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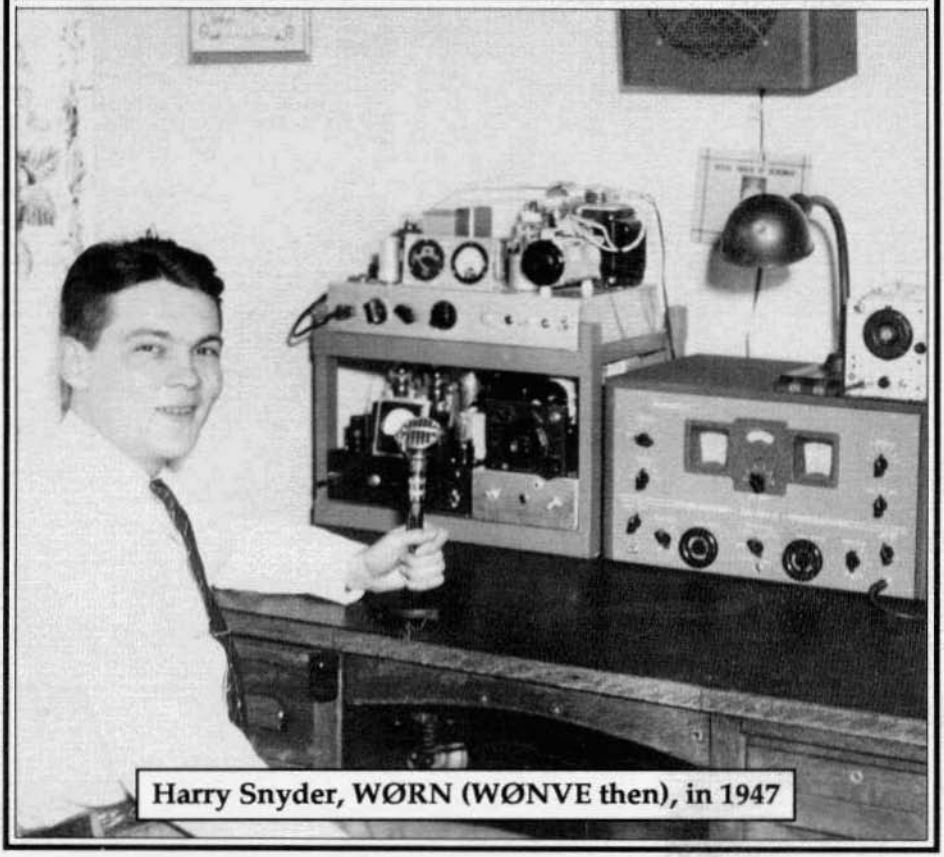
# ELECTRIC RADIO

celebrating a bygone era

Number 34 February 1992



Harry Snyder, WØRN (WØNVE then), in 1947

# ELECTRIC RADIO

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**REGULAR CONTRIBUTORS**

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

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

## Electric Radio Solicits Material

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

## EDITOR'S COMMENTS Barry Wiseman, N6CSW/Ø

These hard economic times we're going through could have a profound effect on amateur radio. Some hams - particularly those that are unemployed - may choose to abandon the hobby, at least temporarily. Others will no doubt do whatever it takes to stay on the air. This may mean returning to repairable American gear or getting back into homebrewing. Some 'state of the art' appliance operators may have to become 'Real Radiomen' to stay in the hobby. I think they're going to enjoy the experience.

For years the central theme in the propaganda of mainstream U.S. ham magazines has been that amateurs should always be 'state of the art' and at the cutting edge of technology. They've discouraged the use of older/vintage/tube type gear; "tubes are very hard to get", "the equipment tends to be very unreliable", etc. The only alternative - if one wanted to follow the party line - was to plunk down a grand or two for a Japanese transceiver. If the rig developed problems the only thing to do was to send it back to the factory. Hams were discouraged from making repairs themselves. The American 'ham' was transformed into an 'appliance operator' who's technical prowess was limited to putting up dipoles and wiring mike cords.

One of the hopes I have for the newly formed Vintage SSB net is that it will be a showplace for the good old U.S. made gear and may provide inspiration for these 'appliance operators' aspiring to 'Real Radiomen'. We can show them that U.S. gear is not 'junk', it's easy to restore and repair, and that there was ham radio before Kenwood, Yaesu and Icom.

This recession/depression may be good for amateur radio... on to #35.

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**Cover:** Harry Snyder, WØRN (then WØNVE), in 1947. See ER #22 for a more recent picture of Harry in his shack.

# Reflections Down the Feedline

**by Fred Huntley, W6RNC**
**POB 478**
**Nevada City, CA 95959**

Nikola Tesla, explorer of the electrical universe, was born in 1856, in Serbia (Yugoslavia) and died in New York in 1943 following 20 years of poverty and obscurity. His inventive career was meteoric and his brilliance of mind unparalleled, but despite his 112 U.S. patents (including 17 pertaining to wireless) and his great contributions to modern civilization, he is today largely forgotten. Practically the only remembrance of him is the Tesla Coil – the air core, high frequency, high voltage transformer that he invented.

However, Tesla also invented every essential of modern radio; invented radar 40 years before WW II; invented neon and fluorescent lighting; invented HF currents for industrial and medical uses; invented remote control by wireless; and invented many other things. Tesla's earliest and most important inventions were the rotating magnetic field, the AC induction motor and the polyphase AC electrical current system which revolutionized the industrial world.

Many people became wealthy because of Tesla's inventions, because Tesla, himself, was more interested in discovering new scientific principles than making his personal fortune. His foremost goal was the betterment of mankind.

In 1884, Tesla arrived in New York from Europe, with four cents in his pocket. His first job, after arrival, was working for Thomas Edison, but because of the difference in their personalities, he did not stay long. Edison invented by the trial and error system, whereas Tesla calculated everything in his mind before starting a project.

The real story of Tesla, is the story of his intellect. He had a mind that today we would equate with a computer. He could visualize mathematical problems as though they were written on a blackboard, and he could do all the calculations in his head.

In his own laboratory, Tesla never used blueprints. He could design a whole apparatus in his head, with dimensions and tolerances; run the machine mentally and then disassemble it to inspect for wear. When he constructed anything from his mental blueprint, all the parts fit.

His memory was equally prodigious. Besides being able to memorize entire books, he carried mathematical tables such as logarithms in his head. Any of the information in his mind could be brought up on command and he could see it as though on a display screen.

Because of the way Tesla's mind worked, he did not leave behind a great amount of personal notes or records and when he died, a lot of extraordinary information about his past and future discoveries was lost.

Tesla sold his first invention – the AC induction motor and the polyphase AC current system to George Westinghouse for one million dollars, plus a royalty of one dollar per horsepower. After concluding the deal, Westinghouse was informed by his bankers that his company wasn't financially viable under such an arrangement. Westinghouse then went back to Tesla and told him of his predicament. Without a further word, Tesla tore up the royalty contract which was worth $12 million, and settled for the straight one million purchase price.

Tesla worked for a year in Pittsburgh at Westinghouse Electric, helping perfect his AC motor and polyphase system. Westinghouse engineers wanted 133 cycles per second as the standard AC



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# WA4KCY 'Lookalike' Amplifier

**by Jack Wheeler, KH6CC**
**P.O. Box 436**
**Paauilo, HI 96776**

This amplifier was inspired by WA4KCY's article in ER #29. I built it strictly from the junkbox.

The amplifier is grid driven. Included under the chassis are the bias and screen supplies and an antenna transfer relay. Because the screen supply comes on with the filaments, there is also another relay which cuts the screen lead until the high voltage is turned on.

The switch at the lower left is the mode switch. The first position is for CW (100 volts bias); position 2 is for tune, it removes screen voltage; position 3 is for AB2 (45 volts bias) and position 4 is for class C AM (220 volts bias) and cuts in the choke in the screen lead.

I incorporated extra screen lead filtering; this amp is sensitive. There was also a mild case of TPTG oscillation between grid and screen. It could be stopped by detuning the grid coil slightly; however it was completely removed with a 47K resistor across the grid coil. Also I found that this unit definitely required neutralization. The symptom here is low output and red plates, particularly on 10 meters.

When I last talked to Andy, WA4KCY, he had sent out twelve packets of data for building this amp. I wonder how many were built? As you can see I took a different approach but its still the same amp. **ER**

# ELECTRIC RADIO IN UNIFORM

**by Walt Hutchens, KJ4KV**
**3123 N. Military Rd.**
**Arlington, VA 22207**

## "About The BC-610 Transmitter"

Usually this column consists of a detailed technical study of a military radio.

Beginning this month, I will occasionally take a well-known set and quote or excerpt interesting material about it, under an 'About the...' title.

Most hams know the BC-610 to be a U.S. Army version of the Hallicrafters HT-4, a prewar ham and commercial transmitter. It delivers around 400 watts output on CW or AM and is absolutely frill-free: a 6V6 M.O. (master oscillator) drives an 6L6 buffer/doubler which feeds a pair of 807's driving a single 250TH final. On phone, a pair of 100TH's operate as a push-pull class 'B' modulator and an external speech amplifier is used.

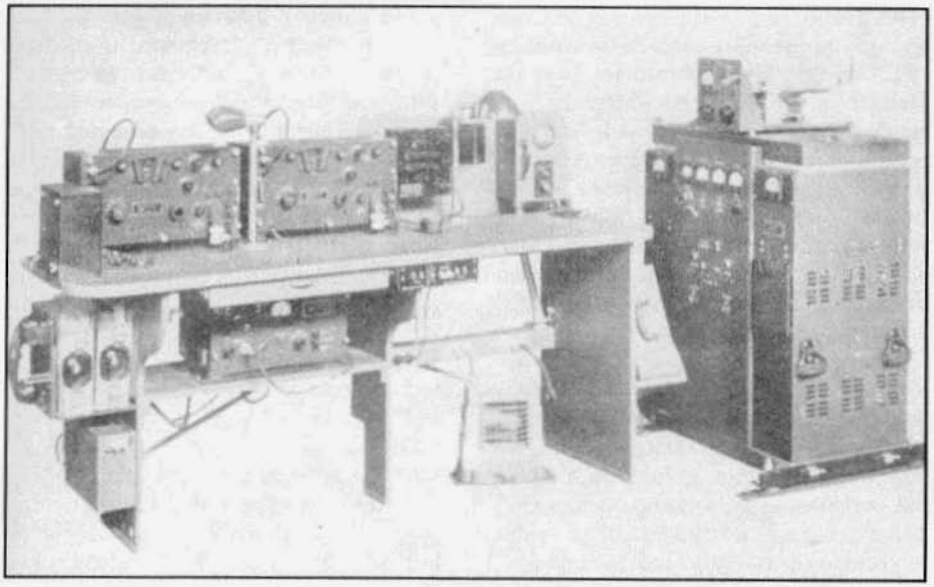
The M.O. may be crystal controlled or continuously tuned; it is not calibrated directly in frequency. A series of plug-in tuning units hold all the tuned circuits up to the final grid. Separate plug-in coils are used for the final.

The BC-610 served in three Army radio systems: SCR-299, a station installed in a 'panel delivery' truck; SCR-399, a larger station mounted in a shelter on a 2-1/2 ton truck; and SCR-499, essentially the SCR-399 without the truck. As a part of these sets, the 610 was normally powered by the PE-95 generator which was mounted in a trailer towed by the truck.

The BC-610 and HT-4 have been widely used by hams and today it is one of the most popular vintage AM rigs, in spite of (or perhaps because of) its somewhat antique and quirky design. As evidence for 'quirky', I have within the last week listened as the owner of an HT-4 operating on 'M.O.' on the upper end of 40 struggled to keep his set within hearing range of the frequency of a round table in which he was participating. Yes, a BC-610 on M.O. does drift that much – but we love it anyway...

This month I have condensed and somewhat edited Part II of an article 'Vehicular Radio' by S. I. Neiman, which focuses on the BC-610. This article appeared in the September-October 1947 issue of *"Signals,"* the journal of the Army Signal Association ('ASA'), an association of manufacturers supplying communications gear to the Army. The author was Director of Association Publicity and had handled public relations matters for the U.S. Army Signal Corps in the midwest during the war. It may not be accidental that almost half of an article on this topic is devoted to the Hallicrafters-designed 610 with no mention of the most famous of the WW II military vehicular sets, namely the Galvin Radio SCR-508, 509, 510, (etc.) and the General Electric SCR-506: W. J. Halligan Sr., the founder of Hallicrafters, was 1st Vice President of the ASA at the time. The article and accompanying photos are reproduced with the permission of *"Signal Magazine"* which is now published in Fairfax, Virginia.

After the article, we will hear from Doug Merganz, K2QHZ, who serviced the BC-610 when both it and he were in uniform during WW II.



**"COMPONENTS OF SCR-299—Operating table has receivers, speech amplifier and telephones. Transmitter, BC-610, is at right. Note portable typewriter on right table leg, heater on floor."**

## The SCR-299

"Military observers just before Pearl Harbor, were almost unanimous in the opinion that the success of fast-moving blitz warfare would be in direct ratio to the efficiency of communications systems. The factors that had been most important in former wars were tabulated and, with projected refinements for radio units that would operate adequately under existing field conditions, were used as basic specifications for new vehicular communications equipment.

"In the summer of 1940, while the Nazis were breaking through the Maginot Line, the U.S. Army held 'proving ground' maneuvers to test recently proposed tactical innovations. These maneuvers were the first extended application of tactics utilizing the mobility of the newly organized armored forces.

"It became apparent, after careful observation, that a mobile radio set was urgently needed, capable of voice transmission up to 100 miles, and farther from a fast moving vehicle. Heretofore such range had only been realized at fixed stations with highly efficient antenna systems. The projected set would be required to operate efficiently in fast armored units, moving over rough terrain, in all types of weather.

"These specifications presented a tremendous engineering problem. The Army realized that it could not accomplish the task alone; civilian engineers would have to be consulted in order to reach an almost immediate solution.

"Major General Dawson Olmstead, then Chief Signal Officer of the Army, recognized the seriousness of the situation. He called in his staff and immediately took steps to develop a unit which later resulted in the Hallicrafters SCR-299 mobile radio unit. General Olmstead had recommended that a high-powered mobile transmitter be designed which would meet all requirements in flexibility, stability and ruggedness. In order to conserve critical time, it was decided to adapt existing equipment that might have the basic operation features and that could be placed in production in the shortest possible time.



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## The Result

"Among the more than 20 transmitters brought into the laboratories was the Hallicrafters HT-4, first designed exclusively for amateur operation. It had been built and sold commercially for several years and considering the power was extremely compact and very stable. Power rating was 325 watts on voice and 450 on c.w. The original unit was crystal-controlled, but provided optional use of m.o.p.a. over a broad frequency band.

