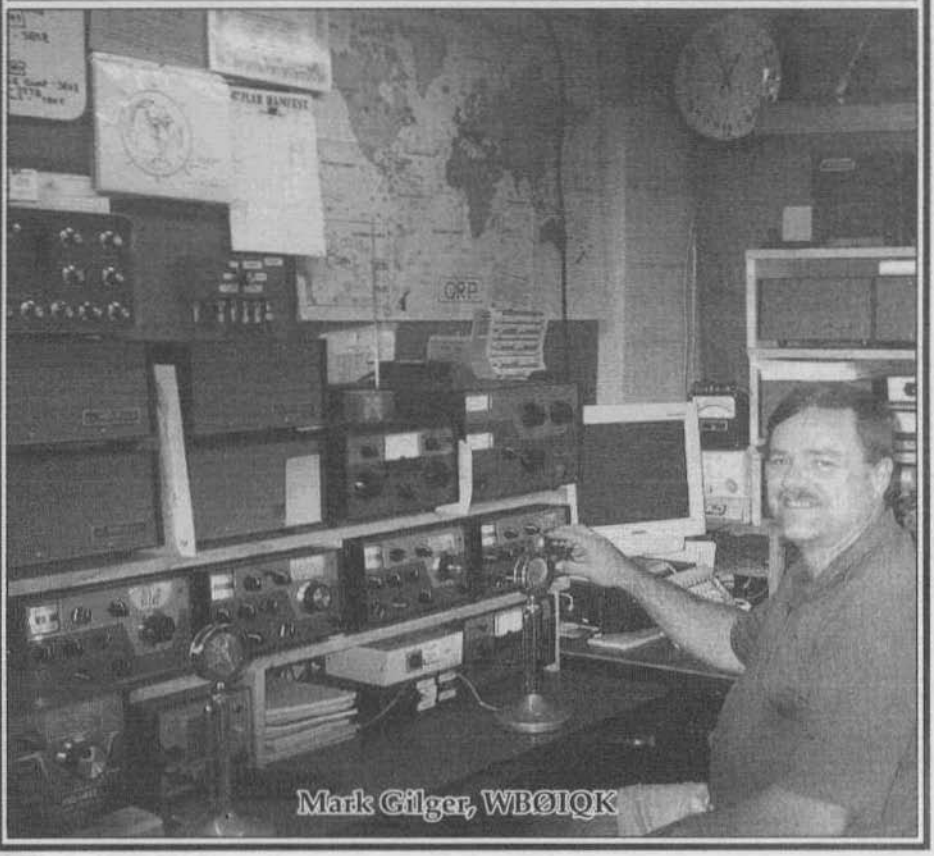
$2.50

ELECTRIC RADIO

celebrating a bygone era

Number 149 October 2001



ELECTRIC RADIO

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

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

Regular contributors include:

Bill Breshears, WC3K; Bob Dennison, W2HBE; Dale Gagnon, KW1I; Bob Grinder, K7AK; Jim Hanlon, W8KGI; Brian Harris, WA5UEK; Tom Marcellino, W3BYM; Ray Osterwald, NØDMS; Chuck Teeters, W4MEW; Bruce Vaughan, NR5Q.

Editor's Comments

Hank Clark, W2IQ, Silent Key

Hank was a gentle person who never had an unkind word to say about anyone. I'm sure that he is going to be missed by everyone that knew him. He was a great 'homebrewer' and restorer of vintage gear. He also operated modern stuff, particularly the Ten-Tec gear that was manufactured near where he lived. I remember Hank telling me several years ago that he had convinced Ten-Tec that it was to their advantage to add AM capability to their rigs. He was a true goodwill ambassador for AM operation. I wonder how many people started operating AM as a result of meeting Hank. See WA4KCY's remembrance of Hank on page 18.

Henry Engstrom, KD6KWH, Silent Key

Henry passed away in June but I just learned about it recently. I did know that he had been fighting cancer for a some time. He was a military collector and had contributed some articles to ER. He was also one of the founders of the California Military Radio Collectors group and had presented forums at the spring meet every year. From the newspaper obituary sent to me I learned that he was 67 when he died and was a retired real estate broker. He had served in the Merchant Marine and in the Air Force. Henry was well-known by military collectors in California and his vast knowledge will be missed.

As I'm writing this (Sunday, Oct. 7) I have one ear cocked toward the radio. The U.S. has just started bombing Taliban and terrorist targets in Afghanistan. Hasn't this last month been unbelievable! Who could have ever predicted the destruction of the Trade Towers in New York and the new war we're in now. I hope everyone stays safe and that everything will get back to normal soon. N6CSW

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A 'Homebuilt' R-390A

by Thomas Marcotte, N5OFF
242 Chestnut Oak Dr
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marcotte@iamerica.net

So you thought you were a hotshot R-390A mechanic because you overhauled a St. Julian's Creek blue striper or similar ambitious project? So did I, until I ran into Bob Luce, W9EFK.

In the early sixties, Bob was the Director of Contracts for Amelco, a company which manufactured R-390A's in Culver City, Calif. Being a ham himself since 1948, seems that Bob could not pass up the chance to build a personal R-390A for his shack. Now before you go off thinking that he did this Johnny Cash style, please note that Bob obtained permission from the company to purchase a set of parts gathered from the parts bins in the plant. The various brand new parts were assembled at his home using the same assembly guides and techniques used by the workers in the plant.

Once the rig was fully assembled, he carted it back to the plant for the bench guys to perform the final alignment and tests. The tests were documented, and Bob proudly brought home a brand new, never been GI'd R-390A! See Fig. 1, c. 1963 of Bob's shack. The nameplate (Fig. 2) bears his initials instead of a serial number. Incidentally, all of the serial numbers of the individual modules match! A rare bird indeed. Total cost, about $900. Less than half of what Uncle Sam was paying.

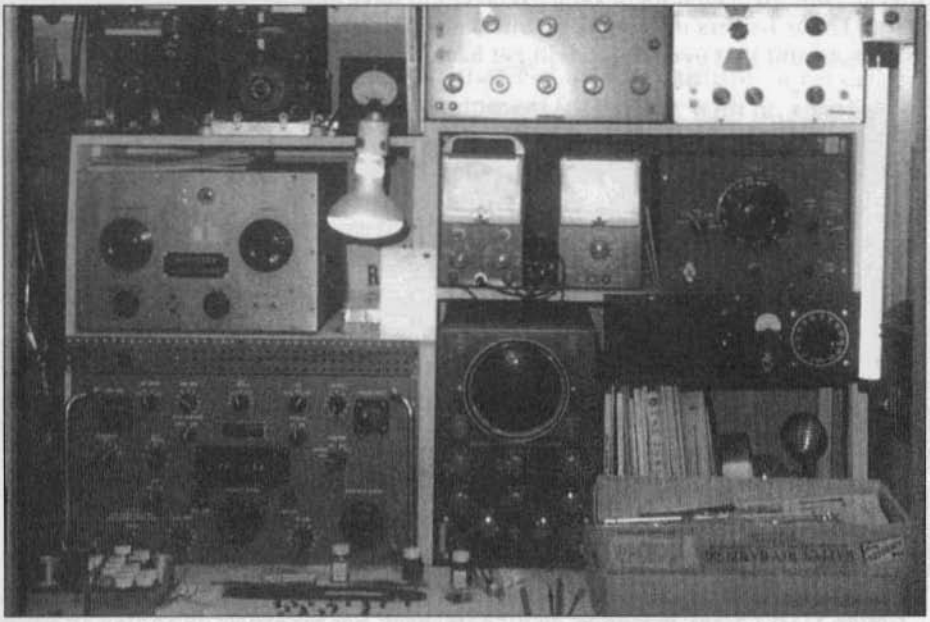

Figure 1. An early 60's photo of Bob Luce's hamshack. His homebuilt R-390A is in the lower left. ***Photo by Bob Luce, W9EFK.***

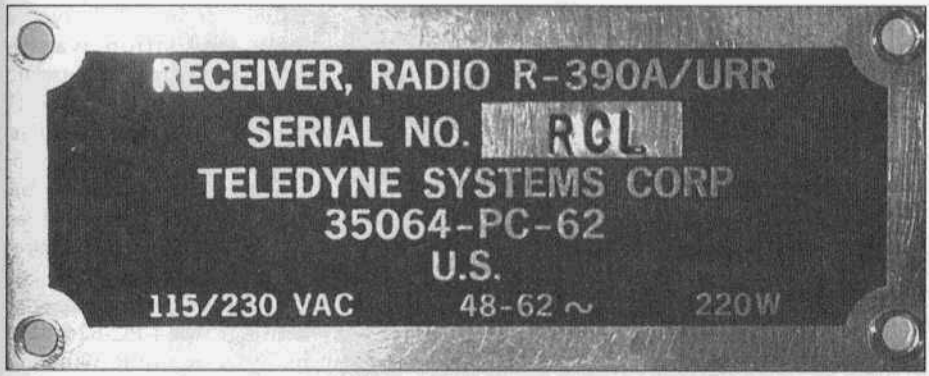

Figure 2. The nameplate with Bob Luce's initials substituted for the usual serial number. *Photo by Chuck Rippel, WA4HHG.*

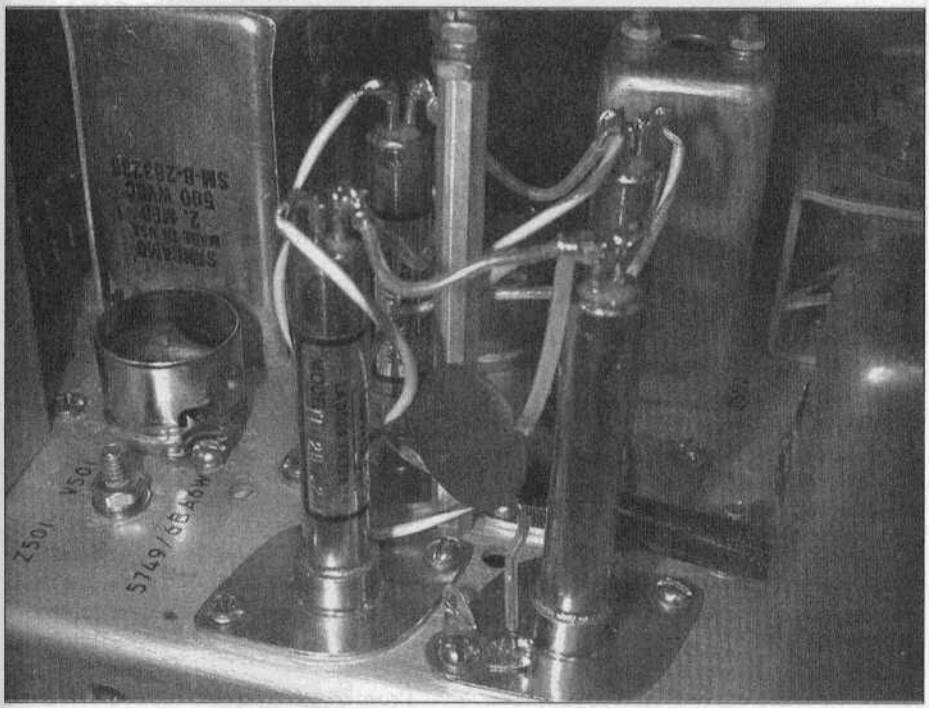

Figure 3. Bob installed Clevite ceramic filters rather than the usual Collins mechanicals because he got them free. *Photo by Chuck Rippel, WA4HHG.*

Another interesting feature of Bob's R-390A kit is the filters. They are Clevite ladder filters (Fig 3). In October of 1961, Clevite Corporation of Cleveland made a pitch to the Signal Corps at Ft. Monmouth that the R-390A should be equipped with its filters as an equivalent to the Collins mechanical filter. The fact is that the Clevite filters did not meet the Signal Corp specification, but they were very close. Anyway, Bob felt that they were close enough for his work,

continued next page

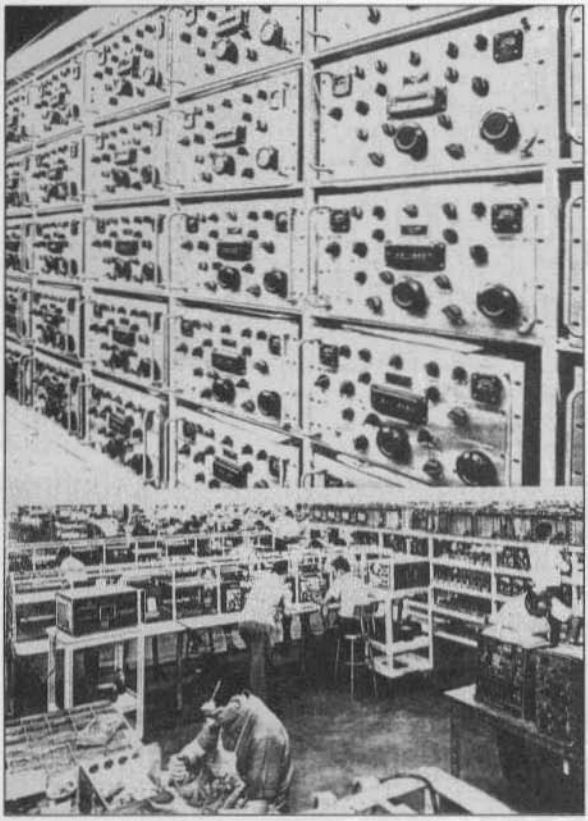

Figure 4. This photo was taken at the Teledyne plant in Culver City, Calif. The lower photo shows R-390As being assembled. The upper photo is a 'wall' of completed R-390As. ***Photo from a Teledyne annual report.***

and installed them as they came free from Amelco surplus after the Clevite pitch. (In an interesting sidebar, apparently EAC felt that the filters were equivalent as they installed about 400 sets of them in their radios in 1960 before this was caught and corrected).

So who was/is this Amelco company anyway? Amelco was one of several firms to tackle the job of building R-390A receivers for the US military. Actually, the Amelco story starts with Teledyne. In the fall of 1960 Dr. Henry Singleton and Dr. George Kozmetsky left Litton Industries and formed Teledyne Inc. Teledyne's first acquisition was to purchase a small electronic "build to print" manufacturing company in Los Angeles named Amelco, which was located on Panama Street in Culver City. Amelco was the first operating company of Teledyne. They bid and won contract 35064-PC-62 for the manufacture of R-390A's in late in early 1962. The first units were manufactured and shipped with the name Amelco on the name tags. Before all units on this contract were shipped, the name of the company was changed to Teledyne Systems Corporation and the remaining units under this contract were shipped under that name.

In the meantime, another Los Angles area company named Imperial won contract 37856-PC-63 to make R-390As. Teledyne acquired Imperial shortly thereafter, and all units shipped under the names Amelco, Teledyne Systems Corporation and Imperial were manufactured and shipped from the plant on Panama Street in Culver City. According to my research, about 7600 radios were built by Teledyne under the three company names and two orders. See Fig. 4, a photo of R-390A assembly at Teledyne.

From its 1963 annual report, Teledyne reported "We are continuing production of ... ARC-73 transmitter-receivers for the Army. With a total of 7000 R-390 [sic] communications receivers now on order, Teledyne has become the nation's largest manufacturer of these equipments." (This was incorrect as at the time Motorola was the largest manufacturer with over 14,000 sets).

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The advertisement above was sent in by Gary Kabrick, W7GMK. He wonders if anyone has ever seen one of these transmitters. Despite the claim in the ad that Gates sold "dozens" Gary has been unable to find anyone that has actually seen one.

If anyone has any information on this transmitter how about passing it along to Gary. His address is: Gary Kabrick, W7GMK, PO Box 831, Vail, AZ 85641. His e-mail is w7gmk@att.net.

Gary will let us all know what he finds out about this interesting transmitter.

Extending the saga of the BC-610E/SCR-299: manufacturers of components and Accessories[1]

by Robert E. Grinder, K7AK
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atreg@asu.edu

Georg Wilhelm Friedrich Hegel (1770-1831) initiated a highly influential movement in nineteenth-century philosophy with a new doctrine—he proclaimed that the significance of a "whole" could be potentially greater than the sum of its "parts" (Russell, 1972). Hegel based his doctrine on metaphysical overtones. He recognized that the mind of a living body, for example, could not be reduced to a summation of neurons and cells. Hegel also proposed a dynamic way of arriving at "truth" via thesis, antithesis, and synthesis-a process by which individual citizens (parts) might collectively reason their way into utopian societies (wholes).

When applied to physical entities, however, Hegel's philosophy becomes problematic. How can a mechanical or electronic system exceed the worth of its material reality? Nonetheless, whenever something is said to possess ethereal, seemingly spiritual qualities, such as a Beethoven symphony, a Rembrandt portrait, or a Wright architectural masterpiece, the product (whole) is often viewed as greater in value than the sum of its constituent parts. In turn, as the status of the "whole" is elevated by attributes of splendor, indispensable functional importance, etc., the intrinsic value of each of its "parts" is enhanced, too.

