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ELECTRIC RADIO

celebrating a bygone era

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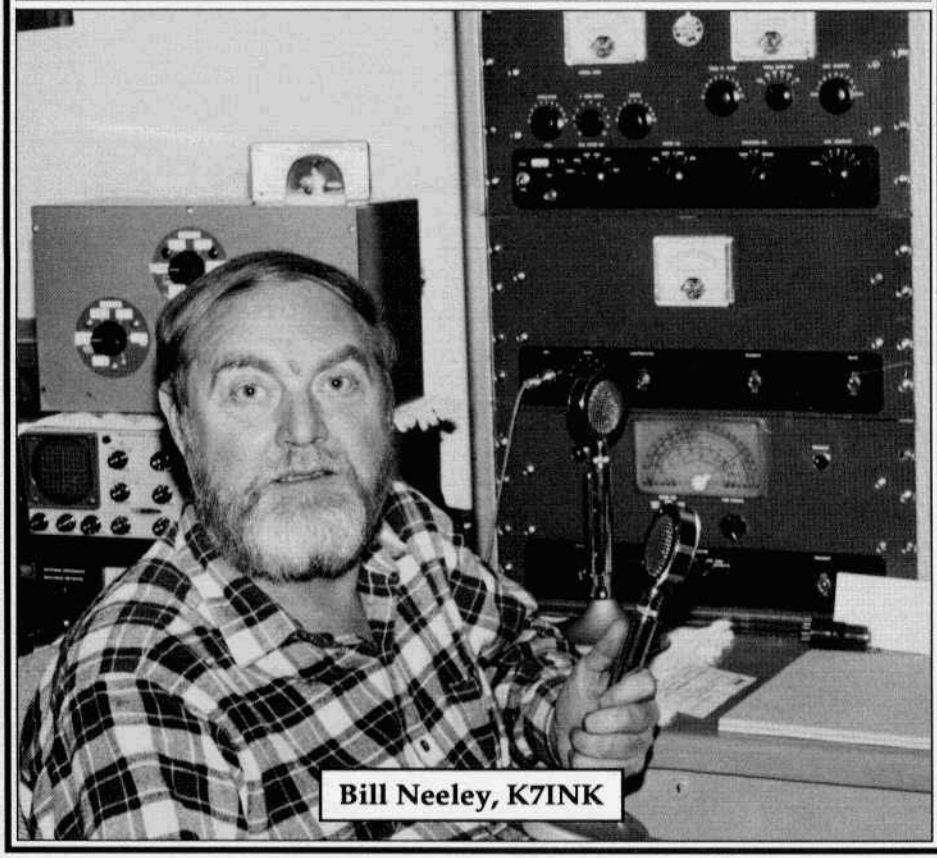

Bill Neeley, K7INK

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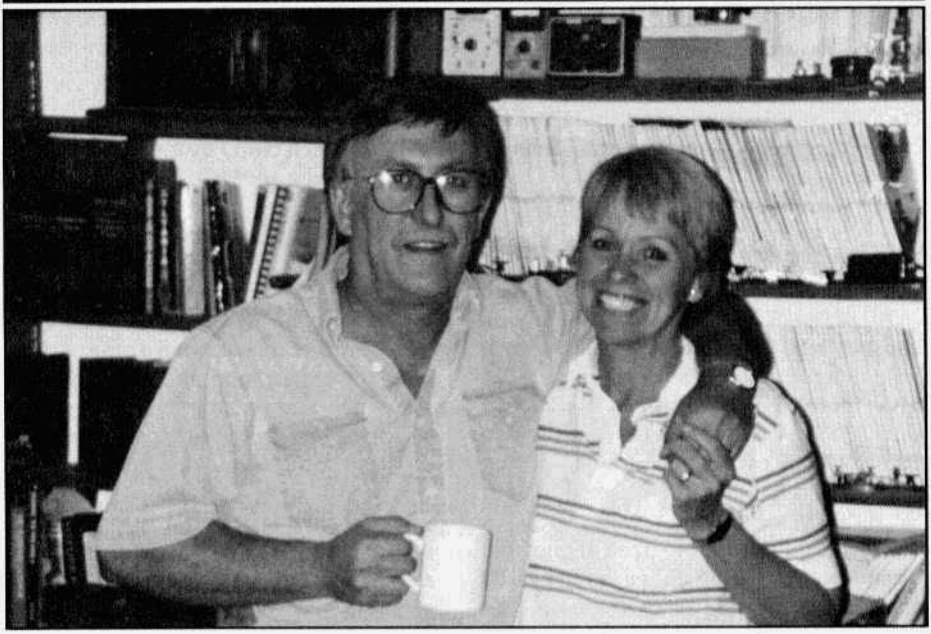
DALE GAGNON, KW1I..... AM REGULATION UPDATES

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

Electric Radio Solicits Material

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

EDITOR'S COMMENTS Barry Wiseman, N6CSW/Ø



This is a photo of the ER 'staff' taken by Dave Ishmael, WA6VVL, when he stopped by earlier this summer. Editor/Publisher (boss), N6CSW, with his long-suffering wife Shirley of 20 + years, who is now the ER 'OFFICE MANAGER'.

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Cover: Bill Neeley, K7INK, westcoast AMI director, at his operating position. The transmitter behind him is a Globe King 500C. Bill is one of the most active AM'ers on the west coast.

The "S" Meter Report... What does it mean?

by Dennis Petrich, KØEOO
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San Jose, CA 95120

Over the years I have homebrewed receivers, transmitters, amplifiers, transceivers, aligned and refurbished commercial receivers, and for the most part I have made understanding ham equipment theory a big part of the hobby. But, the part that has eluded me over the years has been the evolution around the "S" meter.

All of the "S" meter scales seem to look similar, but, the reports given by each ham in a round table sure do vary. What gives here ?? Each meter is marked S1 through S9 with anywhere from 40dB to 80dB over S9 on the meter face, so they should all read the same up to 40dB over S9, right? Wrong!

Most of us have apologized at one time or another for giving either too liberal or too scotch a report to a fellow ham. So I asked myself, why hasn't this problem straightened itself out over the years?? Well, it actually has. Most of the equipment manufactured over the last 25 years subscribes to one standard agreed to by most manufacturers. But we don't use equipment manufactured in the last 25 years. We use equipment made by companies during a time when these standards were evolving. A kind of primordial "S" meter time, so to speak.

For years I've been aware of the different standards companies have used for the "S" meter scale, but until recently I did not know about some of the early attempts made to try and define what was to be the undefinable. Not only did the companies have trouble setting criteria for the "S" meter, or in some cases the "R"-meter, but many of the circuits didn't work anything like the manual said they should, even when the circuit was working as designed!!

Well, I got curious and decided to investigate some of the history of the "X"-meter genealogy so I could better understand what was going on!

First, I tried to understand the manufacturer's dilemma a bit. Let's look at just what the "S" meter could be trying to measure. It could be measuring the RF voltage at the antenna, measuring the dB change on the antenna, displaying the dBm/Vu with respect to known standards, etc, etc...? To compound the problem, no matter which standard one picks, try and implement it accurately in a simple tube receiver on each of 5 or more bands over the entire band and with changing input impedance, antenna loads, etc, etc. . Quite a task even with today's technology and, oh by the way, make it all for under $100 too!

Consequently, most early manufacturers only claimed their "S" meters would make relative measurements of signal strength and were mainly intended as a tuning aid.

In a conversation I had the other night on 75 with Henry Rogers, WA7YBS, he told me about the Patterson PR-10 & PR-12 metering circuits. It seems they had an "R-meter" marked from 1 to 9 with four hash marks above 9 to full scale. The "R" stood for readability as the story goes. The Patterson was popular back in the '30's and was a big seller in the Asian countries.

My research then took me back to an old 1938 HRO instruction manual written by James Millen and Dana Bacon. In it they displayed a chart showing S9 being equal to 8 microvolts and full scale being 200 microvolts at 40dB over S9. In the article they also said the "S" unit was intended to approximate the "S" in "RST", where S1 is very weak and S9 is VERY STRONG! Now help me, how many microvolts at the antenna terminals of a receiver is VERY STRONG?? Hence the problem. For the National HRO engineers in 1938 it was 8 microvolts. Today, with the different band

conditions it's another number. (The values shown in figure 1 have been rounded up or down for ease of viewing. None of the receiver "S" meters tested was exactly to spec, but most were close with some work.)

Manufacturers of the time backed off from making hard and fast accuracy claims on their "S" meters due to the complications in maintaining the exact same receiver gain from the antenna terminals to the detector on all bands. A very hard task to perform without adjustments on every band. Ultimately most companies centered on doing the S-meter adjustment on 20 meters, mid-scale on the bandswitch. The relative accuracy would then vary as you changed from band to band.

Because the basis for the "S" meter scale was the RST's 1-9 relative scale, there was no relationship to actual microvolts inputs at the antenna, etc. . .Consequently, up to about 1965 each receiver company had to make a decision on which standard they were going to stick their neck out and use. As you can see from figure 1, three standards evolved by the three main manufacturers of receiving equipment, National, Hallicrafters and Collins.

All in all, who's to say which system is correct?? I even saw an RCA tech note from June of 1950 for an "S" meter circuit that stated: "You adjust the "S" meter for S9 based on an input signal just strong enough to overcome receiver background noise." That would be something around 3uV to 10uV in most cases. So, as you can see the whole subject is arbitrary at best.

Collins and Hallicrafters put together the best "S" meter spec definitions I know of. Collins defined S1 as approximately -110dBm/1uV, S9 as -70dBm/100uV and full scale as -10dBm/100,000uV. The Collins scale shows 40dB at S9 and 100dB at full scale or 60dB over S9. Now Hallicrafters did it differently. On many receivers they defined S1 as ØuV, S9 as 50uV and 80dB over S9 as 100,000uV. Both definitions increased the dynamic range of the "S" meter dramatically over previous standards used.

Consequently, the biggest difference between the National and Collins/Hallicrafters "S" meter standards was their full-scale spec. On today's bands strong signals are plentiful. The National receivers tend to peg the meter 40% of the time at my QTH whereas the Collins/Hallicrafters meters are still able to handle the dynamic range.

In closing, just pick the receiver you feel the most comfortable with and don't worry if your report is scotch or liberal, it's only relative anyway and among friends as well. I still like my National receivers even if they do give great reports.

I would be interested in any data or stories anyone might have on this subject. Especially, if you were there when these decisions were being discussed at one of the early manufacturers. **ER**

MFG/model	Spec uV@ S9	actual uV@ S9?	Approx.Full-scale uV/dB
NC/HRO	8	–	200/40
NC/HRO-5	25	25	300/40
NC/HRO-50	25	25	300/40
NC/HRO-60	25	25	300/40
NC/NC-183D	25	25	300/40
NC/NC-300	25	25	300/40
NC/NC-303	25	25	300/40
RME/4350A	100	7	–
Geloso/G209	100	30	10,000/40
HQ/HQ-170	?	10	——
Collins/75A-4	100	100	100,000/100
Collins/51J-3	100	100	100,000/100
Collins/75S-1	100	100	100,000/100
H/SX-101A	50	50	100,000/80

Figure 1

"The Gonset G-76 Transceiver"

by Walt Hutchens, KJ4KV
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The bad news about this summer's cross country 'Shore Leave' was that it kept me from finishing the T-8040 – but the good news is one of the hamfest stops that the Puppy From Hell (very mixed breed dog Judy) and I made turned up a Gonset G-76 AM transceiver. Now if I can just keep the mental wires from getting crossed while working on the T-8040 and writing about the Gonset G-76. Do you suppose those wires were always insulated with crummy old rubber or could the problem be too much ozone? Surely it couldn't be age. . .

The trip netted several other interesting ham and military sets but those are topics for the future. This month we're reviewing what seems to be the only all-band ham HF transceiver ever built for 'real' (plate modulated) AM operation.

Overview

The G-76 is an AM transceiver covering the 80, 40, 20, 15, 10 and 6 meter bands. The set transmits CW or AM voice; it can also receive SSB. Rated input power is 100 watts on AM and 120 watts CW. The transmitter and receiver are separately tuned; the transmitter can operate on crystal or VFO control on any band except 6, where it is crystal controlled only. Push to talk is provided.

The set measures 5-1/2" x 12-1/2" x 12" (H x W x D), and weighs 18 pounds not including the external power supply. It is designed for use with antennas of around 50 ohms. There are 15 panel controls. A panel meter is used both for transmitter tune up and receiver signal strength. The meter and receiver tuning dial are lighted brightly enough for use in the dark. There's no built-in loudspeaker; jacks are provided on the back for a mic, a key and external speaker or phones. Also on the rear are the crystal socket, the S-meter zero pot, the mic gain control, the power connector, a pin jack for metering final grid current and a VFO/crystal switch.

Counting the optional crystal calibrator accessory the G-76 has 19 tubes, all miniatures except for the octal 6DQ5 final and 6DQ6 modulators.

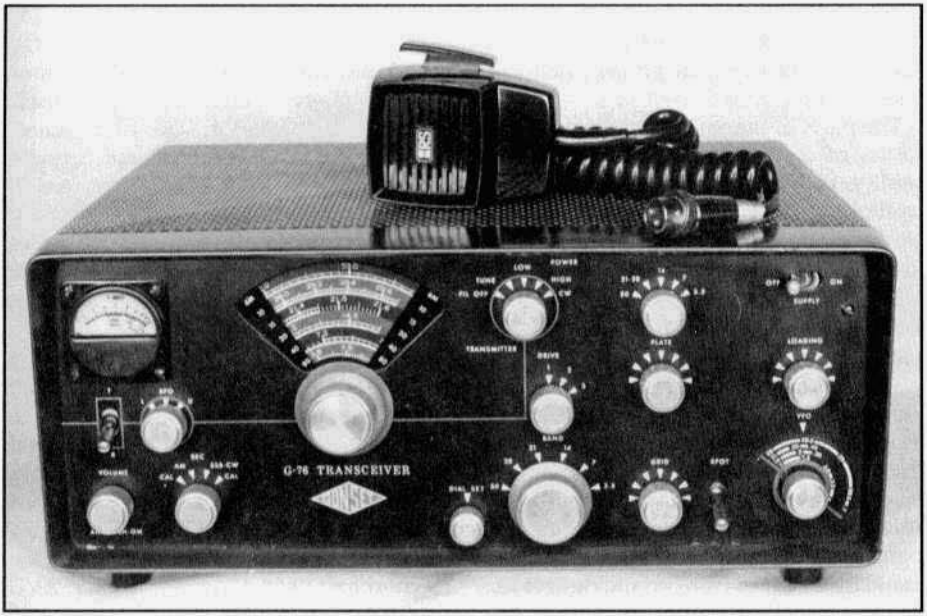
The G-76 was introduced in 1961 at $377; the next year the price was raised to $399. Matching mobile and fixed station power supplies (containing loudspeakers) were $145 each.

History

According to ads in QST, the G-76 was introduced in February 1961. The first question one might ask is: Why? By 1961 the day of AM was ending; new HF set designs were SSB designs.

Besides, Gonset already had the MSB-1 mobile SSB set, the G-33, 43 and 63 receivers, the GSB-100 fixed station SSB transceiver, the GSB-101 linear amp, the G-66 and 77 mobile AM receiver and transmitter, the G-50 and G-28 AM transceivers for six and 10 meters and the VHF 'Communicator' transceivers. Where in that product line was the hole which would be filled by the G-76?

There are a couple of possibilities: one is that Gonset was a developer's company and the effective strategy was 'one of everything'. Perhaps the company was trying to 'find the range' as the ham market shifted from AM to SSB and from homebrew to commercial equipment. Or they may have wanted a shot at the lower-price end of the mobile market. Their other HF mobile sets were the MSB-1 at $795 and the G-66/77 twins at $449 on 'Christmas special' – both prices less power supplies. Against these, the G-76



The Gonset G-76. The combination of black background, white lettering and blue accents with machined aluminum knobs makes this panel both easy to read and one of the best looking ever -- one that says 'quality' without being showy. Only a few glitches (the blue line, the location of the DRIVE knob, the two bandswitches, the old-style lettering for the 'G-76 TRANCEIVER') keep it from being a styling triumph.

would have had a considerable advantage. Whatever the reason, it was introduced, getting a several page review in the March, 1961 QST.

The set did not have a long run. The last G-76 ad showed up in QST in September 1962 and the set was last mentioned in a product summary ad the next month. There were no Gonset ads from January through July of 1963, then in August the Sidewinder 2 meter set, transistorized except for the driver, final, and mixer and boasting a power output of 20 watts PEP appeared. The same ad ran the next month -- but the company was now Gonset Inc., a Division of Altec Lansing. I looked at the ads for the next couple of years but none of the HF products showed up again.

My G-76 is s/n 18347 but I doubt that 18,000 were made; 1000 might be more like it. They turn up from time to time at hamfests, usually at prices in the $50 or $75 range.

Design

The construction of the G-76 is impressive. The cabinet is a five-piece spot welded steel assembly with five spun-in steel (not aluminum, not nylon) bushings for mobile mounting.

The front panel isn't the usual plate held on the front of the chassis by the control nuts. Instead, the steel chassis front extends the full height of the set and all the controls are mounted on it; the actual panel is a steel plate mounted on spacers about 1/4" in front of the chassis. Ugly control nuts, the dial lighting and the receiver dial itself are hidden between the layers giving a sturdy good looking front panel. A die cast shroud protects the knobs, stiffens the set, and adds to its attractive and modern appearance.

Cooling is outstanding, between the perforated metal top, holes in the bottom and slots in the chassis under the final and the modulator tubes. As evidence for

continued next page

good cooling, not a single carbon resistor had to be replaced for being out of tolerance -- a rare event in vintage restorations.

The parts in the set show a fine combination of cost control and attention to quality. For example all the tube sockets are molded Bakelite but the panel switches are top quality solid toggle types (not the cheap slide switches which began to be common about this time) and the PA rotary switches have heavy duty ceramic wafers.