"The laboratories found that the transmitter possessed a healthy wallop on both voice and code and with certain refinements, it would make an ideal military unit. Other equipment was recommended to complete the portable vehicular radio station. Only minor changes were required in the transmitter: increase in frequency range and standardization of control equipment.

"A few mechanical improvements were made, such as strengthening and reinforcing the steel cabinet which housed the HT-4 assembly. Several relays were added to permit automatic changeover of circuits that would be required for military operations.

"The overload relay system, when first developed, presented a very serious problem. It would 'kick out' when the truck was traveling over rough terrain. As a result, Signal Corps and Hallicrafters engineers designed one that would be completely chatter-proof. Reset controls were placed on the front panel and were then more readily accessible to the operator.

"The original HT-4 was designed around two basic units: the RF deck containing the complete radio frequency, exciter, power amplifier and special switching circuits; and another unit that included the power supply, modulator and power controls.

"A master oscillator was designed to provide continuous frequency coverage without the inconvenience of banks of crystals. A simple switching circuit was developed to provide instantaneous changeover from crystal to master oscillator.

"An efficient antenna system was another problem that required immediate solution if the SCR-299 was to operate properly. After much experimentation, a vertical whip antenna was designed, with a length of approximately 35 feet. It was mounted on an insulator mounted on the roof of the radio truck, and was built in six sections. In the normal operating position, the antenna was bent backwards to a horizontal position and held down by an insulated guy to the rear of the truck roof. This arrangement provided clearance for the antenna and kept it from whipping about while the truck was in motion. The snap-catches on the guys, when released, permitted the antenna to spring to a vertical position. If necessary, one or two additional mast sections could be added at the base to extend the height and length.

"A special antenna coupler was designed to match the radiator to the wide frequency range of the transmitter with minimum efficiency loss. A continuously variable network was devised which allowed proper loading at any frequency within the range of the equipment. Two receivers were installed in each unit. Each had a separate vertical antenna, approximately 10 feet in length. One was for emergency use only and was powered by spare 12-volt batteries. The other set operated from the regular 115 volt supply from the power unit. Both receivers covered the frequency range 1.5 to 18 megacycles.

"The power plant had to furnish the considerable amount of current required to operate the transmitter, receiver, and other associated equipment. An independent supply was found most desirable -- one capable of continuous operation in any climate. A special trailer was constructed because a gasoline-driven unit could not be satisfactorily installed within the radio truck without endangering the operators. Special cables were developed to connect the power and radio equipment, allowing considerable separation of the units.

**"JUNGLE RADIO -- SCR-299 in the New Georgia bush,1943."**

## Components

"There are many models of the SCR-299 but they are fundamentally similar. This mobile set is a high power vehicular radio station capable of amplitude modulated voice and c.w.communication over a range of approximately 100 miles, depending upon conditions of atmosphere and terrain; it can operate either from a stationary position or while moving at high speeds over rough roads. It is a completely equipped radio station installed in a 1-1/2 ton truck, combined with a power plant carried in a 1-ton cargo trailer. Original function was to provide headquarters communications for corps, divisions, and other higher echelons.

"From the operating position the power unit, located in the trailer, may be started or stopped by remote control. Receiving and transmitting controls, tuning units, coils and crystals are within easy reach of the operators. Electrical filters are installed at necessary points in the ignition system and along the truck body to reduce interference. Moderate temperatures are maintained by an electric heater for cold weather and a roof ventilator for warm. Both units are fan-driven, providing air circulation whether the truck is stationary or in motion. Sleeping space is available for one person on the four-cushion bench. By removal of the wooden frame and tarpaulin from the trailer, additional shelter may be improvised.

"The radio transmitter has dual controls; it can be keyed or voice modulated from either of the two operating positions in the truck. Later models permit break-in c.w. facilities. Remote control operation is possible by removing one of the telephones as far as one mile from the truck, from where the operator could modulate or key the transmitter, listen on either of the two receivers at the truck and maintain contact with the vehicle personnel through the field telephones of which there were two, provided with two large reels of field wire.

"The power unit could be operated 100 feet from the truck through the use of extension cables. This distance could be



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extended to 200 feet but the operator then had to walk to the trailer to start and stop the generator. Five kilowatts of single-phase 60 cycle alternating current were furnished at 115 volts. The station could be operated from any commercial power source of the proper type.

"Provisions were made to remove the complete equipment for installation either in other vehicles or as a fixed station. Dismounting could be accomplished without special tools through the use of wing nuts, winghead bolts, clasps and turnbuckles. The operating table had been designed as a complete unit containing all of the basic electrical wiring and operating components except the transmitter. All of the equipment could be set up in the field, in a building, or another vehicle with a minimum of difficulty. When the SCR-299 was operated in motion over rough terrain, the operators could anchor themselves by special straps connected to eyebolts in the ribs of the roof, near the rear doors.

## Frequency Range

"The extreme frequency range of the SCR-299 was one of its most remarkable features. Complete coverage in the range from 2 to 8 megacycles was possible, either on voice or c.w.telegraphy.The receivers covered the spectrum from 1.5 to 1.8 megacycles, continuously. Frequency conversion kits were introduced in the late stages of the war to extend the transmitter's coverage to 1-18 mc.

"Reliable two-way phone communications with other vehicular sets operating within 100 miles was frequently accomplished while both vehicles were in motion. In fact this range was exceeded many times. When c.w.was employed, the effective range increased to 250 and more miles.

"Results depended largely on frequency and time. Experience had shown that distances up to 200 miles could easily be covered during daylight hours by using frequencies near 4,000 kilocycles. At night the optimum frequency was around 2,000 kilocycles. Channels in the region of 6,000 to 8,000 kilocycles were required for long distant contacts. The transmitter was shock-mounted on the floor behind the driver's seat with the control panel facing the rear; the special cradle-frame base weighed 51 pounds.

"The speech amplifier used to modulate the transmitter on voice was securely mounted on a shelf under the operating table. The front panel controls on the amplifier provided for the following functions: sidetone for receiver monitoring of c.w. transmissions, manual or automatic receiver disabling for protection when receiving on or near the transmitter frequency or its harmonics, control of the transmitter final amplifier plate voltage, control of the receiver output to the telephone lines, control of remote telephone operation and audio gain adjustment for the microphones.

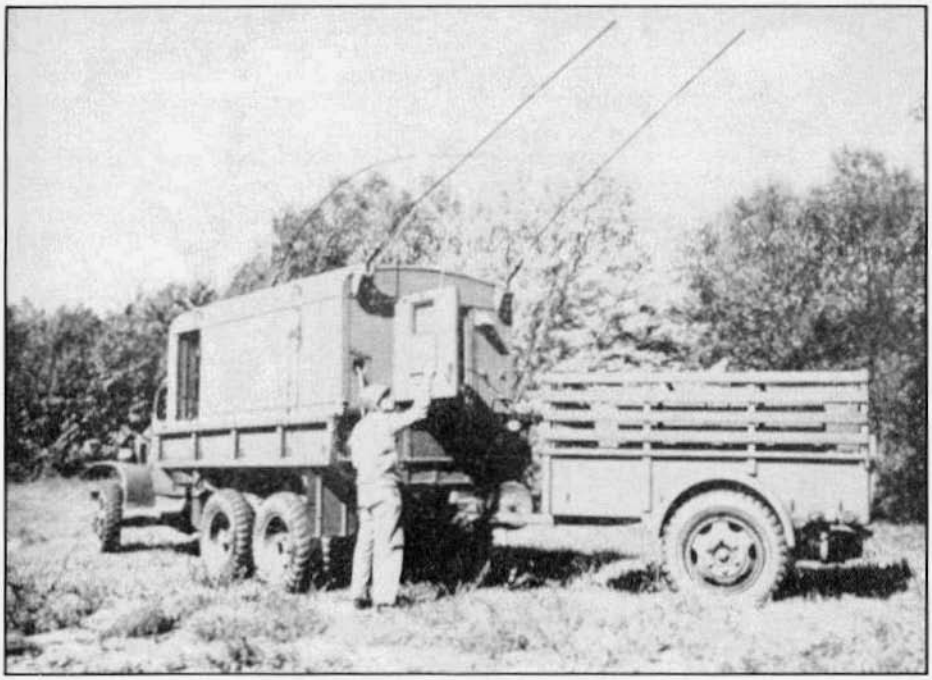
The microphone normally used was the dynamic type with low level output and equipped with a press-to-talk switch to operate the transmitter.

"The operating table was mounted on the floor against the left side of the truck. Wing nuts were used to secure it to the floor mountings and turnbuckles held it to the truck's side. The lights, power wiring, most of the intercomponent connections and the phone and speaker control panel were an integral part of the operating table. The power wiring outlets were protected by a wiring channel which ran the length of the table and was bolted to the rear of all three table legs.

"A control box was rigidly mounted to the back panel at the right end of the table. A meter mounted in its front cover faced the operator, indicating the a.c. voltage of the power unit. Directly below the meter was a dual push-button control switch operating the power generator.

## Mobile Warfare

"One of the most spectacular applications of the SCR-399 was during the final stages of the war, when General Patton's famous Third Army was plunging across France toward the Rhine and the German boarder. Radio mobile units closely fol-



**SCR-399. The radio equipment of this unit was also sometimes mounted in half tracks, DUKW 'ducks', railroad cars, ships, and just about everything else you could imagine. Transmitting antenna is mounted at front of shelter and is just visible above trees in background; the two antennas at the rear are for receivers.**

lowed the advancing armor,in conjunction with the 9th Air Force tactical liaison.

"Other forms of communications had failed in early air-ground experiments and it was found that the 'walky-talkie' could not function properly. It was imperative that correct information be furnished pilots flying over enemy targets in a constantly shifting tactical situation. Several times the Third Army was halted at enemy strong points but was able to proceed when the air liaison officer, using his mobile radio truck, dispatched fighter planes to knock out the obstacle. Additional support came from radio equipped reconnaissance planes which reported on enemy targets during flights across the Rhine. They maintained constant communications with the mobile units that were operating in conjunction with the ground forces. These unarmed planes flew at low levels, reporting enemy movements to the deployed armor."

Doug Merganz serviced BC-610's in Europe. I met Doug one night (well past midnight) in 1986 on 80 meters. Since I was running a military set, the talk naturally turned in that direction and before long I was taking notes as fast as my pen would go, as Doug related his experiences. Recently I got his permission to use the following remarks:

"Most of my war years were spent in Europe as a technician in the 158th Signal Repair Co., 9th Army. I worked on the BC-610 and many of the other Army sets that were common in surplus after the war.

"The BC-610's were mostly used in the SCR-399 which were shelters which included one transmitter, several BC-342 receivers and an SCR-211 frequency meter. The shelter was mounted on the back of a 2-1/2 ton truck. Another part of SCR-399 was a 6-cylinder 5KW generator on a trailer which was towed behind. Gosh



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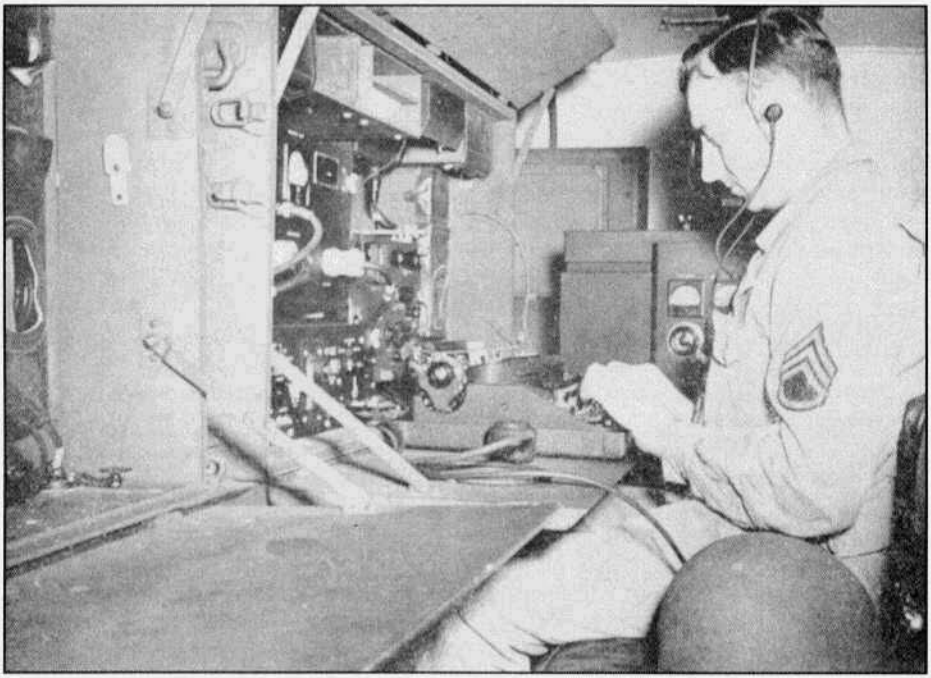

**"INTERIOR OF SCR-309 -- Cabinets are provided for receivers, amplifier, controls."**

that was a good generator.

"There was also an SCR-299 but this was not too satisfactory. It was mounted in the back of a Chevrolet truck (there was less equipment in it) and there wasn't enough space. The 399 was much better, though often they were taken off the trucks and put on anything with wheels to free up the trucks.

"The BC-610's were tough but they had their problems. Just to start with, only about one out of six was working when we got it from the States. A lot of the large tubes came through 'bad', even though they were packed separately, suspended with springs and rubber bands.

"The shelters were made of plywood and the whip antenna was mounted right to it, just behind the truck driver's seat. Well, the shelters would develop a water leak there and the water would run in and down under the BC-610 where it would condense on the insulation and you would wind up with arcing and carbonization and the set would be down. We recommended a design change to move the high voltage area farther from the floor to help this.

"Combat produced some equipment problems you don't see in ham or commercial work. Once we had to fix a 610 that had been strafed by an ME-109. A bullet had passed through two operators (both survived although they were pretty badly messed up), through the 610 cabinet, through the case of the modulation transformer and came to rest against the winding of the transformer -- where it caused a short. We fished it out with tweezers and gave half to each of the operators. I straightened out the windings of the transformer and the 610 was fine; I ran onto that same set later on and it was still working. The towed generator didn't do so well: it was hit by a bomb during that raid and reduced to scraps of metal.