The discussion herein confirms that both military leaders who employed in battle the BC-610E/SCR-299-a mobile radio communications unit crucial to military operations during World War II-and manufacturers who supplied its components and accessories regarded it, in the Hegelian sense, as a "whole" greater than the sum of its "parts." The commentary indicates also that since the components and accessories of the BC-610/SCR-299 are "parts" of something very special, each of them attained singular esteem in the eyes of its manufacturer.

First, I document in Part I below, the significance of the BC-610E/SCR-299 to military operations. On the one hand, the historical data verify that several battles might have been lost without its communications capabilities; on the other hand, there is ample evidence to indicate that the BC-610/SCR-299 assisted in foreshortening the war, saved lives of combat soldiers, and helped conserve vast quantities of equipment. Second, I present in Part II, an accounting of the manufacturers who provided components and accessories for the BC-610E/SCR-299. Most of these manufacturers advertised in electronic or amateur journals the fact that they were providing one or more specific parts. Nearly all of them also expressed in their advertisements inordinate pride and honor in their particular contribution because it had warranted selection as an integral element in the fabled unit.

Part I: The BC-610E/SCR-299 and its significance to WW II

The generals who choreographed the battles of World War II intoned one mantra above all others: "the victorious army is the army that 'gets there fustest

with the mostest'" (Hallicrafters, 1944, p.38). Allied leaders were surprised and highly dismayed in 1940 when the German Army maneuvered around the Maginot Line in lightening-like fashion to defeat French legions and rout British forces. The panzer divisions had been coordinated and timed precisely for action, and the success of the fast-moving "blitz" tactics were directly proportional to the efficiency of communications among the German Divisions.

American generals anticipated the changing nature of warfare, and in 1940, while German victories mounted, conducted in Louisiana tests utilizing the mobility of newly organized armored units. The Generals discovered that available means of communication were woefully inadequate, and they issued an urgent call for a transmitter that would meet the following specifications: (a) possess sufficient power to communicate voice infallibly over a distance of at least 100 miles; (b) operate over all terrains, whether in motion or at fixed locations, including dry deserts where sand might disrupt delicate mechanisms; (c) function during any weather condition, including freezing cold, boiling heat, and jungle humidity; (d) be self-powered; and (e) contain repair and replacement parts to ensure continued operation during isolated missions.

Signal Corps technicians at the Fort Monmouth General Development Laboratories, in cooperation with Hallicrafters engineers, evolved subsequently the HT-4, a transmitter which had been designed for amateurs, into a transmitter that met the above specifications. It was designated in Signal Corps nomenclature as the BC-610E. The steps in its development have been described elsewhere (Grinder, 1999, ER #126, #127, and #128. Hallicrafters, 1944; Read, C., 1943; Read, O., 1943). In brief, the BC-610E is a transmitter that delivers either 450 watts CW or 325 watts AM phone. It functions on 115 volts a.c. and will operate on any frequency between 2 MHz and 18 MHz. It is nearly 40" high, 33" wide, and 22" deep, and weighs about 400 pounds.

Once a transmitter that met the criteria of the Generals was attained, the Signal Corps determined that a complete installation would include the PE-95, a gasoline operated, electric generating plant, which would deliver several thousand watts at 115 volts a.c.; the BC-610E; Signal Corps receivers, the BC-312, which required 12 volts d.c. and was operated from the battery that was used to start the PE-95, and the BC-342, which was designed for 115 volts a.c.; the BC-614, a modified Hallicrafters HT-5 speech amplifier; the BC-729 (later the BC-939A) antenna tuner; which was used primarily to load the BC-610E to a 15 foot vertical antenna; and the SCR-211 frequency meter. Following adoption of a layout for the various units, attention focused on housing. A truck of approximately 1 and 1/2 ton capacity was decided upon. A dual operating system enabled either of two operators to control both receiving and transmitting equipment, for which separate whip antennas were provided. A trailer was added to transport the PE-95 electric power plant, which furnished for the communications truck power not only for the transmitter and receivers but also lighting, heating, and ventilation. Finally, miles of cable were carried in each truck for field telephones in order to utilize the equipment from remote sites.

The Signal Corps designated officially the integrated station as the SCR-299. Assembly and pretesting occurred at Hallicrafters' facilities in Chicago. Trucks were warehoused in the Chicago amphitheater, and brought individually to an enormous Signal Corps depot near the Chicago airport, where the BC-610Es and other accessories were aggregated

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for installation. Hallicrafters manufactured apparently the BC-610Es, BC-614s, and BC-939As; however, the exigencies of production led the Company to subcontract for the manufacture of some of the accessories (see Part II, below).

As a consequence of the prewar "Lend-Lease" program, whereby equipment manufactured in the U. S. was leased to beleaguered European governments, the SCR—299 preceded the arrival of American forces in North Africa. The battlefront there stretched typically for hundreds of miles, and, for a time, the British armies were virtually out of contact with one another. SCR-299s thus provided the first radio contacts between the British 8th and 1st Armies, while General Montgomery was pushing from El Alamein toward Tripoli and Tunis and General Alexander was approaching from the West.

Shortly after American forces landed in North Africa, a fierce battle arose for the Kasserine Pass. American Divisions were forced to retreat 160 miles. Disarray prevailed. The advancing Germans captured massive quantities of tanks, artillery, and other materials. The situation was extremely volatile and precarious for the American forces. Reinforcements and supplies were needed urgently. When the critical moment for counterattacking was at hand, the SCR-299 proved to be wholly effective and reliable in providing communications necessary for coordinating the retaliatory responses of the fighting units, which at the time were scattered about. Afterwards, General Eisenhower credited the SCR-299 for the successful reorganization of the American forces and defeat of the Nazis at Kasserine Pass (Read, C., 1943, p. 45). As another American General commented: "that set [SCR-299] scurrying across sands of the deserts and over tortuous trails of mountains helped bring Rommel to his knees in North Africa. ... Our armies had to overcome Germany's panzer units, with their high-speed communications networks, and the SCR-299 provided the answer to this heretofore difficult problem" Hallicrafters, 1944, p.38).

During subsequent invasions, the SCR-299 was acknowledged for its role in keeping casualties of American forces "surprisingly low." Furthermore, for a period of two months the SCR-299 provided the only means of communication between New Guinea and military headquarters in Australia. Laudatory compliments thus flowed from the South Pacific, e.g.: "the best sets in the Signal Corps", "breakdowns are infrequent," "everybody likes them", and "the 299 is a tremendous thing out here. It is unbeatable and very popular" (Hallicrafters, 1944, p. 38).

As the above testimonials certify, the Commanders who were familiar with the heroic feats of the BC-610E/SCR-299 during WWII, viewed it, much like Hegelian disciples might have, as something in which divine status inheres literally, and therefore, whose "whole" is greater than the sum of it "parts."

Part II: Manufacturers of Components and Accessories for the BC-610/SCR-2992

The following accounting of the manufacturers of components and accessories for the BC-610/SCR-299 presents data alphabetically in an outline of two-levels. The first level consists of 19 arbitrarily defined categories, including: I. Antennas, II. Antenna Tuners, III. Cabinets, IV. Cable Connectors, V. Coaxial Cables, VI. Component Parts, VII. Crystals, VIII. Gas Generator, IX. Insulated Wire, X. Microphones, XI. Panel Instruments, XII. Pilot Light Assemblies, XIII. Plastic Parts, XIV. Relays, XV. Speech Reproducers, XVI. Transformers, XVII Truck Enclosures, XVIII. Tubes, and XIX. Tuning Units. The headings of each of

the first-level categories of the outline are shown in bold-face, capital letters.

The names and addresses of the manufacturers appear in the second level of the outline in bold face, lower-case letters. Twenty-three of the forty-six manufacturers listed were in the Chicago area. Their CEOs were doubtless good friends of Bill Halligan (Grinder, 2001, ER # 142); nonetheless, manufacturers on the east and west coasts, as well as throughout the United States, also supplied parts.

Significantly, all of the manufacturers had become cognizant of the critical importance of the BC-610E/SCR-299 to the war-effort. Since each manufacturer described usually its contribution to the BC-610E/SCR-299 in an advertisement, a condensed version of its content-to both reduce repetition and promote brevity—is presented, with reference(s), directly under the manufacturer's name and address. The prose included here is intended to reveal the extent to which the manufacturers basked proudly, knowing that their contribution, whether large or small, was of sufficient worth and quality to inspire the wholehearted confidence of both the Signal Corps and Hallicrafters, and thereby, to become an integral part of that splendid "whole," the BC-610E/SCR-299.

I. ANTENNAS

James Heddon's Sons
Dowagic, Michigan

The "Whip" Antenna used on the SCR-299 Mobile Communications Unit is produced by the same Heddon Steel-drawing Process which has made Heddon "Pal" Steel Rods "fighting favorites" with fisherman everywhere. [Radio News, February, 1944, 31, p. 68]

Ward Products Corp.
1523 East 45th St., Cleveland

TODAY, in time of war, one of WARD'S operations is the manufacturer of mast sections and mast-bases for the Hallicrafters-built SCR-299. The record of this communications truck is a great record . . . its value to the victories . . . being won is tremendous. [Radio News, February, 1944, 31, p. 74]

II. ANTENNA TUNERS

Barker and Williamson
235 Fairfield Ave., Upper Darby, PA

In the vanguard of invasion, you'll find the SCR-299 Mobile Radio Unit . . . and in this famous unit, you'll find B & W's specialized facilities well represented . . . B & W Air Inductors, . . . amplifier plate coil[s], . . . [and] the complete Antenna Tuning Unit. [Radio News, February, 1944, 31, p. 63].

III. CABINETS

Churchill Cabinet Company
2119 Churchill St., Chicago

Dependable equipment built by Churchill Cabinet Company is constructed to stand the grueling effects of warfare. Proof of their dependability is the job they are doing with the excellent transmitting unit, the SCR-299. [Radio News, February, 1944, 31, p. 40]

Steel Box and Display Company
4245 West Lake St., Chicago

Steel Box and Display Company products house transmitting and receiving units, and are used in the SCR-299 built by Hallicrafters . . . and offer the greatest possible protection for these units against the rigors of war.. [Radio News, February, 1944, 31, p. 58]

H. C. Evans & Sons
1520-30 W. Adams, Chicago

Evans is . . . proud to manufacture for this unit several necessary accessories, among which are: Wall cabinets, tool chests, seat benches, and cabinets for the exterior of the truck. . . . the SCR-299 Is Doing the Job! [Radio News, February, 1944, 31, p. 68]

Voltz Brothers, Inc.
215 E. 29 Street, Chicago (see Truck Enclosures, below)

The Grunwald Plating Co.

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2559 W. 21st Street, Chicago

Protection . . . against adverse climatic conditions and rough usage is afforded the communications equipment in the Hallicrafters-built SCR-299, by Grunwald Plating.

Oxidizing and lacquering . . . Polishing, Buffing, Mechanical Plating. [Radio News, February, 1944, 31, p. 42]

IV. CABLE CONNECTORS

Aero Electric Corporation
Los Angeles

Manufacturers of multiple electric cable connectors. Now assisting HALLICRAFTERS with parts for the famous SCR-299. [Radio News, February, 1944, 31, p. 50]

Appleton Electric Company
1714 Wellington Ave., Chicago

Sturdy, 6-pole Appleton receptacles conveniently placed for quick hook-up-feed the SCR-299 its juice. . . from the trailer. The entire Appleton organization is proud to have had a part in the development and production of the SCR-299. [Radio News, February, 1944, 31, p. 62]

Englewood Electrical Supply Co.
5801 South Halsted St., Chicago

That Englewood cable connectors and accessories are used in the manufacture of this mighty communications war-weapon [SCR-299] is a fine tribute to Englewood's ability to supply fine electronic components. [Radio News, February, 1944, 31, p. 42]

Lenz Electric Manufacturing Company
1751 No. Western Ave, Chicago

A salute to the SCR-299 . . . equipped with Lenz cables. Lenz is proud to have had a part in the production of the remarkable unit that is proving its efficiency and versatility on practically every battle front. [Radio News, February, 1944, 31, p. 48]

Wm. T. Wallace Mfg. Co.
Rochester, Indiana (see Crystals, below)

V. COAXIAL CABLES

The Andrew Company
363 East 75th Street, Chicago

The performance of the SCR-299 has surpassed the greatest expectations of military radio men. It is highly significant that ANDREW coaxial cables were chosen as a component of this superb unit: one more proof that the name ANDREW is synonymous with quality. [Radio, August, 1943, #283, p. 12]

VI. COMPONENT PARTS

Barker & Williamson
255 Fairfield Ave., Upper Darby, PA
(see Antenna Tuners, above)

Industrial Condenser Corporation
1725 W. North Ave., Chicago

Paper, oil, and electrolytic capacitors. Winning the war on every battlefront in the Hallicrafters SCR-299 Communications Truck [Radio News, February, 1944, 31, p. 46]

E. F. Johnson Company
Waseca, Minnesota

JOHNSON's are proud of their part in furnishing many of the important components [tube sockets, couplings, insulators, coils] for this famous transmitter. They are proud to have been selected originally by Hallicrafters to furnish these components for the HT-4. [Electronics, February, 1944, 17, p. 193; Radio, February, 1944, 28, cover III; Radio News, February, 1944, 31, p. 43]

Micamold Radio Corporation
1087 Flushing Ave., Brooklyn

MICAMOLD salutes Hallicrafters . . . and takes pride in the fact that our capacitors have become an integral part of the SCR-299. Here's definite proof, once again, of Micamold preference wherever and whenever dependability is desired. [Radio News, February, 1944, 31, p. 50]

The Muter Company
1255 South Michigan Ave., Chicago

Manufacturers of component parts for the Radio, Electronic, and Communications Industries; supplying

parts for the Hallicrafters built SCR-299. [Radio News, February, 1944, 31, p. 54]

Worner Electronic Devices
848 N. Noble St., Chicago

Worner Electronic Engineers are justly proud of their privilege in contributing especially engineered radio parts vital to the success of the FAMOUS SCR-299 built by HALLICRAFTERS. [Radio News, February, 1944, 31, p. 62]

Ohmite Manufacturing Company
636 N. Albany Ave., Chicago

VII. CRYSTALS

Bliley Electric Co.
Erie, PA

One of the outstanding achievements in wartime radio transmitter design is the SCR-299. This now famous equipment is doing a real job on our battle fronts. Bliley Crystals are engineered for service . . and are, of course, supplied for the SCR-299. [Radio News, February, 1944, 31. p. 53]

Henry Manufacturing Company
2213 Westwood Boulevard, Los Angeles

Cleaner, sturdier, tighter crystal holders than any previously made are now being manufactured and satisfactorily used by our Armed Forces. Another apparently impossible task has been accomplished. Through war . . . into peace . . . look to Henry. [Radio News, February, 1944, 31, p. 52)

Howard Manufacturing Corp.
15 Fourth Street, Council Bluffs, Iowa

Howard Manufacturing Company is the world's largest manufacturer of crystal holders.

Today, Howard is manufacturing plastic electronic parts for the war effort and is supplying crystal holders, used in the Hallicrafters-built SCR-299 [Radio News, February, 1944, 31, p. 45]

Keystone-Piezo Company
2020 West Liberty Ave., Pittsburg

The SCR-299 . . . is more than living up to the communication requirements of war.

