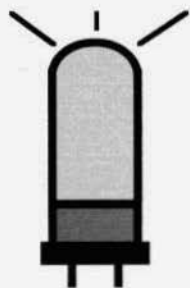


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ELECTRIC RADIO

celebrating a bygone era

Number 76

August 1995



Jay Spivack, N7JDT

ELECTRIC RADIO

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

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

Regular contributors include:

Walt Hutchens, KJ4KV; Bill Kleronomos, KDØHG; Ray Osterwald, NØDMS; John Staples, W6BM; Dave Ishmael, WA6VVL; Jim Hanlon, W8KGI; Chuck Penson, WA7ZZE; Jim Musgrove, K5BZH; Dennis Petrich, KØEOO; Bob Dennison, W2HBE; Dale Gagnon, KW1I; Rob Brownstein, NS6V; Dick Houston, WØPK; Andy Howard, WA4KCY; Skip Green, K7YOO; Albert Roehm, W2OBJ; Steve Thomason, WB4IJN; Don Meadows, N6DM; Bob Sitterley, K7POF (photos) and others.

EDITOR'S COMMENTS

In this issue on page 30 I review Chuck Penson's new book, "Heathkit, A Guide to Amateur Radio Products" that will be published by Electric Radio. This is our first venture (or adventure) in book publishing and Shirley and I are really excited and a little anxious. I hope everyone reads the review.

In other news...I attended the Flagstaff hamfest a couple of weeks ago and had a great time. The 'fest was very well attended by vintage ops/collectors and although attendance in general was down and there seemed to be fewer sellers than in the past, most of the people I talked to will be there next year. Fort Tuthill - where the hamfest is held - is really a nice setting; parklike, clean, lots of room, good access (it's right beside the freeway) and geographically good for all the hams in the western states. There were quite a few California hams in attendance and some from as far away as Virginia (good friend Walt Hutchens, KJ4KV). On Friday night we all got together at a Sizzler's restaurant for dinner and a couple of hours of talk. I think there were about 30 AM'ers in attendance.

I came back from Flagstaff with Gonset Communicators for 6 and 2-meters. Lately I've become very interested in working AM on VHF with some of the good old VHF 'boatanchor' gear. I think that there are quite a number of AM'ers who are becoming more interested in VHF. It's an area of vintage radio that quite a number of us have never explored. In future issues we'll be doing some articles on VHF AM gear. 73 for now, N6CSW

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Cover: Jay Spivack, N7JDT, airline pilot, in his hamshack in the sky. See his article on the National NC-400 on page 20 and another photo of his vintage hamshack on page 29.

LETTERS

Dear ER

Where Have All The 10 Meter AM Ops Gone, Long Time Passing???????

Being a 6 meter fanatic I often have occasion to check on 50.400 or thereabouts whenever the band is open. I operate SSB and CW on 6 and primarily chase DX and grids on the band. However, during a good domestic opening there is usually AM activity. This is the normal every year E skip season. It runs from May to August usually and will provide many E layer openings during these months in the summer. When the band is open for E's on 6, it's open on 10.

Yesterday afternoon I was working WA4DDH/1, Bill, and KA1OXO, Ken, in Massachusetts on 50.375 AM. Of course when Bill said he was going to sign and run down to 10 AM for some contacts, I thought that was a good idea and decided to do the same. It was a surprise when I found the 10 meter AM window empty. I assure you the band was open. There was just no one there.

All you 10 AM types need to know about the summertime E season and take advantage of it during these sunspot lows. It can be a lot of fun as you well know and you don't have to wait for those pesky sunspots! Check out the summer time skip on 10 every year, make some noise, have some fun.

For those so inclined, please understand that AM on 6 is alive and well all around the country. Friday evening I was listening to KD4BR working a W1 on 50.4 AM. I could hear both sides of the QSO S9 plus (I had to swing the beam on each over). KD4BR was listening on his NC-300 and National VHF converter console and the W1 was transmitting with an Ameco TX-62. They both sounded great! I did not break in to the QSO but enjoyed listening to both of them from here in MO.

Mom Nature gives us E's every year, let's use them. Those low power 10 and 6 meter rigs need the exercise. See you on 10 or 6 next season. (This one is over by the time you read this.)

Mike Sanders, KSØF

P.S. There is also a short, less intense E season in winter; late November to late January. However, E skip can occur at any time of the year.

Dear ER

With the present propagation conditions there seems to be little 10 Meter AM at 29.0 and up, so I'm wondering if an informal AM calling channel somewhere between 28.480 and 28.510 would help drum up more activity.

If such a spot could be found, it would serve as a secondary calling frequency—if no activity at 29.0 then QSY to the lower one (plus or minus QRM) and try there.

Such a "Calling Channel" would have to be set up to avoid as much QRM as possible to (and from) SSB, plus TEN-X and other nets. For example, a local group has a net at 5 PM (PDT) Sundays on 28.495.

Gary, KE6CA

Dear ER

There was a big 6-meter band opening on June 27th, between 8:30 PM and 9:45 PM EDST. I worked two stations in Indiana, two in Nebraska, two in Wisconsin, one in Minnesota, one in Iowa and one in Illinois. All were worked on 6M AM between 50.3 MHz and 50.55 MHz. A Clegg 66'er transceiver (approx. 10 watts out) and a 7-element beam, up 35 feet, were used at this end. Signals varied between S4 and S9 +20 dB. On June 29th, during the evening, the band opened again with 6M AM signals coming in from Texas, Oklahoma and Louisiana. It was great hearing all the 6M AM activity.

Hey Barry, maybe you should offer a "lower 48" 6M AM WAS award.

Pete, WA2CWA

What follows is a letter sent to Berk Berkermey, WØREP, who sent in the Taylor tube ad we used on page 18 of the July ER. The ad featured Willard Guimont, W9JID. Ed.

Dear OM

ER just arrived and I was surprised and pleased to see the page 18 reproduction of JID from November 1941 Radio. . . JID would have been happy to see that and perhaps he is watching from the other side!

As you may know, Willard Guimont, W7KW ex W6YMD, ex W9JID, passed away a few years ago in Phoenix, after a stroke, actually a series of strokes.

Willard Guimont and I got our ham licenses in April 1932, call signs came in May 1932. We took our exam in St. Paul, went down there in my old 1923 Dodge coupe with Harry Hoffman who was then W9GZO, herding us around and waiting in the wings for us.

JID was a "Whizzer" on CW and had a burning desire to be always first. You may have known him when he was W6YMD and handled the CW DX contesting at W6AM. He burned his candle on both ends!

You may recall the article in *CQ Magazine* showing his antenna farm outside Phoenix with five 125-foot towers. One tower had an 80-meter full size beam on it. They put the rotator and beam up using a hot air balloon in the early morning while it was cool.

Willard had monumental problems with the township council there and finally had to cut his towers down to 95 feet (before PRB-1) After his stroke he sold the works and was not on the air. He was frustrated when his typing went to heck after the first stroke. His fingers punched the wrong letters some of the time. Some wires in the brain crossed, I guess.

Willard lived in Champlin about four blocks from my QTH in an upstairs room in the house next to the confectionery store his Dad and Mom ran. He

AMI Discovery Weekend Announcement

by Dale Gagnon, KW11, President

Mark your calendars for the weekend of September 8, 9 and 10. This late summer operating event is designed as one of the periodic operating events sponsored by AMI to encourage as many AM enthusiasts as possible to fire up, so that the rest of Hamdom can discover that AM is alive and well. There is a new twist this year. Instead of recognition certificates for the most contacts, there will be three levels of participant recognition. Level 1 will be to make 10 or more contacts on 160, 75 or 40 meters. Level 2 will be to make a contact with another AM station on the 14.286 net frequency on Friday or Saturday night. Normal net activity starts at 8:00 EDT (5:00 PDT). Level 3 will be to make an AM contact on 10 or 15 meters. Send your contact log to AMI Headquarters, Box 1500, Merrimack, NH 03054-1500.

An attractive multicolor certificate will be sent out recognizing you as a AMI Discovery Weekend Participant (Level 1), a Participant-Plus (Level 1, plus 2 or 3) or a Participant-Primus (all three levels). Be sure to exchange certificate numbers with other AMI members. This may sound like fun, but it's also serious business. We need to bolster our operation on 14.286 in the evenings and we need to create spectrum expectations on 10 and 15, especially as propagation starts to improve. This operating event has been designed to allow you to exercise your whole station, without requiring you to spend your whole weekend. ER

**To join AMI send \$2 to:
AMI
Box 1500
Merrimack, NH 03054**

The RCA ACT-150

by Tim Walker, N2GIG
19 Woodside Ave.
Westport, CT 06880

History

This story begins almost 50 years ago, right after the end of WW II. I had been building radios for several years and was now in high school. Then came WAR SURPLUS! Truckloads of sealed boxes containing carefully packaged electronic goodies of all kinds. A BC-375 complete with tuning units and dynamotors, Russian Lend-Lease tank radios and more parts and tubes than any of us had ever seen. If this was not enough, weekends we could take the subway into Boston to 167 Washington Street to the original and at that time only Radio Shack. They had rented the entire building next door and it was filled with a humongous array of sets, parts, tubes and everything else that would make a radio nut drool. If only I'd had more money to buy things with.

After looking over the treasures and selecting all the good stuff that they could ever use for instructional purposes, the teachers turned a bunch of us loose on the storeroom of surplus as a nucleus for our new radio club. The Russian tank radio became the first club rig for the couple of guys who quickly got licenses. Lots of exotic looking tubes became shelf ornaments for many of the members. My loot: an RCA 808, a VT-98 and a VT-127-A. I still have them. I also got some 211's and built an early Hi-Fi amplifier out of them.

Thirty five years later as I was beginning to think about retirement and "what would I do with the rest of my life" I discovered the AWA and was again bit by the radio bug. I finally got my license and started collecting the parts I needed to build a decent AM rig, using 808's, of course.

For several years I slowly collected the tubes, parts and power supplies, etc. that I needed. At the same time, I read up on late prewar equipment in QST, ARRL Handbook and the Radio Handbook plus current articles in ER and the AM-Press Exchange. The back of QST is a great way to date the availability of RCA products. Each month they would feature the latest and greatest. The 808 tube is listed on several covers of this period. On the back of the November 1937 QST is an ad for the ACT-150 transmitter. "Get 'Broadcast Quality' for the advanced amateur; 150 watts output 10 to 160 meters; uses p-p 808 tubes in final and modulator" reads the ad. The price, only \$625 including one set of coils, but no tubes.

Roughly the same ad also appears in the back of the 1938 Radio Handbook. Nice to have, but you will never find one, I thought. Based on this, I finished adapting a power supply and was putting the modulator together when lightning struck.

The ACT-150

In the September 1992 issue of AM-Press Exchange was an ad by Mike Carroll, N14N for a "Historic AM Transmitter" which had been used by WSM of Nashville for 40 years and used 808's in the final. I didn't need it. I had all the parts to build essentially the same transmitter. Why would I buy it? You all know the rest. I called Mike the same day and it was still available. Would he hold it for me? yes; send me some photos? yes. As soon as the photos came I recognized the top of the transmitter as the RCA ACT-150. The rest had been modified over time. Off went my check

Get "Broadcast Quality"

WITH THE NEW
**RCA Model ACT-150
 Transmitter**

RCA offers in this new design many worthwhile features that will appeal to the advanced amateur radio operator. Look these outstanding features over and carefully consider all the engineering features RCA Engineers have put into this—the most efficient—most economical 150-watt transmitter ever offered by anyone.

- 150 watts output C.W. and Phone from 10 to 160 meters
- Special Speech Amplifier with Inverse Feedback for high quality voice reproduction
- R.F. feedback practically impossible
- Modulation indicator
- Coils and crystal easily accessible
- Conservative ratings on all parts
- Transformers given special impregnation
- Circuits fully metered
- Attractive cabinets and panel layout
- "Tune-up" protection
- Low tube and accessory cost.

R-F—RCA-807 crystal oscillator, RCA-802 buffer/doubler, 2 RCA-807 drivers, 2 RCA-808 final amplifiers.

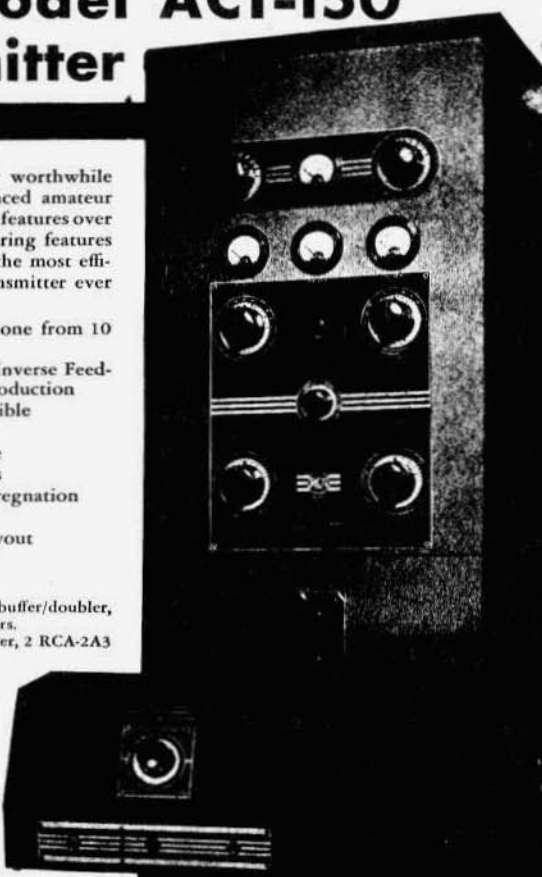
Audio—RCA-6J7 input, RCA-6C5 amplifier, 2 RCA-2A3 drivers, 2 RCA-808 modulators.

Power Supply—RCA-80 for speech amplifier, RCA-83 for exciter, RCA-5Z3 for bias and driver plate, 2 RCA-866 for high voltage.

AMATEUR'S NET PRICE

f.o.b. factory with speech amplifier and one set of coils but less tubes, microphone, crystal and other minor accessories. **\$625⁰⁰**

See your supplier or write for descriptive literature

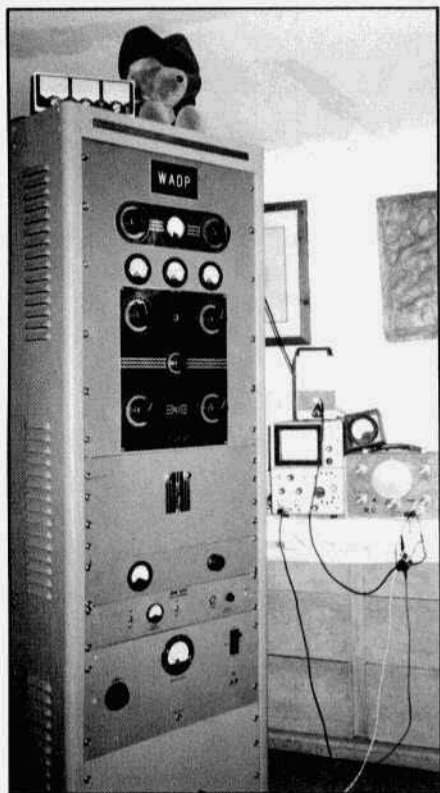


for Amateur Radio

AMATEUR RADIO SECTION

RCA MANUFACTURING CO., INC., Camden, N. J. • A Service of the Radio Corporation of America

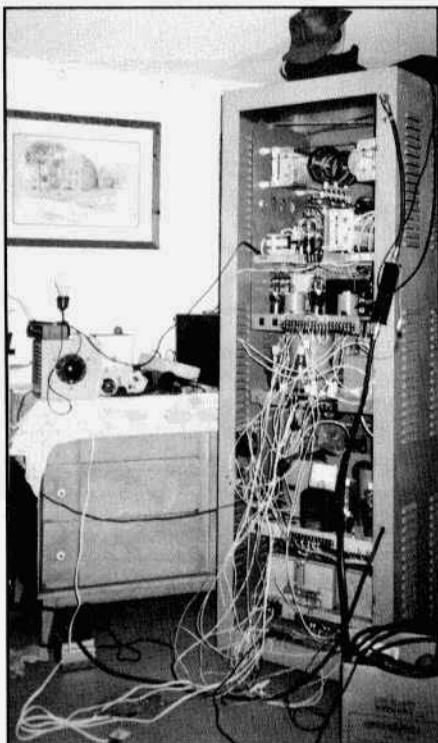
This ad appeared on the back of the November, 1937 QST.



Front view of the '150 during the restoration/testing period.

to Mike. Now, how to get the beast to Connecticut. My friend, Parker Heinemann, W1YG, does quite a bit of travelling from New England to Florida. Nashville is only a few hundred miles out of the way. Yes he would bring it back, but NO promise as to time frame.

During the winter of '92-'93, Mike sent me all the papers he had collected when he salvaged the rig from the WSM generator house where it had been stored after its retirement. Log sheets for the entire service life of the transmitter, original manual (badly dog eared and marked) and a whole bunch of drawings documenting the many modifications made over time. Because the log sheets are pretty cryptic, you have to read them then sit back and try to decide what the operator is referring to



Rear view of the '150 showing temporary wiring for testing.

outside the context of tuning up the transmitter and recording the readings.

WADP is the call sign that was assigned to this transmitter. It was installed permanently in the transmitter lineup at Radio Station WSM in Nashville, Tennessee, and used for outgoing communications to various remote locations. The following is a brief recapitulation of 40 years of history.

First use, March 8, 1938, 3:40 PM "testing, carrier and program" on 2758 kc. Call sign WADP. Then on March 12, 1938, 6:10 to 6:30 and 9:00 to 9:25 "testing with voice and music" 2758 kc and 2102 kc. On April 12, they worked point to point with WADG for two periods, frequency not shown. It goes on like this for 50 pages. Sometimes one page per use, others several operations per page. Most are just test transmissions. Others are point to point with WADG,

WADQ, WEOF and WBPA, which were portable remote transmitters. From 1940 to 1949 the rig was tested about once a week and used to communicate with a remote pickup about once a year. Then for two months in the summer of 1949 the rig saw daily use in communicating with WEOF, which was on location in Brentwood, Tennessee.

In 1950 or 1951 the call was changed to KIB-277 and the weekly testing continued. However, in July 1951 a hardbound record book style of log was implemented, which is much more interesting reading. The new log explains in detail modulation and frequency measuring procedures. A much more vital procedure tells how to adjust WADP antenna tuning when feeding the output of this transmitter to the tower used **at the same time** as the antenna for WSM's 50 kW transmitter. You can bet that this was done carefully!

In 1954 the usual frequency was changed from 2758 kc to 1606 kc. I have this crystal. Occasional operations continued with remote sites until May of 1956 when the high voltage power supply gave out and the rig was taken out of service. New high and low voltage power supplies were constructed. All small capacitors and resistors in the exciter were replaced. A new modulator was built using 6A3 drivers and 811's instead of 808's. The original modulation transformer, an autotransformer custom designed by UTC, was removed. Commercial quality UTC CG series transformers were used throughout. A modulation percentage meter and voltage control for the 808 filaments were also added. Complete sketches of all the changes were recorded in the log book and these were summarized on a large drawing by the WSM engineering department. The rig was now seven feet tall in its new rack.

Only 3 more tests appear in the log book: 1959, 1969 and 1973. Use of the

unit is obviously winding down. The last entry by WSM states that on September 19, 1978 "Unit moved to old Generator House." Forty years and five months of service and the story is just beginning.

Restoration

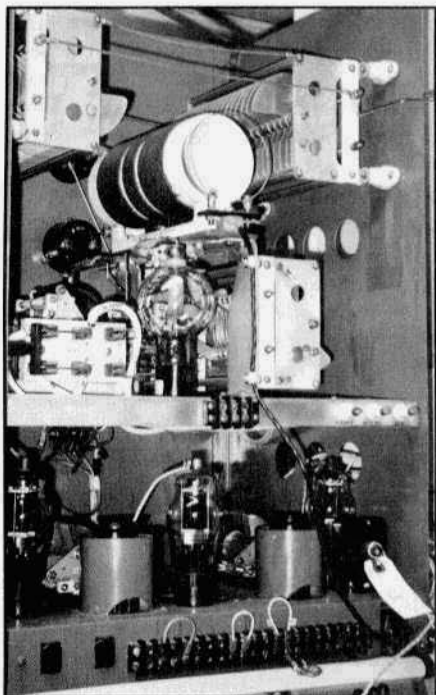
Mike, N14N, saw the rig in the generator house in the mid 1980's and talked WSM management into letting him salvage it. In addition, they gave him all the paperwork, which really makes the relic worth having as it is a well documented piece of history. Since the final log book is only about one third used, I have included Mike's letter and photos and have continued to keep notes as I have restored the rig.

