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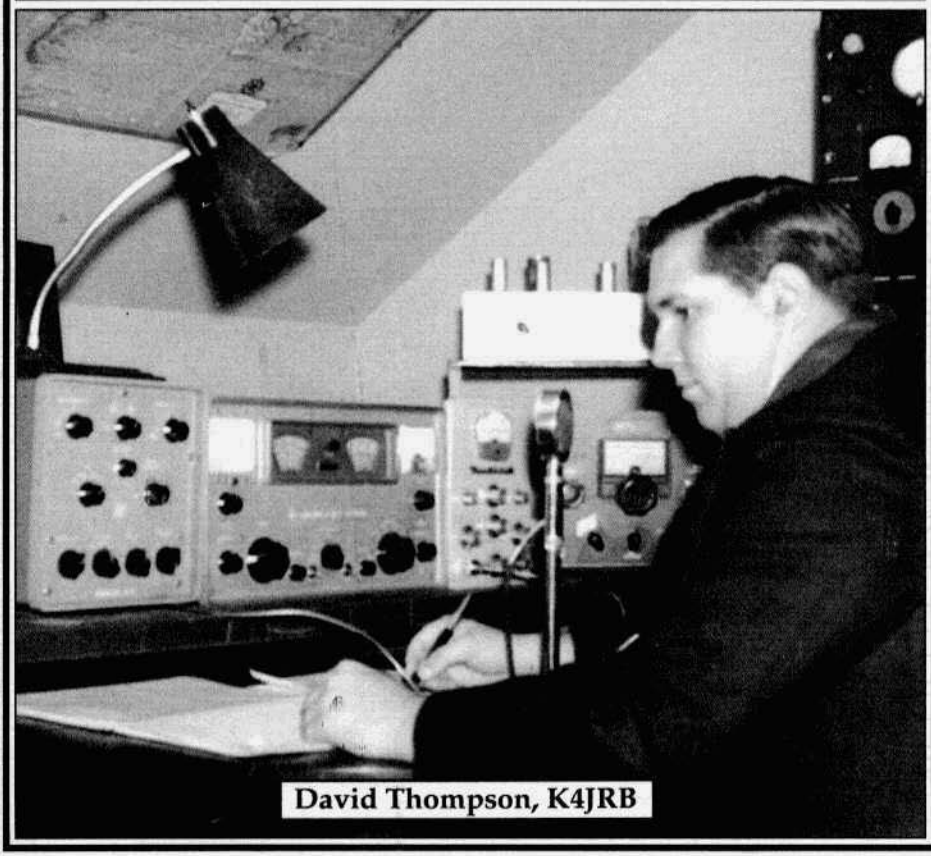
ELECTRIC RADIO

celebrating a bygone era

Number 96 April 1997



David Thompson, K4JRB

ELECTRIC RADIO

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

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

Regular contributors include:

Walt Hutchens, KJ4KV; Bill Kleronomos, KDØHG; Ray Osterwald, NØDMS; John Staples, W6BM; Dave Ishmael, WA6VVL; Jim Hanlon, W8KGI; Chuck Penson, WA7ZZE; Dennis Petrich, KØEOO; Bob Dennison, W2HBE; Dale Gagnon, KW1I; Rob Brownstein, NS6V; Albert Roehm, W2OBJ; Bob Sitterley, K7POF (photos) and others.

EDITOR'S COMMENTS

With this issue we complete our 8th year, another milestone. Our thanks go out to all those who have helped us. Without a lot of help from a lot of people - mainly our contributing writers - we wouldn't have made it this far. Shirley and I are very grateful.

Three months ago I resigned as Editor of the QCWA Journal, a position I held for just over two years. My last issue will be the Summer issue. I enjoyed working with the people in QCWA - many of them are also vintage enthusiasts - but doing two magazines is almost impossible and just too much work. Now we're going to have more time to devote to ER. Hopefully this will equate to a better magazine.

At about this time every year I start thinking about field day. This year it occurred to me that a VINTAGE field day (VFD), quite separate from the regular field day, would be a lot of fun. Maybe we could have it a week before or after the regular event. I'd like to invite comments from all those interested. If there's enough interest expressed I'll announce the details of an ER sponsored VFD in next month's issue.

We're not going to make it to Dayton this year but we're going to offer our usual "Dayton deal" on boxed sets of back issues; the whole works, #1 thru #96 for $195 delivered, the same price as we've been selling the first 7 years (#1 thru #84). The deal gives you a free years' worth. This offer will be in effect for a couple of months.

Speaking of Dayton: Congratulations to Leo Meyerson, WØGFQ, for being selected as Ham of the Year. They couldn't have picked a better person. N6CSW

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Cover: David Thompson, K4JRB (then K5MDX) in his hamshack back in 1960. Some of the gear in the photo includes, from left to right: a Hammarlund HC-10, Hammarlund HQ-110, Heathkit SB-10, homebrew exciter and a homebrew transmitter.

Looking Back

by Lew McCoy, W1ICP
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I am sure that many of our readers will recall the name Don Mix, W1TS, who worked for many, many years at ARRL HQ. Don was what we called a "transmitter" man. If you go back and look through those old issues of QST you'll see that Don designed many transmitters. In fact, one of the very popular rigs that literally thousands of hams built was the beginner rig that used two pieces of wood for a chassis. The rig was a one-tube job and was featured in our book "How To Become A Radio Amateur" and also in the 1949 Handbook. [ed. See ER #90, "Nostalgia - A Simple Single Tube Transmitter".]

Don came to work at ARRL in the thirties and he was technical editor of QST during the WW2 years. Don was rather famous as he was the radio operator on board the Bowdin sailing ship that went to the Arctic on the McMillan Expedition.

Let me break down the technical department of ARRL and describe who did what to whom and with what. This was in 1949 when I came to ARRL. The boss of the department was George Grammer, W1DF and he held the title of technical director and technical editor. We had two assistant technical editors, Byron Goodman, W1DX (formerly W6CAL) and Don Mix, W1TS. Vernon Chambers, W1JEQ and Dick Smith, W1FTX were what was known as technical assistants. Also in the department was Walt Bradley, whose job was to answer all technical questions from members (a job I later inherited along with many other duties.) Byron was also the ARRL Handbook editor and one of the Antenna Handbook editors. Both he and George were electronic engineers. I don't recall that Don held an engineering degree but that didn't matter-he knew his transmitters.

Vern and Dick worked mainly in the ARRL Lab but wrote many articles. All this took place in our old location at 225 South Main St. in West Hartford, Conn. The technical department consisted of one large office with several desks in it and a single office for George, and another overflow office that was shared with the communications department. A long hall ran down to the front office which housed the secretarial and management department - remember this because it relates to a story about Don Mix I will relate.

Down in the basement of the building was where the technical department lab was housed - everyone from the department had a work bench there. We had a long row of work benches and against one wall was another long bench with power supplies housed below it as I recall. The large tooling equipment consisted of a shear, for slicing metal, a press, for making up chassis and there were also drill presses. Readers will have to remember that those were the golden days of ham radio, most of us built our own gear and that included both receivers and transmitters. Our job at ARRL was to look over new innovations and also to come up with our own devices that would help the members.

I started out in the communications department where I stayed for about a year. Then it so happened that Dick Smith got another job leaving a vacancy in the technical department. I was lucky and got hired by George Grammer. (That is a whole other story which I will relate in another column.)

There are loads of funny tales about Don Mix and this column is really about Don. Don was a CW DX hound-and I

Don Mix in the radio room of the sailing ship Bowdin. This photograph was taken during the McMillan expedition to the Arctic in 1923.

mean hound! He ran about 250 watts and at one point he wanted to see how many Russians he could work - he worked at least 1500. And that brings up one very funny incident. I was approached by a government agency and they asked me if I would do monitoring for them of Russian activity - I agreed and did so for several years. It was strictly a voluntary thing. Years later, when Don had retired he would come back to visit HQ and nearly always to visit me. One day I asked him if he had been asked by the XXX to monitor the Russians. He looked at me for a minute and said, "I was doing the same thing you were! " It is no real secret now but we were collecting information for the SPUTNIK shot.

Another thing that happened with Don (I hope that Barry runs this because it really was funny) was he had bad power line noise. He complained to the power line company about the noisy transformer directly in front of his house. They more or less refused to do anything about the problem. Some of us told Don that we knew how to cure the noise, but he would have to leave DX alone for a couple of days. One of the gang took a four foot length of chain whirled it around and around and let it go. It hit the top of the transformer, shorting it out. That was the end of that noisy transformer. When it was replaced Don's noise problem was gone!

Don had one very bad habit, he would consume 3 to 4 packs of cigarettes each day. In fact, there was a huge brown spot directly over his desk on the ceiling from his smoking. Yes, he died of lung cancer but he did live into his 70s.

He was also a very good antenna man but in one case--he really broke up the department. His shack was in his basement and he had a random length wire that ran out the window and then up into some trees. Suddenly he wasn't getting out as well as he had been. It turned out that the wire had broken off just where it came out the basement window and he continued making contacts for a long time with just that short piece of wire until he decided to check his antenna!

Don didn't talk much to anyone-he was what we called in those days a

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THE AN/SRT-14 TRANSMITTER

by Dennis L. DuVall, WA3YXN
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What weighs 400 pounds, has almost 100 tubes and puts out about the same power as your Viking II? Read on.....

Overview

The AN/SRT-14 is one member of a family of Navy radio transmitting sets designed to transmit CW, (AM) voice, facsimile or FSK with a nominal 100 watt output over a 0.3 to 26 mc range.

The other members of this family, the ARN/SRT-15 and 16, could also be operated at a nominal 500 watt output over a 2 to 26 mc range. (To be consistent with SRT panel markings and labels I have used the classical mc, kc, cps, etc. frequency designations throughout this article.) There were also non-magnetic "A" models of these units which varied from the standard types only in the material used for cabinet panels (see Note 2.).

The AN/SRT-14 configuration consists of a radio frequency oscillator (O-275/SRT), two power supply drawers (PP-1094/SRT and PP-1095/SRT), a modulator drawer (MD-229/SRT) and an RF amplifier deck (AM-1008/SRT) all housed in Transmitter Group Cabinet CY-1571/SRT. An SRT-14 thus assembled (see Fig. 1) stands 55 in. high, 16 in. wide, 24 in deep, weighs approximately 400 lbs., and contains 94 tubes. Power output is a nominal 100 watts over a 0.3 to 26 mc range. Primary power input is 110 vac single phase at 14 amps.

Radio set AN/SRT-15 was made up of an SRT-14 as described above plus a high voltage power supply (PP-1096/SRT) and a high-power modulator (MD-230/SRT) mounted in stacked cabinets CY-1573/SRT and CY-1572/SRT (see Fig. 2.). This allowed for 500 watt operation over a 2 to 26 mc range as noted above. The SRT-15 could also be operated at the 100 watt level.

The SRT-16 was an SRT-15 with an additional SRT-14 transmitter also included. This allowed for operation on two frequencies simultaneously, either with both signals at the 100 watt level, or with a 500 watt output from the "SRT-15 half" of the configuration (see above) and 100 watt output from the other transmitter.

The components that make up these systems are described in more detail below:

(1) RADIO FREQUENCY OSCILLATOR (RFO) O-275/SRT. - This unit generates a nominal 2 vrms RF signal variable in 10 cps steps from 0.3 to 26 mc. A modulated frequency shift is provided for FSK and facsimile modes. Control-Indicator C-1352 is also mounted on the RFO front panel and contains the switches and indicating meters required to manually control the remote antenna tuning equipment originally used with the transmitter (see below and Fig. 2).

(2) LOW VOLTAGE POWER SUPPLY (LVPS) PP-1094/SRT. - This chassis provides B+ outputs of +300 and +250 volts, -250 volts bias, and -24 volts for control circuits. Primary power input is 110 vac single phase.

(3) MEDIUM VOLTAGE POWER SUPPLY (MVPS) PP-1095/SRT. - This provides +500 and +1300/1050 volts to the LLRM and RFA (see below). Primary power input is 110 vac single phase.

(4) LOW LEVEL RADIO MODULATOR (LLRM) MD 229/SRT. - This unit accepts audio input from carbon and

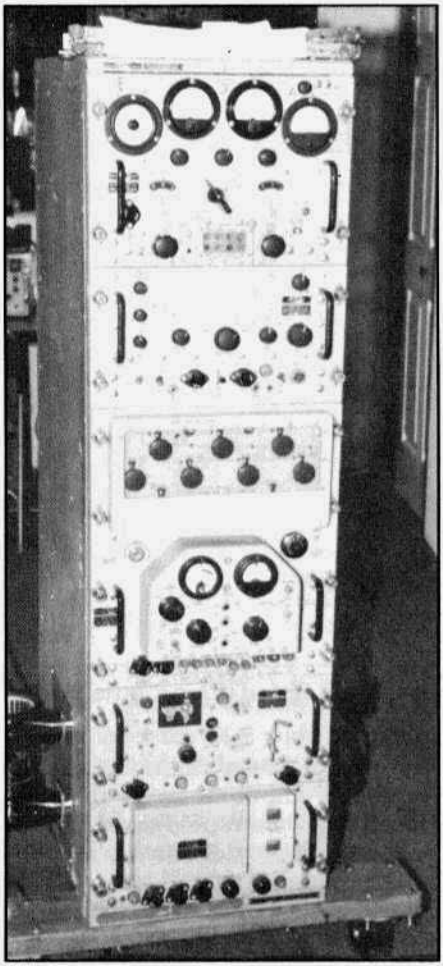

Fig. 1. Author's SRT-14. Drawers from the top down as discussed in the text are: RFA (RF Amplifier); LLRM (Low Level Radio Modulator); RFO (Radio Frequency Oscillator); LVPS (Low Voltage Power Supply); and MVPS (Medium Voltage Power Supply) Note Antenna Control-Indicator C-1352 mounted on the front of the RFO below the frequency setting switches.

dynamic microphones or from external equipment (600 ohm line), and keying signals for CW and FSK. A 50 watt AM modulator (pair of 807s) is included on this chassis along with CW keying and FSK shaping circuits. The speech amplifier includes an audio clipper and associated high/low pass filters. A regulated +250 volt power supply for critical keying circuits and a -12 volt supply for carbon microphones are also included. Primary power input is 110 vac single phase.

(5) RADIO FREQUENCY AMPLIFIER (RFA) AM-1008/SRT. - The radio frequency amplifier receives an RF signal from the RFO (see above) at any frequency from 0.3 to 26 mc. The RFA provides output at the 100 watt level over this entire range and at the 500 watt level from 2 to 26 mc in the SRT-15 configuration (see above). The RFA includes a gang-tuned 6AG7 buffer amplifier and 807W driver (IPA), and a separately tuned 4-400 PA. IPA and PA tuning are done manually. In the SRT-15 configuration, tuning is done at the 100 watt level and then switched to high power (500 W.). Primary power requirements are 110 vac single phase for the filament transformers and 4-400 blower.

(6) TRANSMITTER GROUP CABINET CY-1571/SRT.-This houses the five units described above. The cabinet is provided with retractable intercabling, mating connectors for each chassis, and terminal boards for inputs and outputs to other assemblies of the SRT 14, 15 and 16. This cabinet may rest on blower mounting MT-1423/SRT or on one of the "booster" cabinets, see below.

(7) HIGH VOLTAGE POWER SUPPLY (HVPS) PP-1096/SRT. - This unit was used only in the SRT-15 and 16 during high power (500 W.) operation. The HVPS provides +3000 volts (CW and FSK modes) or 2400 volts (AM phone). Primary power requirements are 220/440 vac, 3-phase. This supply is housed in HVPS CABINET CV-1573/SRT which includes terminal boards for the 3-phase primary power.

(8) HIGH LEVEL RADIO MODULATOR (HLRM) MD-230/SRT. - This unit

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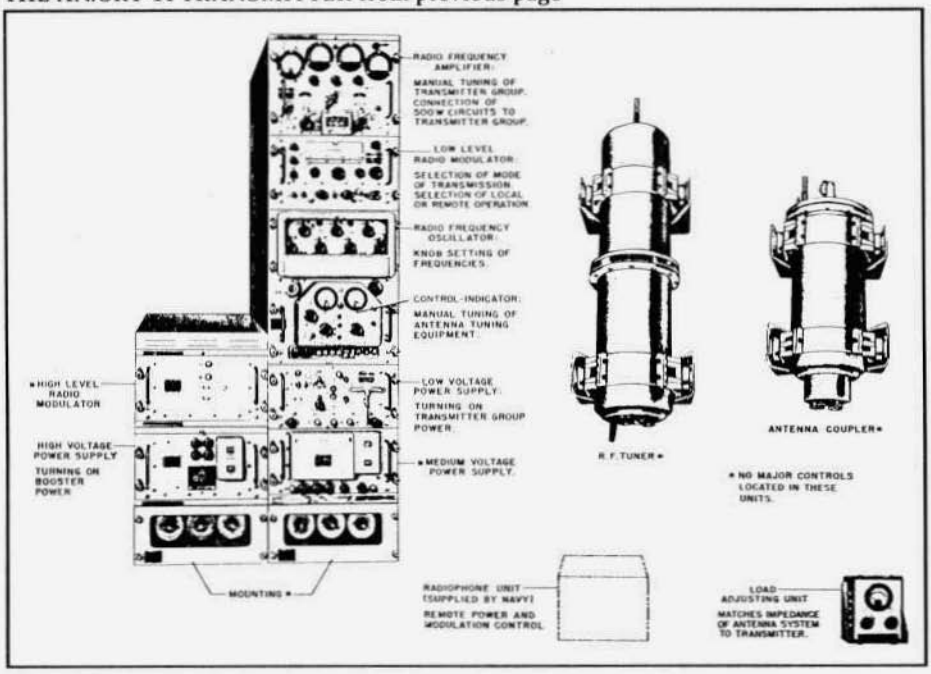

Fig. 2. SRT-15 configuration including antenna loading and tuning units, mounting base and "booster" (see text).

was also used only in the SRT-15 and 16 during high power (500 W.) operation. The HLRM contains a pair of 4-125 tubes and a 250 watt modulation transformer. The 807s in the LLRM (see above) serve as audio drivers for the 4-125s when the SRT-15 is operated in the high power mode. The HLRM is housed in HLRM CABINET CY-1572/SRT which provides retractable cabling and mating connectors for the HLRM chassis, and terminal boards for inputs and outputs to other assemblies of the SRT-15 and 16.

NOTE: The HVPS and HLRM cabinets together with the units they house formed the RADIO MODULATOR-POWER SUPPLY OA-685/SRT, also called the "Booster" (see Fig. 2).

(9) MOUNTING MT-1423/SRT. - This provided mechanical support for units of the transmitter group and booster unit, and housed the blowers and heaters that were used to provide temperature control for the transmitter bay. All input and output cables for the transmitter bay were routed through cable access areas provided in the rear and bottom of these units.

(10) LOAD ADJUSTING UNIT (LAU) CU-402/SRT, R-F TUNER TN-229/SRT, and ANTENNA COUPLER CU-372/SRT. - These units were used to couple the RFU to a 35 ft. whip antenna. The LAU box was mounted near the transmitter and contained a tapped, low-Z toroidal inductor with a pair of multi-position switches to provide impedance matching at the output of the RFU (50 ohms).

This box also included an SWR bridge circuit which fed back to indicating meters on Control-Indicator C-1352 mounted the on the front of the RFO (see above). The other two sealed units were mounted adjacent to the base of the antenna and were remotely tuned from the Control-Indicator panel. These

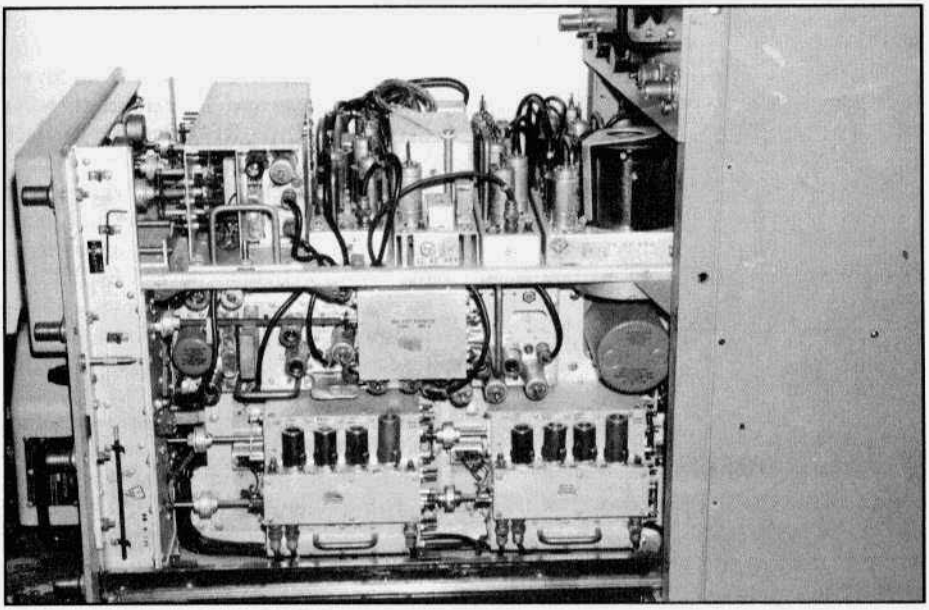

Fig. 3. Interior of the RFO drawer.

contained the necessary loading coils and L-C networks to match the whip antenna over the very wide frequency range covered and were pressurized with dry nitrogen.