"After hostilities ended I went to Charleville in France and packed up those SCR-399's to be shipped back to the U.S. They were to be stored at a Signal Depot



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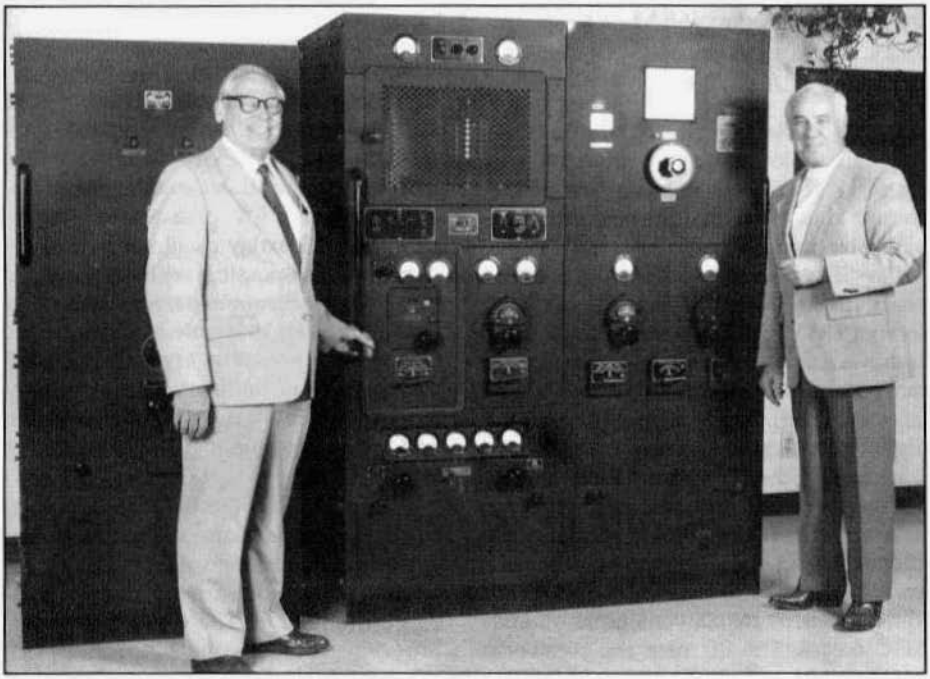
# Westinghouse TAB-7



**Fred Hammond, VE3HC, with the Westinghouse TAB-7 transmitter and Ozzie Jaeger, W6AD, who donated it to his museum in Guelph, Ontario, Canada.**

This Westinghouse TAB-7 transmitter was delivered to the Navy in 1942 for shore station use but was never installed.

It was designed to operate over the frequency range of 100-555 kcs with a power output of 2 KW CW and 1 KW A2 (modulated CW). Power requirements were 230 VAC ,3 phase, 60 cycles. It weighs approximately 4,000 pounds.

The master oscillator uses a type 803 (pentode) in a Colpitts circuit.The intermediate amplifier (driver) also used an 803 in a conventional RF amplifier circuit and this in turn drove a pair of BIG type 851 triodes in the parallel final amplifier. Another 803 was used as a modulator to achieve A2 CW. The rectifiers were the very latest. Instead of the typical motor-generator set this rectifier system used Rectox devises which were copper oxide plates assembled with approximately 200 PIV per plate. The vacuum tube keying is accomplished by using an 807 (beam tetrode) tube. So the entire tube compliment is three 803s, two 851s and one 807.

The transmitter could be keyed either by relay or by vacuum tube keying. With relay keying, speeds up 100 WPM could be obtained and with vacuum tube keying, speeds up to 500 WPM were obtainable. Provision was also made for remote land-line keying (up to 50 miles).

The construction is absolutely first class. The massive switches and inductance components were really something to behold. And all of the wiring (every lead) was run in a separate lead sheath and all of these lead sheaths were laid side by side and soldered together at 12" points. Money was no object when this transmitter was manufactured.

I was delighted to donate the TAB-7 to the Hammond Museum. It will have a good home and will be appreciated for many generations to come. **W6AD**

# A Practical Synchronous Detector

**by John Staples, W6BM**
**732 Cragmont Ave.**
**Berkeley, CA 94708**

In this article, I will describe a practical implementation of a synchronous detector (SD). I will talk about a few of the circuits I have tried and the performance I have obtained.

The SD uses easily-obtainable components and non-critical circuits and will receive FM and SSB as well as AM. The circuit is simple and straight-forward, and can be easily duplicated. No tuned circuits are used, except for the BFO, and a digital phase shifter is used.

I am using the SD with my R-390 and R-391 receivers, and it can be used with any receiver with a reasonable intermediate frequency. The i.f. signal in many receivers is available from a rear chassis connector and some also provide convenient audio and AGC access. The SD uses the receiver's audio system and can be switched out for normal receiver operation.

Figure 1 reminds us of the configuration of the synchronous detector. A BFO supplies carrier to two doubly-balanced modulators, one locking the BFO on frequency, and the other detecting the audio.

The BFO is a low phase-noise discrete component Hartley oscillator so SSB reception is also possible with the lock loop disabled. Synchronous detector integrated circuit chips are available, but in my experience their oscillators are somewhat unstable with substantial phase noise (hissy sidebands). Those chips are less available and not as versatile.

**BFO Circuit**

Figure 2 shows the BFO circuit which consists of an oscillator, an output buffer and a reactance modulator. The tuned circuit uses an air variable and a ferrite-core toroidal coil. The oscillator runs at four times the i.f. frequency, or about 1.82 Mhz, driving a digital four phase generator which divides the frequency by four.

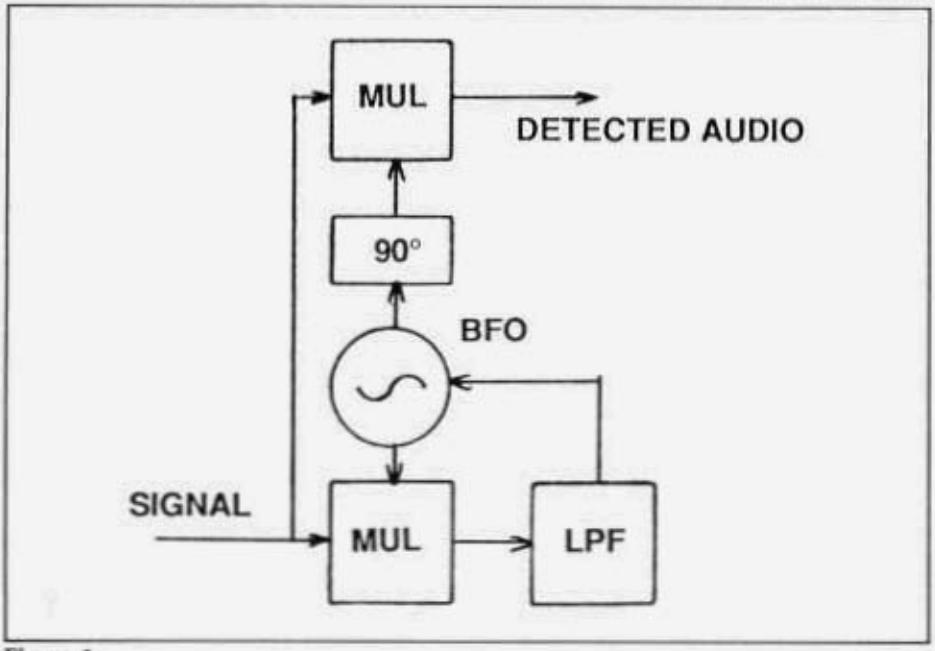



**Figure 1**

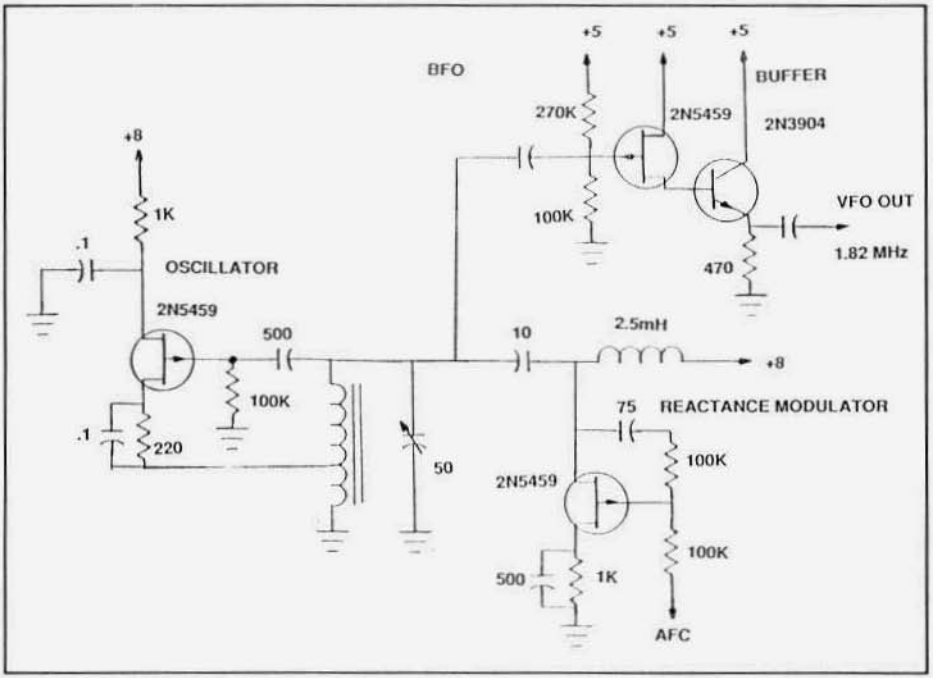



Figure 2

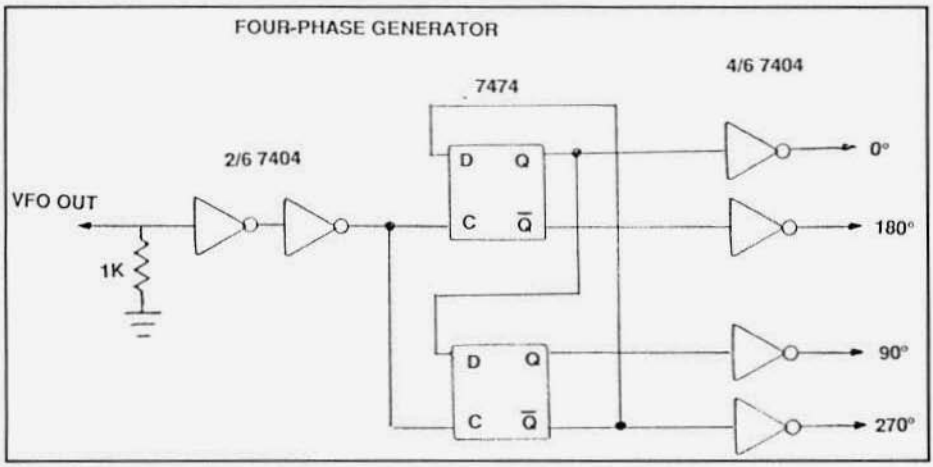



Figure 3

The buffer provides isolation to prevent pulling. The reactance modulator provides an electrically adjustable capacitance across the oscillator coil. A variation of about + or -20 Khz at 1.82 Mhz is given by the indicated circuit values and the linearity is excellent.

## Four-Phase Generator

The two balanced modulators require drive signals that are 90 degrees out of phase with each other. Each modulator is driven in push-pull, so four signals are generated, 0 and 180 degree for the lock loop demodulator, and 90 and 270 degree for the audio demodulator.



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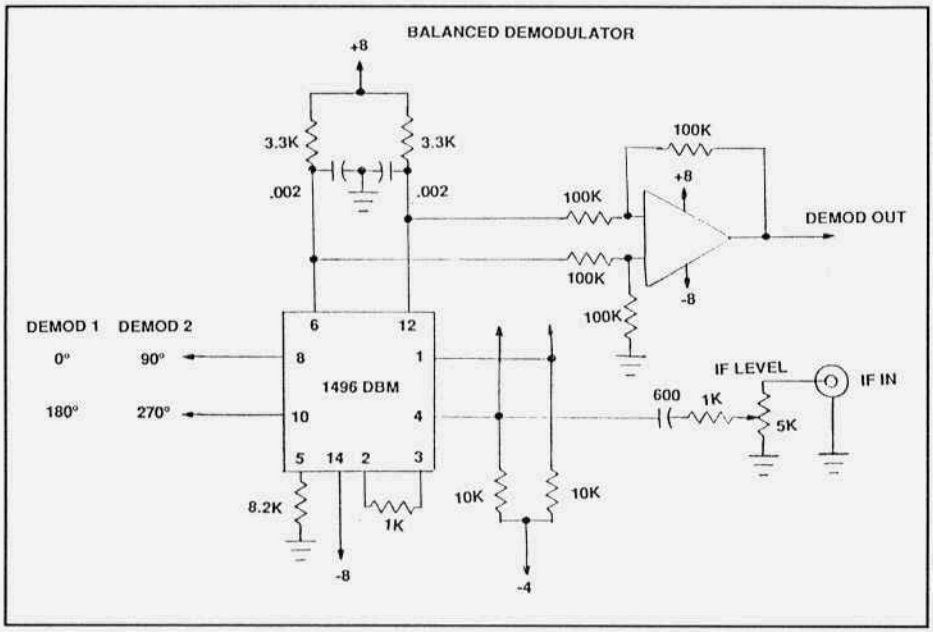


**Figure 4**

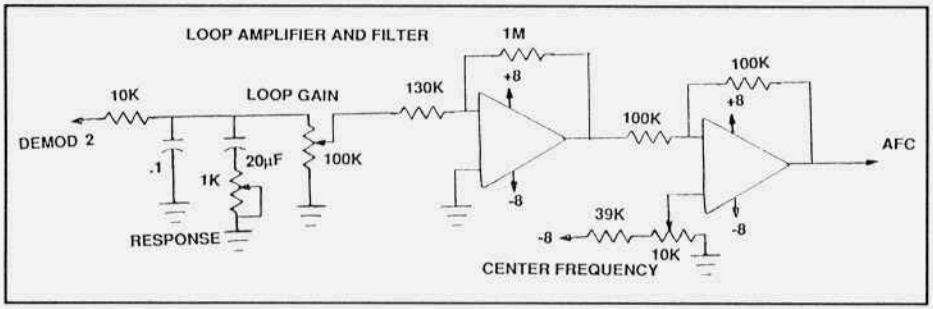


**Figure 5**

A simple circuit using a dual-D flip-flop and six buffers provides the four phase signal, as shown in Figure 3. The circuit divides the input signal frequency by four, producing 455 Khz. This circuit has no adjustments and the phase relationships are exact. This permits the SD to be used with other i.f. frequencies by just retuning the BFO. As the circuit can radiate harmonics of the i.f., it should be shielded.