Mike picked up the transmitter on October 24, 1986. He made some minor changes in the modulator and in the control circuitry to make the rig easier to use as an amateur transmitter. The changes were made in a style consistent with the parts and wiring methods used in the 1950's. Mike had the rig on the air from December 18, 1986 until February 24, 1993, when he took it apart for shipment to me.

The WADP transmitter finally arrived in Westport, Connecticut, on April 12, 1993. The first major problem was very evident. The seven foot rack just will not fit in a room with a 6 foot 3 inch ceiling height. Mike had removed the power supplies and the modulator before Parker arrived to make it easier to handle the rack.

In the summer of 1993, I finally got to working on the rig. Two trips to Korea on a consulting assignment and time out for AWA in September slowed things a bit.

I finally located a nice rack cabinet that would fit in the shack and would hold all of the components if I eliminated a big circuit breaker in the bottom panel. Since the breaker was backed up by fuses which I mounted on the sidewall of the cabinet, all was OK. As



Rear view of the RF deck.

I removed the units from the rack in the garage and reassembled them in the new rack each unit was cleaned, checked for obvious problems and photographed. Further, all wiring harness connections were recorded and checked against the WSM drawings as were the circuits of the units themselves.

Before installing the individual units in the new rack I referred to the original ACT-150 manual and put the high voltage power supply right under the RF deck as it was originally, followed by the filament control, modulation meter, modulator and low voltage power supply at the bottom. In this way the top of the completed rack would have a maximum resemblance to the original transmitter and the later additions are grouped together in the bottom of the rack. No attempt has been made to restore the rig to its original 1937 configuration.

The RF deck is about 98% original,



Rear view of decks below the RF deck; high-voltage power supply, filament control, modulation monitor, modulator and low voltage power supply.

except that the LVPS has been removed. The modulator and high voltage power supply are quite close to original, even though they have been rebuilt. However, the two new control units and the low voltage power supply were designed and built by WSM engineers in 1956. Since they are an integral part of the history, they stayed.

In early 1994 I got started on the RF deck and the modulator. The modulator was the easy part, I thought, and did not take long to check out. Mike had added an additional stage, a p-p 6SN7



The author on the air with second op Clyde.

driving the 6A3's. That made sense, so I left it alone.

The RF deck had some well toasted wire-wound resistors which were replaced, but otherwise looked pretty good. In its original incarnation the low-voltage power supply was tucked in behind the exciter up against the front panel. Probably one of the reasons it was replaced with two LV power supplies by WSM. The filament transformer for the 808's was sitting loose on the bottom of the rack. Somebody at WSM must have forgotten that the 808 has a 7.5 volt filament! I would bet that 811 modulator tubes are used because the new LVPS has only 6.3V windings. The circuit in the log book shows 808's XXXed out and 811's written in above. OK, we like 811's so leave well enough alone.

To shorten the filament leads and to physically tie the transformer down, I mounted it in the cutout formerly used by one of the original power transformers. This seemed like a good solution so

I mounted another transformer for the 6.3V needed by the rest of the RF deck beside it. This turned out to be a really serendipitous idea.

In June of 1994, I finally got it all together. I took some photos, one published in June '94 ER, the other in the Fifth Edition of ARRL Operating Manual (page 3-26). I didn't tell anyone that the interchassis wiring was not yet installed. I haywired the wiring harness with a variac in the HVPS input, and installed meters in many leads. The transmitter looked like a patient in intensive care. I put the CW/phones switch in CW and fired up the rig one stage at a time using a 1.937 kc crystal for 160 and my circa 1939 Meissner Signal Shifter for 80 meters. Good news: IT WORKED. About 150 watts out for 1250V at 200 mA. It still meets specs!

I put the CW/phone switch in phone and tried again. Not very good news. The 6A3's were hot hot hot and this tube is really hard to find. Not surprising when I discovered that they were draw-

The National Select-O-Ject

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

If you were around in the heyday of AM, the mid-fifties or earlier, you probably remember what it was like when 75 meters really got tuned up. I used to keep a schedule with my away-at-college brother, Bob, Wednesday afternoons after school from about 3:30 until 5 PM. We would meet on 3850, Bob using W8LT's BC-610 up at Ohio State in Columbus, and I about a hundred miles away in Fort Thomas, Kentucky, just south of Cincinnati, using our homebrew pair of 809's running 150 watts modulated by a pair of 807's. LT's old Hallicrafters burned a pretty good hole in the band, but along about 4:30 to 5 PM, the wailing banshees would creep up on either side of the frequency and set up their old familiar heterodyne howl that was as characteristic of AM phone in its time as was the buzzsaw rasp of the rotary gap in a still earlier era. I was pretty good at copying through the QRM with the tools my HRO-50 gave me, I'd slip the crystal filter in a step or two, center LT's carrier in the filter peak with the aid of the S-meter, and then dump the phasing notch on top of the worst offender. Beyond that, the best I could do was to cut back the high frequency audio response with the tone control and grin and bear it.

There was one other accessory available then that would have helped me battle the heterodynes, but for some strange reason I never bothered to get one. Perhaps I was just too much of a CW man even then. I could use the sharpest setting on the crystal filter on CW, number five, put my man in the peak, dump the notch on the loudest QRMer and zero beat the next worst

one with the BFO. And I even had one of the war surplus FL-8 audio filters I'd drag out if things got really tough, an LC filter that had either a notch at 1020 cycles in the "voice" position or a narrow, bandpass peak there in the "range" position. At any rate, it wasn't until past my HRO's 45 birthday that I finally added that last original accessory, a "Select-O-Ject."

The Select-O-Ject, or SOJ (pronounced "esso-jay" in case you weren't there) as it was also known, was one of the first active audio filters (no, MFJ did not invent the audio filter, boys and girls). Hams had earlier realized that a Wien Bridge RC circuit would provide an audio frequency notch, and following Raymond W. Woodward's article in September, 1939 *QST*, "Hetrofil - An Aid to Selectivity," none other than the James Millen Company brought out a commercial version. And then the necessities of the war brought forth my FL-8, an LC filter used on aircraft directional beacon signals so that a pilot could hear only the 1020 cycle right/left path indicator CW tones (dit dah was left and dah dit was right if I remember correctly) using the "range" position, so that he could notch out the tone and listen for other info using the "voice" position, or just hear the whole shebang with the filter out on the "both" position.

Finally in *QST* for November, 1949, Oswald G. Villard, Jr. and Donald K. Weaver, Jr. presented a much more flexible, active audio filter in "The 'Selectoject,' A Variable-Frequency Selective Audio Amplifier, Oscillator, and Rejection Filter." (Thanks to Wayne Childress, KC7KUE, for tipping me off



The National Select-O-Ject, one of the first audio filters.

to this article and supplying a copy.) This little gadget was inserted into the receiver audio chain after the diode detector and before the first, low level amplifier. It provided a variable frequency notch or a variable frequency and bandwidth peak. What's more, the notch could be set to the frequency of your least favorite heterodyne, and then the receiver could be tuned across the signal for best intelligibility! Now that's a trick I had not thought of or appreciated until I read the article. National lost no time in introducing their version in December, 1949. It covered the audio range from 80 to 10,000 cycles, and was claimed to boost or reject a signal 38 dB.

Having just acquired an Eico audio generator at last spring's flea market, I decided to measure the actual response of my SOJ and of an Autek QF-1 that I picked up the year before. On reject, the SOJ has broader skirts than the QF-1, but the SOJ has a deeper notch, 41.7 dB as compared to only 30 dB. On boost, the QF-1 and SOJ are similar within about 10 dB of the peak, but the QF-1 is

clearly superior in ultimate, off-frequency rejection, yielding 60 dB against 37.7 dB for the SOJ. While the QF-1 is undoubtedly the better filter, the SOJ is not too shabby, especially considering it was developed 4 decades earlier. And the performance I measured is surprisingly close to that claimed for it by National 46 years ago.

How the little guy works might be of at least passing interest to some of y'all. The heart of the unit is a triode amplifier circuit which produces an output of constant amplitude but variable phase as a function of frequency. An R/C network in this amplifier's output determines the amount of phase shift at a given frequency. The SOJ has two such amplifiers in cascade with the R's in their R/C networks variable and ganged. The resulting circuit in the National version can produce a 180° phase shift (meaning the output signal is just the input signal turned upside down or inverted) at any single frequency over the 80 to 10,000 cycle range.

To produce a null, the output from the phase shifter is combined with that

The Camper's Companion - Model 2

A Complete Vacation Station

by Bob Dennison, W2HBE
82 Virginia Ave.
Westmont, NJ 08108

Part One

The original Camper's Companion was a 2-tube battery operated short wave receiver designed for the young camper. This new model features an improved receiver and a QRPCW transmitter that puts out about two watts on 40 meters. It is designed to operate from dry batteries when used at camp or during emergencies but an AC power supply is available for operation at home. Power requirements have been kept low to ensure long battery life.

You may be wondering whether it's possible to work anyone with such low power. Well, with half this power, W1RST, reports that his "Tiny-Tim" portable was successful - he even used it on his 19-foot racing sloop off Long Island Sound. (2)(References are on page 36). An article in CQ by K7YHA states that most single-band QRP transceivers are made for 40 meters. He consistently works the west coast from his home in NE PA using only 0.9 watts output!(3) His article encouraged me to select 40 meters as the band to use. By restricting operation to a single band, we can eliminate the nuisance of plug-in coils and we can calibrate the receiver tuning dial - more on that later. The transmitter design is also simplified - no plug-in coils or band-switching, only one antenna to take to camp and no antenna tuner required. Part 1 of this article will cover the receiver and transmitter. Part 2 will show the AC power supply used during home operation and also give details for the construction of the dummy load and power output meter. There will also be

plans for the construction of a Tote-Box that can be used to carry the batteries, antenna, ropes, key, headphones, log book, etc. when camping.

Receiver

While a 2-tube regenerative set would have adequate sensitivity, the addition of an RF stage provides isolation between the antenna and the oscillating detector. This ensures that the set will not radiate an interfering signal and, furthermore, the dial calibration is then independent of the antenna used. Refer to Figure 1. Miniature 7-pin tubes are used to conserve space and minimize power requirements. Some measure of gain control is available by detuning the antenna trimmer condenser, C2. If a very strong signal is encountered, the antenna attenuator provides an additional 20 dB attenuation. Isolation between the RF stage and the detector is provided by two aluminum shields and by locating the RF coil above the chassis and the detector coil below. Detuning the RF stage has practically no effect on the detector frequency.

Detector

Another 1U4 pentode serves as the regenerative detector. To avoid having to put three windings on the small Millen coil form, I used the well-known 'cathode tap' for regeneration. Since the 1U4 is a filament type tube, RFC3 is necessary. To secure maximum gain, a high inductance choke, L5, is used as the plate load impedance. Regeneration control by means of R5 is smooth and noiseless.

The tuning condenser is a modified Allstar 3-gang job. The center section was removed and the two end sections were reduced to a single rotor and sta-



The Camper's Companion, Model 2, "a complete vacation station." The 2-watt transmitter and regenerative receiver operate on either battery power or an AC supply that will be described in part 2, next month.

tor. Thus modified, the capacitance ranges from 3.8 to 7 pF. The fiber members that held the outer tips of the rotor plates in proper alignment are no longer required for that purpose; however, a second purpose of these fiber pieces is to stop rotation of the rotor at zero and 180°. Thus it is necessary to save two of these fiber pieces and epoxy them to the remaining rotor plates.

It is very helpful to have a dial calibrated to show frequency in kHz rather than an arbitrary logging scale. This was accomplished in a simple, low-cost manner. The dial is a three-inch Kurz-Kasch dial whose scale runs from zero to 100. By choosing the coils at L2 and L4 to have the proper inductance (see Figure 2), the tuning range is 7000 to 7100 kHz. Thus when the dial reads 20, we are tuned to 7020 kHz, etc. The formula for this calculation was given on page 29 of my VFO article in *ER*, September 1994 and will not be repeated here. If the tuning condenser plates are semi-circular and not offset, the scale

will be very close to linear and good tracking of dial scale and frequency will occur.

After the coils were wound, their inductances were checked on a Tektronix L-C meter and the turns either squeezed together or spread apart to get the exact inductance required. Since the inductance is affected by the proximity of nearby shielding and the chassis, the coils should be temporarily mounted in place during measurement and adjustment. Then the turns can be cemented in place with a coating of coil dope.

Final adjustment is quite simple. Set a signal generator to 7100 kHz. Adjust C9 until the signal is heard zero beat with the dial set at 100. Now set the dial to zero and the signal generator to 7000 kHz. If the signal is not zero beat at zero on the dial, bend the detector rotor plate, C3B, either closer to or further from the stator plate as required. Repeat these two adjustments until tracking is sufficiently good. Since most of my operation takes place in the lower 50 kHz of



Rear View: Oscillator tank coil is at left.

the band, I try to get exact correspondence at 7025 kHz and close agreement at 7000 and 7050 kHz. Thus if you hear a CQ at 20 on the dial you will know his frequency is about 7020 kHz and you can select a crystal closest to that frequency before you call him.

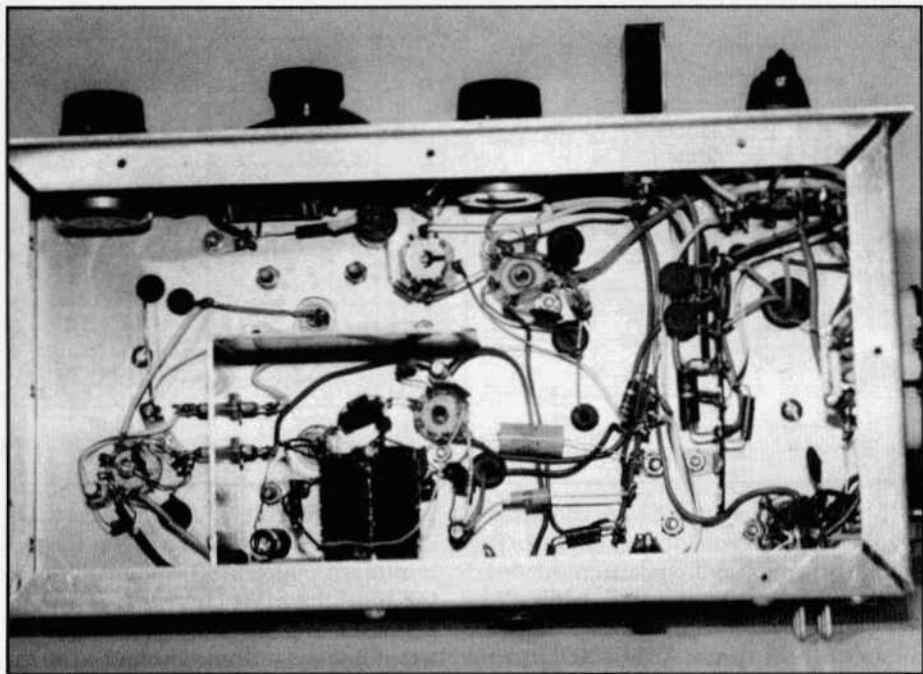
Audio amplification is provided by a triode-connected 1U5. Of all the miniature pentodes, the 1U5 seems to be best suited as a triode amplifier when used to drive 2000-ohm headphones. The amplification factor (triode-connection) is about 14 and the plate current with 1.5V bias is about 2 mA. Bias is provided by a single alkaline N cell. The cell holder is epoxied to the front apron of the chassis between the regeneration and volume controls.

Transmitter

After considerable searching through the tube manuals, I discovered the 3A5

tube. It is a 7-pin miniature twin-triode developed at the start of WW II. It makes a good push-pull crystal oscillator and is rated at 4 watts input with a plate supply of 135 volts, which can be supplied by three 45 volt B-batteries during field or camp operations. At home, I use the AC power supply, which gives 90 volts for the receiver and 150 volts for the transmitter. Even though the tube manual gives 135 volts as the maximum allowable plate voltage, the 3A5 seems to stand up well with 150 volts and, of course, this yields more power output. Typical power output is about 2 watts with plate current of 30 mA (15 mA per section).

The plate tank inductor, L6, has a six-turn link coil at its center which can be rotated 90 degrees to adjust loading. The construction of this variable link is too involved to cover here but two pages



Underchassis: Note detector coil and shield with feedthrough capacitors.

of drawings will be sent to any reader who sends a SASE. Two output connectors, J2 and TB1, allow connection to either a coaxial or twin-lead feed line. After the transmitter was completed, I designed a combination dummy load-power output meter and it also provides these same two output connectors. Thus TB1 on the transmitter is no longer needed and can be omitted.

Keying is done in the 'cathode' (filament) return circuit in order to keep the voltage across the key as low as possible. Actual key-up voltage in SEND is about 12 volts. Note that the receiver filaments are 'off' during SEND and the 3A5 filament is 'off' during REC in order to conserve the filament battery. Since the tubes heat up almost instantly, there is no problem here.

Provisions were made to balance drive and bias on the two halves of the 3A5 in order to secure maximum output. This accounts for C18 and R10. Since both of the controls are running

near mid-position in my transmitter, it would be safe to omit this refinement. Thus you would eliminate R10, tie RFC4 to RFC5 and change R11 to 4000 ohms. In this regard, switch S3 was used to measure the plate current of either section of V4 or the total current. This could also be dispensed with. This would eliminate RFC7, C23 and S3. The choice is yours.

Construction

The aluminum chassis measures 5 x 9-1/2 x 2 inches and the front panel is 10 x 6-1/2 x .083 aluminum. The photos show how a shield box is built on this foundation. Three pieces of 1/2" aluminum angle stock are used to provide the connections between the panel and the rest of the enclosure. The top is covered by a 0.1 inch thick piece of Lucite, which is held in place by two 4-40 thumb-screws. The bottom is enclosed by a sheet of .05 inch aluminum. Six bumper feet (.12 x .5") are attached to the bottom of this cover plate. Output terminals

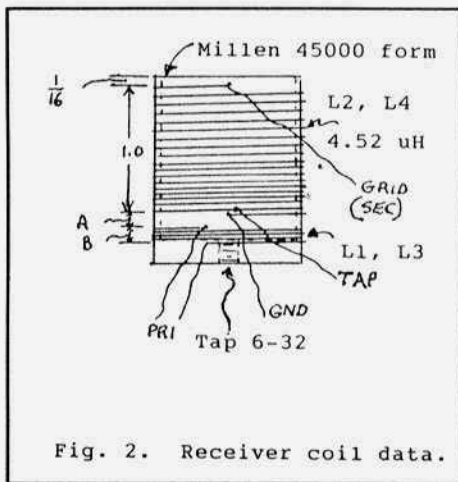


Fig. 2. Receiver coil data.

	RF COIL	DET COIL
PRI	3T No. 26E close wound	12T No. 28E close wound
SEC	16T No. 20E	16T No. 20E Tap at 1T from Gnd end
A	1/8"	1/16"
B	3/16"	1/4"

TB1 and J2 and switch S3 are mounted on the right apron of the chassis. A small carrying handle is also mounted on the right side. The power plug, P1, key jack, J1, and the phone tip jacks are all on the rear apron. A set of 20 drawings is available for \$5. These include coil drawings, mechanical parts, parts lists, photos, certain wiring details, and information relating to the power supply, the Power Output Meter and the Tote-Box.