The information presented above was gleaned primarily from NAVSHIPS 92121(A), see Note 1.

History

Unfortunately, I know very little. I had never heard of this equipment before I acquired my unit two years ago. The manual I have been using is dated 1955 (see Note 1) and identifies two production contracts, NObsr-52021 and 52622, dated 1 September 1951 and 14 May 1952 respectively. No quantities are listed (my SRT-14 is serial no. 116 from the first contract).

The Federal Telephone and Radio Company was the contractor and the LLRM and LVPS drawers in my unit were subcontracted to Westinghouse. These transmitters would seem to have been intended primarily for shipboard use. A few of my ex-Navy acquaintances have recalled seeing and/or hearing about these equipments during their military careers but I have come across no one with direct operational experience. I would be very interested in hearing from anyone who knows more.

Check-Out and Trouble Shooting

My SRT-14 was missing the mounting base (MT-1423, see above), the 4-400 PA tube, a couple of 5R4 rectifiers, and some front panel mounting hardware but was otherwise complete. The overall condition was very good. No documentation came with the set and it was immediately obvious that nothing much beyond a general cleanup would be possible without a manual (see Note 1).

Fortunately, my friend Steve Finelli, N3NNG, agreed to lend me a copy from his library. Reflecting the complexity of the equipment, this book is three inches thick and weighs almost five lbs. It is also very comprehensive and complete.

I began with a careful checkout of the cabinet wiring. A lot of wire and terminal boards are involved here to accommodate the different possible system

continued next page

Fig. 4. RFO 100 kc master oscillator. It all starts here.

configurations (see above) and also to interface with the antenna tuning/coupling units and other peripheral equipment. I found the cabinet wiring to be in good condition and virtually undisturbed, and it appeared that my unit had been originally configured as a "stand alone" SRT-14.

Next, I checked out all the power supplies one at a time on the bench. The low and medium voltage power supplies (LVPS and MVPS, see above) were OK, but I wasn't so lucky in the modulator drawer (LLRM). The power transformer in the +250 regulated supply on this chassis came up with a shorted secondary.

Fortunately, I was able to dig a substitute out of the junk box.

I also found a bundle of scorched wiring under this chassis apparently caused by a short in a high current 6.3 vac circuit (not related to the power transformer problem). Clearing the short and replacing a number of scorched wires took some time, and I also had to replace an open 25 watt power resistor.

The next step was to bring power in to the appropriate terminal strip in the bottom of the cabinet and reinstall the power supply (2), modulator and RF amplifier drawers. The RF amplifier includes provision for input from an external source and I decided to leave checkout of the RFO drawer for last. (The transmitter has a system of internal interlock circuits to prevent operation if any of the drawers are pulled out or, of course, missing, but an overriding "INTERLOCK BATTLE SHORT" switch is conveniently provided.) No problems surfaced in the initial "smoke test". The RF amplifier (driven by my Cubic Astro 103) checked out perfectly, and the modulator only required minor gain and clipping level adjustments. Even all the original tubes worked.

Things went OK for the first few hours of power-on but then fuses in the +1300 volt supply began to blow frequently (but not always) when the transmitter was keyed. By a process of elimination, it was finally determined that this had to be an intermittent short/arc-over in the shielded high voltage cable somewhere in the cabinet wiring harness. This never showed up on the ohmmeter but new high voltage wiring bypassing the original cable cured the problem.

This only left the RFO chassis which we approached with more than a little trepidation. This monster includes 60 tubes on 13 sub-chassis, three thermostatically controlled ovens and a complex system of shafts, couplings and miniature bicycle chains to run the myriad of switches required (see Fig. 3). Describing just how this drawer works is beyond the scope of this article.

It all begins with a 100-kc GT cut crystal in a Bliley TC922 oven (Fig. 4) but what happens after that covers 40 pages of theory and description in the manual and 44 more pages of schematics and wiring diagrams!

Despite all the above, the RFO turned out to be much easier to bring on-line than expected. The manual describes the internal workings of this unit thoroughly and completely. The function,

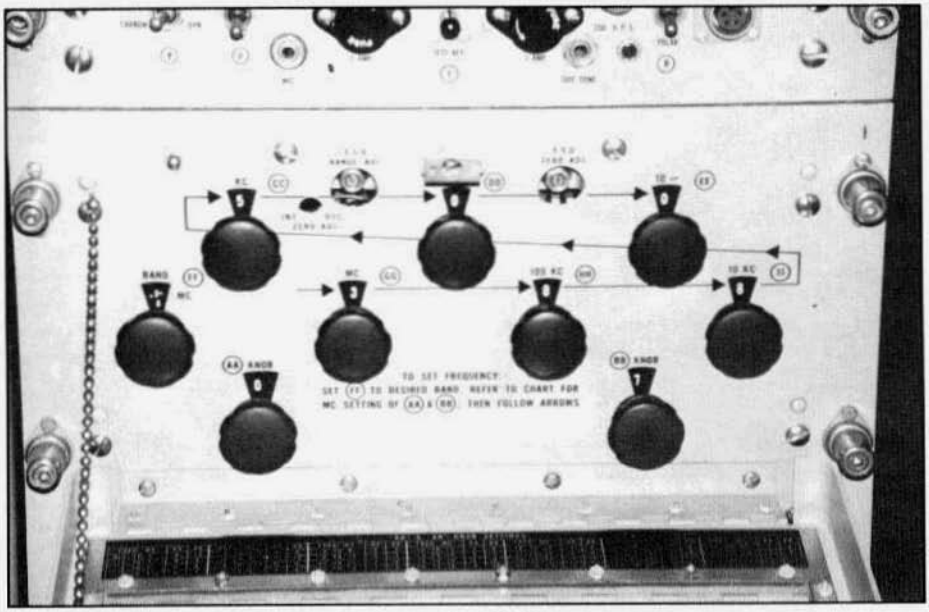

Fig. 5. Frequency setting controls on the RFO.

input and output of each subassembly is clearly described along with instructions on adjustments to be made at each step to get the required circuit response. Basically, each module performs some frequency generation, multiplication, sub-division or mixing function. The manual includes detailed descriptions on how to make the necessary frequency checks using complex lissajous patterns, probably the only way to do this with 50s instrumentation. This is a much easier job, however, with a modern frequency counter and high frequency scope, and checking out each stage and adjusting for correct operation where required turned out to be relatively easy.

I checked all the tubes in this unit first and replaced about a dozen weak ones. Power-up produced no smoke but no output either. Initial checks revealed a dead 100 kc master oscillator. This was replaced by a spare acquired at the Dayton Hamvention just a week before which worked fine but there was still no output. I then worked my way systematically through the chassis module-by-module making adjustments as required. Many modules required no adjustment at all and the only critical circuits were a pair of phase-locked oscillators that worked better with some tubes than with others even though all checked out as "good" on my TV-2. The major reason for no output (besides the dead master osc.) finally turned out to be a broken lead on a band switch feeding the last module in the circuit chain. The broken wire (the stiff and hard to handle center conductor of a piece of RG-59) was in an almost inaccessible spot but was finally spliced with the help of a couple of hemostats and a soldering gun tip bent into the shape of a hook. More than a bit of muttering was also involved. (Murphy lives!)

Cooling for the SRT-14 is normally provided by a pair of blowers in the MT-1423/SRT mounting base (see above). Air from the blowers is distributed throughout the transmitter cabinet by ducts in the side panels. I do not have the MT-1423 base unit as mentioned before, and so a pair of blowers

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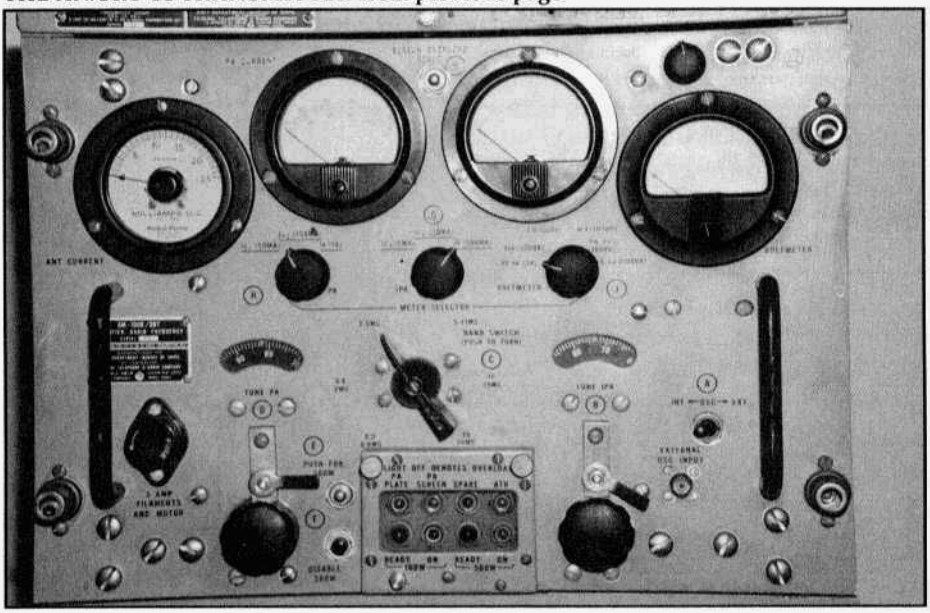

Fig. 6. RFA front panel.

were installed directly on the side panels as can be seen in Fig. 1. I also bolted wooden 2 X 6 "outriggers"with 4 inch casters to the bottom of the cabinet. Connectors for RF output (50 ohm), receiver antenna (50 ohm), audio input (600 ohm) and transmitter keying are mounted on a bracket screwed to one of these outriggers.

On The Air With The SRT-14

Tuning and operation of this transmitter is relatively straightforward. Frequency selection involves nine knobs on the front of the RFO as shown in Fig. 5. The sequence is as follows:

(1) Select the frequency band from three choices - 0.3-6, 6-16 and 16-26 mc.

(2) Select the sub-band. There are 27 choices (.3-1, 1-2, 2-3, etc., through 25-26 mc) selected by two knobs according to a code from a chart mounted on the fold-down cover. (Note that the choice here is more precisely 0.3-0.99999, 1.00000-1.99999, 2.00000-2.99999, etc.)

(3) Set the MC, 100KC, 10KC, 1KC, 100 Cycle and 10 Cycle decade switches to the desired frequency.

The band choices on the RFA are 0.3-0.8, 0.8-2, 2-5, 5-11, 11-19 and 19-26 mc and are selected by a switch in the middle of the front panel (Fig. 6). There are only two tuning controls here, "Tune PA" and "Tune IPA". There is no PA "loading" control; the output circuits are designed to provide rated power into a 50 ohm load over the design frequency range. Full metering of antenna current, PA and IPA cathode, screen and control grid currents is provided along with RF In, Bias, LV, MV, PA EC2 (screen) and PA EB (plate) voltages by the four meters across the top of the panel and the switches located adjacent to these.

Tune-up is basically a matter of setting the "IPA Tune" control for maximum PA grid current, adjusting "PA Tune" for maximum output (max. antenna current), and finally adjusting the "Excitation" control (upper RH corner of the RFA front panel) just to the point where additional drive produces no additional output. PA cathode current is approximately 200 ma and grid cur-

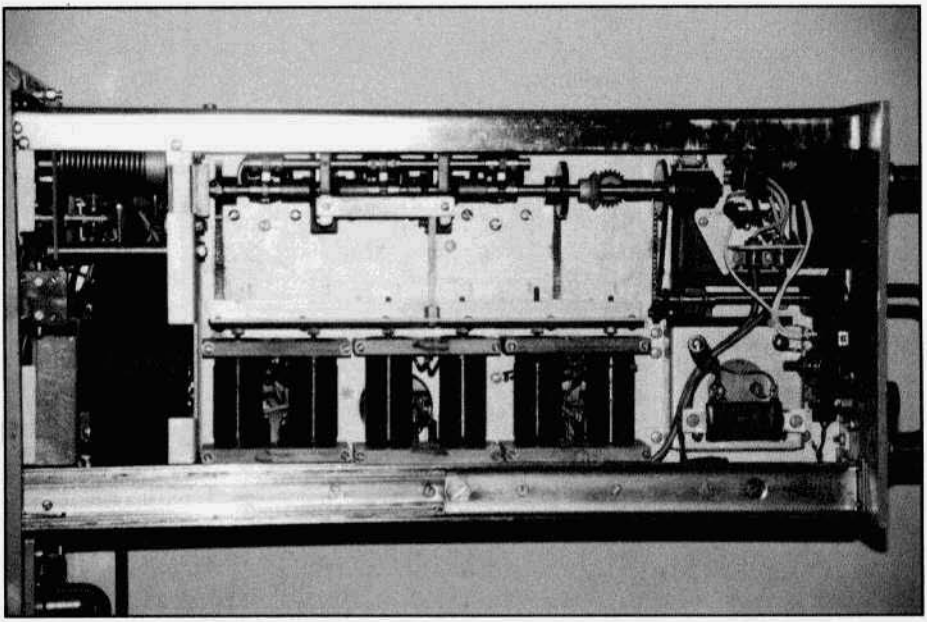

Fig. 7. Low frequency slug-tuned coils in the RFA. The vacuum variable tuning and loading caps. and air wound coils for 2-26 mc are mounted on the other side of the bulkhead seen here.

rent runs 15-18 ma. Off-resonance PA cathode current peaks at only 220 ma so there is no need to rush the tune-up - with only 1300 volts on the plate the 4-400 is under no strain. The 4-400 screen is fed from a fixed 300 volt source (500 volts when operating in the 500 watt mode). Screen over-current and PA dissipation protective circuits are also provided. A 10H series choke allows the screen to self-modulate when operating in the AM mode. The PA output circuit is a Pi-L variation with the "tuning" and "loading" capacitors ganged together. On the lower two PA bands large slug tuned coils are involved as well, see Fig. 7.

The manual specifies a maximum SWR of 4:1 on the RFA output coax (50 ohm). I have found the military ME-165 Standing Wave Ratio Power Meter to be an ideal tuning accessory for this transmitter. I also found the response of the original Antenna Current RF ammeter to be quite sluggish and I replaced it with an RF voltmeter circuit to measure RFA output. Readers will notice the unusual face configuration of the meter on the far LH side of the front panel (Fig. 5).

The modulator (LLRM) has a microphone jack (JK-68) and a connector for a telephone handset mounted on the front panel. Either carbon or dynamic microphones can be accommodated. Provision is also included for a 600 ohm line input from a remote audio source and I feed my SRT-14 (and several other WA3YXN rigs) from a compression amplifier at my operating position across the room. The only change I have made in the modulator is disabling the clipper. This is a shunt circuit and only required pulling the 6AL5 clipper tube. This chassis also includes FSK keying and processing circuitry which I have not used (or even checked out). The 807 modulators operate AB2. The manual specifies 807W tubes but standard 807s will fit in the space provided.

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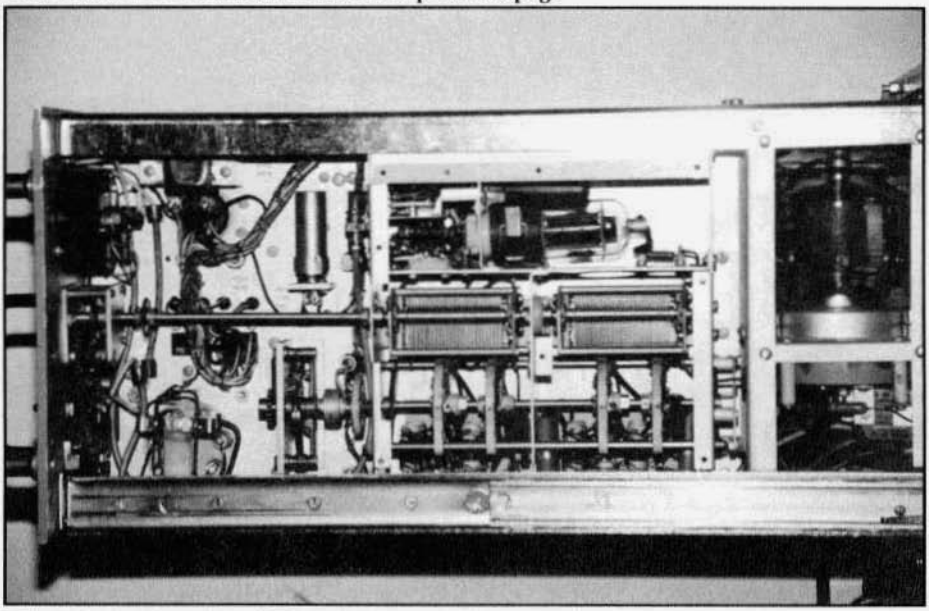

Fig. 8. IPA side of the RFA with cover plate removed. The 6AG7 buffer amp. is hidden behind the 807W.

As designed, the SRT-14 delivers 100 watts out on CW with 1300 volts on the plate of the 4-400. On AM phone the plate voltage is decreased to 1050 and the carrier output is reduced to 68 watts. I modified my unit to run with 1300 volts on the 4-400 in all modes and found that the modulator had enough "head room" to handle this.

I use my SRT-14 regularly on 160 through 20 meters. The rig modulates fully on AM phone and I get excellent audio reports. I experienced some instability in the RFO during the first few weeks of operation and in one case the frequency jumped 50 kc downward in the middle of a transmission. The chassis settled down completely, however, following a couple of tube replacements, some careful adjustments and additional "burn in" time. (But, I keep a careful eye on the frequency counter just in case!) All tubes are common, readily available types. I had to replace a soft 6AG7 in the IPA a couple of months ago (see Fig. 8), but no other problems have surfaced in a year of regular use.

I have found the RFO to be useful as a precision RF source for receiver calibrations, bandwidth and drift measurements, and other tests. The ovens run continuously in this unit and there is no drift that I can measure at any frequency setting. Future plans include using the RFO to drive other transmitters here at Radio WA3YXN. This is also one of the few military HF sets that provides coverage above 20 mc. I have tested mine on 15 and 12 meters and am looking forward to operating these bands during the next sunspot cycle.

Mechanical construction is very rugged. The cabinet alone weighs well over 100 lbs. and is configured around a heavy welded steel frame and back panel. The removable side panels are aluminum and include ducts to direct the flow of cooling air.

Front panels are quarter-inch aluminum. The equipment drawers are each secured in place by two 3/8 in. steel

continued on page 39

The $2 Oscilloscope

by Bob Dennison, W2HBE
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In the March issue of ER, Kurt Miska, N8WGW referred to the low-cost scope that Allied Radio sold for $2. Was it a scam? No, it really did work. When I was in high school, I saw one in operation at W9SRS in Salina, KS. Fig. 1 shows a typical arrangement of parts. The rotating mirror and the neon bulb are housed in a box to shield them from extraneous ambient light. Here a rheostat controls motor speed or horizontal scanning rate. The neon bulb was a glass cylinder about 5" long and about 3/8" in diameter. The RF tuned circuit is link coupled to the output tank of the transmitter and adjusted until the luminous column near the center of the neon bulb is about 1-1/2" long. Now, when the transmitter is modulated by a single audio tone, the waveform of the modulated carrier will be seen. By varying the motor speed (horizontal scan rate), the pattern can be synchronized or made to stand still. Percentage modulation is readily estimated by simple inspection of the display.

An advertisement by Sundt Eng. Co. of Chicago appeared in the June 1936 issue of Short Wave Craft Magazine. They employed a constant speed motor and controlled the mirror speed by means of two discs mounted at right angles. One disc is driven by the motor. Mirror speed is varied by moving the second disc so that it engages the drive disc at varying distances from its center of rotation.

This scope kit may not be a real bargain when you consider that in 1936-37 we were still in the grip of the Big Depression. On the same page in Short Wave Craft is an advertisement showing that one could stay at the Atlantic City Breakers Hotel on the boardwalk for $5 a day with meals and private bath. So you see, the $2 scope foundation kit was not all that cheap! ER

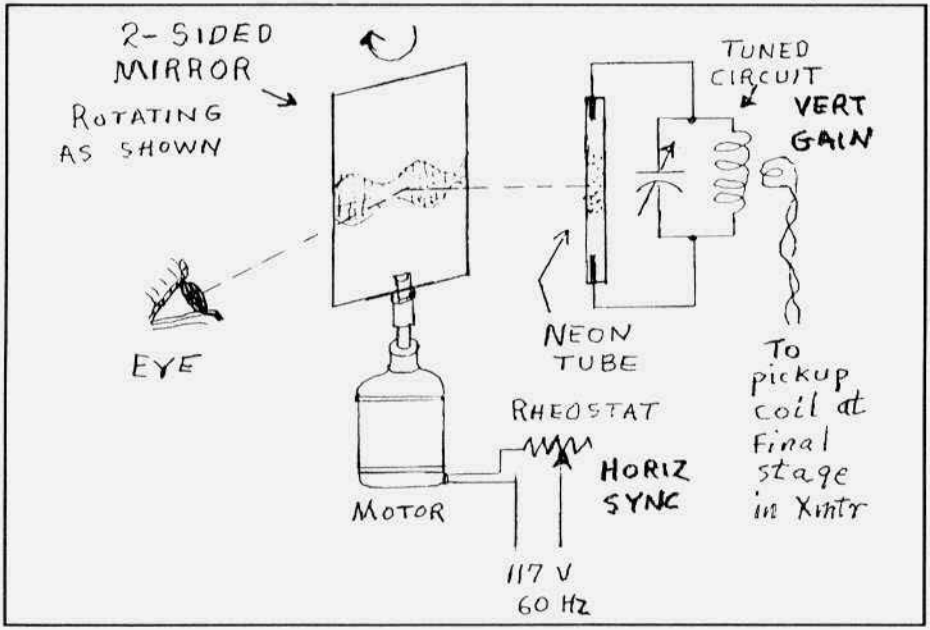


Fig. 1. Construction of the neon bulb scope.