## Doubly-Balanced Modulator

My first approach to the demodulator was to use passive diode ring demodulators. However, they severely load the drive source and their input impedance varies with the local oscillator drive. The 1496 integrated circuit doubly-balanced demodulator is readily available, has higher gain, and is easy to use.

Figure 4 shows the doubly-balanced demodulator circuit, including an op amp to remove the common mode signal and to re-reference the output to ground. Two circuits are used, connected to the appropriate outputs of the four-phase generator with the signal inputs paralleled.

## Loop Amplifier

The output of the loop demodulator is fed back to the AFC input of the BFO through the loop amplifier and filter, Fig-

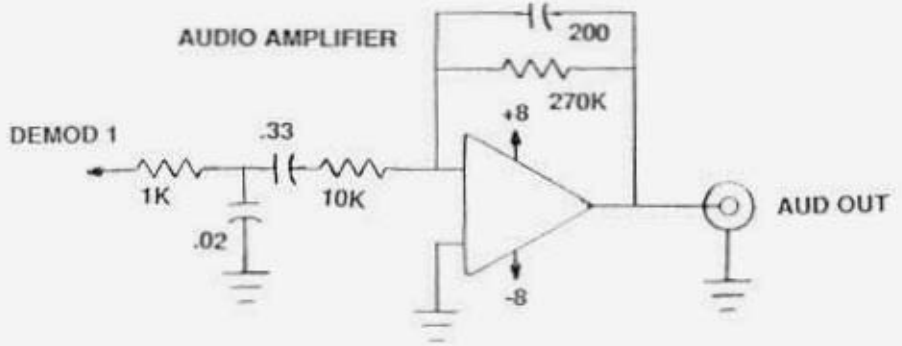


**Figure 6**

ure 5. The 20 microfarad capacitor sets the response of the circuit. The series adjustable resistor provides phase compensation that stabilizes the circuit.

With the loop gain set to zero, the center frequency pot adjusts the reactance modulator to the region of best linearity. The loop gain control sets the lock range and the response pot adjusts the compromise between pull-in range and stability. You may want to provide bias offset adjustments for the phase loop amplifiers.

### Audio Amplifier

The audio amplifier, Figure 6, drives the receiver audio system. The high frequency rolloff prevents supersonic signals from saturating and causing spurious responses in the integrated circuit audio amplifiers.

### Control Circuitry

The control circuit, not shown, selects bypass, AM fast, AM slow, USB, LSB and FM operation. The bypass position allows the receiver to be used normally. The AM fast and AM slow positions provide two different loop amplifier filter functions, set with independent pots.

Fast lock-up is used when tuning across the band; slow response is used when copying fading signals.

The USB and LSB positions open the loop so the BFO is free-running and provide separately adjustable frequency offsets for SSB reception. The FM position widens the response bandwidth so the BFO is locked to the FM signal and provides audio from the correction voltage.

A push button which temporarily opens the feedback loop has proven useful. The BFO free-runs at the receiver's crystal filter frequency. Opening the loop allows zero-beating the receiver to the input signal.

### How Does It Sound?

The detector is easy to get used to. As an AM signal is approached the BFO suddenly locks in and the receiver can be tuned over about a 1 Khz range before lock is lost.

The SD cleans up rapidly (selective) fading signals. Even on weak signals a fairly wide i.f. bandwidth can be used. The signal-to-noise ratio seems improved and readability is better.

AM generated by poorly-adjusted SSB rigs is improved. The circuit locks well to carriers I can barely hear, even when the audio is beyond hope. It would work well for reduced carrier SSB or DSB signals producing good audio quality with lower transmitted power.

The circuit is still evolving. I have yet to implement a good AGC system for SSB and the FM detection has not yet been optimized.

### Summary

I have described my experience in designing and using a simple synchronous detector. Short skip conditions on 75 meters this winter have been awful and this detector has helped dig signals out of the mud.

I hope I have aroused interest in the week end builders to try this interesting AM detector. **ER**

# R390A Bits and Pieces

**by Ray W. Osterwald, NØDMS**
**10679 West Dartmouth Ave.**
**Lakewood, CO 80227**

Since the series on the R-390A was published in these pages last year, many of you have responded with questions and comments regarding the articles, and also about the receiver itself. Many more letters were received than expected, and in discussing them with the editor, we decided to do a follow-up article and share most of these with the readers, as they should have broad appeal.

One reader wrote and asked if I had any information about the potential health effects due to the radioactive meter faces and pointers used on all of these receivers.

It's common knowledge that the government removed the meters ("hacked" is a better description) to avoid problems with "glow in the dark" radioactive lettering. I have another mainframe with the original meters still intact, so I decided to find out exactly what the potential risks might be for an operator sitting in front of one for hours at a time. I rented a recently calibrated dosimeter (Geiger counter) from a geophysical instrument dealer and took it home and down to my shop, where the R390A is. When held directly against the front of the meter case, I read 50 millirads (mr) per hour on the instrument. Moving away from the case, the counter dropped to 5 mr/hour at one inch, and stayed there until a distance of 6 inches was reached, when it dropped to .13 mr/hour. Three feet away, a typical operating distance, the level was .005 mr/hour, which is still above the background level here in Colorado. Then, for comparison, I measured against the 3 inch face of an aircraft altimeter from the 1940's, and found it to be 5 mr/hour. This instrument has a face with much more area than an R390 meter, so the older a piece is, perhaps the safer it is. In my son's mineral collection a sample of uranium, about one cubic inch worth, measured a whopping 220 mr/hour. This one we got rid of!

So how high a dose is too much? To find out, I called the local EPA office but couldn't find anyone to answer my questions. My encyclopedia say that exposure to anything greater than 100 rads is proven to cause serious life-shortening, permanent damage. To receive 100 rads of exposure from my carrier level meter, you'd have to hold it against your body for 2000 hours, or 83.3 24-hour days at the rate of .05 rads per hour. The mineral specimen would require only 19 days! The book goes on to say that lower level doses probably have some biological effects, but they can't yet be proven. I guess we will have to be our own best judge of safety! Wishing to err on the side of caution, I have made paper replacement scales for my meters using a copy machine. They can't be told from the originals a couple of feet away, and have put my mind at ease. (SASE the author if you would like me to send you one of these copies.)

Several readers wanted to know if the Collins-produced sets were really any better than any of the others. In my discussions with long-time users, surplus dealers and others who are technicians (the U.S. Navy still uses and contracts repairs on them), I have found that the consensus is that they actually are a little worse, in that the wiring has become very brittle. They don't have all of the updates the later ones do, and the MVP varnish thickly slopped all over everything makes servicing very difficult, and has deteriorated other parts. Their PTOs are clearly superior, however.

Some users of the older R390s wanted to know if any of the modifications I described would apply to their receivers. Unfortunately, not many of them will. The R390 uses a front-end with two RF

amplifiers (similar to the SP-600 design) as was common practice during the period. All of the shot noise in these two stages, plus thermal noise from circuit resistance, is built up along with signal to substantial levels before reaching the mixers. I'm not sure if low-noise mixers would be much of an advantage in this application. For the same reason, high-gain, low-noise RF amplifier tubes would only make the mixers easier to drive into distortion.

The receiver has five IF amplifiers with selectivity controlled by gang-switching the coefficient of coupling in the IF transformers. I would not change the AGC response of the R390 without making detailed checks of the gain distribution in the IF, and graphing bias voltage vs plate current for the IF amplifier tubes. However, the fast-attack diode I added to the '390A AGC generator could probably be added to the R390 with a little experimentation. I've never tried it and I don't have a procedure available.

I'm not knocking the R390! It's a great receiver with many features the R390A or other receivers do not have. An elaborate series type B+ regulator is used, complete with DC feedback and hum-balance. In the audio section, extra filtering is provided, and there is a squelch circuit.

Apparently, there are quite a few differences in the R390A IF decks, which greatly affects modified performance between different receivers. A few operators have reported that when the conversions are completed, the receiver has so much gain that the 455 kc amplifiers are driven into distortion (flat-topping), and the AGC voltage builds up to levels which reduce gain for weak signals. If your receiver develops these symptoms, reducing the gain in the IF strip will probably help. I would start at the last IF amp. and work back to the first, putting the 6BA6 tubes back in until the IF strip behaves. If there is still distortion, check the cathode bypass caps, which are all paper types. In very stubborn cases, switch the IF amplifiers to a type 6BJ6, again working from the last amplifier to the first. (An oscilloscope with a compensated probe is a great help in spotting distortion.)

Quite a few of you wondered what I do to receive SSB transmissions, and if there is a product detector modification I would recommend. Fairly answered, once the mods to the AGC generator and the BFO coupling are completed, most all of the distortion due to carrier re-insertion is gone. For those who would like to use a real product detector, the one featured in the January 1968 issue of CQ by Captain Lee (USN), W3JHR, is the best. His design replaces the BFO, V505, with a classic 6BE6 circuit, acting as a self-excited product detector. Its a simple change, without drilling or tearing at the chassis. Captain Lee pointed out at the start that an easy solution to the "problem" is to use the CV-157 SSB converter as originally designed. Also, he mentions a simple method of further speeding up AGC attack time. The unused position #10 of the AGC switch is in series with the AGC "fast" time constant capacitor, C551. By connecting a 1 uuf or smaller capacitor between this terminal and ground, the attack time really drops. I tried a .001 uuf here, and got my AGC to recover between characters when listening to a 35 WPM brass-pounder!

The great serial number debate continues! I contacted the most complete sources I could find when compiling the contract number record, and I realize it is not complete. It is the best list I could come up with. Some of the original production records were trashed when Collins changed hands in '72. I have no contacts with the present-day company in Cedar Rapids. I have no connection with the U.S. military and have no idea how the procurement contracts were administered. A contract signed in 1957 may well have had delivery completed two years later. Also, I've been told by ex-Collins employees that John Galvin's Motorola Company helped to complete some of the first contract orders when Art ran into production and delivery problems, so your name



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# Putting The Collins 75A-1 Receiver On 160 meters

**by Howard M. Mills, W3HM**
**Rt 3, Box 712**
**Harpers Ferry, WV 25425**

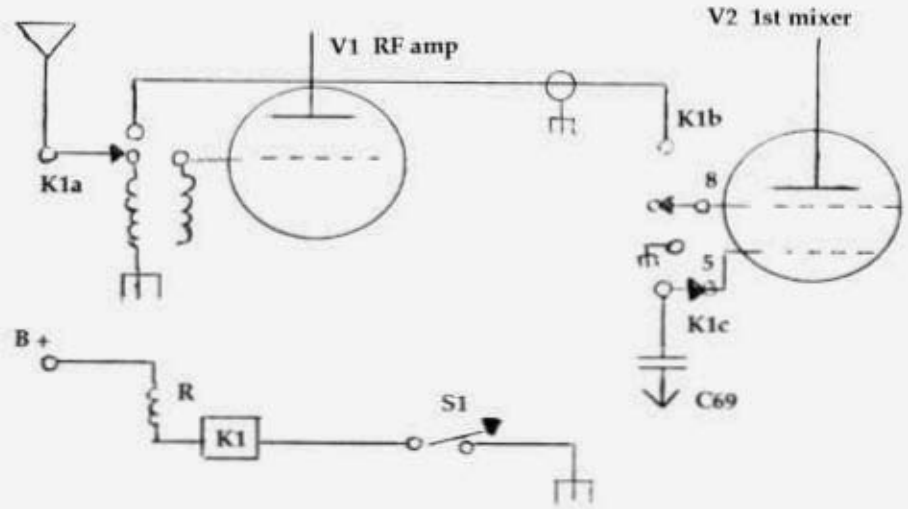
I recently acquired a couple of nice Collins 75A-1 receivers to use as companions for my 32V and 30K-4 transmitters. I was in the process of installing some of the mods which appeared in the September '51 issue of "CQ "when I decided to see how well the A-1 would do on 160 (my band of choice during the winter season).

I removed the crystal oscillator (V5) tube and heard some faint 160 meter activity. I then clipped the antenna to pin 8 of the first mixer (V2). Voila, the receiver came to life. The problem now was how to disable V5 and re-route the antenna to V2. I make it a rule never to drill holes or otherwise deface any of my equipment. Since I very seldom use headphones and never for AM reception, I decided to mount a miniature toggle switch in the headphone jack hole. The relay I used was the smallest one I could find in the 'junque box'. I mounted it underneath on the side wall directly above V2. I secured the relay to the sidewall with a little dab of silicon sealer. The series resistor was mounted underneath the receiver on the opposite side from the mixer.

There is a 10dB difference between signals received on the A-1 as compared to the A-4. This is because there is no RF amplification on the A-1 on 160. However, on 160 AM super sensitivity is not really needed.

The receivers have been on 160 for several weeks and perform very well. I removed the front panel and applied rub-on lettering directly below the 3.2-4.2 Mhz scale. Like the A-4, the A-1 now tunes backward on 160, i.e. left-to-right is 2.5-1.5 Mhz.

**NOTE:** The dial scale is silk screened onto the inner glass. When cleaning the receiver, don't get the dial glass wet. The lettering will run and come off. I washed one of my receivers with the hose and the lettering ran a bit. It looks weird. Perhaps some ER reader versed in computer graphics could make me a new dial paper which includes 160 meters. **ER**



## AM FREQUENCIES

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

## From the Editor:

**Vintage SSB Net**

We've had three sessions so far, with about 15 check-ins each night. I have some observations and comments:

First of all, Saturday nights are not working out. Propogation has proved to be very unreliable (the band dropped dead on us the first time we were on) and a lot of us do things with our wives that night. The consensus amongst those I've talked to is that Sunday afternoons might work out better for the net. Let's try 14. 295 plus or minus at 3 PM Eastern.

I think we're all in agreement that the essence of this net is the appreciation of vintage SSB gear - the older, the more exotic ,the better. That is not to say that check-ins operating newer gear are not welcome. The key word is appreciation. Up on 10 meter AM, it's not uncommon to work someone that's operating a Japanese rig one week and then work him the next week and find him operating a Ranger. We could get converts like that from the SSB net too.

We've heard quite a variety of gear on the net with most of the U.S. manufacturers being represented. The most exotic rig heard so far has probably been the Eldico 100 that Don, KØTNP checked in with. As time goes on, I think more and more of the early stuff will be showing up on the net.

Dennis Petrich, KØEOO/6, has evolved as our net control and is doing an outstanding job. Operating his CE 100V into a yagi from San Jose,Calif., he seems to be heard very well in most parts of the country. Those stations that Dennis cannot hear are picked up by other operators.

I think that so far the net has functioned very well, however, we must be vigilant that it doesn't 'get crazy' like so many SSB nets do. I think we should always be friendly, polite and forever mindful that this is a hobby and we're in it for the enjoyment. **N6CSW/Ø**

**15 Meter AM Contest Sunday, March 1**

The last 15 meter contest was an outstanding event. Probably more people participated in that contest than any other we have sponsored. It was 'wall to wall' and absolutely wonderful.