The mechanical design of the G-76 is conventional: a spot welded flat steel chassis with most of the tubes mounted in the normal manner and the final, receiver RF stage and modulator mounted with the tubes horizontal. The layout is strictly logical with the transmitter RF section signal flow rear to front on the right side, the receiver at the left front, and the modulator on an upright deck at the left rear. In spite of its compact size, the layout is clean and open and the set is a cinch to work on.

The electronics are as straightforward as the mechanical design. The transmitter RF section consists of a 12BY7 Colpitts ECO working on 1750 to 2000 kcs for 80 and 40 meters. On the higher bands another coil and fixed capacitors are switched in to give a tuning range of 7000-7500 kcs. When crystal control is selected, the crystal replaces the VFO tank circuit. On six meters another crystal socket is connected in place of the tank. This should hold a 'rock' between 8334 kcs and 9 Mcs.

The VFO coils and fixed capacitors are in a steel box behind the final amplifier socket and the VFO tuning cap is directly below, under the chassis. That's not great (it is better to put everything in one box) but it's not that bad, either. The coils are wound on very heavy paper forms and the tuning cap is a double bearing receiving type unit with aluminum plates. Most of the fixed capacitors are dipped silver micas.

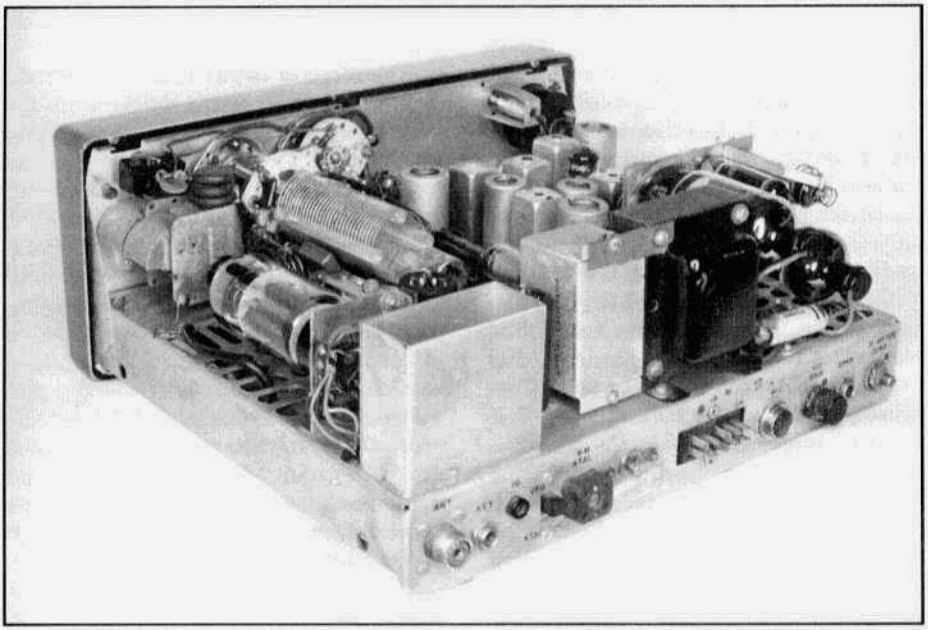
On the lowest band of each range (80 and 20 meters) the ECO output is on the fundamental and the 12BY7 driver thus can always operate as a multiplier, making shielding and neutralization unnecessary. The 6DQ5 final operates straight through; it is protected against loss of drive by a triode-connected 6AQ5 clamp tube. Output at 100 watts input varies from 55 watts on 80 to 30 watts on six meters. The final tank is a conventional pi network.

The receiver is a double conversion superhet. A 6BZ6 RF amp is connected directly to the pi net which serves as the antenna coil. A 6U8 local oscillator and mixer generates the first IF of 2065 kcs; a 6BE6 second oscillator and mixer takes that to 262 kcs. Two 12BA6 IFs drive a 12AL5 as an AVC/detector tube with the second half used as a noise limiter. AVC is applied to the RF, second mixer, and first IF stages. The receiver audio lineup is 12AU7-12AX7-6CM6 with one half of the 12AX7 unused; the spare half of the 12AU7 is the BFO.

The first local oscillator is done with the absolute minimum of parts; all the coils are slug tuned but the padding caps are fixed. Even so, once you adjust the DIAL SET control at one point the receiver dial is accurate within a kilocycle or two across the band -- a sign of careful work at the factory.

On transmit one half of the 12AX7 serves as a mic amp feeding the other half; the receiver output transformer has an extra winding and also serves as a driver transformer. The modulators are 6DQ6 sweep tubes operated class 'B' with the control grids connected to the cathodes and drive applied to the screens. This arrangement eliminates the need for screen and bias supplies (at the cost of increased driving power); you have to wonder why it wasn't more popular.

The set has several other interesting design features. The VFO has a dial about 2" in diameter and is only approximately calibrated. To use the VFO you either



The right rear quarter of the G-76. The box on the near corner holds the VFO coils; in front of it is the final. Across the rear are a Knight Kit calibrator, the mod transformer and the modulator assembly; note that the plate caps are molded plastic instead of cardboard or bare metal. The Air-Dux coil on top is the pi network tank coil.

zero beat the other station or center it in the receiver passband.

There are two bandswitches. The lower one handles the receiver RF and oscillator coils and the transmitter VFO and driver circuits while the upper one switches only the pi net; these controls could logically have been ganged since they must be set to corresponding positions.

A noise limiter is switched on by pulling the gain control knob. The panel meter reads final grid drive when the function switch is set to TUNE and PA cathode current when in LOW, HIGH (AM output) and CW modes. On receive it is connected as an S-meter.

SSB and CW signals are received by turning on a BFO; the BFO tuning knob is marked for upper and lower sideband reception. The AVC and S-meter are disabled on SSB/CW reception; a second section on the volume control is connected as an RF/IF gain control.

There's a master power supply switch on the panel (you don't have to mount the power supply where you can reach it) and a separate function switch position which turns off the transmitter PA and modulator filaments. Push to talk is handled by two 3PDT open frame relays. One contact goes back to the power supply where another relay turns on the transmitter high voltage when the set is keyed.

The only circuits shared between the transmit and receive functions are two audio stages and the pi net/antenna coil; the G-76 is only barely a transceiver.

On The Air With The G-76

My G-76 turned up in electrically good condition at the Atlanta, GA Hamfest. In fact it was in such good condition that when I switched it on not only did I get signals from the receiver but the transmitter had output and sounded good when monitored on the R-8040. The wattmeter, however, wasn't too happy – the

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Gonset G-76 from previous page

'76 wouldn't push the needle above 10 watts. Fortunately this was that rare 'easy one': the set had been modified by replacing the PA screen dropping resistor with 250k, perhaps in order to operate QRP. Fixing that brought the output up to 52 watts at 587 plate volts and 140 plate ma.

The set was even fairly clean, having only the usual operational dust on and under the chassis. There was a 100 kcs calibrator mounted inside; the job was neatly enough done that I didn't at first realize that it was a Knight-Kit unit rather than the G-76 calibrator accessory. Because of the modulator design, the G-76 requires only two DC voltages: 600 volts at 250 ma and 250 volts at 90 ma receive/200 ma transmit. The power supply with the set was a grim looking homebrew unit, but it seemed to work. I put a mating connector on a Radio Shack CB mic, plugged it in and started making contacts.

I never put a ham set on the air so easily; while the others were vintage SSB units which were more complicated it is still impressive to get a 30+ year old set working in a couple of hours.

The main restoration job was the case: the paint was badly peeled and chipped on the panel shroud and the perforated metal cabinet had some rust and several dents. Application of simple auto body repair techniques, repainting with some Chrysler Corp 'Charcoal Gray Metallic' touch up paint and a few hours of brushing and vacuuming of the inside and washing of the knobs and panel brought the set back to near original appearance.

My first impression was of a more than just 'noticeably drifty' VFO, a sensitive, reasonably selective and somewhat drifty receiver, and overall good ease of use.

Signal generator checks on the receiver showed assorted spurious responses when the input signal went over about 200 microvolts. The receiver plate voltage (from the Grim Power Supply) was 320 volts instead of the specified 250 volts... sure enough, when the voltage was reduced (a resistor and an OB2 and OA2 in series) the 'spurs' disappeared.

The receiver bandwidth measured 6.4 kcs at the 6dB points; touching up the alignment brought that down to 3.8 kcs against the spec of 3.0 to 3.5 kcs. The bandwidth at 60 dB was 28 kcs with a spec of 14 kcs. 'Skirt selectivity' problems can be caused by even a tiny amount of leakage between IF stages. An IF noise limiter ('IFNL', CQ magazine, June and November 1960) had been installed on the plate of the second mixer with the ON/OFF switch wires routed along the first and second 262 kcs IF stages. Since there isn't enough signal voltage at the mixer plate for this circuit to do any good (I had wondered why the noise limiter didn't work!), I took the whole thing out. The 60 dB bandwidth fell to about 18 kcs.

The last two problems would make it harder to copy signals when the band is crowded; such hard to spot side effects are the main reason I do a lot fewer 'mods' than when I was younger.

At 3885 kcs the usual KJ4KV transmitter test sequence of four minutes warm-up followed by 30 minutes of one minute transmit/four minutes key up cycling gave over 2 kcs downward drift. Another 10 minutes continuous key down caused about 1 kc more drift. Since the oscillator frequency is doubled again to get to 40 meters, the drift would also be doubled.

Since the oscillator operates on 7000-7500 kcs for 20 meters and higher I repeated the test at 14,286 kcs. The set drifted 1.2 kcs downward in 30 minutes of cycling and 300 CPS more in 10 minutes continuous key down. In both tests the drift was spread fairly evenly over the period so just warming up a little longer wouldn't make this a stable VFO.

The VFO design isn't that bad -- it seemed likely that proper temperature compensation for the 80/40 meter range could make things a lot better. Sure enough when I replaced the 750 mmf silver mica capacitor with three 220 mmf NPO and one 75 mmf N750 ceramic disk

caps in parallel, the drift at 3885 fell from 3 kcs in 40 minutes to wandering in a range of 350 cps. This is fine for vintage AM work and about what can be expected from a VFO of this construction.

Receiver drift in one hour was +2.4 kcs at 3885 kcs; at 7290 it was -2 kcs. Changes similar to those on the VFO improved things considerably.

Transmitters using TV horizontal sweep tubes are unfashionable these days (how long has it been since you've seen one in an ARRL publication?) but an unplanned test of the G-76's 6DQ5 left me impressed. When my antenna came unhooked during a transmission, the first thing I saw was the cathode current meter sitting off scale above 200 ma and the second was the plate of the tube glowing various shades of red to orange -- and no wonder, since the 24 watt plate was dissipating over 100 watts. I let go the mic button, reconnected the antenna, pushed the button again, and went on talking. When I checked later on the wattmeter, the tube was as good as ever!

Conclusions

Mechanically the G-76 is a nicely designed and solidly built radio. And the electronics work fine, allowing for a few 'wrinkles'.

Wrinkles: Just how stable should a VFO be? Surely the least you can ask is that during a long transmission others in the round table won't have to chase your signal down the band. By that standard, the G-76 is okay from a four-minute warm up on 20 and 15 meters, marginal (over 2 kcs drift) on 10, and not in the game on 80 and 40; on these bands you'd need at least a half hour warm-up to settle things down. This is the reverse of what you'd expect; it happens because the 7 mcs oscillator coil (20 meters and higher) has a temperature compensating capacitor while the lower band coil does not.

An unstable receiver isn't such a big problem; only one person needs to retune and if the guy you are talking to is drifting some, you have to do it anyway -- but a couple of kcs is a lot of drift on 80 and 40 meters.

Some of the design features and choices are, well, peculiar. Looking first at the worst, two bandswitches (both affecting both receiver and transmitter) is one too many. Intermediate level 'Handbook' designs do it that way, but one expects a more polished answer on a manufactured set. For a couple of bucks Gonset could have linked the two shafts (saving a knob) and gotten rid of the only real operational 'strangeness'.

Separate VR tubes for the VFO and receiver local oscillator were unnecessary: ECO's can be designed to not need regulated plate voltage or one VR tube could have regulated both oscillators.

You can probably live with having the rarely used controls and connectors out of sight, out of mind, and out of reach on the back of the set. But how would you change crystals or even switch from VFO to crystal in an under dash mobile set up? In a compact rig there will always be trade-offs but this was a mistake.

The drilled marks serving as pointers on the knobs are attractive but nearly invisible in the shadow cast by the panel shroud. They should have been filled with white paint. Both the receiver tuning and VFO (8:1 and 6:1 ratios respectively) are too quick for easy tuning -- especially tuning in an SSB signal on the receiver.

Running a tube with a 24 watt plate at 30 to 50 watts dissipation seems shaky, but it works; evidently TV sweep tubes are a lot tougher than the handbook ratings would indicate.

You have to wonder about including the six meter band. But many HF sets of the early 1960's did. And at the time, 160 (which today might seem a better choice) was shared with LORAN service with the allowed frequencies and output power varying with time of day and from one place to another -- not an ideal market.

The duplication of parts and functions and inclusion of 'features' like the rear apron crystal socket make the G-76 look

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A REGENERATIVE RECEIVER FOR THE BEGINNER

by Andy Howard, WA4KCY
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The regenerative receiver described here represents a copy of the one I built in the early 1950's. It was not my first radio receiver, however. Just my first "electric radio". Now for you younger amateurs and radio enthusiasts who thought that all radios were electric, this may sound a bit odd. Actually, my first radio was an early solid state, non-electric detector. I am talking about none other than the venerable crystal set or diode detector using a galena crystal (lead ore) as a rectifier. I acquired this radio for the bargain price of twenty-five cents. The receiving system was completed with a makeshift antenna and a pair of WW II surplus headphones. Others who have experienced having this type of radio a half century ago when radio was still considered magical will remember the thrill I experienced when hearing that first signal in the phones.

By age 11 or 12 I had discovered that there were signals on the short wave bands and yearned for a better receiver. I was determined to have a regenerative receiver using those magical vacuum tubes that were in all the factory-built radios. Back in those days you just did not run down to the local radio supply store and buy a sack of parts for your project. I grew up out in the country with no-nonsense parents who were not known for wasting money on every whim that came along. Fortunately for me there was a fellow who lived down the road a bit who was in the army. He just happened to be in the Signal Corps and said that he would see what he could do about helping me. Sure enough he managed to come up with the tubes and some of the parts. The rest were scrounged from an old radio chassis. All that is except for a chassis. In the end my chassis turned out to be an old ice tray (used in refrigerators before the automatic ice maker came along). And it was made of aluminum. I would never have been able to get holes in a steel chassis without drills and chassis punches. The front panel came from an old sign of some sort. I can't seem to remember what was on the back of my panel. Some advertisement of a long forgotten product I suppose. Amazingly enough the receiver worked and I spent many hours listening to amateurs and other short wave stations. I wish that I could remember what became of the receiver. It was probably abandoned about the time I discovered girls somewhere in my mid teens. Now, forty odd years later, is where this article comes in: my attempts to duplicate this early receiver using new parts and a real chassis.

I don't remember where I acquired the original plans. The fellow who supplied the parts probably came up with it. No telling where he copied them from or he may have came up with them on his own. In any event, the following is as close as I can remember the original circuit. The simple receiver works well and is certainly worth the effort to construct for those who want a regenerative receiver on the simple side. The performance is good enough for me to copy the 20 meter net on the west coast. Les, K6HQI, booms into Georgia on the receiver. I did not choose to wind all the coils but they should be easy enough to complete using my calculations for the number of turns, taps, etc. Although I chose to put the AC supply on the receiver chassis, this may not work for everyone. You have to be careful on transformer placement to avoid hum. My first receiver was powered with batteries but they were easier to acquire back

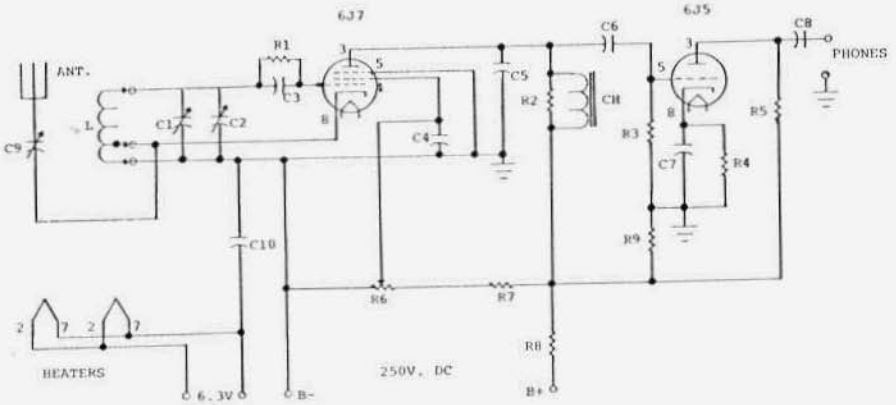
Front panel of regen. receiver with headphones and coil.

in the 50's and at a much lower price. Since power supplies are very simple I chose not to include one. This will give each builder the option on how to power the receiver.

The tube lineup consists of a 6J7 regenerative detector with an additional stage of audio amplification using a 6J5. Both of these are available in the metal variety and are plentiful at most hamfests. Just about any size chassis in the 8 x 10-inch range will work. The panel should be a bit wider than the chassis just in case you want to put the receiver in a case. The height of the panel should clear the tubes and have enough room to accommodate the vernier drive for the main tuning. I chose to leave my receiver open since that was the style of regen receivers in the '50's. The power supply or batteries can be cabled to the receiver with a Jones plug or a terminal strip. The only unusual part in the set is the audio choke. Since they are no longer available commercially I recommend that you go through the junk box and look for an audio output or mike input transformer with a very high impedence in either the primary or secondary. Something around at least 200k should work OK but the higher the better. Just use the high impedance side and clip off the leads on the other side. In the event you choose battery power or the power supply delivers less than 200 volts you will need to remove resistors R8 and R8 in the B+ line. Another important note is that you will need a pair of high impedence headphones. Ordinary 8 ohm phones will not work well. Phones of at least 2,000 ohms impedence were very common in years past and are still available at hamfests. As with the choke the higher the impedance the better.