Keystone-Piezo crystals are used in the SCR-299 and are guaranteeing faithful reception even under the most extreme conditions. [Radio News, February, 1944, 31, p. 58]

Leuck Crystal Laboratory
245 South 11th St., Lincoln, NE

Leuck Crystal Laboratory is forging a vital link in the chain of communications served by the SCR-299 built by Hallicrafters. [Radio News, February, 1944, 31, p.72]

Pacific Radio Crystal Co.
1035 Post St., San Francisco

Accuracy and Dependability are stern requisites for war use. These requirements are more than met in Pacific Radio Crystals as is proved by their service with the famous Hallicrafters-built SCR-299. [Radio News, February, 1944, 31, p. 65]

Quartz Laboratories
1513 Oak St., Kansas City

Quartz Laboratories crystals are meeting the most rigid specifications of the Signal Corps as integral parts of the Hallicrafters-built SCR-299. Quartz Laboratories is proud to have its products serving with the famous mobile communications unit. [Radio News, February, 1944, 31, p. 57]

Wm. T. Wallace Mfg. Co.
Peru, Indiana

Wallace experience . . . includes making crystals for the famous Hallicrafter-built SCR- 299, together with cable assemblies and other exacting wartime orders. [Radio News, February, 1944, 31, p. 61]

Wynne Precision Company
Griffin, Georgia

Wynne Precision crystals are used in the SCR-299 built by Hallicrafters. This unit is the Signal Corps' and American Engineers' great contribution to the victories being won today by the Allied fighting forces [Radio News, February, 1944, 31, p. 67]

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VIII. GAS GENERATOR (Electric Generating Plant)
D. W. Onan & Sons
39-51 Royalston Ave., Minneapolis

Meet the other half of the SCR-299 team-the Onan Electric Generating Plant! They provide a reliable, independent supply of electric power for the SCR-299's, and were selected because they are rugged. [Radio News, February, 1944, 31, p. 56]

IX. INSULATED WIRE
Consolidated Wire and Associated Companies
1635 South Clinton St., Chicago

Wire of every type and description is used in the SCR-299. This wire must be the finest quality available . . . Consolidated Wire and Associated Companies supply numerous types of wire, built to do the job, for the SCR-299! [Radio News, February, 1944, 31, p. 66]

Western Insulated Wire, Inc.
1001 E. Sixth-second St., Los Angeles

Thousands of small, seemingly unimportant, components [wires and cords] are necessary in the successful and continuous operation of the famous SCR-299. Western Insulated Wire, Inc., supplies many of the necessary cables for this mobile radio truck [Radio News, February, 1944, 31, p. 60]

X. MICROPHONES
Electro-Voice Manufacturing Company, Inc.
1239 South Bend Ave., South Bend

Electro-voice microphones are standard equipment with the SCR-299 [Electronics, February, 1944, 17, p. 24]

XI. PANEL INSTRUMENTS
General Electric Co.
Schenectady, New York
O. B. McClintock Co.
Minneapolis

McClintock congratulates HALLICRAFTERS on the recognition accorded SCR-299 and is proud to have a part in the production of this superior equipment. [Radio News, February, 1944, 31, p. 51]

XII. PILOT LIGHT ASSEMBLIES
Dial Light Company of America, Inc.
90 West St., New York

Dialco quality and rapid-fire service are no secret . . . and it is a fact that, in the extensive Dialco line, were found the ideal Pilot Light Assemblies to meet the exacting requirements of the Army's fighting SCR-299. [Radio News, February, 1944, 31, p. 46]

XIII. PLASTIC PARTS
Midwest Molding & MFG. Co.
319 North Whipple, Chicago

Molded Meter window escutcheons and control knobs are manufactured by Midwest for the famous SCR-299 high powered mobile transmitter to withstand the rigors of modern warfare. [Radio News, February, 1944, 31, p. 72]

XIV. RELAYS
C. P. Clare & Company
719 West Sunnyside Ave., Chicago

Rugged design of Clare Type "C" Relays and Clare Type "G" Lever Switches made them natural components of the Hallicrafter's 450 Watt Transmitter with which the Signal Corps maintains communications in battle areas [Radio News, February, 1944, 31, p. 78]

XV. SPEECH REPRODUCERS
Jensen Radio Manufacturing Company
6601 South Laramie Avenue, Chicago

The latest development in military communications equipment deserves the best in speech reproducers . . . it is natural, therefore that Jensen speech reproducers were specified for the famous SCR-299, the high powered mobile communications unit. [Radio News, February, 1944, 31, p. 39]

XVI. TRANSFORMERS

Merit Coil & Transformer Corp.
311 North Desplaines St., Chicago

WHEN THE FULL STORY IS TOLD ABOUT THE FAMOUS SCR-299 BUILT BY HALLICRAFTERS

Merit will take justifiable pride in its manufacturer of precision parts for this miracle mobile unit which has contributed so much to the victories of our armed forces, and gives but a glimpse now of the limitless post-war future. [Radio, September, 1943, #284, p. 69; Radio News, February, 1944, 31, p. 75]

General Transformer Corp.
1250 W. Van Buren ST., Chicago

GTC-important to SCR-299.... G.T.C. transformers, and G.T.C. assemblies, including power packs, speech amplifiers, and rectifiers, built to the rigid specifications of the Signal Corps; Air Corps; the Navy. [Radio News, February, 1944, 31, p. 73]

XVII. TRUCK ENCLOSURES

De Kalb Commercial Body Corp.
De Kalb, Illinois

From covered wagon to the SCR-299—De Kalb's proudest assignment in 38 years of body building. Thirty-eight years of "know how" are behind every turn of a bolt on these Mobile Radio Shelters. [Radio News, February, 1944, 31, p. 59]

Voltz Brothers, Inc.
215 E. 29th Street, Chicago

Our job in the creation of the SCR-299 includes preparation of the truck for the installation of the radio unit and the trailer, for the power plant, and the fabrication of such accessories as chests, battery boxes, backboards, reel assemblies and carriers. [Radio News, February, 1944, 31, p. 49]

XVIII. TUBES

Eitel-McCullough, Inc.
San Bruno, California

Many of the world's leading electronic engineers are radio amateurs and much of the equipment in use today by the armed services is a product of the great amateur testing grounds. Two outstanding examples are: the SCR-299 Transmitter and Eimac tubes. [Radio, December, 1943, #287, p. 45]

Jennings Radio Manufacturing Co.
San Jose, California

Hallicrafters SCR-299 is being powered by Jennings Transmitting tubes and vacuum condensers. Today, JENNINGS RADIO enjoys a well-earned nitch in the top flight ranks of Radio Manufacturers now serving the armed forces. [Radio News, February, 1944, 31, p. 44]

RCA Manufacturing Co.
Camden, N. J.

As one of the principal suppliers of the tubes that "power" . . . SCR-299, RCA takes this occasion to salute the U. S. Signal Corps, the Hallicrafters organization, and the members of our fighting forces who are making such brilliant use of their equipment. [Radio News, February, 1944, 31, p. 55]

XIX. TUNING UNITS

Edwin I. Guthman & Co. inc.
15 South Throop St., Chicago

We at Edwin I. Guthman & Company are proud of the Super Tuning Units that we manufactured for the Hallicrafters' SCR-299.... The SCR-299 has distinguished itself amongst America's most vital "weapons [Radio, May, 1944, 28, p. 4; Radio News, February, 1944, 31, p. 69]

The Radio Craftsman
1341 South Michigan Ave., Chicago

A tuning-dial lock, originally engineered and manufactured for use as a tuning control for the frequency tuning unit of the famous Hallicrafters SCR-299 is now available to other manufacturers [Radio, March, 1944, 28, p. 48]

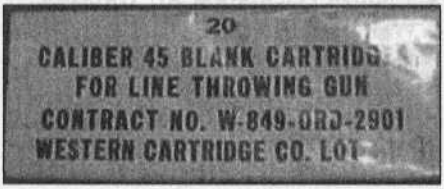
References

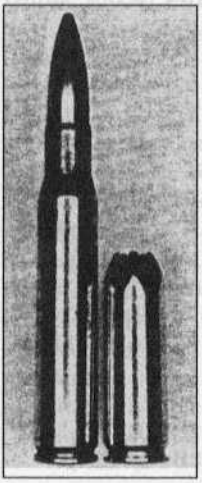
Grinder, R. E. (1999, October). The BC-610 Revisited, Part I, Electric Radio,

continued on page 42

Shooting Antennas

by Richard Bonkowski, W3HWJ
3568 Southridge Dr.
Santa Rosa, CA 95403





Top photo is of the label on a carton of blank cartridges for line throwing. Photo at left is of a standard 30-06 cartridge alongside a blank.

In over 40 years of ham radio operation in four different states, I have had my share of experiences in erecting wire antennas. Between moving to new homes, temporary apartments, and field day operations, I've probably put up over a hundred antennas. The goals are always the same, however.

* Get the antenna as high up as possible
* Keep it away from utility lines
* Make it as innocuous as possible, so the neighbors don't revolt

Like many of you, I've used weighted lines, slingshots, ladders, sticks, and neighborhood kids with bows and arrows to string my dipoles up from tree limbs. Back in the middle 1980's when I lived on a large lot in rural Western Pennsylvania, I got a brilliant idea for securing the end ropes of a full-sized 160-meter half wave dipole.

Having seen various movies and news clips about whaling, I remembered the harpoon guns the whalers used. You should also remember the smaller harpoon gun used in the movie "Jaws." I reasoned that I could make a home-brew "harpoon" from a 3/8-inch wooden dowel about 24 inches long. As I was also an avid shooter, I had a single-shot 45/70 rifle (same caliber as used by Custer's troops at Little Big Horn) which could easily accommodate the 3/8-inch dowel in its barrel. A homemade blank cartridge and some fishing line... it had to work!

Unfortunately, there is more to designing a harpoon than meets the eye. I did get it to launch successfully, and to travel 50 yards or more at pretty high speed. Wooden dowels, though, aren't harpoons. They aren't completely straight and the attached line makes them hook or slice. Because I was aiming for a crook high up in a maple tree, I wasted many blanks trying to figure out where to set my sights. Some promising shots ended in disaster, as the line got caught in small branches and broke, due to the high speed of my "harpoon." My last shot seemed "dead on." Unfortunately, the dowel struck the tree trunk directly and shattered itself into a dozen pieces. I gave up in disgust, made more stinging by the looks I got from my wife, who was sure I was some kind of nut!

Well, last week, I was vindicated. In an old National Rifleman Magazine from the 1970s, there was an article about "Antenna Erecting Blanks." My idea wasn't so crazy, because in May, 1944, the Army actually commissioned

Frankford Arsenal to develop a 30-06 blank cartridge designated "T61" for use in launching wire antennas. The Aircraft Radio Laboratory wanted these cartridges for use in field installation of the AN/CRN-1 aircraft beacon equipment. Some further research on the Internet indicates these may also have been used with the AR/CRN-6 systems.

The Army ordered 16,500 of these cartridges, which were loaded with a mix of black powder and standard smokeless powder. They were shipped to the Air Technical Services Command in Dayton toward the end of World War II. These are less than half the length of the standard 30-06 case, and were crimped to seal in the powder. I would imagine that they were single loaded into the breech of an M-1 Garand and the antenna line was launched, much like a rifle grenade. The fact that they used black powder must have meant that a 100% load of smokeless develops too much velocity (as I later found out). I haven't been able to find any information on what sort of hardware went down the rifle barrel, but I'll bet it wasn't much different from my antenna harpoon!

I won't try to resurrect the harpoon launcher again. Weighted lines and kids with slingshots seem to work just fine. But, maybe that's because I've been willing to live with lower elevation antennas as I get older? ER

References:
"Antenna Erecting Blank." American Rifleman Magazine. Published by the National Rifle Association. July, 1973.
Internet: http://guns.connect.fi/gow/QA6.html "Cartridges, Antenna Erecting", by: P. T. Kekkonen
Internet: http://www.netside.com/~lcoble/dir7/usammo.txt T61: Cartridge, Antenna Erecting

Alignment Tip for the HQ-170A Receiver

by Jim DiMauro, WA2MER
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I recently purchased a Hammarlund HQ-170-A receiver that the seller said needed "a little TLC" to get going. After I cured an intermittent problem and replaced three tubes I fired up the radio and found two more problems: it lacked sensitivity and it had very poor audio, particularly on AM. The AM audio was so bad it was nearly unintelligible with the radio set to its maximum bandwidth (+/-3 kc) and the sideband switch set to "Both" (normal settings for AM reception). Surprisingly, the AM audio improved somewhat with the radio set for upper sideband and narrower bandwidth. Sideband reception sounded better than AM, but it wasn't nearly as good as it should have been. I suspected an IF alignment problem, so I proceeded to do an alignment "by the book" as outlined in Hammarlund's manual.

During the procedure I found that the IF stages were pretty close to proper alignment; in fact they were so close that I discounted alignment as being the cause of my problem. At that point I decided to spend some time with the schematic to review the circuitry and determine where I should look for the cause of my problem. After only a short time looking over the print I found the problem: it wasn't a radio malfunction, it was an omission in the alignment procedure printed in the manual.

While I was studying the schematic I found a tiny note adjacent to the sideband switch that indicates that it must be set to "Lower" and the selectivity

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Arne Sjomeling, KØAS in his hamshack. Arne is best known out here in the west for his big signal on 160. *Photo by Bob Weaver, K6GZL.*

Don Buska, N9OO, with his Millen gear at the AWA James Milen, W1HRX Special Event Station. *Photographer unknown. Photo submitted by Scott Freeberg, WA9WFA.*

Frank Esposito, KB3AHE, proudly working his homebrew 4-1000 transmitter at the 44th annual F.A.R.Fest 2001 (The Foundation for Amateur Radio) at Prince George's Stadium in Bowie, Maryland September 30, 2001. Frank's station was very loud. *Photo by Ken Barber, W2DTC*

Tom Thomson, W9CHP, at his operating position. Note the complete set of Heathkit 'Lunchboxes' in the upper right of the photo.

Hank Clark, W2IQ, Silent Key

by Andrew E. Howard, Sr., WA4KCY
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Henry D. (Hank) Clark, W2IQ, a longtime ham and avid AM operator, builder and collector passed away on September 18, 2001 at the University of Tennessee Hospital in Knoxville, Tennessee. Hank fell from the roof of his home and suffered a broken neck and heart attack. He will be greatly missed on 3885 and the other AM frequencies.

Hank was born in Passaic, New Jersey in 1920. He grew up in Nutley, New Jersey and pursued a career in industrial machinery sales. After retirement Hank and his wife Helen moved south to Grants Chapel, Tennessee, just northeast of Knoxville and close to Sevierville where Ten-Tec equipment is built. Hank had a special relationship with the folks at Ten-Tec and was often the first to try out a new model on the air. He had a great mountain-top home with a view for miles in all directions.

Hank was an early member of AM International and held Certificate Number 80. When we organized the Southeastern AM Radio Club Hank was one of the first to join. Since he had AM International number 80 he asked me if he could get number 80 when he joined the Southeastern AM Radio Club. Although we were at about number 29 at the time he joined I put number 80 on his certificate. When we reached our 80th member I just put Hank in the lineup.

I had the privilege of calling Hank a good friend and visited his home and shack on several occasions. I think our

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W2IQ at one of his operating positions. Although he owned a KW-1, a Johnson KW and several broadcast transmitters he was still fascinated by simple rigs like a Heathkit DX-60.

VINTAGE NETS

Arizona AM Nets: Sat & Sun, 160M 1885 kHz at sunrise,75M 3855 kHz at 6 AM MST, 40M 7293 kHz 10 AM MST; 6M 50.4 MHz on Sat. at 8 PM MST; 2M 144.45 MHz, on Tue. at 7:30 PM MST.
West Coast AM Net meets Wednesdays 9PM Pacific on or about 3870kc. Net control alternates between John, W6MIT and Ken, K6CJA.
California Early Bird Net: Saturday mornings at 8 AM PST on 3870.
California Vintage SSB Net: Sunday mornings at 8 AM PST on 3860 +/-
Southeast Swap Net: Tuesday nights at 7:30 ET on 3885. Net controls are Andy, WA4KCY and Sam, KF4TXQ. This same group also has a Sunday afternoon net on 3885 at 2 PM ET.
Eastern AM Swap Net: Thursday evenings on 3885 at 7:30 ET. This net is for the exchange of AM related equipment only.
Northwest AM Net: AM activity daily 3 PM - 5 PM on 3875. This same group meets on 6 meters (50.4) Sundays and Wednesdays at 8:00 PT and on 2 meters (144.4) Tuesdays and Thursdays at 8:00 PT. The formal AM net and swap session is on 3875, Sundays at 3 PM.
K6HQI Memorial Twenty Meter AM Net: This net on 14.286 has been in continuous operation for at least the last 20 years. It starts at 5:00 PM PT, 7 days a week and usually goes for about 2 hours.
Colorado Morning Net: An informal group of AM'ers get together on 3875 Monday, Wednesday Friday, Saturday and Sunday mornings at 7AM MT.
DX-60 Net: This net meets on 3880 at 0800 AM, ET, Sundays. Net control is Jim, N8LUV, with alternates. This net is all about entry-level AM rigs like the Heath DX-60.
Eastcoast Military Net: It isn't necessary to check in with military gear but that is what this net is all about. Net control is Ted, W3PWW. Saturday mornings at 0500 ET on 3885 + or - QRM.
Westcoast Military Radio Collectors Net: Meets Saturday evenings at 2130 (PT) on 3980 + or - QRM. Net control is Dennis, W7QHO.
Gray Hair Net: The oldest (or one of the oldest - 44+ years) 160-meter AM nets. It meets on Tuesday nights on 1945 at 8:00 PM EST & 8:30 EDT. http://www.crompton.com/grayhair
Vintage SSB Net: Net control is Andy, WBØSNF. The Net meets on 14.293 at 1900Z Sunday and is followed by the New Heathkit Net at about 2030Z on the same freq. Net control is Don, WB6LRG.
Collins Collectors Association Nets: Technical and swap session each Sunday, 14.263 MHz, 2000Z, is a long-established net run by call areas. Informal ragchew nets meet on Tues nights on 3805 at 2100 Eastern and on Thur nights on 3875. West Coast 75M net that takes place on 3895 at 2000 Pacific
Collins Swap and Shop Net: Meets every Tuesday at 8PM EST on 3955. Net control is Ed, WA3AMJ.
Collins Collector Association Monthly AM Night: The first Wed. of each month on 3885 kHz starting at 2000 CST (0200 UTC).
Drake Users Net: This group gets together on 3865 Tuesday nights at 8 PM ET. Net controls are Criss, KB8IZX; Don, W8NS; Rob, KE3EE and Huey, KD3UI.
Drake Technical Net: Sunday's on 7238 at 8PM Eastern time hosted by John, KB9AT
Swan Users Net: This group meets on 14.250 Sunday afternoons at 4 PM CT. The net control is usually Dean, WA9AZK.
Nostalgia/Hi-Fi Net: Meets on Fridays at 7 PM PT on 1930. This net was started in 1978.
K1JCL 6-Meter AM Repeater: Located in Connecticut it operates on 50.4 in and 50.5 out.
JA AM Net: 14.190 at 0100 UTC, Saturdays and Sundays. Stan Tajima, JA1DNQ is net control.
Fort Wayne Area 6-Meter AM Net: Meets nightly at 7 PM ET on 50.58 MHz. This net has been meeting since the late '50's. Most members are using vintage or homebrew gear.
Southern Calif. Sunday Morning 6 Meter AM Net: 10 AM Sundays on 50.4. NC is Will, AA6DD.
Old Buzzards Net: Meets daily at 10 AM Local time on 3945. This is an informal net in the New England area . Net hosts are George, W1GAC and Paul, W1ECO.
Canadian Boatanchor Net: Meets Saturday afternoons, 3:00 PM EST on 3745.
Midwest Classic Radio Net: Sat. mornings on 3885 at 7:30AM Central time. Only AM checkins allowed. Swap/sale, hamfest info and technical help are frequent topics. NC is Rob, WA9ZTY.
Boatanchors CW Group: 3546.5, 7050, 7147, 10120, 14050. 80 on winter nights, 40 on summer nights, 30 and 20 meters daytime. Nightly "net" usually around 0200-0400 GMT. Listen for stations calling CQ BA, CQ GB.
Wireless Set No. 19 Net: Meets the second Sunday of every month on 7.175 +/- 25 kHz at 1800Z (3760 +/- 25 kHz alternate). Net control is Dave, VA3ORP.
Hallicrafters Collectors Assoc. Net: Sundays, 1730-1845 UTC on 14.293. Net control varies. Midwest net on Sat. on 7280 at 1700 UTC. Net control Jim, WB8DML. Pacific Northwest net on Sundays at 22.00 UTC on 7220. Net control is Dennis, VE7DH.