Modification Notes on the Hallicrafters SX-130 Receiver

by Chase P. Hearn, K4AFW
104 Glenwood Dr.
Williamsburg, VA 23185

The Hallicrafters SX-130 is a mid-level, single-conversion, general-coverage receiver manufactured from 1965-1968. In the course of resurrecting one, I found the sensitivity on the two lowest frequency bands to be marginal due to an apparent design flaw. The simple modification described here can add about 10 dB of RF gain.

Examination of the SX-130 schematic reveals a lack of coupling between the 6CD6 RF amplifier 6.8K plate load resistor and the 6EA8 mixer grid tuned circuit on bands 1 and 2. This receiver would not function on these bands except for parasitic coupling not indicated on the schematic - probably between the front and rear sections of bandswitch wafer S1B. The two highest ranges use conventional inductive interstage coupling and have adequate sensitivity.

After a full alignment, the unmodified (baseline) AM sensitivity was determined by measuring the carrier level of a 30% amplitude modulated signal required to produce a (S+N)/N ratio of 20 dB. Interestingly, Hallicrafters literature did not specify the sensitivity of this receiver, but 10 microvolts at the bottom of band 1 is clearly not good. Sensitivity on bands 3 and 4, 5-30 MHz, was between 0.4 and 0.7 microvolts in the "Broad Crystal" bandwidth position.

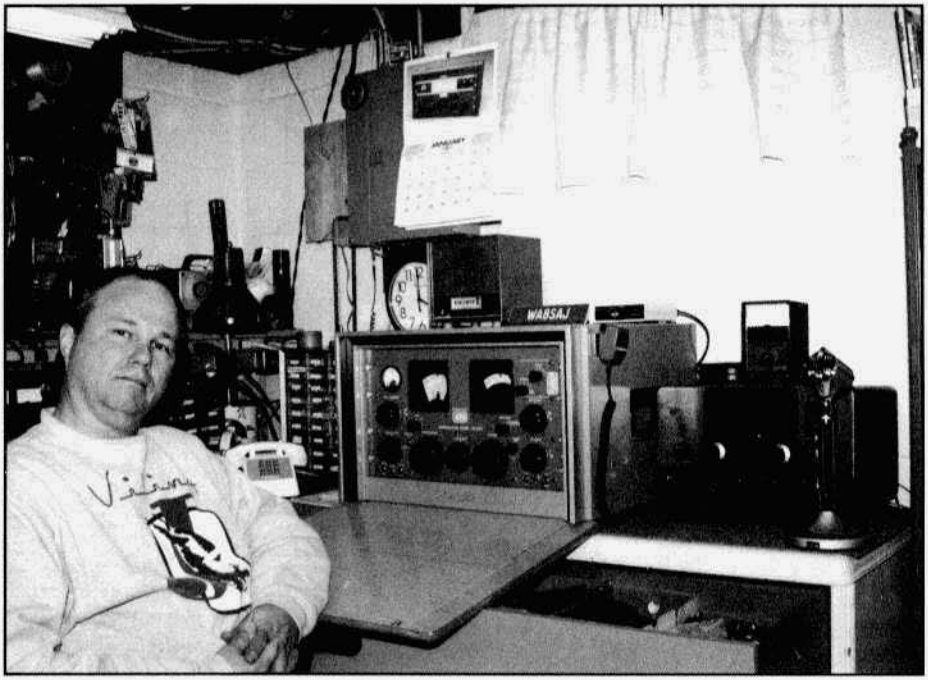
An easy way to increase sensitivity on bands 1 and 2 is to augment the parasitic capacitive coupling between the amplifier plate and mixer grid circuits. Values between 2.2 and 10 pF were tried and 6.8 pF selected for both bands. These capacitors were wired between corresponding front and rear switch positions of wafer S1B, the front-end peaked up and the sensitivity re-measured. The input coils on this receiver are not adjustable and tracking with the local oscillator is not optimum. The antenna trimmer must be re-adjusted as the receiver is re-tuned.

A few other observations and hints. An out-of-case alignment degrades significantly when the receiver is re-cased. This problem was largely solved by using a 6x6 inch piece of aluminum (with a few small holes for tuning tool access) as a temporary bottom plate during alignment. However, in-case performance never quite equaled that obtained out-of-case. I use a homemade Zener-diode broadband noise generator to peak the RF/mixer tuned circuits on the highest bands to counteract oscillator "pulling" on the high bands.

The onset of AGC was found to be as much as 20 dB above the sensitivity level, indicating insufficient (maximum) RF/IF gain. Another gain-controlled IF stage would have improved the SX-130; but, even in the mid-sixties "bean counters" were making technical decisions based on the "bottom line."

There were serious errors in the SX-130 manual. The junction of R10, C18 and R7 on the schematic diagram should be tied to the (low) B+ line. The purpose of the 220 pF capacitor (C10) in shunt with R10 was to lower the RF amplifier plate load impedance at the high end of band 1 to prevent oscillation (which I confirmed by temporarily removing it). In the Alignment Table, page 10, L13 in step 4 should read C13, and L7 in step 8 should read L9.

Although receivers like the SX-130 are not "high tech" by modern performance standards, I enjoy rehabilitating them. They seem to me to have substance and personality - unlike their modern Japanese manufactured counterparts. Furthermore, these "vintage" receivers can be repaired and serviced by their owners! ER

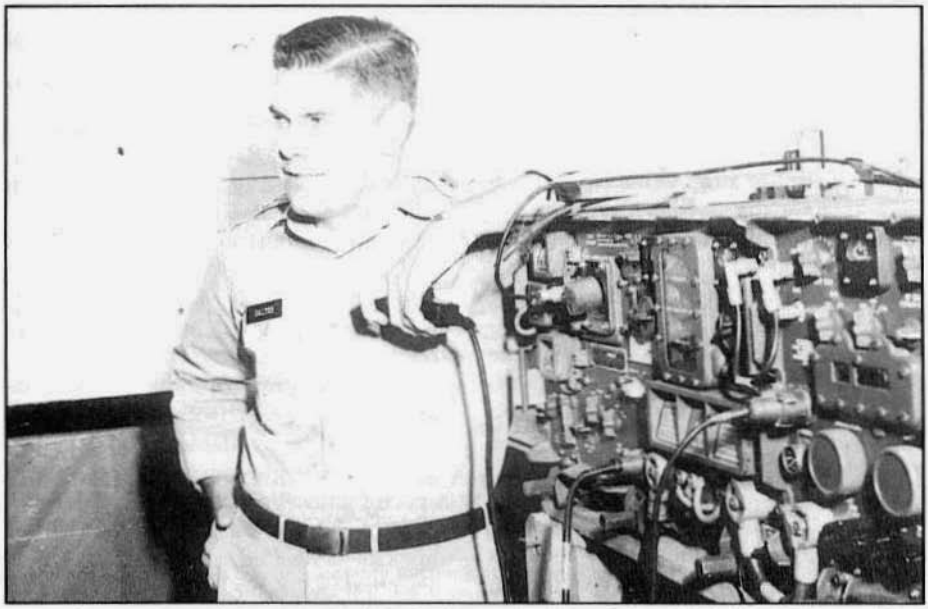


Jeff Covelli, WA8SAJ, at his operating position. The receiver shown is a Hammarlund SP-600. Beside it is a Johnson Viking Ranger.

Edward Guzick, K9QGS, back in 1960. His AM station consisted of a Heath Apache transmitter and Mohawk receiver.

Larry Watson, W5VHP, in his hamshack. Most of the equipment at this operating position is Collins.

Lee Harris, W9VTC on the left with Butch Schartau, KØBS. The transmitter is Butch's 30K-1.



Lea Salter, K4VWD, back in 1961 at Battalion headquarters in Berlin. He used this radio setup on the ham bands. He doesn't recall exactly what it was and would welcome any information from ER readers.

This is Bill Brandenburg, WØQNI, in the fleamarket area at the ARRL Pacificon at Concord, Calif. last October. He says there is 52 pieces of Heath gear in the photo and that prior to the time the photo was taken he had sold 15 pieces! ***Photo by John, KJ6VI.***

AMI Update

by Dale Gagnon, KW1I, President

AM on Collins Collector Association Net - Be sure to tune in on April 17 to 3875 kHz for the Collins Collector Association Net at 2100-2300 EDT (April 18, 0100-0300 UTC). This regular session of the net will be taking AM checkins. WØCXX, Art Collins' old call sign and now the call sign of the Collins Amateur Radio Club in Cedar Rapids, IA will be on frequency with assigned AMI certificate #1000. QSLs will be available to confirm contacts with WØCXX.

AMers are starting to plan their spring hamfest calendar. We will be looking for you at the Dayton Hamvention on May 16-18. Adequate facilities could not be arranged for the AM Forum at the Hara Arena this year so we will be looking forward to meeting everyone Saturday evening at 7:30 pm for our annual get together at Marion's Pizza restaurant, I-75 at Exit 57. We have a room reserved and will have an AM program after dinner. Stop by fleamarket spot #2437 to say hello and to pick up a QSL sized reminder and map to the Saturday evening AM festivities.

Armed Forces Day - For those of you who can't be with us in Dayton there is always the AMI Armed Forces Day Operating Event on May 17,18. Submit logs of your operation listing number of types of military transmitters and receivers used or worked during the Saturday and Sunday operating period. Submitted logs and photos will be evaluated based on number of contacts, number of AMI certificate stations worked, number of transmitters and receivers used/worked, military significance of operating position, etc. Certificates will be liberally awarded for outstanding operations. ER

Military Radio Collectors Meet in San Luis Obispo, May 3

The Military Radio Collectors Group (MRCG) is meeting this year on May 3 in San Luis Obispo Calif. Dave Ragsdale has signed us up at the Camp San Luis Obispo NCO Club which is approximately 5 miles north of town on Highway 1. This year there will be a $2 fee to cover the cost of the meeting place.

There is a campground with RV hookups about 50 feet from the NCO club which will be available to folks associated with the get-together. There are 12 spaces with RV hookups, $10 for full hookup $8 for partial per day. If no hookup is needed there is a large field area that is OK for tents and RVs at $5 a night. Make arrangements through the billeting office, 805-594-6500.

There is a small playground right behind the NCO club with swings, etc. for the kids. Dave Stinson also would like to know how many people would be interested in a BBQ at lunch for approx. $6-$7 each. If enough folks are interested Dave will handle the logistics

A list of the area motels is available. Dave has sent an area map and written directions which I'll pass along with the motel list. Henry Engstom is finishing up a program that will be included.

Last year was fun and interesting with black, green, and a few gray radios available for inspection and operation. If you plan to bring something let me or Henry know about it. Bring along a want or swap list to share with others. There will be demos of and talks about military radio equipment use and restoration. A swap is planned before the meeting, 0700-0900, for participants. Hard copies of the maps etc. will be mailed to folks on the MRCG list and anyone who wishes to show up.

Ed Zeranski, 619-223-3242 or
Henry Engstrom, 707-544-5179

VINTAGE NETS

Westcoast AM Net: Meets informally, nightly on 3870 at 9:30 PT. Wednesday at 9:00 PM PT they have their formal AM net which includes a swap session. Net control rotates.
California Early Bird Net: Saturday mornings at 8 AM PST on 3870.
California Vintage SSB Net: Sunday mornings at 8 AM PST on 3835
Southeast Swap Net: Tuesday nights at 7:30 ET on 3885. Net control is Andy, WA4KCY. This same group also has a Sunday afternoon net on 3885 at 2 PM ET.
Eastern AM Swap Net: Thursday evenings on 3885 at 7:30 ET. This net is for the exchange of AM related equipment only.
Northwest AM Net: AM activity daily 3 PM - 5 PM on 3875. This same group meets on 6 meters (50.4) Sundays and Wednesdays at 8:00 PT and on 2 meters (144.4) Tuesdays and Thursdays at 8:00 PT. The formal AM net and swap session is on 3875, Sundays at 3 PM.
K6HQI Memorial Twenty Meter AM Net: This net on 14.286 has been in continuous operation for at least the last 20 years. It starts at 3:00 PM PT, 7 days a week and usually goes for about 2 hours. Net control varies with propagation.
Arizona AM Net: Meets Sundays at 3 PM MT on 3855. On 6 meters (50.4) this group meets at 8 PM MT Saturdays.
Colorado Morning Net: An informal group of AM'ers get together on 3876 Monday, Wednesday Friday, Saturday and Sunday mornings at 7AM MT.
DX-60 Net: This net meets on 7290 at 2 PM ET, Sundays. Net control is Jim, N8LUV. This net is all about entry-level AM rigs like the Heath DX-60.
Eastcoast Military Net: It isn't necessary to check in with military gear but that is what this net is all about. Net control is Dennis, WA3YXN but sometimes it rotates to other ops. Saturday mornings on 1995 at 0500 ET. Will move to 3885 for summer.
Westcoast Military Radio Collectors Net: Meets Sunday mornings at 0930 local on 3975 + or - QRM, except the 1st Sunday of the month when the net meets at 2130 local. Net control is Tom, WA6OPE.
Grey Hair Net: The oldest (or one of the oldest!- 43+ years) 160-meter AM nets. It meets on Tuesday nights on 1945 at 8:30 PM EST & EDST. Call-up at 8 PM.
Vintage CW Net: For CW ops who enjoy using vintage equipment. This is not a traffic net; speed is not important. The net meets on 14037 Sundays at 7 PM Eastern. Net control is Tracy, WB6TMY.
Vintage SSB Net: Net control is Andy, WB4JSNF. The Net meets on 14.293 at 1900Z Sunday and is followed by the New Heathkit Net at about 2030Z on the same freq. Net control is Don, WB6LRG.
Collins Collectors Association Nets: Technical and swap session each Sunday, 14.263 MHz, 2000Z, is a long-established net run by call areas. Informal ragchew nets meet at 0100Z Tuesday nights on 3805 and on Thursday nights on 3875.
Collins Swap and Shop Net: Meets every Tuesday at 8PM EST on 3955. Net control is Ed, WA3AMJ.
Drake Users Net: Another relatively new net. This group gets together on 3865 Saturday nights at 8 PM ET. Net controls are Criss, KB8IZX; Don, WZ8O; Rob, KE3EE and Huey, KD3UI.
Swan Users Net: This group meets on 14.250 Sunday afternoons at 4 PM CT. The net control is usually Dean, WA9AZK.
Nostalgia/Hi-Fi Net: Meets on Fridays at 7 PM PT on 1930. This net was started in 1978.
K1JCL 6-Meter AM Repeater: Located in Connecticut it operates on 50.4 in and 50.5 out.
JA AM Net: 14.190 at 0100 UTC, Saturdays and Sundays. Stan Tajima, JA1DNQ is net control.
Fort Wayne Area 6-Meter AM Net: Meets nightly at 7 PM ET on 50.58 MHz. This net has been meeting since the late '50's. Most members are using vintage or homebrew gear.
Southern California Sunday Night 6 Meter AM Net: 8 PM Sundays on 50.4. Net controls are Dan, KV6I and Scott, K6PYP. Informal, supports restoring old gear and using it on the air. Loan gear available for those wanting to join in.
Westcoast 40-Meter Sunday Net: Net control varies. The group meets on 7160 starting at 4PM PT.
Old Buzzards Net: Meets daily at 10 AM Local time on 3945. This is an informal net in the New England area. Net hosts are George, W1GAC and Paul, W1ECO.
Canadian Boatanchor Net: Meets Saturday afternoons, 3:00 PM EST on 3745. For hams who enjoy using AM, restoring and operating.
Midwest Classic Radio Net: Saturday mornings on 3885 at 8AM Central time. Only AM checkins allowed. Swap/sale, hamfest info and technical help are frequent topics.
Boatanchors CW Group: Meets nightly at 0200Z on 3579.5 Mhz (7050 alternate). Listen for stations calling "CQ BA" or signing "BA" after their callsigns.

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

Swan of a Different Feather?

Is this a Swan Prototype Rig?

by Eric C. Kutzli, KBØXP
Box 98
Stanton, IA 51573

Through the years I have enjoyed reading articles in Electric Radio about various pieces of vintage gear. I have collected my share of various "boat anchors" along the way and managed to get most of them in decent shape to use on the bands. In fact right now the newest rig I have is a Swan 100MXA that is "old enough to vote". But the most intriguing articles are those about "mystery rigs" radios that are so odd that they seem to have lost their pedigree along the way. It always seems somebody out there knows something about these orphans.

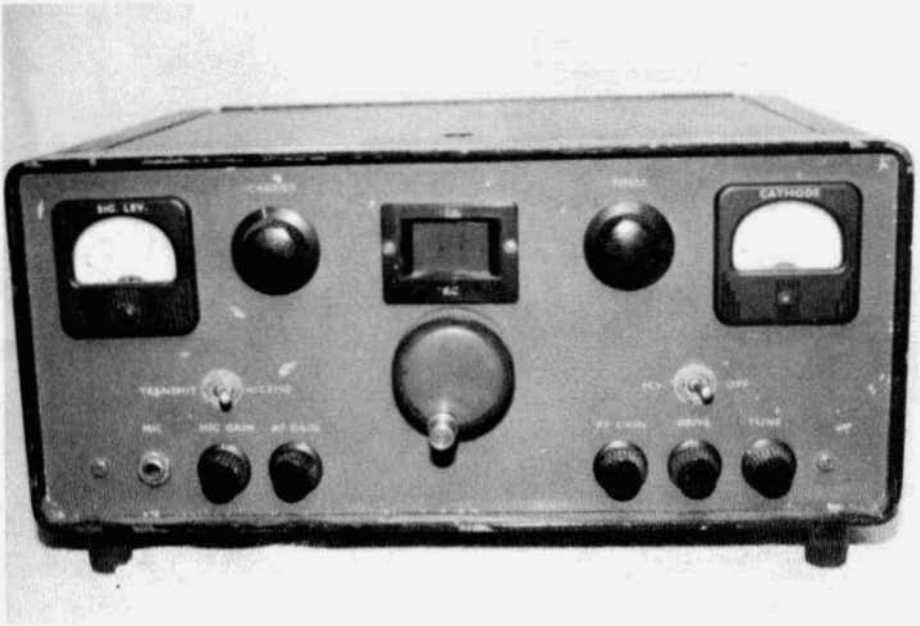
First a little background to get acquainted. My vintage radio weakness has always been Swan rigs. The first ham radio I ever laid eyes upon was a Swan. Back in 1973 I was just a kid of seventeen and started dating a young lady whose father was a ham. One day I asked about all the "duck talk" that was coming from the spare room. Immediately I got a tour of the shack. There on the operating desk sat a nice pair of Swans, a 250 and a 350. What great looking rigs. They were just what communications equipment should look like. Black and charcoal gray with plenty of turned aluminum knob inlays to set it all off. A shiny silver Regency HR2A completed the station.

I kept up with the young lady, and it turned out to be love (or maybe ham radio?). I married the girl in March of 1976. My first anniversary present was a Swan 270. With loving care both the marriage and the Swan have managed to hold up over the years. My father-in-law, Wayne, WØGNJ, did a good job of raising his daughter right. She doesn't complain about weird noises coming from the shack, and knows to yell "RFI!" if herringbones appear on the TV.

Today I still have only one wife, (she tolerates the radios so I'm not pushing my luck), but I have managed to acquire twenty more different Swan rigs. With some research and plenty of hard lessons by trial and error I have come to enjoy troubleshooting the rigs. I can get my thick head around the vacuum tube circuits and there is enough room to get my big thumbs around inside the cabinet. Some have needed just a little cleaning and adjustment, others were in tough shape and were resurrected. It is nice to get a good rig at a decent price, but somehow it is much more noble to take a $10 hamfest basket case and bring it to life. It is almost disappointing to set a rig up and have it work perfectly the first time.

