

THE HOLLOW STATE NEWSLETTER

SELECTED REPRINTS FROM NUMBERS 1-4

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EDITOR'S CORNER

The Hollow State Newsletter (hereafter abbreviated *HSN*), founded by T. J. Skip Arey, WB2GHA, was originally called The R390 Users Group, A Newsletter For URR Users. The first four issues appeared in the spring, summer, fall, and winter of 1983. Because those back issues have been sold out, your publisher and editor have considered the options of reprinting the original issues, or selecting parts which seem to be of lasting value and interest. We have chosen the latter. Previous issues contained what might be regarded as incorrect or misleading information, which we will seek to correct. However, it should be emphasized that those errors were not deliberate, but rather the well-intentioned efforts of subscribers to share their information and knowledge. Also, please bear in mind that one person's "correct" may be another person's "incorrect," or even a matter of personal opinion. Because of our six page limit per reprint, it is unfortunate that some contributions from *HSN* 1-4 could not be included. Prices, such as for tubes below, have been updated, but it is still prudent to write for current prices and availability.

SHORT CONTRIBUTIONS

R-390A TUBES: The 3TF7 tube near the front of the R-390A IF subchassis (usually denoted RT-510 on the subchassis) was originally thought to be generally unavailable. Although expensive at \$10-15 each, several suppliers are now known, and current issues of *HSN* keep subscribers informed of prices and availability. Newly manufactured 3TF7's are available again at \$39 (!). The 26Z5W tube was also thought to be generally unavailable, but again several suppliers are now known, currently about \$5 each. All other R-390A tubes are currently available for about \$2 each. (Dallas Lankford)

R-390A AUDIO MOD: For increased audio gain, place a jumper from pin 6 to pin 8 on the rear terminal strip. (Jim Herkimer) Sometimes there may be no increased audio gain

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with the previous mod. In that case, try jumping pins 1, 2, 3, and 4 together. (Walter Schivo)

TOOLS: A neophyte who doesn't recognize that all of the set screws and socket head screws throughout an R-390A are multiple spline (also known as fluted Bristol) may strip one or more of these next to impossible obtain items. The military manuals call for a fluted #8 Bristo [sic] wrench, which is not how the wrench is described in current catalogs. The military also seems to have misspelled Bristol throughout its manuals. The equivalent wrench in current terminology is a 0.096" Bristol 6-flute wrench (also called a screwdriver). Xcelite makes a good insertable tip (model 99-66) for use with various handles (the model 99-1 regular handle is suitable). I would also recommend the 4" extension (model 99-X5) which is especially useful for removing some front panel knobs. One of my R-390A's included a few sockets which required the 0.111" tip (model 99-67). If you do much work on military equipment it is worthwhile to get a complete set of spline wrenches, such as the Xcelite 99-PS-60. General Cement also makes a set of small, L-shaped, spline key wrenches, GC catalog # 5070 (they don't sell directly to individuals, so you will probably have to order them through your local electronics distributor). You will also need good quality Phillips head screwdrivers in head sizes #1 and #2. If you ever need to remove the RF subchassis, you will require a long blade (8-10") #2 Phillips screwdriver, such as Sears # 9 41296 A WF. (Even with a long blade Phillips, to get its tip onto one of the RF subchassis rear green quick release screws you will have to remove many, but not all, screws from the rear panel, loosen some of the remaining rear panel screws, and tilt the top of the rear panel backward slightly.) I have found the Sears Craftsman # 9 43441 10-piece combination ignition wrench set very useful for the many small nuts in the R-390A. (Dallas Lankford)

DETACHED FERRITE CORES: Has one of your ferrite cores ever fallen off its rod? If it does, remove the bracket by taking out the two Phillips head screws, remove the spline socket head screw with attached wire spring, put a small amount of epoxy glue on the end of the spring which was previously inserted into the the ferrite core, reinsert that end into the ferrite core, wait until the glue sets, remove the ferrite core, re-assemble, and re-peak that coil. (Wayne Heinen) [If glue accidentally gets onto the inside wall of the coil form, or the wire spring does not re-insert fully, you may have a mess. So you may wish to use a wood toothpick to remove the ferrite core (be gentle!) and do the gluing externally. Fast drying epoxy glue sometimes has disadvantages. The wire spring is generally coated with old glue and embedded ferrite so that it can barely be reinserted. When glue is applied, it may be impossible to reinsert the spring completely, and with fast drying glue the mistake may be permanent. I suggest either completely removing the old glue from the wire spring, or at least cutting some small notches so that surplus glue can be expelled from the hole as the wire spring is reinserted. Ed.]

R-390A TUBE SHIELDS: All of the tube shields may be removed for improved cooling performance and tube life. I have no problems here running 300 watts. (Chris Hansen) One manual states that all tube shields may be removed except the voltage regulator, PTO, BFO, RF amp, and three mixer tubes. But I have temporarily removed them all, too, with no noticeable problems. (Dallas Lankford)

R-390A SSB MOD: H. Cornelius has written that a major reason for poor SSB performance is inadequate AGC voltage which fails to keep SSB signal levels at the diode detector below the BFO signal level, thus causing severe distortion on strong signals. This mod increases AGC voltage and shortens attack time, which frequently improves SSB and RTTY performance. (1) remove the IF subchassis, (2) remove R-545 (100K), (3) install a diode (1N914/1N34/1N60/1N4148) in place of R546 (180K) with the cathode (band) facing the tube socket, (4) replace R547 (220K) with a 10K 1/2W, (5) examine R504, if it is not 560 ohms, replace it with that value (this was a production change in some models), (6) replace the IF subchassis, (7) re-align the BANDWIDTH and BFO PITCH

knobs. (anonymous) [This mod does not improve the SSB on some early R-390A's. Before you try the mod, remove the IF transformer shields and examine the Q-spoiling resistors inside the shields which are in parallel with the inputs and outputs of the IF transformer coils. If the resistors in the two T501/T502 cans are 39K, and in T503 is 68K, the mod should work, while if the resistors are 47K and 82K respectively, the mod probably will not work. Replacing the 47K and 82K resistors with 39K and 68K respectively did not help in my experience, suggesting that early IF transformer coils may have different turns ratios and/or couplings from later models. A before-after sketch of this mod is in *HSN* 10. Ed.]

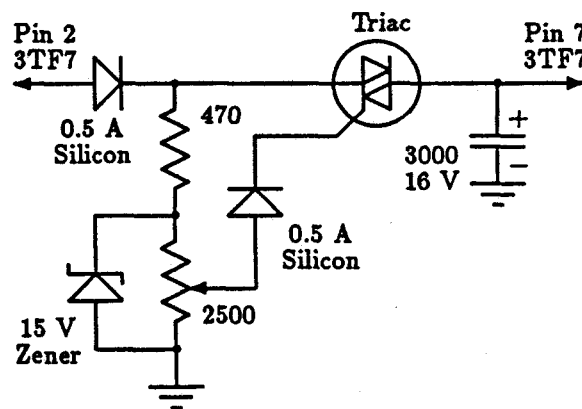
/URR MANUALS: The following manuals were available from the U. S. Army A. G. Publication Center, 1655 Woodson Road, St. Louis, MO 63114. Write for current prices. (1) R-389: (A) technical manual, TM-11-855, (B) TM-11-5820-36-24P (see note (i) below), (C) changes 3, 5, and 6, TM-11-5820-36-24P, C3, 5, and 6, (2) R-390A: (A) Field And Depot Maintenance Manual, TM-11-5820-385-35, (B) Operators Manual, TM-11-5820-385-10, (C) Organizational Maintenance Manual, TM-11-5820-385-20, (D) TM-11-5820-385-34P (see note (i) below), (E) TM-11-5820-385-20P (see note (ii) below), (3) R-392: (A) operators manual, TM-11-5820-334-10, (B) installation and 2nd echelon maintenance manual, TM-11-5820-334-20, (C) TM-11-5820-334-34P (see note (i) below), (D) TM-11-5820-334-20P (see note (i) below), Note (i): direct support and general support maintenance repair and special tools list. Note (ii): organizational maintenance repair parts and special tools list. The following manuals were available from the Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA 19120. R-390A: (A) operation and maintenance manual 096-LP-063-2010, (B) change 2/18/72 0967-LP-063-2011, (C-E) -2012, -2013, -2014. (Phil Bytheway) [Exact titles of manuals above are capitalized in the cases where I could double check them. For the Army R-390A manuals (D) and (E) above, I have the exact titles, but omitted them because those manuals consist mainly of pictures and parts lists, and so are not generally useful. I have an R-390A Navy manual which may be different from above: Operation, Maintenance And Installation Instructions With Parts List, Radio Receiver R-390A/URR, Technical Manual, NAVSHIPS 0967-063-2100, 15 April 1970. Ed.] To obtain manuals through the above sources requires approval of the proponent agency, e.g., Naval Electronics System Command, Technical Publications Branch, and release policies have tightened up considerably. (Bill Neil) [My experiences in 1982 agree with Bill's. Policies do change, however, so those needing manuals might try again. Handwritten letters on cheap notebook paper will probably get no results. A typed letter with a company letterhead and envelope, and a legitimate need for the manual(s) may give good results. Ed.]

R-390A POWER SUPPLY MOD: If this mod has been done in your R-390A, it deserves your attention. My most recent manual (1970) describes the solid state conversion without a dropping resistor. However, the diodes increase the B+ voltage from about 240 VDC (with the 26Z5W rectifier tubes) to about 270 VDC (with the diodes). [These voltage values are incorrect, and merely reproduce another person's mistake. Ed.] If a dropping resistor is not used to bring the B+ down to 240 VDC, the 6AK6 line and local AF output tubes will operate beyond their maximum ratings, causing excessive tube failures and possible damage to associated components. So R-390A users should check out their power supply. (Dallas Lankford) [Originally this contribution was much longer, with details about how to convert the power supply to solid state, replacing the 26Z5W tubes with 1000 PIV, 1 A or better diodes. This conversion was thought to be needed because 26Z5W tubes were thought to be generally unavailable. I have subsequently unmodified my R-390A's back to their original condition, and use 26Z5W tubes. However, I have retained a dropping resistor (currently 75 ohms) because measurement showed that B+ was about 265 VDC with the 26Z5W's alone. Measurement with the diode mod and no dropping resistor was a whopping 290 VDC. Voltages in an R-390A also depend on the strength of a received signal, and on the FUNCTION switch setting, STAND BY / AGC / MGC / CAL. Manual

B+ and tube pin voltages seem to be for AGC (FUNCTION) with no antenna attached and no signal received. Ed.] If you do convert your power supply to solid state, you might want to use 2000 V, 2 A diodes. The 1000 V, 1 A diodes sometimes go "pop." (Dick Walser) [This sounds like a good idea. Unfortunately, none of the electronics suppliers in my area can obtain 2000 V, 2 A diodes, even through their catalogs. The 1000 V, 1 A diodes worked fine in one of my units for two years. Maybe it depends on the brand of diode. For example, my electrical engineering friends are suspicious of all Radio Shack semiconductors. Ed.]

3TF7 PURPOSE: There is one reason why you should *not* remove and/or modify the 3TF7 tube even if they cost a small fortune. Ballast tubes function as an automatic rheostat which keeps a constant current to the BFO and PTO tube filaments, even if there is a line voltage surge or drop. Unfortunately a simple resistor will not perform this function. (Steve Bohac) [A local ham, who is also a professor of electrical engineering, told me that ballast tube replacement is indeed risky. In some receivers, if the ballast tube is replaced by only a resistor, even turning on or off the lights in your house or apartment can cause a noticeable frequency shift, which is certainly undesirable for CW and SSB reception. Despite these potential problems, the high cost of new 3TF7's and scarcity of reasonably priced surplus 3TF7's makes substitutes, including less than desirable substitutes, an important topic for R-390(A) users, see the following. Ed.]

3TF7 SUBSTITUTES: The 3TF7 is used as a ballast tube in both the R-390 and R-390A, and the following three substitutes work for both receivers. (1) Remove the 3TF7 and plug a 42 ohm 5 watt resistor into pins 2 and 7 of the 3TF7 socket. [This is a quick temporary fix in case you don't have a spare 3TF7 on hand. Ed.] (2) Replace V508 and V701 (PTO and BFO tubes) with 12BA6's, remove the 3TF7, and plug a short wire jumper into pins 2 and 7 of the 3TF7 socket. [This mod draws less current than the original circuit, which may have a beneficial effect on PTO and BFO frequency stability. Ed.] (3) Build a triac regulator, such as the one at right, which can be plugged into pins 2 and 7 of the 3TF7 socket. The diodes are 100 V, 0.5 A, and the zener is 14-15 V. Ground the regulator circuit to one of the tube mounting screws. Adjust the pot for 12.6 VDC at 3TF7 pin 7. (anonymous)



600-8 OHM KLUDGE: If you are having difficulty getting good audio from an 8 ohm speaker because the government in its infinite wisdom chose another impedance, try a 115 V to 12 V power supply transformer, such as Radio Shack part #273-1385, current price \$3.29. Connect the primary (black) wires to your receiver and the secondary (red) wires to your 8 ohm speaker. (Skip Arey)

UG-421/U: The UG-421/U connector plug, the one for the R-390A balanced antenna inout, is available from Amphenol under the part number KS 16288L2. (Paul Gunn)

BC-453: Some of the fine old tube receivers can be found wanting in the area of IF selectivity. A cheap way of solving this problem is the BC-453. This is a WW-II aircraft receiver which tunes 190-550 khz, and so it can be used as a selective IF for any receiver whose IF is in that frequency range. The R-11A is a similar receiver which can also be used for this purpose. Both of these receivers are frequently available from Fair Radio for about \$15 plus shipping. They are not for the faint of heart, as you will need to construct a power supply for 12, 24, and 250 VDC. Once you get this little box cooking you can either inductively couple it to your main receiver or use a piece of coax with the shield

connected to the case of both the BC-453 and your receiver, and one end of the center conductor of the coax connected the antenna post of the BC-453 with the other end of the center conductor wrapped a few times around the plate pin of the first IF amplifier tube. You will have to experiment with the degree of coupling between the two. Some folks say the BC-453 works best with the plungers of its IF cans turned all the way out. More information on the Q5er, as it is called, can be obtained in many old ham magazines written before 1965 or so. I found my Q5er with power supply at a ham fest for \$5. (Skip Arey)

ADDRESSES: Fair Radio Sales, 1016 E. Eureka, Box 1105, Lima, OH 45802 has consistently been one of the best suppliers of /URR equipment and supplies for many years. Their catalog is free, and if you purchase from them regularly, they send you catalog supplements and a new catalog each year. Davilyn Corp., 13406 Saticoy St., North Hollywood, CA 91605 has a flashy catalog for \$2. Their prices are somewhat higher than Fair's, but they have some items which are not available elsewhere. For plugs and connectors, try Kings Electronic Co., Inc., Marbledale Rd., Tuckahoe, NY 10707, Colonel Wayne Russell, 9410 Walhampton Dr., Louisville, KY 40222, or The RF Connection, 11707 Judy Place, Potomac, MD 20854. Colonel Russell also has a good supply of /URR manuals. For tubes, my favorite is Daily Electronics (who bought out D. R. P. Electronics), P. O. Box 5029, Compton, CA 90224. Send them an SASE with a list of the tubes you want, and they will quote you a price for each. Include \$2.50 for shipping and handling with each order. They do not have a catalog. Two other highly recommended tube suppliers are RF Gain, Lt., 100 Merrick Rd., Rockville Centre, NY 11570 and Don Skinner, WA8BIE, RFD 1, New Carlisle, OH 45344. For the rare 3TF7 you might also try Gerber Electronics, 128 Carnegie Row, Norwood, MA 02062. (courtesy of your Ed. and HSN subscribers)

THE R-390A ON LONG WAVE — CHEAPLY

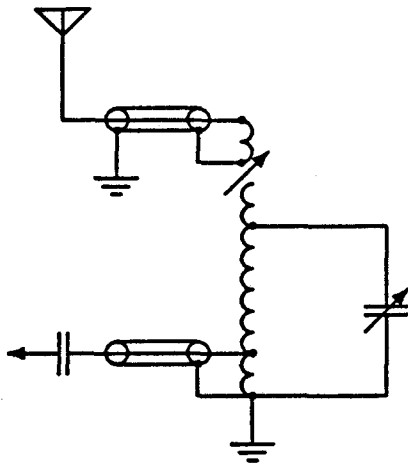
Craig Healy

The R-390A is a fine receiver, and many of us are quite familiar with it. A major drawback is that it doesn't tune below 500 khz. Or does it? A look at the schematic shows that the local oscillator in the 500-1000 khz range does indeed track from 500 down to 0 khz. Working backwards from the first mixer we find the first and only bottleneck. The antenna coils and RF amplifier tuned circuits are the culprits. They stop at 500 khz and go no lower.

As an experiment, I removed the top covers from my R-390A and coupled a longwire antenna through a 0.05 mf capacitor to "test point E-209." This is easily accessible from the top, and is found just in front of V202, the first mixer. Voila! Most of my strong local LW stations were heard, along with an assortment of BCB spurs, IM products, and other electronic garbage. The spurious responses were to be expected because there was no tuned circuit between the antenna and first mixer. Next came some preselection in the form of a ferrite loop antenna. The loop output was connected to E-209 with a piece of small coax and the 0.05 mf capacitor. This gave greatly improved results. There were very few BCB spurs, and an improvement in sensitivity. Apparently the loop compensated for much of the lost R-390A RF amplifier.

A variation of the first experiment gave better results, practically equaling the performance of a Drake R-7A used for comparison. An old coil from a 1939 vintage RCA BCB transmitter [model number? Ed.] was found in the junk box. This is a large coil, with 70 turns of #16 solid wire around a 6.5 inch ceramic and phenolic coil form. A smaller coil of 19 turns was mounted inside it. This small coil was rotatable to vary the coupling. Older members of our fraternity will recognize this as a variometer, common in the early days of radio, but seldom seen nowadays. In this particular unit, the coil had taps on every other turn. A 10-440 pf variable capacitor, also from the RCA transmitter, was used to resonate the circuit. The long wire antenna coax was connected to the smaller, rotatable coil, and the variable capacitor was connected to a tap about 75% up the main coil from

ground. A tap point two turns from the ground end was selected as the feed point for E-209. Optimum coupling between the small inner coil and the large outer coil varied from maximum at 200 khz and below to a very small coupling value at 400 khz. This may be more a function of the antenna I used than anything else.



Unfortunately, the 1939 RCA transmitter parts are difficult, if not impossible to find. [Fair Radio sells an RCA ET-8003 LF telegraph transmitter for \$79 which may be suitable. Ed.] Perhaps an equivalent circuit could be constructed with a ferrite toroid. A suggested schematic is given to the left. The toroid should have two windings - a main coil with taps to adjust the frequency range and feed E-209, and a second winding with taps for varying the antenna coupling. As a starting point, use turns ratios like those mentioned above. The shield of the long wire coax can be left ungrounded, only connected to the coil ground. I have experienced some noise reduction when connecting the coil and long wire coax in this manner. However, the far end of the coax should be grounded. [? Ed.] I have used an antenna tuner identical to this on the BCB with good results.

[I have not used Craig's approach to long wave reception, at least not as he intended. But after reading his most illuminating article, it occurred to me that his method could be used to convert the R-390A into a high dynamic range, precision, low frequency spectrum analyzer. For example, I had always wanted to measure the 6 and 60 db band widths and stop band of mechanical filters. A signal generator, a simple input and output impedance matching circuit using two BCB ferrite "loopstick" antennas, one stage of FET amplification between the mechanical filter and the output, and my dream came true. The output of my test circuit was fed into E-209, and the R-390A provided the relative db measurements via the carrier meter, with frequency measurements accurate to within 300 hz. A complete description of my experiments will appear in a future issue of *HSN*. Ed.]

PUBLISHER'S CORNER

It is Dallas' and my hope that all those who weren't in on the first four issues of *HSN* (a.k.a. *The R-390 User's Group*) will enjoy this compendium. We are continuing in the tradition we began almost four years ago - to publish the best information about hollow state mods, tubes, parts, and tools sources, and the very best in readers' comments, projects, and reminiscences about hollow state equipment.

A few months ago while perusing a leading communications magazine, I came across the term "hollow state" used to refer to tube type equipment. I knew then that the term, which was coined by Skip Arey, had arrived in the language when it was used with no quotes around it. If nothing else, we've added a term to the language, but more than that, we hope we have added to your knowledge and enjoyment of hollow state equipment. We also hope you will write Dallas about your construction projects, tube sources, and experiences with hollow state gear. The other 132 readers of *HSN* will be eager to read your comments.

And now the usual ... All articles and information shared through this newsletter may be reprinted only with permission of the author. The publishing committee assumes no responsibility for the accuracy or safety of untested modifications or the reliability of suppliers of materials and services mentioned in *HSN* publications. Prices quoted on the masthead apply to the USA, Canada, and Mexico (double all quoted prices for all other areas). Checks must be made payable to Chris Hansen and must be in USA funds payable in USA clearing house format. Write for an information sheet; include a SASE.

Thanks for your support. We couldn't and wouldn't do it without you.

Chris Hansen, for the staff of *HSN*

THE R390 USERS GROUP

A NEWSLETTER FOR URR USERS

Q.L. 1 NO. 1 SPRING 1983 FIRST ISSUE PUBLISHER T.J. SKIP AREY WB2GHA
A RUMOR IN ITS OWN TIME!

WELCOME to our experiment! I want to take a brief line to thank you all for your support. You have made this first issue possible. Lets get started...

From DALLAS LANKFORD comes this comment on TUBES: It is said that 26ZW5 rectifier tubes are no longer made, and I have never seen a source for them or the RT510 (3TF7 in early R-390A's) current regulator tubes. Modifying the power supply to solid state solves the rectifier tube problem, while the RT510 may be removed and a 42 ohm 5 watt resistor "plugged into" pins 2 and 7 of the tube socket. The 6AK6 line AF output and local AF output tubes seem scarce, with ETCO Electronics, North Country Shopping Center, Rt.9 North Plattsburgh, N.Y. 12901 the only source I have found. The remaining R-390 tubes are easier to find, but Radio Shack and other retail prices are high. Two other reasonably priced tube source are EDLIE Electronics, 2700 Hempstead Turnpike, Levittown, Long Island, N.Y. 11756 and Translectronic, Inc. 1365 39th St., Brooklyn, N.Y. 11218 (in the latter case ask for both regular and industrial tube lists). (Translectronic has a toll free number 800-221-5802 and a minimum order of \$25.00 so get together with someone on your tube purchases through the R-390 Users Group Newsletter. SKIP) NEAL PERDUE warns that one should be cautious choosing a modification to replace the 3TF7 tube. It appears that some methods are better then others. Watch these pages for a source for this tube in a future issue. Also keep an eye out for tube modifications down the road.

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SALES DEPARTMENT Some people actually sells these rigs ya know.
R390A (serial #1074) is up for sale by KEN ROMSTADT 2541 Schroeder Ct., Toledo OH 43613 phone 419-475-3089 He's asking \$350 or trade for solid state receiver
R-388 can be had from TONY BRATTON 423 Summit St. Marquette, MI 49855

R390A (serial #37) with manuals and CV591A SSB converter. is available from WBOMIX, Rt 2 Box 357, Willow Springs, MO 65793 phone 417-469-3370 for \$450 plus you provide the shipping.(from March 1983 QST)

SPEAKING OF SHIPPING: Anyone with creative ideas on how to move one of our beloved URRs with no damage to either rig or owner might write up their ideas for this newsletter.

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CRIS HANSEN'S Bronx NY apartment was once stripped by burglars who took everything but his R-390A. What burglar in his right mind would try???

PUBLISHING DATE ON ISSUE TWO IS THE SECOND WEEK IN JUNE. SEND IN YOUR ARTICALS
This is a USERS GROUP and your contributions will keep this newsletter helpful informative, thought provoking and most of all regularly published.

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AS IF YOU DIDN'T KNOW: A excellent source for almost anything for the R-390 and its kin is FAIR RADIO SALES, 1016 E. EUREKA, BOX 1105, LIMA, OHIO 45802 phone: 419-227-6573. They are currently listing the R-388 for \$265 used and \$330 checked. There is no truth to the rumor that I bow toward Lima five times a day. They are also a source for the hard to find connectors used on URR equipment. I spoke with them recently about our users group and they said they would keep me posted on any new stock of receivers and related items.

MODIFICATIONS: JIM HERKIMER writes that he uses a modification suggested by ED SHAW for increased audio gain. Jim has placed a jumper across pins 6 and 8 on the terminal strip on the back of the R-390A. (It works great. SKIP) Jim also says he experiences slightly higher gain using the unbalanced antenna input as opposed to the balanced input.

DALLAS LANKFORD found that drift can be reduced in the R-390A by changing the temperature compensating capacitors (10pf N450 and 10pf N1000) to NPO zero temperature coefficient units rated at 20pf. That's capacitors C702 and C703 by the way.

Ever have a tuning core fall off its rod? WAYNE HEINEN solved this problem as follows. He removed the adjustment screw from the bracket by taking out the two phillips head screws, removed the bracket, and unscrewed the adjusting screw all the way out. He took a small amount of epoxy and put it on the end of the adjustment screw and jammed it into the hole in the ferrite rod. He then waited 15 minutes and then found that the adjustment screw with the rod firmly attached came right out. Wayne then carefully re-screwed the adjustment screw with the ferrite rod attached back into the mounting bracket and aligned the adjustment screw bracket with the tuning bracket, inserted the phillips head screws and proceeded with the normal peaking procedure.

CHRIS HANSEN suggests that you remove all of the tube shields for improved cooling performance. Has anyone who has performed this modification run into any problems? I am thinking especially of any ham who might be operating in conjunction with a high powered transmitter. I have had no problems here running three hundred watts.

The H. CORNELIUS pathway to improved SSB performance on the R390A. The major reason for poor SSB performance of the R390A is inadequate automatic gain control (AGC) which fails to keep SSB signal strength at the diode detector below the level of the BFO, thus causing severe distortion on strong signals. The changes listed below increase AGC action and greatly shorten the attack time. The end result is greatly reduced distortion on SSB and a somewhat better RATT performance. This modification should take 30-40 minutes.

1. Remove IF subchassis. 2. Install a diode (1N34/1N60/1N914/1N4148) in place of R546 (180K), with diode cathode facing the tube socket. 3. Remove R545 (100 resistor. 4. Replace R547 (220K) with a 10K resistor. 5. Examine R504. If it is not 560 ohms, change it to that value. (This was a production change in some models). 6. Replace the IF subchassis; realign the BANDWIDTH and BFO-PITCH knobs. If you happen to have a few 6AU6 tubes around the shack you might do the following while your in there. 7. Connect a DC voltmeter to read AGC voltage (negative lead to terminals 3/4 of TB102 on rear panel, positive lead to ground). 8. Tune a steady signal, such as a calibrate marker. 9. Try various 6AU6 tubes as V508 and select the one giving the highest meter reading. 10. Connect a DC voltmeter to read detector voltage (negative lead to terminals 14/15 of TB103 on rear panel, positive lead to ground). 11 Try various 6AU6 tubes as V505 and select the one giving the highest meter reading. 12. As a final adjustment, the GAIN ADJ. control on the IF subchassis should be set for the least usable gain. Too high a setting increases distortion and produces high AGC voltage, which, applied to the front end of the receiver, decreases the signal-to-noise ratio.