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

How to Repair a Transmitter

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Part Three

The Modulator

Once you have the RF portion of your rig running well, you will want to check out the modulator. Just about any element of the final amplifier can be used successfully to apply AM to your signal. "High level" plate modulation, that transformer or choke couples the audio signal in series with the B+ feed to the RF amplifier plate circuit, is popular in the more expensive transmitters like the Valiant, Ranger, Viking I and II, DX-100, 32V series, Globe Kings and HT-20. It even shows up in smaller rigs like the Harvey Wells Bandmaster series, Globe Scout, Lettine 240, Elmac A-54, AF-67 and AF-68, and more. Its advantages are that it is easy to adjust for a high percentage of modulation and that the RF final amplifier operates at high efficiency and high power output. Its disadvantage is that the audio power output from the modulator stage must be half the DC power input to the RF final amplifier for 100% modulation, and that usually requires heavy duty audio tubes and transformers and a husky power supply.

Some rigs like the Heath DX-40 and DX-60 and the Knight T-150 were built to deliver a good CW signal and a somewhat lower powered AM signal at a more modest price. These rigs use a low power audio amplifier to modulate the screen grid voltage of their final amplifier. The advantages of this system are an economical design requiring only low powered audio components and a more modest power supply, and a quite decent AM signal when the rig is properly adjusted. The disadvantages are that the adjustment of the rig for proper AM operation is a bit more tricky and that the final amplifier winds up operating at much lower efficiency on AM and with much lower power output than it is capable of on CW or in plate modulated AM service.

So whatever type of modulator your rig might be using, power it up in the AM mode and try it out. Load it up to the plate current specified in the manual or as specified for Class C Amplifier (Telephony) service in the Transmitting Tubes rating section of the ARRL Handbook. The manual will usually tell you how to adjust the modulator's audio gain for proper modulation, for example specifying what the modulator peak current and resting current should be. If the resting current on your high level modulator when you aren't speaking into the mike and the audio gain control is all the way down is not as specified, look for a modulator tube control grid (G1) bias voltage adjustment and change it for the specified current. If you can't find a bias adjustment, you will either have to live with things the way they are or make a modification to the bias supply. Check the schematics for the speech-amplifier drivers and the modulators in your ARRL Handbook. Several of them will show a variable, control grid bias supply that rectifies the AC from a filament winding. You can adopt one of these supplies or make the bias supply in your rig look more like one of them so that you can adjust the modulator bias for rated resting current.

The first thing you will want to do is tune up the rig, speak into the

microphone and adjust the audio gain per the manual. Listen to the signal on your receiver, headphones would help here so you don't get feedback going from the speaker to the mic, and see how it sounds. If you are lucky and it sounds decent, put it on the air and ask for a few critical reports from some of the AM gang. You can stop here if you like, but I always like to take a more critical look at the modulation on a new rig just to be sure it is at its best. And you may need to do some trouble shooting of the kind I'm about to describe too if your modulation isn't what it should be.

Get out your oscilloscope and set it up to view a wave-envelope pattern per the instructions in the Handbook. I usually just attach a two turn link to the vertical plates or vertical amplifier and put the link near the final tank coil, adjusting its position until I get a pattern that is a little less than half the width of the CRT screen. You will want to use a fairly slow horizontal sweep rate, around 60 Hz is a good starting point. Talk into the mic and adjust the audio gain per the manual, and observe the pattern on the scope. You should see something like the pictures in the Handbook. Give a long "hellooooooo" into the mike, adjusting the pitch of your voice to make the pattern stand still. The pattern should have peaks that are about twice as high as the unmodulated carrier pattern and valleys that go nearly to zero for a high percentage of modulation. If it doesn't look like that, you may be experiencing some distortion somewhere along the way in the audio amplifier stages, or your final amplifier tube(s) may have low emission or may not be getting sufficient grid drive.

Before you start to tear into the rig, try applying a waveform with a known shape to the microphone input of the modulator. Just be sure to cut the level of the signal down far enough, perhaps with the ends of an external volume control wired across the output of your audio generator and the wiper and grounded side attached to the mic input. An audio "sine wave" would be nice if you happen to have a decent audio oscillator. You can probably get something approaching that from the audio output terminals of that signal generator you used to align your receiver. Look at the audio signal that you are applying to the modulator with your scope, you may want to adjust the horizontal sweep rate and sync for a stable pattern, and then at the wave-envelope modulation waveform. The wave envelope pattern should have the same shape as the input signal to the modulator. If it does not, read on.

The first thing I would check is the drive to the RF final amplifier. You are asking it to operate linearly with double the instantaneous plate voltage applied, and that requires adequate grid drive. Your transmitter manual should tell you, and the ARRL Handbook in the Tube Data section will tell you, what drive is necessary. For example, a 6146 operating as a Class C Amp. (Telephony) should be driven to the point where the DC grid current measures 3 milliamperes. Don't overdrive the final, especially if it is a 6146. That can cause some damage. If your grid drive is sufficient and the positive modulation peaks still seem to be flattened, check as described in the following paragraphs for distortion in the audio amplifiers. If you find none, your problem may be a "tired" final amplifier tube, that is one with limited filament emission that is just not up to staying linear on the modulation peaks. You can check that most easily by substituting another known good tube.

Distortion may be happening anywhere in the audio amplifier string. Your job is to find where it is happening and why, and then to fix it. I'd suggest looking with your scope at each control

continued next page

grid (G1) and plate, starting with the microphone input and working through to the grids of the final audio amplifier tubes. At some point along the way, you will find that the waveform shape has become distorted. Typically one half, either the positive going part or the negative going part, will be compressed or cut off. You might also find that it just completely disappears. Once you find the stage where there is trouble, check the tube—replace it with a known good one if there is any doubt—and the actual value of the resistors and capacitors associated with that stage. Your ARRL Handbook has a table of "Resistance Coupled Voltage-Amplifier Data" in the chapter on modulators that may be of help. It lists values for the capacitors and resistors that you should expect to find by tube type. If your inspection doesn't turn up anything, measure the voltage on the tube plate, screen grid if it has one, cathode, and control grid, and compare them to the values for "Class A Amplifier" service listed in the Vacuum Tube Data tables in the back of the book. Remember that the "Grid Bias" will be the voltage from the control grid to the cathode, not to ground, and that the control grid is usually biased negative with respect to the cathode. Pay special attention to the control grid voltage in an amplifier where that grid is capacitor coupled to the plate of a previous stage. If that coupling capacitor is leaky, it may be driving the tube's control grid more positive than its cathode (or at least pushing the bias point in the positive direction) and causing the positive-going signals to go into saturation. You can check for a leaky coupling capacitor by just removing the tube and then measuring the voltage across the resistor from its control grid connection to ground. If there is current leaking through the coupling capacitor, there will be voltage across the grid resistor. If the capacitor is good, there will be zero voltage across the grid resistor.

Especially in high level modulators, you will usually find that the stage driving the high power modulator tubes is coupled to them through a transformer. That transformer may also be your problem. Sometimes a winding can open; you can find that problem by measuring the windings with your ohmmeter. I had a problem with my DX-100 recently in which one half of the waveform was being compressed as it went through that transformer as shown in **Figure 2**. After trying everything else including replacing the driver circuit with one of my own design using a higher powered tube, I finally acquired a "brand new," original Heath DX-100 driver transformer from one of the guys on the Boatanchor Reflector. When I put that new transformer in place, my trouble went away. You may not be as lucky as I was in finding an exact replacement, but the AES catalog does list several varieties of replacement Audio Interstage transformers.

Your rig may also have a capacitor across the secondary of the modulation transformer. It is possible that capacitor is breaking down on high voltage peaks and causing distortion. Temporarily disconnect it to see if that helps.

You may find that the signal is not distorted but that the gain in the audio amplifier chain is just too low for your microphone. You may also notice that the gain of a particular stage is lower than the Voltage Gain listed for it in the Resistance-Coupled Voltage Amplifier Data table. If that is the case, it could be a cathode bypass capacitor that has lost its microfarads. Try shunting another capacitor across each cathode bypass in turn. Something on the order of 5 or 10 microfarads or more will do, just be sure to observe the polarity if you are using an electrolytic. The negative terminal should be on ground and the positive terminal should go to the

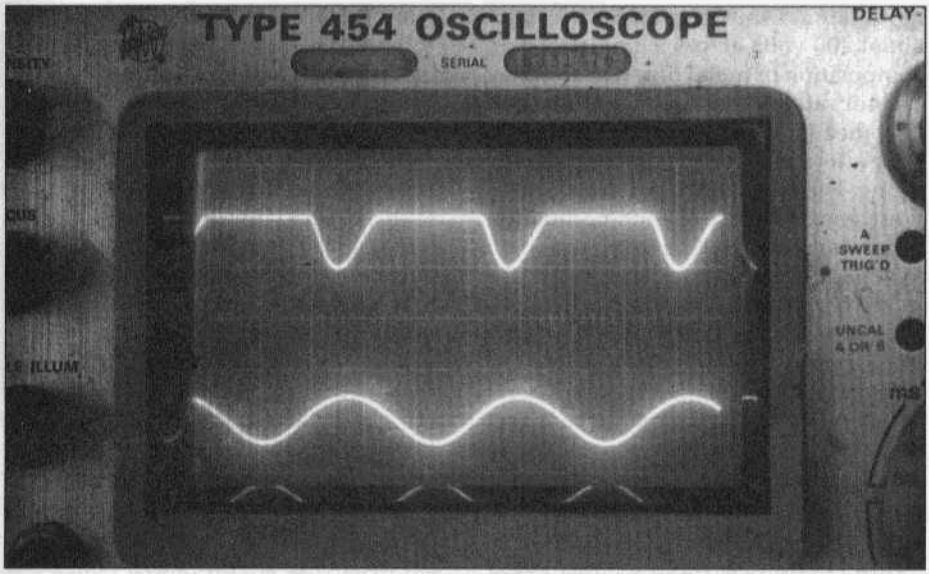

Figure 2. Scope trace of DX-100 audio driver transformer output (top) and of wave envelope modulation pattern (bottom), sine wave audio input.

cathode. It is also possible that your microphone has low output. The Handbook says that a typical crystal microphone has an output of about 0.03 volts. Measure the voltage with your oscilloscope or VTVM. You will need a high impedance meter to get a good reading, a VOM won't do a proper job. If the output is too low, you may need to find another microphone or a replacement cartridge for the one you have.

Beyond simple distortion, you may find that your audio amplifier chain is oscillating on its own, especially when you turn the gain up. This type of oscillation often occurs at a very low frequency and is known as a "motorboat" by the old timers who chased them out of their home brew modulators. The feedback path that allows this oscillation to happen is usually through the common B+ supply line. Most audio amplifier stages will be "decoupled" from the B+ line by a resistor on the order of 10K to 50K ohms, and the side of that decoupling resistor nearest the audio stage will by bypassed to ground by a capacitor typically about 10 microfarads. If those resistors or capacitors have decreased in value, there may be enough signal sneaking through the B+ line path to cause your oscillation.

Restoring everything including the component values to the way they were originally should return your modulator to good operating condition. You may, after reading some articles in ER and elsewhere, decide to make a few "improvements" in your modulator to widen its audio bandpass or to remove a "speech clipping" stage. I'll leave that up to your discretion, but it will be a lot easier to do after you get the modulator working as it was originally designed.

Finally, you may want to set up a "Trapezoidal" pattern on your scope as directed in the Handbook. This will require a couple of resistors and a coupling capacitor that can handle high voltage, at least twice the DC voltage of the final amplifier's power supply if you are working with a high level

continued next page

modulator. Don't put any more than about 400 volts across a single, carbon composition or metal film resistor; they are not rated to handle any more. You may need to put several resistors in series to make the required voltage rating. The Trapezoidal pattern will give you a good measure of your modulation percentage and its linearity, as shown in several scope patterns photographs in the Handbook.

I haven't said much about the proper adjustment of a grid-modulated transmitter, and that's because I don't have much first hand experience in that area. The best thing I can suggest if you are having trouble with a grid-modulated rig is to consult the Amplitude Modulation chapter of your ARRL Handbook. It has several pages of coverage on the various types of grid modulation including adjustment hints.

TVI

Though it doesn't seem like much of a problem these days, TVI (Television Interference) was quite a threat to the existence of Amateur Radio in the later 1940's. Television signals were relatively weak, so Amateur harmonics easily competed with them. Transmitters which had been state of the art during and after WWII, with their class C multiplier and amplifier stages that naturally generated lots of harmonic energy, suddenly were relegated to operation during "quite hours," generally after the TV stations had shut down around midnight. In the early 50's, transmitter designers finally figured out what to do. A well-shielded cabinet was a must, with all control shafts grounded where they exited the panel, all dial and meter holes shielded, all wires passing through the cabinet wall bypassed, and the RF output run through a low pass filter. Eldico and Hallicrafters were among the first to offer TVI free rigs with the TR1-TV, TR-75-TV and HT-20, but soon almost all of the surviving transmitter manufacturers adopted these practices.

In my collection I have several non or insufficiently shielded transmitters that would have to be substantially modified if I wanted to TVI proof them. I generally confine their operation to 7 MC and below. These include my Millen 90800 with its oscillator and amplifier coils hanging out in unshielded midair, my Lettine 240 with a large, open slot in the rear of its cabinet through which its unfiltered power cord exits, and my Viking I of which Phil Rand once said that its cabinet was a good dust cover but a lousy shield. Interestingly, several transmitters from that era can also run on 20 meters without producing disaster on the family TV set, including my Globe King 275 with its wide-open cabinet. It's secret is a well balanced, even-harmonic-canceling, push-pull V-70D final amplifier. Three fairly well boxed Meissner Signal Shifters and McMurdo Silver 701 also do OK on 20 meters.

I have one rig from that early 50's era that I actually cured of TVI, my Elmac AF-67. The Elmac was built from 1953 to 1958, primarily as a mobile rig. It came with certain TVI prevention measures including well-bypassed power supply leads. I acquired it used in 1958, and for the next decade it was my only transmitter, so I was highly motivated to fix it so that it wouldn't generate TVI and I could stay on the air. My fixes included closing up every RF-escape hole in the cabinet. That included building a shield around the back of the panel meter, soldering that shield to the panel and bypassing the meter leads where they went through the shield. I also installed a baffle that closed up the hole surrounding the RF output connector, and I mounted a metal film can as a shield over a shaft that came out of an open hole in the rear of the cabinet (read "stub antenna"). All of these measures helped, but the TVI was finally beaten for good when I bypassed the key lead right at the jack.