Along the way I have acquired most of the more common Swan rigs, and a few uncommon ones. There is still a little room on the shelves. A very early SW-120 with the gold anodized front panel would look nice next to my gold SW-140. I would like to find a 160 meter rig. I guess they are rare, but I have some friends that want me to get on 160. I just can't bring myself to put a Kenwood or Icom in the shack. I guess I'll just have to wait for a Swan 160. I have a couple of Regency HR2's for 2 meters . . . about the right vintage, but a Swan 2 meter rig would be nice. When the sunspots come back I may add a Mark I linear.

Now just so you old timers don't think that I am an SSB snob, I also have a Viking Ranger, Hallicrafters SX-43 AM



A mystery transceiver. Is it a Swan?

setup which works great and a good old Hallicrafters S-38B and 50 watt Knight CW transmitter. All I can say is that you REALLY had to want to work CW to try to pull a contact out with that combination!

So my shack has become something of a home for wayward Swan rigs. I try to keep them all functioning, they are the only gear I have and I operate every single one. I have worked over 200 DXCC countries with nothing fancier than a 500cx, 508 VFO and a 1200x linear. I even worked through the Russian satellite RS12 with the Swans. I am sure my wife thought I had finally gone totally nuts when I was whirling around the shack using one transceiver to listen to the 10 meter downlink and the another transceiver to transmit on the 15 meter uplink, adjust both VFO's for doppler and try to write down callsigns. I've got QSL's to prove that it works!

Now for the mystery. A few years ago I came across one of those cryptic advertisements that junk collectors... er... vintage radio aficionados can't resist. It was for an "unknown ham transceiver, possibly Swan". I made the call, the price was cheap enough but the description didn't sound like any Swan I had ever heard of. The owner said that the radio had come from a hamfest and was with a bunch of other Swan stuff. The owner said that it had belonged to someone who worked for Swan and that it was a "prototype". I waited impatiently for the UPS deliver to bring the box.

What arrived under the layers of foam peanuts was the strangest rig I have ever seen. The rig covers 20 meters from 14.200 to 14.350 MHz. The cabinet and Simpson panel meters are somewhat Collins looking. The control arrangement is sort of Swan-like but the microphone gain and RF gain have swapped sides. The layout and tube complement are classic Swan. The chassis is gold anodized aluminum, definitely not homebrew, but looks to be from a Swan 120 monobander. From the OD3 regu-

continued next page

The author in his hamshack surrounded by Swan gear.

lator to the 6V6 audio output tube everything is in the same place as in the old monobanders. The crystal lattice filter is an old non-sealed type with an open metal shield. However there is one significant difference from the Swan120. Inside the final enclosure, right where a big old 6DQ5 sweep tube final should be, there is not one but two 6146 transmitting tubes. There are a few extra holes drilled in the chassis up around where the 12BY7 driver resides, but everything is very tidy and all the added wiring is neatly run and laced.

The rig is built to easily slide in and out of the cabinet, the hinged top seems ideal for tinkering. I looked from stem to stem and there is not a mark, not a number, not a clue anywhere as to the manufacturer. But anyone who has ever opened up a Swan rig will say ... "That is a Swan!"

The rig had no power supply but it had the traditional Swan 12 connector Jones plug power connector. I spent a little time tracing out the wiring before risking one of my power supplies, but the connections were exactly the same as the old Swan monobanders right down to the contacts that are used on the monobanders to switch the power supply on and off. I did as much cold testing as I could, cleaned out the dust, checked for shorts, bad caps, I even tested the tubes. All looked well. The power cable went on the back and with a deep breath I tripped the switch and slowly brought up the AC. I looked for smoke, and listened for snaps, crackles or pops. The filaments came on and the dial lamps lit. It seemed OK.

I suddenly had a terrible thought. Shouldn't there be some noise? What about the receiver noise? There was none. I was about to do an emergency shut down when I realized that unlike the usual 117 XC power supplies, my bench is a Swan 117 and has no speaker. In the excitement I had forgotten to hook one up. When the two alligator clips made contact the speaker hissed to life. Whatever it is ... it works!

continued on page 39

Heathkit Errata or "Hey! How Did That Happen?!"

Corrections to the book "Heathkit A Guide to the Amateur Radio Products

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Writing a book is a real learning experience. I guess I thought that if six people read the book and couldn't find anything wrong, there must be nothing wrong.

Surprise! I now know that 60 people could have read the book and not caught all the errors. Part of the problem, of course, is that Heathkit is a "technical" book. Unlike "regular" books that suffer from simple grammatical and spelling problems, technical books offer unlimited potential for a variety of errors--subtle and otherwise--beyond the grasp of the average proof reader. The only foolproof way to find all the errors is to let a couple of thousand people have a look. Now, some 18 months after the book's release, at least a couple of thousand people have read the book, I think most of the bugs have been found.

The list that follows is a comprehensive (so far) list of errors contained in Heathkit.. I have listed only errors of fact, not simple spellings errors or grammatical gaffs. I am happy to report that there are only a couple of serious errors, and only a handful of others. My thanks to all of you who took the time to write and point out these problems.

Heathkit Guide Errata List

AT-1: Years of manufacture should be 51-56.

DX-60: The years of manufacture should be 60-64. Also, the text indicates that "A" and "B" version meters always say "Heathkit." In fact, only "B" version meters have Heath's name on them, although some "A" units have been found with "B" meters installed.

GC-1005: The years of manufacture should be 72-77

GR-54: The text says it uses a single PC board. It actually uses two PC boards.

GW-30: The unit was originally designed for 11 meters, but some may have been tweaked by users to 10 meters. To the best of my knowledge Heath never made them specifically for 10 meters.

HM-11: The text says it has a more modern looking meter than the AM-2. It actually has the same meter.

HW-10: The text indicates the units have no built-in speaker. This is incorrect. They do have speakers built in.

HW-22: Incorrectly identified as a 20 meter rig. It is a 40 meter unit. The body text is correct.

HW-22A: Incorrectly identified as a 20 meter rig. It is a 40 meter unit. The body text is correct.

HW-32: Incorrectly identified as a 40 meter rig. It is a 20 meter unit. The body text is correct.

HW-32A: Incorrectly identified as a 40 meter rig. It is a 20 meter unit. The body text is correct.

HW-2036: The "mode" and "tone" knobs are not originals.

HX-10: It uses 23 tubes, not 21.

SA-2060: The "inductor" knob is not original.

SA-5010: The text indicates the unit has an automatic serial numbering feature. It doesn't. Also the paddles shown are not original, and the external paddle connector has three pins, not four.

SB-100: The main tuning knob is not original.

SB-400: Years of manufacture should be 64 to 66.

continued on page 38

Dynamotor Refurb the Easy Way

Part 1

by Michael Hanz, KC4TOS
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There must be a little bit of jet pilot wanna-be in the military radio folks, because the whine of a dynamotor or inverter spooling up seems to be a cherished thread. Although my main interest is airborne ECM equipment of WWII, somehow I've ended up saddled with everyone's dynamotor problems - probably due to a misspent youth building big block Chevy drag racing engines. (...now, I didn't say I did anything as foolish as driving them....) Fortunately, restoring dynamotors isn't as demanding or complex, but it does take some of the same thought and attention to detail. The techniques also apply to the 14/28 volt motors used for cooling fans, autotune mechanisms, and the like. Due to length, this article is appearing in two parts; teardown and reassembly/ finishing touches.

Caveats: This is not intended to be a step-by-step procedure, nor replace a maintenance manual. There are so many variations, special cases, and measurements needed, a manual for the associated equipment is essential. Get one and use it. Neither is this a tutorial on theory and nomenclature of dynamotor parts. You can get that out of a manual, too. The intent of this article is to fill in some of the unstated procedures, how to avoid "uh-ohs" - things you do because of hard experience, but generally not recorded anywhere. You can use as many or as few of the ideas as you want - there are no absolutes in this business.

The most common question I get is, "Do I need to take a motor apart if it appears to be clean and undamaged?" I'll just say that it's dangerous to run up an old motor, even a "New In the Box" unit, until you've at least checked the brushes, and cleaned and repacked the bearings - it can save a lot of heartache later on. Fifty year old grease loses its ability to "float" the bearing surfaces on a film due to evaporation of the lighter components, and the result is a wiped bearing, sooner than later. Unless it's a basket case, I do try to run the dyno with a couple of drops of Mobil 1 added to each bearing before taking it apart, listening for armature vibration or a bad bearing. Use a piece of 1/2" rubber tubing held to your ear to localize any unusual sound. I know that lots of folks have gotten by for years with a few drops of oil added like this - just remember it's a risk judgement, and every motor is different. If you think you might want to do any more than that, read on.

Disassembly: Figure 1 is a good example of your worst nightmare, at least in terms of dynamotors. It has a case of die casting rot, severe iron oxide disease, and has obviously spent some time underwater in a flooded basement (not mine, thank goodness). The good news is that even this can be brought back to blue collar working order most of the time. The first problem you might encounter will be recalcitrant end bells (the thin sheet metal covers over the dynamotor ends). A metal oil filter strap wrench will generally remove them without collapsing the thin metal - a little shock therapy on the strap wrench handle might be needed in the worst cases where the joint is badly corroded. Avoid the nylon webbing type - it'll

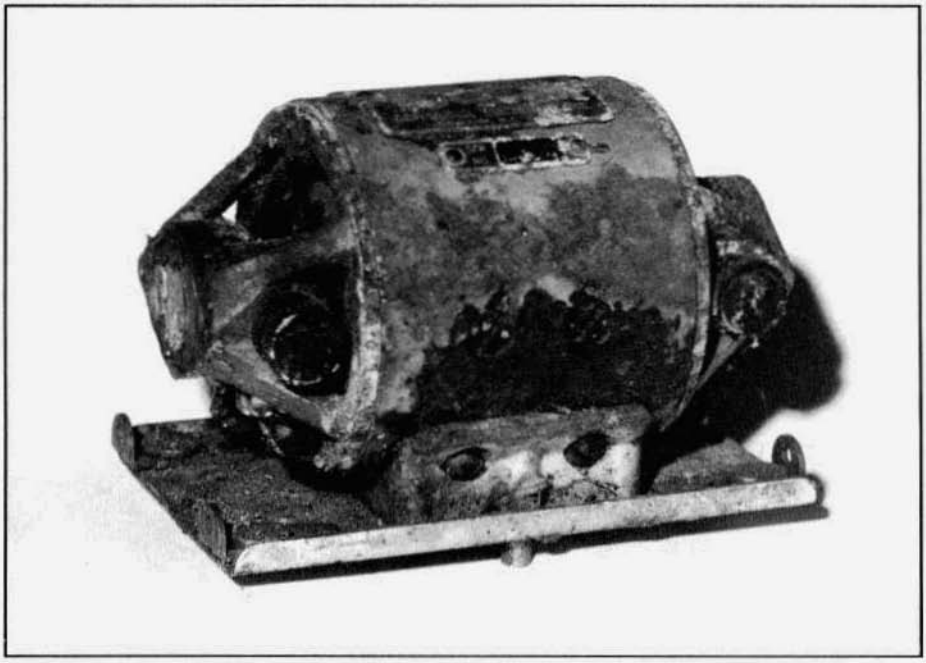


Figure 1. A dynamotor badly in need of restoration.

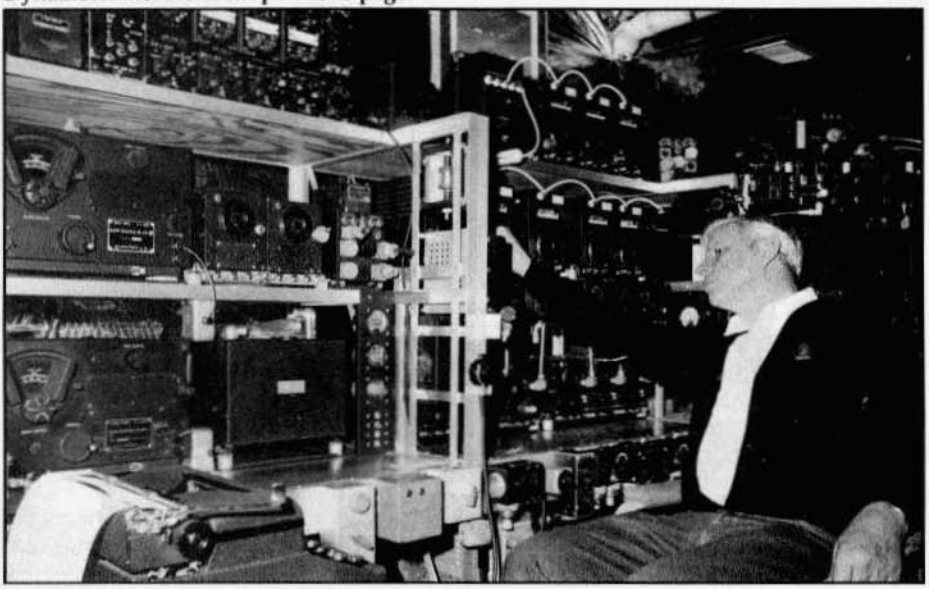
collapse the metal where the strap gets rolled up on the bar.

Make some sketches as you take it apart, if you're not sure you can remember what went where. A copy of the exploded view (if there is one) out of your manual can serve to organize your notes. This is especially important for any clearance adjusting parts, like shims. If you don't need to replace the brushes or turn down the commutators, then tag the location (and orientation) of the brushes so you can eventually get them back into the same holders they came out of, facing the same direction. This is important! Some brushes hit the armature at an angle, and if you get them in backward, there will be one whole lot of wear in a hurry. You'll probably have to de-solder some connecting wires if there's a plug-in base (as on the command set dynamotors,) or a junction box (as on the BC-375). Don't forget the wiring color codes!

I generally strip out everything except the pole pieces and stator coils. They're low voltage, so any small dielectric leakage there isn't a big problem. If the case and pole pieces are badly rusted, I'll even break loose the staked flat head screws holding them and remove them as well, but it often isn't necessary. (Staking is a process of using a chisel shaped die to deform the screw heads and mating surface so they won't loosen...in the days before thread locking epoxies). I use a tight fitting screwdriver blade on an impact driver with a hammer to save the screws for reuse. You can chew them out with a chisel, but there's no substitute for impact (or a long lever bar) when it comes to breaking a bolt loose.

Removing the metal label is usually traumatic - screws are rarely used. More often, those accursed little drive screws looking like rivets with a spiral thread are pressed in. Removing them involves either drilling them out with a machinist's #1 center drill or, if you're

continued next page



The author with his large collection of military gear.

lucky and their holes go all the way through to the inside, using a tiny pin punch fragment or short nail to drive them out from the inside. A heavy metal bar and needle nose pliers work best with the "short" punch. Occasionally I have been very lucky and been able to grab the top of the pin with small vise-grips and back them out from the top. You can also try tapping a wedge under the label to lift the pin out, but I've only rarely had that work successfully - it almost always bends or destroys the label. I normally drill and tap the holes for either 2-56 or 3-48 screws (anticipating the "next" time...).

There's no shortcut for what follows - a combination of elbow grease, rust dissolvers/consolidators (try the Rustoleum rust removal kit if you have no other favorite), metal etchers (Sherwin-Williams W4K 263 Dual Etch works for me), and soap based cleaners. You have to use some judgement in applying the chemicals. I'm particularly careful with the armature, because it has the high voltage winding on it - as much as 1,500 volts! I try to limit its cleaning to mild soap and water. Anything liquid you allow to get in there has to be carefully dried out, preferably by baking for a day or so at 150 degrees. Blow the water out of the rest of the parts with an air hose. Check to see how much the brushes have worn into the commutators. If the groove is more than a few thousandths deep, or has an odd shape, you'll need to turn the commutator down in a lathe. Send an SASE if you want to know more about that - the commutator mica insulators have to be undercut after turning and it's sort of involved. Most of the manual sections on dynamotors discuss this procedure in more or less detail. Otherwise, some 400 grit wet/dry sandpaper (use it dry) should restore the surface to working order. The standard TM caution about not using emery cloth comes from the fact that this type of abrasive is conductive and will work itself into the most amazing places in the commutator! Also refer to the TM for your radio to check the length of the brushes - there is usually a specification for minimum length and every doggone type seems

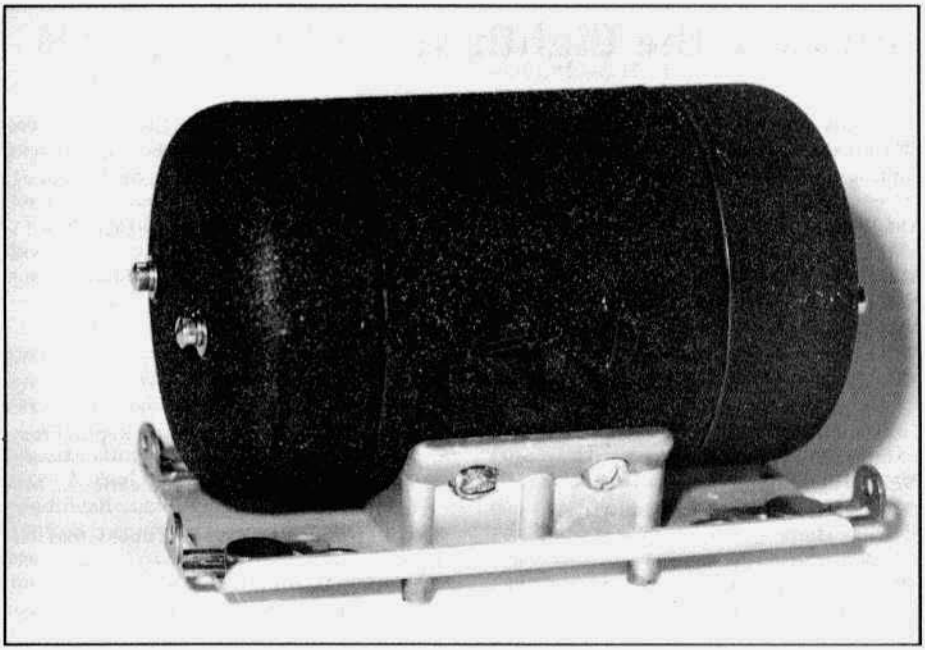


Figure 2. A dynamotor after restoration.

to be different. Use a 1/4 inch minimum if you can't find the spec anywhere. If you do need to replace them, check your local hardware store or motor shop first. Most of the brushes are fairly standard sizes, and you might get lucky!

If the die cast bearing/brush cages (spiders) on the ends are crumbling, you have two choices - find a replacement from a junker or try to consolidate the damage with a filled epoxy. I use Devcon aluminum epoxy putty because you can subsequently machine it, but some form of plastic steel might also work. Seal the finished cage with polyurethane, especially if you'll be operating the motor in humid spaces like your non-air conditioned garage. If you pulled the pole pieces because of rust, re-lacquer them with a clear lacquer or polyurethane before reinstalling them. This goes for the armature as well (don't forget to mask the commutators). This is the usually the point at which I put on rubber gloves or those little finger stalls. You don't want to get finger oils on the commutators or clean bearings.

Bearings: This is the single most frustrating but perhaps most critical part of the motor. Some of these armatures turn up as high as 14,000 rpm in normal operation, so you can't leave this to a lick and a promise. The late and post WWII motors were more likely to have the higher (and more wear producing) speeds, especially the inverters. There are two ways to remove the bearings - one is with a pair of small screwdrivers used as wedges. You HAVE to use this method with the command receiver (DM-32, DY-2) type bearings - there simply isn't enough space between the commutator and bearing to get any puller teeth into. I use a couple of tiny machinist's wedges, but jeweler's screwdrivers will work about as well. You have to be extremely cautious not to nick the commutator or shaft - a task that needs about six hands and five eyes! The commutator is made out of soft copper segments insulated with

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Photographs of Hams

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District #9: KG9D-#93; AB9G-#93; K9QGS-#96; W9VTC-#96.

District #Ø: WAØAUQ-#93; KØBS-#93,#96; WAØNUH-#89; WØQNI-#96; NØTE-#89; WØTOK-#93; KBØXP-#96.

An SSB Adapter for the R-390A

by Mike Bohn, KG7TR
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Introduction

This project represents the results of over four years of on and off experimentation with an R-390 and R-390A. The original objective was to come up with a self-contained mod to the IF chassis that would cure the ills of the basic receiver, i.e., it would provide a product detector and fast attack AGC for SSB reception. I even went so far as to procure a spare IF module from Fair Radio Sales just for that purpose (getting that module to work is another story. Yes, mechanical filters do fail, in my case with a weird failure mode where they exhibited a high resistance leakage to ground which dragged down the AGC voltage). I tried many of the various mods that had been developed over the years, as well as several ideas of my own, but was dissatisfied with the results. Finally, after growing tired of trying to work inside what has to be the most congested module in the radio, I decided to try a stand-alone unit.