Operation

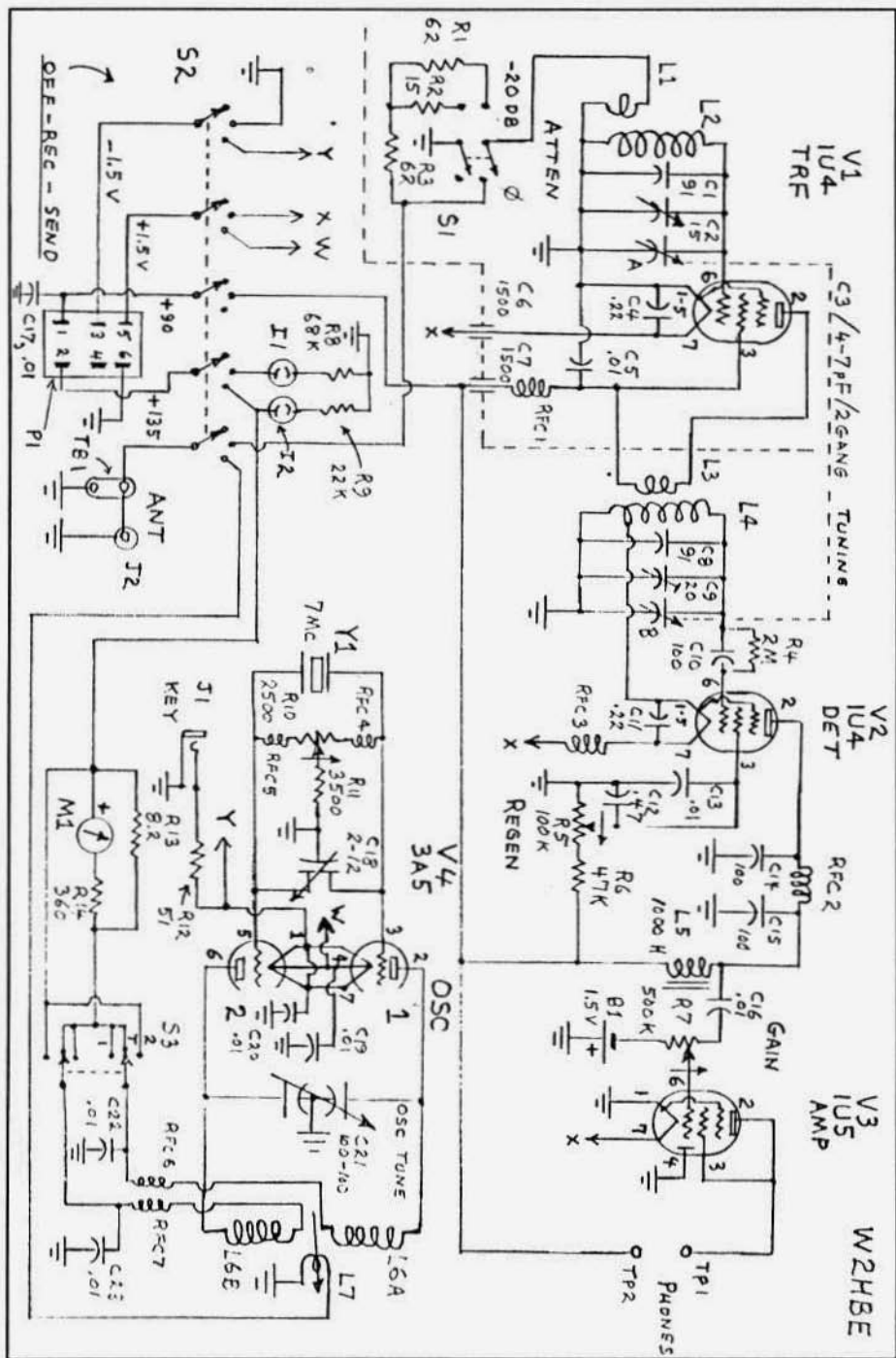
The receiver works better than any other regenerative set I've used. Just turn up the regeneration control until you hear the characteristic rushing sound. Then tune in a station. Set the volume control to give the audio level you like best. On strong signals, you can detune C2 and on very strong signals, throw in the 20 dB attenuator.

Tuning the transmitter requires only a bit more expertise. Set the plane of the link coil, L7, at about 20 degrees from the axis of L6 A-B. Connect the output meter (see part 2) to J2 and switch it to dummy load. Turn the impedance switch to 75 ohms. Turn S2 to SEND and depress the KEY. Quickly tune the oscillator tank capacitor C21 for a dip in plate current. You should now get a reading on the output meter. Gradually

turn the link coil, L7, to increase loading and output while retuning C21 for minimum plate current. Increase loading until the plate current is 30 mA. If all is working properly, you should get about 2 watts output. Now you can try putting power into your antenna. Turn the output meter to 'THRU' and connect the antenna. If the antenna is a 40-meter dipole fed with 75-ohm twin-lead, connect the twin-lead to TB1. If the antenna is fed with 75-ohm coax, connect it to jack J1 on the Power Output Meter. Now follow the same tune-up procedure as before.

My situation at home is slightly more complicated. I have a 40-meter Zepp antenna fed by a Kenwood antenna tuner, type AT-200. When proper matching occurs, it presents a 50-ohm load to the transmitter. Thus the power output meter must be switched to the 50 ohm position. This simply changes the meter multiplier resistor so that the meter reads the correct power in a 50-ohm load. See part 2 for a description of the Power Output Meter.

It is suggested that before taking the Camper's Companion to camp, you use it at home, learning how to tune and how to adjust the coupling. Weed out any crystals that are sluggish or have a tendency to chirp. Listen to the signal



Wiring diagram - Camper's Companion.

Here it is!

• Photographic view of the CALIFORNIA KILOWATT in open position and ready to transmit or receive.



The **KLUGE** "California Kilowatt"

Myron E. Kluge, President of Kluge Electronics, Inc., proudly presents to the radio amateurs of the world a new sensation in radio history. The CALIFORNIA KILOWATT—a "one package" 1000 watt amateur radio station designed and engineered to bring amateur radio out of the attic and the shack and into the living room.

About the size of an ordinary desk, the CALIFORNIA KILOWATT is simply and beautifully designed to fit into your den or living room as neatly and harmoniously as an additional piece of furniture with no clutter or mess. It is completely self-contained with nothing to be added.

Kluge Electronics, Inc., is the first to conceive, design and produce this remarkable contribution to modern radio. Among the special Kluge features designed into the CALIFORNIA KILOWATT are:

1. A California Kilowatt transmitter with an amazing new tube development—5 band operation with variable frequency control in each band—phone or CW at the throw of a switch—110 or 220 volt operation;
2. Provisions for your choice make of receiver;
3. Built-in speaker—(high fidelity remote speaker also available);
4. Built-in frequency monitor—all band crystal controlled;
5. Built-in world time clock;
6. Illuminated world map with cork backing;
7. Price—the complete CALIFORNIA KILOWATT Station costs far less than you would expect to pay for a transmitter alone.



The CALIFORNIA KILOWATT in closed position

Premiere showings of the Kluge CALIFORNIA KILOWATT will be held in key cities soon throughout the nation by America's leading wholesale distributors. For additional information about the CALIFORNIA KILOWATT write to Kluge Electronics, Inc., Dept. F1, 1031 N. Alvarado Street, Los Angeles 26, Calif.

A few territories are still available to qualified distributors. Write or wire Kluge Electronics, Inc.

March, 1946

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The Kluge "California Kilowatt". This ad from March, 1946 *Radio* was sent in by Steve Barnes, K6PFW. If anyone has any further information on this 'rig' please send it in to ER.

VINTAGE NETS

Westcoast AM Net: Meets informally, nightly on 3870 at 9:30 PT. Wednesday at 9:00 PM PT they have their formal AM net which includes a swap session. Net control rotates.

California Early Bird Net: Wednesday nights at 8 PM PT on 3835.

Southeast Swap Net: Tuesday nights at 7:30 ET on 3885. Net control is Andy, WA4KCY. This same group also has a Sunday afternoon net on 3885 at 2 PM ET.

Eastern AM Swap Net: Thursday evenings on 3885 at 7:30 ET. This net is for the exchange of AM related equipment only.

Northwest AM Net: AM activity daily 4 PM - 5 PM on 3875. This same group meets on 6 meters (50.4) Sundays and Wednesdays at 8:00 PT and on 2 meters (144.4) Tuesdays and Thursdays at 8:00 PT.

Twenty Meter AM Net: This net on 14.286 has been in continuous operation for at least the last 20 years. It starts at 5:00 PM PT, 7 days a week and usually goes for about 2 hours. Net control is Les, K6HQL.

Arizona AM Net: Meets Sundays at 3 PM MT on 3860. On 6 meters (50.4) this group meets at 8 PM MT Saturdays.

Colorado Morning Net: An informal group of AM'ers get together on 3808 Monday, Wednesday and Friday mornings at 7 AM MT.

DX-60 Net: This net meets on 7290 at 2 PM ET, Sundays. Net control is Jim, N8LUV. This net is all about entry-level AM rigs like the Heath DX-60.

Military Net: It isn't necessary to check in with military gear but that is what this net is all about. Net control is usually Walt, KJ4KV, but sometimes it rotates to other ops. It starts at 5 AM ET Saturday mornings on 3885.

Westcoast Military Radio Collectors Net: Meets Fri. at 2200 local on 3990 and Sat. at 0800 local on 3990 + or - QRM. Net control is Tom, WA6OPE or Andy, KD6TKX.

Grey Hair Net: The oldest (or one of the oldest) 160-meter AM nets. It meets on Tuesday nights on 1945 at 8 PM in the winter and 9 PM ET in the summer.

Vintage CW Net: For CW ops who enjoy using vintage equipment. This is not a traffic net; speed is not important. The net meets on 14.050, Saturdays at 1 PM PT. Net control is Tracy, WB6TMY.

Vintage SSB Net: Net control is Chuck, N5SWO. The group meets on 14.293 at 1 PM CT, Sunday afternoons.

Collins Users Net: The oldest of the 'users nets'. It meets on 14.263 Sunday afternoons at 2 PM CT. The net control revolves. This group also gets together for an informal ragchew on 3805 Tuesday evenings at 7 PM CT.

Drake Users Net: Another relatively new net. This group gets together on 3865 Saturday nights at 8 PM ET. Net controls are Criss, KB8IZX; Don, WZ8O; Rob, KE3EE and Huey, KD3UI.

Heath Users Net: A new net started by Marty, WB2FOU/5. Net control is shared by Fred, AA5LW. It meets on 14.275 at 4 PM CT Sundays. Check in on either AM or SSB.

Swan Users Net: This group meets on 14.250 Sunday afternoons at 4 PM CT. The net control is usually Dean, WA9AZK.

Nostalgia/Hi-Fi Net: Meets on Fridays at 7 PM PT on 1930. This net has been meeting since 1978.

K1JCL 6-Meter AM Repeater: Located in Connecticut it operates on 50.4 in and 50.5 out.

JA AM Net: 14.190 at 0100 UTC, Saturdays and Sundays. Stan Tajima, JA1DNQ is net control.

Fort Wayne Area 6-Meter AM Net: Meets nightly at 7 PM ET on 50.58 MHz. This net has been meeting since the late '50's. Most members are using vintage or homebrew gear.

Southern California Sunday Night 6 Meter AM Net: 8 PM Sundays on 50.4. Net controls are Dan, KV6I and Scott, K6PYP. Informal, supports restoring old gear and using it on the air. Loan gear available for those wanting to join in.

The NC-400 Communications Receiver

by P. Jay Spivack, N7JDT
1510 Maple Ln., #22
Kent, WA 98032

Ever since I was first licensed in 1954 I have loved quality communications receivers. Having owned nearly every popular tube model at one time or another during the past thirty years, I can say that one of my favorites is the National NC-400.

Production of this receiver began about 1959. The receiver was an attempt by National to offer a quality receiver capable of good single sideband reception along with advanced features such as optional mechanical filters, fixed frequency crystal operation, and dual diversity reception which would appeal to governmental users. At a price tag of \$895, more than the venerable Collins 75A-4, and close to the price of a new Chevy, we know that National wasn't solely aiming for the ham marketplace.

After much investigation, to get a handle on how many of these beauties

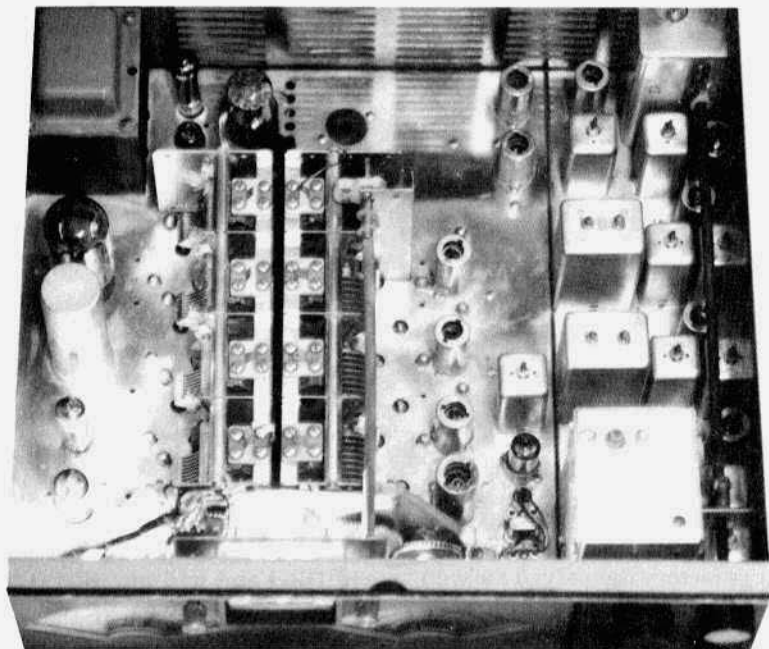
were made (best estimates range between 500-1000), I have discovered that many of these receivers did indeed wind up with the FBI, State Police and other more covert government agencies. This may be one of the reasons so little is known about this communication receiver.

Overview

The NC-400 is a dual-conversion communications receiver with 18 tubes including rectifier and voltage regulator. Its frequency range is 540 kHz-31 MHz, covered in seven bands, with an extreme IF selectivity range of 150 Hz-16 kHz.

For sideband reception, a pentagrid converter is used as a heterodyne oscillator. Sideband selection is provided by 14 tuned circuits (yes, 14), in the second IF section. The center frequency is shifted by a panel selector switch for reception of one sideband or the other.





Topside of the NC-400 chassis.

The crystal filter module is plugged in and may be removed to install a mechanical filter housing which would accept three Collins mechanical filters.

Provisions for a plug-in crystal calibrator, 5 crystal sockets for fixed channel operation, and connectors for a diversity modification kit were standard. Detector output, AGC, and IF signal information is available on the rear chassis.

Circuit Description

The NC-400 has two RF stages (2-6BZ6's). Dual mixers are used for the first conversion, one at 455 kHz for the four lower bands, and the other at 1270 kHz for double conversion of the three higher bands. The second converter is crystal controlled and converts from 1720 kHz to 455 kHz. The first IF section has two tuned circuits at 1720 kHz. The second IF uses three tubes and six tuned circuits at 455 kHz, for 16 kHz, 8 kHz, and 4 kHz bandwidths. 14 tuned circuits are employed for the 3.5 kHz bandwidth and single sideband selection. 10

tuned circuits plus a crystal filter are used for bandwidths to 150 Hz.

Separate detector, noise limiter and AGC circuits are provided for optimum reception of AM, CW or SSB signals, respectively.

Design

The design of the NC-400 was fairly straightforward with a few noteworthy exceptions. More than most receivers of its vintage, there were all kinds of provisions made to "add on" factory options, i.e., mechanical filters, diversity kit, calibrator, etc. In my view this was clearly to enable a fairly sophisticated receiver to remain below the \$1000 mark, which in 1959 would have been an extraordinary price.

Nilvar plates (refers to the tuning capacitors), and high quality ceramic coil forms were employed. Zero and negative temperature coefficient components were used to contribute to the overall electrical stability of the receiver.

The mechanical design was another matter however. Out of its cabinet the

Fred's HRO

by Dave Mills, AJ7O
1503-G E. Adelaide Dr.
Tucson, AZ 85719

My first really good receiver was a used National model HRO-5 that I bought in 1955 from Henry Radio of Butler, Mo. I worked all summer to earn the \$100 plus \$12 shipping for it. The HRO-5 (circa 1946) was the last of the black HRO's that were first introduced in late 1934. The circuitry was slightly updated in the -5 from the original HRO with the use of metal tubes and the addition of a noise limiter.

That HRO and a variety of homebrew and vintage factory rigs served me well until 1967 when I traded them in on a new Drake T4X/R4A station (at Henry Radio, Los Angeles this time). Little did I know at that time that I would miss the old HRO so much. I had worked over 200 countries and had thousands of QSO's with it. I never had to repair it. All of the tubes were the original RCA's.

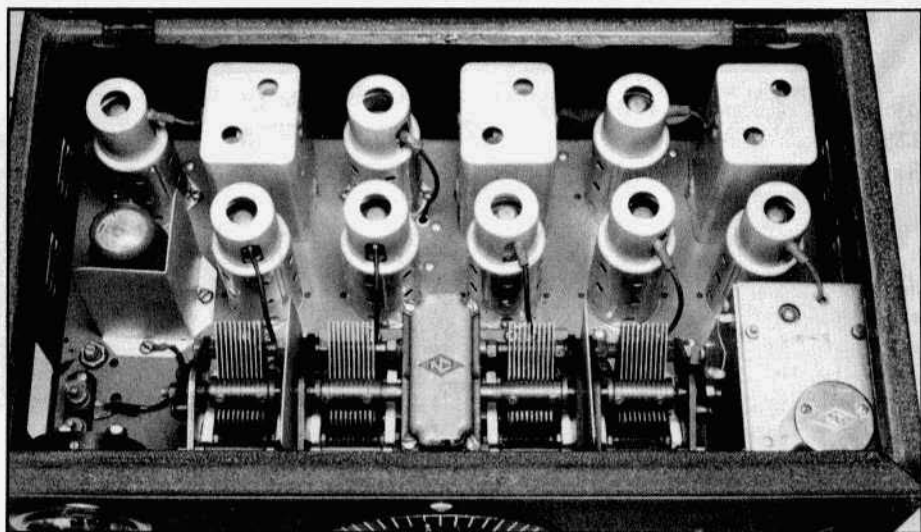
Many years later I ran into Fred Huntley, W6RNC, on 80 meter CW. We had some fine QSO's where we discussed old times and vintage gear. He even convinced me to fire up an old Viking II on AM phone and join the 40 meter Sunday afternoon AM group.

One Sunday in about 1990 Fred mentioned on the air that he had an old HRO that he was repairing and described it as a 1936 HRO Senior in good shape but he was replacing capacitors and doing an alignment on it anyway. I told him about my love affair with my old HRO and told him that if he ever wanted to sell it to please let me know.

In the spring of 1992 I was surprised to receive a letter from Fred. It was written in pencil on lined, yellow note paper. Fred told me in the letter that he had some unusual expenses to pay and asked if I was still interested in buying his HRO. I didn't wait to write him. I



1936 HRO Senior that the author purchased from the late Fred Huntley, W6RNC.



Inside the cabinet view of the HRO.

picked up the telephone and called him to arrange the deal. I didn't know at the time that Fred was battling the cancer that killed him a few months later and the expenses he was concerned about were his medical bills.

The HRO that I bought from Fred looks almost exactly the same as my old HRO-5. A black wrinkle paint job, separate power supply, speaker and 4 plug-in coil sets. The receiver worked just great when I hooked it up. The paint was worn in places and a few months later I disassembled it and stripped the old paint and applied a new coat of black wrinkle paint. It now looks as if it just came out of the shipping box from the factory.

The early HRO receivers went through minor changes. During the year of 1936 the HRO improvements included the addition of a pilot light, the change to rectangular IF transformer cans, and a dark charcoal colored painted main tuning dial instead of the nickel plated dial used previously. The S-meter remained without an internal light until about 1938 or 1939. Mine is serial number P72 (manufactured in the fall of 1936) and includes the later 1936

changes. It uses the 2.5 volt tubes recommended by National at that time because of their lower hum noise compared to the 6.3 volt types that were commonly used by 1936. Most of the tubes appear to be the original RCA's!

The performance of Fred's old HRO is excellent. I even used it on 10 meter AM during the final days of the last sunspot cycle and heard every bit as well as with my Collins receivers. It is not as stable as a Collins though. On CW I have to retune often while it warms up.

The crystal filter works very well. I put it in service during a DX contest on 40 CW to remind myself of just how the receivers were years ago. I quickly adapted again to the characteristics of the HRO and left it in service for several months as my 40-meter CW receiver. Then I used it on 3870 kcs as my 75-meter AM receiver and now it's set up on the west coast AM frequency (1885 kcs) so I can listen to the local AM'ers.

Fred's old HRO has brought me many hours of fine performance and will remain in use here at AJ7O. You can't say much better about a vintage receiver can you? **ER**

Three Generations of the KWickPatch

by Gary Giampaoli, WB6WNI
1294 Hanchett Ave.
San Jose, CA 95126

Introduction

In 1961 John Kennedy had been president for about a year, the Cold War was at its chilliest, Pope John XXIII was beginning to think about holding his revolutionary second Vatican Council, and an obscure English rock 'n roll group called the Beatles was playing at night clubs in Germany. The ham world was full of Johnson, Hallicrafters, National and Collins rigs; the sideband vs. AM wars were in full swing, but AM was clearly losing. And in a suburban home in Redwood City, Calif., a few miles north of what was growing up to become Silicon Valley, old-timer W6YPM had just successfully bid on a government sale of high quality audio transformers.