DO YOU KNOW OF A MODIFICATION OR PRODUCTION CHANGE ON URR EQUIPMENT? SHARE IT THROUGH THE PAGES OF THIS NEWSLETTER. EVEN IF IT IS COMMON KNOWLEDGE TO YOU IT MIGHT BE A NEW IDEA FOR SOMEONE ELSE. WRITING FOR THE R390 USERS GROUP IS THE EASIEST WAY IN THE WORLD TO ADD THE TITLE OF TECHNICAL WRITER TO YOUR RESUME.

Your most dedicated and humble publisher has a NEW PHONE NUMBER 609-877-5302 Please use this number for all calls because my old number belongs to my mother-in law. She will throw us out if she gets late night calls and then might have to move my R390A and you know how hard that is.

+ + + + +
What has seventeen dials, two meters and is loads of fun to carry around?
Answer: If you don't know you are subscribing to the wrong newsletter!

ITS REALLY A PORTABLE, IT EVEN HAS HANDLES. this one via JOHN COHEN.

MANUALS: Many of our newsletter mavens have volunteered to provide photocopies of the various manuals for our equipment. From time to time I will include these names in the newsletter. But our inaugural issue deserves nothing less than PHIL BYTHEWAY'S list of military manual services. PHIL finds that the best source for manuals is that depository of tax dollars, the US MILITARY. It seems the services will reproduce our much needed manuals at the rate of 2¢ per page plus two dollars shipping and handling. Manuals for ARMY issue gear can be purchased from the U.S. ARMY ADJUTANT GENERAL PUBLICATIONS CENTER, 1655 WOODSON ROAD, ST. LOUIS, MO 63114. Manuals and prices are as follows.

- R-389 TM 11-855 (\$1.45) Technical Manual
- 11-5820-36-24P (.57) *
- C3,5&6 (.78) Changes 3,5+6
- R-390A TM11-5820-358-35. (\$1.89) Maintenance Manual
- 10 (.39) Operators Manual
- 20 (?)
- 20P (.36) **
- 34P (.96) *
- R-392 TM 11-5820-334-ESC (?)
- 10 (?) Operators Manual
- 20 (.39) Intallation & 2nd eschelon maintenance
- 20P (.40) **
- 34P (.88) *

* Direct support and general support maintenance repair parts and special tool lists.

** Organizational maintenance repair parts and special tools lists

Whats the matter bunky? Ya say yer radio was honorably discharged from the NAVY? the write to the NAVAL PUBLICATIONS & FORMS CENTER, 5801 TABOR AVE. PHILADELPHIA, PA 19120

- R-390A 0967-LP-063-2010 Operation, Maintenance
- 2011 Change 2/18/72
- 2012 (\$3.51)
- 2013
- 2014

PHIL says that you may only purchase one copy of each of these manuals per person.

JOHN KAPINOS has found out that the U.S. ARMY is not deactivating the R-390A's due to bugetary limitations.

DAVE SCHMIDT tells me that every now and again URR gear can be found amongst the junk "lots" auctioned off through the Defense Department Surplus Sale Cataloge. These lots are sold for scrap and go for very low bids but one lot he knew of contained 2 R390As(be still my beating heart)I will get in touc with DAVE to find out more for a future issue.

Contrary to popular belief you do not tell the Army equipment form the Navy equipment by their tatoos.

WANTED: PHIL BYTHEWAY 9705 Mary NW, Seattle Wash. 98117 is looking for a VFO for an R-389.

YOUR PUBLISHER, 104 West Franklin Ave. Edgewater Park, N.J. 08010 is looking for any information on the SB-8a Type T-200 Panalyzor. US Army Signal Corps issue Panadaptor. It looks great in the rack over the R-390A but I'm lost as to how to resore it. CAUTION*** Anyone planning to purchase one of these panadaptors be advised that the power supply is a seperate outboard unit. Don get one without the other.

EVERYONE is looking for sources for tubes parts and racks. Please share your sources through our newsletter.

We will be looking for a group rate on trusses for subscribers who live in second floor apartments.

+ + + + +
Look at it this way. If I use up all the jokes in issue one you wont have to read them in future issues. Unless, of course, you provide some.

ARTICALS WANTED: There are a few ideas for articals that come to mind through the correspondence leading up to this premiere issue. For instance. FREQUENCY COUNTERS: While the mechanical readouts are without compare, has anyone out in newsletter land investigated the possibility of interfacing a frequency counter with URR equipment. ANTENNAS: What works for you and your receiver. PRESELECTORS AND PREAMPS: Many people out there are using them, tell us what kind and how you think it stacks up in signal improvement. SPEAKERS and other audio support gear such as active filters etc. NOTCH FILTERS: has anyone thought of adding an RF notch filter to the R-390? Write up your ideas on these things and anything else about modification and improvment and share it in the newsletter. This project could end in its first year if we don't all do our part to fill these pages with information. Keep those cards, letters and schematics coming folks.

+++++
This might be a good place to give a plug to those who gave our effort its initial advertizing. NATIONAL RADIO CLUB, NORTH AMERICAN SHORT WAVE ASSOCIATION SPEEDX, GLEN HAUSER'S WORLD OF RADIO PROGRAM AND ALL OF YOU WHO TOOK THE TIME TO SHARE THE INITIAL MAILING WITH OTHER DEDICATED LOVERS OF FINE RADIOS.

And while we are at it a list of charter members whose subscriptions served to offset the start up costs of this project. WAYNE BENKINNEY, KEN ROMSTADT, JIM HERKIMER, DALLAS LANKFORD, DICK TRUAX, NEAL PERDUE, MATT STUTTERHEIM, JOHN KAPINOS, CHUCK HUTTON, GEORGE MULFINGER, CHRIS HANSEN, RON MUSCO, BILL BAILEY, BOB BOWES, BOB MILNE, CHARLES TAYLOR, ROBERT KULOW, TOM FARMERIE, JIM PHILLIPS, ED KOWALSKI, PHIL BYTHEWAY, BILL HOPKINS, BOB LOMBARDI, AND JERRY BERG, and your humble publisher make twenty-five dedicated (read that rabid) hobbyists.

=====

I contacted ANARC (the Association of North American Radio Clubs) about affiliating our newsletter with their group. TERRY COLGAN said that a users group has never been considered. Perhaps if we called ourselves a club there would be less of a problem. He did not rule out the possibility however. The main requirement for affiliation is that the club be active for six months. I will be attending the ANARC convention as the representative of the NRC but I intend to bring the possibility of affiliating our users group at that time. If your not doing anything July 15-17 You could join me in my efforts at the convention. Also you might petition your various clubs that you belong to to gain their support in this effort. But before I climb to high on this soapbox please write and share your feelings about this with me and your fellow newsletter folks.

+++++
Many of you have sent in articals about the R-390A and R-388 That I would liek to use. The biggest problem lies in obtaining permission especially from people who have written for the commercial magazines such as HAM RADIO and CQ. Please try to write for permission to reprint these articals before they are sent to the publishing shack. This might get them into these pages much faster.

SO MUCH FOR BUSINESS: ON TO ANOTHER MODIFICATION!!! This might be a moldie oldie for some of the more experienced owners but for the rest I give you DALLAS LANKFORD and his POWER SUPPLY MODIFICATION. If this mod has been done incorrectly in your R-390A, it deserves immediate attention. My most recent manual (1970) describes the solid state conversion without the dropping resistor R (see accompaning diagram). However the diodes increase the B+ voltage from about 240 VDC (with the 26ZW5 tube rectifiers) to about 270 VDC with the diodes). If a dropping resistor is not used to bring the B+ down to 240 VDC, the 6AK6 line AF output and local AF output tubes will operate beyond their maximum ratings, with excessive tube failures and possible damage to associated componants. So any R-390A user should check out the power supply. the converted solid state power supply schematic is shown on page five. Any 1000 PIV 1 amp or better diodes are adequate (1N561, Radio Shack 278-1627, Sylvania ECG 125, etc.). For the dropping resistor I use a 25 watt power rating for better reliability and heat dissipation. Perfectionists can diddle with the value of R, but I settled on 200 ohms.

Power supply mod cont: There are several potential ways to do the mod, from as simple as soldering the diodes across pins 1 (or 6) and 3 (or 8) of the 26ZW5 sockets and remove the tubes, to as complicated as removing the tubes, sockets and their associated circuitry before adding the diodes. If the dropping resistor is to be mounted on the power supply subchassis, the latter approach would probably be used to facilitate mounting the resistor for good ventilation (the dropping resistor gets quite warm). In my opinion the preferable place to mount the dropping resistor is on the AF subchassis. B+ voltage enters the AF subchassis through pin 5 of J619 and is then routed to L601 by an insulated wire (which is part of a wiring harness). The AF chassis has a plate which covers holes in the chassis, and so is a convenient place to mount a dropping resistor. One hole is drilled for mounting R on top of the AF chassis, and one hole is drilled to bring two wires from the underside of the chassis. Cut the wire which provides B+ to L601 at pin 5 of J619, pull the wire out of the wiring harness until there is enough slack to reach one of the solder lugs on R, and solder to that lug. Remove any solder and wire or other residue from pin 5 of J619, and then solder a length of insulated wire to pin 5 which is long enough to reach the other lug of R. Be sure to save and re-use the insulating sleeve which originally insulated the pin 5 solder joint and lug. If I remember correctly, wire size is #22 stranded. Because many R-390A users will probably convert their power supplies to solid state, it would be a good idea to settle upon a standard approach. Mounting R on the AF subchassis is apparently commonly used by hams, so I have used that approach.

DALLAS also has a few words to say about TOOLS: A neophyte who doesn't recognize that all of the set screws and socket head screws throughout an R-390A are multiple spline (also known as fluted Bristol) will probably strip one or two of these impossible to obtain items. The military manuals call for a fluted no.8 Bristo (sic.) wrench, which is not how the wrench is described in current catalogs. The military also seems to have misspelled Bristol throughout their manuals. The equivalent wrench in current terminology is a ".096" Bristol 6-flute wrench (also called a screwdriver). Xcelite makes a good insertable tip (model 99-66) for use with various handles (the Xcelite model 99-1 regular handle is suitable). I would also recommend the 4" extension Xcelite model 99-X5). My R-390A also includes a few sockets which require a #11 tip (model 99-67). If you work much with military surplus equipment it would probably be worthwhile to get a complete set of spline wrenches. General Cement also makes a set of small, L-shaped, spline key wrenches, GC catalogue #5070 which includes the #8 size. (please send us the company address. Dallas, SKIP) You will also need good quality Phillips head screwdrivers in various head sizes, and I have found the Sears Craftsman #9 43441 10-piece combination ignition wrench set very useful for the many small nuts in the R-390A.

Here is another good question: What kind of lubricant do you use on the gear train of your receiver???

Well gang: there you have it. Our first issue. You made it possible and you will continue to keep this thing running with your support. If you can think of anyone else who might be interested in our group please let them know about it.

 THE R390 USERS GROUP 104 ~~West Franklin Avenue, Edgewater Park, New Jersey~~
 08010 (609) 877-5302 Publisher: T.J. Skip Arey WB2GHA
 All articles and information shared through this users group may be reprinted with the permission of the author only.
 The R390A newsletter is available at the cost of \$1.00 per issue. Back issues available of all issues through the publisher at the same cost of \$1.00 per issue. An index will be published of back issues in the first issue of future volumes.

THE NEXT PUBLISHING DATE IS THE WEEK OF JUNE 12TH. GET YOUR ARTICLES IN EARLY.

THE R390 USERS GROUP

A NEWSLETTER FOR URR USERS

VOL. 1 NO. 2

a tradition since March

PUBLISHER T.J. SKIP AREY WB2GM
TYPIST CHRIS HANSEN

HELLO AGAIN from the hub of the R390 publishing world. We are now seventy members strong. Once again thank you for the support and your continued supply of information for this exchange. Welcome our typist and staff grammarian Chris Hansen. The newsletter will be sent out from his local but please continue to direct all information, questions, threats, etc. to the publisher. In other words, don't shoot him, he's only the typist.

You will notice that we are now publishing 6 pages double-sided. This is in order to reduce shipping weight. Five pages single-side comes too darn close to turning the newsletter into a postage-due situation. Please keep sending ideas and information so that we might fill a full six pages in every issue. Next publishing session will be September 12, 1983. Support the group.

If H. CORNELIUS'S SSB modification in issue 1 was not your cup of tea you might take the advice of ROBERT ROTELLA and contact G.B. COMMUNICATIONS, 963 Birch Bay Lynden Road, Linden, WA 98264. They have developed an adapter that provides undistorted reception of SSB, CW, and RTTY -- sort of a teeny CV-157/URR. This unit mounts with no modifications to your rig, is completely solid state, and does not affect other modes of communication. It sells for \$25.00 plus 6% sales tax for WA residents. ROB is very py with his.

I received a call from KEN ROMSDAT stating that his recently acquired R390 does not operate in the lowest MHz position. Operation appears normal in all other bands. If you have any advice you might contact KEN at 2541 Schroeder Av., Toledo, OH 43613. (Typist's note: Check to see whether any of the tuning slugs have fallen off the slug rack into their transformers. ch)

PSST! HEY BUDDY! Looking for a good deal on a slightly used radio? DAVILYN CORPORATION 13406 Saticoy St., North Hollywood, CA 91605, tel. (213)787-3334/3338 has recently purchased a large quantity of R390 and R392 receivers. These rigs are guaranteed in working order and sell for \$285 for the R390 and \$250 for the R392. Go get 'em folks. Incidentally, DAVILYN is also a source for almost any surplus radio gear and assorted parts, including tubes. They do not, however, list the 3TF7 in their most recent catalog (available for \$2 at the above address). Look out, FAIR RADIO SALES. DAVILYN told me that they will soon begin advertising these rigs in popular ham radio magazines, so if you or a friend are in the market for an R390 or R392 you might want to act with some haste.

Looking for a source for coax fittings for all those plugs on the back of your URR radio?? Try KING'S ELECTRONICS CO., INC., Marbledale Road, Tuckahoe, NY 10707. I found all my connectors at ham radio flea markets. If you're not a ham, you might check QST or CQ Magazine to see when these activities are scheduled in your area. Flea markets are great sources for almost anything for your rig.

JERRY BERG tells of another source for tubes, including the much-sought-after 3TF7. BERBER ELECTRONICS, 128 Carnegie Row, Norwood, MA 02062, tel. (800)225-8290 (in MA (617)232-8100; in New England, NY, NJ (800)225-1800). The price (are you sitting down?) \$15.19 with a \$5 handling charge on orders under \$25. Your humble publisher, in concert with one of our subscribers is tracing down another source for this and many of the much-needed tubes for our beloved R390's, 392's, 390A's, et al. Watch these pages.

From CRAIG-HEALY comes this article he originally wrote for "LOWDOWN"

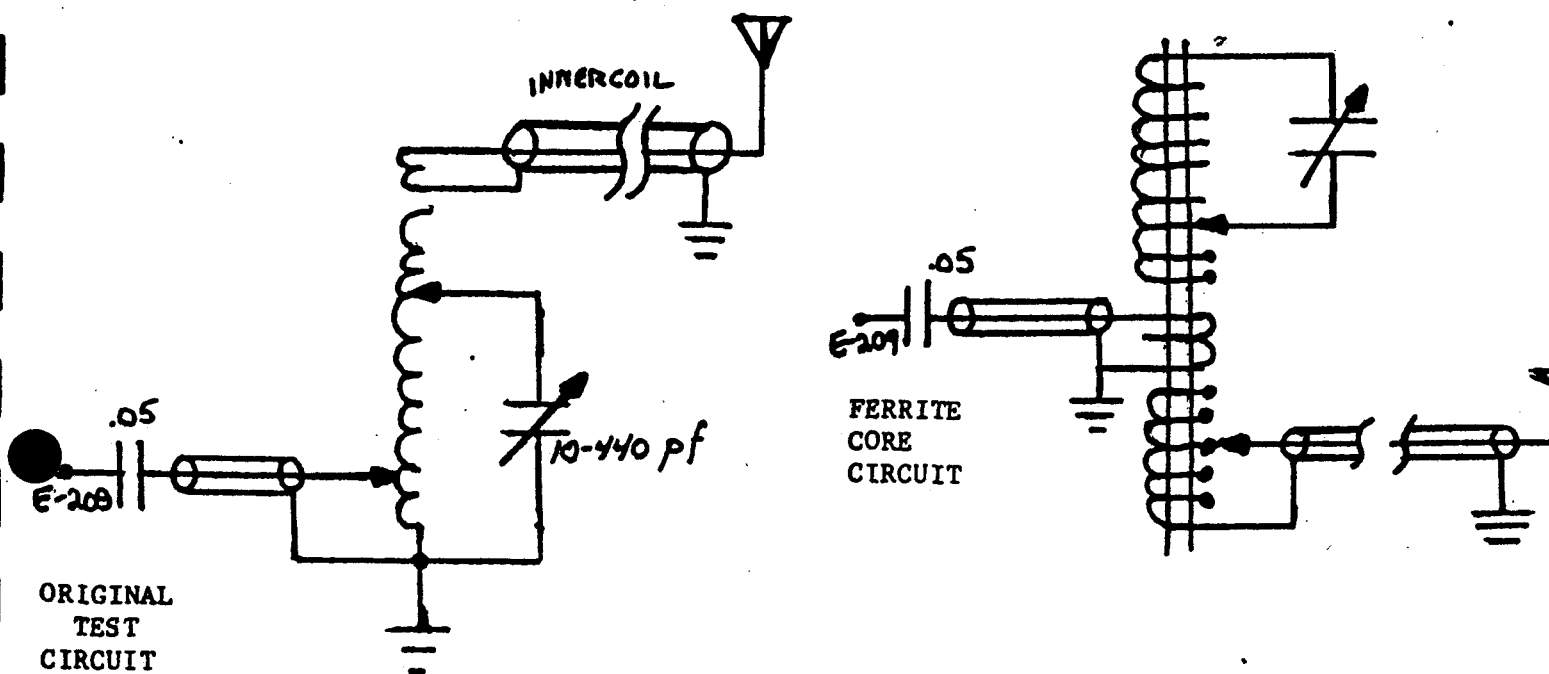
THE R390A ON LONGWAVE -- CHEAPLY

R390A is a fine radio, and most of us are quite familiar with it. A major drawback is that it doesn't tune down below 500 kHz. Or does it? A look at the schematic shows that the local oscillator in the 500-1000 kHz range does indeed track all the way down to 0 kHz. Working backwards from the first mixer we find the first, and only bottleneck. The antenna coils and RF amplifier tuned circuits are the culprits. They stop at 500 kHz and go no lower.

As an experiment I removed the top covers from my rig and coupled a longwire antenna through a .05 mf capacitor to 'test point E-209'. This is easily accessible from the top and is found right in front of V202 (6C4), the first mixer. Voila! Most of my strong local LW stations came in, along with an assortment of BCB spurs, IM products, and other electronic garbage. This comes from injecting a broad spectrum of signals to the grid of this tube.

Next came some preselection in the form of a ferrite loop antenna. The loop amplifier output was connected to E-209 with a piece of small coax cable and the .05 mf capacitor. This gave greatly improved results. Very few BCB spur troubles, and an improvement in sensitivity. The loop amp offset the loss of the R390A RF amp.

The next experiment gave the best results of all, practically equalling the performance of a Drake R7A used for comparison. An old coil from a 1939-vintage RCA BCB transmitter was recovered from the junkbox. This is a large piece, with 70 turns of #16 solid wire around a 6-1/2-inch ceramic and phenolic form. A smaller coil of 19 turns of the same type of wire is mounted inside it. This small coil is rotatable to vary the coupling between the two coils. The older members of our fraternity will recognize this as a autotransformer, common in earlier years, but seldom seen today. This particular unit has taps on every other turn on the main outer coil. It resonated nicely with a 10-440 pf capacitor, also from the RCA transmitter. The LW coax feed was hooked to the smaller, rotatable coil. One end of the main coil was grounded, along with the frame of the variable capacitor. The stator of the cap was connected to a tap about 3/4 up the main coil from ground. A tap point 2 turns up from ground was selected as the feed point for the radio. Optimum coupling between the small, inner coil and the outer coil varied from maximum at 200 kHz and below to a very small value at 400 kHz. This is probably more a function of the antenna I use than anything else.



These parts are difficult, if not impossible to get. I have no doubt that equal or better results could be had with ferrite toroids. An equivalent scheme would have a large toroid core with three windings. The first is the main tank circuit. Taps can be provided to increase the range of frequencies it will tune. The second is a link feed to the radio. The best number of turns can be experimentally determined and should remain the same over a wide range. The third is the antenna input, tapped for varying the impedance the antenna coax sees. The shield of the coax feed can be left ungrounded, only connected to the coil. I have found some noise reduction in connecting the coil across the coax in this fashion. The far end of the coax must be grounded, however. I have used an antenna tuner identical to this on the BCB with good results.

Well, what do you think of that, Campers??? Another band for your radio that you didn't even know was there. We are also looking for articles on various antenna strategies. Just what do you think is the best antenna for the greatest receivers ever made??? Write and join the contributing staff today!

!!
 STEW MAC KENZIE is looking for a source for an audio module to replace the 27A7GT tube. Anyone who knows where these can be found might share it with the group.

!!
 Whatsamatter, Bunky? Ya say ya can't get good audio response from an 8-ohm speaker because the government in its infinite wisdom chose another impedance? Well, take heart, dear friend, for all your problems can be solved by obtaining a 115-volt to 12-volt power supply transformer, available at any Radio Shack, part #273-1385, current price \$3.29. Just connect the primary (black) wires to your receiver and the secondary (red) wires to your 8-ohm speaker, and listen your little heart away.

!!
 DICK TRUAX says that a good source for hard-to-find connectors is COLONEL WAYNE RUSSELL, 9410 Walhampton Drive., Louisville, KY 40222. His list of available parts can be obtained by sending him one dollar.

 PLEASE KEEP IN MIND that we also represent the users of the R392 and similar gear. If you know of any modifications or improvements that will work on this equipment please help to see that it gets into the pages of our newsletter.

+++++
 From DICK WALSER of AIRBORNE ELECTRONICS CO. comes the recommendation that when making the power supply modification (issue #1) you might want to use 2000-volt @2 amp diodes instead of 1000-volt jobs. Dick has had a lot of experience with this modification and he says that the 1000-volt diodes sometimes go "pop." Incidentally, he has a good supply 26Z5 tubes, and you can contact him concerning these and other parts by writing him at 5028 Cartwright Av., North Hollywood, CA 91601. Phone (213)766-2747.

 Here's another question for you: Does anybody out there in newsletter land know what these URR receivers we hold so dear originally cost Uncle Sam??? Also, I have received a few requests for any history that anyone might be able to obtain on our equipment. Send your histories in for the next issue.

 No issue of the R390 Users Group newsletter would be complete without some pertinent information from DALLAS LANKFORD, this time on meters. DALLAS gives us a source for meters in the STRUX CORPORATION, 100 E. Montauk Highway, Lindenhurst, NY 11757. He suggests that when you write them you try to provide them with as much information as possible, such as manual series and part number from that manual series. The going rate for both line and carrier level meters is \$20 each. Dallas feels that meter problems are probably common because under "normal" military use many URR receivers were operated 24 hours a day over a number of years. Upon replacing a defective carrier level meter, the replacement meter gave higher readings than normal, with strong signals pinning the pointer. Dallas tried both 10- and 15-ohm dropping resistors, finally settling on the

15-ohm. One of the small, pronged, threaded, stand-off lugs was removed from the old meter and attached to one of the new meter screws to mount the dropping resistor neatly. Dallas reminds us that the only reasonable way to replace the carrier level meter is to "drop" the front panel. In addition to the manual steps for removing the front panel, Dallas found it necessary to release the cable clamp between the phone jack and local gain control to allow enough slack in the cable assembly. There are at least two different meter styles which Dallas refers to as small- and large-window because of the relative sizes of the glass meter "windows." The small-window meters seem to have smaller numbers and letters. There also seem to be at least two different case styles, one that cannot be opened without a special tool, and a similar style that can be opened with a small screwdriver. Does anyone know what special tool is required, and where to obtain one???

DALLAS also gives us a list of R390 tube shields that should NOT be removed: the voltage regulator, the PTO tube, the BFO tube, RF amp tube, and the three mixer tubes. (I guess I'd better put those back on, huh???)

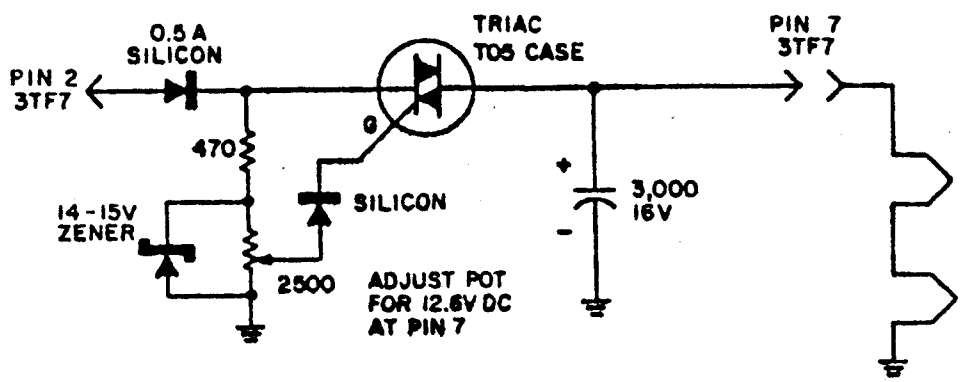
We had a number of responses to our lubrication question, and most universal was 3-IN-1 oil. I have had good luck with LUBRIPLATE white gear grease. Also, if you obtain a receiver that has caked and dried grease jamming the gear assemblies, you will have good luck removing this using either denatured alcohol or automotive carburetor cleaner and Q-tips. You can get long-handled Q-tips from most tape recording supply stores, even Radio Shack.

This note concerning AUDIO GAIN modification listed in issue #1. Increasing audio gain by placing a jumper across pins 6 and 8 may cause inaccurate line level meter readings.

MEMBERSHIP DIRECTORY TO BE PUBLISHED. Many of you have written asking for the names and addresses of your fellow newsletter folk. In the interests of assuring privacy we are ANNOUNCING THE PUBLICATION OF A MEMBERSHIP LIST. If you DO NOT want your name, address, phone #, etc. listed on this list please write publishing central so we can keep this information out of the list. By and large, however, I think everyone seems to be more than eager to be in touch with one another, but, just in case, please heed this notice.