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A Visit to Cedar Rapids

by George Maier, K1GXT
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As the airliner I was in began its descent into Cedar Rapids, the patchwork of roads, farms and little towns below came into sharper view. I couldn't help but wonder how many times Arthur Collins had seen these same sites, and what his thoughts might have been as the Iowa countryside he knew so well passed beneath him. I had been to other Iowa cities, but this promised to be a very different experience. After 42 years as a ham, I would finally see one of the most recognized cities in the history of radio, and one that continues to have a major impact in the development today's sophisticated HF communications systems. My anticipation levels and adrenaline levels were both running pretty high.

For anyone that has ever had the slightest interest in Collins radios, the mention of Cedar Rapids conjures up a host of images relative to the myriad of radios that were designed there as well as the people and the events behind those designs. In the summer of 2000, a small group of enthusiasts had the opportunity to realize some of those visions when past and present Rockwell-Collins employees hosted a meeting for members of the Collins Collectors Association. Their intent was to let us peek behind the curtain, and give us a look into to world of Arthur Collins and his company that only a few outsiders have had the opportunity to view. They did a wonderful job, because a year later, the impact of that visit remains as one of the pinnacles of my life long addiction to ham radio, and an equally long fascination with Collins. Because of the my busy work schedule, it has taken much longer to get these thoughts down than I originally anticipated, but it would have been irresponsible to have been a part of such an event, and not share with fellow hams and ER readers.

The official schedule was divided into two days and two evenings of events, during which, the assembled group was treated to an array of interesting presentations given by such notables as CCA founder Bill Wheeler, KØDEW, Rod Blocksome, KØDAS, Butch Schartau, KØBS, Jay Miller, KK5IM, and others. Due to my arrival late Friday afternoon, I unfortunately missed some of the initial activities, but there were still plenty to look forward to.

On arriving at the hotel, I promptly bumped into my friend Joe Veras, N4QB. Joe is best known in the amateur community for his vintage columns in CQ magazine, and for his fabulous CQ calendars, but this was fun time for Joe, and all the photo gear was safely at home. So, off we went to the Friday night CCA dinner at the Cedar Rapids History Center, where a little more history took place.

After filling ourselves up with good mid-western nourishment, and having a chance to chat with old friends, Gayle Lawson, KØFLY, and Mark Hovda, NØJWI announced to the group that a special gift that had been prepared for all attendees—a serialized brick. Not just any brick mind you, but one that came from the original Collins factory at 2920 First Avenue in Cedar Rapids. The building had been torn down in 1999 and the remnants hauled away, but not before these two enterprising individuals filled their trunks with some

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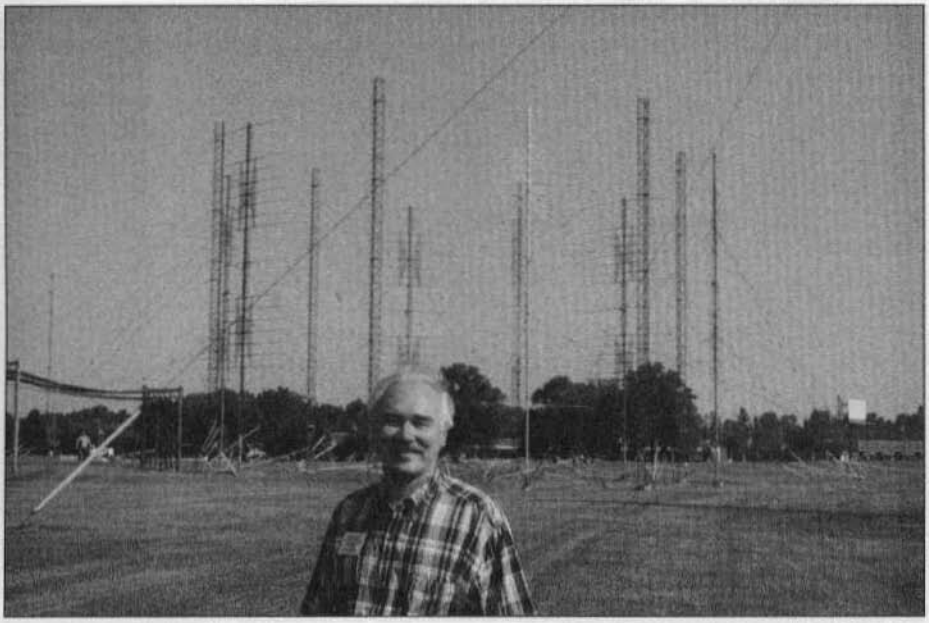
Gayle Lawson, KØFLY presents Jay Miller, KK5IM, with brick number 2920, while Bob Peters, K1JNN lends a hand. Jay would later present this artifact to the Collins family in Dallas.

of the bricks that had been a part of the original structure. Each brick has an engraved brass plate with the inscription "Collins Radio Company" "First Factory—1933" and an individual serial number. As a special tribute to the descendents of Arthur Collins, now living in Dallas, Gayle, KØFLY, presented Jay Miller, KK5IM, with a brick that carried the serial number 2920. Jay had formed a special relationship with the Collins family while gathering material for his book, *A Pictorial History of Collins Amateur Radio Equipment*, and was the obvious choice to bring this treasure back to them.

The next morning, things kicked into high gear with unique events that had the crowd begging for more. The first activity of the day was a trip to the present day Rockwell-Collins facility on the north side of Cedar Rapids, including a tour of the Collins Historical Museum, Rockwell's Comm-Central HF transmission facility, the Collins Club station, WØCXX, and every ham's dream, the Cedar Rapids HF antenna farm.

The Collins Historical Museum has a sizeable collection of amateur, military, avionics, and aerospace systems such as those used for the Mercury, Gemini, and Apollo projects. The amateur section included representative models of the radios we are most familiar with, starting with the 75A-1 and 310B-1.

At the Arthur Collins memorial club station, WØCXX, there was a suitable array of vintage S-Line gear, as well as more modern pieces. Cameras were not allowed in that facility, so a station photo was not in the cards. Suffice it to say that the club is well equipped for all bands and all modes, including digital. The station was in a different building, by the way, and this building was the site of the infamous "green room" where highly focused teams brought design



The author, George Maier, K1GXT, poses with the Collins HF antenna farm in the background.

ideas to reality in a non-stop mode. The 30L-1 was one such example, having been taken from concept to prototype in a matter of days.

The HF antenna farm was a sight to behold. Stacked yagis, log periodics, and discones of all description, plus the famous Collins "billboard" array, which consists of six sets of broadband dipoles with reflectors, that are electrically steerable in 60 degree increments. It's a massive structure, to which pictures do not do justice.

A quick lunch and we were headed downtown, to where more surprises awaited, but on the way, we took a quick detour to 2920 First Avenue to see the site where the old Collins factory once stood. With a little imagination, you could sense the aura of events that took place here decades earlier. This is where Arthur's company really took root, after moving to this location from his basement workshop.

Back at the History Center, the afternoon got under way with a presentation by Butch Schartau, KØBS, on cleaning and restoring the paint work and mechanical aspects of Collins Radios. Butch, who has restored dozens, if not hundreds of radios is always a popular speaker at such gatherings.

Next we were treated to "Arthur and His Company", a wonderful collection of photos in a slide presentation, tracing the history of Arthur Collins through his career, narrated by Ben Stearns. Stearns is not a ham, but he worked on the commercial side of Collins for many years, and has been very active in researching and writing about the company.

Following Ben was a round table session consisting of people that worked at Collins, to give attendees the opportunity to ask questions. Those taking part included: Chuck Carney, WØGDJ, who served as the amateur product line manager from 1957 to 1967, Dennis Day, WØECK, former director of

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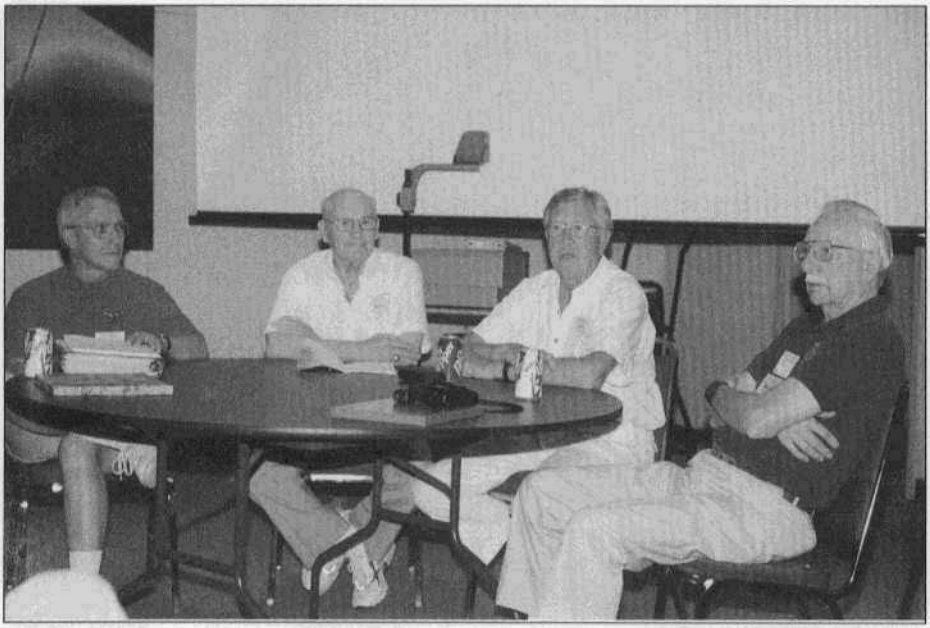

A most distinguished panel of Collins experts. From left to right; Jim Maccani, WØHUP; Chuck Carney, WØGDJ; Dennis Day, WØECK, and Arlo Meyer, WØLBK.

engineering, Jim Macccani, WØHUP, also an engineer, and Arlo Meyer, WØLBK, who was a mechanical engineer. Most of these folks had been around at least through some part of the A-Line development, through the KWM-1, and took part in the development of the S-Line and KWM-2.

As for the questions, many revolved around what it was like to work for Arthur Collins, and from the answers a picture emerged of a man who was driven to technical perfection, and one who earned unusual loyalty from his employees. Being an engineer at Collins Radio in the 1950's was being in the right place at the right time. Part of the challenge was putting up with Arthur Collin's eccentricities, however. The story was told of Collins calling one of his engineers at 3:00 AM with a new idea and declaring that he'd be right over to explain it all so "put some coffee on."

There were questions about ideas that never went market. Dennis Day discussed the 30S-2 and 30S-3 projects, and others talked about the KWM-3 and the KWM-5000, and the little known fact that Collins and KDK of Japan talked at point about collaborating on a replacement for the KWM-2, but it never happened. In 1978, the KWM-380 was introduced to ham community and became the final amateur successor to the KWM-2.

Perhaps one of the most thought provoking questions for the panel was "which radio is your favorite."

Invariably, the answers started out with "they're all different, and all good in their own way....", however it seemed that the KWM-1 got the majority of the votes. Chuck Carney said the KWM-1 was his favorite because it was a very well conceived design in which the engineers took something quite complicated, the first SSB transceiver, and made it very simple to use. Arlo Meyer agreed with Chuck on his choice of fa-

This beautiful KWM-5000 was one of several potential successors to the KWM-2/A. It literally had all of the attributes of a complete 75S-3 and 32S-3 all in one box, with several advanced features, but never went to market.

vorites. Of course the S-Line got some votes also.

All of the panel members agreed that they never expected these radios to enjoy such longevity. Not to mention that they never anticipate being in a room full of people nearly 50 years later, answering questions about events and designs that might have otherwise been forgotten by now. It was a heartwarming moment.

After the panel adjourned, another popular presenter at Collins gatherings, Rod Blocksome, KØDAS, updated the crowd on his research into Collins serial numbers. Rod is a current employee of Rockwell-Collins, and has been with the company for several decades, primarily working on the commercial HF products. One of the reasons that Rod has taken such an interest in serial numbers is that the record keeping in that area was not as well organized as it could have been. In some cases, records have been lost altogether. For example, there were some 75A-4's made in Canada, but it's not certain as to how many, and what the range of serial numbers might have been. Through e-mail surveys, Rod has been able to draw rather firm conclusions, but still some uncertainty exists. Rod's work is greatly appreciated by all.

Later, at the banquet, Chuck Carney, WØGDJ, wowed the audience with a collection of photos and memories of his years at Collins Radio. Chuck, who held one of the more attractive jobs in the company, reminded us at the onset that amateur radio was indeed a loss leader and a tiny part of what Collins really did. However, the ham gear was a great proving ground for new ideas, and way to attract top communications talent.

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Recalling Arthur's thoughts on frequency congestion and the need to conserve spectrum, Chuck pointed out that this belief was the basis for the formation of the mechanical filter development group in the 1940's. The final result was certainly to be one the most heralded Collins inventions.

With regard to their decision to develop the KWM-1, Chuck recalled an incident at a hamfest that proved it to be winner. A ham with his XYL stopped to see the new rig, and she was heard to say "why can't your radio look like that ?" Talk about universal appeal !!!

At one point, Chuck went to Arthur and suggested that it would be a good idea to start a museum to preserve the history of the company, but Collins refused. "We should be looking ahead, not back" he scolded. In spite of that sentiment, historical artifacts somehow kept finding their way to Cedar Rapids, but it was not without incident. In one case, the owner of the second transmitter Collins ever built showed up with the transmitter at the front door. His reward was tour of the factory, and an even trade for a brand new S-Line. Soon after Arthurs' photo had been taken with this historic transmitter, it disappeared. A similar mystery was the disappearance of a plastic encapsulated S-Line that once belonged to famous DX'er Gus Browning, W4BPD.

Through out the two-day meeting, there was one more special treat that our hosts had assembled for all to view. In a separate room at the History Center, was a temporary display of some of the rarest and most unusual Collins radios ever seen in one place at one time. There for our viewing pleasure was an array of prototypes, mock-ups, Colli-Kits, and one-offs that never got into production. The list of items on display included:

30L-1 prototype
32W-1 prototype
75A-4, KWS-1, and 32S-3 Colli-Kits
Two KWM-1 prototypes
Two 310B/C series prototypes
KWM-5000 prototype
30S-3 prototype
KWM-3 & Station control mock-up (balsa wood)
KWM-380
30L-1 Round Emblem

The Colli-Kit designation was given to a radio that was built by a Collins employee from parts purchased at the company store. It's not certain how many were built, but the numbers easily run into dozens, and perhaps much more. As an example, Jim Maccani, WØHUP built a KWM-2A, three 75S-3's and a station control.

All in all, the visit to Cedar Rapids was a once in lifetime trip for this writer, and one I'll never forget. Sincere thanks to Mark Hovda, NØJWI, Gayle Lawson, KØFLY, Rod Blocksome, KØDAS, Gene Duprey, K1GD, Al Culbert, KØAL, Jim Jones, WØNKN, the folks at the History Center, and many others who pulled this CCA event together and make it the success that it was. By the way, if you ever pass through Cedar Rapids, the history Center has one corner totally devoted to Collins, including several vintage radios.

What's next ? It's off to Dallas, where Jay Miller, KK5IM and the Dallas Possee have organized a Collins Users Conference. Hope to see you there! ER

For further information on the CCA, check their website at http://www.collinsradio.org
For further information on the Collins Users Conference, go to http://www.dallasposse.org/

A complete index of the entire 12 years of ER is available for viewing or downloading at the following website: http://www.qsl.net/n9oo

Clatternet: 850 shift RTTY roundtable, on 10137 kcs USB Saturday, starts 0930-1000 Pacific time.

Radio Service in the Golden Age

1930's through the 50's

by Bruce Vaughan, NR5Q
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Episode 5

First Post War Radio's

My new location was much better than my former site in the Late Chevrolet building. Now, only two doors west was one of our town's two 'variety' stores; Clayton's 'Ben Franklin,' better known as 'The Five and Dime.' They had a coffee counter in the back of the store that I visited-sometimes several times a day. Staffed by Mida Harrison, and Mary Frances Maestri, it was easy to see why it soon became my favorite 'hangout'. Both Mida and Mary were attractive young ladies. I had known Mida for years-since well before the war. I wasted little time in getting to know Mary.

Some time later, February 13, 1947 to be exact, I got up enough nerve to ask Mary for a date. She accepted.

I did my very best to make a good impression. I remember wearing my new dark gray topcoat and white silk scarf-a carry-over from my college days. I paid attention to such things as going in and meeting her parents before we left for dinner at one of our better steak houses.