These transformers were to be used in a controversial new product, one whose application was clouded in legal limbo, and for which advertising was refused by the amateur press except for one magazine, CQ. Today it seems rather mundane, but two generations ago Erv Rasmussen's KWickPatch, a simple phone patch for AM and SSB transmitters, led the way for later commercial phone patches made by huge companies like Collins, Drake and Heath. The famous U.S. Supreme Court decision that legalized connection to commercial phone lines eased the larger companies' later entry into the phone patch market. But the onrush of the big companies into phone patch sales did not end Erv's cottage industry. The KWickPatch production line folded only when Marie, Erv's wife, ruled that her kitchen oven could no longer be profaned by baking the enamel on the phone patch's front panel!

In this article you'll learn about the man behind the device, the history of the KWickPatch, its design, and how you can build one of your own. Amazingly, the heart of this phone patch - a high quality hermetically-sealed multiple-winding miniature audio transformer - is still available. Besides its application in making your own KWickPatch for your classic radio station, it can be used as a versatile multi-impedance low-level audio transformer around the shack.

W6YPM

Born at the turn of the century in Oshkosh, Wisc., Erv Rasmussen was first licensed as 9BCH in the early 1920's. Erv's son Bob recalls hearing the story about his dad's first ham station, its transmitter powered by a motor generator (the only source of reliable high voltage DC in the old days). When Erv fired up the motor generator and got 9BCH on the air, his mother thought the whole house would fall down! Erv's call was later changed to W9FAV; when he moved to California in 1945 he was assigned W6YPM.

Erv was one of the earliest preservers of antique radio equipment. He had a fantastic collection of very rare and early tubes (DeForest audions, tubular audions, and other early components), and a large collection of early broadcast and communications receivers. I remember visiting Erv in his Redwood City home about 25 years ago; Gerry, W6NIR, accompanied me and we were both astonished to see his collection of shelf after shelf of early sets and parts. He even had a complete Marconi radio desk and operating position! One of Erv's proud moments was finding Vol-

If it's the best you want, it's

KWICKPATCH

The most wanted amateur patch

With a KWickPatch you can patch your friends, hams and servicemen. A necessity for C. D.

"Ask the ham who owns one"



KWP 1

AM Models \$14.95



KWP 4

Sideband models \$24.95

KWickPatch is made in four models to fit the needs of the modern amateur station. The heart of each unit is the fine quality hybrid transformer. This transformer, completely shielded and hermetically sealed, is flat from 200 to 4000 cycles plus or minus 1/4 DB.

In the AM units we use one of these transformers, together with a heavy duty shielded condenser. Through careful design, hum and feedback are kept to a minimum.

The sidebanders use two of these transformers in a balanced circuit to achieve an unusually low null. Mylar condensers are used for high capacity and long life.

Small in size, all KWickPatch units are only 2x4x4 inches and can be mounted wherever convenient.

No switching is necessary except to turn on and off. Both sides of the line are disconnected in the off position.

KWickPatch units are simple to install and easy to use, with no gain controls to complicate operation. Your transmitter and receiver controls work as usual.

KWickpatches are colorfully finished in Royal blue and Hammertone gray to blend well with your equipment.

Regardless of your equipment there is a KWickPatch to fit your needs.

Sensibly priced, KWickPatch gives you more for your money. Compare quality and price.

THE AM MODELS

KWP 1

For single connector Microphones.
Fits Amphenol 75MC1F Connectors.
Fits all Receivers.

KWP 2

A modification for push to talk gear.
Fits Amphenol 80MC2M Plugs.

THE SIDEBANDERS

KWP 3

For DSB, SSB, AM or Vox Xmtrs.
For single connector Microphones.
Fits Amphenol 75MC1F Plugs.

KWP 4

A modification for push to talk.
Fits Amphenol 80MC2M Plugs.

E. A. Rasmussen Co. •

Redwood City, California

ume 1 (1915) of *QST* magazine at the 1962 ARRL Convention in Seattle - this completed the entire run in his collection. He brought us out to his garage to show us the boxed set, one of the few complete runs still in existence.

Erv was a faithful keeper of radio schedules with his beautiful Collins S-Line and tri-band beam. For years he would get on the air with Gerry, W6NIR, as they chatted back and forth with a SF Bay Area ham who operated weekly skeds from Harvard station WIAF. Erv became a silent key in October 1983; his fabulous radio collection passing to several other prominent preservationists in the area.

In 1960, when Erv decided to build the KWickPatch, he put in a bid for 40 government surplus transformers. These transformers were a legacy of the federal phone tapping field day that occurred during the previous decade's anticommunist excesses. Erv was the lucky bidder; but he was a little surprised to receive 4000 of them when he was expecting 40!

The KWickPatch

The KWickPatch is a phone patch; that is, it allows a telephone call to be patched to a radio transmitter/receiver so that the caller can talk directly to the party on the far end of the radio circuit. The KWickPatch came in two basic versions - one for push-to-talk (PTT) operation, and one for voice-operated-switching (VOX) setups. The main circuit difference between the two versions is that two audio transformers were needed for the VOX unit while only one was required in the PTT version. Both versions have connections for the phone line, for the receiver audio, and for the transmitter audio (microphone input); they also looped the PTT line through the mic connector to the transmitter. Operation was very simple - switch the KWickPatch in-line and adjust the receiver and transmitter gains for normal level audio into and

out of the phone line. (When using a phone patch, you always use your telephone as the radio's mic and speaker.)

Because of the murky legal status of phonepatching in the fifties and early sixties, only one ham magazine would accept advertisements for Erv's device - *CQ*. Reproduced with this article are some of the original ads for the KWickPatch from that era. 17 years later, in June 1978, Rick Ferranti, WA6NCX, wrote *CQ*'s cover story about the KWickPatch and its history, and offered readers an opportunity to again purchase the original transformers left over from Erv's stock. Now, 17 years after that publication, the KWickPatch rides again, and miraculously, the transformers are still available!

Building a KWickPatch

Building a KWickPatch is really very simple. The schematics for both the PTT and VOX versions are shown in the figures. Aside from the transformer(s), you need only a handful of additional components - a few capacitors, a couple of RF chokes, connectors, a switch and, if you build the VOX version, a potentiometer. The coupling/bypass capacitors should be rated for at least 200 volts, as they must withstand the full ringing voltage pumped down the line by the phone company. Otherwise, their values are not very critical; plus or minus 20 percent tolerance is fine.

The switch connects the transmit audio input and the receiver output through the patch to the telephone line. Two single-pole double-throw switches can be used, or you can use a four-pole single-throw rotary switch to duplicate the simple in-out operation of the original KWickPatch.

The VOX unit requires the two transformers shown on the schematic and the null pot. Adjust the latter with the line and telephone connected for minimum crosstalk between the output of the receiver and the input of the transmitter. To operate either unit, you sim-

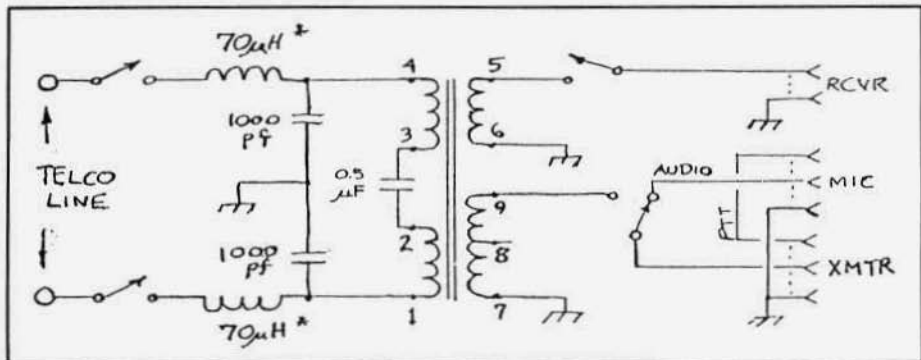


Figure 1, Simple patch.

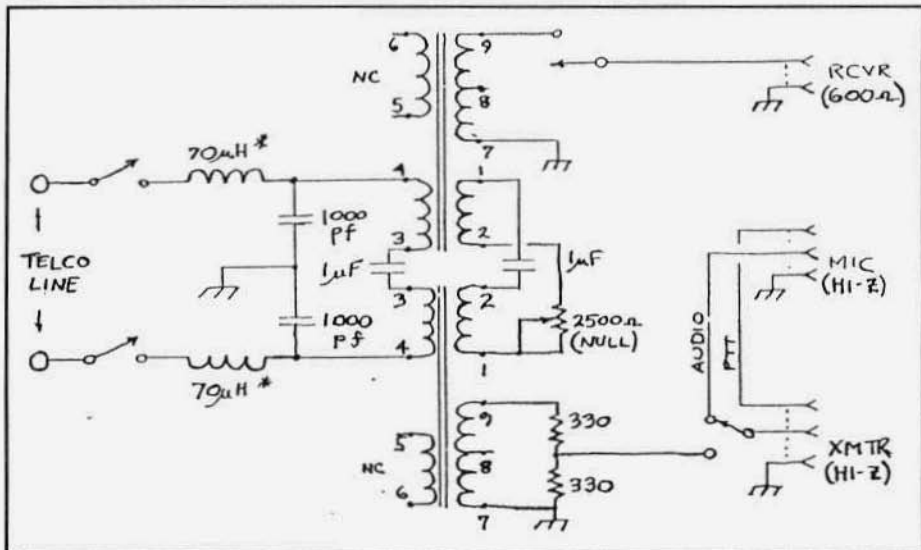


Figure 2, VOX patch.

ply switch in the patch and use the telephone handset as the rig's mic and speaker. You use the PTT as you normally would for that version; VOX operation is, of course, hands-free.

Getting Parts

The heart of the KWickPatch is the transformer; in this case a high-quality, hermetically-sealed Triad model 10747. It's flat over a 200-4000 Hz bandwidth, has three 150-ohm windings and one center-tapped 600-ohm winding, is rated for a 500-volt RMS test voltage, and can handle 6 milliwatts of power. You can purchase one of these units for

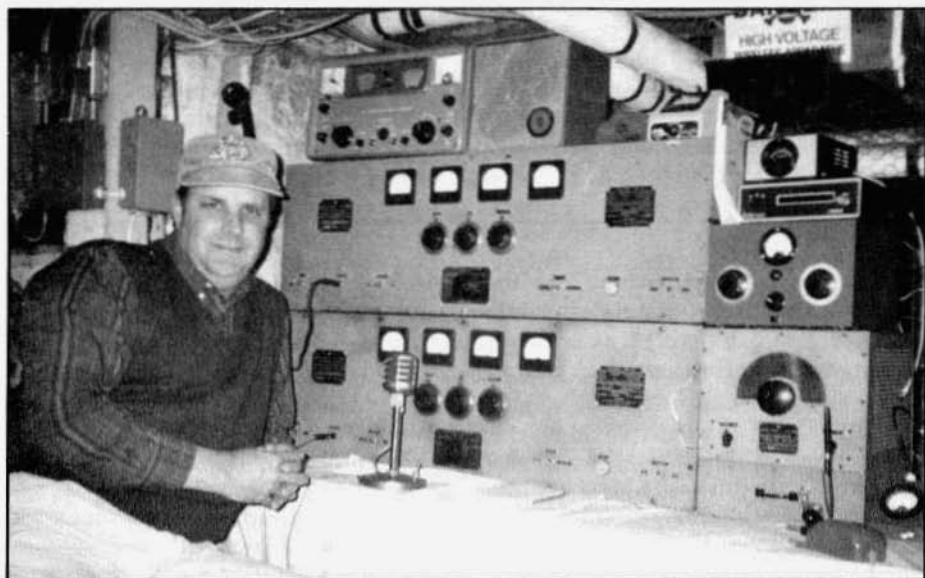
\$4.50 postpaid from the Menlo Pacific Company, P.O. Box 5009, Redwood City, CA 94063-5009, while two (required for the VOX version) are \$8.25 postpaid anywhere in the USA.

Running a Phone Patch

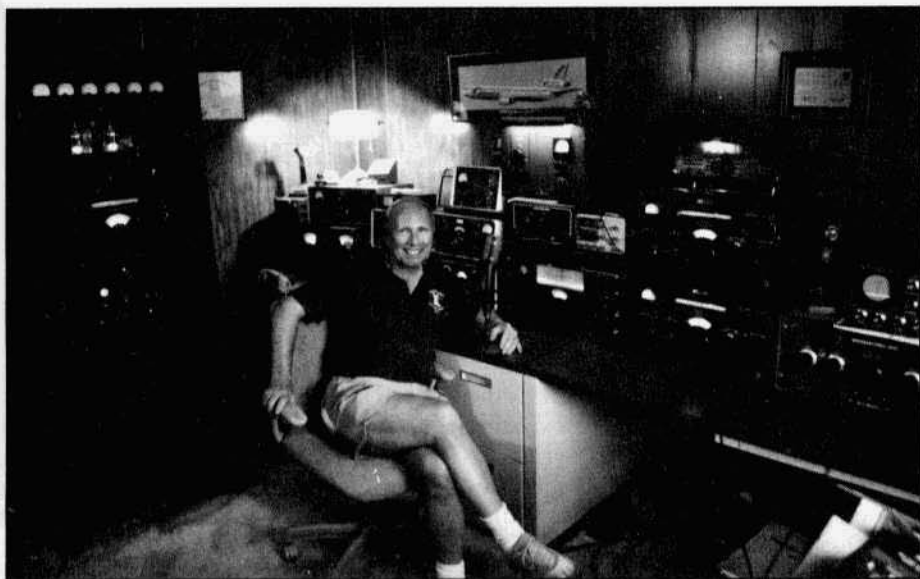
I've found that the best sounding phone patch is one where the levels into your handset are no higher or lower than what you normally hear on your telephone. Set up a mock phone patch some evening on 10 meters with a friend across town to get the levels and procedure right. Another local ham can call you on the phone and serve as the re-



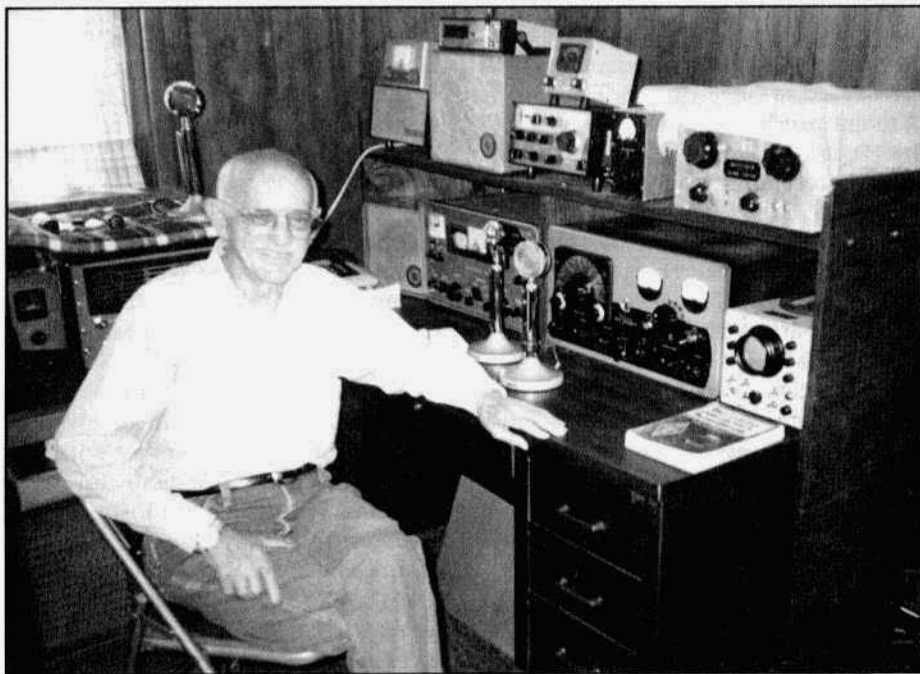
Bob Rose, K6GKU, in his vintage station. The HQ-129X and Heath AT-1 were his first rigs back in the early '50's. Two pieces that he said he 'lusted' for back then were the HQ-140X and the Viking II. Now 40 years later he has them both.



Bill Latimer, WA4DDH, with his two Meissner transmitters. He uses these on the east coast Military AM net. He says that there is a 2 meter AM net in the Eastern Massachusetts area; 145.730 every night between 7:30 and 8:00 PM, AM only, all invited.



Another shot of Jay Spivack, N7JDT (he's also on this issue's cover), this time in his 'real' hamshack. For this shot the room lights have been dimmed and all the equipment turned on. Nice effect...real radio glows in the dark, etc.



'Kasey' Wm. Kasefang, W4HYG, in his hamshack. Hank Clark, W2IQ, who provided this photo, describes Kasey as "the AM voice of Knoxville since 1935."

Book Review

"Heathkit, A Guide to Amateur Radio Products" by Chuck Penson, WA7ZZE, 256 pages, 8-1/2 by 11 inches, 200 photos, \$24.95 plus \$3 S&H, published by Electric Radio.

Chuck Penson, WA7ZZE, has finished his book, "Heathkit, A Guide to Amateur Radio Products" and I'm delighted to announce that Electric Radio will be publishing it. For some time we've been considering book publishing as a possible way to expand our operations but until we saw Chuck's book, the financial gamble always gave us cold feet. We're sure that this book will be a big hit and be the authoritative guide on Heathkit amateur radio products for many years to come.

Most ER readers will be familiar with Chuck's articles that have appeared in ER over the past several years. The book is as well researched and as well presented as these articles. The book is a major production - 256 pages, 8-1/2 by 11 size - and contains approximately 200 photos, at least one for each of the 150 or so Heathkit amateur products.

In the first 50 pages of the book Chuck outlines the complete history of the company. For some this will be the best part of the book. The history of the Heathkit Company is as interesting as that of any American company. After I read this section of the book I came away wondering just where this country would be today, had it not been for Heathkit. Chuck has meticulously researched this section of the book. He has talked with most of the surviving major players in the company and spent countless hours poring over all the documents he could get his hands on. This history of Heathkit may be the definitive one for all time.

The rest of the book is taken up with documenting all the Heathkit amateur products. Chuck devotes a page to most products and as I said there is a photo of each one. His description of each product goes far beyond the basic information like price, size, when it was introduced, etc. He gives us the complete picture that includes who designed it, how well it performed, its weaknesses and its rarity.

The printing and binding are going to be first class. The photos will all be bright and sharp, the print very readable on high quality paper. The cost of a hard cover was prohibitively expensive so we've gone to a heavyweight softcover.

The book will be printed and ready for shipment around October 15. The price of the book will be \$24.95 plus \$3 S&H, which is quite reasonable when you consider that it's almost twice as big as other radio books selling in that price range. So that we can generate some revenue before the book comes from the printer we are offering it at a prepublication price of \$23 postage paid, which is a \$5 saving. And like everything we sell there is a money back guarantee that goes with this book. This offer is good only until September 15. And we are printing only 3000 of this first edition. Please send your cash, check or money order to us here at ER to arrive no later than September 15. **N6CSW**

Letters from page 3

worked 80 meters and I worked 40 meters, no phone on 40 then. One night I called CQ on 40 and a weak signal came back calling W9J???. I gave a long call and then a reply came back very weak calling W9JH? signing a VE5!! I came back calling the VE5 and he came back signing a VE5 call to W9JHS. He said he was on a lake in BC with a portable rig and we went around a couple times and he finally asked if I knew W9JID!! I knew I had been taken in. I ran over to his house and the door was locked. I climbed up on the roof and his window was blocked shut and he was at the window laughing at me. I would have really rubbed his nose if I could have gotten hold of him!! He was keying the regenerative receiver and I was really taken in. I cooled down and laughed about it afterward.

I think Willard died in February 1991. He has a son, Richard Guimont in Glendale, AZ, but he did not answer my letters. Willard has a much younger brother, Merlin Guimont, who lives in Belfair, Washington. I have had some correspondence with him.

Willard would be shocked to learn that the Coast Guard has eliminated CW and a recent MARS broadcast tells us that CW will be dropped from the MARS USAF nets by October 1996. Sad to say. . . .

If I should end up deaf and blind, the only way anyone could talk to me would be by CW using a vibrator and perhaps my K2BLA keyboard CW sender. When I am not wearing my hearing aid, I tell everyone I can talk but not listen!

Thanks for bringing back some memories.

Philip Dejarlais, W0JHS

Dear ER

I enjoyed your article on RCA [RCA Lies and Fiction] in ER #75 As you may know, I worked in the Broadcast TV section and knew many of the broadcast salesmen. Every year, RCA held a week long sales meeting in Camden.

