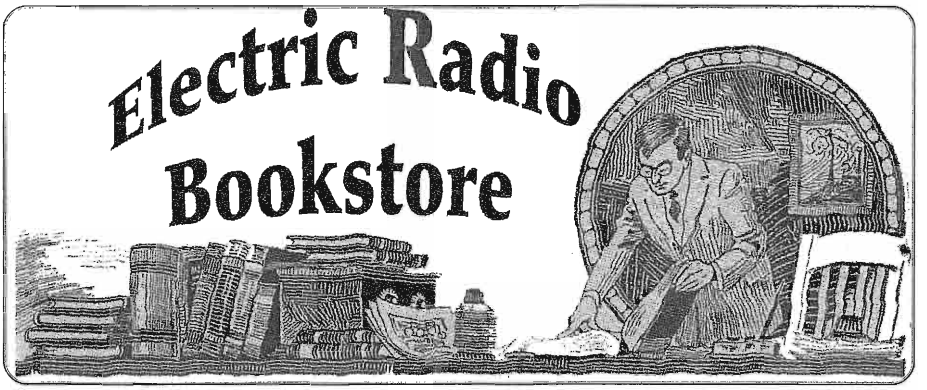
WANTED: Tektronix memorabilia & promotional literature or catalogs from 1946-1980. James True, N5ARW, POB 820, Hot Springs, AR 71902. 501-318-1844, Fax 623-8783, www.boatanchor.com

WANTED: Collins promotional literature, catalogs and manuals for the period 1933-1993. Jim Stitzinger, WA3CEX, 23800 Via Irana, Valencia, CA 91355. 661-259-2011. FAX: 661-259-3830

WANTED: Any books featuring panel meters, gauges, or flight instruments. Chris Cross, POB 94, McConnell, IL 61050.

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

WANTED: JOHNSON RANGER CABS & or BEZELS. Or the whole cab set. Dee Almquist, W4PNT w4pnt@w4pnt.8k.com (540)249-3161 (msg). Cell: (540)480-7179 Virginia. Willing to trade.



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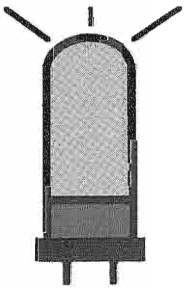

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