Over dinner, Mary told me she planned on leaving her job in the dime store very soon. She had been offered a job at the First National Bank, but she felt that she was getting in way over her head. "Let's face it," she said. "I'm just not smart enough to work in a Bank." She planned on going to California where she had friends and finding some sort of work there.

It was obvious-here was a problem requiring immediate action. The following morning, St. Valentine's Day, 1947, I stopped by Coger's Drug Store. I was greeted by Cliff Samuels, a friend since school days. As a 15-year-old student, Clifford drove a Model 'A' school bus from Clifty, to the newly built state supported Vocational School in Huntsville.

"Cliff, I want to buy one of those new Parker 51 fountain pens they are advertising so highly," I said.

"I've got 'em, Bruce, but the doggone things are awfully expensive," replied Cliff. "One of those Parkers will set you back 25 bucks. I've got cheaper pens that will do the same thing."

"Nope," I answered. "I'll take the Parker. It's going to take some drastic action if my plan is to work-and this pen is part of my plan. Can you gift wrap it for me?"

"Sounds like your head is made up," answered Cliff. "I'll make it pretty for you."

My next stop was at a greeting card shop. I gave considerable thought to my message on the card, the gist of which was a message urging Mary to stay in Springdale, take a tellers or bookkeepers job at the bank, and forget her California move. Then, with card and gift-wrapped pen in hand, I drove three blocks to our town's florist shop.

"John. I would like to order a dozen red roses to be delivered to a young lady that works behind the lunch counter at Clayton's Ben Franklin store," I said to the elderly shopkeeper. "Could you please put this little gift and card in with the flowers and deliver them to

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the Dime Store sometime between 2 and 5 this afternoon? Ralph Clayton and I are good friends, he won't mind."

"No problem, I'll get you a dozen of the nicest roses I have and deliver them about 2:30. By the way, they have gone up in price a little since you used to send me money from France to buy flowers for that little girl up on Emma. Guess you've got a new girl now. I'll have to charge you $8.00 a dozen-is that OK?"

"That's fine, John." I paid the florist and left. I also left his implied question about girl friends unanswered.

Mary took the job at the Bank. We were married December 15th of that year.

Her Mother was waiting up when we returned home from that first date. She told me later that Mary came in the house after our date, and visited with her for some time. Near the end of their Mother and Daughter talk she said, "Mother, I hope you liked the boy I went out with tonight-that's the man I'm going to marry.

First Post War Radios

Delivery of new radios seemed awfully slow in starting after the war. Bigger manufacturers like Zenith, RCA, GE, and Philco were probably delivering a few sets to prime market areas but our small town was receiving practically no new radio or home appliances. My first radios arrived unexpectedly in the summer of 1946.

As usual on warm days, doors in both the front and back of my shop were open to allow some air movement thru the shop. I was kneeling on the floor, removing a chassis from one of those "No Stoop, No Squat, No Squint" Philco consoles. For younger readers unfamiliar with this great 'breakthrough' in radio design, Philco designed their console radios in 1936/37 with a sloping front panel. You could tune in a radio station while standing. Philco was always good at coming up with 'clever' ideas that meant nothing-things like the 'record in a slot' Model 1201 Philco, circa 1947, and the late 30's "Beam of light record players." We will talk more about these wild and weird radios in later articles.

Anyway, back to the story. I was behind the Philco when I heard a voice ask, "Is anyone here?"

I rose up and said, "Yeah, I'm back here, what can I do for you." I noticed the gentleman was holding a bright blue radio under his arm. It appeared to be in a metal cabinet.

"Are you the buyer? He asked.

"Well, I'm the owner," I replied. "It all depends upon what you're selling whether I'm a buyer."

He smiled and asked, "Anywhere I can plug in this little radio. I have a truck full of 'em out front for immediate delivery-I'll sell you one or one hundred for the same price $16.80 each. I have them in five different colors. Hard as radios are to find I think you can move them out at $24.95 each. That's about a 30% profit. Some dealers are holding them for more money but I believe in taking a fast profit and going on to something else."

I cleared off a section of my workbench and he plugged the little AC-DC set in. He unrolled a fifteen-foot antenna hank and threw it across the floor. "Don't the set use a built-in antenna?" I asked.

"Take a look at this set," he replied. "It's all metal-front and back. A built-in antenna would not work on a set like that. We gotta' use the old antenna hank idea."

I looked at the name silk-screened on the front-ELECTONE-a name that meant absolutely nothing to me. Obviously, a company involved in war production found itself with metal working facilities and an absence of orders when the war ended abruptly in 1945. The metal cabinets were heavy gauge steel with neat rounded corners. In the

front was a speaker grill, a hole for the volume control shaft, and another directly above it for the tuning capacitor shaft. The dial was a circular piece of clear plastic, about three inches in diameter, imprinted with frequency markings. Tuning was 'sudden,' a simple direct drive. The frequency dial slipped over the tuning shaft; it was held in place by nothing but a friction fit. In front of the dial scale was a small knob exactly matching the volume control knob. It was very basic. I took out two sheet metal screws and looked inside. It appeared to be a simple.' All American five'-12SA7, 12SK7, 12SQ7, 35Z5, and a 50L6. I bought a bunch of 'em in assorted colors.

The only new radios I had been able to buy for resale before this was an order of Minerva 'Tropic Masters' sold surplus by one of the large surplus dealers launched into business when the war ended. I bought quite a number of them for $44.50, and had no trouble selling them for $79.95—a real bargain for the customer. They were great radios, even though they were AC-DC sets. They used a pair of 25L6's in the output and everything in the sets was designed to withstand tropical conditions. Some customers wanted the radio but did not care for the gray metal cabinet. I overcame this objection by mounting some of them in customers console cabinets to replace their defective or out-of-date radio chassis.

I sold my first ELECTONE that same day. They continued to move out at a fast pace. Within a week, inexperience and over-enthusiasm caught up with me.

"This damn radio caught on fire," said the irate customer as he handed me a bright green ELECTONE. I want it fixed right now, or give me my money back."

I tried to soothe the customer's anger by clearing off a place on my bench and starting to work on his set immediately. I spotted the trouble within minutes. The antenna coil was burned to a crisp. I was lucky enough to have a standard Meissner replacement coil in stock. "This won't take over fifteen minutes," I told the customer. "I will refund your full purchase price, or repair this one better than new-it's your call."

That seemed to reassure the gentleman. "Oh, go ahead and fix it up," he said. "I guess I should have paid attention to the warning on the back. It said not to connect the aerial wire to a ground."

When I heard the word 'GROUND' a bell went off in my thick skull. Yep, the Electone Company had connected one side of the AC line directly to the chassis and, of course one end of the antenna coil went to a chassis ground. If you connected the antenna hank to ground, you had a 50% chance of running 120 volts through the antenna coil-depending upon which way the AC plug was inserted in the outlet. I'll never understand is why with capacitors selling for a dollar a bushel or so after the war, why in heavens name the company did not put a .001 in series with the antenna hank. This 'quick and dirty' fix could have prevented a lot of damage. They had to be aware of the problem because on the back of each set was a white sticker about two inches long by one inch high. DO NOT CONNECT ANTENNA TO GROUND, it read in large red letters.

Well, after this, I realized that every set I had sold would be returned sometime. I called as many owners as I could remember and offered to do preventative maintenance. Every radio returned was modified as well as all my unsold stock.

One last comment on this affair; when a customer brought in his Electone I would point out the sticker and ask if he had connected the antenna to a ground. The reply was always the same, "No sir, I did not—the darn thing was just play-

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Adding an AM Filter to a Drake TR-4C

(Reference Jeff Covelli's article, August 2001 issue of ER)

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This is a follow up to the article written by Jeff Covelli, WA8SAJ in the August 2001 ER. Jeff's article covered the modifications to his Drake TR-4CW, to be able to operate on AM. Because the TR-4CW's are getting difficult to acquire, I wanted to make the modifications to a straight TR-4C, which is still in plentiful supply through various sources.

The TR-4C differs from the CW version in that it does not have the built in CW filter. To perform Jeff's modification on the 'C' version it would require adding a small relay and fabrication of mounting hardware for the new additional 6KC AM filter. It also requires adding a small half wave bridge rectifier, to supply the needed +12 VDC to the relay. The 12 VAC supply voltage can be obtained from two sources. The first is to tie it into the nearest 12-volt filament supply. The second, and the one that I always use, is to tie it into the 12 VAC supply, that is located on the bottom of the remote VFO jack. This is located right next to the USB/LSB filters. Pin 7 is the 12.6 VAC and Pin #8 is ground. This 12 VDC can also be used to power a cooling fan.

The relay I used was Radio Shack part number 275-249A and sells for less than $5. It's mounted in location 'B' on my PCB board layout. I chose to tie wrap mine to the bracket. Super Glue or RTV would also work. The relay was pulling about 60 mA when I tested it and I wanted to reduce the current flow as much as possible, but still maintain solid keying action. I ended up with a value of 120 ohms, in series with the coil, which got me down to about 20 mA draw. See Figure 4.

The new 6KC filter, International Radio (541) 459-5623, part number 2311 is mounted to location 'A' on the PCB board layout. See Figure 4.

This modification will take several hours, the most of which is the fabrication of the mounting board. I used double sided, copper glad PC board as the construction material. All panels are soldered to each other on both sides of the board. This construction turned out to be very sturdy, but yet somewhat flexible. Figure #1 shows the design that I finally settled on. This was the 3rd revision. Each of the predecessors developed problems with component clearance once I attempted to mount them inside of the case. When tying in the new filter,

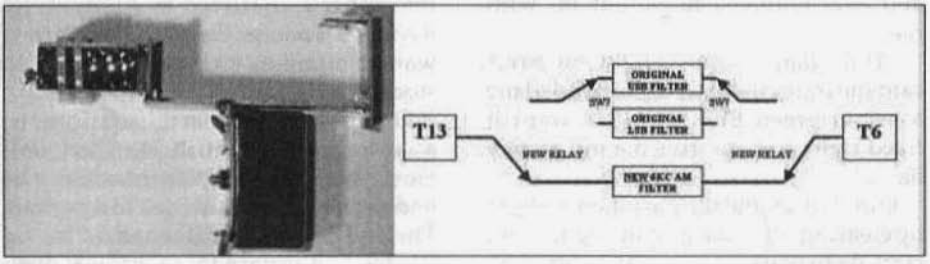

Figure 1.

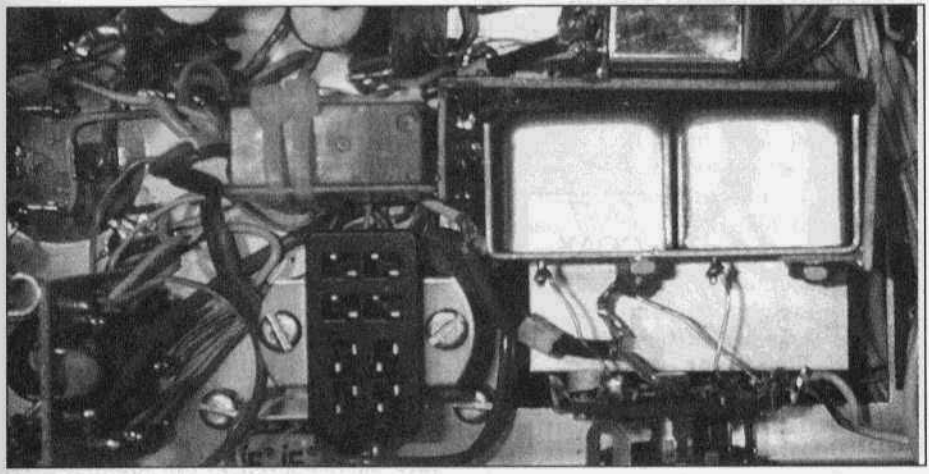

Figure 2.

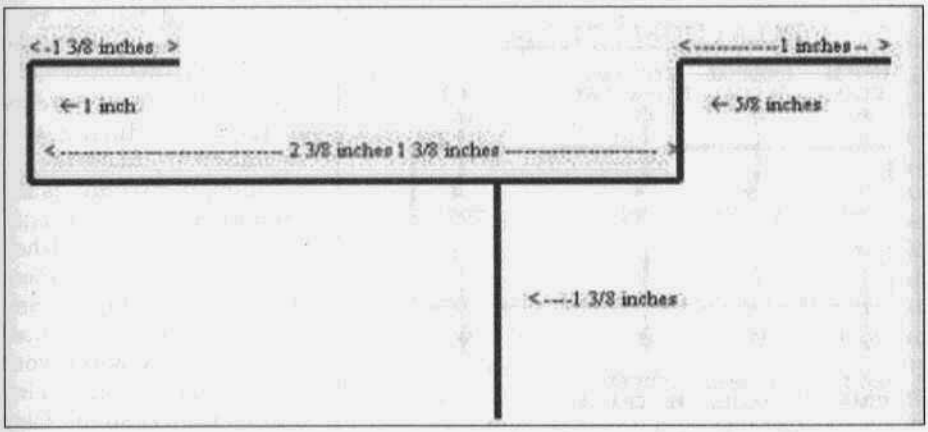

Figure 3.

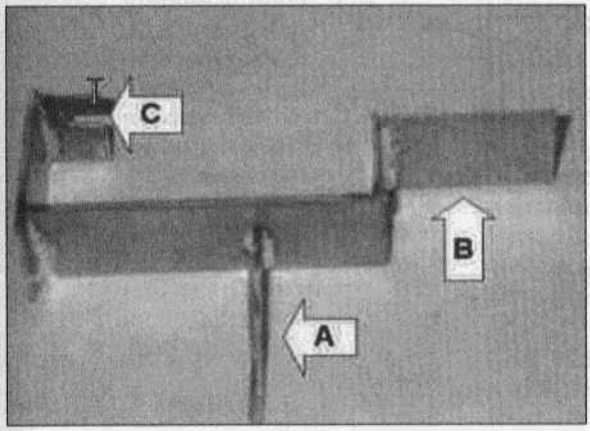

Figure 4.

use RG-174 coax, or a substitute. Make sure all shields are hooked up. I tied the shields, on the mounting bracket side, and soldered them right to the board. See Figure 2.

When mounting the hardware inside of the radio, make sure that no conductive surfaces from the double-sided PCB, or the case of the Filter, is in contact with any of V14 or V17 pins or components.

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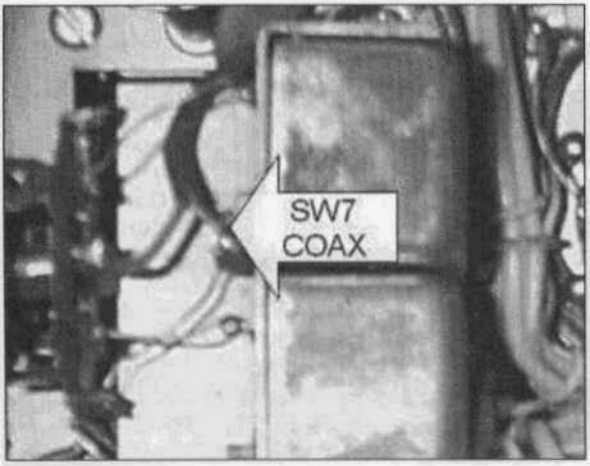


Figure 5.

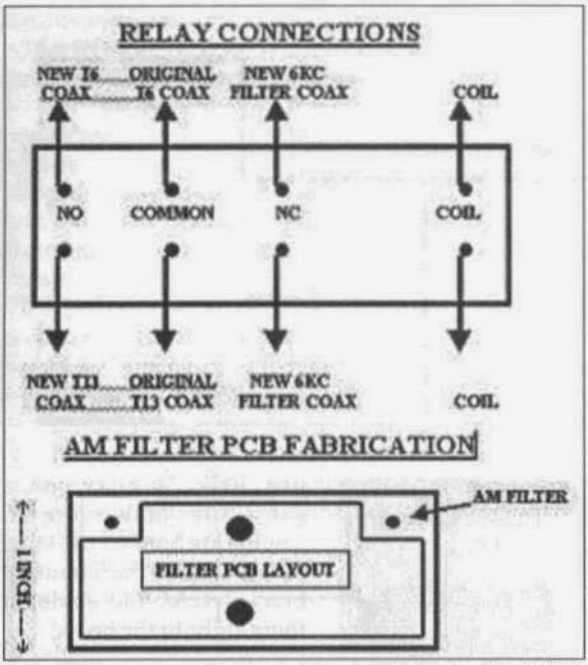


Figure 6.

Step-by-step procedures:

1) Fabricate filter and relay support PCB. See Figure 3.

2) Support 'C' (Figure 4). The slot should be cut to fit the filter stud indicated in Figure #2 of about 1/4 x 1/4 inches.

3) Mount filter to area 'A' on board. See figure 4.

4) Disconnect T-6 and T-13 coax from the center of the top and bottom of filter select switch S7.