Salesmen from all over the country invited their customers to this event where they were taught TV theory, management, operations, etc. They were wined and dined - Thursday night there was a banquet that they would never forget.

The salesmen called on their customers throughout the year and were zealous to help solve any problem that might come up. If you went RCA, it might cost a little more but you had the best equipment and RCA was there to back it up. If a chief engineer called up in the middle of the night saying that a transformer had burned out and he needed a replacement, the RCA dispatcher would call the responsible manager (even at 3 AM) and they would go to the RCA parts dept in Deptford, NJ (just across the river from the Philly airport), get the part and have it on a plane within the hour. I was once sent to Huntsville, AL, to solve a problem - turns out someone had switched a 12AT7 and a 12AX7.

Some of these problems can't be fixed with a telephone call. It's nice to know that RCA will take care of all your problems. A broadcast transmitter is not just a glorified ham rig. It must be well designed, efficient, rugged, beautiful, have long life designed in and be 100% reliable. It must be backed up by the manufacturer. Using these guidelines, RCA comes out on top every time. Just ask the man who owns one!

Even as a kid I knew that RCA tubes were the best and even though they cost a few pennies more, they were worth it. When I was in 7th grade, I told my little brother that "when I grow up I'm going to work for RCA!" OK, so I'm biased. The company no longer exists but I'm still getting my pension check on the 1st of the month. I'm glad I worked for General Sarnoff!

Bob Dennison, W2HBE

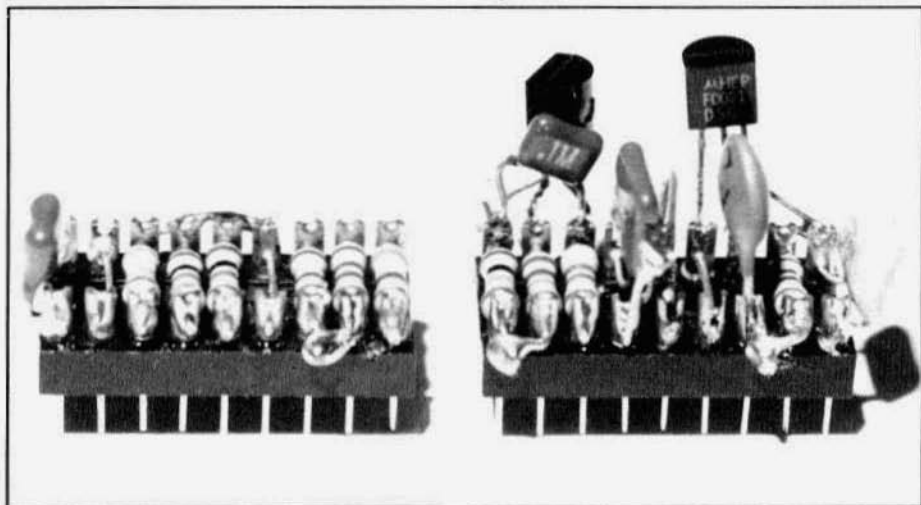
Use of DIP Headers Improves Construction

by Al Roehm, W2OBJ
22 Brookdale RD.
Cranford, NJ 07016

Quite often the decision on whether to build a project or not rests on the method of construction. Where there's nothing critical about the wiring you can build the circuit in a variety of ways. Some examples of noncritical applications are control and logic circuits, product detectors, audio filters and amplifiers, etc.

With tube type circuitry, point-to-point wiring is usually practical because sockets, tie-points and solder posts on certain components are available. For more compact arrangements, particularly where solid-state devices are employed, the use of a PC board is a proven method. However, the time and effort needed to layout and etch a PC board for a single installation is often hard to justify. That's why I want to recommend a combination of the above methods that can make many projects easier to build.

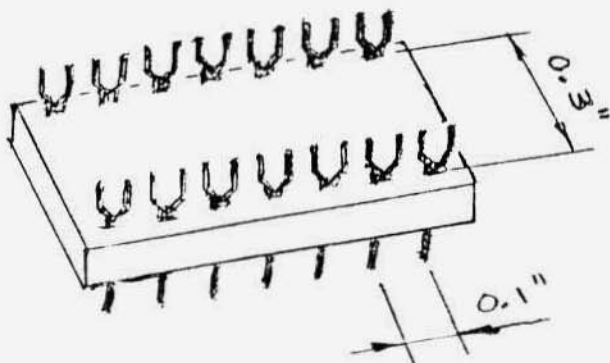
Dual inline (DIP) integrated circuits (IC's) are commonly available with 8, 14, 16 and 18 pins. They can be soldered directly to a PC board or installed in a perf board where soldered or wire-wrapped connections are used for interconnections. Another, and generally preferred, method is to use matching IC sockets. One important advantage of using a socket is the ability to use an often overlooked accessory known as the DIP header or adapter plug. This device is ideal for mounting 1/8-1/4-watt resistors, small capacitors, transistors and jumper wires for special programming requirements. Figure 1 shows a typical 14-pin header. They are also available in 16- and 18-pin configurations. In addition, double width types (0.6" pin spacing) can be obtained for use with larger components. The wide headers can be inserted into two IC sockets and add to the flexibility of this type of system.



In ER #21 Bill Kleronomos, KDØHG, described a product detector for the SP-600. The author built the product detector using DIP headers and it's about one third the size of Bill's.

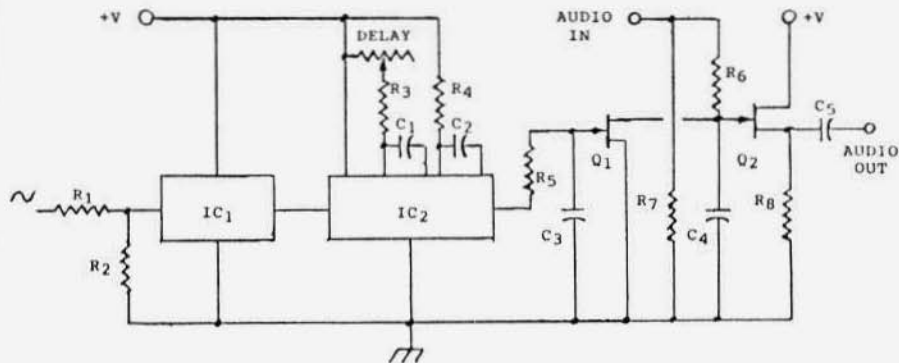
As an example of how useful this system of construction can be, look at the partial schematic in Figure 2. All of the fixed value parts, plus two JFET's, are mounted on a pair of 18-pin headers. These headers are shown in the photograph. To complete the project, two more sockets are used for the IC's. A few jumper connections between the sockets and two leads to the delay potentiometer finish up the wiring. This entire project can be made on a 1-1/2" x 2-1/2" perf board with plenty of room to spare.

I have successfully used this type of construction on many projects, such as; a keyer, synchronous noise blanker, 75-Hz wide audio filter, a code practice oscillator, 455-kHz crystal controlled BFO, and the SP-600 product detector described by Bill Kleronomos, KDØHG in ER #21. If you look at the picture on page 15 of that issue, my board (using two headers) is about one-third the size of Bill's. By the way, headers are usually available from the same source or vendor where IC sockets are sold. **ER**



TYPICAL 14-PIN HEADER OR ADAPTER PLUG

FIGURE 1



PARTIAL SCHEMATIC OF AN AUDIO/CONTROL CIRCUIT

FIGURE 2

A Simple, Cheap Mic Amp

by Berk Berkemeyer, WØREP
402 Kingridge Dr.
Ballwin, MO 63011

Do you ever wish you had just a little more microphone gain? You've got the gain control all the way CW and still don't have enough to get to that lofty perch - 100%. The answer, of course, is a new amplified mic, but--there are lots of things you and the family need more, and 50 bucks is still a lot of money for most of us. There's another answer, and it doesn't cost an arm and a leg. Why not convert the present station mic to an amplified unit? It's easy and cheap! The unit shown gives about 8-10 dB gain (depending on the battery voltage), which is normally sufficient.

You will need three resistors, three caps and an FET, plus a very small piece of perf board and a 9 volt battery. Total cost is well under \$10 if your junk box is completely empty, less if not.

The design is not original, it came from an old Radio Amateur Handbook. A look at the diagram shows the simplicity of the unit - an FET driven by the mic unit which in turn drives the speech amplifier. I built mine on a piece of perf board about 7/8" x 1-1/4". The parts are mounted on one side of the board and the leads are soldered to each other on the back side. Leads from the input and output caps are threaded back to the top of the board along with the ground

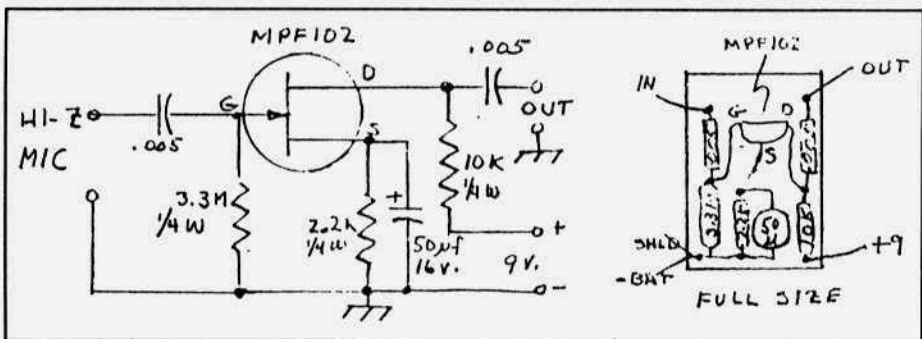
lead from one of the resistors. These are the terminal tie points for the mic leads. Solder the FET last!

To install the unit, cut the shielded mic lead inside the base. Connect the wire from the mic to the input and the other wire to the output. Both shields are connected to ground. The amplifier can be mounted with a piece of two-sided foam tape, as can the battery. Most table stands have plenty of room underneath for both.

You may want to break the battery + line with a switch. I had a DPDT switch already mounted as a PTT switch and one set of contacts turns the mic on when the PTT is actuated. Notice that there is no gain control. You already have one on whatever you are using the mic with, so why add expense?

If you normally use a handheld mic, a little ingenuity should let you mount the unit inside the case. Although I haven't tried them, lithium or calculator batteries might work, and the amplifier will give good results with less than 9 volts. Experiment and have some fun!

My 50+ year old Astatic D-104 now has plenty of output to drive any of my vintage and homebrew gear, without having to shout or swallow the mic. Enjoy! ER



KWickPatch from page 27

ipient of the patch. This way, you can make a note of the various control settings on your receiver and transmitter to make things sound right on the far end of the patch. When it comes down to a real patch, get it running as soon as you establish contact with the other ham station, even if conditions are marginal - things are just as likely to get better as worse. Do your dialing and initial instructions (telling the party on the phone to say "over", etc.) with the patch switched out, then go right ahead and switch it in without further ado.

Check a recent ARRL Handbook for the latest rules and regulations regarding phone patches, particularly with foreign hams. Of course, a phone patch involves a third party and many countries don't allow third party communications over ham radio. The U.S., Canada, and several South American countries do allow patching, but you should abide by a couple of rules: don't facilitate the business affairs of any party, and don't patch just to avoid toll charges. One of the best applications of the patch is to enable communications between an ocean-going ham on his sailboat far out to sea and the skipper's family living nearby your station.

Other Applications

With its multiple windings, the KWickPatch transformer can be used for numerous low-level audio matching and isolation jobs around the hamshack. With two of the 150-ohm windings in series, the unit becomes a 600-ohm to 600-ohm audio isolation transformer, with the third 150-ohm winding available as a separate isolated output or input (this is the way it's used in the KWickPatch). With two of the 150-ohm windings and the 600-ohm winding all in series, you have a 150-ohm to 2400-ohm center-tapped matching transformer. Other combinations are possible; just remember that the impedance ratio is proportional to the square of the turns ratio (that's why two 150-

ohm impedance windings placed in series yield a 600-ohm winding).

Using the combinations mentioned above, you can imagine several useful line-level audio applications such as breaking ground loops in your station (these can be sources of annoyingly difficult-to-trace hum), audio summing and splitting networks, single-ended to push-pull audio converters, and of course, impedance matching.

Conclusion

Classic radio stations - whether they run AM or SSB - are the perfect environment for a classic accessory like a phone patch. Though the original KWickPatch is nearly 35 years old and Erv Rasmussen's fine products are very hard to find these days, you can homebrew an exact equivalent for very little money. There's a special thrill in linking an otherwise isolated ham to a loved one in your area; the feeling is even more satisfying when you've provided the service with a phone patch you built. And like your classic ham rig, this patch has a rich history reaching back to the era when your equipment was new, and when W6YPM was the lucky bidder on four thousand of those same little transformers still at the heart of your latter-day KWickPatch. ER



I THINK WHAT HAPPENED IS OL' SPARKS BLEED TO GROUND WEARING CREPE-SOLED SHOES

The RCA ACT-150 from page 9

ing 150 mA, instead of 60 to 80 mA for the pair. Too much B voltage and not enough bias. I pulled the modulator because there was no way to do anything on it except change tubes when it is in the rack. At least now I knew where I needed to go. Adjusted the B voltage down a bit in the LVPS.

After I consulted with a 1937 RCA Receiving Tube Manual, I decided to make some changes in the 6A3 circuit. The manual strongly recommended that a means be provided to balance the plate current between the two tubes. To do this with directly heated tubes you need another filament winding. Hey, I got one, left over from the RF deck modifications. Also, I bet that the use of 6A3's instead of 2A3's (as per the original circuit) is a result of the new LVPS. Six point three volts strikes again. A 50-ohm hum balancing pot was available if I used some other way to center tap the filaments. Easy, two pairs of matched resistors did the trick. While I was at it, I put in a DPDT switch to flip-flop the 6A3 plate leads to the driver transformer. Now we can maximize the positive modulation peaks. I also installed another matched pair of 10-ohm resistors above the chassis for ease in balancing the 6A3 plate currents with a voltmeter.

Back into the rack, NO WAY! The modulator cabling and the high voltage leads would reach if I faced the modulator away from the cabinet and elevated it on a milk carton. I fired it up and adjusted all the variables. Now we get 150 watts of lovely sine waves into the dummy load for 0.5V (0 dB at 500 ohms) of audio in. That's why Mike added the extra stage. I also tried 600-cycle square waves. Not bad, in fact better than I expected. I decided to let the rig sit right there until I could find a mic preamp and get it working.

The classified ads in *ER* had just what I needed, a Gates program amplifier, quality all the way. As soon as it came, the input was converted to high impedance, a VU meter added and a control relay installed. This DC relay, operated by the PTT switch, controls the 120 VAC to turn the rig on, silence the receiver, etc.

Now it was time to get serious. The modulator was reinstalled and the rig moved across the room to the operating position on November 29, 1994. My goal was to work the James Millen station on December 4, 1994. On that date I was doing some final testing on 3885 while waiting for Bob and Bruce when Ed Wambold, N3LHB came back to me and became my first QSO with the ACT-150. Ed was also tweaking his rig and we had a nice chat before moving to 3867 kc to the biggest AM pileup I ever heard.

Since that time I have had many excellent AM QSOs on 80 meters. I hit the AWA roundtable on some Sundays and the East Coast AM Swapnet on occasional Thursdays.

I have lots of work left to do. One of the first things I have to do is update the drawings so the next owner will be able to find his way around all the modifications. Then I have to find the solution to a serious RFI problem. When I am on 160 meters, the feeders to my (160 meter) halfwave dipole are on the short side and my home alarm system responds loudly to the RF voltage as soon as I hit the PTT switch. Also, I have embarked on building a set of coils for 40 meters to better work some real DX. Hopefully the alarm system will tolerate this better. Until then, CU on AM. ER

The National Select-O-Ject from page 11

of a conventional two stage amplifier having 0° (or 360°) phase shift. When the gains of the phase shifter and the two stage amplifier are adjusted to be the same (by the Reject control), at that frequency where the phase shifter produces a 180° shift, the two signals exactly cancel one another and a null results.

To produce a peak, the phase shift amplifier is connected from the output to the input of a conventional, single-stage 180° phase-shift amplifier. At the frequency where the phase shifter produces an additional 180° phase shift, the feedback signal to the input is in phase with the original signal, thus reinforcing it. For controlled levels of gain, this produces a variable peak at that frequency. If the feedback is high enough, the unit will break into oscillation on its own with no input signal necessary.

Because of this, National also suggested that the SOJ could be used as an audio oscillator for code practice or for RTTY signalling. They even provided key terminals on the back for just such an occasion.

Equally as interesting is how the SOJ is made. As you can see from the photo, it comes in a 1949-modern, gray molded plastic cabinet. The walls are about 1/4 inch thick! I guess National was going to take no chances on a "cheap plastic" cabinet cracking and spoiling their reputation. The SOJ's color and knobs matched its popular companion National receivers of 1949, the NC's 57, 173, 183 and HRO-7. National began a change to a darker gray with my HRO-50 in 1950, but the lighter SOJ continued to be a harmonious color match even then. The SOJ chassis and back plate are sheet copper. It fits snugly into the cabinet, with a couple of screws holding it in the rear and four absolutely tenacious push-on knobs gripping the control shafts in front. Interestingly, my unit is metal stamped as an

"SAF" on the back, with "SOJ-3" printed in black ink over it. Perhaps National had originally planned to call it a "Selective Audio Filter" and then adopted its QST article name at the last minute. The 3 refers to which receiver its octal plug was wired for. The SOJ-3 matched the HRO-50, HRO-50-1, HRO-60, NC-183D, NC-173B, NC-183B and NC-57B. The SOJ-2 was wired for the NC-173, NC-173A, HRO-7, HRO-7A and the NC-183. (I never knew there were that many versions of those receivers till I read the National Application Notes for the SOJs.) The SOJ-1 was a wire-it-yourself model that could be adapted to any receiver that could supply 6.3 volts at 0.6 amps and 200 to 250 volts at 4 mA.

National sold the SOJ at \$24.95 for a relatively short time, perhaps 5 years as I recall. They seemed to go out of favor when the Q-Multiplier came in. National included a built-in SOJ in the NC-125, made from 1950 to '55. I haven't seen an SOJ often in my flea market travels, so they may be a little rare. If you find one, it would be an especially good adjunct for a vintage, non crystal filter receiver like an NC-57 or NC-88, one of the S-40 series or an S20R. It certainly would make a giant improvement in a Command Set receiver.

I couldn't pass up the temptation when I found this SOJ at one of my favorite stopovers, Associated Radio in Kansas City. The boss must have been in a good mood, he let it go for only \$10 as I recall. It even fit into my suitcase for the ride back to New Mexico - unlike its FB7A cousin which nearly broke my arm carrying it home. Installation was a breeze, just remove the jumper and plug it into the SOJ socket on the HRO and it played right away. I can't say it's become my favorite QRM-fighter. I still put CW signals into the filter peak and drop the notch onto offenders (you can't teach an old ham new tricks?). But it's fun to have at last, if for no other reason than that it "completes" my HRO-50. ER

The Camper's Companion from page 16
on your home receiver. You should tune the final tank to a slightly higher frequency than the point of maximum output. This will result in less likelihood that the oscillator will suddenly stop oscillating or develop a chirp.

If you are normal, you will probably experience a real lift in your spirits when you work your first station. First of all, you did it with only 1 or 2 watts output. In the second place, you built both the receiver and transmitter yourself - just like so many hams did in the early days of amateur radio. Any kid can do it with a 100-watt commercial transceiver but you did it the old-fashioned way and you have earned the right to feel good about it. If you need a pep talk to get started, be sure to read K7YHA's article in CQ. (3) ER

Footnotes:

1. The 1933 Camper's Companion, W2HBE, ER, Dec. 1992.

2. The "Tiny-Tim" Portable, A Complete Dry-Battery Station for 80 and 40 CW, Stuart D. Cowan, Jr., W1RST, p.25, QST, April 1955.

3. A Low-Power (QRP) Primer, Part 1 - What It's All About, Rich Arland, K7YHA, p.52, CQ, March 1995.

Part Two next month.

National NC-400 from page 21

NC-400's mechanical stability leaves something to be desired. The chassis needed the stiffening the cabinet offered. Had National provided a cast aluminum compartment of the type installed on the Technical Material GPR-90 or GPR-92 to house the tuning capacitors, they would have done much to improve the mechanical stability of the receiver. Another item worth noting was that National could have been a little more generous with the weight of the two flywheels on the tuning shafts. This would have pro-

vided a better feel when tuning the receiver.

Listening To The World On The NC-400

This receiver is notably hot. There is nothing lacking in the sensitivity department and it is quiet, too. The signals really jump out at you, and the S-meter action is superb. Selectivity is excellent. Control of selectivity is by means of a separate IF selector switch and a crystal selector switch.