THREE METHODS OF REPLACING THE 3TF7 IN THE R390 AND R390A RECEIVERS

1. (FOR R390) Replace V508 and V701 (PTO & BFO tubes) with 12BA6's. Short pins 2 and 7 on 3TF7 tube socket with a short piece of wire. (FOR R390A) Replace V505 and V701 (PTO & BFO tubes) with 12BA6's and short pins 2 and 7 on 3TF7 socket.
2. (SAME FOR BOTH RECEIVERS) Leave 6BA6's in PTO and BFO sockets and put a 42 ohm resistor (5 watt) across pins 2 and 7 on the 3TF7.
3. (SAME FOR BOTH RECEIVERS) Below is a Triac regulator circuit which can be plugged into pins 2 and 7 on the 3TF7 socket. Ground to one of tube mounting screws.



The above information on 3TF7 modifications comes from DICK TRUAX. Incidentally, some of you might be interested in the fact that the 3TF7 was later produced under the number 3HTF4. These and other tubes can be purchased from AMPERITE, 600 Palisades, Union, NJ 07087.

REMEMBER THIS IS A USERS GROUP!!! PLEASE CONTRIBUTE ANY AND ALL INFORMATION SO THAT WE MIGHT SHARE IT THROUGH THE PAGES OF THIS YOUR NEWSLETTER!

Also, most of you, when subscribing, told me what kind of receiver you have. If you have not sent this information in, it would be helpful, so that I might try and drum up more articles for your particular equipment. Or, for that matter, I might contact you to provide some information. Contrary to popular belief, I am not an electronics wizard, and I have only owned by R390 for less than a year. So, many of you have more knowledge than I have to share.

Many of the people in this group are BROADCAST BAND LISTENERS/DXERS (Try it, you'll like it!) NEAL PERDUE shares these tips concerning wiring your BCB AMPLIFIED LOOP antenna to your R390A. Much better nulls can be obtained when setting the AF gain control to a comfortable level (around 3 or 4) and using the RF gain as a volume control, usually between 8 and 9. The setting will, of course, vary slightly depending on your local situation and band conditions. Using MGC gives boost.

This could be called the 'pre-convention' issue. I will be attending the ANARC convention in Washington, DC July 15-17, and the National Radio Club convention at Poquonock, CT September 2-4. If you will be attending either or both drop a note to publishing central so we can plan to spend some time discussing the greatest radio receivers ever built.

THE R390 USERS GROUP, 104 West Franklin Avenue, Edgewater Park, NJ 08010

TELEPHONE (609) 877-5302. Publisher, Skip Arey; Typist: Chris Hansen.

All articles and information shared through this users group may be reprinted with the permission of the author only. The R390 Users Group newsletter is available at the cost of \$1.00 per issue. Back issues are available through the publisher at the same cost of \$1.00 per issue. An index will be published of back issues in the first issue of future volumes.

THE NEXT PUBLISHING DATE IS THE WEEK OF SEPTEMBER 11, 1983. GET YOUR ARTICLES IN EARLY. YOUR CONTRIBUTIONS OF MATERIAL MAKE THIS NEWSLETTER POSSIBLE.

THE R390 NEWSLETTER

P.O. BOX 421
MOUNT HOLLY, NJ 08060

(Sorry, I left the mastheads
at home!!! chris)

VOL 1 NO 3

WELCOME AGAIN to our ever-evolving newsletter. As you can tell this is the Gala Tube Supplier Issue. It is especially important to note in this issue (it of course should be noted concerning ANY supplier of parts and services) that we are publishing ALL sources for parts and services that come into publishing central. We have neither the time nor inclination to thoroughly research these sources, as we assume that the users group member who submits the information has already done so. (We're all in this together, right?!) So LET THE BUYER BEWARE!!! Consult sources as to prices and delivery times BEFORE YOU ORDER! In addition, some of the information might be dated. It goes without saying (I guess that's why I'm saying it) that if you find that any of the data are in error or if you have a problem dealing with a particular source PLEASE inform publishing central immediately so that we can publish an update in the next issue.

WORK IS going painfully slowly on the membership directory, but I hope to have it all together by the holiday season. If you have not already done so please send me a postcard with a listing of the receivers you are interested in or are using. Also, if you don't want to be included, please let me know that as well.

WE ARE STILL LOOKING FOR SOMEONE TO ORGANIZE THE MANUAL NEEDS AND WANTS. If you are interested in taking responsibility for getting members with manuals in touch with members without manuals, please contact me ASAP.

THE POST OFFICE BOX seems to be working out real well. A number of you have tried to contact me by phone and discovered the futility of that. I am not at home nearly as much as I would like to be these days. The best way to get in touch is to drop me a postcard or letter to P.O. Box 421; Mount Holly, NJ 08060. I am sorry that I do not get the opportunity to answer most letters due to time constraints, but all are read and all information is filed to be shared through the pages of our newsletter. Also, all comments and criticisms are taken into full consideration. This is your newsletter and your feedback and information makes it possible. I just compile it and share it. Once again, thank you for all your support and ideas as we go through the growing pains of any new publication.

ANARC REPORT. I met long-time R-390 person MATT STUTTERHEIM at the convention, and in spite of all the new equipment like the SONY 2002 and the new BEARCAT receiver, I think our URR receivers are still the best. You must admit you will never lose your R-390A under the papers on your desk, unlike some of the new pocket-rockets that have hit the market.

WHO IS THE USERS GROUP MEMBER WHO ALWAYS PLAYS THE NUMBER 390 IN HIS STATE LOTTERY?

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This issue brings to you perhaps the most important information for your continued enjoyment of your receiver: TUBE SUPPLIERS.

From NEAL PERDUE comes this source for all R-390 tubes. D.R.P. Electronics, P.O. Box 4357, Supton, CA 90224. This company requests a \$15 minimum order. Any duds or gassy tubes are replaced free of charge, but Neal says he never received a bad tube in three years of dealing with the company. Prices are as follows, plus \$2 for shipping and handling:
OA2: \$1.85; 6AK6: \$1.75; 6BA6W: \$2.10; 2625 rectifier for original power supply: \$2.50; 5814A: \$1.95; 6DC6: \$1.85; 6AK5W: \$2.50. The company has no export license so they will ship only to U.S. addresses. They ship via UPS and Neal reports that he usually gets his tubes 7 to 10 days after placing his order. If you have questions as to the

availability of any particular tube, list your particular needs down the left hand column of your letter, preferably double-spaced, and they will return your letter with either a price quote next to each tube number or will note "no stock." Neal did a great deal of research into this particular company and he tells us that the company has a fairly good supply of 3TF7 ballast tubes.

DID YOU KNOW THAT THE 3TF7 AND THE RT-510 TUBE ARE INTERCHANGEABLE?????

And, just in case D.R.P cannot meet your needs, from Jim Kowalski comes this bit of information. Jim is an engineer for Radio Station WJCM, and he learns of tube suppliers through his vocation. He recommends RF GAIN, LTD, 100 MERRICK ROAD, ROCKVILLE CENTRE, NY 11570, Phone 1-800-645-2322. Jim has made several purchases from them and says that they have fast service and, while they require a minimum order of \$30, they do pay the postage. The company does offer a free catalog, and they list all the tubes needed for the R-390, including the 26Z5W, 3TF7, 6082, 6AK5, and the 6C4. Jim also notes that they accept checks.

IT SEEMS THAT THE GOOD OLD DIODE TUBES ARE STILL AVAILABLE. If you operate out of a damp basement like I do, nice warm tubes are an asset, not a liability.

AND WHAT ABOUT TUBESTERS. These are solid state replacements for tubes. The primary source for these in hobby applications seems to be: SKYTEC, P.O. BOX 535, TALMAGE, CA 95481, Phone (707) 462-6882. Upon writing this company I was quoted a price for a full set of replacements for a Collins S-line ham station. I wrote again trying to explain our particular needs in more detail, but have received no response. Maybe one of our West Coast members might contact these folks so we can find out about the possibility of a "solid state" URR station.

IF ANYONE ASKS WHY YOU USE AN R-390 TELL THEM YOU REALLY LIKE "HOLLOW STATE."

HAMFEST HINT: Every now and then at a hamfest or even a regular fleamarket you might find a box of old technical books. You might want to check through these obsolete toms of wisdom for old military receiver manuals, but also take note of any tube data books. These are usually full of vital information on the care, feeding, and operating parameters of most tubes. The data will be especially useful if you are planning on modifying a circuit containing that tube. Also, most tube data books contain conversion and replacement tables that might suggest alternatives when your last 6AK5 goes PHFFFT. You will find that these old books sell for pennies a pound, but will serve a useful purpose as you advance in years along with your vintage URR receiver.

A BRIEF MENTION OF TUBE SOURCES MENTIONED IN PREVIOUS ISSUES:

ETCO ELECTRONICS, NORTH COUNTRY SHOPPING CENTER, RT. 9, NORTH PLATTSBURGH, NY 12901

EDLIE ELECTRONICS, 2700 HEMPSTEAD TPKE, LEVITTOWN, NY 11756

TRANSELECTRONIC, INC., 1365 39TH STREET, BROOKLYN, NY 11218

FAIR RADIO SALES, 1016 EAST EUREKA, BOX 1105, LIMA, OH 45802

DAVLYN CORPORATION, 13406 SATICOY STREET, NORTH HOLLYWOOD, CA 91605

GERBER ELECTRONICS, 128 CARNEGIE ROW, NORWOOD, MA 02062

AMPERITE, 600 PALISADES, UNION, NJ 07087

AIRBORNE ELECTRONICS CO, 5028 CARTWRIGHT AV, NORTH HOLLYWOOD, CA 91601

Now, then, with all these sources we should be able to keep ourselves in tubes for quite some time.

But wait! Yet another tube source has been located, and it may very well be in your neighborhood. How's that again??? Well, pay attention, Dear Reader!

A very good source for tubes can be any of the older, more established TV repair shops. A quick check of a couple of local TV repair shops revealed quite a few tubes useful to my various tube-type receivers and transmitters. In all three cases I was led to believe that the proprietors were glad to get these things off their shelves. I even spoke to one gent who informed me that just a few weeks previous he threw out boxes of tubes (ARRRGH!!!). Also, one day I was dutifully following my wife on her rounds of the local garage sales, and I ran across a fruit basket full of tubes for \$1.00, half of

which tubes tested OK, and most of these were immediately useful. So, it pays to scrounge. In contacting the TV repair sources, I find that personal contact works better than phone calls.

If you really want to be a purist about these things you might look around the surplus outlets for any of the military issue ELECTRON TUBE TEST SETS. These are numbered TV-7/U, TV-7A/U, TV-7B/U, and TV-7D/U, the manual for which is designated M11-6625-274-35. I picked up by TV-7D/U for free from a local ham, but I understand they can be had for around \$5.

HAH!! Yet another tube source from Dick Truax, who recommends: DON SKINNER, WAB8IE; RFD 1; NEW CARLISLE, OH 45344.

This piece of information from Paul Gunn on connectors. Apparently, the UG-421/U connector plug, the one for the balanced input, is available from AMPHENOL under the part number KS 16288L2. Most major electronics supply houses and parts outlets for television repair people can order Amphenol connectors for you.

Want to save the life of all your tubes, especially that coveted ballast tube? L.G. Robertson says that the life of your tubes can be greatly extended by putting an A.C. thermistor between the line cord and the wall socket. These devices are available from most electronics stores under the names of "Workman Surge Stopper" for about \$5. When you turn on the receiver this device gradually heats up and slowly and gently supplies the power to your precious receiver. These devices were very popular in the age of predominantly tube-type TVs, and I have heard that in some cases they can double tube life.

To add another opinion to the ballast tube controversy, new member John Mohn says that the R-390 was designed to stay on a frequency plus or minus a few cycles for years and years with line voltage variations from 95 to 135 volts and ambient temperatures from 60 to 150 degrees. Unless you want to treat or use your set in the same manner, then it is okay to make one of the modifications to replace the 3TF7. John also feels that leaving the tube shields on has a definite value. "Why spend \$150 for a mechanical filter to go in between tubes and then take the tube shields off so that half the signal feeds around the filter in leakage from tube to tube." This is true whether it is RF, IF, audio, or power tubes. Or, as John puts it, "If you want cool tubes, why not just cut the filament leads and get it over with!"

SPEAKING OF COOL TUBES, I have seen a number of receiver owners using muffin or squirrel-cage fans to cool off their URR rigs. A general rule is to place these fans so that they draw off the hot air, as opposed to blowing air in over the tubes. Muffin fans show up at hamfests for \$1 or so, and they are also available through most major electronics suppliers. They have regained popularity with computer freaks, who use them to cool their chips. The only concern I can see is that this method of cooling might draw dust up into the rig. Anybody with more information on this, please share it with the group.

ANYONE OUT THERE WHO HAS ANY GENERAL KNOWLEDGE on the care and feeding of vacuum tubes (valves for our British audience) might want to write in and share it with your fellow surplus receiver fanatics. We have members who were born in the transistor age who could very well benefit from the wisdom of those among our group who come out of the age of tubes. I guess I'd have to say that my son comes from the age of IC's.

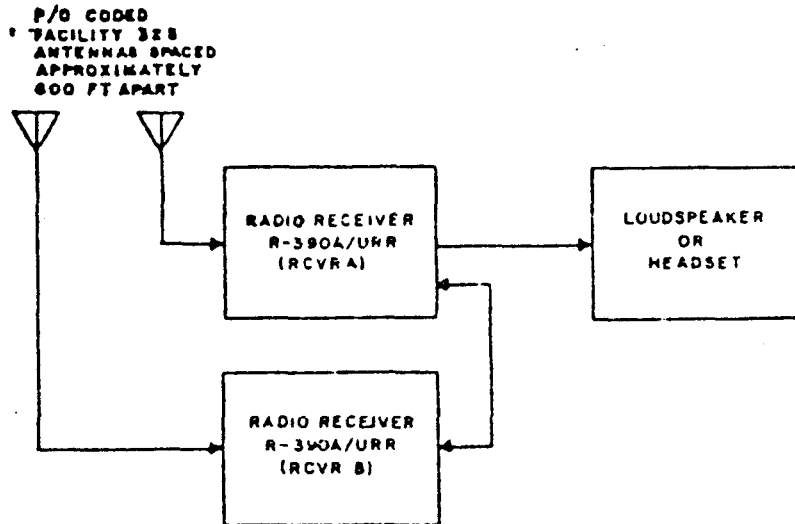
From Walter Schivo comes this tidbit concerning increased audio gain. Walt jumpered terminals 1+2, 2+3, 3+4 together to improve his audio. He said that with his particular receiver no noticeable change came from jumpering pins 6+8 as discussed in previous issues. Could this mean a pre-surplus audio modification of some sets? Anybody who might be able to explain this situation please write publishing central.

In a previous issue the membership expressed the desire to know just what the original market value of these wonderful radios might be. According to John Mohn the military came out with a directive that ordered all "high-value" items tagged with their "acquisition" value. John recalls seeing R-390A's tagged at \$2795, that's in pre-inflation dollars

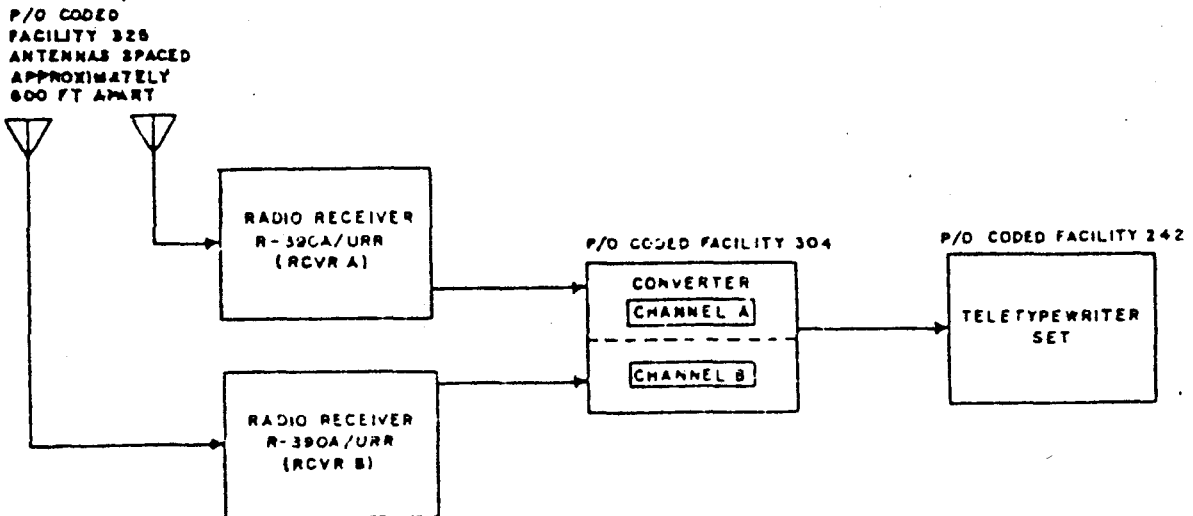
(possibly up to ten to one for you non-financier types). Patrick A. Mulreany purchased an R-389 from Davilyn Corp. that had an acquisition value tag of \$3930. Matt Stutterheim believes the cost to Uncle of the later R-390's must have run much higher than these figures. So, it appears that these radios we hold so near and dear really are Cadillacs and if we paid what the guvment paid we could easily have bought a Cadillac instead (but who would want to, right?). Incidentally, the RACALs with which Uncle Sam is replacing the R-390A's run around \$9000. Which might explain an unsubstantiated rumor that a little man from the Navy has been running around to surplus outlets buying URR receivers for spare parts.

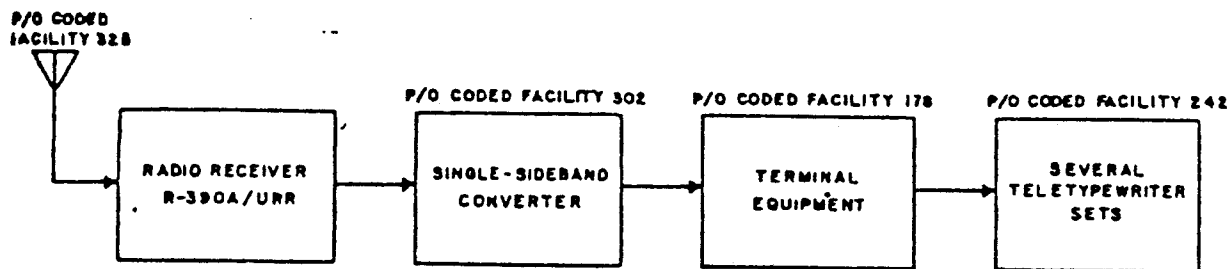
Bill Neil adds another figure to the price of a radio from a Department of the Army Technical Bulletin TB SIG 322-303, listing the 1969 price of an R-390 as \$950. Sounds like a case of the government listing two prices depending on who sees the bill. Anyway, I am sure that others in our club will tell of other prices. That's what this newsletter is all about, sharing all information so that we might be better informed.

And now, from that selfsame document supplied by Bill Neil we give you block diagrams of actual URR applications.



A. VOICE SIGNAL SPACE-DIVERSITY RECEIVING SYSTEM





C. SINGLE-SIDEBAND RADIO TELETYPEWRITER SYSTEM

TB 316 322-303-1

These diagrams lead me, and I am sure others, to wonder about just how one goes about wiring up a couple of URR's for diversity reception. Chris Hansen has a couple of words to say about this. The major reason for diversity reception is that if one has two antennas spaced at a wide distance, each antenna feeding into its own receiver, chances are good that reception differences between the two antennas will cancel each other out, and produce a more readable signal with less fading overall. The type of receiver used on each antenna is immaterial, normally. You may use two different receivers if you like. Some warnings: Don't try this unless you have a rather large back forty -- the antennas must be spaced 200 meters apart or more. Make sure that the two receivers you're using are on opposite sides of your shack to minimize mixing of RF between the two receivers. Of course, this lets out diversity-DX unless you have very long arms or are willing to DX on one of the two receivers, running to the other one when you get a signal on the first and tuning the second receiver to the same frequency. You can feed the signals to the two sides of a stereo jack so that each ear gets the signal from one receiver only, and you can use your brain as the "mixer". It is also possible to construct a mixing amplifier or use a stereo amplifier (keep the treble and bass controls to the minimum setting) as a mixer. This method was devised as a way to help the military communications system (especially the teletype setups) get better reception overall. The military gets away with it because most of the time our precious R-390's were set to one frequency for most of their operational life and locked there. So put those pictures of frazzled privates running from one receiver to the other at the behest of a calm communications officer out of your minds! The two receivers used in diversity reception were locked in place and just had to be turned on (if they were indeed ever turned off!)

A QUESTION for the Users Group Book of Records. What is the most flights of stairs anyone has had to carry a military surplus URR receiver up? My personal record is three flights and I had to see the doctor after that. (I live on a fifth-floor walkup, and my R-390 is up there with me. However, I had help carrying the receiver up the stairs. Does that count? I suppose I'll have to carry it down someday, though. I should get the truss now, I guess! Chris Hansen)

Larry Cohen (a non-member, but I am working on him) regularly uses an R-390 the front panel of which was at one time sprayed with machine-gun bullets! How's that for realism, fans????!!!

THINGS OUR MEMBERSHIP IS LOOKING FOR DEPARTMENT

Ron Musco, P.O. Box 118, Poquonock, CT 06064 needs a top cover for his R-390A.

Jim Kowalski is looking for a copy of the manual for the R-390 (not-A). He also has a copy of the manual for the R-389 that he will give away to the first taker who sends him a dollar for postage. Jim's address: P.O. Box 1181; Sebring, FL 33870.

(6)

OKAY GROUP, we opened a great can of worms by looking for the price of the R-390. Let's open another can by trying to find out just how old these rigs are by their serial numbers. I am sure that if we can discover a few receivers' birthdays in relation to their serial number we will give most of the club an idea of how old their particular receiver might be. Anyone with information, or for that matter, anything that might be of use to the group can send it to publishing central.

By the way, we could use a few more articles pertinent to the R-389 and the R-392. A lot of these rigs are in use, so please share what you've got with the group.

Craig Healy suggests that someone start a "junkyard" for old URR rigs. What a great idea! If anyone has the time or inclination we will be glad to advertise the effort right here in these pages.

Bob Lombardi says that CW selectivity is not quite as good as the wider bandwidths because the mechanical filters on the R-390A are not used. A single crystal is resonated with different loads to get the 0.1 and 1 kHz positions. The manual says that this is a 455 kHz crystal. Bob thinks it might be possible to make a crystal lattice filter with two or more of these crystals and thereby improve CW selectivity. A most interesting idea; does anyone want to try to tackle it???

THE R-390 USERS GROUP; P.O. BOX 421; MOUNT HOLLY, NJ 08060

PUBLISHER: SKIP AREY. TYPIST/EDITOR: CHRIS HANSEN

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THE NEXT PUBLISHING DATE IS THE WEEK OF DECEMBER 11, 1983. GET YOUR ARTICLES IN EARLY. YOUR CONTRIBUTIONS OF MATERIAL MAKE THIS NEWSLETTER POSSIBLE.

EDITOR'S NOTE: The mailing list (as well as the typing and information storage) of the R-390 Newsletter is now computerized. Check your mailing label; if corrections are needed please send the label with corrections indicated to: CHRIS HANSEN, R-390 NEWSLETTER, P.O. BOX 1226, MADISON SQUARE STATION, NEW YORK, NY 10159. The second number at the top of the label is your ID number; the first number is the issue number of the last issue on your membership. All those with a "3" in that space this issue are due to renew.

THE HOLLOW NO. 4 STATE NEWS-LETTER

DECEMBER 1983

ADDRESS FOR SUBSCRIPTIONS: Chris Hansen; P.O. Box 1226; New York, NY 10159

EDITORIAL ADDRESS: Skip Arey; P.O. Box 421; Mount Holly, NJ 08060

SUBSCRIPTION PRICE: \$4 for one year/four issues; \$8 for two years/8 issues
Back Issues: \$1 each, issues available: 1, 2, and 3.

WELCOME FRIENDS TO THE newest evolutionary step in our newsletter. We have widened our horizons from the "R390 Newsletter" to the "Hollow State Newsletter". Our humble journal will be encompassing all of the wonderful old tube-type receivers that you can think of, and their eternal operation through our shared efforts at repair and restoration. This change comes about through discussion with many of our newsletter participants. It seems we all have mutual needs for all our receivers as tubes become scarce and such. We are also shifting gears a tad on the publishing end. Chris has taken full charge of publishing tasks -- handling the subscription list, finances, and final mailing. Skip will be doing the editing. Henceforth, all money and queries concerning subscriptions and back issues should be directed to Chris, and all articles and information for the newsletter should be sent to Skip. This new situation should improve the quality of service for the future of the users group as we expand to take on other tube type receivers. Consequently, we shall be seeking more articles and information on such rigs as the Hammarlunds, Hallicrafters, Nationals, HRO's, and whatever else you have warming your shack. As we round out the first year of publishing we would like to thank everyone who has supported this effort thus far and, with your continued support, we will continue to have a newsletter of high quality far into the future. WHO NEEDS TRANSISTORS WHEN YOU HAVE A GOOD WORKING TUBE RIG!!!

Some of you have been asking about how to find me (WB2GHA) on the air. My station consists of a Heath SB-300 and SB-400 (all tubes, of course) and I can usually be found on the 20 meter band, especially in the vicinity of the independent county hunters net: 14,336 kHz. I will also be operating HF mobile in the near future with a Heath HW-32A (Also all tubes).

Perhaps the biggest news to hit the pages of the tomb of tube-type wisdom comes from Radio West via Joe Bunyard. (Drum roll, please!!) AMPERITE, 600 Palisades, Union City, NJ 07087 is once again producing the coveted 3TF7 tube. (Tah Dah!) Don't that make yer day, Bunky?

DOES ANYBODY OUT THERE use the R392??? This is the mobile semi-equivalent of the R390. It requires 24 volts at 6 amps, but is a really nice radio. I have seen a great many of them recently at hamfests for an average price of \$150. They are sold by Fair Radio for between \$135 and \$200. It's a sort of R390 built sideways.

WHAT??? YOU NEVER HEARD OF A Q5er?? Some of the fine old tube equipment can be found wanting in the area of IF selectivity. A cheap and dirty way of solving this is to scour the surplus outlets for a gizmo called a BC-453. This is an aircraft receiver used during WW II. It tunes 190 kHz through 550 kHz -- right across the 450 kHz IF. Now you're getting the idea. You can also use a R-11A receiver. Both of these rigs are available from Fair Radio Sales for about \$15. They are not for the faint of heart, as you will need to construct a power

supply for its three voltages: 12, 24, and 250 VDC. Once you get this little box cooking you can either inductively couple it to your receiver or use a piece of coax with the shield connected to the case of both the BC-453 and your receiver, and the center conductor of the coax connected between the antenna post of the BC-453 and the other end wrapped a few times around the plate pin of the first IF amplifier tube. Remember, this will only work on rigs with a 455 kHz first IF. You will have to experiment with the degree of coupling between the two. Some folks say the BC-453 works best with the plungers in its IF cans turned all the way out. What this lash-up does is, in effect, give the receiver an additional stage. This should be enough to get the hard-core experimenter warming up his soldering iron. More information on the Q5er can be obtained in almost any old ham radio handbook or circuit book written before 1965 or so. I found my Q5er with power supply all dressed up and ready to go at a hamfest. Because I recognized it for what it was and what it meant to the improved enjoyment of the receiver by the old-timer who was selling it, I got it for \$5. It pays to be friendly at these activities.