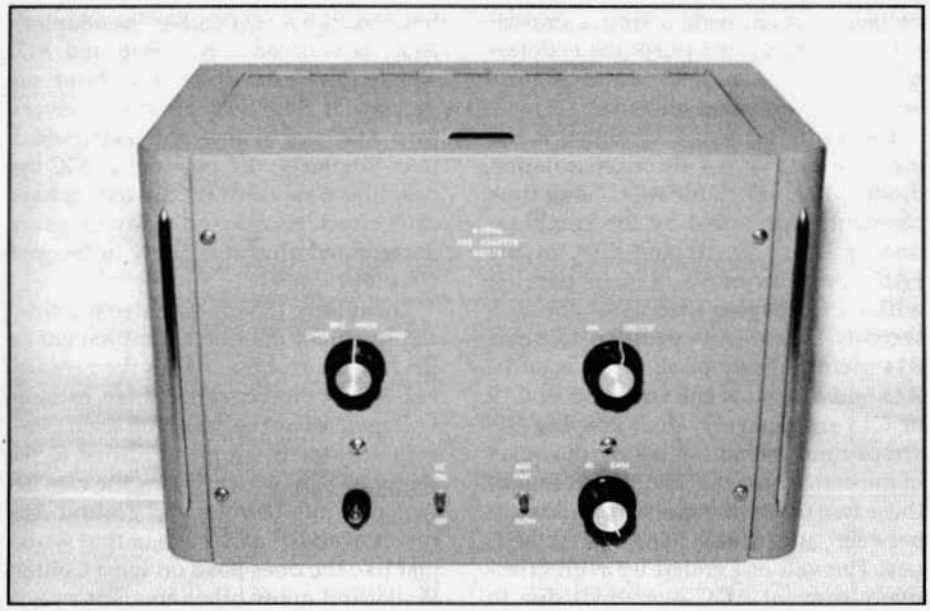
Since I was going outboard with the electronics and could build the unit any way I wanted, I figured some design criteria ought to be in order. The adapter would have to: a) offer decent performance with absolutely NO mods to the receiver itself, b) maintain our sacred hollow state technology, c) use readily available parts, and most importantly, d) be within the construction skills of a typical ER reader. I think the unit described here meets all of those requirements. I'm not familiar with all the SSB equipment and mods that have ever been available for an R-390A, so it's possible that this unit employs some techniques that haven't been tried before.

Circuit Description

Looking at the schematic, the IF output of the receiver is fed into the signal grid of V1, a 6BE6 used as a product detector. This signal is fairly low level, on the order of 200 mv. A 455 kHz BFO signal from V2 is fed into the injection grid through C4. Detected audio is recovered in the plate circuit, with the unwanted IF and BFO signals filtered out by C10, R7 and C11. The audio is then fed into the grid of V3, a 6AU6 used to boost the signal for direct injection into the receiver's noise limiter circuit (more about that later).

The 6AU6 used at V2 functions as an electron coupled Colpitts oscillator (i.e., the screen is the active element in the feedback loop, not the plate). With this type of configuration and the low electrode voltages used, the output signal is pretty darn stable with no extraordinary measures required. Ordinary dipped mica caps are used in the tank circuit. With the circuit values shown, 15 pF for C6 provides almost the identical plus or minus 3.5 kHz frequency delta of the receiver's BFO.

Perhaps the most unique feature of the adapter is the manner in which the audio signal is inserted into the receiver and the AGC is derived. The DIODE LOAD jumper between TB103-14 and TB103-15 is removed when the adapter is connected into service. Switch S1 is used to switch between the adapter's SSB/CW mode and the ordinary AM diode detector of the receiver. In the AM mode, the signal is simply routed through S1 from the receiver's diode detector back into its noise limiter, just



Front panel of the SSB adapter. BFO pitch has lower and upper sideband ranges labeled for convenience.

as if the jumper were in place. However, in the SSB/CW mode the connection is broken, and audio from V3 is injected into the noise limiter circuit instead. R8 is used to set the audio to a level equivalent to the output of the receiver's AM diode detector. The noise limiter is inoperative in this mode because it depends on bias levels normally derived from the diode detector, which are now not available. This is no great loss, as a diode limiter like this doesn't do much good on narrow bandwidth SSB anyway.

More time was devoted to developing a workable AGC system than any other aspect of this adapter. The AGC in these radios simply wasn't designed for SSB, and it will fight you every inch of the way. I've tried revamping the receiver's own AGC system per all the common published mods, plus some of my own ideas. I've even tried audio derived AGC, but that produces no AGC at zero beat of an incoming carrier which causes some weird problems. Nothing seemed to work very well until I came up with the brute force method presented here. The results are outstanding.

In the SSB/CW mode the receiver's diode detector output is no longer needed for audio, and is used instead to derive AGC control voltage. It has a fairly low impedance and a much faster attack time than the receiver's internal AGC. One could remove the AGC jumper between TB102-3 and TB102-4, and inject the audio from the diode detector into TB102-4. With proper time constant capacitors, this will produce fair results. However, this technique will render the carrier meter inoperative unless the receiver is modified.

Since the carrier meter is a necessity and no mods to the receiver were to be allowed, I needed a really low source impedance for the AGC so that I could connect it directly to the AGC terminals at TB102 with the jumper in place. That's where V4 comes into play. This 6AU6 is used as a cathode follower for the AGC

continued next page

voltage. The equivalent source impedance for attack time purposes is determined by R16 and R17, and is only about two thousand ohms.

The audio turned AGC signal is fed into the grid of V4 through isolation diode D1. A selectable AGC hang time constant is provided by the combination of R14, C19, S2 and C18. In the FAST position of S2, R14 in parallel with C19 provides a decay of about .5 seconds. In the SLOW position, C18 and R14 yield a decay of about 2 seconds. R23 and R24 slow the charging of C19 or C18 respectively, thus keeping the attack time fast and delaying the onset of the hang characteristic. The values of these two resistors represent a trade-off between attack and hang characteristics. The values I ended up with effectively prevent AGC overshoot due to noise pulses and popping in the detected audio at high signal levels, yet retain an acceptable hang characteristic. R13 puts a little positive bias on the diode detector to set the AGC threshold at about two microvolts. With the value of R13 chosen, the AGC profile (AGC voltage vs. input signal voltage) is virtually identical to the receiver's own AGC circuit.

The negative going AGC pulses at the grid of V4 reduce the cathode current and resultant voltage drop across resistors R16 and R17. If the cathode resistance was simply returned to ground, the result would be a positive signal at the cathode which would be useless for AGC. Therefore, R16 is connected to a DC bias of about minus 18 volts, and the AGC voltage is taken right at the cathode. R16 is adjusted to match the zero signal AGC voltage in the SSB/CW mode to that produced in the AM mode. The zero signal current at the cathode of V4 is about 10 ma.

The trick to retaining carrier meter function lies in the low impedance of the AGC follower. The receiver's own AGC system is trying to drive the AGC line through R547 (220K). The adapter's AGC is sourced across R16 and R17, whose low resistance (only about one percent of R547) shunts the receiver's own AGC signal and renders it ineffective. Similarly, the receiver's AGC bypass and time constant capacitors have little effect. Attack and delay times are determined almost entirely in the grid circuit of V4.

The minus 18 volt bias also provides a convenient method to implement an RF gain control that varies the zero signal AGC voltage, rather than cathode voltages as in the receiver itself. V4's grid resistor is simply returned to the wiper of R15, which varies the bias between minus 18 volts and ground. The result is an RF gain system that works just like the ones used on most Collins, Drake and many other amateur receivers. As the adapter's RF gain control is turned counterclockwise (with the receiver's RF gain set to max), the AGC voltage goes more negative and reduces receiver gain. At the same time, the carrier meter's zero signal reading increases. However, as long as the zero signal setting remains below the incoming signal itself (for example, SSB voice peaks continue to move the meter needle), the readings are accurate. This is not the case when the receiver's RF gain control is used.

That's about it for the main working circuits of the adapter. The power supply is somewhat unconventional, but it gets the job done with available and affordable iron. Two 25.2 or 26.8 volt filament transformers are connected back to back. The low voltage AC is rectified by a center tapped full wave circuit to produce the minus 18 volt bias, and is also used to power the four 6.3 volt filaments which are connected in series. R20 is used to drop the extra voltage that results from using either 25.2 or 26.8 volt transformers and not loading them to their rated current. The 110 or so volts AC at the high voltage

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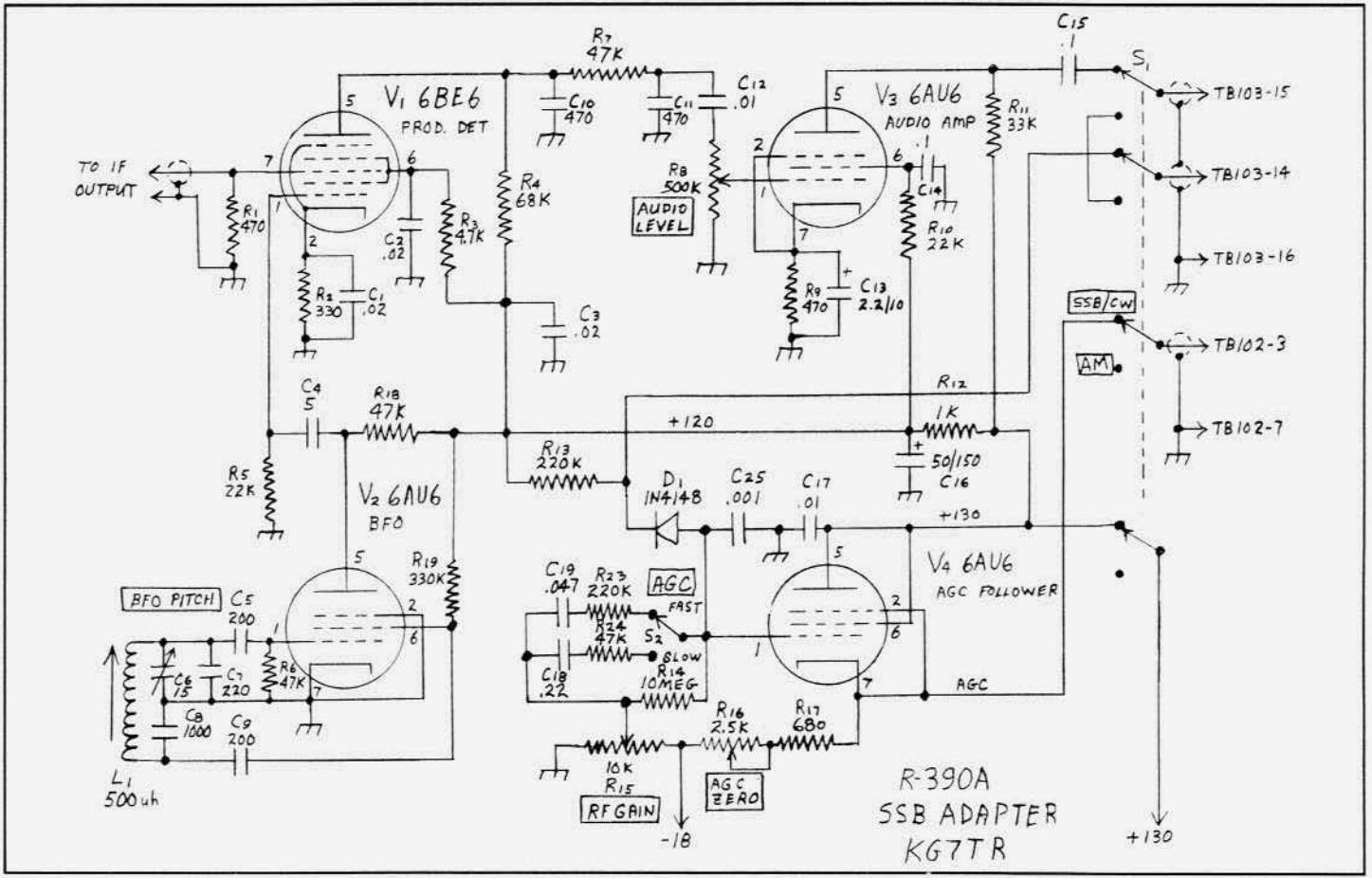
R-390A
SSB ADAPTER
KG7TR
V1 6BE6
PROD. DET
V2 6AU6
BFO
V3 6AU6
AUDIO AMP
V4 6AU6
AGC FOLLOWER
TO IF OUTPUT
AUDIO LEVEL
BFO PITCH
RF GAIN
AGC ZERO
AGC
FAST
SLOW
SSB/CW
AM
TB103-15
TB103-14
TB103-16
TB102-3
TB102-7
+120
+130
-18
L1 500 uh
D1 IN4148
R7 47K
R4 68K
R3 4.7K
R1 470
R2 330
R5 22K
R18 47K
R13 220K
R19 330K
R8 500K
R9 470
R10 22K
R11 33K
R12 1K
R14 10MEG
R15 10K
R16 2.5K
R17 680
R23 220K
R24 47K
C1 .02
C2 .02
C3 .02
C4 5
C5 200
C6 15
C7 220
C8 1000
C9 200
C10 470
C11 470
C12 .01
C13 2.2/10
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C15 .1
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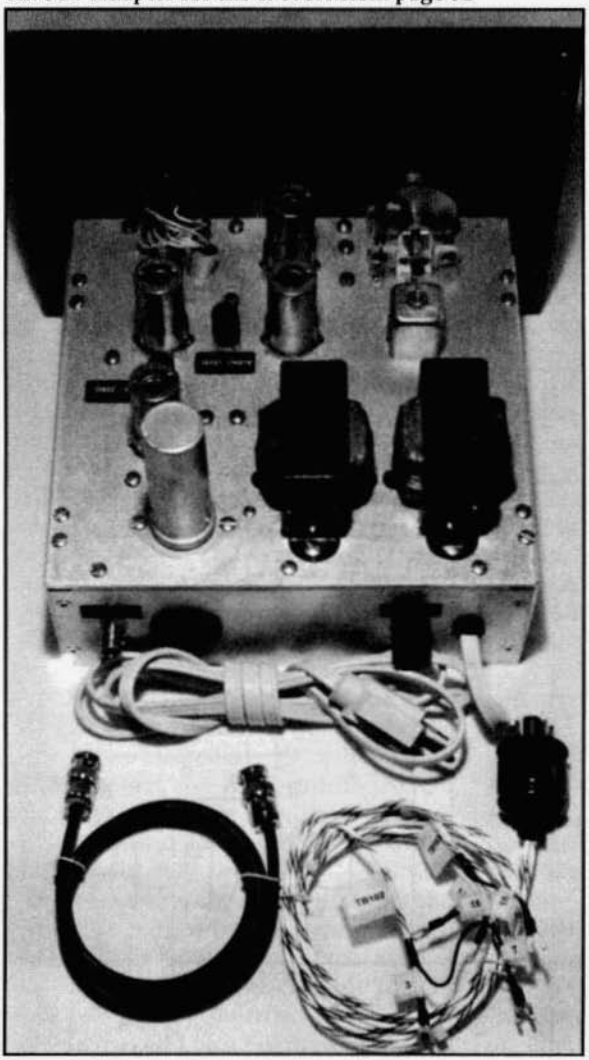
C17 .01
C18 .22
C19 .047
C25 .001
S1
S2



Chassis rear view showing patch cables. No mods to the receiver are required.

winding of T2 is rectified in a full wave bridge, filtered, and then fed to S1. Here it is switched to power up the B plus circuits when the adapter is in the SSB/CW mode.

Construction Details

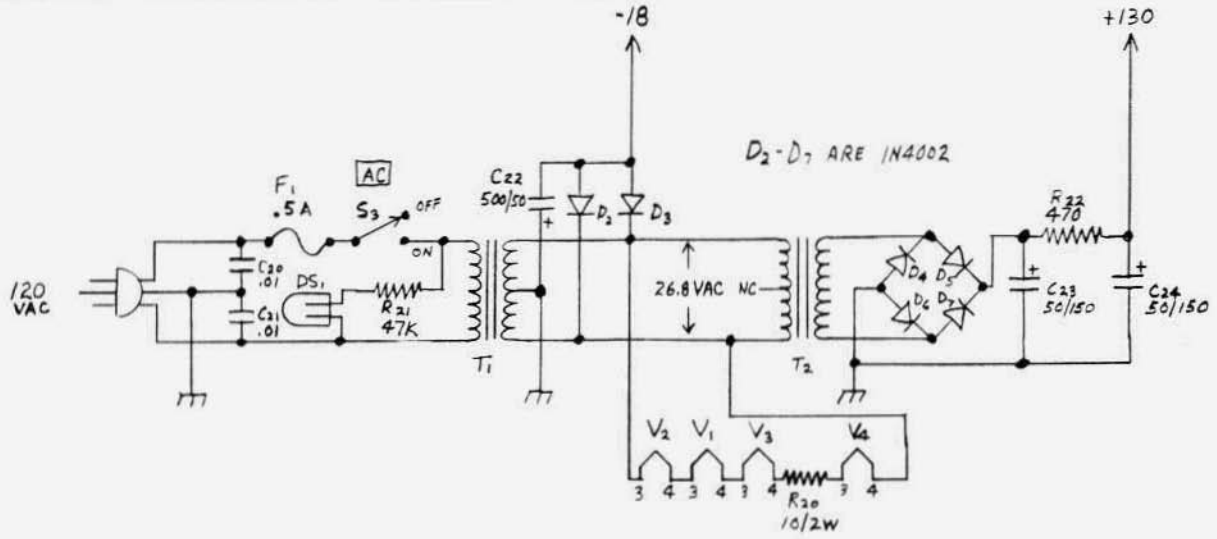
Construction of the unit is straightforward. It may look a little odd in the photographs because I used whatever scrap sheet metal I could find, and had to fabricate my own chassis to fit the cabinet on hand. I used shielded cables for the four connections to the receiver. For convenience, all interconnections were terminated at the rear of the adapter chassis, and then separate patch cables were assembled. A BNC connector was used for the IF, and an octal connector for the AGC and audio signals. The receiver ends of the patch cables were terminated in lugs for the terminal boards and a BNC plug for the IF. There is no reason why the cables could not be brought directly out of the adapter into the necessary terminations to fit the receiver.

V1 is somewhat susceptible to hum pickup. I would recommend locating it as far as possible from T1 and T2. While my unit sounds fine at normal listening levels, there is a small amount of hum in the audio output when the RF gain is reduced to zero and the receiver's audio gain is advanced to max. The value of C13 is selected to roll off the gain of V3 below about 300 Hz, which helps reduce the hum somewhat. I suspect that most product detectors of this type will do the same thing; I know my Drake 2-B does.

Finding the Right Parts

To the extent possible, this unit was designed to avoid the use of hard to find parts. Specs are as noted on the schematic. The tubes couldn't be more common, and of course you can use a 5750 for V1 and 6136's for the other three. Just about everything else is avail-

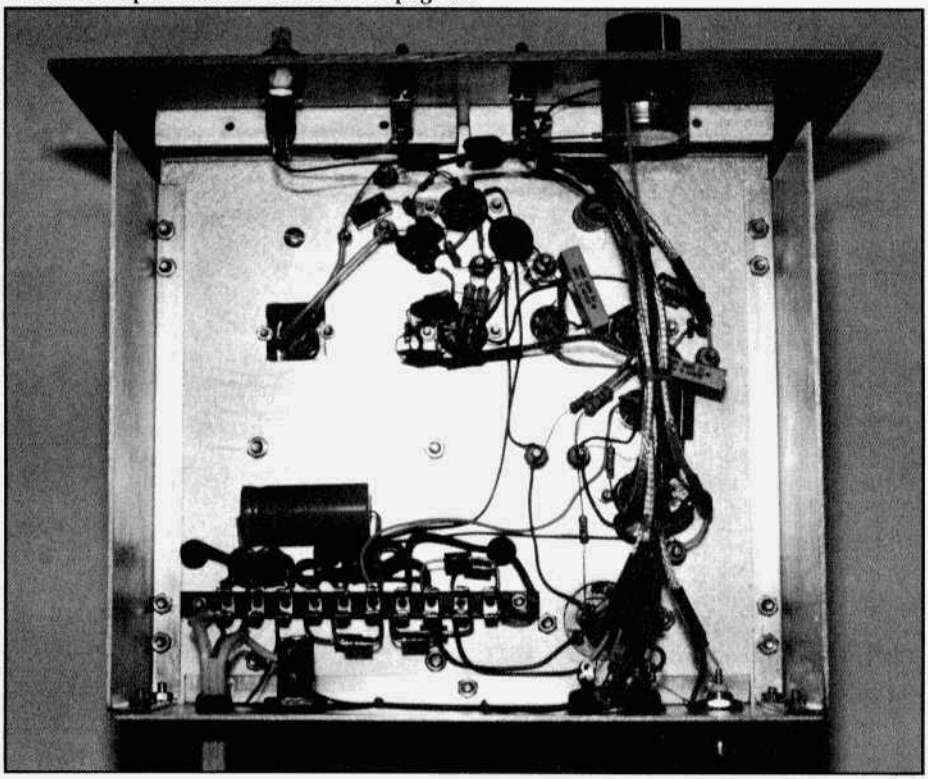
Text continued on page 36



R-390A
SSB ADAPTER
KG7TR

NOTES:

1) All fixed resistors except R20 are half watt, 5%.
2) R8, R15, R16 are linear taper, half watt minimum. R15 is front panel mounted.
3) C1, C2, C3, C10, C11, C12, C17, C20, C21 are disc ceramic, 500 volts.
4) C4, C5, C7, C8, C9 are dipped mica, 500 volts.
5) C14, C15, C18, C19, C25 are polyester film, 200 volts, 10%.
6) C13, C16, C22, C23, C24 are electrolytic.
7) C6 is straight line capacity, double bearing variable.
8) S1 is 4 pole 2 position rotary, S2, S3 are miniature toggle.
9) L1 is 500 uh slug tuned/shielded
10) T1, T2 are 120 VAC primaries, 25.2 or 26.8 VAC secondaries @ 1 amp or more (Magnetek/Triad F-40X, Radio Shack 273-1512 or equivalent).