The NC-400 is also a knob twirler's delight. Every knob effectively does something to enhance reception, right down to one of the most effective noise limiters I have ever used.

AGC action is good on SSB. It has a fast attack slow release time constant that does the job well.

Image rejection is more than 80 dB on any band. No problems pertaining to images have been noticed.

Frequency stability is fairly good. National specs show .002% after warmup. Drift and stability have been acceptable on CW and SSB reception.

The audio, while not up to the SX-88, is adequate. The output stage is a 6AQ5 into a husky output transformer. A tone control which is provided helps.

Conclusion

This receiver works great and was several years ahead of its time in design. In its day it fulfilled the role of being both a commercial general coverage receiver for governmental agencies and a better than average ham receiver, capable of decent single sideband reception.

The NC-400 was one of the last of the National Radio Company's general coverage receivers, and in some ways marked the beginning of the end to a great era. ER

CLASSIFIEDS

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DEADLINE for the SEPT. Issue: SEPT. 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: HS-30 headsets, GI dated 1944, brand new, in sealed, waxed, protective cartons. Extra earpieces, dessicant, instructions, cord, included. Used with virtually all WW II and many later combat and clandestine radios - \$20. Gene, KD4YIZ, (800) 619-0900.

FOR SALE: DX-100-PTT, B mods, cabinet, NC-300, calibrator, spkr, D104, antenna relay, exc. - \$400, PU, Erie, PA. Brian, K3USC, PA, 814-866-2585.

FOR SALE: Hallicrafters SX-110 ham band only AM/CW rcvr in real nice shape - \$150. Don, KK6AN, CA, (415)-467-9669, dbertone@sfbayguardian.com

FOR SALE/TRADE: Navy AN/SRT-14 xmtr, exc, complete & working, 3-26 Mc in 10 cy steps, w/ book, a real beauty. I love to trade. PU only. Richard J. LaMark, N2TXL, 6822 Tuckahoe Rd., Williamson, NY 14589-9589. (315) 589-2552

FOR SALE: Hammarlund HQ-145X - \$100; Hallicrafters S-40A - \$50; National NC-190 - \$55; National NC-270 - \$110, 3 Dow-Key relays - \$20 ea; Hallicrafters HT-37 - \$125; 2 WRL Globe Scout Deluxe xmtrs - \$70 for both; Globe Chief Deluxe - \$50, shpd collect. Eugene J. Santilli, W3ETF, 2415 Martha St., Aliquippa, PA 15001.

FOR SALE: Collins S-Line aluminum knob inlays: small (exciter/PA tuning) - \$1; 30L-1 - \$2; spinner/plain (main tuning) - \$3. Charlie, K3ICR, 13192 Pinnacle Lane, Leesburg, VA 22075. (703) 822-5643

FOR SALE: Receiving tubes, new and used; multi-section twistlock electrolytic caps to 500-VDC; SAMS photofacts. Send stamp for lists. Turner Electronics, 16701 Main St., Ste. 121, Hesperia, CA 92345.

FOR SALE: Millen 90711 VFO - \$125; Echophone commercial rcvr - \$75; Hallicrafter Jr rcvr - \$95; Collins KWSI xmtr, no ps - \$495; Collins 75A3 - \$395; National HRO-60 w/5 coils - \$495; matching spkr - \$100; Riders manuals available, good condx - \$25, ea, inquire. John Kakstys, 18 Hillcrest Terr., Linden, NJ 07036. (908) 486-6917

FOR SALE: "Introduction to Key Collecting", 64 page softcover illustrated guide - \$11.95 ppd USA. Start now in this fascinating hobby. Artifax Books, Box 88-E, Maynard, MA 01754.

FOR SALE: SR-400 Cyclone III & ps, VGC - \$450, OBO. Bob, WA9YWT, WI (715) 394-4418.

FOR SALE: Gornet G-50 AM 6 mtr xcvr, looks nice but output low - \$75 firm. K8GHL, OH, (614) 998-4140.

FOR SALE: HG-10 VFO - \$45; HP-23 Heathkit ps - \$45; **WANTED:** Nice National or Hallicrafters rcvrs. Ron, W00IZ, 10701 W. 54th St., Shawnee, KS 66203. (913) 268-5973 (d) only.

WANTED: Collins pre-WW II xmtr models 30W, 32A, 32B, 32G, 30FX & 40B, desperately needed to finish my station. Paul Christensen, N9AZ, 11142 Raley Creek S., Jacksonville, FL 32225. (904) 646-0129

WANTED: National/RCA/Hammarlund. National AGS w/coils for 5 bands; National SW-3 w/588-AB ps; RCA RAL; HRO-60 (rack mount type). Taka, CA, (415) 697-6719.

WANTED: Johnson 500 (or Desk Kilowatt), will pay top price (i.e., exorbitant) for top unit. Alan, W3VL, 1361 Sylvan Rd., Perkasie, PA 18944. (215) 795-0933

WANTED: Old meters & any aircraft stuff. Chris Cross, Box 94, McConnell, IL 61050.

WANTED: HRO plug-in stal for HRO variation two (only stal). Tajima, JA1DNQ, c/o The Nakagawa's, 22942 Cedarspring, Lake Forest, CA 92630.

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

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

WANTED: Johnson gear, all models, any condition. Please state asking price. Wen Turner, AD7Z, Box 451, Cal-Nev-Ari, NV 89039-0402.

WANTED: Will pay for UTC CVM-5 information. John McAlpine, 110 Lakefront Dr., Mooresville, NC 28115. (704) 663-1364

WANTED: SX-42, SP-400 only in very good conds. Jose Cangas, EA4JL, Contact in the States, Kurt Keller, CT, (203) 431-6850.

WANTED: Faceplate &/or cabinet for EH Scott SLR-12-A Marine radio. Mark S. Rauber, POB 1077, Minden, NV 89423. (702) 782-3596

WANTED: Model F-3 CW filter for Galaxy-V; model RV-1 remote VFO for Galaxy-V; Chopper relay for Boonton 91CA RF voltmeter. Bob Smith, KC4WJO, 14779 Kogan Dr., Woodbridge, VA 22193-3314.

WANTED: Polycomm 6 & 2 meter xcvr; Lafayette BCR-101 rcvr; Drake rcvr crystals. Pete Markavage, WA2CWA, 27 Walling St., Sayreville, NJ 08872. (908) 238-8964

WANTED: Back issues of Electric Radio; 6 meter & 2 meter AM gear. Scott, K6PYP, 210 Mantua Rd., Pacific Palisades, CA 90272. (310) 459-0337

WANTED: Pilot Super Wasp, will trade Drake R8; need data plate for BC-344, will trade plate of BC-342. Ed Allison, 5525 20th Ave., Sacramento, CA 95820. (916) 454-1788

Vintage Manuals Available

for amateur, audio, and radio-related equipment. Quality is always our number one customer priority. Catalog, two \$3.32 stamps. Pete Markavage, **Manual Man**, 27 Walling St., Sayreville, NJ 08872. (908) 238-8964

WANTED: WW II German, Japanese, Italian, French equipment, tubes, manuals and parts. Bob Graham, 2105 NW 30th, Oklahoma City, OK 73112. (405) 525-3376

WANTED: KWS-1; HF-380; 6251; R-389 and SP-600JX. Need exc. conds. Mitsugu Shigaki, JA6IBX, 2825 -2 Jozan Kamidai Machi, Kumamoto, 860 Japan. FAX Japan-96-329-4601

WANTED: Gonset 903A & 913A 2 & 6 meters amps respectively. KSGHL, OH, (614) 998-4140.

WANTED: Squire Sanders SS1BS, SS1RS, SS1V, SS1S. Weber, 4845 W. 107th St., Oak Lawn, IL 60453-5252

WANTED: Power supply and/or interconnect cable for Hammarlund SP200/SP400 series rcvr. Dick George, W0TRF, 15245 Lynn Terr., Minnetonka, MN 55345.

WANTED: Any info/parts/manuals for Navy RAE-2 rcvr; CRC-38027 tubes (Navy 27's). William Donzelli, 304 S. Chester, Park Ridge, IL 60068. (708) 825-2630

WANTED: Tektronix memorabilia & promotional literature or catalogs from 1946-1980. James True, N5ARW, POB 13280, Maumelle, AR 72113. (501) 851-8783, FAX 851-8784

WANTED: HI-FI spkr's & enclosure by Altec, Electrovoice, Jensen, JBL, tube components. Tim Phelan, 845 Lilybud, Ballwin, MO 63011. (314) 227-9264.

WANTED: Heathkit, Eico, Fisher, Dynaco or similar tube audio amplifier in any condition or manuals for same. Mike Nowlen, WB4UKB, POB 1941, Herndon, VA 22070. (703) 716-1363

WANTED: Parts needed: Filters for 75A-4; cover for J102/J103 on back of KWS-1. KO6J, CA, (714) 643-7930, Deanbers@ix.netcom.com

WANTED: MP-28 mod, MT-51 C remote control; connectors for Bendix TA-12 series xmtr; control box, cable, DF loop & connectors for Bendix RA-10 rcvr. Sam Kelly, W0JTT, 12811 Owen St., Garden Grove, CA 92645-2714. (714) 893-2092

WANTED: Johnson Adventurer screen mod or schematic & parts list. Chuck Barton, NZ5M, 8705 Toledo Ave., Lubbock, TX 79424. (806) 798-1452

WANTED: National FB-7 & 1-10/A coils; National CRR scope; CRU-P rack panel. Wayne Childress, KC7KUE, 1903 Jerome Pl. #3, Helena, MT 59601. (406) 443-7255

FOR SALE: New book on Tube Type Transmitters, Transceivers, Linears and more. 1922 through 1970, 550 pictures, 105 manufacturers, 550 models of xmtrs/scvrs & more. Introductory price \$15.95, including postage. Add \$1 for Canada, Calif. residents add appropriate sales tax. Ready for delivery. Sound Values, POB9, Auburn, CA 95604.

FOR SALE: RCA SSB 14T302 CB scvr, factory converted to 10 meters, mint condx w/ documentation, access. - \$69 + shpg. Al Kaiser, W2ZVR, 713 Marlowe Rd., Cherry Hill, NJ 08003-1551. (609) 424-5387

FOR SALE: NO5 tubes 4CX1000 w/socket - \$200; 450TL - \$75; 4-250 - \$75; SB-200 amp, clean - \$350. Stan, WD6GGK, CA, (408) 728-3480.

FOR SALE: New Collins PJ-068 mic plugs for 5-line/KWM-2 - \$8 each. Clint Hancock, KM6UJ, 6567 Ashfield Ct., San Jose, CA 95120-4502.

FOR SALE/TRADE: Teletype equipment w/HAL-ST-6 RTTY terminal, CV-62U freq shift converter, parts & paper, w/books, exc. I love to trade, PU only. Richard J. LaMark, N2TXL, 6822 Tuckahoe Rd., Williamson, NY 14589-9589. (315) 589-2552

FOR SALE: New Amperite time-delay relays for the 30S-1 amp., Part #115N0120 - \$20; Collins Red Label plug-in mech filter, F-455-Q-6 - \$50; R-390 rcvr - \$250. Steve, SC, Correct No's, (803) 873-2499 X200 (D), (803) 821-7749 evs.

ELECTRON TUBES FREE 1995 Catalog, over 2,000 types in stock. Electron Tube Enterprises, Box 8311, Essex, VT 05451. (802) 879-1844, FAX (802) 879-7764

FOR SALE: McMurdo Silver model 800 HF rcvr; McMurdo Silver model 700 VHF/UHF xmtr; McMurdo Silver model 900 VTVM Vomax; Echophone EC-1 SW rcvr; Hammarlund HQ-129 rcvr; (2) Regency ATC Mobile conv. 10-80 mtrs; (2) Delcon Telephone Speech Scramblers; Ameco OT HF Preamp; RME 602 2 & 6 mtr AM xmtr; Henry 200 6 mtr 200 watt linear w/110V sply; Johnson rcvr conv. 6 & 2 mtrs. BO, all + shpg. Harry, W6ATC, 1915 Armacost, Los Angeles, CA 90025. FAX (310)-826-4058

FOR SALE: Electric Radio magazine, issues 1 thru 74, BO via postcard. Bob Mattson, 10 Janewood Rd., Highland, NY 12528-2607.

FOR SALE: Very nice 7551, 32S1, 516F2, crystal pack, manuals & cables - \$600; Heath AR-3, mint - \$200; DX-40 - \$75; OF-1 - \$25; National HRO-5TA1 w/697 ps, coil set - \$250; NC-303 w/calibrator - \$350; Hallicrafters SX-25 - \$250; SX-16 - \$350; S-19R Sky Buddy - \$150; Hammarlund HQ-150 - \$250; HQ-140X - \$250. Greg Gore, 11528 Watermoss Ln., Charlotte, NC 28262. (704) 549-4719

FOR SALE: Drake SPR4 rcvr, exc condx w/AL4 rotating loop ant, crystal calibrator, noise blanker & service manual, will not separate - \$375 OBO. John Peterman, AP9C, 4124 N. 89th St., Milwaukee, WI 53222. (414) 461-5444

FOR SALE: 51J4, orig cab, manual, spkr, 3 filters, exc condx - BO by 9/15/95; HQ129X, VG condx - \$150; HQ110AC, exc condx - \$125; Les Logan, S15 bug, exc - \$100; SIG electric 1930's str. key, brass/bakelite base - \$35; teardrop str. key, black - \$40. Pete, WB2BYQ, NJ, (201) 934-0321.

FOR SALE/TRADE: Navy Air King TCS14; Collins TCS12, both w/cables - \$125; scope AN/SPA-1 - \$40; Belmont BC1068A - \$35; Wells Gardner RAO3 - \$25; NC200 - \$85; NC115 - \$40; nice Globe Scout 66, Chief 90, 755 VFO, TRADE for exc Ranger II; Collins R388 for NC183D. WANTED: Navigator, G76 & ps, NC183 parts, rack spkr, spkr emblem, more NC183s, NC183D please. Select-O-Jack; Ranger manual; Johnson 500. Sam Champie, KD7XX, 105 W. McKenzie, Hermiston, OR 97838. (503) 567-2879

FOR SALE: Exc condx Drake station console model C-4, orig book. Dusty Rhodes, W8MOW, 1324 N. Dorset Rd., Troy, OH 45373. (513) 339-1546.

FOR SALE/TRADE: HQ-170 AC - \$175 + shpg. WANTED: SX-100. Mike, W0LTL, 9425 E. Placita Oaxaca, Tucson, AZ 85749.

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FOR SALE: 1950's vintage cabinet w/chassis & matching (undrilled) front panel, blue gray w/ chrome trim, 17" w x 10" h x 11" d, mint - \$50 or BO. John, WB8IPG, MI, 810-362-2656, FAX 362-2706.

FOR SALE: Collins KWM-2A, RE, w/516F2-solid state & relay, gone over by KØBS, very nice. No shpg. Jon, KØDTA, 8311 5th Ave., S. Bloomington, MN 55420. (612) 881-9037

FOR SALE: Nautel NDB TX. Looking for graticule screen & test lead set for OS-8C scope. Don Trueman, Canada, (204) 832-2875.

FOR SALE: AN/PRC-74B, w/acc. bag & acc. (antennas, key, & misc acc.), no battery box, good condx - \$650. Mike, CA, (619) 588-7817, FAX 390-8611.

FOR SALE: Hallicrafters SX-100 MK1A, museum quality & none finer. John, UT, (801) 479-1609.

FOR SALE: Hallicrafters SX-17, exc - \$90; SX-18, exc - \$100; S-20R, vg - \$70; S-22, vg - \$75; SX-24, exc - \$85; S-36, rack - \$75; S-37, rack - \$75; S-38 A/B/C/E, good - \$50 ea; S-39, exc - \$100; more. Don Jeffery, POB 1164, Monrovia, CA 91017.

FOR SALE: 1994 paperback "Behind the Front Panel: The Design & Development of 1920's Radio", 159 pgs - \$12 ppd. Ken Greenberg, 4858 Lee, Skokie, IL 60077. (708) 679-8641

FOR SALE: 2 new BC-375 tuning units, TU-8-B (orig box), TU-10-B - \$30 ea + shpg. John Snow, 4539 N. Bartlett Ave., Shorewood, WI 53211. (414) 964-0194

FOR SALE: Repair! Radio repair, tube or solid state, reasonable rates. Jim Rupe, AB7DR, Western Amateur Radio Repair Co., (WARRC), POB 697, North Cove, WA 98547. (360) 267-4011

FOR SALE: Very early Heathkit catalog, early 50's, mint - \$8. Marty, NJ (609) 466-4519.

FOR SALE: Jennings VAC variable, USLS-465, 5 kv - \$60 ea + shpg. Jack Dubbs, 44 Monk, Security, CO 80911. (719) 392-2043

FOR SALE/TRADE: Military collectors 1944 Signal Corps Poster, orig 6 M (HB) AM TX/RX; Heath Q/mult. **WANTED:** ARRL "How to Become A Radio Amateur", circa 1953/54. Joe, K2QPR, FL, (407) 220-7362.

FOR SALE: Jennings vacuum variables: UCSX700 (700 pF/15 KV) - \$40; UCSL 750 (750 pF/7.5 KV) - \$35; ceramic VU's-CVDB 2300 (10 dKV), CVDB 1500 (7.5 KV) - \$150 ea. Jan D. Perkins, 524 Bonita Canyon Way, Brea, CA 92621.

FOR SALE: (2) Jennings vac. variable capacitors #UCSL 1000-55, w/hardware; E.F. Johnson variable roller inductor #229-201-1. Pete, N7DUC, OR, (503) 591-9312.

FOR SALE: Collins 305-1 - \$1500; KWM-2(RE) w/ps - \$1000. Ron, KC6WTC, POB 783, Santa Rosa, CA 95402. (707) 539-8319

FOR SALE: ARRL Handbooks 1954-1957, 1961-1969, 1970-1973, 1976, 1978, 1980, 1981 - \$15 ea, ppd. Brown, 4141 West L-2, Lancaster, CA 93536. (805) 943-2027

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For more information contact **Leo Meyerson, W0GFQ** at (402) 392-1708, May-Nov.; (619) 321-1138, Nov.-May.

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

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

WANTED: Photographer is looking for collections of American ham gear made between 1930 & 1980 to illustrate book. I will travel to your location. Joe Veras, N4QB, POB 1041, Birmingham, AL 35201. (205) 328-2661 (d), 967-0639 eves/wkends.

WANTED: 6kHz Collins mechanical filter, circular types F-455-FA-60 or -K-60 or N-60 or -Y-60. Reinhard Wieschoff, 7, rue du Debuiche, F-78120 Rambouillet, France

WANTED: PS/modulator for the Johnson Viking 500. Bill, K4BWC, NC, (919) 266-7373 d, (919) 231-2829 eves.

WANTED: Cabinet for Hammarlund SP-600. George Flanagan, W2KRM, 42 Cygnet Dr., Smithtown, NY 11787. (516) 360-9011 eves.

WANTED: MS-54 antenna section for SCR 284/BC-654. Pete Hamersma, WB2JWU, 87 Philip Ave., Elmwood Park, NJ 07407

WANTED: Johnson Ranger I xmtr. Must be unmodified & at least VGC w/manual. Paul, N6SFC, CA, (415) 355-8585 anytime.

WANTED: SRR-11-12-13 or FRR 21-22-23 rcvs, manuals or schematics. Ray Blackford, WA1ZYE, Box 6591, Edison, NJ 08818. (908) 892-6537, 9-10 PM

WANTED: Racal RA-217, RA-1217, or RA-6217 service manual; correspondence with other Racal 6217 owners. Geoff Fors, WB6NVH, POB 342, Monterey, CA 93942. (408) 373-7636

WANTED: 8116 or 8117 tube. Dale Gagnon, KW1L, 9 Dean Ave., Bow, NH 03304. (603) 228-8721

WANTED: Hallicrafters S-38 (not A or B), must be working on all bands & in exc cosmetic condx. Purchase or trade for exc S-22R Skyrider Marine. Gus Stellweg, 117 Edgewood Dr., Orangeburg, NY 10962. (914) 359-0769

WANTED: Drake C-line, TR4CW/RIT, 2B late production, very clean. KB0W, 11456 Fortyniner Cir., Gold River, CA 95670. (916) 635-4994

WANTED: RCA rcvs; AR-77 table model, CR-88, CR-91. Gary, KE6MS, CA, (310) 696-0177.