ANOTHER HAMFEST, ANOTHER RELIABLE SOURCE for the various connectors for the backs of all surplus receivers. Mr. Joel Knoblock runs an outfit called: The RF Connection, 11707 Judy Place, Potomac, MD 20854; Phone (301) 299-5389. He currently stocks ALL, I repeat ALL of the connectors for the R390, R390A, R392, et al. The guy also has an incredible mind for which connectors go with which rig, so he can even help you out if you're not quite sure what it is you need. His motto: "Mating is our specialty." A great source.

CALLING ALL COLLINS EQUIPMENT USERS (This includes a great many URR receivers, including my own R390A. Collins is celebrating their 50th anniversary, and they are operating a special events station to celebrate. The special-events callsign is ADØC, and I have heard them on weekends in the General and Advanced portions of 20 and 40 meters. I worked them on 14278 kHz and AL, KØHWE, the station op, was glad to hear about the users group and our desire to keep old Collins gear alive. You can send anniversary greetings to ADØC, Collins Telecommunications, Products Division, Box 728, Cedar Rapids, IA 52498

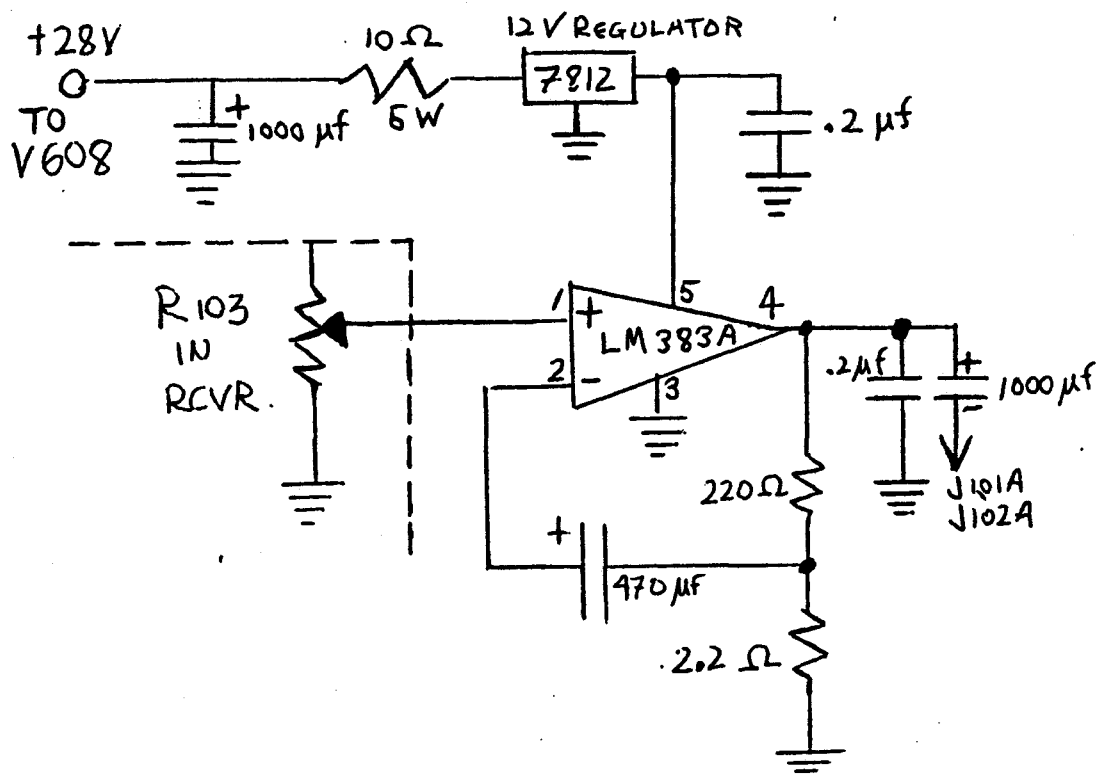
Speaking of Collins being 50 years old, DICK TRUAX says that determining the age of R390A's is as simple as looking at the date stamped on the filter capacitors C-606 and C-603 on the AF subchassis. They are generally stamped with a month and year, eg. 6-67. Also, you might look on C-103, the metal capacitor fastened to the back underside of the chassis behind the main PTO. You could also look on the crystal oven on-off switch S-106. Dick (and I, I might add) is interested in knowing if anyone has an R390 built later than 1967. He has a spec sheet from Hammarlund dated 1970, so he feels either they were still making them or at least stocking them that late. Dick also lists the following companies as suppliers of R390A's: Collins, Electronics Assistance Corp. (aka Hammarlund), Imperial Electronics, Motorola, Stewart-Warner (seems to be most of the earlier ones), AMELCO (American Electronics Co.).

THE GALA TUBE SUPPLIER ISSUE brought two more sources out of the woodwork. From TODD ROBERTS comes: THOR ELECTRONICS CORP., P.O. BOX 707, LINDEN, NJ 07036, Telephone: (800) 526-4052 (in NJ (201) 486-3330 and in NY (212) 239-4510). I think I might do some recon work on this one myself. ed) Todd would also like to remind you ballast-tube-seekers that the 3TF7 can be replaced with the 3TF4 and the 3HTF4. Also, from DICK TRUAX comes yet another source: E.S.R.C., P.O. BOX 1192, DELRAY BEACH, FL 33447. Some price examples: 6C4: \$1; 6DC6: \$2; 6AL5: \$1. No 3TF7's/RT510's.

HELP!!! JORDAN ARNDT, A-306 Marlborough Drive, N.E. Calgary, AB, CANADA T2A 5M1 is looking for someone who might be able to either service or supply a replacement for the VFO of his R-390. I know we have a few members of the group who are adept at VFO info, so please write Jordan and help him warm the Canadian winter with a properly-tuning R390.

In my travels to various shrines of tube type radio seen many a find old rig attacked by mildew, rust, yuck, et al. from prior use in a damp climate. This is especially true of some surplus gear. Anyone with hints on the care and cure of such problems should share it with the group. You can pick up some mighty rank-looking stuff at flea markets, but if we could just learn from one another how to restore this stuff we will resurrect many a rusty rig.

WASSST HEY BUDDY. Ya wanna eliminate three tubes from your R392? RUDOLF SALOMON supplies us with the following circuit that serves as a solid-state audio section, eliminating the 2 6AJ5's and the 26A7GT (good riddance. huh?)



Rudolf says that the 1000 uf capacitor might be replaced with one of lesser value to prevent "motor-boating" when the volume is turned up. Also, in this modification you will need to replace the heaters of V606 and V607 with 82 ohm 5W resistors. The regulator and amp will dissipate heat. This circuit works with 4 ohm or 600 ohm phones or speakers.

Now that we have expanded our horizons the "To Be Published" file is getting a mite thin. Please send all of your information about all the great old tube receivers to SKIP as soon as possible so we can make the expansion of our newsletter a successful one. All tips, hints, ideas, and dreams are needed at: P.O. Box 421, Mount Holly, NJ 08060.

While it is getting a little cold to wander around the flea-market and hamfest circuit, you might take a little time this winter while warming yourself by the glow of your radio to make up a checklist of the tube compliment inside the aforementioned and all other rigs you might own. Making up such a list to take to your various tube sources will facilitate your replacements in the future. Sure, you might need a 3TF7 right now (like your humble editor), but down the line you might just need that 6DC6, so stock up by knowing all you need. My tube-type hamgear uses the later COMPACTRON-type tubes. You know, the tiny squat ones that take the place of two or three "old-fashioned" tubes. Well, I am finding these late-model tubes even harder to track down than some of the good old boys. I guess it is because they came out so late and so close to solid-state. I understand the really new beanut-type tubes are all but impossible to track down. One good source is early-60's tiny TV sets. I grew up two blocks from TUNG-SOL industries. If I only had known then what I need now!

PUBLISHER'S TUBE NOTE: Tom Farmerie, of 62 Sunrise Av., Grafton, MA 01519 (sometimes known as the Grafton Phantom II) has suggested that perhaps those of us who need tubes should band together to pool our purchasing power. He has suggested that a Tube Buying Consortium should be formed. In line with the good old tradition of: "Don't suggest it

unless you're willing to run it," Skip and I have charged Tom with finding out whether such a consortium is possible and then coordinating it. Our suggestion is that you should make a list of your tube needs and send them to Tom. Tom will then try to find the best prices. When he does, you will be asked to forward your remittances and the tubes will then be ordered and shipped. Remember, this is just a suggestion, so if you're interested please contact Tom at the address above.

Speaking of needing a 3TF7 it is time your humble publisher-turned-editor added his two cents to the ballast tube replacement controversy that came out in previous issues. Okay, so the ballast tube went pffft! I did not have one handy (shame on me), but one of the replacement schemes gets the rig back on the air UNTIL I can re-install the ballast tube as per spec. How's that for standing on the middle of the fence and waving both ways!!!

Some people have been looking for power supplies to use with various surplus gear. As usual, the best source seems to be FAIR RADIO SALES, 1010 East Eureka Street, P.O. Box 1105, Lima, OH 45802. Incidentally, if you're not quite sure what your needs are you can call them at (419) 227-6573. They are glad to help.

In the January 1940 issue of RADIO magazine the New Hallicrafters S20R was selling for \$49.50. This was such a staggering sum that Henry Radio offered it for \$9.90 down and \$3.49 per month. What would you pay for one of these now???

NOTES ON TUNING THE R390A, by H. Cornelius

The comments below are based on the BFO being properly zeroed so that the zero position on the knob corresponds to the exact center of the IF passband. To check this:

1. Set receiver to 2 kHz bandwidth, full gain, with no antenna connected, and with BFO on. There should be a fairly loud rushing noise.
2. Turn the BFO PITCH knob back and forth. At one point, the rushing noise will be at its lowest pitch. If the BFO knob is not at zero, loosen the shaft coupling behind the front panel and reset the knob to zero.

SSB TUNING: Set BANDWIDTH to 2 kHz, BFO to $-1\frac{1}{2}$ (USB) or $+1\frac{1}{2}$ (LSB).

RATT TUNING: Set BANDWIDTH to 2 kHz, BFO to $-2\frac{1}{2}$. Tune KILOCYCLE CHANGE knob for a normal presentation on the RATT demodulator. Special case: when copying narrow-shift RATT on a CV-89/URA-8 or a URA 17, set the BFO PITCH knob to -1. RATT is normally copied with the RF gain fully up and the AGC control on fast. If using limiterless demodulation, try FAST, MED, and SLOW settings for best results.

ALIGNMENT: The technical manual notwithstanding, an R390A can be aligned using only the calibrate signals and the LINE LEVEL meter, with the RF GAIN control retarded to keep the signal strength down. Use the calibrate points nearest the receiver dial readings called for in the alignment procedure. Do not overlook the first crystal oscillator tuning, T-207, which can be peaked for maximum on any frequency below 8 MHz. Do not attempt alignment of the 455 kHz I.F. transformers. Performance of the three mixers varies considerably with various 6C4 tubes. If possible, try several in each socket and retain the tube giving highest gain. Although the technical manual calls for 3 microvolt sensitivity, a well-manicured R390A will get down below 0.5 microvolt.

AN IMPORTANT POINT: The UNBALANCED input jack is at high impedance and works very poorly with coax or with any but a very short antenna. The R390 will work well only through its balanced (two-pin) antenna input, with the antenna (center conductor of coax) connected to one pin and with the other pin connected to ground. This can be jury-rigged if necessary, but the best approach is through use of a connector designed for the purpose. A UG-970 or UG-971 connector will mate with the two-pin socket. The UG-971 adapts to a type C connector such as the UG-709 (for RG-58/U cable) or UG-636 (for a UG-88/U BNC connector). The UG-970 adapts to the PL-259 UHF connector. In any case, check the three connectors on the antenna relay box inside the R390 to be sure that each cable is made up to the correct jack.

(5)

DOES ANYBODY OUT THERE KNOW ABOUT DYNAMOTORS??? I have managed to avoid these things like the plague throughout my radio hobby career and I can't see any reason to learn about them now, but a great many of our readers who might be using or experimenting with equipment that requires dynamotors could use all the info you can supply. Please send all of your information about this subject and all other stuff you have to share with your fellow tube-travelers to SKIP.

I am sure more than a few of our members have faced replacing worn-out filter capacitors. Just what is your particular strategy for your particular radio? The metal "can" types and plug-in types are getting pretty scarce. Since in many cases these parts have limited shelf life, we need to know our possible alternatives.

The Most Diligent Subscriber Award goes to new member PETER CURRY who first overheard a couple of hams talking about the newsletter on the air. Pete wrote one of these hams via the callbook address and came to find out that, after his long-distance information gathering, Skip lived only a few miles away from him. Glad to have you aboard, Pete!

Just a note that BARKER AND WILLIAMSON has discontinued its Q-multiplier and notch filter circuits for the Collins 75S1 (model 337-51), and its circuit for the KWM2/2a (model 340-A) will be discontinued when its current stock is depleted.

Speaking of the KWM2A, your humble editor has been smacking his lips over this rig for a long time. I would very much like to acquire one or a KWM2 (which can be converted into a 2A; more on this in future). If you have one for sale, or know someone who does, write me at Box 421, Mount Holly, NJ 08060.

THERE IS NO TRUTH TO THE RUMOR THAT SKIP decorates his Christmas Tree with old 6L5's (actually, I use 35W4's).

FOR SALE FOR SALE FOR SALE FOR SALE FOR SALE FOR SALE FOR SALE FOR SALE FOR SALE FOR SALE

DICK TRUAX, 3003 Gleeson Lane, Louisville, KY 40299, phone (502) 491-2871 evenings or weekends only, has the following R390A/URR JUNKYARD!!!

R390A parts, all are complete and operational unless noted otherwise. UPS shipping additional. All subchassis have been checked in full operation -- they are complete except for tubes, which are common types and readily available used or new.

One Crystal Oscillator Subchassis, complete with all crystals -- \$50

One Power Supply Subchassis -- \$60

One RF Subchassis, complete with all gearing, racks, and slugs, digital counter -- \$90

Two AF subchassis -- \$60 each

One IF subchassis LESS BFO PTO and 8 and 16 mechanical filters only. All transformers intact -- still has 2 and 4 kHz filters -- \$90

One antenna relay assembly -- \$15

Two front panel grab handles -- \$5 each

One front dial face w/window -- \$5

One crystal oven HR-202 w/200 kHz and 17000 kHz crystals installed -- \$25

One PTO subchassis, complete with 6BA6 -- \$60

One Oldham coupler assembly, all three pieces -- \$20 for the set of three

One dial lock mechanism -- \$5

One zero-adjust mechanism -- \$5

One carrier level meter -- \$20

Miscellaneous parts include BFO switches, rear chassis oven switch, almost all front panel switches and rheostats, the main wiring harness MINUS a few connectors but largely intact, are 15.5 and 16 MHz crystals, and many other pieces of hardware including clamps, shaft extenders, etc. Hard to find unless you dismantle an R390A as I have done.

I have NO knobs or front panels.

(6)

I would prefer to sell the subchassis complete rather than part them out, but would part out the IF subchassis for mechanical filters, transformers, couplers if necessary. Prices are not fixed -- willing to negotiate on part or all if interested in purchasing the entire package. Best offer takes it all -- I need the space it takes in my shack!!!!

LIN ROBERTSON, 936 Loring St. 1B, San Diego, CA 92109 has an R390A series 9719-P-55 for sale. This set has been nicely restored in function, equipment, and appearance. The outer chassis and front panel has been completely repainted in forest green; the front panel has been re-engraved and the engraving filled with white enamel. Comes complete with manuals, covers, spare fuses, and a box full of tested replacement tubes (NOT SUBS!). A lot of work and sweat has gone into this rig, including the Cornelius SSB mod. Am planning to travel and cannot (alas!) take it with me. \$600, we split shipping costs. Telephone (619) 483-1219 anytime (not collect) or write to me at the the address above.

THE HOLLOW-STATE NEWSLETTER; C/O CHRIS HANSEN; P.O. BOX 1226; MADISON SQUARE STATION;
NEW YORK, NY 10159

PUBLISHER: CHRIS HANSEN. EDITOR: SKIP AREY

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THE NEXT PUBLISHING DATE IS THE WEEK OF MARCH 5, 1984. GET YOUR ARTICLES IN EARLY. YOUR CONTRIBUTIONS OF MATERIAL MAKE THIS NEWSLETTER POSSIBLE.

EDITOR'S NOTE: The mailing list (as well as the typing and information storage) of the Hollow State Newsletter is now computerized. Check your mailing label; if corrections are needed please send the label with corrections indicated to: THE HOLLOW STATE NEWSLETTER; C/O CHRIS HANSEN; P.O. BOX 1226, MADISON SQUARE STATION, NEW YORK, NY 10159. To find out when you are due for renewal, look on your address label; you will see the words: "SUB EXP # " and a number. The number is the issue number of your last issue. All those who have a "4" on their mailing label are due to renew with this issue. Those who see a "5" at that place on their label are due to renew in March. By that time I will have a "LAST ISSUE - PLEASE RENEW" stamp for your envelopes.

THE HOLLOW NO. 5 STATE NEWS-LETTER

MARCH 1984

ADDRESS FOR SUBSCRIPTIONS: Chris Hansen, P.O. Box 1226; New York, NY 10159

EDITORIAL ADDRESS: Skip Arey; P.O. Box 421; Mount Holly, NJ 08060

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MAKE CHECKS PAYABLE TO
CHRIS HANSEN

LAST ISSUE
PLEASE RENEW

WELCOME, FRIENDS, TO THE NEWSLETTER that instead of "daring to be different" strives to be exactly the same as things were around 20 or so years ago. It seems that the changeover to all-tube receivers has been widely accepted and our current membership is pushing the 100 mark. Thank you for making this possible through your continued support and your steady stream of information.

A very important and somewhat scary piece of information comes to us from new member DICK NELSON. Anyone out there who owns an R390A should take note as well as immediate steps. Go inside your IF-subchassis and check capacitor C-533. It is a .01 mf paper unit that has a rather low voltage rating; it frequently shorts out and (here's the scary part, please read it sitting down) TAKES THE MECHANICAL FILTER IN USE OUT WITH IT!!! To compound matters Dick knows of one fellow R390A user who, discovering his set was dead, proceeded to switch to various bandwidths in an attempt to get audio, thereby popping ALL of the precious (and terribly expensive) filters because C-533 had shorted out. Dick's recommendation is to replace C-533 with a 400 V or 600 V orange drop Mylar capacitor. I would go further and say that while you have the rig unracked tear in and get rid of all the paper capacitors. These types of capacitors deteriorate with age and (get this) lack of use, like sitting on a surplus store shelf for a while. Orange drops are made by Sprague and can be found at any radio-TV parts store or through many catalog sources. THIS TYPE OF MODIFICATION IS APPLICABLE TO ANY TUBE-TYPE RECEIVER WITH PAPER CAPACITORS IN IT. So, go over your schematics today. I have seen some really impressive modifications done in antique radios where they have taken the insides out of the paper cap and placed the usually smaller Mylar capacitor inside the old paper capacitor case, thereby preserving the original appearance.

Incidentally, Dick Nelson represents Astronomy, Unlimited, 3470 Travis Ave., Simi Valley, CA 93063. Perhaps in future issues Dick might let us know if and how receivers of our favorite ilk are used by amateur radio astronomers. I saw a book on this subject once and found it fascinating. I think that book recommended the old Heath H-312 or some such receiver. Anybody with any ideas send them in.

If you want to hear a lot of experienced people talking about tube-type gear PETER CURRY recommends that you listen to the frequencies occupied by ham radio operators who are into using AM, in contradistinction to most hams who use SSB. Pete says that you might try 1885 (160 M) nights, 3860-3890 (75 M) nights; 7290-7295 (40 M, daylight until wiped out by foreign broadcast stations), 14285 (20 M), approximately 9 PM EST weeknights, as well as 29000 kHz band around dinnertime when conditions permit. These AM frequencies are useful

to tube-type equipment users in that these folks tend to prefer using vintage equipment and spend a great deal of time talking about it. If you thought ham AM was dead Pete can prove otherwise, with over 500 loggings.

JOE BUNYARD reminds us of two tried and true methods of reading those faded-out tube numbers. Method one is to put the tube in the freezer for a few minutes and then remove it and look at it quickly. The obvious caution in this case would be to allow the tube to return to room temperature before installing it or performing any tests on the tube. Too quick a change from cold to hot could fracture the envelope. Method two, and a very effective one too, is to dip the tube in plain old household ammonia. This will usually bring the number right up. Some dyed-in-the-wool tube scroungers carry a small bottle of the stuff with them to hamfests and flea markets.

AND NOW A NEW FEATURE (drumroll). Welcome to MEET THE TUBE, an in-depth investigation of a specific tube in common use by all of us tube-set fans. This issue we get to know and love the ever-popular 6AU6 and 6AU6-A. The 6AU6 is a miniature-type tube used in radio equipment as an RF amplifier. It is most often found in high-frequency, wide-band applications, but it is occasionally used as a limiter tube in some FM equipment. What makes a 6AU6-A out of a 6AU6 is the addition of a controlled heater warm-up time (usually around 11 seconds) for use in applications employing series-connected heater strings. The 6AU6 makes its home in a seven-pin miniature socket, and it can be operated in any position, making it desirable for portable and mobile applications. This tube can be found in applications with or without external shielding. In some cases, the external shield is connected to the cathode. This will affect interelectrode capacitances when the tube is used with a triode connection. Tubes of this type are most commonly referred to as "sharp cut-off pentodes."

Filament voltage.....6.3 volts
 Filament amps.....0.3
 Capacitances uuf
 C in.....5.5
 C out.....5.0
 C gp.....0.0035
 Plate supply voltage.....250 volts
 Grid bias.....68 ohms
 Screen voltage.....150 volts
 Screen ma.....4.3
 Plate resistance.....1 megohm
 Transconductance.....5200 micromhos

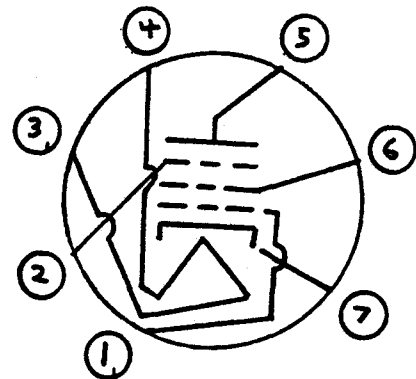
No substitution information available at this time but this is a common enough tube. Current prices range from Radio Shack's current lifetime replacement price of \$6.29 through Edlie Electronics \$2.45. Hamfest price is usually around \$1.00.

Incidentally, a little-known service of your local Radio Shack (so little-known that you might have to remind the manager of it) is Radio Shack's Tube Hotline. Radio Shack's current catalog (page 121, in case you have to prove it to the manager) claims over 2000 tubes available. Also, all Radio Shacks are supposed to have tube testers. These can be found in a back corner, usually, and you might want to bring a rag with you to dust it off before using it. However, special kudos must go to the Cherry Hill NJ RS store, as their tube tester is prominently displayed in the front of the store next to their fancy computer display. Some people can remember their roots, ya know.

We received a letter from a company called the Windsorce Co, P.O. Box 280, Wamsutter, WY. Owner Al Smith tells us that they specialize in radios from WLF through microwave. They stock parts as well as complete sets.

While involving myself in another un-radio-related activity I ran across a man who works for Powell Electronics, Inc. South Island Road, Box 8765, Philadelphia, PA 19101. They are THE source for Amphenol, TRW, Kings, and SMA connectors. They stock all current and previous military connectors. They do, in fact, stock the connectors for the R390, R390A, and special applications connectors for command sets, et al. These are all NEW connectors. They are knowledgeable in both civilian and military part numbers, so send them your want list.

6AU6
6AU6-A



FINAL WORD on the tube shield controversy comes through DALLAS LANKFORD and his copy of Army Manual TM11-5820-358-20. This manual states that all tube shields except V201, V206, V505, and V701 can be removed. There does not appear to be any new leakage paths around the mechanical filters with any other tube shields removed.

So from Dallas comes this word about tube testers. They are notoriously unreliable for checking tubes. (Do they do anything else? pub.) Of bad, weak, and otherwise defective tubes I have tested on tube testers, about 90% have tested good. The standard approach to tube replacement is replacing with a known good tube. Of course, there is a catch. You need an identical piece of equipment which is known to be in good operating condition. (There we go, I now have an excuse to talk my wife into a second R390A. ed) Fortunately, it usually suffices to replace one tube at a time until the problem goes away. The only case I have encountered where the one-tube-checked-at-a-time did not work was an HQ-180 which slowly lost AGC voltage (resulting in the S-meter reading S(+40 on almost all signals). The problem was traced to two bad gain-controlled IF tubes. When this 180 was compared to my older 180 the AGC voltage on the older 180 was found to be less for stronger signals. This problem was traced to the 455/60 kHz converter (which is gain-controlled). No change in S-meter readings was observed after correcting the problem, but strong signal handling performance noticeably improved. Perhaps the 180's reputation for overloading is undeserved.

This might be a good place to note that we have on hand very few non-R390 articles for publication. For that matter, we are low on articles all the way round. We will need a lot more information if we are to keep from delaying publishing the next issue or substantially shortening it. You are the user group. Please send information on receivers, tubes, or what have you. Your humble editor also could use desperately up-to-date tube substitution data. Send all of the above to: Skip Arey, P.O. Box 421, Mount Holly, NJ 08060. The newsletter you save may be your own.

ANYBODY GOT DATA ON OLD-STYLE CARBON MICROPHONES ??????????

AND NOW, live from the elegant Tube Room, high atop Skip Arey's R390 rack, comes more TUBE SUPPLIERS:

Weller TV, 208 S. 2nd St., Augusta, AR 72006 sells used, carefully checked tubes. Send \$1.00 for catalog.

Elmira Electronics, Inc., P.O. Box 4320 SS Sta., Elmira, NY 14904 handles all Westinghouse tubes, ships within 24 hrs., and accepts personal checks. Tubes are guaranteed.

Rutan Electronic Sales Co., 164 Mercer St., New York, NY 10012 handles RCA and GE tubes. They do list the 6DC6, 3TF7, 25Z6, and even the discontinued 6BA7. You can call for current price data at (212) 334-9393.

Steinmetz Electronics, 7519 Maplewood Av., Hammond, IN 46324, phone (219) 931-9316. Send \$1.00 for catalog.