Chassis bottom view. Ten-terminal strip is used at rear for power supply components and connections.

able from Mouser Electronics (800-346-6873). If you don't have a variable inductor for L1, you can use a 470 or 500 uh choke with a 200 pF cap for C7 and a 50pF trimmer connected across it. You could probably also get away with using one of the windings on an old IF transformer. It only has to resonate at 455 kHz. It might be a little hard to find a source for a new C6, but these things are quite common in the junk box or at hamfests. If not, I'm sure you could use a varicap, a pot and a couple of resistors to do the same thing. Another option, if you plan to only receive SSB using the 2 kHz filter, is to use 200 pF for C7 and switch one of two 50 pF trimmers across it, one for each sideband.

The Magnetek/Triad power transformers are available from Mouser. I just happened to have two of them on hand from a scrapped boat anchor. You should be able to use the Radio Shack units and save a little money (I have not tried them). The latter also appear to be magnetically shielded, which may help reduce hum pickup by the detector. Depending on your line voltage and the transformers used, you may have to tweak R20 or eliminate it altogether to get a nominal 6.3 VAC across each filament.

DS1 was a junk box neon indicator. 47K was the right value at R21 for this lamp, but you should use whatever is recommended for the lamp you select.

Alignment and Operation

Alignment of the adapter is a snap, but first you have to make sure your receiver is operating properly without

the adapter connected. If you have a calibrated signal generator, the gain of the IF strip should be set in accordance with the Tech Manual. Next, make sure the carrier meter is at zero with the receiver's RF gain at minimum and the function switch in AGC. Then check for BFO zero beat with the knob at zero and the calibrator signal peaked in the 100 Hz selectivity position.

For one reason or another, I settled on 3.3 MHz as the baseline frequency for all of my testing. At this frequency, with 8 kHz bandwidth and either of my two IF modules installed, the receiver's AGC threshold is about 2 microvolts at the antenna terminals. With 200 millivolts input, the carrier meter reads 100 dB and the AGC voltage is about minus 14 volts on one module and minus 15 on the other. At 20 millivolts both modules produce about minus 12.3 volts. I quote these figures only as a guide to what a healthy receiver should be doing. In all cases, the signal generator was an HP 606A terminated into a 50 ohm load.

With the adapter hooked up (don't forget to remove the DIODE LOAD jumper), select the AM mode and check that the receiver operates normally. Then select SSB/CW, rotate the receiver's RF gain fully ccw and the adapter's RF gain fully cw. Adjust the AGC ZERO pot for a zero reading on the carrier meter. Switching from SSB/CW to AM and back should not cause any change in the meter reading.

Set the mode switch back to AM, advance the receiver's RF gain fully cw and peak the calibrator signal on any band in the 100 Hz selectivity position. Set the selectivity to 8 kHz , turn on the receiver's BFO and adjust it to produce about a 1 kHz beat note. Set the line meter switch to 0 and adjust the line gain to produce a line level reading of 100.

Set the mode switch to SSB/CW and set C6 to the exact middle of its rotation. Turn R8 AUDIO LEVEL to about the middle of its rotation, and adjust L1 (or trimmer if you're using one) to produce a zero beat note. The BFO will now be almost exactly at 455 kHz. Then adjust C6 for a beat note of the same frequency as you set the receiver's BFO previously, and adjust R8 for a reading of 100 on the line level meter.

That's it. Now you're ready to put the adapter into service. For SSB operation the BFO must be set higher than 455 kHz for lower sideband, lower than 455 kHz for upper sideband, and in either case about 20 dB down the selectivity skirt for the filter in use. This is easy to do using the calibrator and the carrier meter. For example, for 2 kHz bandwidth and upper sideband, simply turn C6 about an eighth of a turn in the proper direction to lower the BFO frequency. Then peak the calibrator signal in the 100 Hz selectivity position, select 2 kHz bandwidth and note the carrier meter reading. Adjust the receiver's frequency towards zero beat until the carrier meter reads 20 dB below the previous reading, and then set the BFO for zero beat. Once you get the hang of it, it only takes a few seconds.

The receiver's AGC time constant doesn't seem to make a whole lot of difference in the way the signal sounds, but I recommend medium or fast. In the slow position it causes the carrier meter to bounce up and down much faster than the actual time constant of the adapter, probably due to the effect of V506A in the receiver.

I've tried this adapter on my R-390A with two different IF modules, and the performance was virtually the same. I even tried it with my R-390, and other than the selectivity of the mechanical filters, the performance was the same. It should do a good job for you too.

If anyone has any questions or comments please feel free to contact me either by phone or e-mail. ER

Dynamotor Refurb the Easy Way from page 27

delicate mica strips, so it's easier to damage than the shaft. Be careful!

The second way (if there's enough clearance behind the bearing) is with a small bearing puller. If you had a chance to run up the dynamotor before taking it apart and the bearing was noisy, then this is the easiest way. Sears has a good one (they call it a battery post puller). You'll have to grind the jaws a bit to slip behind most of the bearings used on the larger dynamotors. You also have to remove the little cylinder on the tip of the puller and file the tip down to a point with an electric drill, or it won't clear the bearings coming off the shaft. A cheaper (and therefore lighter construction) battery post puller might be better. If that doesn't work with a reasonable amount of pressure, then you have to wrap a towel around the commutator, have someone keep wetting it down, and torch the outer end of the bearing with the puller exerting pressure on it all the while. Never had that fail yet. Watch out for fire! There's flammable grease in that bearing.

If the bearings are sealed, factory greased types, there's nothing more you can do with them. If they are the open type, clean them in a good de-greaser (I use acetone, but WD-40 works well too), and blow them out with an air hose. Wear safety glasses! The air hose, or a can of compressed air, is essential. I do this at least three times...four if I get any old grease still coming out the third time on the white cloth or paper towel I hold them in. Check them by spinning ***by hand, not with the air hose***, and listen and feel for roughness. The cautions in the books against spinning a clean bearing with an air hose are aimed at high speed spinning, not hand spinning speeds. If you have to replace them, most good bearing houses still stock bearings that will fit the application, though you may have to wade through a few catalogs to find them. If the bearing company can't cross reference the old number, you'll need the outer diameter, width, inner race offset (if any), and shaft dimension measured with a dial caliper or micrometer, as well as the working speed.

In the next installment, we'll tackle reassembly, including bearing lubrication and painting.

Figure 2 shows how it all turns out. Stay tuned! ER

Heathkit Errata from page 23

SB-610: It uses four tubes excluding the CRT, not three.

SB-630: The "timer" control knob is not original.

Note: For those products that have errors in their years of manufacture please be sure to make the changes in the product lists at the back of the book as well. ER

Editor's Note:

Chuck's book, "Heathkit A Guide to the Amateur Products" can be ordered from the ER Bookstore (see page 56 for details) or it can be purchased directly from Chuck at the upcoming Dayton Hamfest. He will be at Space 519.

Looking Back from page 3

"Silent Sam." But he sure had one helluva sense of humor.

Remember that long hall to the front office - well one day Clark Rodiman who worked in the front office went out to lunch and had a New England baked bean meal. Later back at the office the gas went to work on him leaving him quite noisy-in fact, the noise was stentorian.

The next morning, Don Mix posted a heard card on our bulletin board to Clark Rodiman stating that his "signals" were received at the other end of the building, 5 by 9 with a pleasant modulated note! Just remember you old timers, if any of you built that little CW rig that was mounted on two slats of wood-that was Don's baby. I know because I also built one long before I came to work at ARRL. W1ICP

Swan from page 22

That is where things have been. The receiver works well, but I haven't done much transmitting with the rig. I have loaded it up using general ideas about how a Swan transmitter works, but I have not put it on the air.

What I would really like to know is if anyone out there recognizes this beast. It is surely one of a kind. If someone modified their old Swan monobander they sure went to a lot of work, especially removing every number, label or tag that said Swan. It seems like the story about the rig being a prototype may be true and if so, a prototype for what? There has to be some history behind this thing and it sure would be nice to know more about this mystery rig.

Please drop ideas, suggestions and hopefully interesting historical Swan recollections to me. I will appreciate any leads you can provide. I hope to get enough info to write again and let you know what it turns out to be! ER

THE AN/SRT-14 from page 12

locating pins at the rear and four 1/4 in. cap screws on the front (eight for the RFO). The mounting screws, in turn, are held captive to the front panels by small metal hoods which can be seen in Fig. 6.

When this rig is buttoned down it would appear to be well prepared for the rigors of sea duty. Strangely, however, the drawer slides used are marginal for the weight they must support when extended and are prone to distort and jam.

Final Comments

The frequency range and precision capabilities of this equipment represent a vast overkill for ham use, of course, but I had a lot of fun getting my SRT going and it is a great conversation piece on the air and with shack visitors. The Navy probably used these units operationally in the 500 watt (SRT-15 and 16) configuration most of the time. The 3-phase power requirements of the high power cabinet, however, would preclude its use by most hams.

Inquiries and comments are welcome. I would be especially interested in hearing from readers who have had operational (or any other) experience with these transmitters. ER

Notes:

1. NAVSHIPS 92121(A) "Instruction Book for RADIO TRANSMITTING SETS AN/SRT-14, AN/SRT-14A, AN/SRT-15, AN/SRT-15A, AN/SRT-16 AND AN/SRT-16A" published by the Department of the Navy, Bureau of Ships, approved 26 October 1955.

2. The "different" material used in the "A" models is not identified. However, considering the large amount of steel in the cabinet frame and power supplies it is not clear what would be accomplished by the use of non-magnetic material in the cabinet panels. My unit has aluminum front and side panels as mentioned in the text but is not identified as an "A" on any of the attached tags or name plates.

Phil Ponzi, KB2MAM, Silent Key

I regret to inform the AM community of the passing of my friend, Phil Ponzi, KB2MAM, on January 8, 1997 following a long illness.

Given the fact that Phil was licensed less than six years and was plagued with health problems, he managed to assemble a remarkable vintage station. Besides being an excellent technician, Phil was very innovative as demonstrated by his station. Early in his amateur career he learned that he had one antenna restriction - nothing outside. Undeterred, Phil went ahead and built a wire antenna for 75 meters and installed it in the attic on the third floor. What he did for 40 through 10 meters - how about a Butternut vertical hanging from the rafters horizontally next to the wire antenna. After seeing this indoor antenna farm I was amazed at the great signal Phil put out from Staten Island.

But the thing that I admired most about Phil is the fact that he never gave up. Whether it be a radio project or life, Phil never quit, right up to the end.

George Carroll, N2GBY

West Coast Military Radio Collectors Group Activities for Armed Forces Day

The West Coast Military Radio Collectors Group will hold their annual Armed Forces Day observance with a "tactical field day" operation on 17 May from approximately 1600-2300Z. Checkins at the top of each hour. We will have several field sites operating GRC-9, GRC-109, BC-1306, BC-654, TCS, PRC-47, PRC-25 and VRC-7/RT-70 systems. We also plan to have the USS Pampanito, a WWII Fleet Submarine moored in San Francisco check in with their newly restored TBL. We will operate 3975 kc AM, 7120 kc CW, 51.50 FM with local liaison on 146.535 simplex and the 147.045 (+94.8) repeater. NECOS will be N6CC or Tom, WA6OPE.

Tim Sammons, N6CC

N6CC operating a GRC-109 at an exercise on Mount Diablo.

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FOR SALE: Tubes: 3-500Z, 203Z, 45, 50, 2A3, 6L6G, etc; DeForest 503A, 845/545, WE249B. SASE for details. Dan Knipe, W7IGE, 3750 Highgrove Ln., Nampa, ID 83687. (208) 888-9575

FOR SALE: Zenith Transoceanics, H-500, Royal-1000; Heath QF-1 Q-multiplier. Carter Elliott ,1460 Pinedale Rd., Charlottesville, VA 22901. (804) 979-7383.

FOR SALE: Johnson Viking Mobile and VFO w/ orig. manuals - $125 plus shpg. Larry Steeno, K9LWI, 1838 Bluespruce Ct., Green Bay, WI 54311. (414) 468-5149, l.steeno@exc.pc.com

FOR SALE: Palomar loop antenna, 2 loops - $100; Millen Grid Dip - $75, orig. boxes, manuals. Dan Merz, 312 Sierra St., Richland, WA 99352. (509) 375-1334

FOR SALE: HW-16 - $75; DX-60B - $60; HG-10B vfo - $60; SB600 spkr - $25. Also NC-300. Manny, 70 Orme Ct., St. Paul, MN 55116. (612) 699-7932

FOR SALE: Military,ham, test equip, mil tech manuals, books. LSASE for list. Gary Cain, POB 521 Shakopee, MN 55379.

FOR SALE: Collins S-Line aluminum knob inlays: small (exciter/PA tuning) - $1; 30L-1 - $2; spinner/plain (main tuning) - $3. Charlie, K3ICH, 13192 Pinnacle Lane, Leesburg, VA 20176. (540) 822-5643

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

FOR SALE: R-390A/URR Orig.1961 Maintenance Manual TM11-5820-358,189 Pgs.,$28 incl.dom Priority Mail. Aben POBox 4118 Jersey City,NJ 07304 Avidov@aol.com

FOR SALE: Ultramodulation info and schematics. Increase the amount of audio sent and received - $2 WB8BEM,410 Robinhood Dr. Florence, AL 35630.

FOR SALE: Gonset G-50 w/D-104 mic, used every week, runs exc. - $150; Johnson Viking 6&2 meter converter - $50. Tom Muller KE6FDL POB 6128 March AFB, CA 92518. (909) 929-0294

FOR SALE: NOS Western Electric 404A tubes - $10; used 4X150G w/spec sheet - $15. John, WB9OVV, (708) 431-2693 or JVercellino@sprynet.com.

FOR SALE: 75A4 w/3.1 filter - $550; KWM2A, 516F2 - $725. **WANTED:** Case for 51S1. Fred, W6YM 209-296-5990, fhonnold@juno.com

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In pristine condition: Collins 32V3, 75A1, 30S1, 270G1, KWM1, 30K1, mech filter adapters, 55G1. Not for resale, willing to pay top dollar.

Lee, W9VTC, (847) 439-4700 (d), 726-1660 (n)

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WANTED: Still collecting early WW II radar equip. & manuals, what have you. Allan H. Weiner, 97 High St., Kennebunk, ME 04043. (207) 985-7547

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

WANTED: Good R-389, R-390A and SP600JX. Mitsugu Shigaki/ 2825-2, Jozan Kamidai Machi.Kumamoto.860, Japan. FAX JAPAN (0)96-329-4601, fk831630@pcvan.or.jp

WANTED: Info on military entertainment radios, photographs, manuals, personal histories on use, or any set you may have to sell. Henry Engstrom, KD6KWH, POB 5846, Santa Rosa, CA 95402. (707) 544-5179

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

WANTED: Marantz, McIntosh, or similar tube audio amplifier in any condition; Heath catalogs. Mike Nowlen, WB4UKB, POB 1941, Herndon, VA 20172

WANTED: Compactron sockets, 9-pin; also Amphenol black tube type plugs & sockets, 4 thru 12-pin. Send SASE for tube list T. Typetronics, POB 8873, Ft. Lauderdale, FL 33310. (954) 583-1340, FAX 583-0777.

WANTED: Drake - T4, T4B, 2C/2CQ, 2LF, TR6, SW4A, AL4, CW-75, UV-3, TC2, PS-75. Mike Bald, WD5GLW, 7637 S. Quebec PL, Tulsa, OK 74136. (918) 492-7361, RadioMB@aol.com

WANTED: Manual for Technical Materiel Corp model ATS-2 and Control Monitor MCU-50. KA5SRB, (505) 824-2155

WANTED: Audio xfmr made by UTC. part number LS-47X. James Owens, NWØO, 1363 Tipperary ST. RR#3, Boulder, CO 80303-1621. (303) 673-9019. owens@stout.atd.ucar.edu

WANTED: Drake 2-C and Collins 51S-1; in excellent or NM condx only. Thanks. Robert Seeber, WB9JPJ, 1044 East Whitaker Court, Milwaukee, WI 53207-5259.

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

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

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WANTED: Plastic dial & bezel for HW-16. Help me restore my novice rig. B. Johnson, 195 Royal Ridge Way, Fayetteville, GA 30215

WANTED: Hallicrafters SX-88, SX-100. Must be in exc. or better condx. Joe, WA5HNK, 5233 Spencer, Pasadena, TX 77505. (281) 487-5233, jsm@phoenix.net

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

WANTED: Hammarlund HQ-180A for parts, must have dial assemblies intact, unscratched & not warped. Bob Gustafson, 7340 Furrow Ct., Cherry Valley, Il 61016. (815) 332-9520

WANTED: HR10B and HG10B in good condx, no mods. George Folse, KB5WWO, 630 Dolhonde St. Gretna, LA 70053. (504) 362-1896, kb5wwo@juno.com

WANTED: Orig. manuals of Collins 75S1, Hallicrafters SX28, Hammarlund SP600JX, National HRO60, RCA CR88. Kozo Suzuki, JGA00136@niftyserve.or.jp

WANTED: Radio test set AN/GRM 21 for Collins AN/TRC 75. Jack, KC5VS, Rt3 Box 334, Fredericksburg, TX 78624. (210) 997-9766

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FOR TRADE: Two good RCA 833A's for one Taylor 833A. John H. Walker Jr., 16112 W. 125th St., Olathe, KS 66062. (913) 782-6455 johnh.walker@alliedsignal.com

FOR SALE/TRADE: Xmtr/rcvr tubes, new & used - 55¢ LSASE for list. Many thousands added lately. I collect old & unique tubes of any type. WANTED: Taylor & Heintz-Kaufman types & large tubes from the old Eimac line; 152T through 2000T for display. John H. Walker Jr., 16112 W. 125th St., Olathe, KS 66062. (913) 782-6455. johnh.walker@alliedsignal.com

FOR SALE: Heaths: SB-220 - $535; SB-200 - $335; HW-16 - $60; CW filter - $40; SB-300 - $120; SB-400 - $90; Gonset Communicator II - $50; exc Conar 400 xmtr - $60; Ten Tec Century-21 - $175; SASE for list. All w/manual + shpg. Larry Wright, N4QY, 170 Heritage Ln., Salisbury, NC 28147. (704) 633-3881

FOR SALE: Audio xfrms, NOS in orig box; UTC CVP-360 watt variomatch output, PRI 3,000-14,000 ohms pp, SEC 1.5 to 500 ohms in 8 taps, wt.10 lbs - $100, ea., shpd, 24 available; Triad S-36A 5000 ohm pp, plates to 125/250/500 ohm line, 18 watts - $18.50 ea, shpd, 57 available; Triad A-35A Interstage, 10K plate to 9K CT, single or pp, grids ratio 1:3 - $10, ea shpd, 35 available; Triad C-12A filter reactor (choke), 6 Henrys @ 160 MA, 165 ohms - $10, ea, shpd, 48 available; Kenyon T-319 multitap, no other info - $25, shpd, only 1. Consider offer, entire lot. Jim, WØNKL, KS, (913) 471-4644.

FOR SALE: Heath SB303 - $115; HG-10 - $50; Allied A-2516 - $215; Realistic DX-160 - $75; B&W 3002 - $70; Knight Z-bridge - $18; Stancor P-6492, 5 volt 30 amp - $35; Millen SWR - $20; RME VHF 152A - $45; Johnson CB matchbox - $20; much more, request list. Richard Prester, 131 Ridge Rd., W. Milford, NJ 07480. (201) 728-2454

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FOR SALE: 1936 Radio Handbook by Pacific Radio Pub. - $25 ppd, USA; 1936 ARRL Handbook - $28 ppd. Restored condx, good to exc. Tom Berry, K9ZVE, 1617 W. Highland, Chicago, IL 60660. (773) 262-5360 or 262-0016

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FOR SALE: CEI 100V exciter, xmtr, manual - $400; lots more ham gear, test gear, write. V. Vogt, 330 SW 43rd St., #247, Renton, WA 98055.

FOR SALE: Military BC-1068A VHF rcvr, very nice, no book. Fred Clinger, OH, (419) 468-6117 after 6 PM EST.