WANTED: Collecting early Heath gear 1940's - 1950's; early Heath catalogs and literature; Heath mics, spkrs, supplies, access., any parts units. Byron, WA5THJ, 1215 Fresa Rd., Pasadena, TX 77502-5017. (713) 941-3631

WANTED: 10-80 final amp tank coils for Globe King 500 radio. Jim Wilhite, W5RXC, 2404 S. Hughes, Amarillo, TX 79109. (806) 371-7233

WANTED: Knobs for Heathkit Apache, Mohawk and Marauder, aluminum or chrome. Gary, AA5QT, 18615 Big Cypress, Spring, TX 77388. (713) 355-6153

WANTED: Hammarlund MLW-125 capacitors to restore Collins 30W xmtr. See ER 6/95 ad for picture/info. Thanks. Brian Harris, WASUEK, 3521 Teakwood Ln., Plano, TX 75075. (214) 996-2914 (h), 644-1610 (w)

FOR SALE: Collins 75A4, Hammarlund SP-600, Teflon wire - \$1000. WNIS, RI, (401) 254-1609.

FOR SALE: 2 tubes, 5563A NIB - \$200; Ameco code course ca. 1957 - BO. Randy Hull, WB3ECC, 1101 Hagy Ln., Dauphin, PA 17018. (717) 921-2966

FOR SALE: HP 2DO CD audio osc; VibroKeyer Del; Antique Elect. Supply audio amp; Realistic Minimus 3.5 spkr - \$100 +UPS. Tom Waters, 3703 Bonview Ave., Baltimore, MD 21213. (410) 488-5356

FOR SALE: Viking I parts unit - \$60; (2) 6LP6s, mint - \$250. Lane, KM3G, CA, (619) 462-3857

FOR SALE: Used technical books - radio, electronics, math, military, magazines, etc. List \$1 (stamps OK). Software, 2 Dept. ER, 1515 Sashabaw, Ortonville, MI 48462

FOR SALE: New list - hundreds of manuals, schematics and service information. Send 2-stamp LSASE. David Crowell, KA1EDP, 40 Briarwood Rd., North Scituate, RI 02857-2805. (401) 934-1845

FOR SALE: NIB BC-645-A - \$25 + shpg. John Snow, 4539 N. Bartlett Ave., Shorewood, WI 53211. (414) 964-0194

FOR SALE: Drake T4XC, R4B, MS-4, AC-4 - \$400; TR4w/MS-4, AC-4 - \$200. Gary, NO5H, 808 Clarice St., Delhi, LA 71232. (318) 878-8032

FOR SALE: Superior tube tester model 450 w/ book, circa 1940 - \$19 + shpg. H. Mohr, 1005 W. Wyoming St., Allentown, PA 18103.

FOR SALE: Hallicrafter S-38-E, on a 1-10 it's a 9 - \$65 + UPS. Ken Tountas, TX, (817) 772-7307.

TRADE: 211 (VT4C), 715B, 4-125A, TZ-40, 805, 1629, 3B28; Sams CR1. **WANTED:** EL38/6CN6; Hallicrafter SR-46A; Ameco TX-86; Sams CB-2, TR-46. Al Bernard, POB 690098, Orlando, FL 32869-0098. (407) 351-5536

FOR SALE: Variacs, 0-140 vac., bench top & panel mount. 8 amp, 10 amp, 20 amp, 25 amp - \$45 to \$65. Bob Bakinowski, 1524 St. Tropaz, Tucson, AZ 85713. (520) 624-8029

FOR SALE: Hallicrafter SX-73R-274/FRR manuals, 100 pgs, NOS - \$10 + shpg. Dan Mason, RRI, Box 204F, Santa Fe, NM 87501. (505) 455-3416

FOR SALE: Collins F455B08 - \$125; F455FA21 3V2 - \$50; MP-1 - \$50; Drake DC-4 - \$50; Central Electronics 100V - \$300. Ron, K1BW, MA (413) 538-7861.

FOR SALE: Heath Twins, Mohawk & Apache + SSB adapter, manuals, cabling, etc. - \$375. Lin, KJ6EF, 1038 Turquoise, #9, San Diego, CA 92109. (619) 488-3226

FOR SALE: 1994 Paperback, "Behind The Front Panel - The Design and Development of 1920's Radio", 158 pages - \$12 ppd. Ken Greenberg, 4858 Lee, Skokie, IL 60077. (708) 679-8641

FOR SALE: Heath VF-1 VFO, very good condx - \$25 + shpg. Thorne, W7HWA, CO (303) 299-0562.

FOR SALE: RT-294A/ARC-44 8W xcvr 24-51.9 MHz FM - \$35. Alan Dale, W9ZPP, 2824 Forest Ave., Evansville, IN 47712. (812) 424-5208

FOR SALE: Command Sets: BC-454B, fair - \$13; BC-453A, very good - \$25; BC-453A, no tag, nice looking - \$29; BC-455B unmodified - \$39; BC-453B, unmodified - \$39; BC-453B, nice - \$29; BC-454E, rear connector wrong - \$34; T-23/ARC-5, unmodified - \$49; R-28/ARC-5, unmodified - \$59; Aircraft Radio Corp glass vacuum capacitors for RE-2/BC-442 - \$11 ea. **WANTED:** Black R-xx/ARC-5 rcvr covering 6-9.1 MHz. Don, N3RHT, 47 Hazel Dr., Pittsburg, PA 15228. (412) 234-8819 EST, weekdays.

FOR SALE: Collins VFO, 1.5-3 MHz, see Electric Radio #73, like new - \$20; Jennings RB2A vacuum relay, DPDT, new - \$20; Kilovac vacuum relay, SPDT, new - \$10. Dave Sundheimer, W0NBZ, 13020 Lakeview Dr., Burnsville, MN 55337. (612) 890-1844

FOR SALE: Clean Heath Apache - \$195; Warrior amp - \$295, PU only; SB-10 - \$100; Johnson 6N2 TX - \$60. Clem, W8VO, MI, (810) 795-4670.

FOR SALE: Clegg Zeus high power 6 & 2 meter xmtr - \$250, very clean. S.T. Carter II, W4NHG, POB 033177, Indialantic, FL 32903-0177. (407) 727-3015

FOR SALE: Collins 325-2 VG condx, BO; Heath DX-100 (early model) - \$90 OBO; Clegg 99'er - \$30; National NC-188, not working - \$40. **WANTED:** Collins 515-1; 30L-1 & 75S-3B or 75S-3C, willing to trade or pay fair price. John Poland, AE4EN, 2859 Scotts Hill Loop Rd., Wilmington, NC 28405. (910) 686-4236

FOR SALE: Eldico S-119 system, complete (Collins clones), rare; Heathkit HW-101, HP-23B, never completed - \$200; Heathkit HW-22A, HP-23, exc - \$100; Swan 350, 117X, exc - \$175; Drake TR-4, MS-4, AC-4, exc - \$225; Drake TR-4 CW only, poor, intact, receives - \$100; Drake C-line complete, exc, rcvr not working - \$250; Johnson Challenger - \$75; National NC-270 - \$80; Collins 75A-4 exc, s/n 52XX, 3 filters - \$750. All + shpg. Richard Lucchesi, WA2RQY, 941 N. Park Ave., N. Massapequa, NY 11758. (516) 798-1230

FOR SALE/TRADE: HK-VF-1; RCE GR-54 HMIO2. **WANTED:** HK 1681 TX. Ray, MO, (314) 428-1963.

FOR SALE: PRC-47 LSB conversion, Collins mech filter - \$45. Retains freq calib. SASE for info. Roger Leone, K6XQ, 136 Delta Cir., Vallejo, CA 94589. (707) 552-6659

FOR SALE: Drake 2B - \$90; 2B/2BQ - \$165; 2CQ - \$45. Copy of manual for above. John Keil, 4618 Norwalk St., Union City, CA 94587. (510) 471-4838

WANTED

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

WANTED: McIntosh and Thordarson amplifiers any conds. Marcus Frisch, WA9IXP, Box 28803, Greenfield, WI 53228-0803. (414) 297-9310

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WANTED: Collecting Pre-1950 commercially built amateur gear; xmtrs, rcvrs & accessories. Dean Showalter, WA6PJR, 72 Buckboard Rd., Tijeras, NM 87059. (505) 286-1370

WANTED: Old tube amps & xmtrs by Western Electric, UTC, Acro, Peerless, Thordarson; Jensen, JBL, EV, ALTEC, WE spkrs. Mike Somers, 2432 W. Fargo, Chicago, IL 60645. (312) 338-0153

WANTED: Kleinschmidt "Teletype" equipment, literature, 7/8" paper tape, Hallicrafters elevating base for SX-42. Tom Kleinschmidt, 506 N. Maple St., Prospect Heights, IL 60070. (708) 255-8128

WANTED: TMC GPR-92 HF Rcvr. Hank, W6SKC. (602) 281-1681 FAX: 281-1684

WANTED: NC-101X rcvr in exc or mint conds, conds more important than price. Bob, N6CM, CA, (408) 395-9025.



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

WANTED: Military radios. Any manpack, walkie-talkie, survival. Prefer working/cosmetically clean, premium for NIB. Particular PRC-17, 21, 28, 63, 64A, 93, 103, 126; CRC/7; URC-64 pwr sply AM-65; RT-66-67-68/GRC; crank generators including G8/GRC & G-76G; test sets URM-30, AN/PRM-32, TS 2530/UR, URM-172, TRC-77 battery box, 12V pwr cable & TM. Harness for PRC-75. Daniel Cahn, 3444 Greenwood Ave., Los Angeles, CA 90066. Msg (310) 398-3840, FAX 398-7159

WANTED: Coils for National 1-10/A & FB-7. LSASE for eight page radio/book list. Wayne Childress, KC7KUE, 1903 Jerome Pl. #3, Helena, MT 59601. (406) 443-7255

WANTED: Regency TR-1; Sony TR-63 & Japanese made early transistor radios; WW II Japanese military radios of any kind. Takashi Doi, 1-21-4, Minamidai, Seyaku, Yokohama, Japan. FAX: 011-8145-301-8069

WANTED: Two ARC-5 rcvr tuning knobs (need not be alike) or two ends from splined flexible shaft. Mike Dinolfo, N4MWP, 4027 Barbour Dr., Fairfax, VA 22030. (703) 591-7717

WANTED: Hallicrafters R-50 or R-51 spkr for SX-146 rcvr. Louie, NY, (718) 748-9612 after 6 PM.

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

WANTED: Military radios, any URC/PRC, manpack, walkie-talkie, survival, particularly URC-4, 64, 68, PRC-63, 93, 68, 47; RT-10, 20, 60. Pref. working/repairable. Additional contacts appreciated. Daniel Cahn, 3444 Greenwood Ave., Los Angeles, CA 90066. Msg/FAX (310) 398-7159

WANTED: Hammarlund manuals, parts, parts units, from the series Comet, HQ, SP. Also accessories, catalogs, spec sheets, memorabilia. Robert, Amateur Radio Surplus, (517) 789-6721

WANTED: Collins 30J, 30FXB/C, other pre-1940 Collins amateur gear for my collection. John Finney, WBSHRL, 14818 Delbarton, Houston, TX 77083. (713) 5615-KW1

WANTED: Vintage tube CB's; pwr sply/modulator for Johnson 500. Send card or call with model you may have. Steve White, WBSUGT, Box 1086, Clute, TX 77531. 800-374-6477 - 9008 (leave message)

WANTED: Uniden CR-2021; (Hickok, etc.) mutual conductance tube tester; Kenwood T-599 xmtr; RadioShack DX-400, SB-610 scope. Rick, K8MLV/Ø, 1802 W. 17th St., Pueblo, CO 81003. (719) 543-2459

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

WANTED: Teletypes and any other teleprinter machines, parts, literature or information from the 1940's to the '70's. Gary Ashbaugh, POB 2008, Corvallis, OR 97339. (503) 758-8006

WANTED: Hallicrafters HT-40 Mk1 and/or HA5 VFO; clock cover for HQ-100AC. Jim Berry, WA3JAT, 2512 16th St., Cuyahoga Falls, OH 44223-2048. (216) 922-0158

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FOR SALE: Johnson Valliant - \$325; JMBBox 275W - \$90; JMB 275W w/SWR mtr - \$120; DX100 - \$150; Heath HW-22A, working w/supply - \$75; Yaesu YP150 dummyload watt mtr - \$125; ARRL Handbooks; many AM rigs. LSASE for list. WA7IHN, POB 442, Aumsville, OR 97325, (503) 749-1149

FOR SALE: T-368 - \$600; Valliant - \$200; B&W 5100B - \$200; B&W amp deck (pair 813s) - \$250; Clegg Zeus Interceptor - \$450; Dentron MT 3000A ant tuner - \$225; SX111 - \$150; HQ-140 rackmount - \$125; Gonset Com IV, 220 MHz - \$50; Drake TR-4C - \$275; (2) Heath SSB adapters - \$40, pr.; Millen exciter - \$50; Dynamotor 120V, 400 cy, 21.5 amp, 2500 watt output, 24V input - \$100. Ron, WA3WBC, PA, (717) 282-2731

FOR SALE: Hallicrafters FPM-300 MK II, 80-10M xcvr (last set made by Hallicrafter). **WANTED:** 75A1/32V cabinet. Carter Elliott, WD4AYS, 1460 Pinedale Rd., Charlottesville, VA 22901. (804) 979-7383

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

FOR SALE: 1 NIB (sealed) mic & rcvr headgear (made by Zenith) - \$35 + shpg. John Snow, 4539 N. Bartlett Ave., Shorewood, WI 53211. (414) 964-0194

FOR SALE/TRADE: Millen NCS-90801 TX; Millen 90801 amp; parts unit for Heathkit Seneca xmtr. **WANTED:** Millen 90711 Variarm VFO; other Millen equip.; Stancor 10P; other xmtrs. Thanks! Tom Smith, N5AMA, 13034 Elmington Dr., Cypress, TX 77429-2062. (713) 376-3436 (h), 957-6420 (w)

FOR SALE: HP606A Sig gen, 50 kHz-65 MHz, manual - \$135; Delta Electronics 01B-2 operating impedance bridge, 2-30 MHz - \$490; HP182T spectrum analyzer mainframe - \$118; list-LSASE. Kirk Ellis, KK4YP, 203 Edgebrook Dr., Pikeville, NC 27863. (919) 242-6000 eves

FOR SALE: R-390A/URR orig. maintenance manual TM 11-5820-358-35, Dec '61 issue, 189 pgs. -\$28 includes priority mail. Aber, POB4118, Jersey City, NJ 07304.

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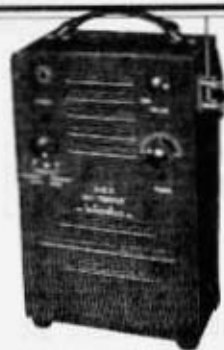
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FOR SALE: Collins S-line 75S-3C w/filters, 32S-3A, 516F-2 (spare W/E 516F-2), SM-3, DX engineering processor, Collins interconnecting (labeled) cables, multitudinous spare tubes, unused Tubesters, CP-1s, weighted knobs, 321B-4, 30S-1 w/new spare final/rectifiers, 180S-1, 51S-1 w/filters, 55G-1. All are 1973 vintage R/E, w/ridiculously low hours, prodigious documentation/service bulletins, CoverCraft jackets, spare parts/tools, immaculate condition, in climate-controlled storage since 1984 - \$8500 or BO. Can be expertly boxed/shipped anywhere, or bring suitcases/trunk to airport. You'll be thrilled! WB81PG, MI, (810) 362-2656 voice (no calls from 0200-1200 UCT), FAX 362-2706

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FOR SALE: Hallicrafter manuals. Most photocopies - \$5 + \$1 shpg; Johnson, Heath, WRL, others. SASE for list. DSM Diversified, 909 Walnut St., Erie, PA 16502.

FOR SALE: Drake 2C rcvr w/2cs spkr & 2NT xmtr, both exceptionally nice w/orig. manuals - \$250. John Peterman, AB9G, 4124 N. 89th St., Milwaukee, WI 53222. (414) 461-5444

FOR SALE: TMC GPR90 - \$325; new Collins 180S1 tuner - \$295; Collins parts. Ron Follmar, K5GJT, 332 Camino Real, Kerrville, TX 78028. (210) 896-8830

FOR SALE: SX-100, Sky Buddy, both - \$225; Palamore QRP amp, 40-10, 5 in 150 out, (2) 6LF6s - \$225; 75S1, 75S3 (needs paint), 32S1, HP23, extras - \$925. Lane, KM3G, CA, (619) 462-3857

FOR SALE: R390 collectors: 11 rare, full size shop drawings detailing all aspects of R390 design - \$95 ppd. N1FRX, ME, (207) 834-6273 eves/wknds.

DOVETRON PD-1 PRODUCT DETECTOR

The Dovetron PD-1 product detector is a small solid-state (dual JFET) device that plugs directly into the NBFM adaptor socket located on top of the chassis of the National HRO-50, HRO-50-1, HRO-60, NC-183 and NC-183D. It also plugs directly into the E-2 NBFM adaptor socket of the Collins 75A-2, 75A-2A and 75A-3 HF amateur receivers. Selecting CW with the front panel Mode switch enables the PD-1 with fast AVC. Selecting FM enables the PD-1 with slow AVC. The AM position provides the original AM detection. Specs upon request.



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FOR SALE: Heathkit lives on in historical anecdotes by employees. Quality 124-page illustrated book. \$9.95 postpaid. Heath Nostalgia, 4320 196th S.W., Suite B-111, Lynnwood, WA 98036-6754

TRADE: SW-3 model 1, battery tubes, exc. **WANTED:** Model 2 or 3 in exc condx. Sandy, WSTVW, 417 Ridgewood Dr., Metairie, LA 70001. (504) 836-2134

FOR SALE: EFJ Viking SSB adapter (for Valiant II xmtr & others) w/ps, orig. manual - \$175; WRL Globe Chief model 90 & 90A xmtrs - \$75 ea; Collins KWM2A, WE, rough but complete - \$225; Collins 312B3 spkr, very good - \$170, OBO. John Peterman, AB9C, 4124 N. 89th St., Milwaukee, WI 53222. (414) 461-5444

FOR SALE: Harvey-Wells T90 xmtr & matching ps, Harvey-Wells R9A rcvr - \$225 set; Drake T-4X xmtr, AC4+MS4 - \$150; NC-300 - \$125; Bendix RA-10 rcvr + accs. - \$115; Hallicrafter SR-42 + VFO - \$50; HQ-180C - \$140; Thordarson 300W mod xfmr - \$120; sig gen/GR-1001A - \$200, GR-804C - \$125. Gary, POB 310783, Newington, CT 06131. (203) 665-6056

FOR SALE: 32V3 and 75A1, very good condx. Ron, K6LLQ, Box 21608, Concord, CA 94521

FOR SALE/TRADE: Transmitting/Receiving tubes, new and used. LSASE for list. I collect old and unique tubes of any type. **WANTED:** Taylor and Heintz-Kaufman types and large tubes from the old Eimac line; 152T through 2000T for display. John H. Walker Jr., 16112 W. 125th St., Olathe, KS 66062. (913) 782-6455

FOR SALE: OS-8E Navy scope, vg to exc - \$30 + shpg. John Snow, 4539 N. Bartlett Ave., Shorewood, WI 53211. (414) 964-0194

FOR SALE: Octal base, glass envelope 100 kc xtals for SX-100, SX-101, etc - \$10 ea; National NC-303 w/calibrator & matching spkr - \$150, + shpg. Evan Haydon, NOGMR, NE, (402) 435-4083.

FOR SALE: Collins R729 (1952) rcvr 400-500 MHz, exc condx; Collins 180U-2 ant tuner/wattmeter exc; PTOs-70H-2, 70H-7, 70E-22. Richard, KD6CPE, CA, (714) 855-4689.

FOR SALE: Collins 75S3B WE - \$425; 75A32 filters - \$525. **WANTED:** 6 kc filter for 75A4, KWM2A, RE; antique Collins gear. Stu, K2OA, NY, (914) 691-7957

FOR SALE: Parting 5X-42, 5B-303, 5B-401, Globe Chief, HW-22, HW-32, HP-23 - \$40; HG-10B - \$40; DX-60 - \$50. Ron, KS, (913) 268-5973, days only.