Electronictown, Inc., 440 7th Av., Box 2048, San Diego, CA 92119, phone (714) 232-9379

Electronictown (East Coast Store) 1617 South Main St., Box 1000, Wilkes-Barre, PA 18703 phone (717) 824-7859.

Spencer Tubes, RD2, Box 24, Corning, NY 14830 specializes primarily in final amp tubes like the 6KD6, 6LF6, 6LQ6, 6JB6, etc. It sells matched pairs for such applications.

Slep Electronics Co., Hwy. 441, Otto, NC 28763, phone (704) 524-7519 is a source for tubes and equipment. It's almost as good as Fair Radio for most gear.

THIS MONTH'S TUBE AND EQUIPMENT SUPPLIER DATA CAME FROM JOE BUNYARD AND JOHN ARTHUR.

About half a dozen members wrote suggesting that I let everyone who is in love with Collins equipment in on this information. Some of you might recall that I mentioned in a previous issue that Collins was celebrating its 50th anniversary. Well, a fine book has been published about this fact called: "The First Fifty Years: A History of the Collins Radio Company and the Collins Division of Rockwell Collins." It is available for \$10 plus \$2.75 shipping from: "Spectrum Association, Attn: Judy Jourdan, 105-161, 400 Collins Road, NE, Cedar Rapids, IA 52498."

ISAMATTER, BUNKY, ya say ya can't find a schematic or shop manual for your old Sky-Buddy receiver?? Ya say that even if you find a SAMS photofacts dealer who can supply one he wants your first-born child as payment? Well, take heart, friend. You need merely call

the central branch of your nearest large city library. I found out that really big libraries often have a complete set of SAMS photofacts, with xerox machines standing close by. So, make a few calls and you will no longer have to pay \$14 for one sheet of paper (last quoted price for the Hallicrafters S-120 diagram)(But, watch out! I once requested the photofact sheet on an esoteric piece of equipment from the Boston Public Library. They brought it out but would not allow me to xerox it -- I had to COPY IT BY HAND!! So, bring your straightedge, circle template, and lots of pencils with erasers. pub)

SO YOU KEEP SEEING OLD HEATH GEAR AROUND HAMFESTS without original manuals? Relief in the form of replacement manuals, parts, and technical support is but a phone call away at (616) 982-3296. I must have called this number dozens of times over the past few years and I have always received expert assistance. Once, when tracking down some power supply data on a very old piece long since out of production, the technician helped me by supplying alternative power supply designs using updated components. The folks at Heath are OK in my book.

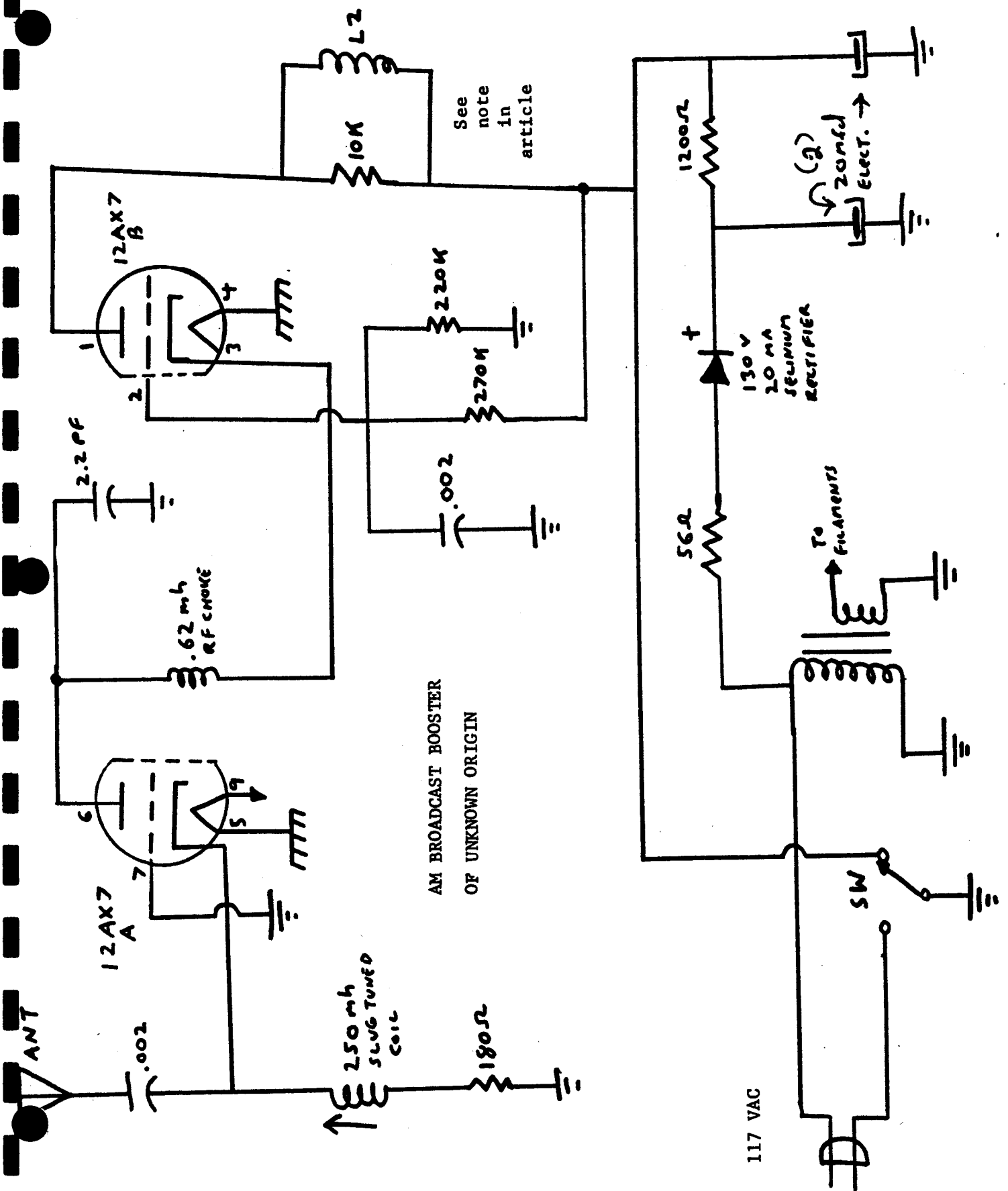
From LARRY DAVIS comes this problem and solution that R390 owners might face. "I've had a problem in my receiver since I first got it of low sensitivity on most bands below 8 MHz. I tried all the normal fixes in the first mixer and first crystal oscillator, and replaced nearly all the components in these circuits with no noted improvement. Finally, in desperation I dragged the receiver to my job, where I have access to a spectrum analyzer (some people have all the luck. ed). I used it to make relative gain checks throughout the front end. I found that I was getting 14db less signal from the RF amplifier into V202 grid on 7 MHz than I was getting to V203 grid on 8 MHz (the normal sensitivity range). This was with all the tuned circuits properly tuned, of course, and I couldn't find any failed components. The problem of excessive loss was in the RF amplifier rather than the first mixer oscillator. If you look carefully at Z204-2 (etc), the second tuned circuit in the RF amp plate circuit, you will see that the output of these to the next mixer is tapped-down from the maximum with two series capacitors (C240-2 and C241-2 in Z204-2). I found that by moving the line going to the mixer grid (through S207) from pin 2 over to pin 3 (the ungrounded end of the 12 pf capacitor C321), the gain went up to a level similar to the bands over 8 MHz. I also did this to all the other under-8 MHz bands with similar good results. I can't explain why I had to go to this extent to get normal sensitivity, but I suggest anyone with a similar problem might try this also.

Another hint from Larry is that a 6BA6 will substitute directly with the 6DC6 RF amplifier and will also give higher gain. You will have to run the RF gain lower for the same results, otherwise, it works well.

This admonishment concerning mercury-vapor rectifier tubes comes from JOE BUNYARD. Mercury Vapor Rectifier tubes such as #83, #816, #872, et al. should always be stored and handled in a vertical position. Before installing, apply filament voltage (5 V) only, for 30 minutes to one hour. This will increase the tube life. If turned off, allow a minimum of 1 minute before turning on again.

Also from Joe this question. What does the suffix "WA" stand for in a tube name, e.g. 12AU7 WA. Joe saw this in some older radio ads and noted a higher price on such tubes. The only thing I can think of, Joe, is that it could be the equivalent of the "A" designation (see "Meet the Tube" on page 2).

A number of you have asked about a tube-type amplifier for boosting an AM broadcast loop antenna. I have not been able to find any circuits that are directly designed for this purpose, but I did find an old junk box schematic that someone drew up for a friend a number of years (about 15) ago. I must say up front that I have not tried this circuit, so perhaps one of the more adventurous members might want to give it a try. This circuit is inductively coupled to your present antenna circuit through L2, and please note that only the filaments are at chassis ground. WARNING: FAILURE TO CORRECTLY ASSEMBLE THIS GROUND SCHEME WILL RESULT IN A "HOT" CHASSIS AND PASS UNWANTED VOLTAGE THROUGH THE COMPONENTS, THE RIG, THE ANTENNAS, AND, WORST OF ALL, THE USER. DO NOT ATTEMPT TO BUILD THIS IF YOU ARE NOT AN EXPERIENCED EXPERIMENTER FAMILIAR WITH SAFETY PROCEDURES. L2 is constructed by experimenting with a loop of 100 turns of #30 enameled wire configured into a loop sized roughly 2 x 5".



AM BROADCAST BOOSTER
OF UNKNOWN ORIGIN

See
note
in
article

117 VAC

(2)
20mfd
ELECT. →

130 V
20 MA
SELENIUM
RECTIFIER

FILAMENT

FOR SALE: Allied SX-190, good condition (SWBC only) \$135 + UPS
 Drake SW-4A, good condition (SWBC only) \$125 + UPS
 Dymek DR-33C Digital receiver (50 kHz - 30 MHz), with extra Collins mechanical filters, rack mount, and cabinet both provided. \$800
 FRG7, damaged by fire but repaired by Yaesu and fitted with new cabinet, works great as backup receiver, however, "DX" position of filter doesn't work despite \$105 repair bill, \$100 +UPS
 Collins 5LJ4 with 3 and 6 kc filters (mechanical) in original Collins cabinet (1 kc filter missing) \$300 + shipping.
 All available from: Matt Stutterheim; 510 Main St.; Roosevelt Island, NY 10044
 (212) 838-5182 (answering machine)

Two ways to improve audio of the R390. First, from DICK NELSON. He suggests that good audio can be had by coming off the diode load terminal on the back of the set (14 or 15 on TB 103) through a .25 mf capacitor to an external audio system. Dick uses an old Dyna preamp and amplifier in conjunction with a good speaker. The second method is used by LARRY DAVIS. He built a synchronous AM detector and a 10-watt audio amplifier which is fed from the AF output jack on the receiver. The results are well worth the effort. The detector system used with the 8 kHz filter gives response nearly like FM on strong broadcast signals such as the BBC. The circuit used comes from the April 1982 Popular Electronics. Your editor tried to get permission to reprint but could not, so you all will have to hit the local libraries for the schematic for this circuit.) Larry also says that it really does reduce fading distortion in SW and BCB stations. This is one I am going to have to build myself.

())))))))

Well, there you have it, Campers. Another issue come and gone. But, our stock of articles and materials for future issues is running mighty low. I'll need a lot more data for the next issue, especially for other receivers such as the Hammarlunds and Hallicrafters rigs. So, if you don't want to receive six pages of "Meet the Tube," please send your stuff post haste. Thanks for all the wonderful support to date. I am confident it will continue into the future with our rigs of the past.

THE HOLLOW STATE NEWSLETTER, c/o CHRIS HANSEN, P.O. BOX 1226, NEW YORK, NY 10159

PUBLISHER: CHRIS HANSEN EDITOR: SKIP AREY

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THE HOLLOW NO. 6

STATE NEWS-LETTER

JUNE 1984

ADDRESS FOR SUBSCRIPTIONS: Chris Hansen; P.O. Box 1226; New York, NY 10159

EDITORIAL ADDRESS: Skip Arey; P.O. Box 421; Mount Holly, NJ 08060

SUBSCRIPTION PRICES: Domestic and Canada/Mexico. . . \$4 for four issues
\$8 for eight issues

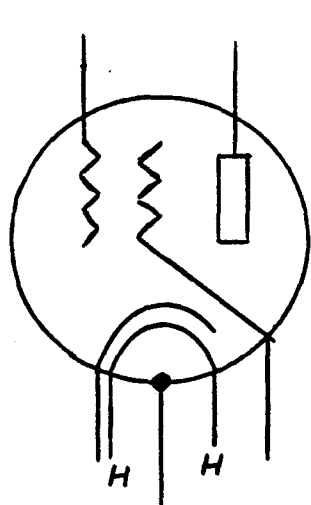
Make checks payable to: Other foreign: \$8 for four issues, \$16 for eight issues
Back issues: \$1 each USA/Canada/Mexico, \$2 each other foreign;
CHRIS HANSEN issues available: 1 through 5.

GREETINGS ONCE AGAIN, all you faithful followers of tube-type-tech. We are really becoming a tidy little group, with new members who are also addicted to the warm glow of fine old radios. But first, a word on the headline article from last issue. Many of you spotted the problem with this article. The capacitor in question on the R-390 IF sub-chassis is C-553, not C-533 as reported! The origin of this typo may just go all the way back to Uncle Sam, because, as your intrepid editor performed this small modification I referred to my Army manual (TM 11-5820-358-35), pages 68-69. If you have this manual you will note that Figure 41 has the C-553 capacitor mislabeled as C-533. C-533 is really off in the BFO circuit someplace. George Mulfinger thought it was an April Fool's joke, but many of our members picked up on the typo in addition to George. Our regular R-390 whiz DALLAS LANKFORD takes DICK NELSON's advice a step further. To begin with, Dallas suggests using a .01 1000v disc ceramic capacitor, although he notes that anything in the .01-.1 range with a voltage rating of 600v or better will do. Dallas goes on to note that there are actually two paths to ground -- one from one of the mechanical filters, and one from the ground of the trimmer caps. The ground from the mechanical filters was rerouted to the grounds of the trimmer caps, and the path from the trimmer caps to the chassis ground was replaced by one of the above-valued capacitors. The point of the modification as Dallas does it is that you now have two caps protecting the mechanical filters, so that if one cap shorts the other cap still protects the precious (and expensive) mechanical filter

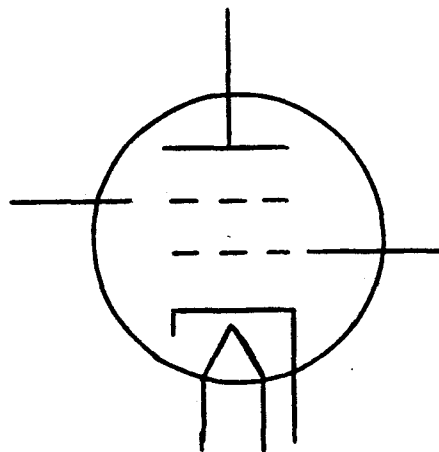
While on the subject of mechanical filters, the new (red cover #WS-84) Fair Radio Sales catalog lists "used-repairable mechanical filters" as well as new filters on page 27. I have never heard of repairing mechanical filters, so if any of our audience knows how to go about it, please send it along to HQ for the rest of us.

This Fair Radio Sales catalog is listing a special purchase of R-390As, used repairable \$215 and checked \$335. They also list the less-used but wonderful toy the R-392 for \$135 used-repairable and \$200 checked. You can get a copy of this catalog by writing to: P.O. Box 1105, 1016 East Eureka Street, Lima, OH 45802.

This episode of MEET THE TUBE concerns schematic symbols old and new. Deep in the bowels of your editor's mildewed collection live a number of circa-1940 RADIO magazines. You will note in the drawing an "old" way to draw tubes, and then the "new" more-conventional way. When I think over my rather meager understanding of tube theory, the "old" drawing



OLD WAY



NEW WAY

seems to look more descriptive to me. Anyone who might know the history of the evolution of the schematic symbols for tubes might share it with the troops.

0-0-0

At a recent hamfest I ran across Joel Knoblock, the proprietor of R.F. Connection, which we plugged (no pun intended, I hope! ch) a few issues back. He was amazed at the number of curious inquiries on your part, and looks forward to meeting all your connector needs. He's still at: Suite 11, 213 North Frederick Ave., Gaithersburg, MD 20877.

0-0-0

We have a new member who also has a business worth noting in our pages. Sue Coulter, 1000 West Columbus Ave., Space 11-A, Bakersfield, CA 93301. Sue runs Sue's Radio Repair; she specializes in pre-1950 radios. She also, along with some colleagues, has access to between 6,000 and 8,000 tubes. Sue sent us a rather amusing price list headed "Summer Cook Out -- Gourmet Menu." Some of the "dishes" of interest are: "Salsa Picante: 5Y4, 5W4, 81, 80, and 5Z3 or 5V4 ... all 5 for \$5.50." "Zen. Tranny Heart: new 11726 or 11723 . . . \$4.00" "Paella - 'yeech' 4 to 5 lbs. old boob-tube parts, many new in original boxes . . . \$4.00." There are more, so a SASE to Sue will get you a copy of this list. Sue also says that she and her partners will make a bid on any list of needs a HSN member sends them, so make up your list of needs and send it, with a SASE of course, to Sue at the address above. Also available are large electrolytic caps and many schematics.

Do keep in mind that most of those who are willing to provide HSN members with information and merchandise would appreciate SASE's with any requests for reply.

From MARTIN STAHL comes this word on tube testers. Martin agrees up to a point with DALLAS Lankford's observation that tube testers are unreliable. Martin informs us that HICKOCK still manufactures very reliable tube testers. They have a lab model #539C, and a less expensive model #6000B. He notes that older models like the 600A and the 800 show up on the used market, and can be rigged to test almost any type tube by adding a CA-5 adapter still made by Hickock. The reason for their reliability is that they have a line voltage adjustment which establishes a standard reference voltage applied to the tube under test regardless of variations in power line voltage. Also, the meter reading depends on a mutual conductance number measured in micromhos, which provides a more accurate gauge of tube status than the more traditional red-green face.

NEW MEMBER RICHARD DAVIS, 859 Helena Drive, Sunnyvale, CA 94087 is parting-out 6 R-390 receivers and 3 R-389 receivers. If anyone needs parts they should send a SASE with a list of needs. R-390A: no IF parts, some VFO, all RF, some audio and power-supply, knobs, meters, hardware. R-389: all "top-side" parts, some bottom side, knobs, meters, panel, and chassis.

REMEMBER TROOPS: THIS IS YOUR NEWSLETTER. IT IS THROUGH YOUR CONSTANT STREAM OF DATA THAT WE KEEP EVERYONE'S NEED FOR INFORMATION SATISFIED.

FOLLOWS AN ARTICLE ON R-390A/URR PTO ALIGNMENT BY DALLAS LANKFORD.

R-390A/URR PTO ALIGNMENT

Dallas Lankford
(c) August 1982

The purpose of these notes is to describe an alignment procedure to achieve almost exact end point alignment of the R-390A KILOCYCLE CHANGE (PTO tuning). This procedure is similar to the method described in NAVSHIPS 0967-063-2010, the navy maintenance manual published April 15, 1970, but is simpler because it avoids dropping the front panel. Thanks to Dick Truax for the crucial simplification, and for his general comments about PTO alignment which I have incorporated into the method below.

(1) PTO (VFO) Subchassis Removal **WARNING!!!**: Handle the PTO subchassis carefully to prevent damage or misalignment. To prevent misalignment, do not turn the PTO subchassis shaft or the KILOCYCLE CHANGE shaft (either outside or inside the front panel). To remove the PTO the R-390A is placed upside down. If the bottom dust cover is present, remove it. The PTO subchassis is in the center of the bottom three compartments. Locate the Oldham coupler and remove the anti-backlash spring, see Fig. 1 below. The Oldham coupler connects the PTO tuning shaft to the kilocycle change shaft. You will probably have to rotate the kilocycle change shaft with the front panel knob to bring the anti-backlash spring into a convenient position for removal. Do not loosen the spline socket head screws. To remove the spring I use a small hemostat which is ideal for delicate work like this. (Hemostats are also useful for soldering and unsoldering work, holding small parts, and other tasks, and are sold through several supply catalogs and at larger electronic supply stores. Or if you know a doctor or nurse, they will probably give you one or two free.) Put the spring in a safe place and do not lose it. Next rotate the kilocycle change knob until the Oldham coupler guide (the central disc) is in the position shown in Fig. 1 (when viewed from above). At this point, if you are the careless type, you should lock the KILOCYCLE CHANGE shaft with the front panel DIAL LOCK. Disconnect the blue plug P-109. (The metal cylindrical plug cover/lock mechanism rotates to unlock, and then the blue plug can be pulled out. If you cannot unplug P-109, examine the plug closely and make sure you have unlocked it.) Trace the white wire through the hole in the PTO compartment to the top side of the R-390A, unplug it from the RF subchassis (J 217), and pass it through the hole in the PTO compartment. Loosen the three green Phillips head screws completely, and carefully lift out the PTO subchassis. Because of the positioning of the Oldham coupler, and because you have locked the kilocycle change shaft, you must lift straight up. The coupler guide will probably fall free, but in any case remove the coupler guide and put it with the anti-backlash spring for safe keeping. PTO removal can also be accomplished with the R-390A on its side, but it is not as easy to replace the coupler guide in that position.

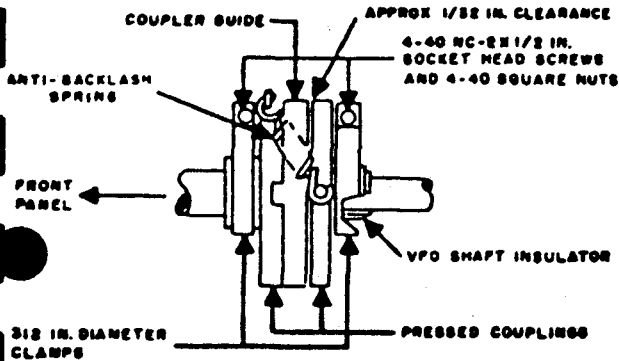


FIGURE 1

Next rotate the kilocycle change knob until the Oldham coupler guide (the central disc) is in the position shown in Fig. 1 (when viewed from above). At this point, if you are the careless type, you should lock the KILOCYCLE CHANGE shaft with the front panel DIAL LOCK. Disconnect the blue plug P-109. (The metal cylindrical plug cover/lock mechanism rotates to unlock, and then the blue plug can be pulled out. If you cannot unplug P-109, examine the plug closely and make sure you have unlocked it.) Trace the white wire through the hole in the PTO compartment to the top side of the R-390A, unplug it from the RF subchassis (J 217), and pass it through the hole in the PTO compartment. Loosen the three green Phillips head screws completely, and carefully lift out the PTO subchassis. Because of the positioning of the Oldham coupler, and because you have locked the kilocycle change shaft, you must lift straight up. The coupler guide will probably fall free, but in any case remove the coupler guide and put it with the anti-backlash spring for safe keeping. PTO removal can also be accomplished with the R-390A on its side, but it is not as easy to replace the coupler guide in that position.

(2) PTO End Point Adjustment Cover Removal The location of the slotted hex nut which covers the end point adjustment control is shown in Fig. 2 below. Older PTO's may not look exactly like Fig. 2 (some do not have the same shaped cut-out holes which give access to the slotted hex nut through the front bracket of the PTO), but the position of the hex nut is the same in all models. With the appropriate size screw driver, remove the slotted hex nut, and place it with the anti-backlash spring and Oldham coupler guide.

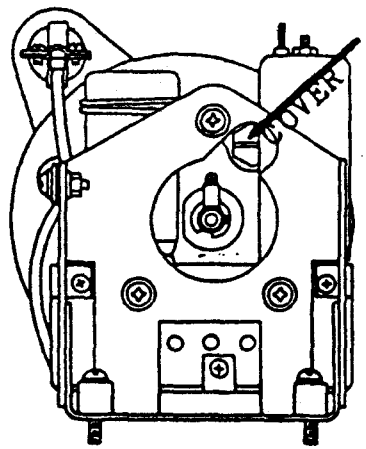


FIGURE 2

(3) PTO Subchassis Replacement Reverse the removal steps in step (1) above. Here if your PTO is a tight fit it may help to loosen (but do not remove) the two Phillips head screws that secure the triangular bracket towards the rear of the PTO compartment. But to tighten these two screws firmly after replacement of the PTO requires either a flexible shaft Phillips screw driver or an offset Phillips screw driver with appropriate head size. These two screws can be gotten reasonably tight with a straight blade Phillips screw driver angled past the flange of the triangular bracket, but do not use much pressure or you may strip the heads of the Phillips screws. Be careful when replacing the anti-backlash spring. A little grease on the Oldham coupler guide may help hold it in place during replacement of the PTO subchassis. Again, a

hemostat is very helpful for spring replacement. Make sure the spring ends seat properly in the grooves of the spring posts in the Oldham coupler. A close inspection with a flash light is probably a good idea.

NOTE: If the above preliminary steps seem complicated, they are! PTO end point adjustment is not for the impatient or careless.

(4) Warm Up Turn on the R-390A and let it warm up for at least an hour. I do not normally use my crystal ovens, but if you do, remember to turn them on with the switch on the rear panel. In some cases, an hour may not be enough warm up time for an R-390A to stabilize. One of my R-390A's seems to require 2 - 3 hours for stabilization. If in doubt, wait longer than the recommended one hour minimum.

(5) 100 KHZ Calibrator Alignment Tune in WWV on one of its frequencies. Turn on BFO and adjust BFO PITCH to zero beat with WWV. Turn FUNCTION switch to CAL. A het with your 100 khz calibrator should be heard. With a small screw driver or metal blade alignment tool, adjust C 310 through the access hole in the rear panel for zero beat. Do not change BFO PITCH setting from the above setting.