5) Hook wires disconnected in step #3 to the center pins on the relay. These pins are the common relay input.

6) Hook up new coax (RG-174) to the center pins of S7 switch position that were disconnected in step #3.

7) Hook up the other end of this coax to either the NC (normal closed) or NO (normal open) pins. In my case, I used the NC pins since I'll be using the radio primarily for AM and wanted the relay deactivated during this operation. If you use the NB position, it disconnects the ground when switch is in the 'ON' position. So when moved to the OFF position, the relay is pulled in and active during SSB operation. I would suggest wiring your remote switch, if not using the NB switch, so the relay is deactivated in your favorite mode of operation. In my case, AM.

8) Use new coax (RG-174) to hook up to the NC position (if noise blanker is used). Hook the other end to the new filter.

9) Solder a 30 pF capacitor to each pin of the filter. See Jeff's write up.

10) Hook up +12VDC leads to the relay.

11) Optimize current draw through relay (see above explanation).

12) Mount relay into position 'B' on mounting PCB.

13) Follow procedures laid out in original article.

Figure 7.

As pointed out in Jeff's article. You should always have a fan mounted in the general area of the final amplifier section. In AM mode this becomes even more important due to the heavier draw that AM puts on the 6JB6 finals. ER

Radio in the Golden Age from page 33

ing along and caught on fire."

After the first five or six returns, I rephrased my question. "Are you sure you had it connected to a good ground?" I would ask.

"I certainly did, I connected it to the water pipe," the customer would answer. The only variations in customer's replies were in the type of ground described-sometimes it was a copper rod. ER

TUBE COLLECTORS GROUP FORMED: The new tube collectors association is now in operation. This is a non-profit, non-commercial organization of collectors & history enthusiasts focusing on all phases & vintages of tube design. The founding president of the group is Al Jones, W1ITX, who is known for his award winning tube collection. For more details & complimentary copy of the association's bulletin contact Al Jones, CA, (707) 464-6470, Ludwell Sibley, OR, (541) 855-5207, or mail request to POB 1181, Medford, OR 97501.

How to Repair a Transmitter from page 24

Though I haven't done it to mine, there was a thorough TVI proofing job that could be performed on the Viking I ("TVI Proofing the Viking I," Phillip Rand, W1DBM, QST June 1952, page 20). It consists, among other things, of building an RF-tight shield around the top of the chassis that fits inside of the original cabinet, adding a bottom plate, shielding the meter and the readout dial for the final tank circuit, shifting several stray resonant circuits inside, bypassing leads to the outside, and incorporating a low pass filter on the RF output. I think Johnson even offered a modification kit for the Viking I, and the resulting rig became the basis for the redesign to the Viking II and subsequent Johnson rigs which are TVI proof.

At this juncture I wouldn't recommend that you go on such a crusade to cure an older boatanchor of its TVI on the higher frequency bands. You can operate on 160, 80 and 40 and perhaps 20 with the rig as it is, and you probably wouldn't want to make the kind of necessary modifications to a 50 or more year old antique—they would tend to lower its resale value. If you want to operate on 20 meters and above, get a "newer" rig like a Ranger, Valiant, DX-anything, Collins 32V-3, and the mid-50's WRL rigs. You may be able to make a few, unobtrusive improvements with appropriately placed bypass caps and a low-pass filter. If you'd like to find how the interfering signal is getting out of your transmitter's cabinet, attach a "probe" lead to one of the antenna terminals of a TV set and position the probe at likely spots around the transmitter. That's how I found that the key lead on my AF-67 was hot and that TVI was getting out of a Globe Chief 90 through its unshielded meter. Once you know what ports or wires are letting it escape, you can decide what if anything you might want to do about it. ER

Ed. Next month part 4.

The TBW Navy Transmitter

by Robert B. Login, AA8A
30 Bark Court
Travelers Rest, SC 29690

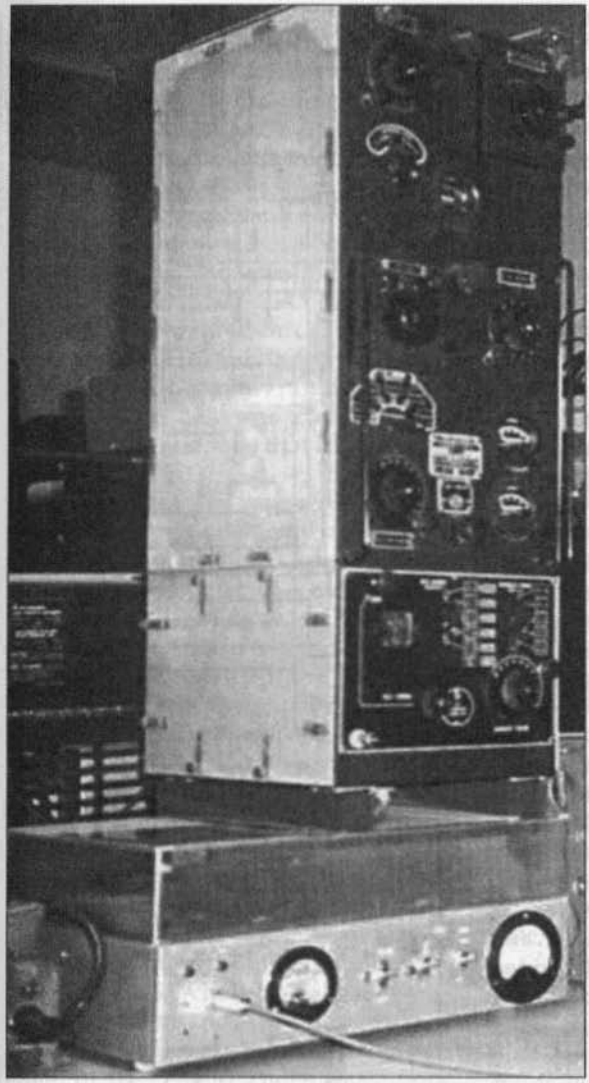
We recently moved to the country outside of Greenville, SC to the small town of Travelers Rest. I now have 2.5 acres on top of a small hill. My only close neighbor doesn't own a TV and his dad is a ham! And best of all I have my own 15x30-shack building filled to the gunnels with vintage gear. I think it's a 1950's era Ham paradise containing all the "stuff" I couldn't have when I was a teenager. In those days I was KN2VQM first licensed in '56. I got on the air with a DX-20 and a BC-455 (ARC-5) later "upgraded" with a VF-1 and a RAX3 Rx. Even though I lived in Brooklyn, NY in an apartment house with 40 other families and had a dipole on the roof mingled in with the forest of TV antennae, I had no TVI because in those days everyone watched TV at the same time!

In my article in ER concerning the RBM receivers (ER #127, Nov. '99), I mentioned my interest in obtaining the associated TBW transmitter. Well after some friendly horse trading, I convinced Fred, WA4TDC to part with his TBW-4 HF section. The HF section consists of a 837 VFO/MO driving a 837 buffer/doubler driving a 803 final. The rest of the TBW consists of a 800 cps AC power supply/screen modulator and a LF transmitter section similar to the HF section. These seemed unnecessary so I passed up the offer of a complete TBW from Steve, N3NNG, a very active collector who graciously let me copy his manual.

It would be a challenge to get this rig on the air not to mention putting it on AM! The TBW originally used screen and not high-level plate modulation. I envisioned salvaging the modulator fixings from an ART-13 and swapping the 803 for an 813. I have a collection of 813's and could see myself really pushing the old warhorse tube. I immediately got to work on a power supply. This was a lot of fun and reminded me of the old days scrounging for parts on Courtlandt Street (Radio Row). The hamfests in the Carolina's are some of the best around and parts can be plentiful. I found several plate transformer candidates. I used a 1100 VCT at 500 mA in a voltage doubler for the final and a 800 VCT at 200 mA in a full wave for the 837's. I used Variacs to adjust the voltages because both supplies will put out more B+ than needed. I didn't use chokes because I felt that the high values of capacitance (450 uF/450V in the doubler string) in the filter should be enough (?).

One of the CQ Surplus Conversion books has a chapter on the GO-9/TBW which was useful in that it said there was nothing to really do. Just build a power supply and use grid-block keying for all three stages. The author also recommended adding a 803 plate choke and even replacing the 803 with the 813. Well the recommended power supply is now so vintage as to be outdated and I was fearful of keying all stages at once preferring to run the final while keying the VFO and buffer just in case of instability and parasitics. Keying all three stages would mask spurious transmissions. Unfortunately I was right! I just wondered how hams back in the 50's tackled a rig like this without access to all the test gear so typical of present day builders. My frequency counter showed parasitics all over the place until I figured out how to tune the rig!

The HF section was originally keyed by a giant relay that switches the antenna and the grid ground return circuits in the 837's. I decided to key the filament centertap return in the 837 filaments circuit instead and to use the relay for antenna switching and mut-



The author's TBW transmitter sitting on the top of his homebrew power supply.

ing. It supposedly requires 12 VDC to work but a separate unregulated 12V supply hardly moved the thing. I thought for sure the relay was broken but after looking at it as I put 12V on it and seeing it move feebly, I realized that not enough power was available to move it. I checked the voltage, 12+ volts open and 6-7V actuated! Well there was not enough voltage so I changed the rectifier to a doubler and now had 30V that dropped to 9-10V when actuated. The relay worked well with this power supply.

As you can see in the photo, I added a plate voltmeter switchable between both the 803 and 837 supplies and a 300 mA meter in the 5V 803 filament ground return to measure total final tube current. The HF section has meters for grid drive to the 837 buffer and 803 final and an RF ammeter in the antenna circuit affords an indication of output. The VFO tunes from 1.5-3.0 MHz but can be doubled by the selection of the appropriate plate tank feeding the buffer that can also double the frequency. The final runs straight through. The final did not have a plate choke nor a parasitic trap so I used a design from the '55 handbook for the latter and one designed for a grounded grid linear for the former. I also added a 2.5 H choke across the output for safety.

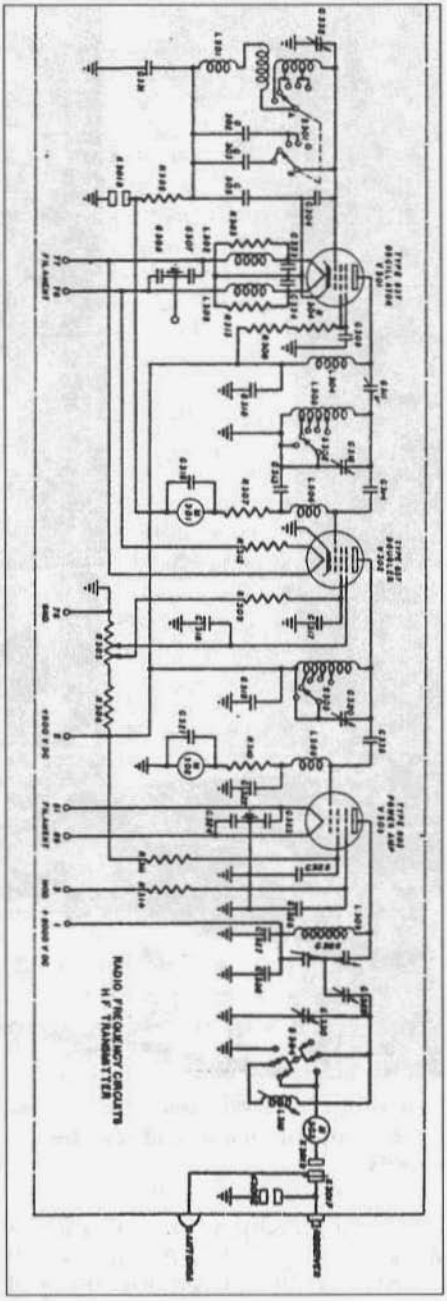
Well, I decided to fire her up on 80 CW. Filaments looked OK, the 803 gives off a bright pleasant glow. I raised the B+ to the 837s with a Variac to 500V, turned on the relay and closed the key. I got a nice note in my R-390 but got worried when I heard other heterodynes as I tuned across the frequency. Orr's '59 handbook suggested that this might be an indication of low frequency parasitics. I had resonated the doubler and buffers and found the

recommended readings of 6 mA for the buffer grid and 40 mA for the 803 grid. So the 837s seemed to be working correctly. Now I turned on the B+ to the final and gave her 1000V for tuning. I then closed the key and resonated the final and loaded her up to over 100 watts. I was thrilled so I increased the plate to 2000V and hit the key, 200 watts out to my dummy load but when I let up on the key output continued at about 60 watts! Not on 80 but somewhere... darn the 803 is self oscillating and obviously unstable!

Well backing off resonance in the VFO/doubler circuit as evidenced by the drop off in grid drive dropped out the self-oscillation. I reduced the grid drive to a minimum trying to keep the drive to the 803 at the recommended 40 mA. This cured the self-oscillation and allowed me to load the final to over 200 watts out with no sign of instability. However, listening to the signal with my R-390 worried me to no end as I could clearly hear more than one beat note as I tuned across the signal. It was even hard to tell the correct beat note to listen to! I was convinced at this point that I had low frequency parasitics and blamed it all on leaky bypass caps.

Everything in this xmitter is oversized. The caps are gigantic and look very sturdy and reliable. I decided to replace the 0.01 mFd bypass and coupling caps with new disc ceramics even though they seemed to be OK. It was very easy to do and my goal has always been to restore performance inside while maintaining authenticity outside. As per Orr's '59 Handbook, I also installed recommended low freq parasitic traps in the plate and grid 837 buffer circuits. No luck, same problems! Multiple heterodynes and instability.

Yes, I checked the tubes very carefully and measured voltages. Unfortunately the manuals I had access to failed to have the extensive maintenance sections so typical of the military's later manuals



TBW Schematic

and they proved to be of limited utility. Lucky for me, I found a couple of 837's and tried them. Bingo, the heterodynes

vanished on 80 replaced by a single carrier. Well so much for the low frequency parasitics. Goes to show you that you need all those tubes and my desire to buy tubes and more tubes is a worthwhile pursuit never mind all those TV tubes that got in the door.

I was now able to crank out 225W on 80 by detuning the drive to the 837 buffer so that the minimum drive needed from the 837 VFO kicked the buffer up to about 40 mA. Could this mean that the 837 buffer was unstable or the 803 final? Possibly putting a plate choke in the 803 was causing the instability? Could it be that I needed to neutralize the 803?

However, the rig keyed nicely and sounded very good in my rx. It was very touchy wanting to oscillate but when carefully adjusted seemed OK. So I put it on the air and made a couple of QSOs on 80. Actually got very good signal reports! On 40 it still had the multiple heterodyne problem but worked well on 30 producing about 80-100W out and a QSO with a good signal report. One problem remained and that was why the 803 tank circuit did not resonate at the correct MHz indication as the dial is calibrated in frequency. On 80 instead of 3.5 it read 3.0 when tuned-up. Well I figured this out!

It was my mistake. I had improperly installed the RF choke in parallel with the tank circuit and had disconnected one leg of the tank capacitor coming from the B+. The RF choke was doing nothing as the B+ simply went through the tank inductor and not through the choke! In fact I had inadvertently changed the tank circuit and that's why it resonated at a different setting. I went back and did it right; now however the choke burned out when I increased the power. The 2.5 mH choke across the output also got hot. I took the RF choke out altogether and put the tank circuit back to the original configuration.

Without the plate choke and everything put back to the original circuit, the tank now resonated at the correct setting. However, it would load to only about 180W out instead of 225W and was just as touchy and unstable as with the mistaken hookup. Looking at the schematic, the higher output circuit is simply breaking the connection from the B+ to the differential capacitor in the tank circuit. Tracing this new tank suggests to me that it worked and is more efficient than the original. However, I'm certainly not knowledgeable enough to draw that conclusion with any authority.

Well that's where I left it when I decided to write this progress report. I have been asking my friends and acquaintances for advice. This is the first project of this type that I have tried to tackle and so far it has been both fun and educational. If you have some suggestions or experience with the TBW please let me know. I plan to fix the instability problem(s) and then modulate the rig with the ART-13 modulator parts I now have on hand. My biggest problem is that my friend Brian, KN4R, decided not to work on a TDB rig but to offer it to me. I just can't resist this stuff and maybe I'll put the TBW project aside to work on this one. After all it has two 813's in the final! **ER**

Alignment Tip from page 15

must be set to +/-0.5 kc for alignment of the 60 kc IF. The note appears only on the schematic; the alignment procedure text and diagrams make no mention of the unique control settings the 60 kc IF stage. I originally had the bandwidth set to +/-3 kc, sidebands to "Both" and mode to "AM" (these settings, be the way, are correct for alignment of the 455 kc and 3035 kc IF stages). After I realigned the 60 kc IF with the proper control settings the radio came alive with excellent sensitivity and audio fidelity. ER

BC-610E/SCR-299 from page 13
#126, pp. 4-13.
Grinder, R. E. (1999, November). The BC-610 Revisited, Part 2, Electric Radio, #127, pp. 4-9, 39.
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Hallicrafters. (1944, February). The Giant of Military Radio . . . The Army's SCR-299 Communications Unit. Radio News, 31, pp. 35-38.
Read, C. (1943, December). The saga of the 299. QST, 17, pp. 44-47, 98, 100.
Read, O. (1943, August). The Army's SCR-299. Radio News, 30, pp. 17-20, 54.
Russell, B. (1972, originally published, 1945). A History of Western Philosophy. New York: Simon and Schuster, pp. 730-746.