The contest will start at 5:00 AM Pacific and end at midnight Pacific. The scoring will be the same as the last few contests; 1 point for each contact. For a contact to be eligible for a point, both stations must be operating AM. The logs should contain the standard information and I'd like to have them within a couple of weeks of the contest.

I'd like to remind everyone to avoid 'stepping on' nets and on-going QSOs as much as possible. Let's all be good ambassadors for Vintage/AM operation. Last year we did a great job in this regard.
**N6CSW/Ø**

# SR-75: The First Ham Transceiver?

by Mike O'Brien, NØNLQ
1031 E. University St.
Springfield, MO 65807


Before you passup what appears to be just another old Hallicrafters S-38B receiver at a hamfest, make sure you're not overlooking a rare piece of ham history.

You may have stumbled upon an SR-75, arguably the first transceiver mass-produced specifically for the amateur market.

The SR-75 is, indeed, a 1950-vintage S-38B receiver -- but with some additions by Hallicrafters to provide a few watts of CW output on 80, 40, 20,11 and 10 meters.

Before proceeding with a description of the SR-75, let's examine its claim to the title of first ham transceiver.

Many trace transceivers only as far back as the trend-setting Collins KWM-1. [ see the story on the facing page, "Gene Senti, WØROW, Designer of the KWM-1" also by Mike O'Brien.] If a basic requirement of a true transceiver is common control of both receiving and transmitting frequency, then the KWM-1, introduced in late 1957, probably belongs at the top of the list.

However, it should be noted that two other manufacturers were attempting to match Collins that same year:

--In the August 1957 issue of QST, Hallicrafters presented a full-page advertisement for the FPM-200, which actually was a more ambitious design than the KWM-1. It had two VFOs, was mostly solid-state (the KWM-1 employs 24 tubes) and, unlike the KWM-1's limited 20-through-10-meter range, the FPM-200 also covers 40 and 80 meters. Hallicrafters struggled with development of the rig, drastically altering the exterior appearance as well as refining circuitry over the next half-dozen years. Only a handful of FPM 200s ever made it out of the factory.

--In late 1957, Cosmos Industries of Long Island City, N.Y., completed a pilot production run of its Cosmophone 35. This



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# The KWM-1, And How It Came About

**by Mike O'Brien, NØNLQ**
**1031 E. University St.**
**Springfield, MO 65807**

While there may be room for good-natured debate over the claim of "first ham transceiver", there is no argument that the success of the Collins KWM-1 in 1957 pointed a course that amateur radio equipment manufacturers still follow today.

The KWM-1 is even more remarkable because it was born not in a fancy company laboratory but rather in a home basement hamshack.

The basic concept was the brainchild of Gene Senti, an engineer who had joined Collins in 1941. For much of World War II, Senti was test foreman for one of the two ART-13 transmitter production lines. During his 30 years with Collins, Senti worked on other military and commercial projects, including the R-392 receiver, and he was a principal designer of the classic 30L-1 ham linear amplifier.

During the spring of 1956, Senti began tinkering on his home workbench with his personal Collins 75A-4 receiver that he used with his ham station. Senti, who likes to point out that his WØROW call "looks the same forward or backwards," describes his early transceiver experiments as "sort of like taking the receiver's block diagram and running it backwards."

"I was trying to figure out a way to use the 75A-4's high-stability PTO (permeability-tuned oscillator), with its good linearity, along with the crystal oscillator, for injection purposes in a transmitter," recalls Senti, his voice at age 74 still strong and firm over the telephone from Cedar Rapids, Iowa.

"I took the signals from the oscillators out of the 75A-4 with some pieces of coax and recombined them in a separate chassis. I also took the BFO (beat frequency oscillator). So I was using all three of the receiver's oscillators. All I had to do was come up with new mixers."

While he toyed with the engineering challenges of the project (for instance, tracking with the 75A-4's variable 1.5-2.5 Mhz IF), Senti also began dreaming of the convenience such a setup could bring to his hamshack: "After I saw where I was heading, I thought to myself, 'Gee, this could be neat! All I'll have to do is tune in a signal and my transmitter will be zero-beat with it.' So I went ahead and hooked it up – and, by golly, it worked!"

Of course, his experiments were too good to keep to himself. Senti shared his excitement with fellow engineers at work. Soon word reached top boss Art Collins himself. Shortly thereafter came a knock on the door of the Senti home. "Mr. Collins came to my basement for a demonstration in my junky workshop. I was kind of embarrassed, but he seemed to enjoy it."

Art Collins promptly set a factory team to work on Senti's concept. The KWM-1 was on its way to dealers a year and a half later.

"It was Mr. Collins' idea to make a mobile rig," Senti explains. "Mr. Collins thought the simple frequency control would appeal to the mobile operator because he wouldn't have to take his eyes off the road so much to tune."

The decision to limit the KWM-1's coverage to 10, 11, 15 and 20 meters also came from Collins, Senti says. "He was thinking of it mainly as a mobile rig, and he said to us, 'The lower in frequency you go, the more loading coil and less antenna you have.' He told us to concentrate on 10 through 20, and to worry about the rest later. Also, there were bad spurious emissions in the 80-meter band in our early models that weren't the type of thing you'd want to sell to the public."

The KWM-1, with a pair of 6146s putting out 175 watts of CW or SSB (no provision for AM), sold for about $1,000 with required accessories.



**continued on page 24**

SR-75 from page 20
unusual rig really is two receivers and a 6146-powered transmitter in one large cabinet, with a "tracking" feature that allows the transmitter to follow the receivers. Later came the Cosmophone1000, a kilowatt version featuring a pair of 4CX-300As. Although well-constructed, using Collins mechanical filters and other quality components, the Cosmophone transceivers never achieved widespread popularity.

(During this same period, P & H Electronics of Lafayette,Ind., tried a different approach toward the same end by marketing a gizmo called the VFO-Matic, which allowed a Collins 75A-series receiver or a Drake 1-A to control the frequency of a 9-Mhz SSB transmitter such as a Central Electronics 10A, 10B or 20A.)

If a transceiver can be defined even more simply as a transmitter and receiver combined within a single cabinet (but not necessarily offering simultaneous frequency control), then others successfully preceded the KWM-1 and its 1957 rivals.

Gonset, for instance, marketed its series of popular Communicator VHF rigs beginning in 1953. The Communicator (affectionately dubbed "the Gooney Box" by many hams) was billed as a "self-contained station." The receiver was tunable but the transmitter was crystal-controlled. Eventually an optional VFO was offered, but it was mounted in a separate cabinet.

The Communicator also helped pioneer a scheme perfected in the KWM-1: use of the same tube for different purposes during receive and transmit cycles. A 12AX7 and 6V6GT in the early Communicator's modulator circuit also serve the receiver's audio system.

Ham interest in transceivers goes back even further. Immediately following World War II, military surplus SCR-536 handie-talkies enjoyed some popularity on 80 meters. The list of vintage gear compiled by Alton Brand, WA9MBJ, notes a couple of other obscure early efforts: the Abbott TR-4, a 20-watt two-meter transmitter/receiver combo, announced in 1946; and a two-meter handie-talkie advertised in 1948 by an outfit named Sperti. And wayback in 1936, Radio Constructors Laboratories in New York City placed ads in QST for a transmitter/receiver, the RH-6 Duplex, for 10, 5 and 2 1/2 meters.

Which brings us back to the Hallicrafters SR-75. This short-lived little rig seems to have been the first attempt by a mainstream manufacturer of ham gear to market a transceiver.

All-in-one-box rigs were nothing new for Hallicrafters. In 1938 the company offered the HT-3, a 50-watt transceiver for the 2-Mhz marine radiotelephone band. The following year, two more marine-band radiotelephones were introduced: the 25-watt HT-8, dubbed The Cruising, and the 12-watt HT-11, marketed as The Ensign.

During World War II, the U.S. Army appropriated the HT-8 as the BC-441. An improved 50-watt marine radiotelephone, the HT-12, became the BC-669 and in 1946 evolved into the HT-14, marketed to civilian sailors as The Commodore.

Peacetime also brought a flood of new ham products from Hallicrafters. No fewer than four transmitters and a dozen receivers were introduced between 1946 and 1950. One of the most popular new models was the entry-level S-38 general coverage receiver. Originally a six-tube design, it dropped to five tubes with the S-38A. By 1950, with slight refinements, it was selling well as the S-38B.

In late 1950, Hallicrafters officials revealed plans to produce the SR-75, describing it as " a completely new type of unit." The initial announcement was low-key. However, in January 1951, just as production of the little transceiver got underway in Chicago, FCC commissioners in Washington made a move that caused Hallicrafters to step up its trumpeting of the SR-75.

The FCC action was the creation of the new Novice class of ham license. Exams were to be offered beginning in July 1951, but the Hallicrafters marketing depart-

ment didn't wait. In full-page ads in the March 1951 issues of QST and CQ magazines, under the banner "A Special Announcement," the company boasted:

"The Hallicrafters are proud to point out that in the SR-75 we have anticipated the needs of these new aspirants to the ranks of Amateur Radio. The Hallicrafters are ready for Novices with good equipment to get them started in the right way."

The company touted the SR-75 as "the most compact, flexible unit of its type ever offered. Ideal for semi-portable or emergency use, for vacations or for new Amateurs. A complete one-package station. Ideally suited for Novice class operation."

Beneath all this ballyhoo was a simple design. The ads conceded that the SR-75's receiving section "is substantially the same as our S-38B." In fact, from a distance, the only clue that distinguishes the front panel of an SR-75 from the all-black S-38B is a silver matte rectangle surrounding the two crescent-shaped dials and the bandspread knob. Up close, the model designation can be seen spelled out in small characters at the upper left corner of the front panel. Also, the S-38B's "Receive/Standby" slide switch is labeled "Receive/Transmit" on the SR-75.

From the rear, however, the extra features of the SR-75 are more readily apparent. Additions include knobs to control transmitter oscillator tuning, amplifier tuning and loading; a band-selection switch; a socket to connect a telegraph key and a pilot lamp to assist tuneup; and a transmitter antenna connection.

Inside the cabinet, most of the standard S-38B tube lineup is retained: 12SA7 converter, 12SK7 IF amplifier, 12SQ7 second detector and AVC, and 50L6GT audio amplifier. In the SR-75, an 117Z6GT is substituted for the S-38B's 35Z5GT rectifier. Added to the circuit is a 12BA6, serving as the SR-75's transmit oscillator. And, in true transceiver style, in the SR-75 the 50L6GT doubles as the RF amplifier in transmit mode.

Transmit frequency control is by crystal. The hard-to-reach single socket is located amid a cluster of hot tubes. Also difficult to reach is the banana-jack receptacle for the four supplied plug-in coils. While bandswitching, the receive section requires a mere twist of a front-panel knob, changing transmitter frequency is a clumsy, time-consuming and sometimes painful procedure.

Another SR-75 addition to the chassis is a clip to hold a pair of D-cell flashlight batteries used to actuate the keying relay.

Output is via a Pi-network. Tuneup is simple: Dip the final by adjusting the amplifier tuning control, determining resonance as the pilot light dims. Adjust the loading control in small steps, redipping the final each time, until bulb brilliance is stabilized. For operation on 10 and 11 meters (remember, 1951 was pre-CB), the oscillator tuning control is used to help achieve proper resonance.

The factory specs claim 7.5 watts output on 80 meters, decreasing as the frequency increases to a low of 4.5 watts on 10 meters.

The entire package, weighing about 15 pounds, measures 13 inches wide, 7 inches high and 8 inches deep.

Retail price for the SR-75 in 1951 was $89.95, which was $40 more than the standard S-38B.

Despite the popularity of the new Novice class and the shrewd attempt by Hallicrafters to promote the SR-75 as the ideal Novice rig, it disappeared from the product line by the end of 1952. Its attractive price was overshadowed by limited features, awkward operation and TVI problems.

The SR designation (for "send/receive"?) on a Hallicrafters transceiver reappeared in 1958 with the SR-34 for six and two meters. The 1960s saw several Hallicrafters rigs with SR names, including the SR-42 and SR-46 VHF transceivers and SR-150, SR-400 Cyclone, SR-500 Tornado and the SR-2000 Hurricane HF transceivers.

Whether or not the SR-75 really was the first ham transceiver remains a matter for debate. What is certain is that it was an innovative rig 40 years ago and remains an interesting collector's item today. ER

**KWM-1 from page 21**

"Mr. Collins used one of the first three KWM-1 prototypes to contact both the north and south poles," notes Senti. "It turned out to be a pretty good little rig."

It also spawned the Collins S-Line gear and a host of transceivers by other manufacturers, decendants of which continue to be sold new today. The Collins 32S-1/75S-1 transmitter-receiver combo, with the capability of common frequency control, was introduced in 1958. Shortly thereafter came the KWM-2 transceiver, which added 40 and 80 meters and other refinements to the original KWM-1 package. By the way, Senti casts a gentlemanly vote against the Hallicrafters SR-75 as the first ham transceiver. "It sounds interesting," he says when told of the little rig billed by Hallicrafters in its 1951 advertising campaign as "a completely new type of unit -- a small transceiver..."

However, Senti's verdict: "That's a transmitter-receiver, not a transceiver." ER


WHY DON'T YOU GO AHEAD AND BUY IT? YOU ALREADY BOUGHT THE BOAT ANCHOR FOR IT AT THAT HAM SWAP MEET!

**Dave Ishmael, WA6VVL, in his hamshack. Recently he made his first AM contact since 1962 and says it was a very nostalgic experience.**

Gerald Parker, KØGPX, is his new hamshack. He's a 99% CW operator and he says he enjoys the vintage CW net on Saturday evenings.

Paul Zapotocky, K1JKJ, with a B &W 5100B and National NC-270 receiver.

# LETTERS

**Dear ER**

An excellent review of the 10 meter only transceivers was presented in the February issue of QST.

I was disappointed with the conclusions section however where the authors state, "Almost no one uses AM on 10 meters so this feature is nearly useless on the '2950". My goodness, it would appear that the authors never monitor above 29 Mcs. AM activity, much to the annoyance of the die-hard SSB stations, is alive and well and has a great growing interest in the amateur community. Not because it is a superior mode of DX communications but because it is a superior mode of modulation. When SSB came into use back in the '50's we all commented on the distorted audio and also that it sounded like Donald Duck. Well, over the years with the aid of speech processing, SSB modulation still sounds like Donald.

Not only is the AM signal pleasant to listen to but many amateurs who are fed up with equipment that is impossible to repair have reverted to the good old MADE IN THE USA amateur equipment.