(6) End Point Adjustment With FUNCTION switch set to CAL and BFO on (and at the same BFO PITCH position as in step (5)), set KILOCYCLE dial to +000 (a het of the BFO with the 100 khz calibrator should be heard), tighten the ZERO ADJ. knob, zero beat by turning the KILOCYCLE CHANGE knob, and release the ZERO ADJ. knob. Set the KILOCYCLE dial to 000 (the low end of the 1000 khz range). Again a het of the BFO with calibrator should be heard. Now comes the tricky part. Cut a plastic handled metal blade tipped alignment tool (Radio Shack 64-2223 or equivalent) to 3 3/16 inches long, see Fig. 3 below. The maintenance manual recommends using a non-metallic alignment tool, but I experienced no problems with my plastic handled metal tipped home-brewed tool. Slip the alignment tool through the holes in the RF subchassis front plate and PTO front bracket, and engage the end point

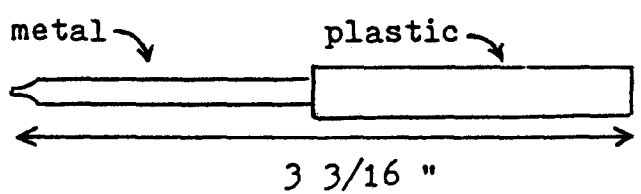


FIGURE 3

adjustment control (slug). Good lighting is essential at first until you learn the "feel" of proper engagement. I used a flash light to visually verify that my alignment tool properly engages the end point adjustment slug. You should also be sure that your tool does not damage the threads which accept the end point cover nut. Some end point slugs can be turned by hand, but mine was stiff, so I used needle nose pliers to rotate my alignment tool. About 3/4 inches of the plastic handle protruded past the front plate of the RF

subchassis near the ten turn KILOCYCLE shaft stops for a good grip with the needle nose pliers. In any case, turn the alignment tool (either clockwise or anti-clockwise) until zero beat is obtained. My PTO was about 2 khz off at the end points, and this initial adjustment required about 1/2 turn. Next tune back to +000 (the other end of the 1000 khz range). Again, a het should be heard. Zero beat as before, using the ZERO ADJ. knob and KILOCYCLE CHANGE knobs. Tune back to 000 and zero beat with the end point slug again. Alternately repeat the +000 and 000 adjustments until no improvement is obtained. After 5 or 6 passes, you should be within 50 hz or less. WARNING: Do not reverse the +000 and 000 steps during this procedure.

(7) PTO End Point Adjustment Cover Replacement Remove PTO subchassis as in step (1). Replace slotted hex head nut (refer to step (2)).

(8) PTO Subchassis Replacement Refer to step (3). NOTE: Before replacing the PTO subchassis for the final time, inspect the Oldham coupler, and clean and re-lubricate if necessary. I often use 3-in-1 oil, but you may want to use a heavier lubricant. I have also used a good quality bicycle bearing grease before with excellent results.

REMARKS: My first (and, until now, only) PTO alignment was done on a unit which was about 2 khz off (1000 khz actual = 1002 dial reading). End point calibration was achieved with about 1/2 rotation of the end point slug after 5 or 6 alternations of the +000 and 000 adjustments. Neither of the two PTO's I have experience with (one aligned by Dick Truax, and the other by me) are exactly linear throughout the 1000 khz range even though the two end points in both cases are almost exactly 1000 khz apart. After a thorough warm up, the R-390A I bought from Dick is as much as 200 hz off at 100 khz calibration points between the end points, while my other R-390A is as much as 400 hz off. Such departures from linearity are common, and the maintenance manuals specify that linearity should be better than 300 hz when calibrated at the nearest 100 khz calibration point. In both of my R-390A's, linearity is probably within 50 hz when calibrated at the nearest 100 khz point. In the PTO that I aligned, zero beat at 000 was obtained by rotating the end point adjustment slug clockwise (when viewed from the front). I would like to express my appreciation to Dick Truax for his patient explanations and discussions of PTO alignment. Without his advice and discussions, these notes would not have been possible.

The preceding article was originally published in the National Radio Club's "DX News," and is reprinted with permission of the author. ed)

ADDENDUM: Check the PTO tube before alignment, and replace, if necessary, before alignment. I learned this lesson the hard way by replacing the tube and tube shield after end point alignment, and then learned to my dismay that the change brought the PTO about 700 hz out of alignment.

REMEMBER, DEAR READER, how last issue we asked the musical question: just what do those "WA" numbers mean??? Your editor received many variations on essentially the same theme, perhaps best described by SUE COULTER. "Increasing use of radio in mobile installations showed a definite need for more rugged internal tube elements were manufactured of heavier or more rugged material. Some were specially treated in order to withstand greater overloads. These tubes were termed 'ruggedized,' and the letter "W" was added as a suffix." Many JAN Mini-tubes have "WA", which stands for sturdy construction with quick-heating elements. There, another mystery solved through your newsletter.

NEW MEMBER SCOTT FABRIS, 3626 Morrie Drive, San Jose, CA 95127 needs copies of pages 16, 17, 28-36, 114, 126 of Air Force Manual TO 31R1-2URR-442, and wishes to sell a Scott military receiver, and wants to buy a prewar Scott. Write to Scott for details.

SKIP WESTRICH sent me a copy of the February 1971 issue of QST, and in it was an article that almost made your editor cry. It involves an account of the activities of Ralph McClintock K1SCQ on the afternoon of January 23, 1968. Ralph was stationed on board the U.S.S. Pueblo when the North Koreans captured it. The article recounts how his shipmates and he had to take sledgehammers and fire axes to the ship's R-390A's and all of its other "juicy" equipment. I am sure many of you have that field operations manual that describes how best to destroy your rig in time of emergency. Very very chilling thought. I am glad my rig is decommissioned because I don't think I'd have the heart.

AT THE REQUEST OF THE SHARP-EYED PUBLISHER, who tired of your editor's childlike scrawl of schematics, I went in search of the ideal draftsman's template for use in our journal. Very few are still around that have cutouts for tube work, but one nice one some of our members might like to purchase for their own use or for submitting schematics (although it is by no means necessary because your editor has a tolerant eye) is the RAPIDESIGN #316 Missile and Space Electronics Template. Wow! Even the title conjures up images of old 1950's sci-fi movies. With template in hand future issues should have much improved schematics to match our better printing process.

JUST A SHORT NOTE TO once again thank all of the contributors in all of the past issues. I recently took a few days vacation and did a major teardown of my R-390 and performed no less than seven modifications, adjustments, and improvements, all made possible by our contributors. At this point it looks like I will have another half-dozen or so by my next maintenance session. Remember to keep articles about all types of tube receivers coming in to Editor's Central -- we need articles on other receivers than the R-390. Any of you Hammarlund or Hallicrafters buffs out there have something to offer? Please send it in posthaste!!!

PUBLISHER'S CORNER: Please take a moment now to check the mailing label on the envelope your HSN arrived in. If there are any typos, please tear out the label, correct the typo, and mail it to Publisher's Central (P.O. Box 1226, New York, NY 10159). I am going back to the stone age -- xeroxed mailing labels instead of computer printed labels. Oh well. Members will note that the foreign rates have changed -- doubled, in fact. HSN is still a great buy at twice the price -- this proves it (hi!). HSN has no advertising policy -- we do not take fees for printing information about suppliers. We would appreciate it if the members would contact us and recount the results of their contacts with suppliers mentioned in these pages. A STORY: When I first bought my R390, five years ago, it had no meters (like most R390's obtained from the government). I was shocked to find that a well-known supplier in New Jersey wanted \$70 for the pair of meters I needed. When asked why the price was so high this source stated that inflation was rampant, didn't I know? Well, I was resigned to being meterless when my eye fell on a catalog of McGee Electronics in St. Louis. They were advertising military-type meters, both audio level and signal level meters! I immediately sent away and bought 10 of each, because the prices were \$1.79 and 1.19 respectively! So much for inflation.

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CHRIS HANSEN

WELCOME ONCE AGAIN TO THE NEWSLETTER WITH THE TUBE-U-LAR OUTLOOK. AHEM!!!!

AM AFRAID I must report that things appear to be fairly lean, material-wise, here at the Editor's desk. Chris and I intend to continue to publish the best piece of vacuum tube based journalism that we can, but this will only be possible if you, the members, get more data, articles, and notes to us. Please help us out so that the Hollow State Newsletter continues to be everything that it now is.

There! Now I can get down off my soap box and give you the data you need to keep your little tubes warm.

As many of you recall from our gala tube issue, your humble editor receives catalogues from the various commercial outlets that stock new tubes for sale. Well, 'tis 'bout one whole year since we obtained the original data, and it appears from the most recent catalogues that prices, by and large, have remained stable, with only slight (10%) price increases...except, of course, for rare or unique tubes. But, alas, there have been no particular price breaks on common tubes.

Along these same lines, I am about halfway through the hamfest season and I am encountering more and more tubes that are being priced as collectors' items, as opposed to tubes to be used in regular service. Many more people seem to be buying tubes as collectables, albeit rather esoteric ones. (It's like collecting glass insulators. ch) So, it appears that in future we will find ourselves in competition for these "bottles."

With this in mind I feel we must begin to seek out designs which will (sigh!!) allow us to replace tubes with FETs and such. So there!!! Having said it, your editor now throws down the gauntlet to our more technical types to search and peruse the data and literature to provide us with these circuits. I have seen some fine surplus gear that engineering students have converted over to FETs as class projects. I have even heard of (are you sitting down?), "Solid-State R390s!" Is this possible? What I think all our readers would look forward to would be circuits that could be whipped up and essentially "plug" in in place of tubes. So, get cracking out there. I know from our membership list that the technical ability is out there in our ranks. Besides, it might be just the shot in the arm our newsletter needs.

YO, BUDDY! (Philadelphia vernacular) You say you have encountered drifting in your receiver? TODD ROBERTS shares with us the following on a possible hollow-state cure for drift. Todd's notion applies particularly to the R390s but can be used with any tube-based VFO or LMO. Todd cured the drift problem in his VFO by substituting several other 5749/6BA6W (Tube V701 in the R390A) tubes each in place and noting how the receiver drifted during warm-up. He hit upon a "good" tube that shows very little drift during warm-up. His receiver now drifts no more than 100 cycles from a cold start. So, if you have access to several of these tubes it might be worth trying each of them if your receiver drifts far beyond human tolerance. Todd also applied the same technique to his BFO and crystal calibrator tubes with equal success.

I must report a scrounging coup. I was walking between my office and my post office box one rainy day, and came across yet another old tube-type marine-band radio out in the trash. This one yielded ten 801's and the potential of building one serious amplifier for the low bands. Not to mention the fifteen odd standard tubes that are becoming harder to find. Also, my scrounging has produced no less than twenty 5-tube "kitchen radios," all loaded with goodies. That's better than 1 radio per week. So practice getting up really early on garbage days and take your doggie for a nice long walk. You could train the dog to pull a small wagon so you do not break any of your internal anatomical connections if you do run across an old marine radio. I am still not quite right from that walk to my post office.

I owe DICK NELSON of ASTRONOMY UNLIMITED a bit of an apology because I missed out on some stuff he has to offer for sale to members of our group. Dick has what appears to be quite literally a ton of tube radios and parts to sell, including the following:

Eight long-wave tube sets, such as RBA, RBL, RAK, AN/SRR-11, et al. All cover approximately 15-600 kHz. All are too heavy to ship.

Many general coverage sets, including RBA and RBB sets, one of which even has a decal of the USS Hornet, which was sunk at the battle of Midway. The radio was out for servicing when the ship went down.

A whole lot of R-390 subassemblies, parts, filters, etc. A good stock of subminiature wire-lead tubes -- these are becoming hard to find.

Dick can be reached at 1-805-526-7066, or you can write him at 3470 Travis Ave, Simi Valley, CA 93063.

A few issues back we asked people to track down substitutes for the tube complements of various radios. TODD ROBERTS has provided us with tube substitution data for the R390A's 9 different tubes. Total: 26 tubes. Standard subs underlined.

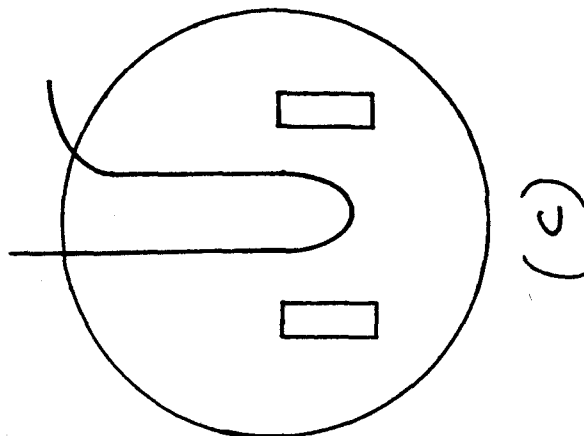
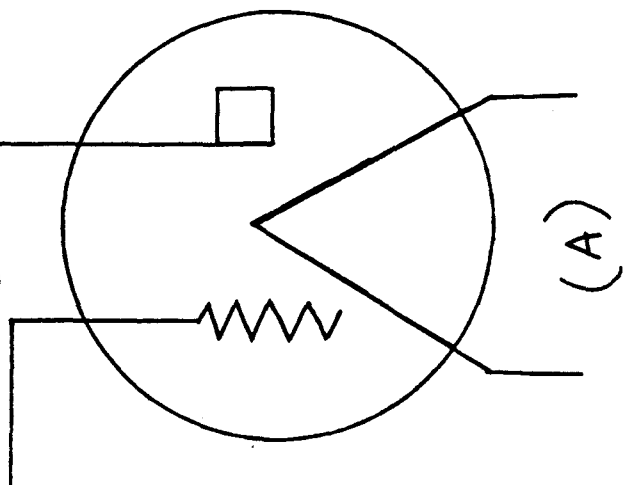
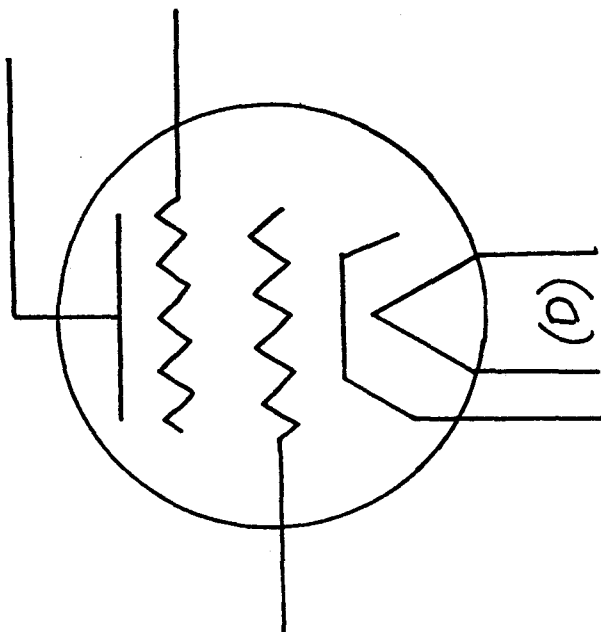
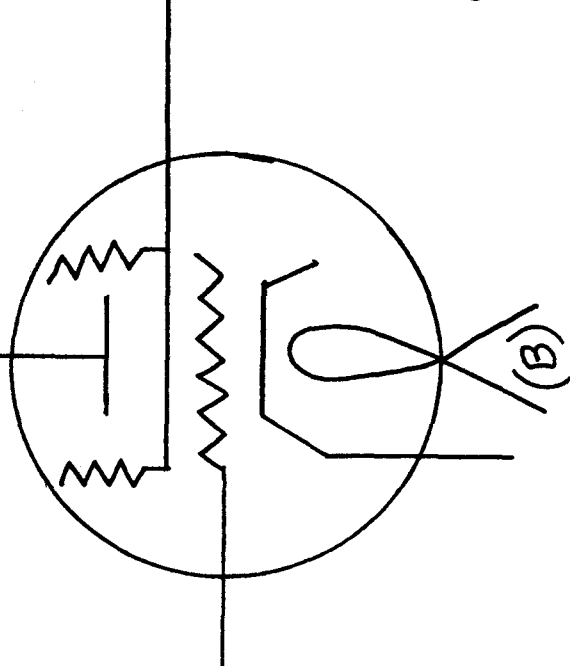
- 6DC6 : 1 tube, subs 6HQ6, 6HJ6, 6BJ6, 6GM6.
- 6C4W : 3 tubes, subs 6C4, 6C4WA, 6135, 6AB4, 6DS4.
- 5814A: 7 tubes, subs 5814, 5814WA, 6680, 7730, 12AU7, 12AU7A, 12AU7WA, 12AT7, 12AT7A,
- 5654 : 2 tubes, subs 5654W, 6AK5, 6AK5W, EF95, 6096. 12AT7WA.
- 5749 : 5 tubes, subs 6BA6, 6BA6W, EF93, 6660, 6HR6, 6AU6, 6AU6A, 6HS6.
- 6AK6 : 4 tubes, subs 6AU6, 6BA6, 6HR6, 6HS6.
- OA2 : 1 tube, subs OA2WA, 6073, 6626.
- 26Z5W: 2 tubes, no subs, see back issues of HSN for diode circuit replacements.
- 3TF7 : 1 tube, subs 3TF4, 3TF4A, 3HTF4, RT-510, or one of the many modifications published previously in HSN.

DOES ANYBODY KNOW HOW TO REPLACE THESE TUBES WITH FET'S OR OTHER SOLID-STATE DEVICES??
SHARE THIS INFORMATION THROUGH THE HOLLOW STATE NEWSLETTER.

WE COULD ALSO USE TUBE SUBSTITUTION INFORMATION FOR THE HAMMARLUND HQ RIGS AND OTHER POPULAR TUBE RIGS.

Another supplier of surplus rigs has loomed over the horizon (my, what a terrible sentence!) N.E. LITCHE, P.O. BOX 191, CANANDAIGUA, NY, phone 1-716-394-0148. They are selling checked R390A's for \$250, CV-1982 SSB converters for \$80.

MEET THE TUBE this issue brings our first guest host, Sue Coulter. In addition to clueing your editor in to the ingredients of Paella, Sue is most mindful of fine old tube diagrams and even knows of the old drawings that omitted the outside circle. There are so many that it is little wonder that those who grew up in the days of 2N222's do not recognize them. For your consideration we present four tube symbol exhibits. (A) is a symbol used by ALL AMERICAN MOHAWK for a 171-A. (B) is what you will see if you are looking at a dog-eared schematic which includes a THOMAS EDISON 224-A. (C) comes from the symbol for a RADIOLA 280 (where are companies like Radiola when we really need them?), and (D) is a PHILADELPHIA STORAGE BATTERY COMPANY 224-A. Sue also included many more designs, which we will share in future issues. She reminds us of a great book called SAGA OF THE VACUUM TUBE, available through SAMS BOOKS. It's not just a dry history book, but includes many pictures and anecdotes. For example, it seems that Edison had developed a grid tube, but didn't know it, because he was too busy developing the light bulb. Just think of it, folks. We could all be listening to radio in the dark. This is progress???



One of our toops (what is a toop, Skip? Is it like a Camper? ch), Mike Harla, 158 West Maplewood Avenue, Philadelphia, PA 19144 picked up a R390A filter from Radio West. Lucky for him, but he can't figure it out in terms of input or output. He also needs the resonating capacitance. The type is F455 N40, ser. is 4V2, P/N: 526 9160 009. This is not the first question we have received concerning the use and abuse of Collins filters. Can anybody out there give Mike a hand, and would someone write up a simple technical article on possible uses of the mechanical filter???

Fellow traveler KEN ZICHI, 2001 S. Huron Pky, #12, Ann Arbor, MI 48104 has access to all the Sams plain number schematics and the Rider's manuals. Just send KEN a SASE and \$1 and he will copy away and refund any excess. If you just need the schematic send the SASE and 20¢ (or a stamp). Also, Ken is looking for a way to hook up an S-meter to a Hallicrafters S-40A. If you help Ken out with this, send us a copy and we'll share it with everyone else in the group!

BILL BAILEY has informed us that when the 26Z5 tubes failed in military applications, they used plug-in solid-state substitutes. They worked with no additional modifications. (yep, right in the 01' tube socket, Bunkey!). They carried such ID numbers as ED5902, EDI 8033, and STR,ST26Z5W,7942. To Bill's knowledge there is no civilian supplier of these goodies. If anyone has these in their sets or can shed some more light on this please let your fellow users know. Your humble editor has been getting a teeny bit of arcing in his R390 power supply during warm-up since I made the diode and resistor substitution, so I am very curious about these items, or a cure for my heart-wrenching buzzes, for that matter.

We couldn't let an issue go by without the help of DALLAS LANKFORD. Dallas would remind us that tube socket resistances and voltages can only be used to trouble-shoot if the resistance and voltage tables are correct. He notes that this is not the case for later model HQ-180's and 180A's. One thing that should be done is to check the tube socket resistances and voltages of an actual unit in good operating condition to determine whether the tables in the manual are correct. Otherwise, you could spend a lot of time trying to figure out what is wrong with your unit using this approach. By the way, in addition to what Dallas says here, it might be wise to check the readings and calibration of your own personal VOM. It would seem to be a good idea to check your rigs out with your meter to see what deviations from normal your VOM shows. (I hope that made sense and did not detract from Dallas' comments. sa).


WAYNE HEINEN has just one thing to say to all of us: BEWARE OF CLOTH!!!! It seems that a recent firing up of his HQ129X led him to discover a problem he had not dealt with, but which all of us will experience at some time. The cloth wire insulation will give way, especially around the pilot light sockets and grommetted holes. This will happen especially in dry environments. Smoke shorts and frustration may be avoided by checking these areas and any cloth covered wiring upon acquiring an old receiver, and of course before firing it up, lest you fire it up most literally!!!

By the way, Wayne sees to it that the Hollow State Newsletter gets out across the Medium Wave Interlude section of HCJB's DX Party Line. If you can't receive HCJB see if your radio's plugged in. Fillings have been known to work also.)

INTERMITTENT WEAK/LOSS OF RECEPTION is Sue Coulter's subject. Do you have an old tuber which plays great when first turned on, but fades in a few minutes? You check obvious things like the line cord, antenna, ground connections, and wiggle the tubes around. Nothing is wrong -- what next?? One clue may indicate the next move: does it fade and stay quiet, or does it come back on briefly only to fade again? This on-again, off-again syndrome may be a defective tube whose filaments open when hot and silence the receiver, then cool down and unite again, turning the receiver back on. Time the cycle, then put each tube in a tube tester and leave it under test for this length of time or longer before deciding it's OK. If working in a cool room, invert an ordinary drinking glass over the tube to simulate heat conditions inside the set's cabinet (that should freak out the local Radio Shack manager. sa).

Sets that fade and stay weak or silent until another electrical device on the same circuit is cut off or on most probably have intermittent coupling or bypass capacitors. A small surge in line voltage causes an arc over a poor connection and restores it temporarily. The set will suddenly gain volume, but fade again.

If you haven't already replaced the original paper capacitors, now is the time. Do not forget to check the resistors as well. Replace any that deviate from tolerance percentage. Beware of bargain capacitors; if you must use them, check them with a good meter such as the SPRAGUE TEL OHMIKE or a similar apparatus. Do not use a VOM to test leakage. Use test equipment capable of submitting them to the 450-1000 VDC they must endure in a radio.

When replacing a component, it is best to remove all leads from the terminal, clean off the old solder, and resolder as if you were just assembling from scratch. The routine use of lap joints is sloppy technique, but there are two places where such joints might be best. This depends upon soldering equipment available, i.d., use only fine-pointed, relatively cool irons on lugs attached to wax-covered coils. Use a very large blunt taper straight iron to make chassis grounds involving puddles of solder. The heat radiated by a large iron or gun can loosen the windings of small coils in a tightly-packed assembly and render them useless or incapable of holding alignment. A small or medium-size iron cannot heat a chassis sufficiently to produce a good bond covering a half-inch or larger surface. Therefore, in the absence of these tools, Sue suggests cutting the old lead $\frac{1}{2}$ " or even $\frac{1}{4}$ " from the original joint and making a hooked lap:  , and crimping the hooks before soldering.

If the capacitors have been replaced before the intermittent behavior started, try reheating the solder joints. Touch up original factory joints that may have been poorly done or have cracked.

One hopes that tube testing, C & R replacement, and retouching of soldered connections will cure the intermittent condition. If it does not then prepare to spend some time with a can of coolant spray.

SPEAKING OF SOLDERING, DALLAS LANKFORD supplies these data on soldering and unsoldering. If you own an older tube-type receiver, chances are that it has had some work done on it. And, I have observed that in some cases the soldering was not well done. Here are some tips I've developed through experience. If a solder joint looks different from others in the unit with a similar solder lug and similar number of wires, it may be poorly done. For unsoldering I use Chem-wik -- Radio Shack and other types of desoldering braid do not work nearly as well. My iron is a 45-watt unit with steel-plated tip. Copper tips are fine if you clean them regularly, and occasionally file the tip. To unsolder, apply the Chem-wik braid to the joint, and touch the iron to the braid. When the solder melts it is sucked up by the wick. For solder joints with lots of solder, cut off the end of the wick and repeat as many times as necessary to remove all the solder. If the wires become loose or fall off the lug as the solder melts, it is definitely a bad solder joint. Many times a bad joint can be redone without cutting the leads and starting over. Dental probes, hemostats, and needle-nose pliers are useful for recrimping loose wires securely to solder lugs. Only after the wires are firmly attached to the lug is solder applied.

Correct technique is to apply the iron tip to the lug and solder (rosin core) nearby but not on the tip itself. I often apply a little solder to the tip to improve heat conduction to the joint. If wires must be removed from a lug, dental probes and hemostats are essential. (Note: a hemostat is a medical clamp, something like a flat-tipped scissor-like tool that locks closed. Your local medical supply house will have them in profusion, and many Radio Shacks et al. also not stock them. ch) Even with care, wires must sometimes be cut (as near the lug as possible) and re-stripped. Stranded hook-up wire (used extensively in most receivers) is difficult to unsolder because the strands break easily, and it retains solder, which makes re-inserting and re-crimping difficult. When extra length is not available, as might be the case in line or RF-gain replacement, one solution is to firmly wrap the wire ends together with #22 solid wire, which is in turn attached firmly to the lug and then soldered. In other cases, splicing works nicely. Twist the wires together firmly and solder (see lap-joint above. ed) A small insulated crimp connector can be slid over the joint and crimped. Taping solder joints together is not recommended for insulation because tape ages poorly.

If you have doubts about how a good solder joint is made, unsolder a few in your receiver and look closely at how the wires are crimped around the lug. Hammarlund in their HQ-170s and HQ-180s occasionally "float" one end of a component (resistor, capacitor, et al.).

For example, one end of a resistor is merely stuck through a solder lug hole. Such an arrangement is really poor wiring practice, but works when the other end of the component is firmly attached and soldered first, and tension is used to hold the floating end against the lug.

Well, Campers, that wraps up all we have for this round. We really need a great deal of material, especially stuff that takes us beyond the R390. It may be my favorite receiver, but I also use an HQ-180, and I sure would like to learn about its innards. PLEASE (just imagine your humble editor down on his knees before his Sears Communicator II mill). Send in more information, articles, circuits, Meet the Bubes, anecdotes (I'm not the only funny person, you know), tube complements, Solid state (ouch) replacements, and anything else appropriate for HSN. The publisher will give a free year's subscription to the best NEW contributor (in his and my judgment) next issue. See you in 3 months. Skip.

PUBLISHER'S CORNER. This issue is late because your publisher came down first with tonsillitis, and then with an affliction known as Bell's Palsy (partial facial paralysis -- left side only). I lost 20 pounds in a week because of the discomfort. I don't need that weight, but it was a shock nonetheless. The Bell's Palsy will pass within two months, but the throat has improved muchly, thanks.

Just as a matter of record, issues 1 through 4 of HSN/R-390 Newsletter are out of print for the moment. Perhaps next year we will reprint those issues. Those who ordered back issues along with subscriptions have had their subs extended -- those who only ordered back issues have had their checks returned, with apologies.