No special attention need be placed on lead length if parts are arranged as shown in the accompanying pictures. The coil forms are Millen XR-1 and are one inch in diameter with four prongs. Any others of suitable size will work just fine. All coils are wound from number 22 gauge enameled wire with the exception of the 160 meter coil which uses number 28. CW

continued next page



C1 - 100pf. midget variable
C2 - 15pf. midget variable
C3 - .0001 mfd. mica
C4 - .05 mfd. tubular (400V.)
C5 - .00025 mfd. mica
C6 - .01 mfd. tubular (400V.)
C7 - 25 mfd. electrolytic (25V.)
C8 - .05 mfd. tubular (400V.)
C9 - 7-35pf. trimmer
C10- .003 mfd. mica

CH - 400K ohm audio choke
R1 - 2.2 meg, 1/2 watt
R2 - 100K, 1/2 watt
R3 - 470K, 1/2 watt
R4 - 1K, 1/2 watt
R5 - 100K, 2 watts
R6 - 50K pot, linear taper
R7 - 100K, 2 watts
R8 - 22K, 2 watts
R9 - 47K, 2 watts

4 pin tube socket
2-8 pin octal sockets
Vernier drive
Misc. knobs, hardware, phone jack, etc.

Schematic of 2-tube regenerative set.

and sideband signals can be received by adjusting the regeneration control until the receiver loses regeneration and then reversing the control to just start regeneration. It will take some experimentation but learning how to operate the set is a lot of fun. Calibration can be accomplished with an RF generator or even listening to signals on the bands of known frequencies such as WWV, etc. Mark each band on the bandset control and tuning is easy using the main vernier tuning dial.

This receiver is easy to build and great fun to operate. It will take you back to much simpler times. A few finishing touches such as wrinkle finish paint for the panel and dry transfer lettering will make the little receiver look very much like the commercially available regen kits of the period. Hopefully you will be able to find old style knobs and a vernier drive. Just take your time and you will have a receiver that you will be proud to show off to your friends. **ER**

COIL TABLE FOR REGENERATIVE RECEIVER

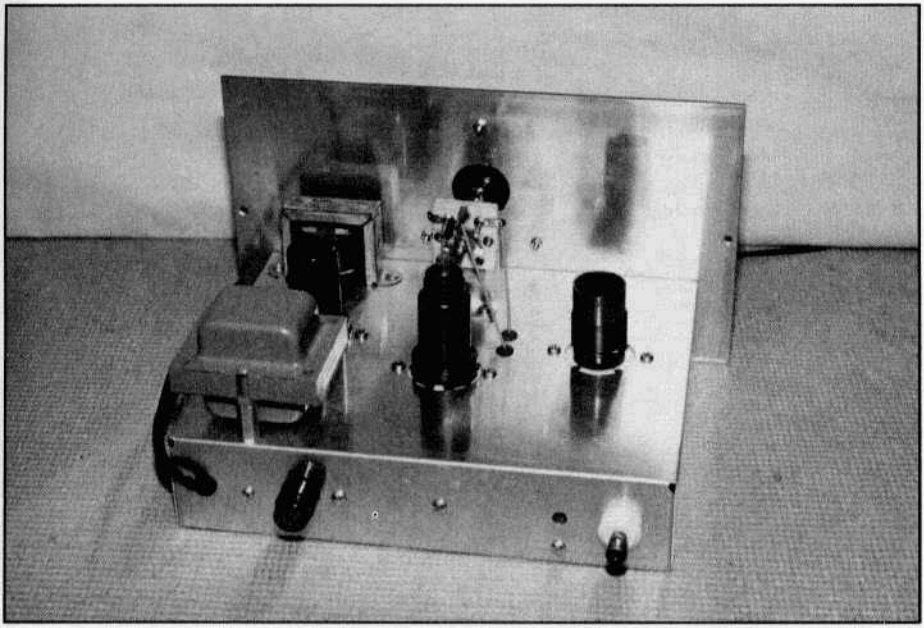
1.8 mc. 68 turns no. 28 enamel. Cathode tap at 9 turns.

3.5 mc. 30 turns no. 22 enamel. Cathode tap at 3 1/2 turns.

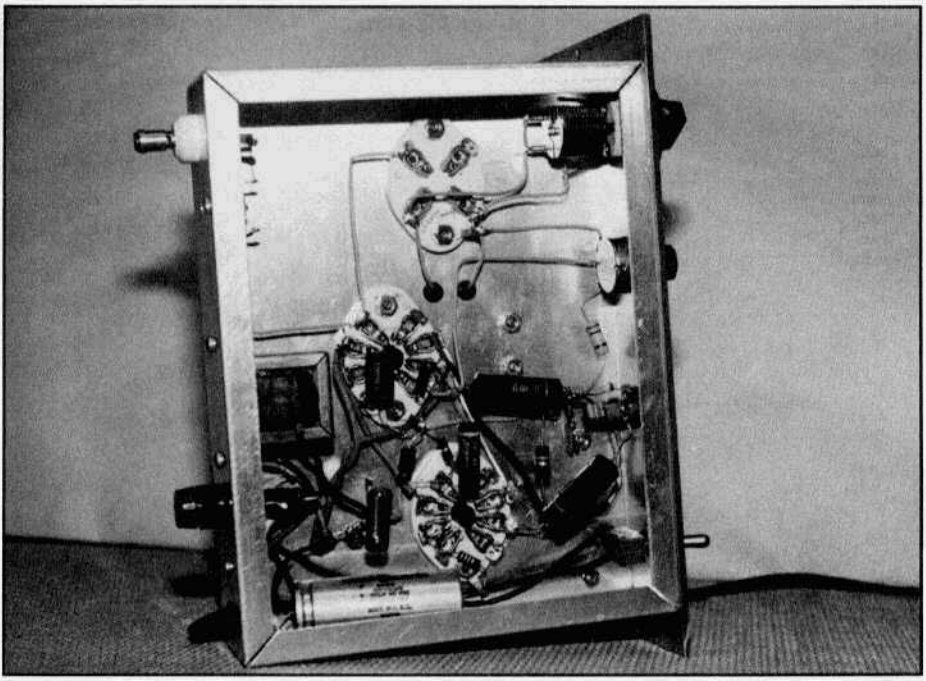
7.0 mc. 19 turns no. 22 enamel. Cathode tap at 2-3/4 turns.

14 mc. 9-3/4 turns no. 22 enamel. Cathode tap at 2-1/2 turns. Space to 7/8 inch.

21 and 28 mc. 4-3/4 turns no. 22 enamel. Space to 7/8 inch. Cathode tap at 1-1/2 turns. Change bands with bandset control.



Rear view. Note small hole next to antenna terminal. This is for the antenna trimmer adjustment.



Underside of receiver showing wiring layout. Note old style ceramic tube sockets. Small transformer is power supply choke.

David Kump, W7MBR and bulldog 'Franny' at one of his four operating positions.

Harvey Imhoff, WB7VON/Ø, a long-time AM'er formerly of Tucson, but now of Colorado Springs, Colo. Encountering antenna restrictions at his new QTH, he cleverly got around the problem by installing a 52 foot flagpole!

Claude Evard, F1HSH, in his hamshack. His QTH is near Strasbourg, France.

Al Hart, W6UBM, at his vintage operating position. He has been operating AM since 1938.

LETTERS

Dear ER

Congratulations on your August, 1993 issue. I particularly enjoyed Jim Hanlon's "The National SW3", a superb description of a great little receiver.

However, Hanlon's love affair with the National 3-tuber should not justify his put-down of the Pilot Super Wasp, "offering" (as he stated) "a regenerative detector directly coupled to the antenna." Let's clear the record.

The four-tube Super Wasp had instead the "new" screen grid type 24 as a tuned RF stage, with a 227 detector plus two audio stages. The kit was advertised, with 10 coils, at $29.50 on page 75 of June 1929 QST. Sales were good enough to pay for color on the inside cover ads in the December, 1929 and April, 1930 QST's.

This was my Volkswagen radio, compared to the $35 plus $5 per each pair of coils for the SW3, which appeared several years later, both of course more than a generation before the "Bug" arrived.

But this is not to criticize the SW3, a fine little set for those who could afford it in that depression era.

Gerard Wagstaffe, W6NIR

Dear ER

As I sit here and compose this letter, I am listening to commercial CW traffic on my recently acquired 51J-4 and thinking how much I enjoy the old radio equipment and how much "Electric Radio" means to me. Thank you for the monthly insight into the equipment that keeps on giving!

This is not to say that I do not enjoy the new equipment, though rather, the modern rigs do have their place. I am fond of telling my friends that I work all modes from AM to Pactor, terrestrial to satellites, and enjoy everything between. It would be a little hard for me to try to use the 75A-4 on OSCAR 13 so I must defer that use to my dedicated satellite rig of recent vintage. Besides, the NCX-500 and the Heathkit SB-301 & 401 setup don't have a quick enough turnaround time for effective Amtor operation. (Both setups are unmodified!)

I really am glad that you have such good folks writing for you and my only complaint is that the magazine is too short! I am thirsty for the knowledge that I can get from "Electric Radio."

In addition to ham radio, I am also an avid audiophile and it was with great interest that I read Bill Kleronomos's article on his homebrew stereo amplifier. There are companies in the USA today that make tube type stereo amps with an entry level price of nearly $1000! (this is the recently re-introduced Dynace Stereo-70, one of David Hafler's most enduring designs). The best stereo gear today is manufactured in the US by small shops with names like "Krell," "Mark Levinson," "Conrad-Johnson," Hafler" and "Audio Research," to name a few. These folks carry on a tradition of fine technical virtuosity in both their solid state and hollow state equipment that is unmatched anywhere else in the world. Bill's article shows the readers of "Electric Radio" how to homebrew a world class amp. I would like to see what the people at "Audio" or "Stereophile" magazines think of this amp! It would be great seeing a ham homebrew audio amp get recognized!

I had a book put out years ago by the perfectionists at the now defunct "New York Audio Labs" that explained the reasons for the difference between tube and transistor amplifiers. I wish I could find this book to give the direct quotes from it but to the best of my recollection the reasons they gave for the sound were due to the distortion characteristics of solid state versus tube type amplifiers. Their thinking was that when tube amplifiers where driven into non-linearity, they produced more distortion products which were of even order harmonics, which music is composed of, than the odd order

harmonics, which we perceive as noise and harshness to the sound. This was against the way most transistor designs were wont to produce odd order distortion products. This company produced some of the finest amps ever available and some are very highly sought after by audio perfectionists, especially their Julius Futterman series of output transformerless tube amps. In 1985, the Julius Futterman OTL-1 monophonic amplifier sold for $12,000. It was built on four separate chassis, had 5-kv power supplies, produced 100 watts class AB RMS power into 8 ohm speaker loads, weighed 150 lbs. and was rated by "Stereophile" as the top sounding amplifier of all during its production. It seems as if we folks who love the sound of old tube rigs might be on to something! If I ever find that book, I'll get more info out of it and share it with the readers of "Electric Radio." This company also built a line of high power hybrid amplifiers that used MOSFETS with tubes and were reviewed as having a very smooth and "liquid" sound quality to them. A friend of mine currently owns a NYAL "Moscode 600" amp, capable of 300 real watts per channel. He runs this amp into a pair of Quad electrostatic speakers and it produces some of the most accurate and unfatiguing sound I have ever heard with any style of music from rock to Bach.

Bob Carver has done experiments on tube and solid state amps and has declared that he could build a solid state amplifier that has the same sound qualities as the best of the tube gear. He proceeded to measure what he calls the "transfer function" of these amplifiers. He constructed a tube amp. the Carver "Silver Seven" which uses 15 KT88's in its highest quality version (base price of the amp in 1991 without the KT88's was $8750), and presented it for testing by the audio press. This amplifier won acclaim for its high degree of sonic purity and for its ability to play music. Then he proceeded to adjust this "transfer function" in some of his solid state amps and was able with careful tweaking to produce sound that was the equal of the Silver Seven's. He used this knowledge to bring out a series of solid state amps that mimic the sound of tube type amplifiers by adjusting this transfer function.

Rick Blank, KI5SL

Dear ER

It may interest readers of *Electric Radio* to know that yours truly was responsible for W1AW being activated on 40-meters amplitude modulated 'phone (!) between 2:30 PM and 4:00 PM EDST, on Friday 23rd July, 1993.

The family and I were returning from vacation in Cape Cod, and decided to stop by ARRL headquarters in the final leg of our trip. The folks at Newington were very gracious, and generous with their time -- even the XYL and the kids enjoyed the informative tour of their facilities (by the way, did you know that the League Museum of Amateur Radio houses a near-mint Collins 75A-4, serial #1?).

In any event, I was determined that I would not leave Connecticut, until such time as I might guest-operate one of their "studio" rigs, using my favorite voice mode. Ten-Tec, Kenwood, and Icom were well-represented at the two operating positions, but I elected to use their Yaesu FT-1000 (past personal experience has demonstrated Yaesu's "modern solid-state, plastic" superiority in the quality of their AM).

Even though the station manager hardly batted an eye when I informed him of my choice of mode and band, I was told that the accompanying Yaesu solid state linear amplifier in the shack was off-limits, and , (ouch!) my antenna would consist of a lowly inverted vee dipole (sorry. . .no 3-element monobander this time!). Despite this -- and in the face of poor conditions -- I proceeded to work fully six stations in the 40-meter AM window with my 50-watt carrier, commenc-

continued on page 31

Passive Noise Suppression

by Hank Scharf, W6SKC
P.O. Box 6160
Nogales, AZ 85628-6160

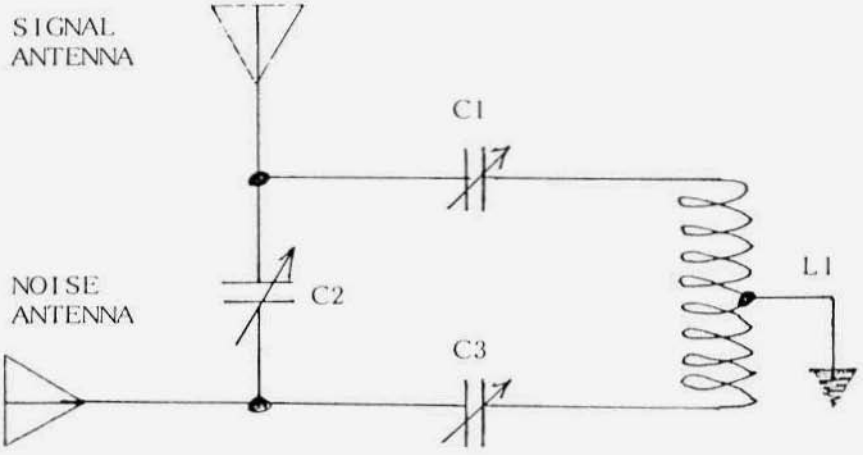
I am often told that my signal cannot be copied "thru the noise". A typical comment is: "You are S9, but my local noise is 20 over".

That is discouraging because I usually report that I am receiving their signal about an S4 with a noise level of SØ, i.e., Q5 and S4.

Obviously a signal that is four S units above the noise is easier to copy than one that is 20 dB below the noise level. Why so much difference on a reciprocal signal path?

The answer is on page 90 of the 1942 isssue of Radio Handbook, published by Editors and Engineers, which I believe is now part of the Howard W. Sams, Inc., Indianapolis, Indiana.

Figure 31 is titled "Jones Noise-Balancing Circuit" and looks like this:



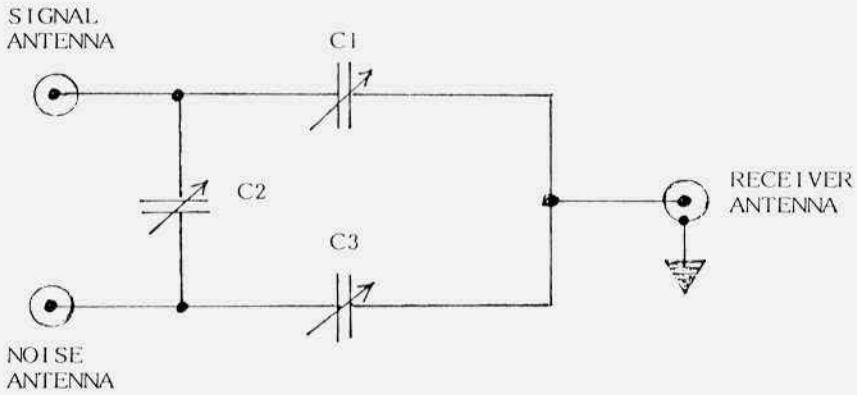
C1, C2 and C3 are 5 to 100 (or 150) pFd. Hammarlund RMC-140-S or equivalent.

The original idea was to slip L1 either OVER or INSIDE the receiver's RF input or antenna coil. These coils were often of the plug-in type.

A more modern circuit has a single ended output and utilizes the RCA phono jack or other type of coaxial connector.

AM FREQUENCIES

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



It has been my experience that C2 may not be needed in all applications. For simplicity, a fixed 50 pFd capacitor may do as well. A little experimentation may be called for.

Connect the SIGNAL ANTENNA jack to the receiver side of the antenna relay.

DO NOT ATTEMPT TO TRANSMIT THRU THIS NOISE SUPPRESSION CIRCUIT.

The Noise Antenna can be any 'poor' antenna, i.e., one that hears noise very well, but doesn't hear much of the wanted signal. It should have a deliberately poor signal-to-noise ratio.

Often a 15 to 20-foot piece of insulated wire lying on the floor will be an excellent noise antenna.

Tune the 3 caps for the lowest noise level and the highest signal. It may sound simple, but it may take a little while to get the hang of it.

If the signal disappears completely, the noise antenna may be too good.