A word of caution however, some amateurs have been known to become addicted to AM, spending every available moment restoring vintage equipment, ignoring both family, friends and SSB. In a recent study conducted in the San Diego area there was conclusive proof that amateurs operating AM suffer a divorce rate twice that of SSB operators.

**Art Rideout, WA6IPD**

**Dear ER**

Please keep up the high standards you have. I do want to caution you about going too far with the SSB articles.

Let me explain... Many of the problems with Amateur Radio began with the introduction of SSB. The technology is good but the lack of a carrier and the use of VOX caused the phone QSO's to be easily interrupted by anyone. Thats why I gave up on phone years ago until recently when AM became more popular again.

The simple QSO of the AM days where a great deal of information was exchanged changed to large 'party line' conversation where anyone felt it was ok to join in or comment on the conversation as it was going on. Most QSO's degenerated to the lowest common denominator (usually idiots took over).

Also, the shift to all store bought gear was promoted by the magazines to help their advertising clients. This caused many to abandon the quest for technical skills. I even hear "Hams" say that they send their rigs back to the factory for repair! I would be too ashamed to say that over the air.

**Dave Mills, AJ7O**

**Dear ER**

In December of 1985, in the Yellow Sheets, appeared an advertisement from a ham in Milwaukee, Wisconsin, saying that he had 35 years of collections that he had to remove. I called him on the telephone and I told him that I would increase the amount that had been offered on the following receivers: SX-17, SX-28, SX-42, NC-183D, RME-69, 75A-2 and S-38. I bid about $20 dollars higher than any other offer made. Making sure that I would get them, I sent him a check.

He sent me the 75A-2, the NC-183D and the S-38 and the speaker for the SX-28. I returned the shipping costs expecting the other receivers to arrive within the next several weeks. After many calls, many letters and hearing many excuses I still did not have the other receivers over 7 years later.

Two days ago, on 10 meters I ran into a N9ISH by the name of Dave that lived in Franklyn. He told me he was south of Milwaukee. I told him the story and he said, "I will go and get your receivers".

Last night I talked to Dave again and he had gone by and picked up all my receivers and is shipping them down to me. I

told him that I did not know that there were any people like him anymore.
**Bob Hohertz, W5PYT**

**Dear ER**

Remember in Issue #5 (Schoolboy's Radio) I mentioned hearing Hoisy, W9NOE['Hoisy' Hoisington now W4CJL] on my set – back in 1934. A photo of his 1934 station appeared on the cover of #6. Fifty-eight years later, on January 17 of this year, I finally worked him on 14.250. We've never met in person but we've corresponded for years.
**Bob Dennison, W2HBE**

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**R390A Bits and Pieces from page 17**

plate may say Collins Radio Company, but, I guess we will call it a team effort, ok? Any reader with further knowledge of production contract numbers we missed, production dates and numbers, or further information and wishing to share it with ER readers would be very welcome. Send the data to the author or to Barry, and we will continue our historical record-keeping.

I have no idea where to find brand new R390As! Its true that an unknown quantity of them were for sale on the surplus market brand new, in the original shipping crates, with spares, book, etc. as late as 1970. For example, the December 1968 issue of "73" carried an ad from EAC Industries for some new ones, and since they were one of the suppliers, these might have been left over from a cancelled contract, or perhaps they were an over-run. Later, in December 1970, *"Ham Radio"* carried an ad from the Herbert W. Gordon company for new R391s a well, plus a quantity of "remanufactured" R390s. A Denver ham friend remembers that someone in Nebraska had at least one R390A new in the box in his barn in the late 1970s. So, keep your eyes open, they may still turn up somehow!

There was an official modification order which added a vernier drive and dial to the BFO tuning unit shaft. I have been unable to find a copy of the procedure, so I left it out of the original article. If you run across one of these, its official!

Some guys have written asking me to settle the debate over how to maximize tube life: should an operator leave the gear on around the clock, or turn it off when done? In an age when the receiving tube lines have closed forever (and therefore only a finite number are left for us to enjoy), and a new pentode can cost between six and ten dollars, this is a valid question. I've answered them by saying that in the first place, I don't use diode rectifiers. The diodes start supplying B+ as soon as you close the switch, long before the heater is warm enough to start supplying the space charge with electrons. As pointed out by KDØHG, without the space charge to protect the sensitive cathode, ion bombardment will soon 'poison' the cathode structure. A filament/cathode vacuum rectifier is like a built-in slow-start devise in that it doesn't make much juice until its filament heats up. Also, I don't turn my equipment on and off. If I know I'll be using a piece of gear, for example, on the weekend or during vacation time, I'll leave it on, but not on standby where no plate current flows. Without plate current, the space charge disappears, and the thin coating on the cathode is easily damaged by inward particle flow from the other tube elements, and from external electromagnetic fields surrounding transformers, etc. Allowing this condition will reduce total emission life by as much as 50:1! Again, maintain the heater voltage within 10% as specified in the tube manual because improper heater voltage disrupts the space charge. I use Variacs to bring up the line voltage slowly when firing up, because this initial period is the hardest on any electrical component. Don't use one with the R390As because the front-end relays will arc, and the life of the front-panel function switch will suffer.

I'm glad that the R390A articles were enjoyed by so many readers. It was a fun project for me to work on, and I am sure that many of you are discovering that a big old R390A might just be the best kept secret of the 1990's. **ER**

**ER in Uniform from page 10**

near Baltimore. Well we had some free time and some of us were hams so we decided to try to get on the air. I had some POW's working for me and they built a 'shack' -- I think it was about 10' by 12' or so. So we got on and started calling CQ and we raised several stations in the European Theater of Operations. There was a station using the call B1G in Spain -- they had a BC-191 in a cargo plane -- and we raised a station in Egypt which was using command gear and the call SU1D. We chose the call F1USA.

"In October we heard that the 10 meter band was going to be opened to ham use. None of our gear would work on ten but we had extra tank coils for the 610 so we took off four turns from a 20 meter final tank coil and tuned it up so it would double in the final. It's a darn good thing there weren't any TV sets over there.

"We started calling and in a few days we were making contacts everywhere. We made quite a few in the USA and some with Navy ships -- I remember the Missouri and the Iowa -- in the Pacific. And we were able to get messages home for a few of the boys and things like that.

"Then we heard that the Navy stations -- of course they were using military gear too -- had been put off the air. The brass had said that anyone caught using military gear for ham use would be court-martialed so that was the end for them. But our CO thought what we were doing was fine and since no one had told us to stop he said it was okay to keep on and we did, for a few days.

"Then we heard a strong station come on-- he must have had two KW--and tell us to get off and if anyone was caught using military gear for hamming he would be court-martialed so that ended it for us too. But it wasn't long after that, that I went home. It was sure a lot of fun while it lasted -- that was about the most fun I ever had, I guess."

After we talked recently, Doug sent me an original F1USA QSL card (surely one of the rarest of 'special event station' cards!) and some snapshots of his buddies at the QTH in France. He was the first to tell me of the end-of-the-war 'bootlegging' by hams in uniform; does anyone else have stories to tell from this time? **ER**

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**Reflections from page 2**

power frequency. Tesla insisted that 60 cycles was more efficient. His opinion prevailed and that's how our present 60 cycle standard came about.

During the height of his career, Tesla was world renowned. His lectures and demonstrations before engineering societies were notable events. He was especially adept at producing spectacular displays of lightning and other electrical phenomena. He would run hundreds of thousand of volts through his body and melt a metal object. His demonstrations were sensational and made him very famous.

In 1892, at the Royal Institution in London, the scientific elite of England personally persuaded Tesla to make a lecture presentation before them by equating his scientific accomplishments to those of their own revered Michael Faraday.

Today, one hundred years later, it would be appropriate if we, in the AM amateur radio community took the initiative and honored Tesla, as is rightly his due, by naming or re-naming some commonly used electrical value after him.

"Hi OM, I'm running a Viking II with 20 Teslas on the finals." **ER**

# CLASSIFIEDS

## Advertising Information

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

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

**VINTAGE EQUIPMENT ONLY**

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

## DEADLINE FOR THE MARCH ISSUE: MARCH 3

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

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**FOR SALE:** Heath DX-35 - $35; IO-103 scope - $60; Sonar VFX-680 xmtr - $40, all w/manuals; tube testers: B&K #500 - $60; Superior #TV-11 - $40; Supreme #35 (old) - $35; A-K shelf spkr (1920's) - $50; '30's RCA audio amp #82A - $50; ham gear manuals - SASE or call. **WANTED:** Tubes: 304TH, 6L7, 812A and NE-32 neon tubes. Mike Carroll, NI4N, 108 Wessington Ct., Hendersonville, TN 37075. (615) 822-0082 or FAX 615) 741-7224

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**FOR SALE:** Miscellaneous odds and ends, antique radios and parts. LSASE for list. Hidyne Research, POB 3342, Williamsport, PA 17701. (717) 326-2148

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**WANTED:** AM signal generator in good condition, freq. coverage - 100 Khz-100 Mhz or more. Beni Fernandez, KP4KN, 1674 Atlas St., Summit Hills, PR 00920.

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**FOR SALE:** NC-240 w/manual - $200; parts for Henry 4K Ultra amp. Earl, K5FTE, 1009 Stanley, El Paso, TX 79907. (915) 592-9185

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

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**FOR SALE or TRADE:** Drake - 2B, 2BQ, 2NT; Millen - 90810, 92101; RME - MB3; BC-101; BC-IV; HA1; HT-32A and S-120. Ray, 4521, Whitfield Ln., St. Louis, MO 63134. (314) 428-1963

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**WANTED:** Technical Material Corp. rcvrs - GPR-90, GPR-91, GPR-92; SBC-2, GSB SSB adapters; VOX-5 diversity combiner. Also original manuals, cabinets and spkrs for same. Ron, KC6WTG, POB 783, Santa Rosa, CA 95402. (707) 539-8319

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**FOR SALE:** Johnson Viking Valiant, looks good, works fine - $195. No shipping. Dan Radcliffe, KP9BP, 8201 Plainview Pkwy, Sussex, WI 53089. (414) 255-9165

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**WANTED:** Johnson Viking Ranger and Heathkit DX-60 w/manuals. Roy Barnett, K4VDT, 5552 12th Ave., S. Birmingham, AL 35222. (205) 591-6321

# CLASSIFIEDS

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

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**FOR SALE:** 300 rigs, SASE for list; vintage manuals. Mike Horvat, POB 73, Stayton, OR 97383.

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**WANTED:** Audio tubes KT66, KT88, 7308, 8223, 6550, 6CA7, 7027, 8417, 6336. Michael Charest, P.O. Box 1540, Champlain, NY 12919-1540. (514) 389-8537

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**FOR SALE:** (2) SB-10s - $60 each; R 648/ARR41 rcvr - $200. **WANTED:** Navy RAX rcvr CG-46115. Steve Davis, KD2NX, (908) 280-9760

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**WANTED:** Schematic/manual for Temco RA-600 xmtr & RA-400 vfo or for RA-150. Dale Krolczyk, KB5IKH, 424 Spring Valley Rd., Waco, TX 76643. (817) 666-3787

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**FOR SALE:** Collins WE 32S-3A w/Datascan freq. counter (C1400A, 10 Hz - 1.4 Ghz) - $720; 516F-2 w/cabinet, spkr, Vista relay and solid state rectifiers (one extra pair), all in excellent condition, DX Engineering speech processor - $100; crystal pack CP-1 - $145; many tubes for KWM-2/2A, 75S and 32S - SASE; brass key, antique - $75. Add shpg. Barry Rosenthal, KE7PT, 5211 North Oracle Rd., Tucson, AZ 85704. (602) 293-6000

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**WANTED:** Squires-Sanders - information on company or personnel; whereabouts of AN/URR-58 Coast Guard receiver prototypes; SS1V bandscanner; late SS1R. Alan Douglas, Box 225, Pocasset, MA 02559.

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**WANTED:** Military radios and electronic equipment, collections, components, cables and manuals; freq. standard for GRC-109; GP-7; TU's; NIB 811A's. Charles Di Cecca, KA1GON, 501 Mystic Valley Pkwy, Medford, MA 02155. (617) 396-9354

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**FOR TRADE:** Case for R-1051; 4-250 tubes; RF amp units from AN/SRT 502 (3-28 Mhz, 2x4-400A, 300 pf vac. variable, large roller inductor, etc) **WANTED:** Military radio equipment. Tom Brent, Box 1552, Sumas, WA 98295. (604) 826-4051

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**WANTED:** Millen Vari-Arm vfo, type 90700, 90701 or 90711. Also looking for a Millen ceramic jack-bar type, 5 pin coil socket #41205 and air coils #43022 and #43042 for a 90800 exciter. Interested in Millen equipment and any information on James Millen's life and company for a future article. Thanks to all who have helped so far. Henry Rogers, WA7YBS, POB 501, Minden, NV 89423. (702) 267-2725

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**WANTED:** HRO-60 coils type G,H, J, AA, AB. Cash/trade. Barry Nadel, Box 29303, San Francisco, CA 94129. (415) 346-3825

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**WANTED:** Breting radio equipment. Also looking for information on Breting; photos, newspaper articles, letters, anecdotes and facts. Bill Mayes, N6LKA, 255 So. Montgomery St., San Jose, CA 95110. (408) 280-7172

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**FOR SALE:** Drake Q-Xer Q-multiplier with notch/peak for 2A/2B rcvrs - $20; Heathkit HM-102 HF and HM-2102 VHF SWR/watt-meter - $25 each. Wayne, K8WB, 5261 Jane Way, Las Vegas, NV 89119. (702) 795-2652

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**WANTED:** Original 150 ma meter and clean front panel for DX-35; ceramic base for 813. Tom Jurgens, KY8I, 3920 Jim Dr., Bridgeport, MI 48722. (517) 777-2257

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**WANTED:** I need plate characteristic graphs (family of curves) for tube type 811A. Can anyone help? Dr. V.P. McGinn, 10714 E. 20th St., Tulsa, OK 74128.

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

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**FOR SALE:** 455 Khz Collins mech. filters, 2.4-8-16 Khz, usable in 75A-4 etc - $100 for set of 4. Larry Asp, VE3DRA, Box K22, Sutton, Ont. L0E 1R0. (416) 722-5853

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**WANTED:** T-368 xmtr. I will pick up if located within a reasonable distance of my location. Mark Burton, WB4TGB, 8808 Calderwood Dr., Knoxville, TN 37923. (615) 693-4791

# CLASSIFIEDS

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

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**FOR SALE:** 100 boxed tubes - $65; 150 unboxed tubes - $40; 89 CB xtals, 3.57-37.85 Mhz - $30; 40 used 7,8,9 pin tube sockets - $5; Jackson 103 tube tester, no manual - $20; Heath FM3 FM tuner w/manual - $20; ARB rcvr tuning head - $12, control box - $4; NOS/used coils, chokes, xfmrs, yokes, flybacks, var caps - SASE for list. Include shpg on all items. Robert Morrison, KE4XI, 231 Perkins St., Havelock, NC 28532.