I would like to second Skip's plea for more material. You should hear him -- he's a shadow of his former self -- pining away because he wants more material from you, the readers (hi). Seriously, folks, a few people are supporting us well now -- we'd like to hear from all of you. As was mentioned above, the NEW contributor of the best tidbit/article in December's HSN will get a free one-year extension of his/her subscription.

THE HOLLOW STATE NEWSLETTER, c/o CHRIS HANSEN, P.O. BOX 1226, NEW YORK, NY 10159

PUBLISHER: CHRIS HANSEN. EDITOR: SKIP AREY

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THE NEXT PUBLISHING DATE IS DECEMBER/JANUARY (TO AVOID THE CHRISTMAS RUSH). YOUR CONTRIBUTIONS OF MATERIAL MAKE THIS NEWSLETTER POSSIBLE.

SUBSCRIBERS NOTE: Check your mailing label -- if corrections are needed send the corrected label to the publisher at the New York address above. To find out when you are due for renewal, look on the envelope. If the stamped legend: 'Last issue please renew' appears, this is your last issue. Otherwise, look on your label -- you will see the words "SUB EXP #" and a number. The number is the issue number of your last issue (8 is December/January, 9 is March 1985, 10 is June 1985, etc.) Thank you.

THE HOLLOW NO. 8

WINTER 1984-5

STATE NEWS-LETTER

ADDRESS FOR SUBSCRIPTIONS: Chris Hansen, P.O. Box 1226, New York, NY 10159

EDITORIAL ADDRESS: Skip Arey, P.O. Box 421, Mount Holly, NJ 08060

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Please make checks (U.S. funds only) payable to CHRIS HANSEN

HELLO ONCE AGAIN, AND A HAPPY HOLIDAY SEASON TO YOU ALL. Am I the only person in the world who decorates his shack Christmas tree with TUBES?? First, the news. The new 1985 ARRL Handbook is out, and when compared to my 1964 edition, it is quite amazing. The 1964 edition is almost exclusively tubes and tube circuits, with tons of data about our little glass-enclosed friends. The 1985 Handbook contains a mere one and one-quarter COLUMNS on a SINGLE PAGE (out of hundreds of pages). There are no references to receiving tubes at all. So it goes. Still, it is a handy book to have to learn about electronics; you will be even happier if you chase down a pre-1965 edition at a hamfest. I recently located a 1965 ALLIED (that's pre-Radio Shack for you younger folks) Electronics Data handbook, cover price \$0.75. My tube friends and I read it only after midnight in a circle gathered around the light from an overdriven 6AU6. But, I am waxing nostalgic, and I want to save that for MEET THE TUBE. Excelsior. . . Our first tidbit comes from JOHN SCHMELZER, WB5WRW (who owns a 1966 Allied Radio Tube Substitution list -- there I go again). John tells us that some older tube socket contacts may have oxidized over the years, giving non-linear contact resistances. Unusual R.F. and I.F. amplifier oscillations often result from this oxidation. The offending tube can be identified by wiggling each tube slightly. A little contact cleaner sprayed into the socket is a quick solution; more permanent results can be had by soaking a toothpick in the cleaner and wiping the insides of the contacts, but care must be taken not to spread the contacts apart so that the spring pressure is lost.

THE WINNER OF THE NEW CONTRIBUTOR CONTEST IS (drum roll please) EDWARD MC FADDEN, who sent us, along with many items you will see in future issues, this tale about his tube receiver: . . . Just over 3 years ago, I purchased a used Hammarlund HQ-180AC receiver from an individual in the great State of Iowa. Upon receiving the set from the UPS delivery service, I immediately set about examining it for any problems. Fortunately, there was very little wrong with the set other than dirt inside and out, and its need of alignment. After a few weeks use, I decided I could use a new set of tubes for it, as the BCB DX season was already upon us. So, I ordered a set of new tubes from Lindal Tube and Transistor Company in New Jersey. I had to buy a RCA 6X4 as Lindal didn't list that tube on their order form. Shortly after installation of the new tubes and several hours of burn-in time before tweaking up the alignment, I noticed a problem. I smelled burning carbon and heard an arcing and sizzling sound. As I turned the RF gain pot counterclockwise, I noted the problem ending. I realized that by turning the

RF gain pots ccw, that more resistance was being introduced into the cathode circuit of the 6BZ6 RF amplifier tube, and that the RF gain pot had to be handling more voltage than it was intended to. Unfortunately, I didn't realize all of this quite quick enough, as permanent and unrepairable damage had already occurred to the pot. Upon examining the underside of the chassis, I noticed a 2-watt resistor (R-18 47K) hidden under the IF transformer T_c was burned up, and the 10K pot of the dual 10K/15K RF gain control also burned up. Upon replacing these 2 parts I fired the set up again. The new 2-watt resistor began to warm up quite quickly, so I turned the set off. I pulled the 6BZ6 RF tube and replaced it with the original tube the set came with. The 2-watt resistor appeared normal when I fired it up this time. I tried the other 6BZ6 from Lindal that I had installed in the crystal calibrator circuit. I turned the set on for a few moments and, lo and behold, the resistor had already begun to smoke. I had no 4-watt 47K resistors, so I soldered 4 1-watts in a series parallel configuration equal to one 4-watt 47K. Now I couldn't fit all this into the space available, so I soldered leads to the points where the resistor was attached, and brought them out to the far side of the place where the shaft passes underneath. . .

(it is well known that tubes often vary somewhat in characteristics and quality; a visit to your local Radio Shack with its tube tester might reveal what's wrong with the two 6BZ6's. ch)

From WILL MARTIN comes this observation: "Anyone who works on SW receivers needs an RF signal generator. Traditionally, these have been relatively elaborate and expensive devices, because they needed not only stability, but also an accurate dial mechanism for frequency readout. The advent in recent years of the digital frequency meter, often at very reasonable prices of less than \$100, has made the need for fancy dials or accurate calibration superfluous on a signal generator; the operator can easily put a frequency meter in the test circuit and read the frequency exactly.

"Therefore, why has no company come out with a low-cost (under \$100) RF signal generator? It should be no more expensive to make a good RF signal generator than it is to make a decent AM radio. Anybody have an answer??"

Publisher: "Well, I suppose the answer is this: there is really a bigger market for AM radios than there is for RF signal generators. I would guess that if we commission a market research company to do research on this market, come up with conclusions, and present them to a manufacturer, they might be swayed into putting one out. Most of the market is with repairmen and amateurs/SWL's/tinkerers. Most have their own setups now with or without a frequency meter. Perhaps the solution is a very low cost frequency meter advertised as being compatible with everything electronic, and sell that to all the people who now have an RF signal generator with a dial readout?!"

In the spirit of international relations we share this letter from FRITZ BRUNS, DC8XA, Stupfstr.2, D-8 Munich 19, Federal Republic of Germany: "Hundreds of OM's and SWL's in Germany own R390A's, R388's, and R392's. I have been an R390 owner for two months now. It is an old one that needs some technical polish. Of course, repair parts are not available here. I need some parts for the reconstruction of my R390A, and some spare parts. 1) VFO, complete (6BA6W/5749W). 2) Line level meter. 3) Crystal oven w/ crystals 0.2 & 17mc. 4) Top and bottom dust covers 5) condensers 2x 45uf, 3x 30 uf, 300 VDC. 6) Technical manual, and 7) SSB converter. If anyone can help Fritz, please write him at the above address, including the prices, and possibly some discussion of shipping arrangements. I have this image in my mind of one of our members trying to cram a rack-mounted SSB converter into a Coca-Cola bottle while checking out a map of the Gulf Stream currents.

YOUR HUMBLE EDITOR HAS RECENTLY RECEIVED Catalogue Supplements WS-84 from Fair Radio Sales, 1016 East Eureka Street, P.O. Box 1105, Lima, OH 45802. If you are an R390 owner you cannot last another day without the supplement. They list not only the rig itself at competitive rates but spare upon spare upon spare, all at reasonable rates (Hi, boys and girls, can you say 'Slug Racks and Springs, only \$3.00'?) I called out to Lima recently, and they assure me that they can meet many of the parts needs of R390 and R388 owners well into the future. Also, they are glad to accept your calls concerning your particular needs at (419) 227-6573.

WAYNE HEINEN has something to relate to us all concerning GARAGE SALE SCROUNGING. Wayne tells us to Never Overlook the Not Too Obvious. . . a used Heathkit VTVM with a busted case yielded up a 12AU7, 12AT7, and a 6AL5, all good and all for \$2.00 (total). A used and abused reel-to-reel tape recorder (Wollensak) got Wayne a variety of tubes, 12AT7s and 12AU7s among them, for \$1.00. Along with the older AM and AM/FM radios that don't work, these items appear regularly at prices that save money on spare tubes. Wayne also says not to be too quick to strip these old sets. Wayne collects old production model AM radios (an addiction he shares with your humble editor). He hits the garage sales for the occasional real find, for example, an RCA 5X model, circa 1936 for only \$5.00. (Hmmm, I saw a few old Art Deco AM radios with Bakelite cases (remember Bakelite??? You're getting old!) selling in a flea market next to the Post Office where P.O. Box 1226 hangs out for more than \$100 each!! ch).

By the way, don't forget to tune your vintage tube-type shortwave rigs to HCJB for Wayne's program, Medium Wave Interlude, on DX Party Line once a month or so.

DALLAS LANKFORD has rethought some of his thoughts on soldering, so we'll share them with you. Dallas changed his mind about using steel-plated soldering iron tips. Radio Shack's steel tip rusted internally, and welded itself to the heating element. After buying a spare 45W heating element, force was necessary to remove the old steel tip, naturally damaging the element. Of course, one could only diagnose the problem after removal. Anyway, Dallas uses only copper tips now. They periodically have to be cleaned, reshaped, and retinned, but they don't 'corrode-weld' to the threads of your heating element. Be looking in future issues for a number of Dallas Lankford's excellent articles on the R390 and HQ180.

CAN WE TALK??? A number of our well-intentioned members have sent xerox copies of articles taken from other publications, mainly commercial. All the non-commercial club bulletins, newsletters, et al. have long operated on the basis of free permission to copy each other's material with proper credit given. We do this, and our sister publications do this with our material. However, commercially published material such as that found in QST, CQ, Ham Radio, and even in out-of-print magazines such as the much-missed Electronics Illustrated, are protected by copyright law. In some cases we are trying to locate the author for permission to publish his article; we cannot publish without it. This may seem unimportant to some of you, but I must relate that some of your humble editor's commercially-published material has been reprinted without permission, and it is not pleasant or courteous. I have also had to deal with individuals breaking the "code of credit" that makes sharing among hobby publications possible; that is sad and a hassle. I thank each and every one of you who have sent articles in, and I assure you that we are making every effort to get permission to publish some of these articles. But, it is a simple fact that respect for an author's material is always the best policy. End of harangue; off the soap box.

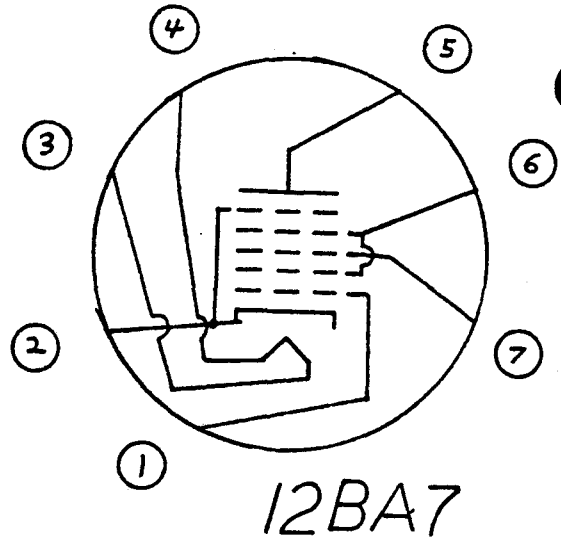
JOE BUNYARD has some data to add to the tube substitution list for the R390 that TODD ROBERTS gave us in issue #7:

For: 6DC6, substitute 6BJ6A (Mil.) or 6662; for 6C4, sub 6100; for 5814A, sub 7316, 6B 6189, 6189, 6067; for 5654/6AK5, sub. 5591, GB 408A, 6028, 6968; for 6AK6, sub GB 5136, 7543; for 6OA2, sub. 6830. Joe goes on to point out that most of these military type ID numbers don't mean anything to a person without a substitution list. Maybe this will help someone to keep from passing up otherwise new tubes at usually very reasonable prices. Most times the seller doesn't know what he has either, and wants to be rid of the tubes.

OKAY, OKAY, I've dragged my feet 'til now, but the nostalgia bug has reared its ugly head once more. And now, another episode of MEET THE TUBE. Many years ago I was trying to decide between taking woodshop or electronics in my freshman year in high school. Since I knew absolutely nothing about either, I sent to the library to look these subjects up. While going through the stacks I came upon a book that simply said on its binding "TUBES." It was a period RCA tube substitution manual. I took it down from the shelf and leafed through trying to make sense of it all. Here was a book with pictures for better understanding which I couldn't understand. Now, this is something, I thought. Then my eyes fell upon the words: "PENTAGRID CONVERTER." From that moment on, woodshop was out of the picture, as I began to imagine hanging around the Kennedy in a white shirt and narrow tie casually dropping phrases like PENTAGRID CONVERTER into the conversation. Anyway, with a tear in the corner of my eye I give you the 12BA7 Pentagrid converter. It's the very tube that started me suffering through eight semesters with "Blinky" Austel, who kept trying to teach me about these things called transistors.

The 12BA7 is a miniature-type tube used as a converter in AC/DC superheterodyne circuits, especially those for the FM broadcast band. Heater voltage is 12.6 V AC/DC at 0.15 amperes. Except for the heater rating this tube is identical to the 6BA7. No substitutions available.

Modern electronics forces us to talk in abbreviations. We have ICs, CMOS, and such. Wonderful gadgets that can be destroyed by the static electricity in your fingertips. But what young ham can forget firing up his first one-tube transmitter and goofing up the plate setting, making the tube glow cherry-red? It never complained. It understood you were new at this thing called electronics. It forgave you and let you try again, and in trying, learn, Remember your mother yelling down the basement stairs with the lights in the house dimmed? Nope, you just can't pull that one off with an IC circuit.



Before the nostalgia bug leaves me completely I must relate an experience at a recent hamfest. I was walking around with a friend who is a rather jaded Extra-Class ham with all the awards, a 2 kW station, and no more worlds to conquer. We came upon one table of goodies and he broke into tears. There on the table was an Ameco-AT-1 two-tube transmitter. He immediately paid the \$5.00 asking price -- a cardinal sin in hamfest circles. As we headed on he related that he started off with one of these little crystal-controlled transmitters, and he never recaptured the spirit of those times no matter how hard he tried and how many awards he accumulated. Well, he took this thing home, fired it up, and the last I heard of him he was floating around the novice bands having the time of his life once again.

A few issues back we related that Ken Vito Zichi was willing to share his SAMS/RIDERS collection with members for a SASE and \$1. His address has changed: 2017 Dexter Road, Ann Arbor, MI 48103 will now find him. SUE COULTER, Space 11a, 1000 West Columbus Av., Bakersfield, CA 93301 also can be contacted for schematics for older radios. Between the two of these HSNers I'll bet you can find whatever your little heart desires.

PSSST...HEY, BUDDY...Ya say you aren't an amateur radio operator yet??? Well, wake up and smell the 12AX7 burning, bunky! Now that the volunteer examiners program is in full swing it is easier than ever to get licensed. No more trudging off to FCC offices. Any local group of hams or ham club in your area will have VECs willing to ELMER you into hamdom. Why, even your publisher might become a ham! (That's a hint, Chris. ed)(I'll wait for the codeless license, even if I have to have the application buried with me. ch). Don't know any hams? Well, contact the ARRL, 225 Main Street, Newington, CT 06111. They will get you in touch with your nearest VEC group. The reason I am pushing amateur radio even to those who have long resisted the urge is that the bands are full of old Uncle Charlies who go all the way back to the days of spark gap transmission, and some of these old birds (said affectionately in case any of you are old birds) know so much about tube-type technology that it would be foolish for a serious HollowStater not to tap into this data base. (I think the old birds will get more upset at being referred to as a 'data base' than they will at being referred to as 'old birds,' hi! ch) Did you know you could raise bias voltage of a power supply that teeny extra tad you need by hooking up a 9-volt battery in line with it? No??? Well, get on the air with these folks and you will learn all kinds of tricks that never appeared in any technical manual or magazine.

WHILE ON THE SUBJECT OF HAM RADIO, those of you who are interested might drop me a card telling me what bands you are on so that we might give consideration to a regularly scheduled net. I could only be net control about once a month, but we might rotate that responsibility. We could publish the schedule in these pages so that non-hams (you mean us peons, Skip? hi! ch) could listen in and benefit from what we have to offer.

MATT STUTTERHEIM, 510 Main Street, #732, Roosevelt Island, NY 10044 lists the following equipment for sale:

- Callicrafters SX-62-A receiver, .54-108 MHz, continuous. Works, but needs alignment.....\$ 95.00
- MC GPR-90 receiver with GSB-1SSB adapter. Both in near mint condition, except that receiver only works on two lower bands..... 200.00
- Hammarlund HQ180A receiver, good condition..... 225.00
- Collins 51-J-3 (R-388) receiver. Coast Guard issue..... 185.00
- 1134/WRR-3 receiver. Covers VLF 15-600 kHz. No power cord, as received. Uses digital readout like R390; appears to be ok, never used by me..... 125.00
- Hammarlund SP-600, .54-54 MHz receiver..... 175.00
- Cycom R-2174-A VLF receiver, 10 kHz to 450 kHz, in portable case. Has large signal strength meter/panel speaker..... 95.00
- Communitronics MR-17 receiver, 25-225 MHz, AM-CW-FM, with LED readout, thumbwheel entry of frequency, plus fully functional spectrum analyzer/display. Instruction manual (cost \$150 in 1984) included. Solid state (boo! hi! ch)..... 500.00
- Surplus rack mount (19") RF distribution amplifier. Plug in an antenna and it will distribute identical signals to eight receivers. Hollow state. Covers 2-30 MHz. With panel tube-tester/meter..... 65.00
- MFJ-950 receiving antenna tuner..... 45.00
- MFJ-1020 active antenna..... 55.00
- McKay-Dymek DA-5 BC loop with amplifier. Sleek looking. Good condition. Nulls out interfering stations, use for DF..... 95.00
- Hammarlund HC-10, extra IF states plus audio amp. Takes 455 kc from receiver and reconverts to 60 kHz IF strip with passband tuning, notch filters, SSB detection etc. No cabinet but complete..... 95.00
- Heath SB-620 Panadapter/Spectrum display..... 100.00
- Keesu FRA-7700 active antenna with AC adapter..... 50.00
- 752 active audio filter..... 65.00
- Racal RA-17-C-3 receiver, 500 kHz to 30 MHz, rack mount, works well, very good shape, but could use a realignment for even better performance..... 275.00
- Dentrol 160 meter longwire antenna tuner (transmitting)..... 100.00
- NRC loop built by Bohac, excellent..... 160.00

All prices are exclusive of UPS shipping. Matt's phone number is (212) 838-5182, no collect calls, please.

OUR STOCK OF ARTICLES is quickly returning to healthy proportions. However, I must ask you all to go to the well again and continue to produce more stuff. The reason is that your humble editor has taken on a responsibility to Uncle Sam by joining the Army reserve (perhaps another way to get R390s?). I will be heading out for training at Fort Benning sometime this June, so the summer issue will need to be prepared not too long after the spring issue has gone to press, so remember: they also serve who only stay and wait!!! Get your articles in early. You'll be doing your newsletter and your country a big favor. Come to think of it, you'll be doing me a favor too -- there's no place to plug the electric typewriter into on bivouac!

PUBLISHER'S CORNER. Well, your publisher learned his lesson as regards DX furniture recently. For the last four years my R390A and my HQ150 or whatever other receiver I owned stood on a kitchen table in my bedroom. I had no occasion to move it, so it just stood there. Well, I recently added a roommate with bed &c. to my menagerie, and had to move the radios to the other wall to accommodate her. Well, we got the radio table over there, all right. However, in adjusting the position to accommodate the window repairman, the rear left leg fell off and the equipment fell (or, rather, slithered, as I had the presence of mind to hold things as well as I could) to the floor. The table, being made of particleboard, was not really sturdy enough to hold all that heavy equipment. I bought some bolts and drilled holes through the tabletop to bolt the leg back on. The R390 hides the boltheads nicely, and the left rear leg will now stand even after the rest of the table disintegrates. I have more bolts for the right rear leg. The moral of the story is: when you own heavy hollow state equipment,

*** 6 ***

make sure your furniture will be sturdy enough to hold it.

Meanwhile, as usual, we leave the December/January issue of HSN until the holidays are well over. Well, we'll call it the winter issue from now on. I haven't gotten any complaints yet, but this is in case you wondered where the December issue is.

Skip and I don't contemplate any increase in the Domestic/Canada/Mexico rate when postage goes up by 2¢ in February.

You will notice an advertisement for Sue Coulter and Stan Lopes is included in this issue. This is an experiment to see whether an occasional paid ad will keep the costs down. We aren't making any money on this one, as the ad rate only pays for printing the ad itself and part of the postage. We aren't beating the bushes for commercial advertising, but if any of you out there have a Hollow (or even, fie, a Solid) State-connected business and you wish to run an ad, write your publisher for details.

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THE NEXT PUBLISHING DATE IS MARCH. YOUR CONTRIBUTIONS OF MATERIAL MAKE THIS NEWSLETTER POSSIBLE.

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WANTED TO BUY: Automobile radios, BCB only models and/or European models with LW/MW/SW. Unfortunately, no tube radios needed (too much bother to hook up and keep going). Also looking for a rack/stand suitable for R-390A and SSB converter. Write your publisher, Chris Hansen, P.O. Box 1226, New York, NY 10159 or call (212) 549-3039 (no collect).

THE HOLLOW NO. 9 STATE NEWS-LETTER

SPRING
1985

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CHRIS HANSEN

PUBLISHER'S NOTES -- I'm going first this time around (sorry, Skip) to emphasize some new developments. First, we are going to go on a schedule of four times a year WHEN THE MATERIAL WARRANTS. Very important, that phrase. It means that you are now our partners in producing Hollow State Newsletter. Send your material -- original articles on any subject bearing upon tube-type receiving equipment (care and feeding, or usage, or even nostalgia articles are eagerly solicited). I am retitling the month of issue to reflect the season -- spring, summer, fall, winter of each year. Your subscription will still cover four issues -- it might cover more than a year, depending upon your response to the above appeal. So, get those quill pens and word processors and your a---s in gear!! We await stuffed post office boxes.

AVAILABILITY OF BACK ISSUES -- Now that my office is providing free copying, I am reprinting the first four issues of HSN (then called R-390 Newsletter). To celebrate my employers' (yes, that apostrophe is correct -- there are three partners) new bounty, the first four issues of HSN are available as a package for \$3.50. Single issues are available at the customary \$1.00 a piece. As always, issues 5 through 8 are available at \$1.00 a piece. Send your orders to Chris Hansen at the above address, enclosing a check payable to "Chris Hansen". (HSN is still too small an operation to have its own account).

EDITOR'S NOTES -- GREETINGS CAMPERS! Welcome once again to the best little newsletter in radiodom. Things have been happening at your humble editor's shack. After spending many months trying to find a tube-type computer (ENIAC is still mostly in pieces at the Smithsonian and the Franklin Institute has no idea what happened to their UNIVAC; besides, my basement is too small), I now have a Commodore SX-64. Eventually, I will acquire a printer, and we should then be processing away just as our esteemed and revered publisher (okay, Skip, how much do you want? hi! ch). Anyhoo, your editor would appreciate any programs or data which might help him in his awesome tasks -- let him know.

APPEAL FOR ARTICLES (YOU MIGHT CALL IT BEGGING) The material for publication has been coming me at a steady trickle -- however, it is still just a trickle. This creates a problem for steady publication dates. As Chris has mentioned above, publishing dates are now going to be flexible -- darn the dates, just publish when there is a sufficiency of material. We would rather please you by putting out 3 issues a year of great relevance and utility rather than putting out 4 with 6 pages of filler per year (one full issue). As Chris mentioned above, subscriptions will still be for four issues -- however, those four issues may or may not

constitute one year. In fact, if we get five issues worth a year, you might find a special issue published!! Of course, we do seek your comments and opinions on this matter. If anyone is unhappy with HSN for any reason, refunds are cheerfully provided for all unmailed issues (which is more than many commercial magazines will do!). So, get to your desks and write!!!

POWER LINE SURGE PROTECTOR Our first bit of information comes from the ever-present DALLAS LANKFORD. He writes: "One usually thinks of power line surges and spikes as being dangerous only for solid-state equipment. But, these glitches can also destroy capacitors with ratings of hundreds of volts (like those in our tube gear)." So, Dallas has invested in a Radio Shack "transient voltage surge protector," which is a three-prong plug-in device which accepts in turn a two- or three-prong plug. It is rated at 15 amps. It may seem expensive at \$7.50, but even if you repair your own gear, your time is worth something; it does take time to find a single blown capacitor in an HQ180, R390, or similar gear. Anyway, it seemed like a good buy to Dallas. More from Dallas later.

ANTIQUA RADIO CLASSIFIED MAGAZINE Every now and then a useful publication comes across your editor's desk. There is another resource for tube-type folks in the Antique Radio Classified, 9951 Sunrise Blvd, #R9, Cleveland, OH 44133. You can obtain a sample issue for \$1.50, or subscribe for a year (12 issues) for \$15.00. The magazine contains some pictorial articles of '20's and '30's-type gear, and lots of classified ads for many different old rigs, parts, tubes, and the like. It seems that it might apply mostly to the needs of our friends who go for truly antique radios, but then one can never have too many tube sources, can one???

MORE TUBE SOURCES Speaking of tube sources, here are a few more to warm your hearts: Steinmetz Electronics, 317 Pulaski Road, Calumet City, IL 60409 and Old Tyme Radio Company, 2445 Lyttinsville Road, Silver Spring, MD 20910.

TELL US ABOUT YOUR EXPERIENCES WITH TUBE SUPPLIERS Your editor and publisher have been passing along names and addresses of tube sources since the first R390 Newsletter. However, we are panting like hinds for some news of your satisfaction (or lack of satisfaction) with any tube sources you deal with. Found a friend with a tube source? Do you know a really upright and honest -- exceptionally upright -- tube source? Share your experiences. Have you been burnt by a tube source? Did the 'Dud Tube Source Emporium' live up to its name (hi!)? Then, help your fellow tube enthusiasts by passing the information along. If you have documentation, it might help to send copies to us. Telling the company that you're going to expose them in a tube enthusiasts' newsletter might help to gain satisfaction. In a future issue, we will draw together all the tube sources into one comprehensive list. Perhaps, with a little prodding, we'll try to get some more comprehensive information about their services and resources. Help us out with reactions to 'Duds' and 'Goods.'