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WANTED: Military sets, US RI-136/GRC-13; ABK, APX-1 & other I.F.F. sets; British W.S. No. 21. Leroy E. Sparks, W65YC, 924 W. McFadden Ave., Santa Ana, CA 92707-1114. (714) 540-8123

WANTED: Heathkit, Eico, Fisher, Dynaco or similar tube audio amplifier in any conds. Mike Nowlen, WB4UKB, POB 1941, Herndon, VA 22070. (703) 716-1363

WANTED: Circuit diagram for Astatic D-104 & T-UG8 stand w/preamp. Will reimburse your expense. Larry Bush, 359 Arrowhead Pl., Waco, TX 76712. (817) 848-5155

WANTED: Coil winding info (or coils) for Graymark 511 regen. radio. Harry Blesy, 95740 Clarendon Hills Rd., Hinsdale, IL 60521. (708) 789-1793

WANTED: Knight Ocean Hopper, manual for Knight Star Roamer II; manual for Hallicrafters CR-3000 multiband rcvr. David Mazza, KB9EI, 366 S. McKinley, Kankakee, IL 60901. (815) 933-5624

WANTED: Collins 310B3; info on Thermador CS-2156 +48 dB & Thordarson 21M62 mod xmtrs. Jerry O'Halloran, W8EGD, 7065 S. Gray Ct., Littleton, CO 80123-3921. (303) 979-2323

WANTED: Still want a Hallicrafters BC-610. Want a complete xmtr or empty cabinet or anything in between; BC-610 modulator; BC-610 ps. Joe, AB5LL, AR, (501) 257-2567. Collect.

WANTED: T-368 mod; T-368 exciter; good RF signal gen for aligning AM/HF rcvrs, does not have to be lab quality or mint conds cosmetically, older unit or military OK. Joe, AB5LL, AR, (501) 257-2567. Collect.

WANTED: Hammarlund HQ-150 rcvr, mint or near mint conds; cabinet for Hammarlund SP-600 rcvr. Thomas Panter, 1654 Villa Rica Rd., Powder Springs, GA 30073. (404) 943-1669

WANTED: Hallicrafter HT-9 xmtr & spkr parts. Robert Braza, N1PRS, 23 Harvard St., Pawtucket, RI 02860. (401) 723-1603

WANTED: Collins 75S2, KWMI, 32V3 (no cabinet needed); Transco 141000 series, 4 position N connectors; 28 VDC, ant. relays. Ron Steinberg, K9IKZ, IL, (708) 773-3583 (h), FAX (708) 773-0822, (800) 279-8324 (w), rstein@interaccess.com

WANTED: Need to locate a PTO for an R389, to be used for restoration and ER historical article. Will purchase entire parts unit. Ray, N0DMS, Box 582, Pine, CO 80470. (303) 838-3665. Please call collect.

WANTED: 5X42, SP400, only in very good conds. Jose Cangas, EA4JL, Contact in the States, Kurt Keller, CT (203) 431-6850

WANTED: MD-7/ARC-5 mod, less dynamotor, any conds. Ted Bracco, Quincy University, 1800 College Ave., Quincy, IL 62301. (217) 228-5213

WANTED: New subscriber to ER wants old copies to get caught up. Tex Kehler, W1ICW, RR1 Box 204C, Zephyr, TX 76890. (915) 985-3925

WANTED: 3 windcups for windometer, about 4" dia. W6CAS, 1501 Sherwood Ave., Sacramento, CA 95822. (916) 731-8261

WANTED: Schematic for a Hallicrafters S-38C, copy OK. Peter Doherty, W1UO, 304 Trelawney Ln., Apex, NC 27502. (919) 387-9323

WANTED: Cabinet for 32V-2; schematic/parts list for Heathkit IM-2212 multimeter. Mark S. Rauber, POB 1077, Minden, NV 89423. (702) 782-3596

WANTED: Collins 75A1's, 75A2's, 75A3's, 75A4's, or accessories (spkrs, filters, knobs, station consoles, etc.) Bob Kemp, POB 470, Lake City, MN 55041. (612) 345-5345, days

WANTED: BC-474; BC-223; #19Mk2 or Mk3. Mack Lester, POB 149, Lewisville, AR 71845. (501) 921-5874

WANTED: Help! A Johnson Ranger needs to get back on the air. I am in need of a replacement mode switch. Tim, WB1EXG, MA, (617) 491-4818 days

WANTED: Hammarlund HQ-150 rcvr in exc to mint conds. Rick, N6NVG, CA, (510) 687-2719.

FOR SALE: Reconditioned Hammarlund radios: HQ-110AC exc condx, w/clock - \$250; HQ-110A exc condx, no clock - \$200; HQ-105 TRC gen. coverage rcvr, 10-11 meter scrv w/spkr (S-100), CB 8 xtal switch & extra xtals & mic w/24 hr clock, exc condx - \$350; HQ-100 VG condx, no clock - \$145. All prices include shpg & manuals. Radios have been repaired & aligned & are warranted. Robert, Amateur Radio Surplus, MI, (517) 789-6721.

FOR SALE: Knight Ocean Hopper, looks as new, full coil set, manual, exc - \$200, shpd. Kim Herron, KE8NE, MI, (616) 677-3706.

FOR SALE: Heathkit phone patch - \$20; coax switch - \$15; Astron VS20M ps - \$110. **WANTED:** Knight T60. Dave, WIDWZ, MA, (508) 378-3619.

FOR SALE: Collins 32V-3, near mint - BO; B&W 5100B, restored - \$350; Motorola R-390, exc - \$300. Bill, NY, (914) 356-6553.

FOR SALE: Collins: PM-2 supplies - \$75; NIB, KWM-2/S-Line frequency dials - \$50 ea; MP-1 mobile supplies - \$50 ea; directional coupler/wattmeters (look identical to 312-B4 couplers), 100/1000 watt scales - \$40 ea; used, 4D32 tubes - \$25 ea. Derek, K16O, callbook address, CA, (916) 965-4904.

FOR SALE: Four-stamp 15ASE for long list; Heathkit HA-14 mobile HF amplifier, HP-24 AC ps, cables - \$275; new, Heath SB1000 linear, kit in unopened box - \$800; NIB, J-45 knee keys - \$25; new, Jennings vacuum variables, 7-1000 pF, 5 KV, 1/4" x 4" shaft - \$65 ea; new, unused aluminum 19" rack panels, 1-3/4" to 21" - \$2.50 to \$21; NIB, RCA 807 tubes - \$8 ea. Derek, K16O, callbook address, CA, (916) 965-4904.

FOR SALE: Clem Chase, W7JGU is seeking loving home for 100 watt 80, 40, 20 and 10 meter AM xmtr, 1949 ARRL Handbook circuits (diagrams furnished) 90% complete, w/out tubes, needs pair 807's final, 6V6 doublers, 6AG7 xtal oscillator, pair 809's modulator - \$200 firm. Clem, AZ, (520) 325-7847.

FOR SALE: ARC5/274N, private collection, T21, T22, R25, BC453, BC457, more, complete no mods, some like new; TU-5B tuning unit, orig. - \$35; Heathkit SB620 panadapter, manual - \$160; Zenith Transoceanic 3000, nice - \$95; orig. Collins manual 18051 - \$15; Heathkit HW30 (Twoer) w/manual - \$30; Philco 70 chassis - \$40; Drake T4XB, MS4 ps - \$275; R4B - \$175. G. Stevens, W0ATA, Box 704, Longmont, CO 80502, (303) 776-9036

FOR SALE: Parting HT-32A, call for info. F.W. Nicholas, W7RBF, AZ, (602) 864-9987.

FOR SALE: Parting out ATD xmtr. **WANTED:** TDO or BC-460 modulation xfmr. Steve Finelli, N3NNG, 37 Stonecroft Dr., Easton, PA 18045. (610) 252-8211

FOR SALE: McMartin AGC - \$50 + shpg. Fred, KC4MOP, MD, (301) 567-2012.

FOR SALE/TRADE: NC-173 w/spkr; 75A-2; Heath GP-II; HP-10; RX-1 w/AK-5 spkr; TX-1; SB-10; Hammarlund HQ-140X; Drake 2A & 2AQ; Johnson T-R switch. **WANTED:** Viking Courier; Select-O-Ject 72; parting HQ-140X & Drake 2-B. Al Culbert, K0AL, 328 Norman Dr., Cedar Rapids, IA 52402. (319) 377-4367

FOR SALE: TMC FFR rcvr, 4 plug-ins, book - \$165; Forest Service 1940s SPF portable HF radio, w/pack box - \$100; TCS-13 rcvr, xmtr, cables, control box, vertical mount w/base, Navy AC supply, manual copy - \$325; 872A used - \$6; 37H, 275 Ma modulation choke - \$25; TM-11-5820-358, R-390A - \$10; canabalizing; TCS rcvr/xmtr. Trades, offers? U-Ship. George, WA7HDL, ID, (208) 756-4147 after 1730 MDT.

FOR SALE: NOS 3B28 - \$15; 5894B - \$27.50; 4CX250B - \$45. **WANTED:** AN/PRC-68B. Joseph Pinner, KC5JJD, 201 Ruthwood Dr., Lafayette, LA 70503. (318) 981-7766

FOR SALE: HP606A RF sig. gen., 47 kHz to 65 MHz, xtal hetrodttne at X100 kHz & X1 MHz for calibration, also calibrated output from 1 micro volt to 3 volts to 50 ohms, w/CW & AM modulation, 0% to 100%, great for alignment, clean & working - \$155; Hickock cardmatic tube tester AN/USM-118B w/the large set of test cards, calibration cards, Zener calibration cell, good condx, operating - \$200; Heath HR-10, 10-80 meters - \$40; NC-44 rcvr - \$50; HP200AB & HP200CD sig gens running - \$45 ea; Triplett 630NA, nice - \$30. All items + shpg. Stan Krumme, K06YB, 16432 Lakemont Ln., Huntington Beach, CA 92647. (714) 841-5866

FOR SALE: BC-603 tank rcvr - \$15; HP120 scope - \$10; HP524 counter - \$20; Fluke diff. VM - \$10; Elmac mobile ps's - \$5 ea. Joe, W7EJ, AZ, (520) 886-3087.

FOR SALE: Hallicrafters radios: S-38B, VG condx, works well - \$65; S-40B VG condx, works well - \$95; S-85 VG condx, works well - \$95. All have been aligned & repaired as necessary. All prices include manuals & shpg. Kim Herron, KE8NE, MI, (616) 677-3706.

FOR SALE: RDF SRC-503-B, BC-973-B, good condx. **WANTED:** Drake 1A. Fred, W6YRM, CA, (209) 296-5990.

FOR SALE: Hallicrafter HA-1 T.O. keyer - \$100; Heath SB-630, station console - \$45; Heath XC-2 2M converter for RX-1 - \$75; D-104, new - \$50; Drake cabinet - \$8; Collins trim ring - \$10; Johnson Speed-X key - \$25; Ameco TX-62 - \$20; Ameco VFO-621 - \$20; Heath HR-10B rec - \$15; Heath HD-15 phone patch - \$15; Heath catalog, like new early 50's - \$8; Heath VTVM, (model V-6) - \$18; Granada AM, FM, SW table radio - \$50; Heath A-9C audio amp - \$35. Marty, NJ, (609) 466-4519.

WANTED: Collins radios, accessories & promotional items, coil cover, calibrator, kilocycle dial for 75A3/75A2. Brian Roberts, K9VKY, 3068 Evergreen Rd., Pittsburgh, PA 15237. (412) 931-4646

WANTED: Philmore novice xmttr 1950's parts, ps or pwr xfmr, picture dia. that shows where parts go. Larry Myers, W3MNE, 1598 Brimfield Cir., Eldersburg, MD 21784.

WANTED: 1920s & 30s QSL cards; PL-172/8295A tubes; 75 meter BC-610 coil. Marc, WC1X, 641 E. Main Rd., Middletown, RI 02842. (401) 849-8531

WANTED: Manual or copy for Heathkit SB-310 rcvr. John Keil, 4618 Norwalk St., Union City, CA 94587. (510) 471-4838

WANTED: US Navy type RBA TRF low frequency rcvr in good condx; also RBB & RBC. Peter, NY, (212) 623-9665.

WANTED: BC-683 rcvr; BC-924 xmttr; TBW HF xmttr w/ps if possible; 1954 ARRL Handbook. Steve Davis, KD2NX, 11 Vineyard Ave., N. Middletown, NJ 07734. (908) 495-2950

WANTED: Mint SX-99 w/spkr; exc S-40A; DX-60B w/narrow lighted meter; Hallicrafter, Jeunkit Hammarlund & National units, nice, no junkies please. Ron, 10701 W. 54th St., Shawnee, KS 66203. FAX (913) 268-0461

WANTED: Meissner Signal Shifter or VFO. Bill, WA4DDH, Box 646, Shrewsbury, MA 01545. (603) 425-7023

WANTED: Working meter for Ranger II. J.R. Berry, Jr, K8UGL, 2707 Vanderberg Rd., Columbus, OH 43204.

WANTED: R390A; 32V2/3; CW, AM filters for 75-A4; Navy ETN3&2, RM3&2 ratings manuals. Robert Harding, KC5LHR, 1321 Monte Largo Dr., NE, Albuquerque, NM 87112. (505) 291-0950

WANTED: Modules 020, 021, 030 or 031 for HP 5328A; modules 3302A, 3304A or 3305A for HP3300A. Kurt H. Miska, N8WGW, MI, (810) 641-0044/1718 phone/FAX.

WANTED: WW II Japanese xmttrs & rcvrs (and parts) for restoration and ER articles, information on T1083 30's vintage British aircraft xmttr. Ken Lakin, KD6B, POB 310, 701 SE Salmon Ave., Redmond, OR 97756. (503) 923-1013, e-mail klakin@aol.com

WANTED: Copy of schematic & manual for S38E RX; Brown Brothers straight key. Gary Wagner, K3OMI, 11124 Oak Hollow Rd., Knoxville, TN 37932. (615) 690-4217, days, M-F.

WANTED: Modulation xfmr. All inquiries welcome. Randy Starace, KE7TV, Custom Sound & Video, 2350 W. Mission Ln. #7, Phoenix, AZ 85021. (602) 841-2645 (w), 371-0522 FAX at wk, 482-6565 (h).

WANTED: HI-FI & guitar amps (tube-type); Eico, Fender, Fisher & output xfms. Franklin Albanese, 1610 Prince St. #6, Berkeley, CA 94703. (510) 845-2625

WANTED: Cheap but usable, Hallicrafters SX146. Bill, KA9CWK, 4146 S. Goff Rd., Hillsboro, IN 47949. (317) 397-3860

WANTED: National FB-7 & 1-10/A coils; National CRR scope; CRU-P rack panel. Wayne Childress, KC7KUE, 1903 Jerome Pl. #3, Helena, MT 59601. (406) 443-7255

WANTED: R-390A rcvr in good condx; modulator xfmr UTC/Stancor, CMS-3 or same as Johnson Desk Kilowatt type. P. Jay Spivack, 325 S. Washington Ave. #244, Kent, WA 98032. (203) 859-2680

WANTED: Collins 75A-1. Mike, W1JZ, MA, (508) 529-4427

WANTED: Collins 180S1 ant tuner, KWMI, priced friendly; swap back issue's of ER. Mike, MA (617) 581-5479. e-mail, mc@shore.net



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FOR SALE: Hallicrafters S-22R, cosmetically good, not working but restorable, w/schematic - \$30; HP 410B VTVM w/manual - \$25; Collins R-390A IF strip, unused w/tubes, 4 filters, schematic - \$75; set of connectors (m-f) for R-390A IF strip - \$10; pair of Eimac SK610A sockets & SK606 chimneys for 4CX250B, etc., mounted on subchassis - \$40 + shpg. Keith Kunde, K8KK, 8355 Dalepoint Rd., Independence, OH 44131. (216) 524-7698

FOR SALE: Collins 75A-4 #5017; KWS-1 (2) #1460 & #1527; 310-B-1; KWM-2A (round, #30,000+) w/PM-2 & winged 312B-5; National FR-59A (2); Hallicrafters SX-115 & HT-32B; HT-32A; SX-101 w/160; HT-37; Hammarlund HQ-170 w/6 & 2 meter converters; HQ-150; Gonset GSB-100; Johnson Viking II CDC; Viking II; Ranger. **WANTED:** HQ-180A. Joel Thurtell, 11803 Priscilla, Plymouth, MI 48170. (313) 454-1890 TEL/FAX

FOR SALE: Heathkit ham radio collectors guide, pictures, specs. List of all ham gear ever made - \$22, includes S & H. Marty Drift, POB 21, Blawenburg, NJ 08504.

FOR SALE: HP-606A sig. gen. good condx - \$180. Victor, KE6VHI, CA, (805) 581-5317

FOR SALE: Fan bracket for KWM-2/32S-7 lowers the internal temp 20 deg.C using two 60MM micro-boxer fans (ER #71). Drop-in, no mods - \$15; replica Ocean Hopper front panels - \$20. All \$ ppd. DWI Engineering, POB 3611, Costa Mesa, CA 92628-3611.

FOR SALE: Hallicrafters S-20 rcvr, good; SX-25 good condx; S-36A, military manual, very good condx. Fred Clinger, W8BKJ, OH, (419) 468-6117, after 6 PM EST.

FOR SALE: Good used 810s - \$55 ea. Don Gies, K4GJT, Box 2790, Rt.2, Melrose, FL 32666. (904) 475-3306

FOR SALE: Hallicrafters SX96 & R46B, mint condx - \$200; SX43 & R42B, fair condx - \$100; Heathkit DX100 (early model), exc condx - \$115; Heath Q-multiplier; National NC188, good cosmetics but not working - \$40; Clegg 99er, exc condx - \$50. John, AE4EN, 2859 Scotts Hill Loop Rd., Wilmington, NC 28405. (910) 686-4236 daytime.

BUY/SALE/TRADE: Collins 32S-3DX Engineering speech processor & Turner (SM-1) (no base) mic for KWM-2 DX Engineering speech processor. **WANTED:** Mint Astatic mic stand model T-UP9; switch for KWM-2 NB 136B-2, case or complete 302C-3 watt meter; 399B-4/5 novice adapters; 399C-1 or 312B-5 ext.VFO. Dale, WA7GMY, WA, (206) 391-2328 or 1995 CB.

Please remember to count the words in your ad. If you are over 20 words, please send 20 cents for each extra word.

FOR SALE: Military electronic & test equipment Buy/Sale/Trade. URM-127 audio generator, 20 Hz-200 kHz, 10V p-p checked - \$45; URA-17 teletype converters, unchecked - \$20; R1051, 1051B, 2-30 MHz, all mode rcvr, checked - \$295; R1051G current, fully synthesized, Collins mech filters, guaranteed - \$800; resistor decades .1-100M ohm, 2 watt selector type in water tight box, checked - \$25; Tektronix 7B53N scope plus in functional check - \$35; PRC-77 RX/TX manpacks 30-75 MHz w/ant, batt box, handset, checked - \$295; WLR-6 HF 6' tall, 8' wide, small digital readout, Collins mech filters, AM, FM, USB, LSB, CW, 1 microvolt sensitivity, checked - \$295. Will have a big display at the Virginia hamfest. Tony Snider, 512 Princess Anne Rd., Virginia Beach, VA 23457. (804) 721-7129, 426-6454

FOR SALE: NC125 w/orig. manual, exc - \$110; SW54, exc - \$85; 75A2 w/orig. manual, good - \$300; projects: Scott SLRM - \$125; Swan 250, VT2 & 117 ps - \$195; HX11 - \$35; NC125 - \$45; S85 - \$35. Frederick L. Watson, KB8NRF, 581 W. Summit St., POB 58, McClure, OH 43534. (419) 748-8798

FOR SALE: Manuals, (copies): Ocean Hopper - \$7.50; DX20, DX40, HR10B, HW29 - \$10 ea. LSASE (2-stamps) for complete list. David Crowell, KA1EDP, 40 Briarwood Rd., N. Scituate, RI 02857-2805.

FOR SALE: Rascal MA79 xmtr drive unit, 1.5 to 30 MHz, SSB/DSB/CW/FSK, ex British Government, matches the RA17 rcvr, 19" rack mounting, all tube, diecast chassis, very good condx - \$450; Rascal TA83, 500 watt SSB/CW tube xmtr, 3 to 15 MHz, unused & mint, stored since the 70's - \$3500; Rascal TA127 1 KW tube xmtr, 1.5 to 25 MHz continuous, very good condx & very rare - \$3750. **WANTED:** RTTY 1200 series terminal & tuning units made by Frederick Electronics/Plantronics; Siemens T100 teleprinter spares & tools. Nigel, AD4AG, GA, (404) 255-6790 ext 252 (w), 949-1097 (h)

FOR SALE: Hallicrafters SX115 w/manual, outstanding, condx 8, new tubes w/R44 spkr - \$500. PU or you pack & ship. Bob McElroy, N4XFH, 136 River Hills Ln., Macon, GA 31211.

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