Footnotes:

[1]I wish to express my appreciation to Larry Godek, WØOGH/7 for sharing with me aspects of his deep store of knowledge regarding the models of the BC-610.

[2]A BC-610E/SCR-299 surely could be assembled from the products of the manufacturers listed herein; however, as the listing shows, Hallicrafters drew often from several different manufacturers to obtain a given item, and it is probable that I have not identified all of them.

W2IQ, Silent Key from page 18

favorite times were spent at the various hamfests in the southeast. Although Hank was 81 years old, he made most of the hamfests. Hank would always have time to sit and chat with his friends. He was upbeat and always had a kind word for everyone. Dayton will not be the same next year with him missing from the tailgate vendors.

He had a great looking station which included a Collins KW-1, a beautiful Collins 20-V broadcast transmitter, a Johnson desk kilowatt, Collins 75A-4's and many other pieces of vintage gear. He would always have the very latest Ten-Tec station to show off to visitors. Hank was a very proficient builder and favored the older style of breadboard construction. I suppose the reason Hank and I hit it off right away is that we both enjoyed the construction aspect of the hobby. It seems we always had a project in the works to talk about.

Although Hank was heard frequently on AM he was a very good CW operator and would operate while driving his car on trips. I know that there are many CW operators who will miss Hank in addition to his AM friends. His love of CW always came through when he signed off on AM. Hank would say "this is W2IQ, Hank in Grants Chapel near Dandridge, Tennessee pulling the plug, diddle de dah de dah".

And a diddle de dah de dah to you my friend Hank. 73 from Andy, WA4KCY. ER

A 'Homebuilt' R-390A from page 4

In summary, the Teledyne production of R-390As looked something like this:

Badge Name	Order No.	High s.n. noted
Amelco	35064-PC-62	2540
Teledyne Systems Corp	35064-PC-62	3642
Imperial	37856-PC-63	3022
Teledyne Systems Corp	37856-PC-63	3976

Total Production, at least 7619 sets (including Bob's).

We now know of at least one ham who built his R-390A himself, one piece at a time. Bob Luce is still enjoying his kit built R-390A today. Special thanks to Bob Luce for the facts of this interesting story. ER

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FOR SALE: Military Radio manuals, origs & reprints. List for address label & $1. For specific requests, feel free to write or (best) email. Robert Downs, 2027 Mapleton Dr., Houston, TX 77043, rwdowns_wa5cab@compuserve.com

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FOR SALE: New Collins winged lapel pin, still have meatball version, either type - $5.95 + 75¢ s/h. W6ZZ, 1362 Via Rancho Prky, Escondido, CA 92029. (760) 747-8710

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FOR SALE: Mohawk/Apache drum dial reproductions. email for details. Ron, AB5WG, ab5wg@mylinuxisp.com; (281) 491-7823

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

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NOTICE: T-368 Registry. For info w2zr@aol.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. (516) 653-5350

FOR SALE: Write, phone, e-mail. Your postal address brings new list of 100+ vintage items. Richard Prester, 131 Ridge Rd., West Milford, NJ 07480. (973) 728-2454, rprester@warwick.net

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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

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FOR SALE: Heath SB313 with AM and SSB filters - $300 plus shpg. Doug, OR, (541) 367-3322

WANTED: SW3 #33A and #35 coils. I will trade my extra coils SW3 coils. Hank Bredehorst, 2440 Adrian St., Newbury Park, CA 91320. (805) 498-8907

WANTED: Parts for a TMC GPT-750 xmtr. I need the AM modulator deck and other parts to restore this unit. John, KF2JQ (716) 873-0524 jprusso@acsu.buffalo.edu

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WANTED: Globe King 500 B/C; Viking Valiant I/II; Viking 500; Heathkit Mohawk. Frank, (916) 635-4994, frankdellechaie@sprintmail.com

WANTED: National SW-3 model1, version 3. Uses 32-32 30 tubes. Dean Showalter, W5PJR, 72 Buckboard Rd., Tijeras, NM 87059. (505) 286-1370

WANTED: Collins 32V & Collins 75A series; Globe Scout; National SW54. KBØW, CA, (916) 635-4994. frankdellechaie@sprintmail.com

WANTED: National Company emblems, escutcheons, logos from equipment. Also WW II rcvr's manufactured by National. Don Barsema, 1458 Byron SE, Grand Rapids, MI 49506. (616) 451-9874, dbarsema@prodigy.net

WANTED: 1950's Popular Electronics; 1961-65 Heathkit catalogs & Radio-TV Experimenter. John Curtis, WØCAR, 3146 S. Franklin St., Englewood, CO 80110. (303) 781-8027, wøcar@arrl.net

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WANTED: Hallicrafters SX88 or SX115. Larry Redmond, 413 Bedfort Dr., Duluth, GA 30096. (770) 495-7196

WANTED: Back issues of QRP or RADIO AGE magazines. Gary Fender, W5UUO, 450 Cunningham Rd., Celina, TN, 38551. (931) 243-5323, gdfender@multipro.com

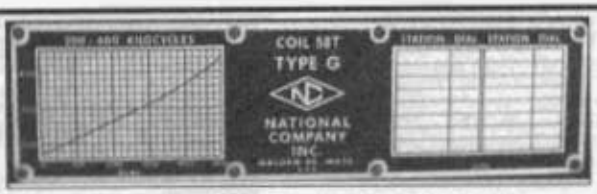
WANTED: Antique tubes. Paying $40 ea for good used type 201 tubes (not A). Buy list & new 2000-2001 catalog of collector tubes available. See www.fathauer.com. George H. Fathauer & Assoc., 688 W. First St. Ste 4, Tempe, AZ 85281. (480) 968-7686, tubes@qwest.net

WANTED: WRL Globe Champion 300A cabinet without dents or modifications. Bad paint OK. Will take an entire parts radio. Warren, K7SA, AZ, (602) 692-0205.

WANTED: Cabinet for restored Hallicrafters SX100 rcvr, consider junker SK100 if cabinet OK. Roger, W9UVV, WI, (262) 242-4931. w9uvv@aol.com

WANTED: Instruction-Service Manual (with schematics) for Nems-Clarke Type 2801A UHF Receiver. Paolo Viappiani, Via G. B. Valle 7 - 19124 La Spezia, Italy. Fax: ++39-0187-21647, pviappiani@tin.it

WANTED: Hammerlund Super Pro 200 series parts, spkr, pwr sply w/1V tube, buy/trade. Bill Coolahan, 1450 Miami Dr. NE, Cedar Rapids, IA 52402. (319) 393-8075



Need the 200-400 Kc. "G" coil (J196) for HRO-W (HRO-5) to complete the set Tony Stalls, K4KYO, 703-522-1568, bc348@sprintmail.com

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

FOR SALE: 51J-4 filter replacements, direct plugin—6.0 kc Collins mech. filter, 3.3 xtal lattice, 2.3 kc xtal latice ,500 cycle xtal latice - $215 each; R-390A 16 kHz flat phase filter, for Hi-Fi AM - $245. Chuck Felton, KDØZS, WY, (307) 322-5858, feltoned@coffey.com, www.feltondesign.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: http://www.maxpages.com/murphyjunk. Murphy's Surplus, 401 N. Johnson Ave., El Cajon, CA 92020. (619) 444-7717

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FOR SALE: Thordarson Multi-Match mod xfmr T-21M64, 300-watts audio; Crosley 52, 3-tube with 01As, works. Fenton Wood, W5AIR, 4716 Stonebriar Cir. College Station, TX 77845. (979) 690-9824, milordwood@aol.com

FOR SALE: Johnson Viking Matchbox 250-23-3 like new with built in SWR meter - $175; 2nd matchbox, no meter - $125. Van Field, 17 Inwood Rd., Center Moriches, NY 11934. (631) 878-1591, W2OQH@ARRL.NET

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FOR SALE: Kenwood R1000, very nice - $250; Mirage D1010 450 linear, bargain, no book - $200; Johnson lowpass - $20; D104 w/stand - $35. Jack, W9FQK, AZ, (928) 634-2028.

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FOR SALE: I am making aluminum plate and grid connectors for T series tubes. If interested contact Alan Price at fixr752e@cs.com

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

FOR SALE: Ur old QSL card? Search by call free, buy find at $3.50 ppd. Chuck, NZ5M, CRBCS1@prodigy.net

FOR SALE: Precision E400 sweep generator; E200 signal generator w/book - $19 ea or both $35 + shpg. Henry Mohr, W3NCX, 1005 Wyoming St., Allentown, PA 18103.

FOR SALE: Elenco SS-75 filter SSB exciter, complete, unchecked (R Moore, Transmitters, pg 48) w/manual - $20 + UPS. Louis L. D'Antuono, 8802 Ridge Blvd., Brooklyn, NY 11209. (718) 748-9612

FOR SALE/TRADE: Mint, working Kenwood DG-5 Digital Readout for TS-520-S w/connecting cables & manual - $100 +UPS or BO. Will trade for Kenwood AT-200 antenna tuner. Wes Chatellier, 1950 Chevelle Dr., Baton Rouge, LA 70806. (225) 927-2199 eves, wesw5dpm@cateLnet

FOR SALE: Yaesu FTDX560 - $125; FGR-7 rcvr - $150. **WANTED:** Eldico SSB-100F. Bob Braza, W1RMB, MA, (508) 222-5553

FOR SALE: RCA BTA-250L broadcast xmtr - $375, PU only. Terry Knapp, 1937 Valley Dr., Las Vegas, NV 89108. terryk@nevada.edu

WANTED: Swan VX-1 VOX or other Swan stuff. xcvrs, meters, etc. Working or not. Butch, WA8X, (989) 275-3420, jpeitsch@voyager.net

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

WANTED: Orig Heath manuals for ham & test equip. Please state condx & price. Warren, K1BOX, POB 1051, Spruce Pine, NC 28777. (828) 688-1922

WANTED: Modulation Reactor, 30-50 Henries, 600 mA. Ronnie Hull, W5SUM, 1855 Shady Lane Dr., Shreveport, LA 71118. (318) 688-1389

WANTED: Globe King 500/A/B/C xmtr. Will pick up anywhere near Chicago. Jim Jorgensen, K9RJ, 1709 Oxnard, Downers Grove, IL 60516. (630) 852-4704. JandRJor@interaccess.com

WANTED: Bendix radio rcvr RA-1B; Belguim set RST-101. George Rancourt, K1ANX, MA, (413) 527-4304 or k1anx@mindspring.com

WANTED: WW-2 Japanese military radio and radar of any kind. Yokohama WW-2 Japanese Military Radio Museum, Takashi Doi, 1-21-4, Minamidai, Seyaku, Yokohama 246 Japan. Fax 011-8145-301-8069, takadoi@carrot.ocn.ne.jp

WANTED: Stancor/Chicago PCC200, PCO/PS0150, RC8150; Triad A-9-J, A-10-J, A-11-J, A-12-J. **FOR SALE:** Books, send SASE. Richard Robinson, POB 1425, Wallingford, CT 06492. (203) 949-0871, richmix@erols.com

WANTED: RBB/RBC rcvrs, pwr splys, cables & RAK/RAL equip. Andy Miller, KD6TKX, CA, (831) 484-2389, amillertkx@aol.com

WANTED: Mics: Astatic JT 30/40; UT-48; Shure CR80/81/41; 707A; Turner VT-73; CD/BD; parts for same. Tom Ellis, Box 140093, Dallas, TX 75214. (214) 328-3225. tomsmics@flexcomp.com

WANTED: Desperate for museum display: lge AC cooled or water cooled xmtg tubes. Certain types including RCA, 898, 862, 893A or R & 5831s; other manufacturers such as Federal Telephone & Radio F 124R. Name your price. Tommy Bolack, 3901 Bloomfield Hwy, Farmington, NM 87401. (505) 325-4275

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: WWII BC-610-E series or earlier xmtr; BC-739 interphone control box. BC-652 rcvr. Steve Finelli, N3NNG, 37 Stonecroft Dr., Easton, PA 18045. (610) 252-8211, navrad@enter.net

WANTED: Plug-in coils 4, 5, 6-pin types; Hammarlund, Millen amphenol, used or new. Henry Mohr, W3NCX, 1005 W. Wyoming St., Allentown, PA 18103

WANTED: Replacement power transformer for Heathkit DX-35. Ron Faulkner, W6TUR, 7188 Ruane St., San Diego, CA 92119. (619) 303-1307

WANTED: TUs for ATD; cases for GRC-9 & for BC-652 RX; all any condx. Rian, W6SVU, CA, (562) 421-7213.

WANTED: Galaxy LA550 linear w/sply, has anyone ever seen or touched one? Kelley, W8GFG, 9010 Marquette St., St. John, IN 46373. (219) 365-4730

WANTED: Wireless set #19, MKII cable set. Allan Zwaaf, 14 Blackwell Ave., Hopewell, NJ 08525. (609) 466-0552

WANTED: Complete set chrome knobs for Heath HX-10 Marauder; small red knob for Heath DX-40; black tuning knob for DX-60; Allied Knight T-400 xmtr. Dennis Henrichs, KO7KCW, POB 1717, Medical Lake, WA 99022.

WANTED: Large Collins winged emblem for the door of my KWS-1. Doug Morgan, 1576 Kupau St., Kailua, HI 96734. kh6u@gte.net

WANTED: Electric Radio; Antique Radio Classifieds; Old Timers Bulletin. Alan Mark, POB 372, Pembroke, MA 02359

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

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

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

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WANTED: Clean Mackay 3010C & Kenwood R599D w/all filters & manual. Ric, C6ANI, POB N4106, Nassau NP, Bahamas

WANTED: National SW3, complete tube shield. State price & condition. Roger, K1TG, rwkuchera@snet.net

WANTED: Collins 70K-2 PTOs working or not; IN82A diodes; Bretting 14/14AX manual. Clark, WØBT, KS, (785) 286-2132

WANTED: National NTE. I love National. Sylvia, N1VJ, 33 Lawton Foster Rd., Hopkinton, RI 02833. (401) 377-4912

WANTED: Collins 30K1 xmtr; also need orig manuals & literature for 75A1, 32V1, 30K1. Paul Kluwe, W8ZO, POB 84, Manchester, MI 48158. (734) 428-2000

WANTED: Hammarlund HQ-180; Scott Special Communications rcvr; RCA Channalist. EA4JL, phone Kurt Keller, CT, (203) 431-9740 or k2112@earthlink.net

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

WANTED: Junker SX-42 or front panal. **FOR SALE:** Surplus Conversion Manual 3, 1956 ARRL Handbook - $25 ea. Gary, (952) 496-3794, k7adf@aol.com

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WANTED: National HRO black wrinkle spkrs, oak coil boxes, coils; Western Electric horns, spkrs, amps, mics. Barry Nadel, POB 29303, San Francisco, CA 94129. bnadel@ccnet.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: New or used unmodified BC459A, BC696, T18/ARC/5, T19/ARC/5, CBY52232. Louis Lytch, K2DET, 117-33 230th St., Cambria Heights, Jamaica, NY 11411-1806. (718) 528-5065

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

WANTED: Collecting military electronics including radio, radar, RDF and test, manuals & literature. William Van Lennep, POB 211, Pepperell, MA 01463. (978) 433-6031

WANTED: Postcards of old wireless stations; QSL cards showing pre-WWII ham shacks/equip. George, W2KRM, NY, (631) 360-9011, george2f@aol.com

WANTED: HRO-5 "silver front" G Coil 180-430 Kc. Also PP-327 AC power supply for GRC-9. Tony, k4kyo@arrl.net or (703) 522-1568

WANTED: HBR-14 or HBR-16 rcvr. Mike, WØLTL, AZ, (520) 907-1914. mikezwoltl@aol.com

WANTED: Manuals for Conar 281, Measurements 800, & Marconi TF-2006 sig gens; Measurement/Motorola S-1323A deviation meter; RCA WO-33A o'scope; Simpson 335 tube tester. Eric Jones, N4TGC, 6537 CR 61, Florence, AL 35634. (256) 764-0675, ejones@hiwaay.net

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

WANTED: 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

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WANTED: QSL cards from old/pre WW II Ham DX countries; old regen kits. Hajime Suzuki, Nishikuniyoshi 1644-24, Ichihara-Shi, Chiba-Ken, 290-0231 Japan

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