Generally C1 will be set about mid-scale and C2 and C3 will be adjusted for noise-balance with C2 being the most critical. If C2 does not appear to do much for your particular application and type of noise, C2 can be taken out of the circuit completely.

To use this circuit with a transceiver, install a relay to switch it out during transmit, much like a relay in a linear switches it out on receive. A "steering" diode may be used to isolate the linear's relay from the noise suppressor's relay. You may be able to run the two relays in series. **ER**

The Russian Connection: military aircraft radios

Brian Ryan, NØLES
5145 Bona Road
Mounds View, MN 55112

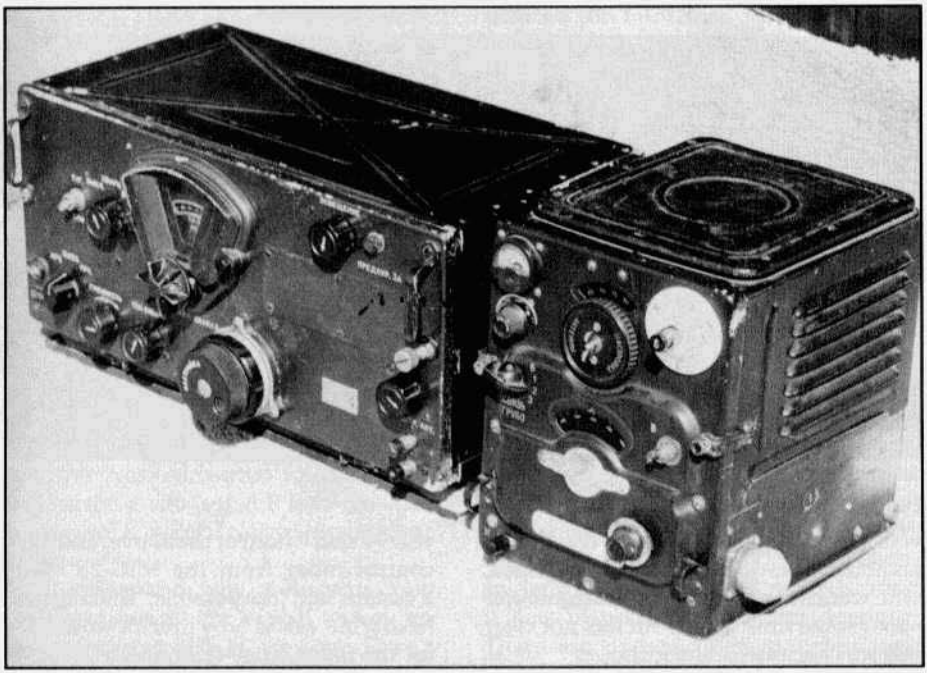
Every once in a while in collecting military radios, a real surprise shows up, worthy of sharing with other collectors. This occurred this summer while attending the annual Experimental Aircraft Association (EAA) fly-in convention at Oshkosh, Wisconsin. This week-long event is the mecca for pilots, as the Dayton Ham convention is to electronic enthusiasts. My wife, Sally, and I have attended this event for 23 consecutive years, and of the numerous activities that are available for enjoyment, my favorite pas time is visiting the flea market for unusual radios. As usual Sally and I camped by our Navion aircraft in the Antique/Classic area. Most of the regulars who attend each year camp in the same place so people get to know and visit others from around the country and the world. This story is about an unusual acquisition from the former Soviet Union.

In 1992, a Russian parachute team of three men and two women camped with us during the convention. They arrived by commercial airline, and wound up being hosted by us and some of the other Antique/Classic volunteers. During the week-long event, we got to know each other very well. They intended to jump during the daily airshow representing their country, but due to lack of previous arrangements with the EAA, that didn't happen. I explained to the Russian commander of this team my interest in collecting military radios, and in helping the EAA set up the radio display in their museum. He said he would return next year to this same convention, but would be flying their own Russian jump plane, and would pass through Minneapolis and land at my airport (Crystal) and drop off a load of Russian military radios. This naturally got my adrenaline flowing, and helped me withstand the many vodka toasts that Russians enjoy. I don't think they drink any water in their country.

For a variety of reasons, the two young women didn't get along with their commander. He was very much from the old school, most likely a prior military pilot, although now a civilian pilot and has an association with a local parachute club in Khabarovsk, Russia, which is about as far South and East as you can go in Russia. This commander is very used to getting his own way, and undoubtedly was an official of sorts in the old communist party. It was becoming clear that the two women, nineteen and twenty three years old, feared this man and also were increasingly hesitant to follow his orders. I left the convention on the last day to return to work, but my wife as usual stayed behind for several days to further assist in her voluntary activities. When I returned to pick her up, I was informed we have two Russian female parachutists that hid from their commander forcing him to leave without them, and now wish to seek political asylum. They would be staying with us indefinitely until they could become established in this country.

At this point, I could see wings on my Russian radios, and they weren't flying in my direction. When this commander finds out who is harboring two of his charges, I may be on his list of things to take care of next year.

The intervening months between EAA conventions were adventuresome with enrolling the girls in English class, getting them part-time work washing dishes, and teaching them how to drive a car. The older girl, Elena, got her license, and bought and paid for a used car with her dish washing money. The younger girl,



Russian military receiver and transmitter. The receiver is a copy of the BC-348 with some improvements added.

Luba, was near passing her driver's test when she returned home to Russia for family reasons. It was interesting to observe their behavior in department stores and supermarkets. One comment was "I can't believe they have a full aisle of pet food, as pets simply get fed leftovers in Russia, with no commercial pet food products available" (commercial people food isn't that available either).

As July, 1993 rolled around, Elena decided she wanted to return to Oshkosh where she began her life in this country. My wife arrived more than a week early to set up camp and help with the volunteer activities. On Wednesday the 28th, the day before the convention officially opened, I flew in and parked in front of the campsite. As I greeted my wife, she said the Russian commander is back and wanted to see me. He arrived under somewhat different auspices this year, traveling commercially with a Russian cosmonaut. She told him not to return to the campsite, as she didn't want him to confront Elena when she arrived the next day.

Thursday morning as I was preparing to walk up to the flea market in search of old radios, into the campsite walked the Russian commander. He immediately put me at ease by saying he brought me some Russian military radios, and would bring them to the campsite tomorrow. There was an immediate conflict of interest, as Sally was adamant about not wanting him around the camp area when Elena was here. I said he could make one more short visit, but only at the front of the camp site near the plane, and not in the back where Elena was camping. I made it clear to him not to make contact with Elena, as she was happy in this country, and was in no need of being rescued by him. The commander stated repeatedly how much trouble he was in when he arrived home without the girls last year. I replied repeatedly that the choice to stay

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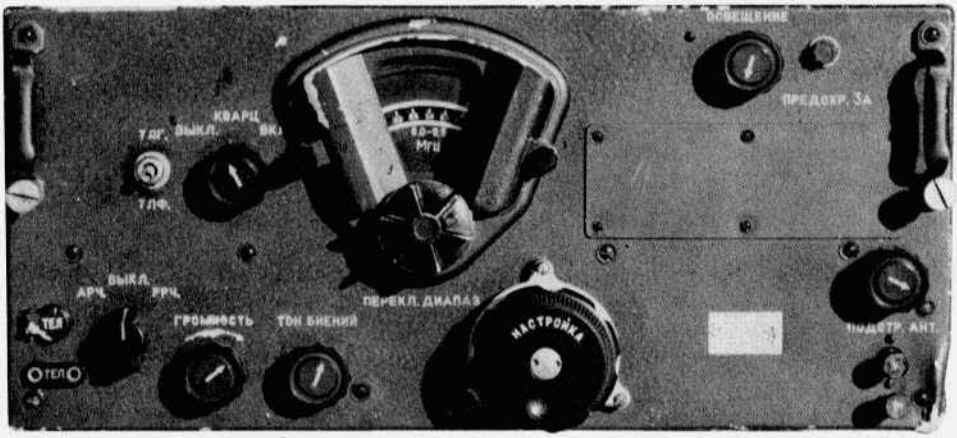

Front panel of the 'Russian' BC-348.

was Elena's and she was only reacting to his abusive ways. Rumor has it from Luba, who went home, was that the commander spent some time in jail, but it is not clear if it was because of the girls.

Friday morning the commander arrives again with a friend, Igor Volk, a Russian cosmonaut, and they are carrying a large box. As we are untying the rope around the box, the commander said they had a hard time getting this box through the American customs, at Anchorage. On unpacking, I pulled out an antenna switching relay box that looked very interesting, a small conglomeration of little boxes that were cabled together, possibly some sort of control device, a transmitter that looked quite interesting, and sadly, the last item was a surplus BC-348 receiver. I laughed as we pulled this out until I noticed it was labeled entirely in Russian, had some small changes such as a two pronged headphone jack instead of a coaxial jack, and a large tuning knob quite different from ours. This was not an American BC-348 receiver modified to their use, but a nearly exact copy with some logical improvements. There was also a HV fuse on the front panel instead of under the chassis. We made our deal to the satisfaction of everyone, and the commander said what would you like next year? I said "more of the above, and a fire control radar from the MIG-25". Both Russians said "not possible," shaking their heads, but asked how much I would pay for the radar. They then said it probably would be possible, but how would they get it into this country? I said that was their problem, and by the way it would probably weigh about 900 pounds, so don't expect to hand carry it.

For the remainder of the convention, the commander and the cosmonaut kept appearing at the campsite at random times, despite our insistence that we didn't want them confronting Elena, and fortunately this never occurred. Elena didn't know the commander was around until I was placing the Russian radios into the plane just before I returned home for work. She said why didn't you tell me he was around, and I replied I didn't want to witness a cardiac arrest.

As an interesting aside, Victor Belenko, the Russian fighter pilot that flew his MIG-25 to Japan in 1976 while defecting to the West, was in Oshkosh during this convention. His favorite hang-out was the Acey-Deucey bar in town, where he informed patrons that he is now a "capitalist pig". He was under cover for many years with a different name, but now he passes out a business card stating "HAVE

MIGS WILL TRAVEL". Apparently with the cold war over, he is no longer at risk. The evaluation of this aircraft before it was returned crated in pieces to Russia provided valuable insights to top secret Russian technology.

EQUIPMENT EVALUATION

The receiver is labeled TNO-YC-9, which is apparently the model number, and N40302 which presumably is the serial number, and the number 1977 which is possibly the date of manufacture. Although that date may seem incredible for a receiver that RCA designed in the late 1930's, it should be understood that Russia had retained tube type electronics long after the West converted to solid state. One reason given is that it is so resistant to damage from EMP caused by a nuclear event.

To understand why a Russian copy exists requires a little WW II history review. A number of B-29's flew into Russia with battle damage that wouldn't allow them to return to their home base. These aircraft were confiscated and never returned even though they were our allies. The B-29 was a significant leap in technology for the Russians, and they succeeded in duplicating them to the tune of several hundred copies, including the radio equipment. The Russian's called their B-29 copy the Tu-4.

Besides the differences from the BC-348 indicated previously, externally the cabinet has a large cross flute in the top for added rigidity. Inside are several significant differences. First, the dynamotor is replaced by a solid state DC to DC converter in an enclosed box, and it plugs into the casting through a 6 pin Cinch Jones type connector, instead of a barrier strip with screws to cables in the BC-348. Second, the three tubes on the angled RF deck are moved closer together making room for a full size VR tube, instead of the small neon lamp RCA used to regulate the plate voltage of the LO. Third, the large glass 6F7 dual purpose tube used for the 2nd IF and BFO has been replaced with a 9 pin miniature. The bypass and coupling capacitors bolted to the frame are somewhat smaller than RCA's, probably because newer technology in dielectrics allows this to happen, and the wiring is of better quality insulation for the same reason.

The tuning knob is interesting, because it has an inner knob which requires about twice the turns to go from one end of a band to the other than the BC-348, while the outer portion will take you end to end in less than two turns. Some small mechanical changes were required around the tuning knob to allow this feature, but otherwise everything else is mechanically the same. The sheet metal is stamped identical to the BC-348, and has a somewhat nicer finish. The wiring and soldering is of excellent quality, with every solder connection painted red indicating it was inspected by another operator. There are find numbers stamped near each component throughout the receiver, but they bear no correlation to that in the BC-348 manual. Possibly the Russians did not wish to infringe on RCA's copyrights.

The receiver did not come with the shock mount, but it fit perfectly when snapped into a BC-348 mount. The tubes are exact copies of those used in the BC-348 with the exception of the 6F7 replacement. I examined a number of components for date codes to verify the 1977 potential date of manufacture, but couldn't arrive at any conclusions. I suspect this receiver is not the first cut at the BC-348 copy, and has seen a variety of improvements to this example. One wonders why they didn't add a crystal calibrator, and expand the divisions on the dial from 100 KHz increments to 10 KHz increments, but that would have required a significant mechanical change that they apparently didn't want to invest in.

The transmitter is labeled TEP SVS-560-1 which, is apparently the model number, and 403331, which is probably the serial number. Externally, there is nothing like it in the US military as the photos

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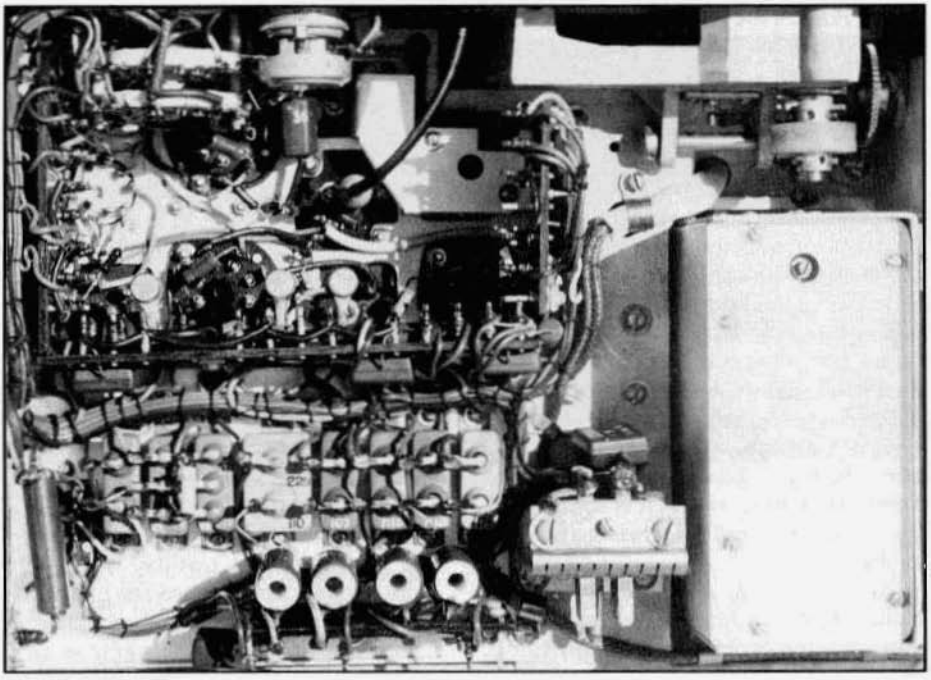


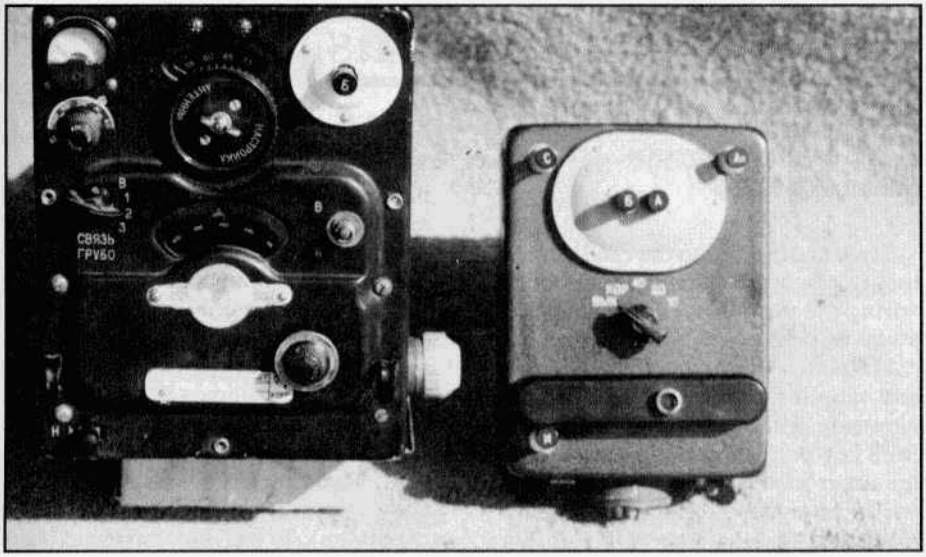
Underside of the Russian BC-348 showing the neat wiring. Each solder joint has been given a dab of red paint to indicate that it has been inspected.

reveal. Internal examination reveals a conventional VFO transmitter with two 807 look-alikes with the exception that a grid cap is located near the tube base protruding out the side. One of the "807" tubes is the VFO, with inductor and variable capacitor components in aluminum castings for stability. The other "807" is a non-tuned buffer driving an 813 look-alike as the final. This tube is a copy of our 813 with the exception of having a wire plate lead instead of the large plate cap. The pins on the base of this tube are on the same pin circle as the 813, but instead of two larger pins for orientation, there is only one very large pin for orientation. The "813" has a unique output circuit. No variable capacitor is used to dip the plate, rather a rotary variometer inductor accomplishes this function as well as loading the antenna. A switched meter monitors various parameters in this transmitter; however, the only tuning functions available is the VFO and single output tuning of the variometer, although a coarse switch taps an inductor in series with the variometer apparently to electrically center it within the tuning range.