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**FOR SALE or TRADE:** Hallicrafters SX-25 w/ restorable spare; Heath DX-100B; Philco and Zenith consoles. WANTED: SP-600JX; TMC GPR-92 (finders fee paid); Hallicrafters SX-73; SX-88; Drake R4A; SW-4A; Collins 51S1/G-133; Squires-Sanders SS-1BS, SS-1R/701; Navy RBB/RBC rcvrs; power supplies; cables; early Collins and Hallicrafters AM xmtrs; WW II Navy HF rcvrs, xmtrs, xcvrs; TCS equipment; any high power HF AM xmtrs. Shane Ward, N1DMX, 14 Pond St., Amesbury, MA 01913.

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**WANTED:** ART-13 low freq. oscillator O-16/ART-13 (200-1500 Khz). Tom Smith, N5AMA, 13034 Elmington Dr., Cypress, TX 77429-2062.

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**WANTED:** 3" cathode ray tube 3KT4; National type "O" dials, metal skirt with bakelite knob; sets of B&W xmtr coils type HDVL; "Coil Unit" C-448-B w/brown bakelite frame and center link; other xmtr coil sets; National RF chokes, R-175 and other equivalents. Roland Matson, K1OKO, RFD #1, Box 2943, Kennebunk, ME 04043. (207) 985-3751

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**FOR SALE:** Multi-Elmac PMR-6A rcvr w/AC supply - $125; Clegg 22'er, 2 meter AM - $95. Cliff Fleury, AI7Y, 64174 Tumalo Rim Dr., Bend, OR 97701. (503) 382-9162

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**WANTED:** HRO-60T; NC-400; KWS-1; spkr/coils for HRO-50T1; 55G1 preselector; RV-4C remote vfo; SPR-4 manual/xtals; spkr for 75A-4. Carter Elliott, 1460 Pinedale Rd., Charlottesville, VA 22901. (804) 979-7383 (H), 980-7698 (W)

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**WANTED:** Radar equipment, units or complete systems. Also early WW II aircraft TV cameras. Allan H. Weiner, 14 Prospect Dr., Yonkers, NY 10705. (914) 423-6638

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**WANTED:** WW II military sets, racks, etc. Finders fee paid on non-owned sets purchased. Sam Hevener, "The Signal Corps", W8KBF, 3583 Everett Rd., Richfield, OH 44286. (216) 659-3244

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**WANTED:** KW-1, SC101, SC301, 75A-4, NC-101X, HRO-500, NCL-2000, NCX-1000, NC-400, 150A, 150B, 40B, 30W, 32A, 32B, 30DX, 30DXB, 20B, 42B, 300B, 202A, 202B. Collector. Rick, (617) 233-1414, collect.

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**FOR SALE:** MFJ 900 antenna tuner - $45 shpd; antique Mesco railroad key and sounder, nice - $25 shpd. SASE for literature list. Dave Mantor, W9OCM, 2308 S. Fairlawn Way, Anderson, IN 46011. (317) 642-1103

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

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**FOR SALE or TRADE:** BC-342; HT-33A; ARC-3; HA5; SB-10. WANTED: DX-20; DX-35; Viking 500; PRO-310; NC-303. Al Sziriski, AI4U, 6251 Fox Hunt Trail, Orlando, FL 32808. (407) 222-0007 days, 298-3493 eves.

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**WANTED:** Can someone advise me of National Co. S-meter calibration for the NC-200? mV input vs S-units. R. Haworth, W2PUA, 112 Tilford Rd., Somerdale, NJ 08083. (609) 783-4175

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**WANTED:** Pre-WW II FCC amateur license application form, a copy, blank or otherwise. James T. Schliestett, W4IMQ, POB 93, Cedartown, GA 30125. (404) 748-5968

# CLASSIFIEDS



**FOR SALE:** Wireless Set No. 19 Mark II, complete with accessories, factory sealed and crated - BO, PU only. **WANTED:** Collins 75A-4; Viking Navigator; Speed-X bug; Hallicrafters parts source; 160 M xtals; 1300 ohm electrodynamic spkr. Brian Roberts, K9VKY, 3068 Evergreen Rd., Pittsburgh, PA 15237. (412) 931-4646

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**FOR SALE:** Over 150 military manuals of the 1940's and early 1950's. Large SASE w/$.52 postage for list. August J. Link, 2215 Faraday Ave., Suite A, Carlsbad, CA 92008. (619) 438-4420 days.



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

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**WANTED:** Hallicrafters S-85, smoking or not! Marcus Frisch, WA9IXP, Box 28803, Greenfield, WI 53220-0803. (414) 545-5237 (machine)

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**FOR SALE:** Collins R-388, very clean, orig. manual from Signal Corp. - $185; '60's era RCA Marine, general cov. rcvr, needs cleaning, matching RCA 20 xtal rcvr, both have Collins filters - $150 per set. Dave Bechtel, (206) 820-0609

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**WANTED:** "RCA Vacuum Tube Data" handbook; KWM-1, will pay up to $700; 75A-4 tuning knob; KWM-2 metal trim ring. Mimi, (213) 379-6052

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**FOR SALE:** HRO-50 coils: A,B,C,D,AA - $25 each; spkr - $50; Collins filters: F455C12, F45N40 - $35 each; R4C filter, 250 cycle - $45. M. Cox 12411 86th Place, NE, Kirkland, WA 98034. (206) 823-8139

# CLASSIFIEDS



**WANTED:** WW II military or civilian radio sets, radar, aircraft, infantry, racks, manuals, anything. Sam Hevener, W8KBF, "The Signal Corps", 3583 Everett Rd., Richfield, OH 44286. (216) 659-3244.

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**FOR SALE:** BC-222, no battery box or accessories. **WANTED:** BC-191 and GO-9, any cond. Ted Bracco, Quincy Collge, 1800 College Ave., Quincy, IL 62301. (217) 228-5213/5484

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**WANTED:** Meissner Signal Booster and RME DB20 in good operating condition. Also xmting chokes. Roland Matson, K1OKO, RFD #1, Box 2943, Kennebunk, ME 04043. (207) 985-3751

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**WANTED:** Hallicrafters SX-115 and SX-88; also Collins 75S2. Bill Smitherman, KD4AF, Rt 4, Box 79, East Bend, NC 27018.

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**FOR SALE:** Military radar, airborne model T28 AOT-1 xmtr - $50; Gonset linear, VHF model 3063 - $95; TMC Sideband Adapter, mint - $90. **WANTED:** Unique Wire Tuner. Milton Levy, W5QJT, 539 McCarty, Apt. #407, San Antonio, TX 78216. (512) 366-3290

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**FLEA MARKET:** March 14, 1992 in Hudson, NH at the Lions Club Hall, Lions Ave. from 8 am to 3 pm. Sponsored by the Interstage Repeater Society. Free parking. Admission: buyers $2, sellers $10/space. Talk-in 146.85. Contact Wayne, KA1MKH at (603) 895-9035 or send check for space (s) by March 1 to IRS, P.O. Box 693, Derry, NH 03038.

**FOR SALE:** Heath DX-40 and vfo; SSB adapter; HW-30; old instructographs; Knight T-60; National XCU-109 crystal calibrator; package: 4 FBXA's and coils, 2 5987 power supplies - $1100; Swan 250C & ps - $160; Galaxy III with AC & DC - $170. SASE for list. Tom Raymond, W5JM, 2320 S. 'O' St., Fort Smith, AR 72901. (501) 783-8848

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**WANTED:** Incarcerated ham seeks correspondence with vintage radio collectors. Also, photo donations of vintage gear. William K. Smith, KA3MFN/4, POB 488-152541, Burkeville, VA 23922-0488.

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**FOR SALE:** 1 watt QRP AM xmtr for 160, 80 and 40. **WANTED:** Tube tester and spkr for 75A. Pat Bunn, N4LTA, 171 Springlake Dr., Spartanburg, SC 29302. (803) 583-1304

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**WANTED:** Manual or copy for R-390A and HQ-170A. Al Norton, K7IEY, 1008 Liberty St., Lynden, WA 98264.

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**WANTED:** I'm looking for coils sets A,C and D for my National HRO-5TA. They should have the one piece metal, silk-screened graphs and nomenclature. Will purchase or can trade National RAS equipment. Henry Rogers, WA7YBS, POB 501, Minden, NV 89423. (702) 267-2725

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**WANTED:** Johnson 6N2 receiving converter and 6N2 vfo. John, WB5OAU, 7605 Roberts, NE, Albuquerque, NM 87109.

# CLASSIFIEDS

**FOR SALE:** With so many new parts coming in, its hard to keep our catalog up to date! HV caps and builders goodies galore in our latest Winter 1992-B catalog. Large SASE appreciated. Thanks, Steve, NW2F, Two Fox Electrix, POB 721, Pawling, NY 12564. (914) 855-1829

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**WANTED:** Will pay top price for the following in good shape: Hallicrafters SX-24; RME-69 or 70; RCA ribbon mike. Les Mitchell, W8WLQ, 5090 Nichols Rd., Mason, MI 48854. (517) 676-6441

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**WANTED:** Plate xfmr for Collins 30S-1 amp, pn 662-0351-00; Johnson 6&2 meter Thunderbolt. Steve Abbott, WB0HUR, RR 1, Box 140, W. Branch, IA 52358. (319) 643-2617

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**FOR SALE:** SB401/SB303 w/AM and CW filters - $300; AF-68 xmtr - $60; Eico 720 and 722 - $75. Plus shipping on all. Gary Elliott, NO5H, POB 295, Epps, LA 71237. (318) 926-3343

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**WANTED:** Very old or unusual Hallicrafters equipment, entire 1934 "H" and "Z" line of Silver Marshal, parts, memorabilia and manuals. Chuck Dachis, "The Hallicrafter Collector", WD5EOC, 4500 Russell Drive, Austin, TX 78745.

**WANTED:** BC-AA-191; TU-AA-3 thru TU-AA-10; BC-AA-192; TM-AA-160; BC-196. James Treherne, 11909 Chapel Rd., Clifton, VA 22024. (703) 830-6272

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**FOR SALE:** BC-614 speech amp, still in box from being overhauled by gov't - $50 plus UPS. Alan Dale, W9ZPP, 2824 Forest Ave., Evansville, IN 47712. (812) 424-5208

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**WANTED:** To share a lifetime of accumulated radio since 1920. What do you need? Cdr. Glenn W. Ritchey, USN Ret., W7SAB, 219 Naval Ave., Bremerton, WA (206) 373-9631

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**FOR SALE:** RME 6900 rcvr, working, nice condition - $175. Stuart T. Carter, II, W4NHC, POB 033177, Indialantic, FL 32903-0177. (407) 727-3015

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**WANTED:** B&W 2Q4 phase shift network or any junk equipment containing a 2Q4. Ken Kinderman, WB9OZR, 362 Echo Valley Ln., Kinnelon, NJ 07405. (212) 512-1866 days, (201) 492-9319 eves.

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**WANTED:** Transistor radios, Zenith, Motorola, Regency, Sony, etc. Also small tube portables. S. Martin, 815 N. Hayden Rd., B-204, Scottsdale, AZ 85257. (602) 994-3162

# CLASSIFIEDS



**WANTED:** Collins KW-1, KWS-1, KWM-1, R389, R390a, 75A-4 with 3 filters; Hallicrafters SX-115. F.H. Werry, DJ3OE, Saturnweg 18, D-4056 Schwalmtal, Germany. phone: 01149-2163-20528, FAX: 20552. 24 hrs., will call back.

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**FOR SALE:** C.E. 100V/600L cabinet; wood factory shipping crates. WANTED: Service manual for Clegg FM DX and 031 power supply. Val Johnson, POB 51, Henry, IL 61537. (309) 364-3160

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**WANTED:** Johnson RF attenuator for Ranger, Johnson T-R switch. Herb Hildebrand, W6UBI, 4223 Astoria St., Sacramento, CA 95838. (916) 921-5867

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**WANTED:** For 75A2/75A3: Collins emblem for top of front panel and Mhz dial drum. Tom Hoitenga, K8NGV, 3170 Kennesaw View, Marietta, GA 30064. (404) 426-8682

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**FOR SALE:** Wm. Nye 1 kw low pass filter, 52 ohms - $16; Hallicrafters S-08, general coverage rcvr - $45; RCA Senior Voltohmyst - $18. All tested. Ward Becht, 625 Tufts Ave., Burbank, CA 91504. (818) 842-3444

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**FOR SALE:** Hammarlund HQ-215 solid state, matching spkr, SW xtals - $275. Levy, 8 Waterloo, Morris Plains, NJ 07950. (201) 285-0233

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**WANTED:** Pair of V-70-D tubes. Carl Koch, AH6Q, 9975 Lane St., Denver, CO 80221. (303) 450-9472

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**WANTED:** Lafayette collector seeking amateur & CB gear manufactured by Lafayette Electronics which is in excellent-to-mint condition such as the HA410 (10m xcvr), HA460 (6m xcvr) and the Comstat 25-B 23 channel AM CB xcvr. In addition to these rigs I would be interested in any type of Lafayette gear including rcvrs, meters, catalogs, etc. if they are in excellent-to-mint condition. Please write to me with what you have and price. All letters will be answered. Thank you. Harry A. Schools, KA3B, 1606 South Newkirk St., Philadelphia, PA 19145.

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**WANTED:** Model 3201 modulator/ps for Gonset G-77A xmtr. John Lewis, WB9NWO, 3526 N. Elmcroft Ter., Peoria, IL 61604. (309) 685-5865

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**FOR SALE:** Heath DX-60B - $30; Heath HR-10B - $40; Regency S/S converter ATC-1 - $30; Hallicrafters SR-160 w/spkr supply - $150. U-ship. Richard Lucchesi, 941 N. Park Ave., N. Massapequa, L.I., NY 11758. (516) 798-1230

## ELECTRIC RADIO PARTS UNIT DIRECTORY

**At this point the directory has 200 units in it. If you need a part for a vintage restoration send $2 and an SASE (.52 postage) for the list. If you have a parts unit, consider putting it on the list. Your dead unit can help bring others to life!**

# CLASSIFIEDS

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

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**FOR SALE:** Parts by mail since 1954. Vintage parts available. Send stamp and request "Vintage Flyer". USA only. Bigelow Electronics, Box 125, Bluffton, OH 45817

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**WANTED:** Coil sets and xtal calibrator for National HRO-50-1; clock for Hammarlund HQ-100; power plug for BC-348. Robert Bennett, 5675 Shadow Hills, Las Cruces, NM 88001.