FOR SALE: Service. Reproduction dial covers, clock lenses (Hammarlund, etc) old or dimensioned drawing - $10 ppd. William P. Turner, WA0ABI, 1117 Pike St., St. Charles, MO 63301. (314) 925-1307

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

FOR SALE: Xtals 7010 kHz, type CR-1, NOS military - $2 ea, quanity pricing available. WA5THJ, Rt 9 Box 163, Alvin, TX 77511. (281) 331-2956

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FOR SALE: Collins HF-80 amp & pwr sply manual; 651S-1 rcvr; 32V2; 18J-6 police xmtr; orig 50TH year book. Bill Coolahan, 1450 Miami Dr. NE, Cedar Rapids, IA 52402-2933

WANTED: Very early Hallicrafters and Hallicrafters/Silver Marshall equipment including Skyriders with entire front panel dull aluminum color, S-30 radio compass, S-33 Skytrainer, S-35 panadaptor, wood console speakers - R-8 & R-12, HT-2, HT-3, BC-939 antenna tuner, parts, advertising signs, paper memorabilia of Hallicrafters. Also want RCA model AVR-11 airport tower receiver. Chuck Dachis, WD5EOG, "The Hallicrafters Collector", 4500 Russell Dr., Austin, TX 78745. (512) 443-5027

WANTED: Visitors and tubes by museum. Old and odd amateur or commercial tubes, foreign and domestic purchased, traded or donations welcome. All correspondence answered. K6DIA, Ye Olde Transmitting Tube Museum, POB97, Crescent City, CA 95531. (707) 464-6470

WANTED: ARC-5 command set rcvr top sheetmetal. Jim Riff, K7SC, 9411 E. Happy Valley Rd., Scottsdale, Az 85255. (602) 244-4441

WANTED: Cabinet for Collins R-390A/URR. Merle, W1GZS, FL. (352) 568-1676

WANTED: DX-100 Heath xmtr, working conds. Tom Thomson, KB9IFT, 315 Wellhouse Dr., Kimberly, WI 54136. (414) 734-1068

WANTED: Kenwood VC-10 converter, 118-174 MHz, for the R-2000 rcvr. Bob Bakanowski, 1524 St. Tropaz, Tucson, AZ 85713. (520) 624-6029

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WANTED: GPR 90, 91, 92; Hallicrafters SX-88; Eddystone rcvr's. James B. Geer, 1013 Overhill, Bedford, TX 76022-7206. (817) 540-4331

WANTED: Mics by Altec, Neumann, AKG, WE, Sony, any vintage; tube compressors/limiters; will trade my rare NOS tubes for mics. Mike States, Box 81485, Fairbanks, AK 99708. (907) 456-3419 ph/fx

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WANTED: JW Miller RF coils; IF trans; chokes. Buying JW Miller & Millen parts, esp. need Miller B-727; B-727C; S-27; 912-C2; 912-C4; 912-C5. WA5THJ, Rt 9 Box 163, Alvin, TX 77511. (281) 331-2956

WANTED: Part's rcvr SSR5-A; SST-1 xmtr canvas bag; MX-183-PPN-2. Top price paid. Steve Bartkowski, 4923 W. 28th St., Cicero, IL 60804.

WANTED: HT9 parts. I recently acquired a beautiful HT9 but without any coils. I need all oscillator and PA coils. Please help me get this rig on the air. Thanks. Ron Skipper, W8ACR, NY. (518) 643-2089

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FOR SALE: Used 807 tubes, tested OK, guaranted - $5, + $3 priority mail. James T. Schliestett, W4IMQ, POB 93, Cedartown, GA 30125. (770) 748-5968. imq@bellsouth.net

FOR SALE: Centimeg 220 MHz converter, VGC - $15; SB-300 pwr trans - $14; International xtal 6-meter conveter, VGC - $10; AF manual 52-8 radar - $8; CQ 1950 - $8. Shpg extra. Patrick Marineau, K9HF, 6300 Kingsway DR., St. Louis, MO 63123.

FOR SALE: Control radio set C-1218/GR, control head for BC-610 - $50; frequency control units for BC-610 - $25 ea. Charlie Svoboda, WBØUTC, NE, (402) 474-4272.

FOR SALE: Nice SX-140 HT40 panels, fine, some scratches on cabinets, manuals. Dusty Rhodes, W8MOW, 1324 N. Dorset Rd., Troy, OH 45373 (5130 339-1546

FOR SALE: Plug-in coil forms for SW-3, Pilot Super Wasp & homebrew radi & xmtrs. SASE please. ARL-USA, 5355 S. 275 W., Cutler, IN 46920.

FOR SALE: Drake TR-3, AC-4, MS-4, manual & bill of sale by orig owner - $250. Barry Sims, W7JKY, OR, (503) 631-3219.

FOR SALE: Antique Atwater Kent horn type M loud spkr; 1 ea. type 810 pwr tube. **WANTED:** T-368 xmtr exciter, also output tube type 6000 for this exciter; 1 to 4 ea. 4-125 tubes. Joe, WE5I, AR, (501) 257-2839.

FOR SALE: MC Jones micro match VSWR model 260 (box) - $125; scope xfmr, 6.3-2.5V fils, 117V 4.3 kv, 6 lbs - $35. Joe, W6CAS, CA, (916) 731-8261.

FOR SALE: QST's, complete years 1990-94, 1996 - $10 ea yr; Heath unassembled kits, SA2550 antenna matcher - $50, HN31A cantenna - $15; HD1234 coax switch - $15; EICO 235 VTVM - $15; EICO 235 VTVM kit, new, unassembled - $25; GE portable World Radio P99C - $35; AIWA all wave solid state portable AR144 - $25. Bill Riley, 863 W. 38th Ave., Eugene, OR 97405. (541) 345-2169

FOR SALE: RME 1000 T, 1 KW AM xmtr, one of two in the US, pictures available, needs work & TLC, xfmrs check good, two big black heavy cabinets on wheels; pair of 250THs modulated by a pair of 810s; lot of coils for the various ham bands. Call for details eves. Fred, KC4MOP, MD, (301) 567-2012.

WANTED: SP400, RME, EH Scott rcvrs, only in very good condition. EA4JL, contact in the States, Kurt Keller, CT (203) 431-6850

WANTED: Collins KWM2-A labeled on chassis Collins Radio Co of Japan; early KWM2 serial No. below 100. Bill, KD4AF, NC, (910) 699-8699.

WANTED: Aircraft or airport radios, xmtrs, pre WWII; flight gear from all eras. James Treherne, 11909 Chapel Rd., Clifton, Va. 20124 703-830-6272.

WANTED: BC946B rcvr; plastic meter face cover for Heath HM 2102 wattmeter (or HM 102). Don Hilliard, WØWP, 8630 Nighthawk Rd., Neosho, MO 64850. (417) 451-5892

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

WANTED: Military sets WS #29 Canadian A set; US DAS-2 Loran rcvr-indicator. Leroy Sparks, W6SYL, 924 W. McFadden Ave., Santa Ana, CA 92707-1114. (714) 540-8123

WANTED: Amphenol molded 4 pin & octal black phenolic tube sockets, either MIP or SS type. Pay $1 for new & 50¢ for clean used ones. ARL-USA, 5355 S. 275 W., Cutler, IN 46920.

WANTED: HRO-60; Vibroplex Zephyr or McElroy bug; early Collins equip, memorabilia, promotional items. Brian Roberts, K9VKY, 130 Tara Dr., Fombell, PA 16123. (412) 758-2688

WANTED: ARC type 12, C-49 & C-56 control units. David Boardman, 10 Lemaistre, Sainte-Foy, Quebec G2G 1B4, Canada. (418) 877-1316

WANTED: Balanced modulator kit/info for National NCX-5. Marvin Moss, W4UXJ, Box 28601, Atlanta, GA 30358. (770) 429-0314

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

WANTED: Huge Navy equipment: shipboard & shore radio, radar, & sonar, mint thru junkers. William Donzelli, 304 S. Chester Ave., Park Ridge, IL 60068. (847) 825-2630, integrat@usr.com

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

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

WANTED: Globe King 500, A, B or C xmtrs, any condx., reasonably priced. Terry Collins, KB9AUP, 18 N. Tomahawk Ave., Tomahawk, WI 54487. (715) 453-3707 d, 453-4633 eves

WANTED: In pristine condx.: Collins 32V3, 75A1, 30S1, 270G-1, 32S3A (RE), 310B3, 30K1, mech filter adapters, 55G1, SP-600JX, cabinet, TV-7 tube checker & 75A-4. Lee, W9VTC, IL, (847) 439-4700 d, 726-1660 eves.

WANTED: S-meter for CR-88. Gene Peroni, KA6NNR, Box 58003, Philadelphia, PA 19102. (215) 665-6182 dys.

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

WANTED: Info/history on WW2 TCS radio system for article. Your help appreciated. Thanks. Greg Greenwood, WB6FZH, Box1325, Weaverville, CA 96093. greg6fzh@aol.com

WANTED: Pwr sply & telegraph key for TBY-8 to complete set. Bob Forte, K2RGM, POB 160, Lake Luzerne, NY 12846. (518) 696-2400

WANTED: Intermediate freq xfmrs, 465 kc, Acratest if available. David L. Muse, 510 Minturn Ave., Hamlet, NC 28345.

WANTED: Coils for 160, 80 & 40 meters, prefer B&W MEI, JVL & TVI., Bud products will work too; parts or complete Globe King 500. John, AE4EN, NC, (910) 686-4236.

WANTED: HQ-100, HQ-100, HQ-100, HQ-100. Pete Cullum, KØWRX, 1332 Harlem Blvd., Rockford, IL 61103. (815) 965-6677

WANTED: Glass attachments for Marvel Violet Ray; tube CB sets/accessories, manuals, literature. C. Zafonte, N1FRX, RR3 Box 2075, Fort Kent, ME 04743. (207) 834-6273 eves/wkdys

WANTED: BC-312 or BC-342 or BC-348 military rcvr; schematic diagram for 117X 168 Swan AC pwr sply; Temple brand luggage type portable radio; 1930-1950 Popular Mechanics Magazines. Harry L. McCall, KB4CSY, 9135 Glade Valley Rd., Ennice, NC 28623. (910) 657-8248

WANTED: WRL-70 xmtr; HB xmtrs for display, must be museum quality; thousands of QSL cards to paper walls of Amateur display. Call Leo, (619) 321-1138

WANTED: Orig. tube-type CB radio operating/owners manuals; also tube-type CB radios. Walter Ryan, 7114 Geyser Ave., Reseda, CA 91335. (818) 344-8735

WANTED: Knight equip. all types; ham, shortwave, CB test, etc. Thank you. Walter, CA, (818) 297-7249.

WANTED: National sets MB-29 & 30; LC-3; SW-58C; SW-34 & HFC. Cash or trades. Robert Enemark, W1EC, POB 1607, Duxbury, MA 02331.

WANTED: Navy xmtrs: TCA, TCE, TCN, TCX, TDE; rcvrs: RAX, RBD, TBM; modulator CAY-50065. Steve Finelli, N3NNG, 37 Stonecroft Dr., Easton, PA 18045. (610) 252-8211

WANTED: Hammarlund Comet Pro parts & parts sets; coils & coils sets; National SW-3 model 1, 2 volt version (32-32-30 tubes); Browning Labs preselector, 1947; Hallicrafters xmtrs: HT-1, HT-4, HT-9, HT-19; Collins 310B exciter; other pre 1950 commercially built ham gear. Dean Showalter, WA6PJR, 72 Buckboard Rd., Tijeras, NM 87059. (505) 286-1370

WANTED: 6900, 845, E134 tubes, Dynaco, Eico, Fisher, Marantz, etc.; Western Electric tube audio amps. Robert, IL, (815) 229-1344

WANTED: SW-3 & Comet Pro set & coils; HRO7, R115, BC312/342. Rick, NM, (505) 983-3623.

WANTED: WW II Japanese military radio of any kind; pre-war Japanese QSL cards. Takashi Doi, 1-21-4 Minamidai, Seyaku, Yokohama, 246 Japan. Fax: 011-8145-301-8069.

WANTED: Gonset model G-28; Eico 730 modulator; kit manual for Eico 720. Dan Kernan, K3XR, 218 Balthaser Rd., Sinking Spring, PA 19608. (610) 670-2980

WANTED: Need S-meter to complete full restoration of Hallicrafters SX-99; appreciate any assistance w/replacement or repair of mine. Richard D. Cohen, 11802 Willow Point Way, Tampa, FL 33624. (813) 962-2460 after 6 PM EST

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

WANTED: To buy any Lunch Boxs & related items. Arthur Fritz, N3SFE, 104 2nd St., Montgomery, PA 17752. (717) 547-2674

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

WANTED: One and two tube receivers (regenerative), kits or homemade. Bob Mattson, KC2LK, 10 Jane Wood Road, Highland, NY. 12528-2607. (914) 691-6247, rmattson@freemark.com

WANTED: Still looking for Swan 160, other Swan stuff any condx. Eric, KB0XP, Box 98, Stanton, IA 51573. (712) 829-2446

WANTED: JW Miller RF coils; IF trans; chokes. Buying JW Miller & Millen parts, esp. need Miller B-727; B-727C; S-27; 912-C2; 912-C4; 912-C5. WA5THL, Rt 9 Box 163, Alvin, TX 77511. (281) 331-2956

WANTED: Hammarlund HC-10 converter; cabinet for R390A; EV 638 mic. Dave Humbertson, W3NP, HC86 Box 123A, Fort Ashby, WV 26719

WANTED: Suggestion for suitable replacement of Q1 (K1504 RF P-channel FET) in Davco DR30 rcvr. A.J. Bernard, POB 690098, Orlando, FL 32869-0098. (407) 351-5536

WANTED: Rcvrs R-388 or 51J-4. Will pay fair price for good rcvrs. James B. Geer, WB5LXZ, 1013 Overhill, Bedford, TX 76022-7206. (817) 540-4331

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

WANTED: Telephonics earphones TH37, short Y cords ST17, ST19 cords; throat mic RS76, 37A17. James Treherne, 11909 Chapel Rd., Clifton, VA 20124. (703) 830-6272

WANTED: Good to exc SX101 Mark III w/160M. Herb, K9GTB, IL, (618) 362-6312.

WANTED: Bendix MP28 pwr unit & Bendix TA-2 xmtr or info on same. Thor Lyford, WQ1K, 1354 Arden View Dr., St. Paul, MN 55112.

The Radio Finder©

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April Specials:

AM transmitters: T-368-F, Collins 32V-3, 32V-1, Johnson Valiant, Desk KW, Ranger, Heath DX-100, Harvey Wells TBS-50, Multi-Elmac AF-67, AF-68.
SSB transmitters: Hallicrafters HT-32, HT-32B, HT-37; Central Electronics 100-V; Drake T4XC; Gonset GSB-100.
Rare find: Collins 62S-1 VHF transverter.
Receivers: Collins 51J-4, R-388, 75S-3B, 75A-4, 75A-3, 75A-2, 75A-1; National HRO-500, HRO-60, FRR-59A, NC-300, 1935 HRO, NC-101-X, NC-183; Hallicrafters SX-88, SX-73, SX-101A, SX-28, SX-17; Hammarlund SP-600, SP-200, HQ-140-X; Military R-390, R-390-A, R-220 (VHF); R-1051-B, R-1051-E; Miltronix R-389, R-390, R-390-A, R-725; Multi-Elmac PMR-7; Scott SLR-F.
Transceivers: Collins KWM-1; Hallicrafters SR-150; Heath HW-100, HW-16; Yaesu FT-101-EE complete line w/VFO, phonepatch, scope, digital readout; SBE SB-34
Linears: Johnson Thunderbolt w/Peter Dahl transformer; Yaesu FL-2100B.
Miscellaneous: Johnson KW Matchbox with SWR meter; Collins 516F-2, 312B-4, 312B-1, DL-1.

WANTED: 62S-1; KWS-1, 75A-1/2/3/4; 310 exciters; 32V-1/2/3; 75S-3B/C, 32S-3/32S-3A; 51S-1; KWM-1; KWM-2/KWM-2A; MM-1, SM-1/2/3; other Collins accessories; HALLICRAFTERS SX-28/28A; SX-42; SX-73; SX-88; SX-100; SX-115; HT-20; HT-32B, HT-33; TEN-TEC ARGOSY II.

Radio Finder website: http://www.radiofinder.com

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FOR SALE: Just released: Send 2-stamp LSASE for latest Olde Tyme Radio Co. Flyer 196A. Olde Tyme Radio Company, 2445 Lyttonsville Rd., Ste 317, Silver Spring, MD 20910.

FOR SALE: DX60 - $110; Viking Valiant - $300; Yaesu 101E w/counter, spkr, AM filter - $350; Globe 300 - $325; 32V3 - $475; EICO 720 modulator - $100; SX101A - $225; Globe Chief Deluxe - $125; Knight T60 - $95; Heath AT-1 - $75; Viking 6n2 - $90; Multi-elmac AF68 - $65; Gonset 2 meter - $55; Hallicrafters S14 - $125; Heath 2'er - $45. PU only S. Jersey. Peter, N2IDU, NJ, (609) 296-7437.

FOR SALE: Hallicrafters SX110 SW rcvr w/R48A spkr - $175. Frank Brewster, RR2 Box 201C, Baxter Spgs, KS 66713. (316) 856-3220

FOR SALE: Collins 75A1, serial 309, exc. orig. 270G-1 matching spkr, serial 83, VG, 32V1, serial 684, VG. PU only - $1000; NC183, gd - $150; NC173 gd - $100. **WANTED:** Manuals NC300; Laf HE80; Collins 310B, copies OK, exc condx; NC303; DX100B; 75A3, trade or cash; 500 ma 2000V xfmr; 3 KV DC meters; BC610 final var. cap. Sam Champie, W7XXX, 105 W. McKenzie, Hermiston, OR 97838. (541) 567-2879, weekends only

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FOR SALE: New Collins 500 kHz filters 2.7 kHz wide, used in 51S1, works in all 51J series & R-388 - $75 + shpg. Walter M. Chambers, K5OP, POB 241371, Memphis, TN 38124-1371. (901) 761-9381

FOR SALE: Tube list, new & used, wide variety audio, ham. Recently expanded. SASE 52¢. Bill McCombs, WB0WNQ, 10532 Bartlett Ct., Wichita, KS 67212-1212.

FOR SALE: Good finish & performer NC 300 w/manual - $195 +. RF Haworth, W2PUA, 112 Tilford Rd., Somerdale, NJ 08083. (609) 783-4175

FOR SALE: Viking 500 - $1000, OBO PU; Collins 212S1 console - $375 PU; Valiant cabinet - $45; 32S1 junker - $40. Michael, WM1O, NY, (914) 834-7678.

FOR SALE: 1930 National SW-5, AC model, VG, working - $450; mid 30's Howard; Silvertone 5656A, rare communications rcvr, VG, working - $250. Greg Gore, KF4PRN, 11528 Watermoss Ln., Charlotte, NC 28262. (704) 549-4719

FOR SALE: Collins 75A-1 - $395; Drake L4B - $695; TR4C/AC4 - $350. Ron, K1BW, MA, (413) 538-7861.

FOR SALE: At Dayton space 3352: Collins, keys, bugs, military; plenty of old stuff. Send SASE. Bob, 23 Daniluk Dr., Camillus, NY 13031.

FOR SALE: Heath SB610 monitor scope, book, average - $65; ARC-5s - call. Ken Kolthoff, K8AXH, 5753 David Pl., Fairfield, OH 45014. (513) 858-2161

FOR SALE: Patterson 16, needs cosmetics & work - $500 + shpg/hndlg. L. Schimmel, POB 1234, Spanaway, WA 98387.

FOR SALE: Vintage equipment manuals starting at - $5; Hallicrafters, Johnson, WRL, others. SASE for list. DSM Diversified, 909 Walnut St., Erie, PA 16502.

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

FOR SALE: Drake 2B, nice - $130; Hallicrafters HT-40 xmtr - $65; Knight Ocean Hopper, no case, 5 coils - $75; orig SX-99 manual - $10; SASE for list. Most w/manual & + shpg. Larry Wright, N4QY, 170 Heritage Ln., Salisbury, NC 28147. (704) 633-3881

FOR SALE: Fully operational vintage test equip needed to maintain vintage radio equip, calibrated w/manuals: GR1001A HF sig gen, 10 kHz-50 MHz - $125; GR1650A RLC bridge - $150; GR1650B - $200; HP410C VTVM, measures AC, DC, RF (to 700 MHz) - $100. Chase Hearn, 104 Glenwood Dr., Williamsburg, VA 23185. (757) 229-7263

FOR SALE: Collins: 75A4, clean & orig, KWS-1, w/manuals, needs TLC - $1850 for the pair; 32S-3 RE, very sharp - $600; 516F-2 RE, w/manuals, clean - $150; Johnson Thunderbolt, w/manuals, exc condx - $500; possible ship or delivery on all. Dennis, ID, (208) 853-8711 anytime. leeid@ix.netcom.com

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FOR SALE: Rare pair Conar 400 xmtr, 500 rcvr, orig manuals, ex condx - $110 + shpg. Tom Jurgens, KY8I, POB 324, Bridgeport, MI 48722. (517) 777-2334

FOR SALE: RCA AR-88D rcvr, exc condx w/ external S-meter & manual - $600 + shpg. Cormac, W7JHS, WA, (509) 786-3099.

FOR SALE: Eldico S-119 communications set (The Collins Clones), good working condx, complete manual, cables & spare restorable xmtr - $450 + shpg. Cormac, W7JHS, WA, (509) 786-3099.