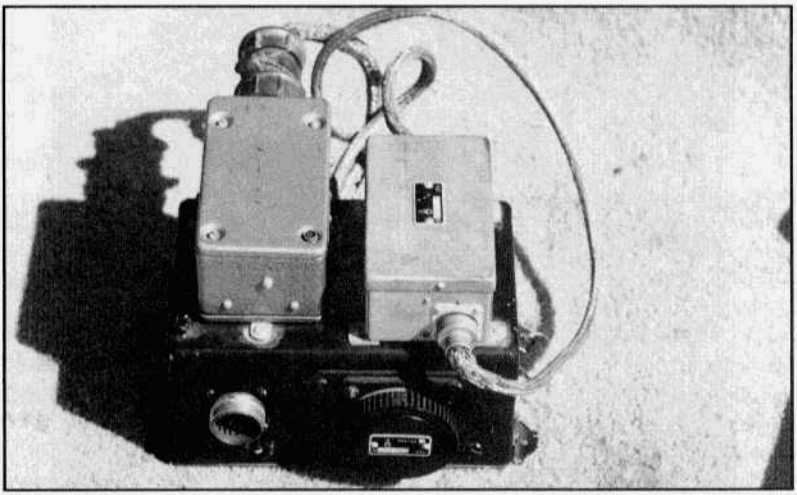
The Russians may have seen the Collins ART-13 transmitter and decided they didn't need that complexity, or else they saw the BC-375 and knew immediately they could do better. The oscillator tuning dial is marked in units of 350 to 500 kilocycles. No modulator was found in the transmitter itself. This transmitter may be one of a series that covers only a limited frequency range for each unit.

The antenna relay box has a good quality open air relay in the top portion of the box, and five octal tubes that have nothing to do with the relay. It is possible that these are an audio section for low level modulation of the 813. No modulation transformer was found in any of the boxes.

The other unit is an assortment of several little boxes. The largest box has a motor which turns a cam with ten equally



Transmitter and antenna relay box.



Control box.

spaced bumps over 180 degrees, and none for the remainder. This operates a switch which drives a relay which in turn places two different LC circuits in operation. I can only guess that this is part of a tone oscillator that changes in frequency by the cam operation, and in turn modulates the transmitter possibly through the tube circuits found in the antenna relay.

No power supply was received for the transmitter, nor cables and connectors to verify the opinions suggested.

It was interesting to examine the quality of workmanship in all of these items, and how closely they copied the BC-348. Where they ventured on new ground, their designs were very unique including a completely different manner of fastening the transmitter cover to the base. **ER**

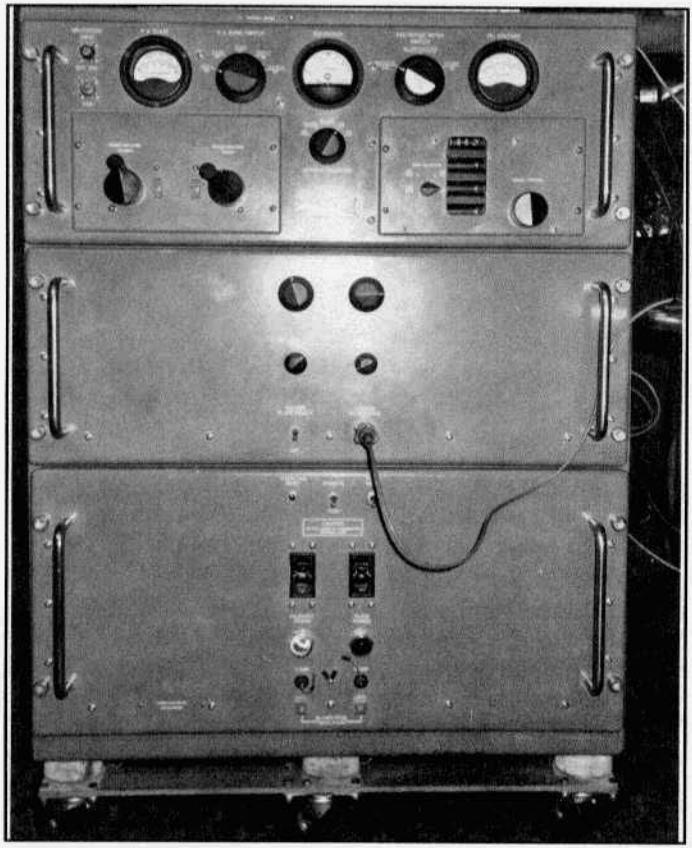
T-368 Modifications

by Bill Dudan, N2KQA
P.O. Box 45
Salem, NY 12865

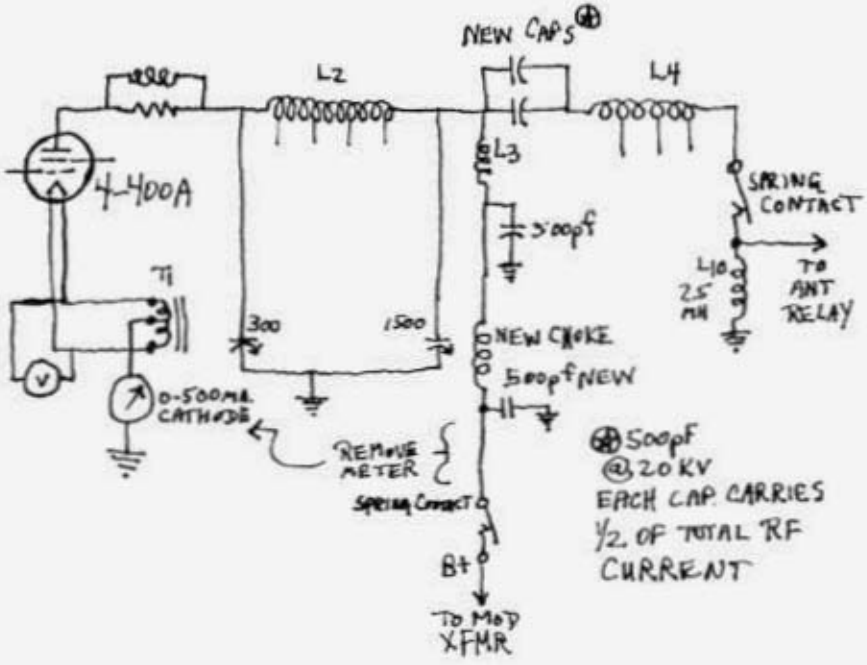
Two simple mods to the T368 transmitter are discussed: 1-remounting and rewiring the plate meter and 2-improving audio response of the RF final amplifier.

1. Remove the meter insulating ring and mount meter on outside of panel. Now you will be able to read the meter from any position and it will now match the other meters. Remove high voltage wiring from meter terminals and temporarily tie back out of your way. Run 20 ga. hookup wire from meter along front panel and on left side of exciter back to CT of filament transformer. Remove existing wire from CT and tape its end. Other meter terminal is grounded to chassis at any convenient point. Across meter install new .01 disc ceramic and a new pair of 3A/1000V silicon diodes wired in opposing polarity.

Now you have a meter that is easy to read, is completely removed from high voltage, and is self protected (to .7 volt maximum). It will last forever. It now



T-368 transmitter. Photo courtesy of Tony Wheeler, K9BBA



reads cathode current so deduct 30 mA to get plate current (20 mA screen and 10 mA grid).

2. The second mod improves audio by reducing excess capacitance in the class C final. In the early models (Basic thru C) remove one or two of the capacitors situated between the main tank coil and the PI-L output coil. Here you want a maximum of 1000 pF (.001 mF) total. If one of the caps is this size, use it alone. Better would be to use a pair of 500 pFin parallel so each would only have to carry 1/2 of the total RF current. This is enough capacitance to operate efficiently down to 1.8 MHz. Use at least 10 KV rated capacitors as you are producing ~6KV at 100% modulation.

In the E and F model T368 transmitters (no D model ever appeared) there is one big mica tub cap here of 3900pf capacity. Replace this with a paralleled pair-each rated at 500pF 10KV min. I used TV "doorknob" caps rated 20 KV which do fine through 40 meters. If you operate on 20 or 17 meters you (may) want to use expensive RF grade ceramics (Centralab 858) to run cooler.

The late models also have an additional rf choke in series with the solenoid wound original. This is the same pi-wound original. This is the same pi-wound 500 mA style found in DX-100 and Viking I and II's. If your transmitter does not have this second RF choke add one to your modulated B+ line and replace the stock 2000 pF bypass cap with a 500 pF. Add another 500 pFcap on the power supply side of the second RF choke to ground. Doorknobs will work fine for bypass service. Use a ceramic standoff insulator to mount the new cap and choke if needed. Now your modulated B+ line should be neater and well away from the front panel. We end up with a total of 2000 pF across the modulated B+ instead of 6000 pF as originally. Treble response is opened up and speech sibilants are preserved. ER

Ivo's Mighty Fleapower

Jim Hanlon, W8KGI
P.O. Box 581
Sandia Park, NM 87047

Ivo Depenbrock was over weight, balding, and in his 60's when I knew him as a high school student in downtown Cincinnati in the early 1950's. My Dad knew the Depenbrock family. They had run a wholesale grocery across the river in Covington, Kentucky, but their business failed during the depression because they had trusted too much in their customer's credit. So Ivo, instead of spending his later years as a prosperous business man, was working as a counter man in the basement Parts Department at Steinbergs, 633 Walnut Street, only two blocks away from Saint Xavier's High where I went to school.

Steinbergs sold all the popular, big name amateur gear; Collins, National, Hallicrafters and Hammarlund. But Ivo didn't push us kids to wheedle our parents into buying the expensive gear like his boss, Jules Burnett, would have liked. Instead, he showed us how to have fun with ham radio on a minimum budget.(1) I remember one time when he went on vacation - fishing at a lake somewhere down in Kentucky. He took along his regenerative receiver and a flea power transmitter and worked quite a few of his friends back in greater Cincinnati, myself included. Ivo's business card size QSL from that contact read, "You have been bitten by the mighty fleapower rig of W8BAE." After that vacation, there was so much demand from all the guys that Ivo had talked to that Steinbergs had to stock the parts for his little rig, right alongside the high priced Collins gear. That frosted Jules, believe me, but it kept the customers happy. And of course I built one, or I wouldn't be spinning this tale for you now.

Ivo's basic design is a two stage, Pierce crystal oscillator, triode amplifier job built out of a single dual triode. I think he used a 6SN7 in a cigar box for his original, but he fixed me up with a 6J6 and a SCR511 Walki Talki tuning unit for a chassis. The tuning unit contributes the amplifier tank capacitor and coil. The coil is a plug-in unit which can be rewound as necessary to resonate in the 80, 40, 30 or even 20 meter band and to which I added a link for output coupling. You can still buy these tuning units from Fair Radio Sales(2); see their ad in the back of ER. So you just might want to build one of Ivo's Mighty Fleapower rigs for yourself.

The schematic and the picture show what's inside. The Pierce circuit will oscillate at the fundamental, series resonant frequency of the crystal, just a little below the marked, parallel resonant frequency. So be careful with this rig right at the bottom of a band edge. The triode amplifier has no tuned grid circuit, so it does not need to be neutralized. It will operate straight through or double, so that the rig can be used even on 30 and 20 meters. With 250 volts B+ on 30 and 20 meters, it puts out 1.5 watts doubling. With 300 volts, it generates about 2 watts on 40, doubling or straight through, and almost 3 watts on 80. The rig is keyed in the common oscillator-amplifier cathode lead making it convenient for QSK.

As you can see from the picture, when I built this rig back in 1954 I used a fairly large 2.5 mH RFC for the oscillator plate. If I were doing it again, I'd look for a physically smaller choke and one about 750 microhenries, perhaps just one pi section of a larger choke. But this one does do the job. There was just enough room un-

The QRP rig is built into a SCR-511 walki-talki tuning unit. The tuning unit contributes the amplifier tank capacitor and coil. The coil is a plug-in unit which can be rewound as necessary to resonate in the 80, 40, 30 or even 20-meter band.

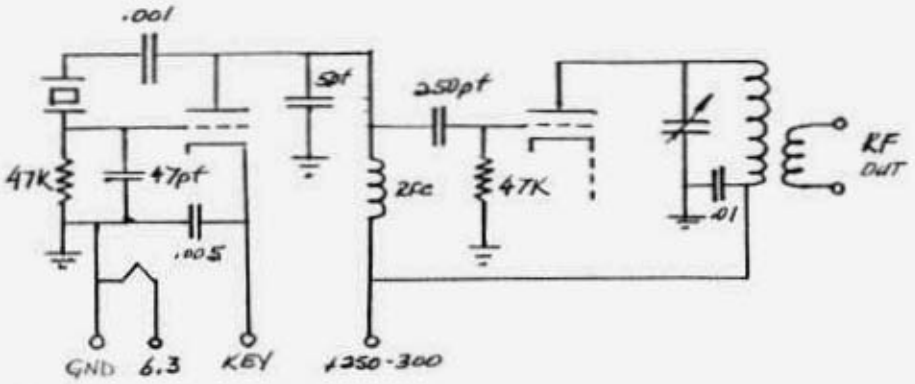
der the chassis for all the other parts. I cut down a molded octal socket for the crystal socket. The double crystal socket which comes with the tuning unit is nice, but it doesn't leave enough room to mount the 6J6. And apparently it was cheaper to make a crystal socket out of an octal socket from the junk box than to buy a new one. Ivo was a practitioner of Ben Franklin's "Want not, Waste not" which he passed along to us kids.

The rig as I originally built it was far from optimized. The grid resistor in the oscillator was only 1K, in the final it was 2.5 megohms! The coupling capacitor between the oscillator and the final was only 12 pF. When I got it out recently and powered it up, it did work. But it put out only a hundred milliwatts or so and the final didn't dip, rather it peaked at about the level of maximum output. How I ever worked anything with it is amazing. The components shown on the diagram are what I'm using now, and the rig operates, much more respectably. Guess I've learned a thing or two since I was fifteen.

Tune up is straight forward. Just put a crystal into the socket and dip the final. Then adjust the size and position of the link for the desired coupling. I measure the cathode current in series with the key. Pulling out the final tank coil lets me measure the oscillator current alone, which I can then subtract from the total to get the final current. The 6J6 is not a high powered bottle. The amplifier in this rig is rated for a maximum of 300 volts and 15 mils or 4.5 watts input. I do run a little higher plate current on 80 with no apparent harm to the tube (and I have several spares), but I also keep the dashes short.

You could also build a single tube, higher power oscillator rig into the SCR511 tuning unit, using a 6CL6 or a 6AQ5 for example. But these tubes are too tall to fit under the cover of the tuning unit. As it was, I had to drill a small hole in the fiber cover to clear the little glass tip on the 6J6. And besides, that wouldn't be Ivo's little rig any more.

continued next page



Schematic of Ivo's Mighty Fleapower rig.

I put Ivo's Mighty Fleapower on the air in 1954, and I can still remember the thrill of working as far as Baton Rouge, Louisiana from my home QTH in Fort Thomas, Kentucky, just south of Cincinnati. Since the coil I found inside the rig when I resurrected it from the drawer of my old, roll top operating desk was for 40, I strongly suspect that was the band where I worked my QRP DX. My antenna then was a pretty decent 134 foot center fed Zepp, which must have helped to work out with only a hundred milliwatts or so out.

This time around, I've optimized the circuit a bit and added the coils for 80, 30 and 20 thanks to some extra forms that I picked up recently at an Albuquerque swap fest. Using a 268 foot center fed Zepp and operating a couple of evenings during my Christmas vacation and a bit since then, I've worked New York and had a nice, half hour rag chew with Steve, WB9IIQ in Urbana, Illinois (both our teams lost their bowl games) on 40. I worked a K1 on 80 who didn't want to even give me his QTH because he was calling CQ DX and didn't want to hang around with a W8. And I've worked Texas and a number of Californians on 80 in some good, solid rag chews. On 30, I got a 469 from Oscar, N6OG near Laguna Beach, CA in response to a CQ. In mid-January, when I finally found a 40 meter crystal that would get me out from under a guy constantly broadcasting "code practice" on my single, 20 cw frequency, I was called by KD4MWA in Lexington, North Carolina, just as I finished tuning up. And I worked W3MOY in Williamsport, PA a couple of days later.

Newkirk is definitely right, just as Ivo was. You can have more fun with less rig.

Afterthoughts

It was really a "blast from the past" to team up Ivo's Mighty Fleapower rig again with my original HR050 receiver and with the same surplus R42 headphones, Vibroplex Original bug, and surplus teardrop base MacKey that I used with it back in 1954. Even the New Mexico Zepp is made from the same wire that I used in the flat top and feed lines of the Kentucky Zepp. I'm sure that Ivo has gone on to his reward, but I hope that somehow he knows how much joy that I and other kids from St. X have had from his efforts. **ER**

1. An early demonstration of "Newkirk's Rejoinder to Gooch's Paradox ("RF gotta go somewhere."), "Whatever you think you need, you can always have fun with less," QST, 10/92, page 63.

2. Fair Radio Sales, POB 1105, Lima, Ohio 45802, Catalog WS92, bottom center of page 9, BC746 Tuning Unit.

Gonset G-76 from page 9

like a hurry-up design. But most of the gripes are small: there's a lot more right than wrong with this set. It is good looking, rugged, outstandingly flexible and compact, puts out enough power and has a good receiver compared to others hams were using in 1961. And $544 got you a complete home station which for another $145 could go mobile: compare that to a Johnson Ranger for $360 with a receiver in the $300 price class and 'mobileable' only in something like a delivery truck. Had the G-76 been introduced even four years earlier with the peculiar bandswitching fixed and perhaps a bit less drift, it would have been a 'hot' item -- one which might have changed both Gonset's fortunes and the shape of the ham marketplace. You can't help wondering why it didn't happen and for that matter why no other company built an AM transceiver. What is it they say about things seen in life's rear view mirror are clearer than they were through the windshield?

For fun per pound I don't know where you'd find another AM rig to beat this one. My G-76 seems likely to take a permanent place on the operating table; given the cramped quarters here, that's saying something. Anyone out there got an original power supply and calibrator? **ER**

Letters from page 17

ing with John ,W3VYL, in Chrisfield, Maryland, and ending with Howard, W3HM, in Harper's Ferry, West Virginia.