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**FOR SALE:** Unused Collins mechanical filters - $50-$75 each: F455FA21, F455FC60, F455FD58, F455Z16, F455Z17, F500B60, F500Z5, USB and LSB. Dallas Lankford, 903 Sherwood Dr., Ruston, LA 71270. (318) 251-2716.

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**WANTED:** Brown Bros. keys and paddles; E.F. Johnson bug. Robert, (510) 845-2625

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**WANTED:** Two, NIB 4-250As, please no pulls or Chinese tubes; General Radio modulation monitor; clean 75A-1 and 75A-4. Pete Brown, KH6IRT, 5332 Puahia Pl., Honolulu, HI 96821. (808) 373-2792 (call collect)

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**FOR SALE:** Several Hallicrafters S-38s, ABCDs, very good, may need alignment, includes manual copy and shpg - $50 each; Collins mech. filter F455A2 for KWM-2 - $60; 15 ARRL Handbooks, 1943 to date, plus other books - LSASE for list; parting BC-610 and B&W 5100. **WANTED:** Pre 1940 ARRL Handbooks for my collection. WA7IHN, P.O. Box 442, Aumsville, OR 97235. (503) 749-1149

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**WANTED:** B coil for HRO-7. Also complete, clean, operating/repairable S-72 and S-72L Hallicrafter portable radios. H.L. Turner, 2079 Beaver Rd., NE, Atlanta, GA 30345. (404) 634-1605

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**FOR SALE:** (4) 3-500Z tubes NIB - $85 each; Sprague TO-5 capacitor analyzer - $35; Johnson Pacemaker - $130. Bill Jenkins, WA5MWJ, 11916 Donahoe Bend, Fort Smith, AR 72916. (501) 646-3859

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**FOR SALE:** 75S-3 - $200; 180S-1 - $100; Skytech tubes for 75S-1 & 75S-3 - $100 each; Millen GDO - $65; RCA Radiotron Handbook - $15. Bill, K7VZP, (602) 242-2192

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**FOR SALE:** HQ-145 - $80; R105/ARR-15 - $90; Hallicrafters SR-46A 6 M AM w/vfo, mint, orig. boxes - $100; SB-303/SB-401 - $225; DM-64A dynamotor, 12/275v - $15; 1964 Callbook - $4. Mark Hovda, NØJWI, P.O. Box 10091, Cedar Rapids, IA 52410. (319) 364-4048 7-9 CST

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**WANTED:** Globe UM-1 and SM-90; meter for Valiant; Mick T-60 xmtr. Sam, N4VIB, (404) 695-5658

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**FOR SALE:** Pre-'40's and later xmtrs and rcvrs; special purpose tubes; surplus radio equipment. LSASE for list. B.V. Edmondson, Rt 1, Box 2599, Lee, FL 32059.

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**WANTED:** B&W 850A inductor and 77DX ribbon mike. Andy Howard, WA4KCY, (404) 832-0202

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**FOR SALE:** Heath AR-2 - $15; Viking II w/vfo - $100. **WANTED:** Any coils for HRO-60. Jim Jorgensen, K9RJ, 1709 Oxnard, Downers Grove, IL 60516. (708) 852-4704

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**WANTED:** Instruction manual for Collins 32V-1; also manual for Hickok tube tester KS15750. Photocopy ok. Al Feder, W1EOX, POB 640, Killingworth, CT 06419. (203) 663-1811

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**WANTED:** Matching spkr for late model 75A-4. Tom Russell, K8LZF, 1320 Cedarhill Dr., East Lansing, MI 48823

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**FOR SALE:** Old Sylvania portable B&W TV camera, turret will accept 4 C-mounts, w/1 lens - $100. **WANTED:** VHF-602 Globe xmtr; manual for Globe HG-303; external modulator for Globe HG-303. Larry Howe, KBØHIB, 1333 S. Airwood, Springfield, MO 65804. (417) 882-1682

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

# CLASSIFIEDS



**WANTED:** Eddystone 830's, any model (working or not working) or parts for my restoration hobby. Colin Trass, K1KYX, 6 Quail Run, Acton, MA 01720. (508) 635-0261

**WANTED:** Hallicrafters SR-42 2 meter rig; SM-40 S-meter. Bill Colligan, N1DJR, 35 Quail Run, Hampstead, NH 03841. (603) 329-7879

**WANTED:** CE 458 vfo; Lakeshore vfo; Drake 2-LF; 1A rcvr; 2B rcvr; for 75A-2/3 - NBFM adaptor, xtal cal., cabinet, spkr, 75A-3 CW fltr; Heathkit - SB-640 vfo, SB-610 scope, SB-600 spkr; WW II radios, manuals, accessories, J-37 key, headphones, BC-348, ARB radio opr. or navigators chair WW II bomber. Greg Greenwood, Box 1325, Weaverville, CA 96093.

**FOR SALE:** Jennings vacuum variable, 25-1000 mmfd @ 7.5 KV, 60 A, NIB - $150; (6) Eimac 50 mmfd @ 20 KV - $20 each; Eimac 6, 12, mmfd @ 32 KV - $20 each. Ron, KC6WTG, POB 783, Santa Rosa, CA 95402. (707) 539-8319

**FOR SALE:** Very clean, high serial no, RE 32S-3, 75S3B, 516F2 - $1100; nice WE KWM-2 w/ 516F2 - $450; excell. Drake T4XB, R4XB, CC-1 and ps - $600. **WANTED:** Drake 4-NB and TR4CW. Ron Smith, AD6V, 4682 E. Terrace, Fresno, CA 93703.

**WANTED:** Receivers: Squires Sanders SS-1R; 515-1; ARR 15; R-388/388A; G1 33. Mitsugu Shigaki, JA6IBX, Jozan Kamidai Machi 2825-2, Kumamoto, Japan 860.

**FOR SALE:** Drake C-Line w/AC4/MS4; 75A-4; 75A-2; 51J; DX-100; HQ-215; T.O. keyer; Heath monobanders; WRL Duo-Bander; BC-221. Joel Thurtell, K8PSV, 11803 Priscilla, Plymouth, MI 48170. (313) 453-8303

**WANTED:** Audio driver xfmr, UTCS-8, Stancor A-53C, Triad A-31X or similar; Globe RME-602 VHF xmtr, any condition, and/or manual. Al Bernard, NI4Q, POB 690098, Orlando, FL 32869-0098. (407) 351-5536

**WANTED:** KW-1 and 32V-3. Will pay good price. Tom Teruya, KH6BM, 3762 Lirline Dr., Honolulu, HI 96816. (808) 734-6001, 949-5564

**WANTED:** BC-348, J, N and A rcvrs and ART-13 xmtr. Also manuals for BC-348 J, N, Q and ART-13. Alan Mark, POB 372, Pembroke, MA 02359.

# CLASSIFIEDS



**WANTED:** Audio Driver xfmr or working substitute for Johnson Ranger; also need manual for Panoramic Products Panadaptor PR1. Al Feder, W1EOX, POB 640, Killingworth, CT 06419. (203) 663-1811

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**FOR SALE:** Older type surveilance receivers: 30-1000 Mhz - $450; 30-300Mhz - $250; 300-1000 Mhz - $250. Michael Murphy, 11621 Valle Vista Rd., Lakeside, CA 92040. (619) 561-2726

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**FOR SALE or TRADE:** Comet Pro w/coils, in nice shape - $225 OBO; SX-16 w/correct spkr, very nice cond - $225 OBO; Western Electric horn type broadcast mic - BO. **WANTED:** Pilot radios and related items, any cond. Bill Moore, 1005 Fieldstone Ct., Huntsville, AL 35803. (205) 880-1207

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**FOR SALE:** Equipment, parts, books, magazines, manuals, list - $.75 (coins). **WANTED:** Collins 62S-1 VHF converter; 32S-3 xmtr less ps. J. Orgnero, VE6RST, Box 32, Site 7, SS 1, Calgary, AB T2M 4N3 Canada. (403) 239-0489

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**WANTED:** Heath Cheyenne and Comanche with DC supply. George Carroll, N2GBY, 301 New Jersey Ave., National Park, NJ 08063. days - (609) 848-8600, nite - 848-6699

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**FOR SALE:** Collectors only! Parts to assemble $35,000. RCA diversity receiver - $2,000. PU only. Made in early '60's. Pix available. J.M. Etter, W2ER, 16 Fairline Dr., E. Quogue, NY 11942. (516) 653-5350

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**WANTED:** Gonset G43, G63; RME 6900; orig. cabinets for SP-600JX and GPR-90; National spkrs. Bill, KE7KK, 6712 Lake Dr., Grand Forks, ND 58201. (701) 772-6531

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**FOR SALE:** Lots of tubes, many NOS, some pulls, all checked. Send SASE with wants, no list available. Steve Harmon, N9HGF, 4340 N. Congress Ave., Evansville, IN 47711.

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# CLASSIFIEDS

**WANTED:** 17th or 18th edition of the Radio Handbook; Tektronix LC meter and DX-100B. Don Hilliard, WØIPW, Rt 5, Box 219, Neosha, MO 64850. (417) 451-5892

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**FOR SALE:** Late excellent Collins RE S-Line, 32S3 sn 100k, 75S3B sn 80k, 516F2 supply - $1150; WE KWM2 sn 11k, 516F2 - $450; Drake B-Line, very nice, w/MS4 - $650; 75S3, WE, clean - $350; SB401/SB303 combo, good cond. - $300; excellent 75A-4 w/6 kc, 3 kc, 2 kc filters - $575. Smitty, (209) 255-1177

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**WANTED:** T-368 exciter unit; manuals for Comanche and Cheyenne; band spread dial for HQ-120X. Will pay shpg. Joe Saah, WB5ZPQ/4, (919) 779-5659

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**FOR SALE:** HQ-110, near mint; HG-10, good; Apache, cabinet scratches, needs minor repair; SB-10 sideband adapter, very good; Knight T-60, works. **WANTED:** Heath Marauder mint or unassembled. Wayne Arnett, AI7C, 2699 Mazatlan Dr., Grand Junction, CO 81506. (303) 241-3474 days

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**WANTED:** Manual for late SN 75A-2 (75A-2A) that has same tube line-up as the 75A-3 but no mech. filter. Also need RME DM-36 5 and 10 meter converter (matches RME-69 revr). Will trade very good RME VHF 152A converter.Bill Braden, WC7O, 2831 N. Sherry Ave., Tucson, AZ 85712. (602) 322-5601

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**FOR SALE:** Tektronix original manuals - RM503, 545a, 545b, 545 maint & cal, 546, 547, 551, R556, RM561A, RM561B, R561B, 661 - $20 each; 105, 107, 122, 125, 127, 132, 134, 162, 180A, 190A-B, 1121, 1A1, 1A5, 1A7, 3S5, B, N, Z - $15 each. Plus postage. Ron, KC6WTG, POB 783, Santa Rosa, CA 95402. (707) 539-8319

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**FOR SALE:** AN/SRR-11 and AN/SRR-13, each with spare unit - $50 each. Original tech manual. PU only. Jim Comeau, Fullerton, CA (714) 773-9320

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**FOR SALE:** (set of) Barker &W illiamson 1 KW transmitting coils for 80,40,20 and 10 meters - $15 each. Bill Riley, 863 W. 38th Ave., Eugene, OR 97405

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**FOR SALE:** Assorted broadcast, SW, ham revrs, xmtrs and other treasures, shack overflowing - QSL and two stamp SASE brings list. KB8MOV, POB 131, Novelty, OH 44072

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**WANTED:** Power tranformer for NC-183. Gus Enquist, VE3MAL, RR 1, Redbridge, Ont., P0H 2A0, Canada

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**FOR SALE:** National NC-300 - $300; NC-303 - $135; HRO-50T1 w/xtra coils & spkr - $190; CE 20A - $40; Hallicrafters SX-111 - $75; HT-37 - $80; HT-40 - $40; HT-41 amp - $125; Swan 250, 6 M xcvr w/ps - $65; TV-2 transverter - $40; TV2-B - $50; Knight T-108, 2 M w/vfo - $35; Heath HW-16 - $35; HG-10B vfo - $25; SB-630 console - $30; SB-640 xternal LMO - $30; SB-110A, 6 M xcvr w/ps - $85; SB-500 transverter - $60; HW-100 xcvr w/ps - $90; VHF-1 Seneca - $20; HX-30, 6 M SSB xmtr - $30; Johnson KW Matchbox w/SWR - $150; Galaxy V MK II w/ps spr - $90; SBE-33 - $50; HX-500 - $110. George Hawrysko, K2AWA, POB 568 Boro Hall, Jamaica, NY 11424. (718) 224-2448

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**WANTED:** National HRO or RAS series revr w/coils, spkr, ps, coilbox, etc, rack or table mount, complete or partial sets, parts considered. Greg Greenwood, WB6FZH, POB 1325, Weaverville, CA 96093. (916) 623-4520

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**FOR SALE:** WW II military equip. manuals, originals and quality reprints. Send your wish list or a check for any of the following reprints: BC-348H, BC-312-J/BC-342J, BC-375-E, B-17 flight manual. $10 each plus $1 shpg. Keith Morton, 3936 E. Orchard Ln., Phoenix, AZ 85044.

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**FOR SALE:** RT-178/ARC-27; Wireless Set No. 19, MK II w/control boxes & supply on mobile mount; Motorola & GE FM VHF radios; HP 202A gen.; Galaxy 300 w/spkr ps & manual. I also have other miliaty gear and a lot of parts-tubes, xfmrs, chokes, meters, switches, etc. Rick, K8MLV/Ø, (719) 543-2459

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**WANTED:** To correspond/talk to WW II bomber radio operators. Need information on content of radio messages made from aircraft on mission for radio displays I am building. Also stories about the equipment etc. Greg Greenwood, POB 1325, Weaverville, CA 96093.

# CLASSIFIEDS

## MARTI ELECTRONICS

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*COLLINS EQUIPMENT REPAIR AND RESTORATION*

Mike Palmer,K5FZ, the owner and primary technician, has been a licensed FCC technician since 1970. He worked for Motorola for 16 years and now sells and repairs VHF/UHF equipment in the Houston area. Mike is well known in the amateur community and is a long-time Collins collector.

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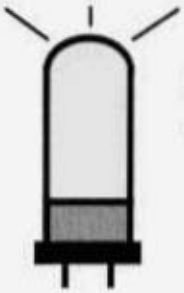

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