FOR SALE: DX-60B, HG-10B, DX-40, Johnson KW Matchbox, HT-40, 22'er, Globe 6-2 VFO, Lafayette stuff. Richard Lucchesi, NY, (516) 798-1230. wa2rqy@juno.com

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FOR SALE: Collins KWM-2 round; PM-2 sply in Samsonite carrying case - $700 + shpg. Merle, W1GZS, FL, (352) 568-1676.

FOR SALE: New orig. PJ-068 mic plugs for Collins S-line/KWM-2A/HF-380 shp'd in USA - $8 ea. Clint Hancock, KD6H, 6567 Ashfield Ct., San Jose, CA 95120-4502.

FOR SALE: KWM-2 fan bracket - $15 ppd. Dave Ishmael, WA6VVL, 2222 Sycamore Ave., Tustin, CA 92780. (714) 573-0901

FOR SALE: Apache - $195; NC125 - $110; Johnson 6N2, set-up complete - $150; Collins 51VZ - $95. Fred Watson, KB8NRF, 581 W. Summit St., McClure, OH 43534. (419) 748-8798

FOR SALE: Hallicrafters S118 - $60; FPM 300 xcvr - $350; Boonton 170A Q meter - $100. WANTED: Early HRO coils. Mel, K2AOQ, NY, (716) 671-0776.

SALE/TRADE: Thordarson multiband 100w xmtr, PU ony; Hammarlund 4-11 modulator restorable - $50 + shpg. **WANTED:** Clean Viking I front panel; Collins G133 rcvr. Tom Smith, N5AMA, 13034 Elmington Dr., Cypress, TX 77429. (713) 376-3436 h, 957-6420 w tsmith@lle.com

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FOR SALE: Viking phone patch in VGC - $30; ? Cesco tel-o-patch - $10; audio VOX FM converter for car radio - $10. All + shpg. SASE please. Don Dillard, 5106 Red Oak Dr., Amarillo, TX 79110.

FOR SALE: Collins 75A2 - $425; Viking II w/122 VFO - $175. **WANTED:** NC 303 matching spkr. Robert Braza, N1PRS, 23 Harvard St., Pawtucket, RI 02860. (401) 723-1603

FOR SALE: Excellent RME69 cabinet - $50; rare, exc RME 69 600 ohm spkr, black wrinkle, trapezoid shape - $125. San, K5YY, AZ, (501) 756-5010.

FOR SALE: Sonar 2m AM - $125; Stancor ST-203A - $95; Somerkamp FR-100B - $225; Lafayette HA-225 - $125; Heath HG-10B - $75; HD-20 - $35; Twoer - $45; AR-3 case, new - $45; free list. Richard Prester, 131 Ridge Rd., W. Milford, NJ 07480. (201) 728-2454

FOR SALE: Hammarlund HQ100 rcvr, has hard to find clock; Telefunken Jubilate Deluxe AM FM short wave radio, has factory wood cabinet - $100 for both, U shp. Joe, WE5I, AR, (501) 257-2839.

FOR SALE: Gonset G-66B rcvr w/DC pwr sply - $85; Heath IG-1025 sig gen - $20; Precision E-200-C sig gen - $30; Superior TV-20 VOM, wood case - $25; EICO 635 tube tester - $35; EICO 666 tube tester - $30; Yaesu FT 401B w/matching spkr - $250; Yaesu FT 101 EX w/matching spkr - $275; Simpson 372 ohm meter - $15; Galaxy III mobile pwr sply - $25; misc parts for Galaxy III & 110V pwr sply, inquire w/needs. Cliff, WB8LNG, 5 Fab Ave., Sierra Vista, AZ 85635. (520) 459-4109, weekdays & Sat's 9:30-5:30 MST

FOR SALE: Johnson 250-33 audio amp - $125; BC-459A - $10; Shure 701D mic - $15; Hallicrafters S meter kit - $12. Joe Sloss, K7MKS, WA, (206) 747-5349

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

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

WANTED: Tubes 8005 & 6550; tube type mixing console. George Schwarz, 18504 Arrowhead, Cleveland, OH 44119. (216) 486-6489

WANTED: Johnson or B&W Electronic TR switch. Frank Scutch, W4FMS, (954) 472-9474 or efs0038@email.mot.com

WANTED: VFO knob for Johnson Ranger II; modulation xfmr for B&W 5100. Andrew Dinger, KA0SDT, 201 Moore Dr., Lacrescent, MN 55947. (507) 895-8926

WANTED: Johnson Viking Valiant II; Swan 600R custom; Hammarlund SP600-JX21A; TMC GPR-92. Ric, C6ANI, POB N4106, Nassau NP, Bahamas.

WANTED: Orig key & filter unit for SCR-288 WW II radio unit. Pat Stewart, W7GVC, 1404 Ruth Ave., Walla Walla, WA 99362-3558. (509) 525-1699

WANTED: Manual TMC rcvr type GPR 110S. Harry Weber, 4845 W. 107th St., Oak Lawn, IL 60453-5252.

WANTED: AC pwr sply for Elmac AF-67 xmtr. Harold Sullivan, 15300 Prairie Rd., Andover, MN 55304-2625. (612) 434-3003

WANTED: January 1963 QST. I will reimburse shpg, etc. Thanks Ron Lowrance, 6340 Black Oak Dr. Cumming, GA 30130.

WANTED: 572B tubes, w/large roller inductor. Lane, KM3C, CA, (619) 470-6528

WANTED: For my fixer-upper HRO RX - table spkr, S-meter (working or not), coils G/H & I; 1931 & 1991 ARRL Handbook; Globe Scout 40, 65 or 66; Gonset Monitone; Philmore catalogs, 1958-64; WW2: MD-7, BC-456, FT-221, FT-225 and black wrinkle 6-9MHz RX (ARC-5 or 274N). Greg Greenwood, WB6FZH, Box 1325, Weaverville, CA 96093. (707) 523-9122, greg6fzh@aol.com

WANTED: 6000, 250TH, 100TH; 160, 80, 40 coils for 610; T368 exciter; BC-614. Mike Malta, WA4FRB, 1256 Kesler Rd., Front Royal, VA 22630. (540) 465-6422

WANTED: GPR 90 matching spkr. Don, W7KCK, OR, (503) 289-2326.

WANTED: Heath HW-16 xcvr & HG-10B VFO, mint to exc. Michael, WA8LAG, OH, (216) 951-3124

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

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

FOR SALE: Rcvr preselector filters. Tight bandpass filter eliminates broadcast band interference on 160 meters. Works especially well with older rcvrs, limited quantity - $54 ea ppd. James Owens NWØO, 1363 Tipperary St. RR#3, Boulder, CO 80303-1621. (303) 673-9019

FOR SALE: HT32A parts, SP600 - $145. **WANTED:** 2500V 700 MA xfmr. W7RBF, AZ, (602) 864-9987.

FOR SALE: ARR-5, SX28 - $100; ARR-7, SX36 - $75; 2 racks BC-610 xtals - $50, OBO. W5WBA, NM, (505) 831-2646.

FOR SALE: Rare Hallicrafters S-72L, VGC - make offer; Drake L-4 amp, VGC - $500 prefer PU. Bob, K8RNE, OH, (216) 322-8722.

FOR SALE: ARC-5 Command sets, 80M, RX & TX, 40 M TX & TX; Q'5er. Joe, K2QPR/4, FL, (561) 220-7362.

FOR SALE: Gonset G-76, no pwr sply - $150; Drake T-4X - $100; Heath DX-40 - $50; SX-88 band selector drive belts - $25 ea or 2 for $40. **WANTED:** Good panel for SX-88 or parts radio; matching spkr for Lafayette HE-10; B&W model 2175-2179 plug-in coils. Jim Jorgensen, K9RI, 1709 Oxnard, Downers Grove, IL 60516. (630) 852-4704

FOR SALE: Collins 75S3, 32S1, 516-F2 - $800; 30S1 - $1250; 75A2 w/Central Electronics SSB slicer - $395, all very good; HQ-180 clock, spkr - $300; HQ-180C, parts/repair - $100; BC-312 - $125. **WANTED:** Johnson/B&W SSB adapter, 75A4 filters. Jim, N1MAA, RI, (401) 253-4257.

FOR SALE: Drake L4B, w/brand new spare set of Eimac 3-500Z's - $825. Lane, KM3G, CA, (619) 470-6528

FOR SALE: Convert any wattmeter to read PEP! Perfect for AM/SSB - $19.99 ppd for complete kit! HI-RES, 8232 Woodview, Clarkston, MI 48348. (810) 391-4660, hires@rust.net

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

FOR SALE: Free K7FF mailorder list of parts/equip; ten pages, including antenna parts/coax etc., for spring antenna projects, two first-class stamps/mailing label or e-mail karenski@inreach.com. QSO? I'm on 80/160 CW using the K7FF Super Sloper antenna (article in upcoming issue CQ contest magazine). Derek, K7FF, 5191 Rimwood Dr., Fair Oaks, CA 95628. (916) 965-4904

FOR SALE: Over 700 military radio equip TO's (tech manuals), for free list e-mail karenski@inreach.com or $2 & mailing label to Ski, WA6AME, 7966 vintage Way, Fair Oaks, CA 95628. (916) 966-4749

FOR SALE: Collins mech filter adapter plug-in, 353C-31 for 75A-1 & 353A-15 for HRO-50 - $200 ea; Japanese WW II field phone - $125; German WW II field phone (2) - $250; K-274 rcvr - $350; National SW-3, 4 sets of coils - $350; SX-28 rcvr, nice, as is - $200. George, K1ANX, MA, (413) 527-4304.

FOR SALE: MFJ verse tuner II model MFJ941D - $60; Realistic DX-150 - $65 + shpg. Tom Murray, 3177 Latta Rd. #409, Rochester, NY 14612. Ph/FX (716) 723-1672. tomvidtek@aol.com

FOR SALE: Two exc R-388s - $325, w/handles; $295 w/o handles; AF-67 - $80; parting out SX-28. U shp. George, WA7HDL, ID, (208) 756-4147 after 0030Z.

FOR SALE: Ranger - $150; RME 45 rcvr, outstanding - $225; Heath HO-10 monitor scope - $125; SB-200, mint, w/o tubes - $225; Amp Supply LA-1000 HF amp, 160-10M - $325; Ameritron AL-811, 160-10M w/o tubes - $325; Buttermut HF6V - $75; Unique ant. tuner - $175. Lane, KM3G, CA, (619) 470-6528

WANTED

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

WANTED: Hallicrafters HA-6, SX-88, SX-115; National NC-183; Ranger II; knobs for SX-99 (i.e. volumn & pitch control); broadcast mic; BC-348 parts rig; Viking Valiant. Emil T. Zelasko, KA8GEF, 9401 Grand Division, Cleveland, OH 44125. (216) 883-5134

WANTED: BC348 shockmount FT154; R392 shockmount MT836; R390, R390A, R392 in very good or exc condx shape. Will PU within 300 miles. Top cash for top units. Have 11 BC610 tuning units, BC375 TU10B, TU6B w/cases to trade for very good ARC-5 rcvrs. Dave Sundheimer, WØNBZ, 13020 Lakeview, Burnsville, MN 55337. (612) 890-1844

WANTED: Manuals, Heath model IP32 regulated pwr sply; HP audio oscillators, 200 CD & PL4. Allan Lurie, W9KCB, 605 E Armstrong Ave., Peoria, IL 61603. (309) 682-1674

WANTED: DM-24 dynamotor; R25/ARC-5 1.5-3.0 MC rcvr. Pete Hamersma, WB2JWU, 87 Philip Ave., Elmwood Park, NJ 07407.

WANTED: For BC-375/191 - 1 top cover, 1 back panel, 2 front panels; Scott SLR-M. Marty, K1CVF, Box 21, Bridgewater, CT 06752. (860) 354-9035

WANTED: Radio rcvrs R96A/SR, R203A/SR for parts or radiomarine 8506-B, radiomarine 8510 & Makay 3007A. Mike, CA, (209) 931-6059

WANTED: Restorable or parts Ranger & any Hallicrafters SR series rigs; nice RME 70 or 79. Ron, WØOIZ, KS, (913) 268-5973. arongv@aol.com

WANTED: RME 45, 70, 99, 99 Deluxe, 79; parts or restorable Ranger & any SR series rigs. Ron, WØOIZ, KS, (913) 268-5973. arongv@aol.com

WANTED: Heath part 422-626 or UA78MG for IP2715 pwr sply. Robert Milligan, K14MB, 6608 N. 18th St., Arlington, VA 22205-1802. (703) 533-0650

WANTED: Cash for Collins SM-1, 2, 3; 312A-1, 2; 55G-1; 62S-1; 399C-1; 51S-1; 302C-3; KWM-1; KWM-380; also buy estates. Leo, KJ6HI, CA, ph/fax (310) 670-6969.

NOTICE: Stop by spaces 1960-1961 at Dayton. Bring manuals to trade or sell. The Manual Man, 27 Walling St., Sayreville, NJ 08872. (908) 238-8964

WANTED: I would appreciate info from anyone w/personal anecdotes, paraphernalia, including logs, maps, & equip, associated w/the "War Emergency Radio Service (W.E.R.S.)" during WW II. I would like to include this data in a forthcoming presentation at the Antique Wireless Association, Sept. 3-7, 1997. Bob Grinder, K7AK, AZ, (602) 948-2743, Fax, 922-3666. atreg@asuvm.inre.asu.edu

WANTED: Triad F32A filament xfmr; Ohmite series A 25 ohm 150 watt pot; General Radio Co. type 906 friction dial; 4 RCA 6SF5 tubes; any Weston model 733 panel meter; instruction books for Western Electric 106A & RCA MI-9375 monitor amps. John P. Tiedeck, WA2SDE, 212 Grandview Rd., Media, PA 19063. (610) 566-8049. Fax 566-0763

WANTED: Zenith Royal 500 Deluxe transistor radio, electrically & cosmetically exc to mint only. Gordon W. Hullin, K2ZBU, 3666 Cold Springs Rd., Baldwinsville, NY 13027. (315) 622-0141

WANTED: Swan Mark 6B Linear and PS/Modulator for Clegg Zeus. Joseph W. Pinner KC5IJD, 201 Ruthwood Drive, Lafayette, LA 70503, (318) 981-7766, kc5ijd@net-connect.net.

WANTED: 120 VAC 3" rd meter; Heath AT-1 meter. **FOR SALE:** "Principles of Radio Servicing" 1943 - $5. Chris Cross, Box 94, McConnell, IL 61050.

WANTED: Zenith T/O 600 series/leather in mint condx; T/O R-520/URR; Sony TR-714 AM/SM shirt pocket transistor from late '50s. Jeff Wayne, K1YLV, 61 Allendale Dr., N. Haven, CT 06473. wayne4@snet.net

WANTED: The oscilloscope probably goes back to the late '20s. Info on development of the practical oscilloscope for possible ER article. Kurt H. Miska (810) 641-0044 w, (313) 663-1642h, khm@tir.com

WANTED: DX Engineering speech processor and rack mount for KWM2A. Arnie K1NFE, CT, (860) 675-3333

FOR SALE: Dynaco SCA-80 two (or 4) channel transistor amp, 40 watts (or 20) per channel, perfect - $120 ppd. Charles Graham, 4 Fieldwood Dr., Bedford Hills, NY 10507. (914) 666-4523

FOR SALE: HQ110, works, fair cosmetics - $75; HQ170, nice - $125; HQ145 w/clock, very nice - $175. Plus shpg. Dave Metz, VA, (540) 885-7914 till 10 pm E

FOR SALE: SX-111 - $130; SX-117 - $100. Ed Sauer, KC9SP, 787 N. Peterman Rd., Greenwood, IN 46142. (317) 881-1483

FOR SALE: Tubes, new and used audio, antique, ham. List updated monthly. SASE $.55. Bill McCombs, WB0WNQ, 10532 Bartlett Ct., Wichita, KS 67212-1212.

FOR SALE: Test sets: 1-139A, I-176; control unit RM-53/TM11-2632; NAPDA MC-85/U mic; T-17 (4857-CHI-42) mic; C-847/U R392 spkr; AF-67/PMR-6A manuals. Charlie, W5SGT, TX, (915) 677-3675

FOR SALE: B&W 5100B/515B-B/650 wattmeter dummyload, very good condx, w/manuals - $350 + shpg. Mike, NØWEL, (612) 559-3971

FOR SALE: Collins 618-T3 w/military trunk - $500; Navy rcvr AN/SRR-13A S/N 881 - $200. Plus shpg. Fred, KI4YL, NC, (910) 883-0897

FOR SALE: Motorola Conelrad rcvr (xtal controlled BCB rcvr) model D59660A - $50 OBO. Harry Blesy, N9CQX, 95740 Clarendon Hills Rd., Hinsdale, IL 60521. (630) 789-1793

FOR SALE: Hallicrafters S-107 - $125; WR-600 - $75; Heath HR-10B - $75, AR-3 - $75. Clean, working. Stuart T. Carter, II, W4HNC, 680 Fernwood Dr., Melbourne, FL 32904-1995. (407) 727-3015

FOR SALE: BC-339, 1000W out RTTY, PP833A's driven by 813 exciter - $500. Fred Althouse, KE3FV, 5730 Pine St., East Petersburg, PA 17520. (717) 581-0498

FOR SALE: Collins mech. filters F 455, 2.1 kHz, 526 9427 00 - $80; Heath HD10 keyer - $45; HD15 patch - $40; HM102 SWR/PWR meter - $35; AM2 SWR bridge - $25; AR-88 - $300. Larry, VE3RF, Box 509, Ayr, Ont., N0B 1E0, Canada. (519) 632-7921

FOR SALE: ARRL Hbks: 1933 - $50, 1942/43 - $25 each; mil tech manuals: T-368 - $35, BC-603/604 - $20, VRC-12 - $15 pr., BC-611 - $20. LSASE for list. Gary Cain, POB 521, Shakopee, MN 55379.

MESSAGE: Talk to me again at Dayton. Look for WW II uniform or Space #1353. Sam Hevener, W8KBF, "The Signal Corps", 3583 Everett Rd., Richfield, OH 44286-9723. (216) 659-3244

FOR SALE: Collins 455 mech.filter - $195. **WANTED:** Old broadcast mics; ultraviolet ray devices. C. Zafonte, N1FRX, RR3 Box 2075, Fort Kent, ME 04743. (207) 834-6273

FOR SALE: Rare Drake C4 station monitor w/remote antenna, power block, manual, mint - $350. WA7IHN, POB 442, Aumsville, OR 97325. (503) 749-1149

FOR SALE: Heath Marauder HX-10. Lee, K7MBJ, 4874 Powell Hwy, Cody, WY 82414. (307) 587-9506 or 864-3286

FOR SALE/TRADE: Ranger II; Challenger; HT-37; ARC-5 xmtrs; SP-200; 75A-3; HM-15; AM-2. SASE. **WANTED:** Navigator; SBE-2 manual, PS. Sam Timberlake, POB 161, Dadeville, AL 36853. (205) 825-7305. stimber@worldnet.att.net

FOR SALE: WS #19 headset/mic assemblies, new - $40, used - $25; 60' extensions, new - $35; Variometer (minor paint chips), new - $65; spares chest 5C w/key, complete, new - $135. Military Marketing, Inc., Box 741, Norcross, FA 30091-0741. (770) 729-9315

FOR SALE: Orig. manuals, unused condx. TM 11-800 BC191A-E, 1942/51 - $12; TM 11-620 SCR-608-A,B & -628-A (BC-683/684) 1947 - $20; TM 11-601 SCR-808-A & -828-A (BC-923/924) 1945/51 - $20; TM 11-867 BC-787-B (S-36) 1944 - $10; TM 11-308A RM-29-A 1943 - $7; TM 11-284 AN/GRC-328 1950 - $15; TM 11-5039 AM-65/GRC 1951 - $7; TM 11-5036 PP-109 & 112/GR 1951 - $7; TM 11-289 RT-66,67&68/GRC 1951 - $15; TM 11-5038 AN/GRA-6 1951 - $7; TM 11-5020 RC-292 1950 - $6; TM 11-296 AN/PRC-6 1951 - $6; TM 11-612 AN/PRC-8,9 & 10 1951 - $14; TM 11-295 AN/GRR-5 1952 - $10; TM 11-291 AN/BRC-13,14 & 15 1951 - $15; TM 11-306 ME13 A-D 1946 - $10. Have multiple copies. Shpg incl. in US. August J. Link, 2215 Faraday Ave., Ste. A, Carlsbad, CA 92008. (619) 438-4420 d, FAX 438-4759

FOR SALE: Heath RX1 Mohawk rcvr, TX1 Apache xmtr, both exc., manuals - $175 each; SB10 sideband adapter - $50. Dave, W1DWZ, (508) 378-3619

FOR SALE: HRO 5TA1 w/A/B/C/D coils, very good condx - $350; Browning Labs mic - $45. Donzil, WSØF, AZ, (520) 772-1297

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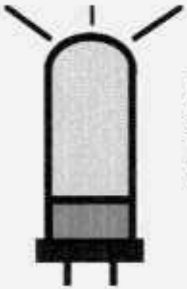

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