This modest effort was a dream-come-true for me. Almost every station I contacted commented upon how gratifying it was to hear W1AW on AM again ". . after all these many years". I might add, however, that mine was NOT the first time that AM has emanated from W1AW in recent memory: at least two other such "expeditions" have gone before my meager effort. I strongly encourage other AM aficionados to drop by the League and do likewise. The guest operating times and restrictions are well-documented in each issue of QST. . .just remember to bring your original license!

One final word: at the time of my QSOs, I was unsure of the QSLing policy for guest operators. At the conclusion of my stint at the microphone, however, I was informed that my hand-written log would be transcribed into a computer file, and any and all subsequent QSL requests would be honored, either direct or via the bureau, depending upon how the initiating card was received at the League. . .

Fraternally yours,
Edward "Eddy" Peter Swynar, VE3CUI

Editor's Comments from page 1

This summer we've been going to a lot of hamfests. We've discovered they're a lot of fun and very beneficial for the magazine. Not only do we sell a lot of our books, back issues, T-shirts, subscriptions, etc, but we get a chance to meet our subscribers and get their input on how ER might be improved and what kinds of articles we should be publishing in future issues.

The weekend of Sept. 3 and 4 we travelled to Alamagordo, New Mexico, about 400 miles south of Durango. It was a long trip but well worth it. We had an opportunity to see some new country (beautiful) and meet some really super people. Other hamfests we'll be attending this fall are Sante Fe (Sept. 18), Longmont Sept. 26 and El Paso (Oct. 9 and 10). If you attend any of these 'fests please look for us. **N6CSW/Ø**

The Heath User's Group will have their first net October 10th at 8 PM CST on a clear frequency between 14.270 and 14.280. The net will be for buying/selling/swapping and the exchange of technical info etc. Net controls will be WB2FOU and AA5CW.

CLASSIFIEDS

Advertising Information

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

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VINTAGE EQUIPMENT ONLY

ER
P.O. Box 57
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DEADLINE FOR THE OCT. ISSUE: OCT. 3

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

FOR SALE: Patterson PR-15 communications rcvr. Lee, K7MBJ, (307) 587-9506 or 473-8544 after 6 PM

WANTED: Electron tubes: military surplus, Western Electric, transmitting & receiving tubes. Cash or trade radios, dynamotors, etc. Can pick up large quantity. I pay more than some and much more than others. Tim Metz, 221 Wheatland, Fairview, OK 73737. (405) 227-2456

FOR SALE: Collins KWM-1; KWM2A; Drake TR4C; C4 console. Joel Levine, WB2BMH, 67 Derby Ave., Greenlawn, NY 11740. (516) 757-7641

FOR SALE: GRC-109 radio set - $100; HT-37 - $100; 1KW CW HB xmtr - $300, PU only; CE 20A,unit only,- $60. Steve Davis, KD2NX, 705 13th Ave.,Belman, NJ 07719. (908) 280-9760

FOR SALE: New amperite time delay relays 115NO300 - $19. Jeff, W7ID, (208) 323-9267

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 22075. (703) 822-5643

FOR SALE: New list of 1000's of tubes! Includes new, used, antique, collectible, Majestic and Western Electric types. Send SASE to Jim Cross, 2817 Parklawn Dr., Dayton, OH 45440-1538. (513) 298-5827

WANTED: Eimac 3CX1000A7/8283 tubes. WS4I, 10616 Savoy Rd., Richmond, VA 23235. (804) 320-1130

FOR SALE: ART 13 parts & other interesting stuff. SASE for "The Bone Yard List." eLKay electronics, 231 Shenandoah Trail, Warner Robins, GA 31088-6289

WANTED: Collins Mechanical filter model F455B60 for the 75A-3. Bill Edwards, K4BWC, 4209 Live Oak Rd., Raleigh, NC 27604. (919) 231-2829 after 6 PM EDT, collect

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TRADE: Good/excellent R-390A for 51J4, 75A-3/A-4 also considered. Ed Cole, 6060 4 Mile Canyon Dr., Boulder, CO 80302. (303) 444-7296

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

FOR SALE: Hallicrafters SX-101 - $135; Heath Warrior - $250; Drake 2NT - $85; Heath DX-40 - $75; Hallicrafters HT-37 - $135; HP 200 CD audio oscillator - $55; ART-13 vfo w/ps - $55. Cliff Fleury, 64174 Tumalo Rim Dr., Bend, OR 97701. (503) 382-9162

WANTED: Amateur radio operator w/35mm SLR camera to take photos of rcvrs & xmtrs in NJ museum. Alan Mark, Pembroke, MA.

FOR SALE: LCR bridge, AN/URM-90 w/ orig. tech manuals & spare tubes. Very good condx, ready to use - $100 + UPS. Joe, KF9EU, (812) 384-3362

WANTED: BC-348Q & BC-375 exc/mint for restoration of B-17 radio room. Top price for unmod unit w/rack. K2ENN, 145 E. 15th St.-6A, NYC, NY 10003. (212) 777-1332

FOR SALE/TRADE: Stromberg Carlson SR402 tuner, AU62 amp, R-390 front-back panels. **WANTED:** SR-150 tuning knob; Johnson Heath am rigs. Joe Hargis, WSØE, 2505 S. Aspen, Springfield, MO 65807. (417) 882-3197

FOR SALE: Offical Boy Scout twin signal set #1098, 1948-1950 in orig. box, 2 keys, wire, instruction sheet - $50 shpd USA; ARRL Handbooks, LSASE for list. Bob Schafer, WA7IHN, POB 442, Aumsville, OR 97325. (503) 749-1149.

WANTED: Original meter for Johnson Ranger-1 xmtr; 1941-1944 QST mag's. Thank you. Eddy Swynar, VE3CUI, 3773 Concession Rd. 3, RR#8, Newcastle, Ontaro L1B 1L9 Canada.

FOR SALE/TRADE: Collins 32S3 516-F2, 75S3B 312B4, 30L-1 Drake SW-4A; MS4; Morrow MBR-5; Heath SB-630, SB-301. Ray, (314) 428-1963.

WANTED: Any information on Sherwood engineering 7-SP speech processor maintenance manual for Cubic/Swan 1509 series xcvr; manual for Heath 1B-5281 RCL bridge. Will pay for copies. Roger Faustick, KD4AS, 210 Mariah Ct., Merritt Is., FL 32953. (407) 453-3312, FAX 453-2258

FOR SALE: Classic amateur and all Lafayette radio manuals. Will match or beat any published price. List available. Satisfaction guaranteed. Pete Markavage, WA2CWA, 27 Walling St., Sayreville, NJ 08872. (908) 238-8964

FOR SALE: New reprint "Tubes and Circuits" by Wholesale Radio Laboratories, circa 1942-43 - $8 ppd. James Fred, R1, Box 41, Cutler, IN 46920.

WANTED: SC-101; SC-301; KW-1; 30K-1 thru 5; 302C1; 75A thru 75A-4 rcvrs and spkrs, any condx. Purchase entire estates, pick up 48 states and top $ paid. Rick, (800) 462-2972

FOR SALE: Antique RCVG/xmtg tubes 30's-40's; antique tube tester for same.; "B" battery eliminator. SASE. Plimpton, W2IXH, RD 6 Box 264, Wellsboro, PA 16901

WANTED: Chassis & spkr for RCA models 810k, 810k1, 810T, any condx. All replies answered. Itsuo Yano, 80 Lehua St., Kahulwi, HI 96732.

FOR SALE: Browning MF9 freq. meter; MARS 80/40 AM/CW xmtr - $35ea + shpg. Henry Mohr, W3NCX, 1005 Wyoming St., Allentown, PA 18103. (215) 435-3276

WANTED: Manuals for the following NEMS Clark's: DCA-5100A-1, R-1071A-1, RFT-109A, RFT-101D, PSD-104E, PSD-105E & 1673. Edward White, WA3BZT, 809 Seymour Rd., Bear, DE 19701-1121. (302) 322-1313

FOR SALE: Collins 75A-3, mint condx, matching spkr. Comes w/6kc AM & 800 cycle CW filters, crystal calibrator, product detector-plugs in FM socket, no mods. Ray, WA2MZX, (914) 736-0739

WANTED: Any available info on a CW keying machine 'Alphacoder Mod AC-1' mfgd by Autovolt. Unit has a keyboard. Believed to have been used 1935 or so & during WW II & carried a military type # used on Navy ships etc. Approx one half size of old #5 typewriter. Unable to locate any info in old ARRL Handbooks ads this era. L.C. Skipper, W6KF, 725 N. 'O' St., Livermore, CA 94550.

WANTED: Early Hallicrafters - any condx. Also SX-88, Blue Racer, JT-30 and Breting #9. Tom Lucht, 9317 Jaynes, Omaha, NE 68134. (402) 571-0688

FOR SALE: R-390A service: Module repair and alignment to complete remanufacture, new front panels, knob sets, VFO calibration,expert service, reasonable, any condition accepted. Rick Mish, (419) 726-2249

WANTED: Parts, assistance to reconstruct Stromberg Carlson 160L Acoustical Labyrinth! France is not on the moon, will pay all expenses. Reinhard Wieschhoff, 7, rue du Debuche, F78120 Rambouillet, France.

FOR SALE: Electronics suite from U.S. aircraft carrier. MF-UHF rcvrs, xmtrs, radars, PPI displays, RTTY cnvters, terminals. Much more.Bob Mantell, W6VQT, 3135 N. Ellington Dr., Los Angeles, CA 90068. (213) 851-2786

WANTED: Restoreable DX-100, Hammarlund 170, HF amp parts. **FOR SALE:** 1930s homebrew regen, National vernier dial, 1F4/1B4T tubes, rough - $15. Norm, W1CIX, (508) 583-8349

FOR TRADE: FB-7 & HRO coils. **WANTED:** National HRO rack mount spkr/coil enclosure, pre HRO-7 style. Neil Wiegand, WA5VLZ, 12105 Mustang Chase, Austin, TX 78727. (512) 219-8548

FOR SALE: HQ-170 exc - $135; RME preselector VGC - $25; Heath SB-630 station console - $40. Ed, AA4ZU, 215 E. Dade Ave., Bushwell, FL 33513. (904) 793-4038

WANTED: Hammarlund HC-10 converter; manuals for 51S-1 & CV-157/URR SSB converter. Dan Mason, R.Rt. 1, Box 204F, Santa Fe, NM 87501. (505) 455-3416

FOR SALE: Collector grade Knight T-60 xmtr & book - $50. Michael, AB5L, 3701 Junius #E-001, Dallas, TX 75246. (214) 946-1606

WANTED: WW II Japanese military radio equipment & literatures; KWM-1 w/516F-1 in mint condx; Hammarlund PRO-310. Takashi doi 1-21-4 Minamidai Seyaku Yokohama, Japan.

FOR SALE: Hammarlund HQ-170C, matching spkr, manual; Collins 30L1; Clegg 22'er 45- W AM xcvr, manual; FT-101E spkr. **FOR TRADE:** HRO-5A1 coils; HRO-60 spkr for HRO-5 spkr. Carter Elliott, WD4AYS, 1460 Pinedale Rd, Charlottesville, VA 22901. (804) 979-7383 (h), 980-7698 (w)

ELECTRON TUBES FREE 1993 Catalog, over 2,000 types in stock. **Electron Tube Enterprises,** Box 311, Essex, VT 05451. (802) 879-0611, FAX (802) 879-7764

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

WANTED: Collins literature, manuals, catalogs, SM2, SM3, MM2 mic's, TD1, 647T dipole ant, 35C low pass filter, 55G1. Rick Coyne, KD6CPE, POB 2000-200, Mission Viejo, CA 92692. (714) 855-4689

FOR SALE: (5) Amperex VC-100 32KV, (1) Amperex VC-50 32KV vaccuum capacitors - $20 each. Antique Electronic Supply, 6221 S. Maple Ave., Tempe, AZ 85283. (602) 820-5411. See ad inside back cover.

WANTED: Espionage equipment. Historian purchases spy radios, code and cipher machines and any equipment, devises or manuals pertaining to the world's intelligence organizations. Keith Melton, Box 5755, Bossier City, LA 71171. (318) 747-9616

FOR SALE: Heath Nostalgia - 124 page paperback covers Heath history in pictures and stories. $9.95 postpaid (plus tax in WA). Heath Nostalgia, 4320 - 196th SW., Suite B-111, Lynnwood, WA 98036.

FOR SALE: Johnson Viking Valiant - $180; repairable Viking-II - $60; Hammarlund HQ-110 - $75; Hallicrafters SX-42 - $100; T-54 television; SX-62 w/no dial plate; Drake T-4X w/ 6146 finals & AC-3 - $100; Johnson Messengers; Gonset GSB-201 - $240; Globe King 500B RF & pwr sply/VFO decks, rough; Eldico "S-line" rcvr; new Geloso VFO dial. **WANTED:** Hammarlund PRO-310; Heath Mohawk. Jim Jorgensen, K9RJ, 1709 Oxnard, Downers Grove, IL 60516. (708) 852-4704

FOR SALE: VG Collins 75S-1 w/500 HZ filter, 32S-1, 516F-2 - $750, prefer PU only. **WANTED:** 1957 Allied Catalog; mint front panel overlay for SX-100; current meter for Heath IP-32 p/s. David Ishmael, WA6VVL, 1118 Paularino Ave., Costa Mesa, CA 92626. (714) 979-5858

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BC-348R Rcvr, 200-500 Kc & 1.5-18 Mc; used-repairable w/DM-28 - $165.
T-47/ART-13 Transmitter, 2-18 Mc, 100 watt; used, not tested - $145
Shipping charges additional.

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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: Help! Can someone in Radioland get me a schematic or a manual for an ITT Mackay 3010-B? **FOR TRADE:** Dudley-Gray 101D sig. gen. from avionics shop. Ray, NØDMS, 10679 W. Dartmouth Ave., Lakewood, CO 80227. (303) 987-3836

Electric Radio Back Issues

All back issues are available at $30 per year or $3 for individual copies. This price includes delivery in the U.S. and Canada. Foreign orders please enquire.

WANTED: Feb. 1944 Radio News, "Signal Corps Issue". Will pay $20 each. Also Fair Radio and John Meshna catalogs, '50's-'60's Sam Hevener, "The Signal Corps" 3583 Everett Rd., Richfield, OH 44286-9723. (216) 659-3244 before 8:30 EDT

FOR SALE: RCA 100-W HI 9377A theater audio amp. BO + shpg. **WANTED:** (1) 6DE7 & (2) 6CA7/EL34 tubes. Fred Spiertz, WB2AVE, 378 Albany St., Saddle Brook, NJ 07662. (201) 845-6386

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

FOR SALE: Swan Cygnet, model 270, clean w/ manual - $175. Bob Zimmer, NV1X, 205 Brigham Hill Rd., Milton, VT 05468. (802) 879-7235

WANTED: Schematic or manual for James Millen VHF xmtr, model 90810 using an 829B final. Will pay copying costs. Dick, K9IFF, 2206 N. 53 St., Milwaukee, WI 53208. (414) 442-5105

WANTED: Like new 32S-3A, 75S-3C, accessories. Bernard Greeson, KH6P, 98-1145 Kahapili St., Aiea, HI 96701-2811. (808) 486-8879

Western Heritage Museum Omaha, Nebraska
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Leo Meyerson, WØGFQ, (founder of WRL) needs donations of gear and related materials for the amateur radio exhibit at Western Heritage Museum in Omaha, Nebr.

This permanent display is the only one of its kind in the country and is something that all hams can be proud of. We expect 50,000 visitors annually.

Your tax deductible donation will be permanently noted on a plaque that will be prominently displayed.

For more information contact Leo at (402) 392-1708, May-Nov.; 619) 321-1138, Nov.-May.

FOR SALE: Collins kHz dials for 75A-1, 75A-2, 75A-3, 32V-1, 32V-2, 32V-3, KW-1, KWS-1 - $30 per dial or $35 exchange. Butch, KØBS, (507) 288-0044

WANTED: List, indexes or directories of WW II Navy tec manuals or equipment. Willing to help to identify WW II Navy 5-digit type numbers. Send SASE. Ray, W6RIC, (805) 985-6048

FOR SALE: Hallicrafters S-16 - $225; SX-42 rack mount - $150; HT-37 w/manual - $150; S-19R - $100; SX-140 w/manual - $100; Hammarlund HQ-110-C - $85; J-47 key & other old telegraph equipment; OS-8B/U scope - $25+shpg. Gerald Perkins, RR2, Box 34, Milo, ME 04463-9605.

WANTED: Manuals or copies for Hallicrafters SX-111 & Heath DX-60-B. Needed to repair station for 12 yr old novice. Wayne Beever, WØNHK, 620 W. Main Cross, Palmyra, MO 63461

FOR SALE: Heathkit SB-200, near mint, new 572-B tubes - $350; Collins S-line, winged, 75S3B, 32S3, 516F2, exc - $795; **WANTED:** Hallicrafters SX-88, SX-112, SR-2000. Steve, WB4IJN, 601 Black Oak Blvd., Summerville, SC 29485. (803) 821-6931

WANTED: Mint high serial 75A-4 & 51S1. R-390A Organizational Maintenance manual TM 11-5820-358-20. Dan, WB4GRA, Visalia, CA (209) 734-0597

WANTED: HRO-60 or HRO-50 "B" coil. Chuck Cole, K4OMM, POB 192, Ontario, CA 91762. (909) 923-2300

WANTED: Citizen Radio Callbook magazine for 1920 and 1921. Bob Arrowsmith, W4JNN, PO Box 166, Annandale, VA 22003. (703) 560-7161 collect

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TRADE: My original SX-28 or SX-28A manual for your orig. Zenith sales manual 1939, 1940 or 41. A. Bruno, 24 Butternut Dr., New City, NY 10956. (914) 354-8899

WANTED: Instructions for threading dial cord used on the band switch dial pointer for the National NC-100A rcvr. James Schliestett, W4IMQ, POB 93, Cedartown, GA 30125. Phone/FAX (404) 748-5968

FOR SALE: WE rebuild twist-loc, wet style, rectangular, can capacitors. Mail your can to us, typical in shop time is 10 days. We custom build tubular & can capacitors & rebuild your capacitor. Inquire. Frontier Electronics/Everett Hoard, NØNVQ, Lehr, ND 58460. (701) 378-2341

FOR SALE/TRADE: SX-62 w/R46; NC-190. **WANTED:** Magic (tuning) eyes; SX11, S14, NC100X, RCA ACR-111, Sargents, Silvers, home allwaves. Jim Dillon, 201 Seward, Juneau, AK 99801. (907) 586-3223, 10-6 PDT

WANTED: Old panel meters & parts, any condx. Any catalogs or books showing pictures, manufacture, or repair of meters. Chris Cross, POB 94, McConnell, IL 61050.

WANTED: Clean Mosley CM-1 rcvr. Don Fancher, K6TCP, POB 103, Clearlake Oaks, CA 95423. (707) 998-9251

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

WANTED: McIntosh and Thordarson amplifiers; poor to junk Collins 75A-2, 3 and 51J series rcvrs; poor to junk Hallicrafters louvered spkr. Serious sellers only! Marcus Frisch, WA9IXP, Box 28803, Greenfield, WI 53228-0803. (414) 545-5237 (24 hrs) collect

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WANTED/FOR SALE: Vintage tube CB's. Send card or call with models you have for sale. LSASE for list. Steve White, WB5UGT, Box 1086, Clute, TX 77531-3814. (800) 374-6477 (9008) leave message.

FOR SALE: Dallas area; complete Johnson Desk KW Ranger, all cables; HRO-60 spkr & 5 coils; Globe King 500C on the air. K5BAL (214) 562-6924

WANTED: Manual or copy of Eldico SSB-100F xmtr; round dial for Heath SB-401. Bob, WBØAUQ, 986 E. 1587 Rd., Lawrnce, KS 66046. (913) 842-9799

WANTED: Quality audio recordings of AM QSOs. Trade Eastern U.S. activity for elsewhere. Open reel, cassette, DAT. WA3VJB, Box 73, W. Friendship, MD 21794.

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Electrolytics, high voltage capacitors, power resistors, plugs, switches and more. Free catalog. **A.G. Tannenbaum, WA2BTB, P.O.Box 110, East Rockaway, NY 11518. (516) 887-0057, FAX 599-6523**

WANTED: WW II & Korean mititary sets, xmtrs, rcvrs & test equipment. Send list of equipment along with price. Richard Mollberg, K6PWF, 2340 Almond Ave., Concord, CA 94520. (510) 283-6786 eves

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MESSAGE: McElroy is coming. W1IMQ's big biography of T.R. McElroy, World Champion Radio Telegrapher. Illustrated; every Mac Key. Limited hardcover edition $39.95, order by November 1 to assure availability. Softcover $19.95 + $2 shpg per order. Publication early December. Artifax Books, Box 88-E, Maynard, MA 01754.

WANTED: Meissner Signal Shifter Model EX in exc operating condx. Prefer rack mount panel but will accept other. Roland Matson, RFD #1, Box 2943, Kennebunk ME 04043. (207) 985-3751

FOR SALE: 19" rack, desk top cabinet,ex. condx. Panel opening 8 3/4"x 19". $48+UPS. See BUD CR-1741 in your Newark catalog. Bob Bakinowski, 1524 Saint Tropaz, Tucson, AZ 85713. (602) 624-8029

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

Fixing Up Nice Old Radios by Ed Romney.....$25

Wireless Communication in the United States by Thorn L. Mayes.....$29.95

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

Don C. Wallace, W6AM, Amateur Radio's Pioneer by Jan D. Perkins....$29.95

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Collins promotional literature, catalogs and manuals for the period 1933-1983. Jim Stitzinger, WA3CEX, 23800 Via Irana, Valencia, CA 91355. (805) 259-2011. FAX (805) 259-3830

FOR SALE: Collins 75A-4 filters: 6 pole ceramic for high quality AM. 3 bandwidths available: 4, 6, or 9 Khz - $83.50 ea.; single pole CW crystal filters - $88 ea. 10% discount for two filters. Money back guarantee. Calif. residents please add sales tax. Vector Control Systems, 1655 No. Mountain, Ste. 104-45, Upland, CA 91786. (714) 985-6250

FOR SALE: Vintage parts. Send stamp and request "Vintage Flyer". USA only. Copies of some obsolete Readrite/Triplett equipment manuals. Bigelow Electronics, P.O. Box 125, Bluffton, OH 45817.

FOR SALE/TRADE/WANTED: Vintage tube CB's, all makes/models available; old radio books. LSASE for lists (specify). Charles Zafonte, RFD #1, Box 75, Fort Kent, ME 04743. (207) 834-6273 eves.

WANTED: Broadcast equipment catalogs and transmitter brochures from 1930-1955. Magazines wanted: "Broadcast News" (RCA), "Pick-ups" and "Oscillator" (Western Electric). Sam, W6HDU, 1031 San Antonio Ave., Alameda, CA 94501. (510) 521-1429

FOR SALE: AM Press Exchange issues 18-107 - $45; QST complete on fiche w/EyeCom 1000 reader - $225; The Milliwatt complete reprint - $35; Yellow Sheet 'Buyer's Guide' thru '79 - $8; Navy tape recorder RD365/UN, unused, access, book, mech. adj. needed - $25; Capehart R-390A, covers, suitable new Bud cabinet, books, spares, connectors, pkg - $250; GRC109A, unused, pkg incl access, spares - $125. Call details on pkg, shpg extra some items. Jay, WBØL, (612) 724-0322 eves.

FOR SALE: 51J-4 - $400. **FOR TRADE:** BC-375; BC-348 & FT-154; URM-25; BC-728; T-1154. **WANTED:** R-388A; R-390A (Collins); RBU or RBV Panadapter. Tom Brent, Box 1552, Sumas WA. (604) 826-4051

FOR SALE: Navy type CJB-2600BA "flameproof" keys. New in original bx - $47 shpd con.US. WA7HDL, (208) 756-4147

FOR SALE: Transmitting/Receiving tubes, new and used. LSASE for list. I also collect old and unique tubes of any type. Looking for Taylor and Heintz-Kaufman types and large tubes and sockets from the old Eimac line; 250T through 2000T for display. Maybe you have something to trade? John H. Walker Jr., 16112 W. 125th St., Olathe, KS 66062. (913) 782-6455

WANTED: Johnson gear, all models, any condition. Also parts and literature. Please state condition and shipped price. Wen Turner, AD7Z, Box 451ER, Cal-Nev-Ari, NV 89039.

WANTED: Collins 270G-3 or 312A-1 spkr; escutcheon for 75A-4 and Electro-Voice model 419 stand. David A. Clark, K5PHF, 9225 Lait Dr., El Paso, TX 79925. (915) 591-4184

FOR SALE: Hallicrafters SX-24, works - $75 obo; RCA Radiola 17, fully tubed, nice wood - $80; TCS parts rcvr - $20; Measurements 560FM sig gen - $30; TRA-4 rotor & control w/cable - $10; Swan 500 w/117XC supply, cables, book, clean vintage SSB - $215 obo U-ship. WA7HDL, (208) 756-4147

FOR SALE: New Collins parts PM-2 pwr xfmr - $60; 399B4 S-line crystal adapter - $80; 30S-1 screen xfmr modification UTC HIT-1 - $35. Richard Prester, WA2IPS, 131 Ridge Rd., West Milford, NJ 07480. (201) 728-2454

WANTED: Swan mic & mobile pwr sply; HP-13. **SELL or TRADE:** Exc RT-66 (2) w/ps - $125. Andrew Yoder, POB 109, Blue Ridge Summit, PA 17214. (717) 263-6109

FOR TRADE: Restorable Ranger 1 for SX-140 or HQ-110. Don Ferrill, K9TWO, (317) 788-4337

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

ELECTRIC RADIO PARTS UNIT DIRECTORY

If you need a part for a vintage restoration send $2 and an SASE (.52 postage) for a 6 page list of parts units. If you have a parts unit, consider putting it on the list. Your dead unit can help bring others to life!

FOR SALE: Repair & refurbishment of older tube-type amateur equipment. Fully FCC licensed; 35 years experience. Chuck Banta, N6FX, Claremont, Calif. (LA area) (714) 593-1861

FOR SALE: Narrow bandwidth (600 Hz) mech. filters for CW reception with Collins 51J-type rcvrs - $45 each. Limited supply. Joel Thurtell, 11803 Priscilla, Plymouth, MI 48170. (313) 453-8303

FOR SALE: Have you received your 1993 catalog of coil forms, literature, tubes and other radio parts? If not send $2 to Antique Radio Labs, R1, Box 41, Cutler, IN 46920 for your copy.

WANTED: Heathkit SB300 or 301 front panel for restoration. Must be original paint no scratches. Gerry, WA1VWL, 238 Milford St. Manchester, NH 03102. (603) 669-9968

FOR SALE: Signal one CX-7 spare parts rig - $325; DX-160 w/matching spkr, mint, BFO - $150. Lane, (505) 678-6401

TRADE: Gonset G66B/AC, (2) Elmac PMR7's/AC, Piper autonav LF/BC RX, all for nice telegraph key. Rick Ferranti, WA6NCX, 254 Florence Ave, Arlington, MA 02174-7248. (617) 646-6343

WANTED: Radio News 2-1944 (special Signal Corps issue), complete. Will pay $35 for clean one, $50 for a new one. Gene, KD4YIZ, 800-619-0900 or 800-872-9680

WANTED: All types of military electronics, especially RDF and radar items, manuals too. Also need URD2 antenna. William Van Lennep, POB 211 Pepperell, MA 01463. (508) 433-6031

WANTED: Valiant restoration help. Good panel and meter. Will pay $50 for exc. Burgundy paint source, circuit diagram, past ER# modifications list. Tom Marcellino, W3BYM, 13806 Parkland Dr., Rockville, MD 20853. (301) 871-7463

FOR SALE: 10 KV Vacuum capacitors w/ mounting, attaching hardware & collars for GPT-10K (FRT-39) xmtr, all tank circuit sizes/types-mint, 1 lge box 60+lbs - $100 obo. Paul Albanese, N6BZY, 7831 Lansing Dr., Lemon Grove, CA 91945-4442. (619) 461-0130

WANTED: Meter for Collins 51J series rcvr; 75A series mechanical filter (CW). **TRADE:** F250A67 & F100Z4 filters. Brian Roberts, 3068 Evergreen Rd., Pittsburgh, PA 15237. (412) 931-4646

WANTED: DowKey antenna relay w/external contacts; B & W or Johnson TR switch; 1930s issues of The Radio Handbook & other older publications. Hal Waite, 2941 Sorrel St., Las Vegas, NV 89102.

WANTED: Service manual for National HRO-600. Must have wiring diagram of printed circuit included. Copy OK. Masahiro Nada, #503 1942-2 Murakami Yachiyo Chiba 276 Japan. FAX 011-81-474-86-7085

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Dovetron NB-1 Noise Blanker

The Dovetron NB-1 noise blanker is a small solid-state device that plugs directly into J22, J23 and J24, which are located on the top of a Collins KWM2/2A HF transceiver. The NB-1 may also be installed in all versions of the Collins 75S(*) receiver.

In addition to noise pulse blanking and random noise suppression, the level of the received signal may be amplified 15 dB or attenuated more than 20 dB. Specs upon request.

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Nogales, AZ 85628-6160
TEL: 602-281-1681
FAX: 602-281-1684

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

FOR SALE: RIT for KWM-2 and S-Line. No modifications for KWM-2; 75S- needs one wire - $59.95. SASE for info. John Webb, W1ETC, Box 747, Amherst, NH 03031.

WANTED: Tube audio amplifiers; Heath, Macintosh, Fisher, Dynaco, etc. **FOR SALE:** R-390A EAC (1967) S/N 51xx, complete, near mint. Mike Nowlen, WB4UKB, 12911 New Parkland Dr., Herndon, VA 22071 (703) 481-9614

WANTED: National Doghouse or rack pwr sply; 1 1/4"knobs for SW-3; 1" scope or 913 tube; 47 tubes. Richard Bauer, K5RB, 563 Hambrick Rd., Dallas, TX 75218. (214) 348-3378

FOR SALE: Japanese WW II telegraph key - $50; Japanese panel meters, make offer; Heath Warrior - $225; SX-101 - $175; DX-100 - $175. **WANTED:** cabinet for TCS rcvr. Cliff Fleury, 64174 Tumalo Rim Dr., Bend, OR 97701. (503) 382-9162

WANTED: Ameco AC-1 xmtr; DX-100 drive & load knobs; relay for auto-mate keyer. Steve, K8CA, (313) 659-8000

WANTED: S-Line R/E 3253A, 75S3C, 312B-5 & 516F-2 set; 75A-4 S/N 5000, R/E KWM-2A, w/516F-2; REAL HF-380 or HF-8020/851S-1 or 851S-2. Mimi Kobayashi, 2212 Rockefeller Ln., Redondo Beach, CA 90278. (310) 379-6052

WANTED: Repairable or parts units tube-type SSB/CW gear, accessories or power supplies-Heath, Drake, etc. Byron Tatum, WA5THJ, 1920 Maxwell, Alvin, TX 77511. (713) 331-2854

FOR SALE: Summer specials; pulse generators: HP212A - $75; HP214A - $100; freq. meter USM-159, exc w/acc. - $50; ME26/HP410B V TVM w/probe - $20; new weather balloons - $7ea; new vacuum tubes for Motorola xcvr, write wants; lge Sola line conditioner, like new - $75; 50 MHz oscilloscope - $200; shpg additional. Joe Bunyard, 1601 Lexington St., Waco, TX 76711-1701. (817) 753-1605

WANTED: Manual or copy circuit diagram Heath voltage calibrator VC-3. W. Britton, 225 S. 17th St., St. Helens, OR 97051

WANTED: Manuals, copies OK for Hammarlund 180A & RME DB150A. Fred, (609) 734-1321, 8:30 AM - 4:45 PM.

ELECTRON TUBES: All types - transmitting, receiving, obsolete, military--Large inventory. **Daily Electronics Corp.**, 10914 NE 39th St., B-6, Vancouver, WA 98682. (800) 346-6667, (206) 896-8856, FAX (206) 896-5476

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FOR SALE: Restoration of vintage radios; 25 years experience. Phil Goodman, K4FXB, 4112 Commodore Dr., Atlanta, GA 30341. (404) 457-4195

FOR SALE: Heathkit amateur radio repair by RTO Electronics, 4166 Maple St., Berrien Springs, MI 49103. (616) 473-3201

WANTED: TMs for, GF11, GF12, TDQ, TBX8, National 110, Mk II (19) dynamotor & cable. Ken, KD6B, Box 310, Redmond, OR 97756. (503) 923-1013

FOR SALE: National plug-in coil set consisting of 7 sets (3 coils per set, A-G) for either the ACS or FB-7 w/preamp, BO; 1948 Stancor ST-202A w/coils, book & spare 35T - $125/swap; Eldico S6B-100F xmtr clean w/book - $150/swap; Collins 312B4 - $100. **WANTED:** WE or Machlett 279A/379A or 251A/351A transmitting tubes. Can trade dud towards good tube. Gary, WA9MZU, 1751 Michon Dr., San Jose, CA 95124. (408) 266-2218

WANTED: Johnson Ranger, DX-100, 32V-3, & SP-600, all in good condx. Peter, (609) 296-9208

FOR SALE: Put a class knob on your classic Collins 75A-4. 'Jupiter Superknobs' are solid brass, six times heavier than fragile plastic original vernier knob - Price reduced - $99 + $5 shpg.48. Joel Thurtell, 11803 Priscilla, Plymouth, MI 48170. (313) 453-8303

WANTED: Pre WW II radio magazines, books, photos of stations, QSL cards, broadcast and ham collections bought. C. MacNeill Book Dealer, WA8ZNX, 3165 12 Mile, Berkley, MI 48072. (313) 543-1177 days

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WANTED: Nems-Clarke VHF rcvrs & related literature; REL FM BC tuners; misc FM BC rcvrs. Joe, N4WQC, Box 19302, Alexandria, VA 22320. (703) 256-2468 phone/Fax

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FOR SALE: Collins; KWM-2A; 30L1 + ps + 4 new 811A; 75S1; 32S1 + ps; 30S1 + new 4CX1000 w/manuals; Globe champ 300; Globe VFO V-10; Globe Scout 65A; Heath TX1; SB610 + manuals; DX35; Harvey Wells T90; R9A +ps + manuals; TBS 50A + ps + manual; Swan 500L + ps + manual; Morrow M85 MB560A + sp + ps + manuals; Elmac AF68 + ps + manual; Drake 2B; T4X +ps; T4XB+MS4 spk; T4XC + MS4; R4C, PS synthesizer; Etek FR-4 frequency readent counter; BTI Linear LK 2000 + spare 4-1000; Ameco 6-80 meter-AM CW xmtr; 6 meter convertor + ps. Gene, W7MXM, (208) 522-5854

FOR SALE: E.F. Johnson goodies & classic rcvrs, Ranger I - $150; Pacemaker - $100 (parts rig included); Navigator - $125; Challenger - $75; Messenger w/310-M crystals - $65. Classic rcvrs - Drake 2B w/Q multiplier spkr - $225; National NC-300 - $150; BC-348 - $85; Hallicrafters portable S.W.S-72 - $75; Warrior Linear - $225; all rigs in great condx w/manuals. Jeff Garrett, KEØMT, 4622 W. 33rd Ave., Denver, CO 80212. (303) 455-5658

ANNOUNCING: New address for The Colorado Bighorn Museum of Amateur Radio is P.O. Box 229, Byers, CO 80103 for mailing purposes. Visitors to #2 Arapahoe St., Byers, Colo. Phone is (303) 822-9868. Thanks to everyone for your interest and support.

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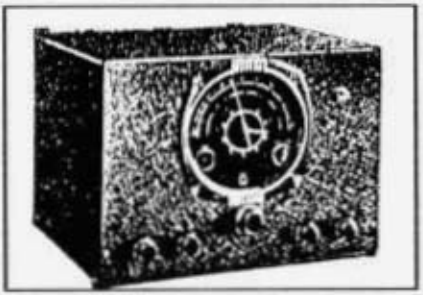

WANTED: Any condition, Hallicrafters Sky Master and EP-132 as shown. Also want SX-46, S-48 and S-49. Chuck Dachis, 'The Hallicrafter Collector', 4500 Russell Dr., Austin, Texas 78745. (512) 443-5027

WANTED: 24 hour drum type mechanical clock. **FOR SALE:** RT-556/APX-46 IFF radar xcvr - $35; more items-list - $1. Joe Orgnero, VE6RST, Box 32, Site 7 SS 1, Calgary, AB T2M 4N3, Canada. (403) 239-0489

FOR SALE: Collins 51S1 (RE) - $1200; Collins 51S1 (WE) - $900; Collins KWM 380, all mods & filters, mic - $2500; Collins KWM2A (RE) - $500; Collins 30L1 (WE) - $600; Collins 312B5 (WE) - $375; Collins R-388 - $450; Harris RF-1205 remote antenna coupler - $500; T-368 antenna tuner - $150; B&W SSB adapter - $100; Wilcon T-158 - $500; Johnson 6&2 xmtr - $100; ZM 11 LCR bridge - $75; TV-7 tube tester - $70; rack mounts for KWM-380, KWM2, 312B5, 51S1 - $135ea or all $500. Howard, W3IIM, (304) 876-6483 after 7PM

WANTED: Help! Need photocopy of that 6Y6 cathode modulator article appearing circa 1966 ARRL Hints and Kinks book. Mike Agsten, WA8TXT, 405 W. Bogart Rd., Sandusky, OH 44870

FOR SALE: Ameco 6 & 2 xmtr mod TX 62 w/ VFO 621, good condx - $50; Viking 6N2, no pwr sply - $30; Heath SB10 - $25; RME HF 10-20 preselector nice - $45; DB20 works & looks good - $40. P.W. Binford, W6LHH, 561 Atherton Ave., Novato, CA 94945 (415) 892-2643

WANTED: Heath AC1 antenna coupler. **FOR SALE:** Manuals/copies for AT-1, VF1, Navigator, CE-20A, BC-458, 1A, R4B, Nat-270, HQ-170. Craig, KB6XV, 14 Governors Ct., Sacramento, CA 95817. (916) 736-1133

WANTED: Western Electric rcvr model KS7676; following items for a Western Electric tube type TD2 microwave radio relay rcvr - main IF amp J68330A (uses tubes 6 ea 404A, 417A & 418A); IF converter preamp J68330N (uses 3 417A tubes); manual for measurements corp model 560FM signal generator. Robert Bennett, 5675 Shadow Hills, Las Cruces, NM 88012. (505)382-0148

FOR SALE: 4 pr of 1000A's, (heavy duty 4-1000's) - $125 ea. or all for $125 (1 is low but good); National NC-300, retubed 8/93, spkr, 6 & 2 meter converters (6 meter is HB), orig. manual - $200; Hammarlund super-pro, no cabinet, great parts rig - $95; Boonton model 91-C RF voltmeter - $65; Heathkit HP-23A ps mounted inside SP-600 spkr - $75; Heathkit HW-100, looks rough, exc. parts rig - $75; DX-100, does need a few tubes, buyer pays shpg, 100lbs, orig. manual - $90; Hallicrafters SX-62 w/spkr - $185. Lane, KM3C/5, (505) 678-6401 wkdys

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WANTED: 4-400 & 4-125 tubes, prefer matched. Tom Smith, N5AMA, 13034 Elmington Dr., Cypress, TX 77429-2062. (713) 376-3436

FOR SALE: Navy R1051b - $265; Racal RA6217e - $325. **WANTED:** HRO-50T1 coils E, F, AA, AC. Nick Oliviero, 8121 Manchester #491, Playa Del Rey, CA 90293. (818) 367-5000 eves

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WANTED: Ranger-1 modulation xfmr. Eddy Swynar, VE3CUI, 3773 Concession Rd 3, R.R.#8, Newcastle, Ontario L1B 1L9, Canada

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WANTED: WW II Japanese military radio equipments and literaures; original S-meter, spkr, pwr sply for HRO-5T. Takashi doi 1-21-4 Minamidai Seyaku, Yokohama, Japan

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FOR SALE: Heathkit SB-620 scanalyzer w/ manual, IF 3395 KHz - $75+UPS. Bill Allen, W7US, 11720 E. Twin Hills Tr., Tuscon, AZ 85748. (602) 721-8202

WANTED: Cabinet for SP-600-JX 17 rcvr. J.A. Thomas, 1130 Pleasant View Ln., Colorado Springs, CO 80921. (712) 481-4564, 4th ring ans. machine

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FOR SALE: RME #6901, nice clean condx in metal cabinet 10"H x 6-1/2" D x 8-1/2"W ,w/ cord & plug. Howard, (904) 344-9603

WANTED: SX-71 junker w/knobs or knobs alone; panel meter for Globe Chief 90. Dale Cochrane, AA3BK, 14652 Mustang Path, Glenwood, MD 21738.

FOR SALE: Motorola mobile rig model FMTRU5V w/mike & control box, instruction bk - $20 + shpg. Bill Riley, 863 W. 88th Ave., Eugene, OR 97405.

FOR SALE: NCX-500 xcvr, AC 500 - $175; Swan 1011D xcvr - $95; Heath HM17 - $17, all very good to exc. condx w/manuals. Bill, KE7KK, 6712 Lake Dr., Grand Forks, ND 58201. (701) 772-6531

FOR SALE: Pair of Stancor plate xfmrs, pri - 120-V, sec. 2500 @ .5 amp - $200 for pair. **WANTED:** SX-101 MK II; Radio Shack DX-400; Uniden CR 2021; TMC GPR-90/92; RCA model CRM R6A;. Rick, K8MLV/Ø, 1802 W. 17th St., Pueblo, CO 81003. (719) 543-2459

WANTED: For BC-348 (Q or similar); RF/OSC coils 200-500 kc & nameplate; QST magazine May 1959. Hans Zimmermann, HB9AQS, POB 209, CH-3780 Gstaad, Switzerland

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FOR SALE: Tektronix maintenance manual for model "L" plug in or Textronix model 160 series units or Hewlett Packard model 425 A, original not copies - $5ea + UPS $1 S/H. Ted Stewart, W6NPB, 2157 Braemar Rd., Oakland, CA 94602. (510) 531-7042, Fax 531-7072

WANTED: "BC" radio equipment bag listing information from the Signal Corp Supply Catalogs SC1 through SC8. Paul Thekan, N6FEG, 335 Rutherford Ave., Redwood City, CA 94061. (415) 367-1499

FOR SALE: Rider manual volumes 5 and 9 thru 20; National Union volumes 4, 6, 7 & 8, BO for lot only, I pack, U ship. NK5C, POB 1798, Pasadena, TX 77501-1798. (713) 473-7951

WANTED: 3" bakelite Weston Round panel meters type 301, in ranges 0 to 25mA, 0 to 50 mA, 0 to 100 mA, 0 to 250 mA, 500 mA, also can use 301 cases, w/glass, or open meters, complete. Roland Matson, K1OKO, RFD #1 Box 2943, Kennebunk, ME 04043. (207) 985-3751

FOR SALE: Yeasu FL-101 xmtr, FR-101 digital rcvr, cords, manuals, exc. condx - BO. John File, N9TWQ, POB 566, Tolono, IL 61880. (217) 485-3439 eves, 356-7034 days

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WANTED: WRL-70 xmtr; HB xmtrs for display, must be museum quality; thousands of QSL cards to paper walls of Amateur display. Call Leo, (402) 392-1708, Western Heritage Museum, Omaha.

FOR SALE: Collins 30K1, AM xmtr serial 133 - $3800; Rockwell-Collins 637T-2 antenna, new - $225. Jim Stitzinger, WA3CEX, 23800 Via Irana, Valencia, CA 91355. (805) 259-2011

WANTED: Schematic &/or manual for RX-1 Heath Mohawk rcvr, copies OK; ARRL Handbook 1965-1969. Chet Smith, WB2LUQ, R.D.#1 Box 30, Verona, NY 13478. (315) 336-1739

WANTED: National SW-4 regen rcvr, looks like SW-5 but only 1 coil used per band, super cash or trade. Robert Enemark, W1EC, Box 1607, Duxbury, MA 02331. (617) 934-5043

FOR SALE: (2) Globe Champion 300 xtmrs - $400. Jo Sanford, WA6UCI, 5779 N. Date Ave., Rialto, CA 92376. (909) 874-8849

FOR SALE: Crystal synthesized VFO by W3QLV, see QST, Dec. 1964, exc condx w/ article. Pickup preferred - $100. Jim Miccolis, N2EY, 126 Summit Ave., Upper Darby, PA 19082. (215) 352-5247

WANTED: Unbuilt kits by Heath, Johnson and Knight. Gene Peroni, POB 58003, Philadelphia, PA 19102. (215) 665-6182 days

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FOR SALE: ARRL Handbook 1942 Special Defense Edition - $30; 1947 - $25; 1948 - $25; 1949, no front cover - $15. Ron, KC6WTG, POB 783, Santa Rosa, CA 95402. (707) 539-8319 - noon to 9 PM Pacific time.

WANTED: Teletype Crypto gear, as built by Crypto AG., Ericsson, IBM, Kleinschmidt, NSA, Siemens & Halske, Teletype Corp., etc. Dave Ross, KA6EPI, (206) 465-2117

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WANTED: Schmatics/service manual for 1936 RCA communications rcvr, ACR175, copy OK. J.A. Thomas, 1130 Pleasant View Ln., Colorado Springs, CO 80921. (719) 481-4564

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WANTED: PRC-74, PRC-66, RAX-1, URA-17, PDR-27J & ARC-115. Joseph Pinner, 201 Ruthwood Dr., Lafayette, LA 70503. (318) 981-7766

FOR SALE/TRADE: WW II British Bomber Command rcvr, R-1155E, unaltered, orig. condx - $650. Sam Hevener, W8KBF "The Signal Corps", 3583 Everett Rd., Richfield, OH 44286-9723. (216) 659-3244

WANTED: Indoor receiving antenna for general coverage rcvrs. Levy, 8 Waterloo, Morris Plains,NJ 07950. (201) 285-0233

FOR SALE: Heath AT-1 & VF-1 - $85; Hallicrafter S38-E - $45, + shpg. Carold Slagel, WØDCO, 306 S. 16th, Hot Springs, SD 57747. (605) 745-3265

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WANTED: Manuals for: Racal RA6217D19 rcvr, Singer MF5/VR4 spectrum analyzer, General Radio 1163A generator, copies OK. Hal Layer, KK6HY, POB 27676, San Francisco, CA 94127.

WANTED: HRO-5 silk screen coils D.E.F.H.J. doghouse pwr sply 5880, 5886 or 5897 for HRO & SW3. Jim Leathem, K7BTB,Box 50355, Parks, AZ 86018. (602) 635-2117

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WANTED: Pwr sply for Gonset G-76 xcvr, AC model 3349 & DC model 3350. Alan Schreier, WA5DJU, 12805 Powderhorn St., Austin, TX 78727. (512) 835-2056

WANTED: Heathkit AT-1; Turner model 99 microphone. Bill Brossmann, K9IUF, 547 Lake Connie Rd., Carrollton, GA 30116. (404) 834-0460

FOR SALE: Collins 32S3 xmtr, w/516F2, 30L-1 amp and 312B4 station console, VG condx, all winged. W.A. Schroeder, W9NDL, Anna, Illinois. (618) 833-8117

WANTED: Cabinet for SP-600 and R-390A rcvrs; Operators Manual: Radio Receiver R-390A/URR (TM 11- 5820-358-10). John Keil, 4618 Norwalk St., Union City, CA 94587. (510) 471-4838

FOR SALE: Millen grid dip meter, model #90651, complete set w/instructions, near new - $75. Roy Kramer, W3ZIF, 740 S. Carldon St., Allentown, PA 18103. (215) 797-9406

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WANTED: RME-69 rcvr. J.B. Jenkins, W5EU, POB 5087, Red Oak, TX 75154. (214) 723-1835, collect calls OK

WANTED: 20-30 HY 500mA. 5KV choke; 2MF, 5KV condenser. Fred, KC4MOP, 6922 Furness Ave., Oxon Hill, MD 20745. (301) 567-2012 eves

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WANTED: For Colorado Bighorn Museum. Hallicrafters HT-33, S-40B, SX-101A, SR-34; Heath AK-5 spkr, SB-10, DX-35/40/100; B&W LPA-1; National SW-54, HRO-60, NC-183D; Collins 32V-3, 75A-4; Gonset G-43, G-63; tubes 8874 (3), 3CX800 (2). Don Zielinski, KØPVI, (303) 822-9868

WANTED: Copy of CQ 1/1965 page 86 article on use of 572B tubes for Collins 30L-1. Ernst Schroeder, DJ7HS, Pinkenburger, Str. 25 D, 30655 Hannover, Germany

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FOR SALE: BC-342 parts set - $35 + $10 shpg; radar rcvr R 375/APR4X - BO; type CND 46155 by Amdrea Radio Corp. - BO; radio direction finding equipment DP-13, 100-1500 kc by RCA - $50 + shpg; Knightkit V-107 vfo, w/papers - $25 + $5 shpg; Precision model V-70 VTVM, very nice, no probe - $25 + $5 shpg; Heathkit SSB/CW rcvr model HR-1680, solid-state, works on CW, needs work on SSB, as is, w/manual - $50 + $10 shpg. James Fred, R1, Cutler, IN 46920. (317) 268-2214

WANTED: Vacuum relay for CU-32/ART-13A. I broke this relay while trying to repair all the shpg damage done to this otherwise beautiful piece. Please, all sellers of this great old gear, please use a professional packer. An old box and some crumpled newspaper doesn't cut it. Our treasures are becoming too rare to sacrifice to our modern day carriers. Thanks. John Coward, POB 276, 8970 Glen Arbor Rd., Ben Lomand, CA 95005. (408) 336-3414

FOR SALE: NCX-5, w/ps - $210; Gonset III - $50; IV - $75; G-50 - $95. **WANTED:** HRO-60, w/matching spkr and coils A thru J. Clark, WØBT, (913) 235-2721

FOR SALE: Heath wattmeter/SWR bridge - $40. **WANTED:** S-53A; 40-M ARC-5 xmtrs and rcvrs. Bob Braeger, WA6KER, 6634 Navel Ct., Riverside, CA 92506. (909) 682-5084

WANTED: Hallicrafters DD1 Skyrider diversity, only in very good condx. Jose Cangas, EA4JL. Contact in the States Kurt Keller, (203) 431-6850

FOR SALE: Hammarlund HQ-170C - $150; Hammarlund HQ-180 - $200; Hallicrafters HT-37 - $150. **WANTED:** SX-100, SP-600 for parts. Bill, (304) 842-4635, 6 to 10 PM EST

WANTED: AR/CR-88 for parts; ITT Mackay 3010; HT-20; SX-28A; good AR/CR88; RME 99; Howard 450A, 490; GPR-750; T-368; GRR-92, whatever? **FOR TRADE:** R-390; R390A; RCA 8516; DX-100s; Viking II's; Elmacs; Drakes; Hallicrafters; RBBs, RBCs, RBMs; Heathkits; much more vintage ham & military equip. SASE for list or trade for yours. Shane Ward, N1DMX, 14 Pond St., Amesbury, MA 01913. (508) 388-9716

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WANTED: Service manual for Hammarlund HQ-105TR (copy OK); Drake MS4 spkr; RME 4301 sideband selector for 4350A. Doug, (206) 472-3478

FOR SALE: Collins KWM 2 (round emblem) S/N 15270 w/PM2 pwr sply, 312B-5 VFO/SWR, orig. manuals - $550; 75A-4 S/N 3975 w/spkr, 2.1 filter, manual - $450; Collins PM 2 pwr sply, manual - $60; Johnson Ranger w/manual - $150; Heath HG 10B VFO w/manual - $30; LM 14 freq. meter w/maint. manual, cal. book, rack & plug - $40; 6 pcs new 4CX250B - $40ea; UTC LS19 broadcast quality interstage xfmr $20; misc "A" series UTC broadcast xfmrs mike to grid, line to grid etc - $10ea. Roger Faulstick, KD4AS, 210 Mariah Ct., Merritt Is., FL 32953. (407) 453-3312; FAX 453-2258

WANTED: 8R-1 xtal calib. for 75A-2; National HRO's, parts, coils, dog house p.s., spkrs; National SW-3 parts, coils, p.s.; Collins "S" line pwr sply, cash or trade. **FOR TRADE:** SX-28, SX-101, R46B spkr, S19R Skybuddy, SX-117/HT-44 w/matching spkr, HQ-110C. Larry Tinkler, 18012 Pt. Conception, Cerritos, CA 90701. (310) 860-3131

FOR SALE: N.I.B. 837 tubes - $3 ea of 4/$10; Hammarlund SP200/BC779 rcvr w/home brew pwr sply (works fine) - $90. **WANTED:** modulation xfmr multi-match, 250w or larger; knobs for RME-45 rcvr. Jack C. Shutt, N9GT, 1820 Dawn Ave., Ft. Wayne, IN 46815. (219) 493-3901

WANTED: Test equipment (IE-17E) for WW II walkie talkie (BC-611); test unit I-135E and artificial antenna A-82A. Richard Mollberg, K6PWF, 2340 Almond Ave., Concord, CA 94520. (510) 283-6786 (n), 827-4056 (d)

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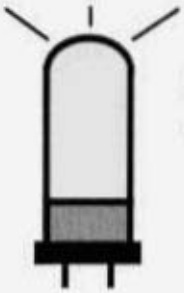

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