MANUAL WANTED FOR RME-84 RECEIVER. Member MORRIS SORENSEN, 111 Town Line, Milton, ON, CANADA L9T 2X1 recently purchased an old RME-84 receiver, manufactured by Radio Manufactures Engineering of Peoria, IL, ca. 1946. It is in good working order except for the non-functioning of the BFO. This rig uses Loktal (lock-in type) tubes and has a mechanical bandspread which seems capable of providing fairly precise tuning. Morris would like to obtain a manual for this receiver, and would also like to hear from any readers who may have used one.

A SOURCE OF INFORMATION ON HQ129X AND HQ150 receivers is the National Radio Club Receiver Manual, Vol. I. For a catalogue listing this and other NRC publications, you may write to NRC Publications Center, P.O. Box 166, Mannsville, NY 13661.

WANTS INFO ON BC-221 FREQUENCY METER WAYNE HEINEN, 4131 South Andes Way, Aurora, CO 80013 has recently acquired this piece of equipment. He would like to correspond with anyone who has a manual or information about the meter. He would also like to correspond with users of older RBB receivers (he has a manual available for copying). Listen for Wayne's 'Medium Wave Interlude' program on DX-Party Line on HCJB, Quito, Ecuador. The times GMT are: Saturday 2130, and Sunday 0230, 0630, and 0930. We like it!! See recent WRTH or program schedules for frequencies.

ANOTHER SOURCE FOR ARRL HANDBOOKS AND TUBE SUBSTITUTION MANUALS could be your local library. Some of these might be available for sale as well as loan (many have already been sold. ch). You might even be able to trade a copy of this year's Handbook for a 1960 or so!!

ELECTRON-EYE TUNING TUBES EXPLAINED Sue Coulter provides us with this tidbit of information from the February 1983 issue of a service magazine concerning these tubes. Known as the "Taco Tuning Indicator", this self-contained unit makes use of the 6E5 electron-eye tube and obtains its power from the radio set itself through a five-wire cable connecting with various circuits. The installation is simply cutting a hole in the set panel for the neat bezel ring or the "window" through which the tube target is viewed, and mounting the bracket behind the panel. For precise tuning the set operator views the electron-eye target of the 6E5 tube through the bezel window. When the set is sharply tuned for a given signal, the black segment of the luminous green circle is reduced to minimum width, if not entirely eliminated. This closed eye condition indicated maximum resonance. The Taco Tuning Indicator was manufactured by Technical Appliance Corporation, 17 East 16th St., New York, NY (Hey, Chris, take the bus into the city and knock on the door, they might still be home! hi!) (I doubt it. However, I once owned an HH Scott radio which made use of two of these tuning eyes, one for FM and one for AM/SW. The AM/SW one could never be induced to work, but the FM one was a beauty, and I still think that it was the best tuning aid around -- better than a meter as it didn't fluctuate so wildly. ch)

MEET THE 6E5 TUBE That beautiful blue glow (mine was green. ch), those perfectly-emitted photons, the precision -- the total class it brought to a radio. I've seen these things in use on a receiver well into the '60's. In some cases they were applied to substantially solid state units. This can mean only one thing: let's MEET the 6E5 TUBE!!!

The 6E5 is a glass-type electron-ray tube used to indicate visually, by means of a fluorescent target, the effects of a change in a controlling voltage. It is used as a convenient means of indicating accurate receiver tuning. This tube requires a six-contact socket. Its heater voltage is 6.3 volts AC/DC at 0.3 amperes.

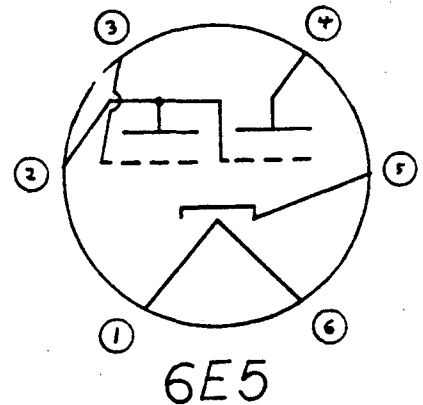
- Plate supply voltage..... 250 V max.
- Target voltage..... 250V max. -125V min.
- Plate and Target supply voltage..... 200V/250V
- Series triode plate resistor..... 1 megohm
- Target current..... 3-4 ma
- Triode-Plate current..... 0.19-0.24 ma
- Triode-Grid Voltage (approximate):
 - for shadow angle of 0° . -6.5 to -8.0 V
 - for shadow angle of 90°... 0V

NOTE: Target current and Triode-Plate current are subject to wide variations.

CATALOGUE: Another catalogue has crossed your editor's desk. This one includes a good collection of tubes and other radio supplies, including transformers and chokes. **ANTIQUÉ ELECTRONICS SUPPLY**, 1725 W. University, Suite 2, Tempe, AZ 85281 (602) 894-9503. Also, especially if you are looking for surplus Collins gear parts, including mechanical filters, contact **SURPLUS SALES OF NEGRASKA**, 2412 Chandler Road, Bellevue, NE 68005. These folks have a lot of neat stuff, especially some surplus stuff off missiles and aircraft, so if you want to build a delivery system to launch your R390 into space, this is the catalogue for you.

ANOTHER CATALOGUE: Jay Mathisrud reminds us of another catalogue you might be interested in. **RADIOKIT**, P.O. Box 411, Greenville, NH 03048. Price: 50¢. Their book includes many fine new components of use to the builder, repairer, and restorer. There are air core capacitors to be found here (hen's teeth are more prevalent these days). They also feature a kit to convert the **DRAKE R4A, R4B, & R4C** to continuous general coverage. Pretty neat, huh?

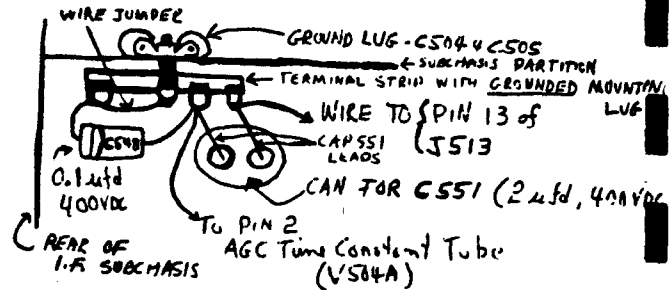
ANTIQUÉ RADIOS RESTORATION AND PRICE GUIDE, Johnson, David & Betty. Your publisher received a copy of this book recently (it was published at \$10.95 but sells for much less from Publisher's Clearing House). In case there are some HSNers who are also interested in antique radios of the type prevalent from the 20's to the '50's, I'll review the book at short. At 99 pages, this book can't go into much detail about restoration (in fact, they spend as much time talking about cabinet restoration as about the actual radio restoration). To their credit, however, they realize that anyone who is much interested in these receivers will hunger for more information, so they have included a generous bibliography, a list of



sources for parts, especially TUBES. (Most of them have already appeared in these pages.) The best part for the non-technical person like myself is the chapter on radio theory. The pics and the price list are good for laughs and memories too. If you come across it somewhere and have some \$\$\$ burning holes in your pockets, you could do worse than to pick up a copy. Who knows, someday an Atwater Kent may land in your shack!

REPAIRING THE R390A AGC GERALD MURPHY has this to share with us concerning the AGC time constant on the R390A.

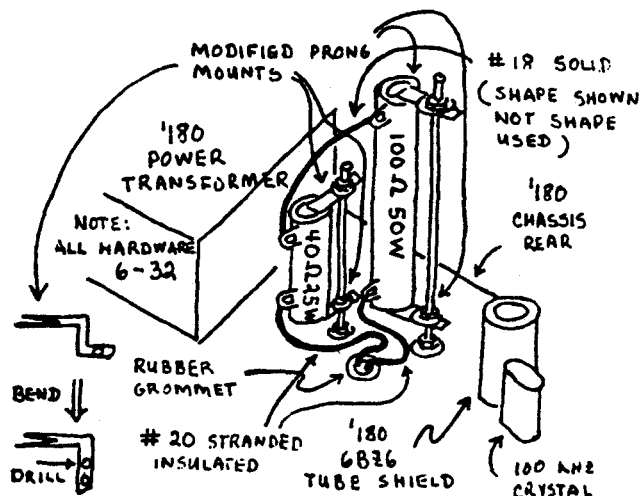
"After about 15 minutes of warm-up, the receiver gradually lost all AGC in the slow setting and partially in the medium setting. Checking with my VOM, I found that C551, an electrolytic cap in a metal can sheild on the IF sub-chassis was defective, measuring only about 250K ohms resistance and passing DC current. In repairing this defect, I purchased a 2 ufd non-electrolytic cap (GE 457A373H01-400 VDC -- original was 500 VDC). In order to preserve the 'ambiance' of the R390A, I pulled off the contacts of the original capacitor, drained off the fluid, desoldered the can, and, after carefully insulating the new capacitor leads and lining the can with heavy cardboard, placed the new cap in the can and sealed it with silicone cement. Perfect fit! It is necessary to solder wire extensions onto the cap leads, and these were taped to the body of the cap with good plastic tape. In making this repair, I also replaced C548 with a new 400-VDC Mylar-type unit. It is physically in the way and is rated at 100 VDC. In order to insure good mechanical rigidity, it seemed wise to mount a terminal strip on the chassis partition where C504 and C505 are gounded. A diagram is above.



DALLAS LANKFORD ON THE HQ180A. It was interesting to note Edward McFadden's remarks about R-18 (47 K, 2W) in his HQ-180A which had burned up and caused the 10K section of the dual 10K/5K RF gain pot to also self-destruct. Chris Hansen suggested parenthetically that bad 6BZ6's might be the cause, as they appeared to be from Edward's comments. Another potential cause is that R-18 dissipates about 1.3 W. Because of its crowded location, it may actually be operated beyond its power rating. Apparently Edward's HQ180A is a late model because earlier models used R-106 (100K, 1/2 W) in parallel with R-18 (100K, 1W) to achieve 50K. I described this situation in a Musing in DX News, v.51, #21 (March 5, 1984), and suggested essentially the same solution that Edward described. Actually, I used two 100K, 2W as the equivalent of a 50K, 4W, and mounted the resistors on a terminal lug strip which was mounted on the L-bracket that supports the bandwidth and sideband switches. Removal of R-18 (and R106 if also present) is non-trivial, and I recommend using small pieces of scrap aluminum as heat sinks-shields to protect nearby wires and components from the hot tip of your soldering iron. One other resistor in some older HQ180A's and HQ180's was underrated: R-3 (6.8 K, 1/2W) should be increased to 1W. When changing the R-18 (/R-106), you should be especially careful when re-doing the tie points from which the resistor(s) was(were) removed and to which the associated wiring connected. In one of my units about a year later I noticed that my S-meter was making small but noticeable random discontinuous jumps. The problem was traced to my R-18/R-106 mod. The original feed to R-18/R-106 was a red wire that ran from a terminal lug on one of the IF transformers. This lug was also the tie point for two other red wires (the B+ line). When I originally did the mod I did not notice that one of the red wires was not firmly crimped to the lug, but merely 'stuck through.' So, when I resoldered, the solder joint was not good, causing small variations in the B+ supply to some of the IF tubes, which in turn caused the small random discontinuous S-meter jumps. The lesson here, I think, is that when you disconnect one wire from a lug, check that the others are firmly crimped to the lug. I had carelessly assumed that Hammarlund never used bad wiring practices, but learned that they did, the hard way.

Another thing mentioned in my DX News musing was that many (most?) HQ180A's (HQ180's?) have B+ voltages that are too high. The nominal B+ line per Hammarlund's manual is 255 VDC, but both my '180A's ran around 290 VDC. This can cause a number of components to be operated

beyond their maximum ratings, and may also have been a contributing cause of the problems that Edward observed. The audio output tube is definitely operated beyond its maximum ratings, which can lead to frequent tube failures, and cause associated component failures. The solution is to add a dropping resistor in the B+ line. The exact resistance seems to vary from one 6X4 to another, but 125 to 140 ohms is about right from my experience. In my units I currently use a 100 ohm 50 W in series in series with a 25 ohm (or 40 ohm) 25W. The equivalent 125 ohm (or 140 ohm) resistor is inserted between the output of the silicone diodes and the 8 henry (L-6) filter choke. For improved ventilation the two resistors are mounted vertically above the chassis near the rear behind the main tuning capacitor and between the power transformer and 100 kHz crystal oscillator tube. A couple of holes were drilled through the chassis to mount the resistors and to feed wires through. It seems that I also mounted a terminal lug underneath. The high wattage was necessary to get the resistors to run reasonably cool (about 55° C). A sketch of the mounting arrangement is above.



HAMFEST SEASON APPROACHETH Remember to make up a list of all the tubes in your receivers and support gear. Also, take a look at a few tube catalogues to get an idea of premium prices. If you purchase a boxed tube ALWAYS look inside to make sure the right tube is in the box. Some of the sellers at hamfests buy these things up in bulk and even they don't know what they have. Also, if you see any rigs being sold 'as is' or as scrap for real low prices, take a look inside and see if they contain any tubes or components that would make it worth dragging the rusty hulk back to your car. If you are in the market for permeability-tuned radios like the R390 ALWAYS ask to look inside and really pay attention to the condition of the planetary gears and the slug racks. Try to get an idea of the quality of the radio by listening to the seller talking to other people. Does the seller sound like an old-timer with respect for this gear, or does he sound like someone just trying to unload a boat anchor that he got when he was a novice and never got to work right? Remember, knowledge is power. If you've been reading the HollowState Newsletter you're equipped to make intelligent purchases. CAVIAT EMPTOR. COGITO ERGO SUM. ILLEGITIMI NON CARBORUNDUM.

PUBLISHER'S CORNER (as opposed to "Publisher's Notes" on the front page, hi!). I am a new (re)subscriber to Glenn Hauser's Review of International Broadcasting (Box 490756, Ft. Lauderdale, FL 33349 \$18/yr US, \$21/Canada, samples \$1.50). Since I last saw this publication, a new department has emerged, called "Radio Equipment Forum," edited by David Newkirk. Mr. Newkirk, who is sometimes quite witty and pointed, has an interchange with a gentleman named Steve Kennedy this month, partially about tube receivers. Mr. Kennedy: "I can't overstate the usefulness of having a decent-quality older tube receiver on hand. There is a special feeling about working with one of the old sets...a special feeling of working with a radio that was built with a serious SWL/DXer in mind...a charisma, if you please. The audio in the old sets is not bad, either...sure, it's a 6BQ5 or a 6L6, but it sure can make BBC or Radio Nederland sound solid when hooked to a good speaker. But be warned! Once you have tried a 'hollow state' receiver...you might get hooked!" (I think HSN has added something to the language. ch) Mr. Newkirk: "I think we should point out another distinction (between newer receivers and older tube receivers): there is a great difference between sets made for "real" use and sets whipped up for "consumer" use in any era. The difference in quality between any Hallicrafters or National receiver and (the) R390A is astounding. The R390A drifts little and has linear digital-readout tuning if properly aligned. Its weak point, as was the weak point of many receivers...is that it doesn't do well at all in the most common

SSB/CW listening technique these days, RF/IF full up, and agc controlling receiver gain. This is because of: unoptimized detector (just the rectification detector ("AM") diode used with BFO added), BFO too weak by the time SSC/CW gets to the end of the IF strip if the RF/IF gain is up all the way, and inadequate AGC control range. . . . Really, you see, there IS NO SUCH THING as "state of the art." It's a science, not an art, and the fact is that if you just understood what was said on your radio -- in other words, if the message was understood -- then your radio is as "state of the art" (CHOKE) as it need be. Fact is, "state of the art" is a cliché invented by admen, and is a carrot tied to the stick that radio amateurs and broadcast station engineers tie to their own backs along with the carrot to keep themselves busy and make themselves feel that they are achieving "progress."

Well...I must say that Mr. Newkirk's distinction between 'commercial' and 'real' receivers is new to me -- I like it. It explains somewhat the mystique around the R390, R390A, HQ180, HQ150, and the like. These are working receivers. People used them, not for hobby listening, but to earn their bread. Some of the aura of their efforts has stuck to our receivers, and it can help turn a hobby into an avocation and a serious pursuit of excellence.

THE HOLLOW STATE NEWSLETTER, c/o CHRIS HANSEN, P.O. BOX 1226, NEW YORK, NY 10159

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Please send all subscription orders, inquiries, and address changes to Chris Hansen; send all editorial material to Skip Arey.

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THE NEXT PUBLISHING DATE IS JUNE/JULY, BUT THIS DEPENDS ON YOU!!! GET YOUR MATERIAL TO SKIP AS SOON AS POSSIBLE, FOR YOUR CONTRIBUTIONS MAKE THIS NEWSLETTER POSSIBLE.

SUBSCRIBERS NOTE: Check your mailing label -- if corrections are needed send the corrected label to the publisher at the New York address above. To find out when you are due for renewal, look at your envelope. If the stamped legend 'Last Issue Please Renew' appears in red, this is your last issue. Otherwise, look at your label: you will see the words "SUB EXP #" and a number. The number is the issue number of your last issue. Thank you for your support.

THE HOLLOW STATE NEWS-LETTER

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ADDRESS FOR SUBSCRIPTIONS: Chris Hansen, P.O. Box 1226, New York, NY 10159

EDITORIAL ADDRESS: Skip Arey, P.O. Box 45, Beverly, NJ 08010 (NOTE CHANGE!!!!)

Price: \$4 for 1 year/four issues, \$8 for two years/8 issues; back issues (all currently available) \$1 apiece. Double all prices for subs outside US/Canada/Mexico.

Well, well. . . here we are at the nether world pass between hollow and solid state. Living forever two major technological jumps behind the rest of the pack, where portable means anything less than 35 pounds. Yes, friends, the twilight in the Twilight Zone is the glow of 6L6's, 3TF7's, 35W4's. As we sit warmed by this glow, let us begin.

EDITORIAL CHANGE IMMINENT HSNers may or may not know that I have taken on new responsibilities (including the Army Reserve and a new house). Chris and I went on a search for one new editor, and came up with three. There will be more details in the next issue, but suffice it to say that Skip will continue as a Contributing Editor, and two other HSNers will do the Editorial Honors! All Chris will be doing is getting this thing printed and mailed, and depositing your checks (hi!). In any case, contributions are solicited to kick off the new Editorial Department with a bang -- you should send them to Skip's NEW address above. Skip will collect them and forward them to our new editor, whose computer word-processes so well that HSN is likely to win a design award (hi!).

FLEA MARKET SEASON -- Do you have your list of needed tubes made up? Are you scouring the garage sales for old five-tube radios??? Are you attacking hamfests in search of tube data books??? WHY NOT? Make hay while the sun shines, folks, so that the winters of your days will continue to be warmed by Hollow State. (In the summer you'll need air conditioning, though. It's 90° here in the Bronx today. No time for tube heat! ch)

REGULATOR TUBE SUBSTITUTE -- Our first contribution this month comes from Gerald W. Murphy. Dr. Murphy writes: "When the RT-510 tube in my R390A failed, I devised a simple interim substitute while trying to track down a new tube. I used the 12.6 volt heater section of a 12BH7A 9-pin miniature tube connected in series with the heaters of the BFO and PTO tubes. In the series connection this tube's heater draws 0.3 amp, which is just what is needed. The appropriate pins of the tube were connected together as noted in the diagram (next page) so the tube can be plugged right into the regulator socket. The shunting wires were soldered into place after scraping each pin to get good contact. I used a heat sink in the form of a hemostat to protect the tube. This set-up works well and could be used permanently. I could detect no adverse effect on stability after warm-up. There may be a bit of regulating action, in fact, since variations in current would presumably cause some temperature-dependent effects on resistance and current in the three heaters. I think this is a better way to go than to replace the two oscillators with 12.6 volt heater tubes; that route may result in a need to do some realigning of the PTO to get accurate calibration and linearity."

(SEE DIAGRAM PAGE 2)

Also, Dr. Murphy needs a copy of the (TM-11-5820-10) R390A Manual. He will pay costs and copying. Contact him at Box 152, Scottsville, NY 14546.

REGULATOR TUBE SUBSTITUTE

BALLAST TUBE REPLACEMENT KIT AND SSB ADAPTOR NOT RECOMMENDED BY DALLAS LANKFORD

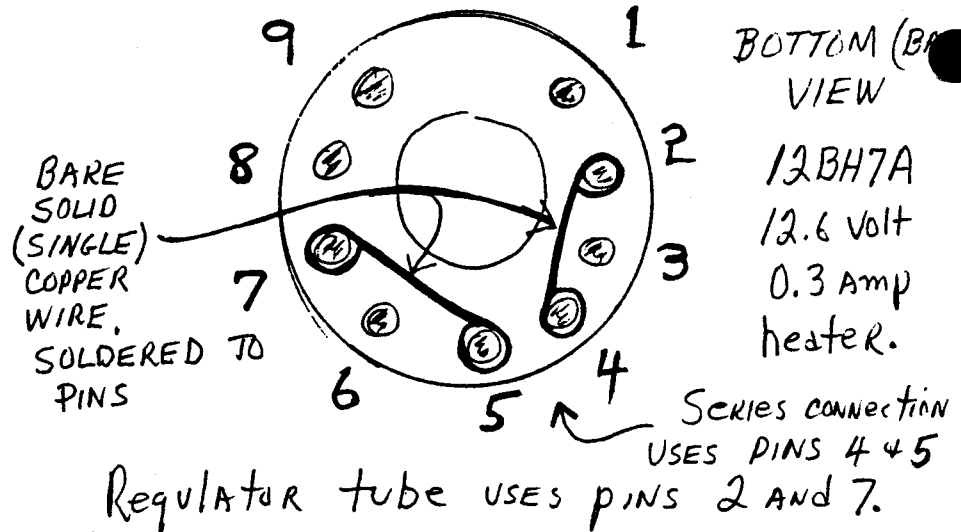
For your consideration, the following wit and wisdom of our own DALLAS LANKFORD. In this writing Dallas refers to a modification published in our first issue. Dallas writes:

"Because of the increases in 3TF7 prices, I decided to look into the solid-state ballast tube replacement advertised by G.B.

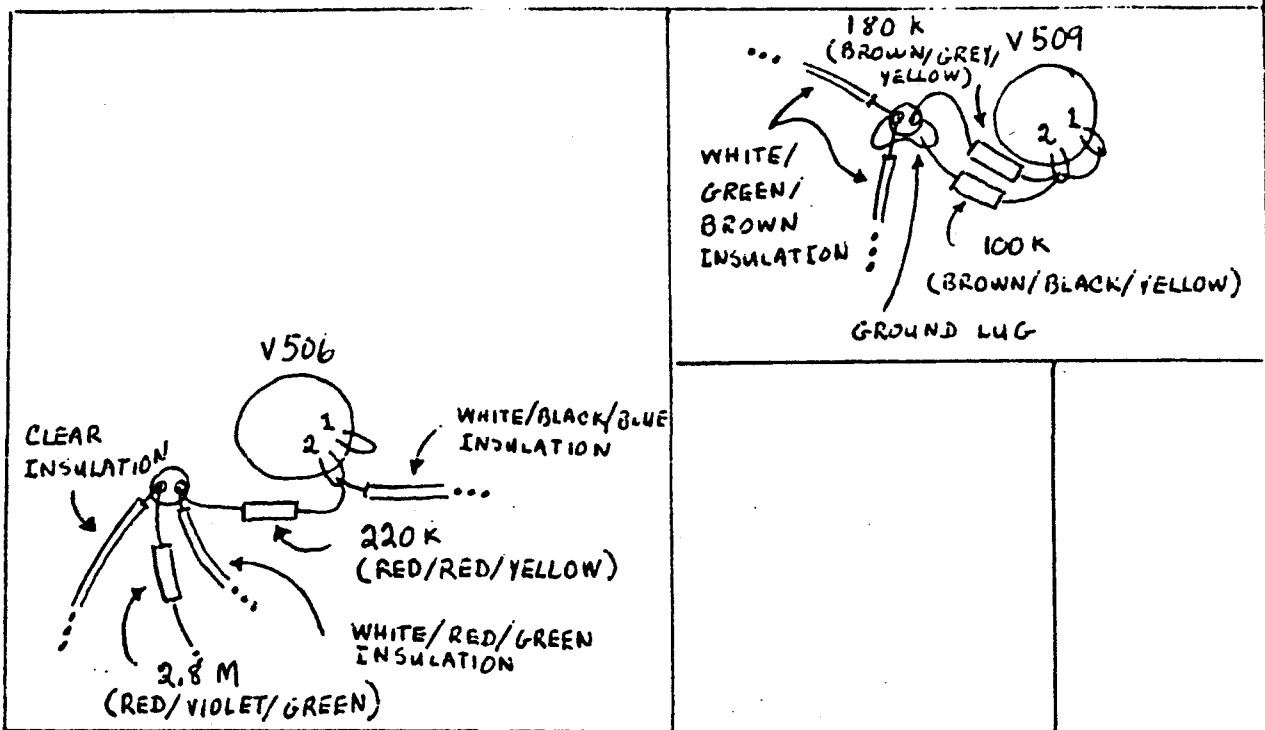
Communications in Ham Trader Yellow Sheets and elsewhere. I also purchased their R390A SSB adaptor at the same time. What a waste of money! The ballast tube adaptor is and looked homebrewed. The adaptor base had been carelessly ground away. It was such poor workmanship that I didn't even bother trying it out. Worse yet, I could not have used it anyway, because parts of the adaptor mount on the outer side of the R390A in such a way that there is not enough clearance to re-install my R390A's in their cabinets. The unit comes with one page of installation and operating instructions, and no schematic. The unit is not completely assembled, and several solder connections must be made.

The SSB adaptor also is and looked homebrewed. It is a small (1-3/4" x 1-1/16" x 1-5/16") approximately rectangular piece of black plastic with four wires (two #20 bare solid copper, and two #22 stranded insulated, one red, one black), coming out of the bottom. The black plastic is some kind of homemade encapsulation. I would assume the circuit is encapsulated to prevent you from copying it. But, of course, this also prevents you from repairing the unit if anything goes wrong. The unit comes with one page of installation and operating instructions, and no schematic. The four wires are attached to terminals 3 (AGC), 10 & 13 (line output), and 16 (ground) on the rear of your R390(A). For operation the LINE METER switch is set to +10, and the LINE GAIN is set at 7-8. The unit I received did not operate as described in the operating instructions. Also, with the unit installed, local audio gain was greatly reduced, and audio hiss obscured weak SSB signals. I do not know if you can use the line audio while the SSB adaptor is attached. However, this is perhaps a moot question, since I would strongly recommend against purchase of this SSB adaptor. The SSB mod described in #1 of the "R390A Users Group" (HSN's predecessor) is vastly superior, and requires only two diodes, a resistor, a little solder wick, a little solder, and a little of your time. I am enclosing a diagram of that mod for reader information." (SEE PAGE 3)

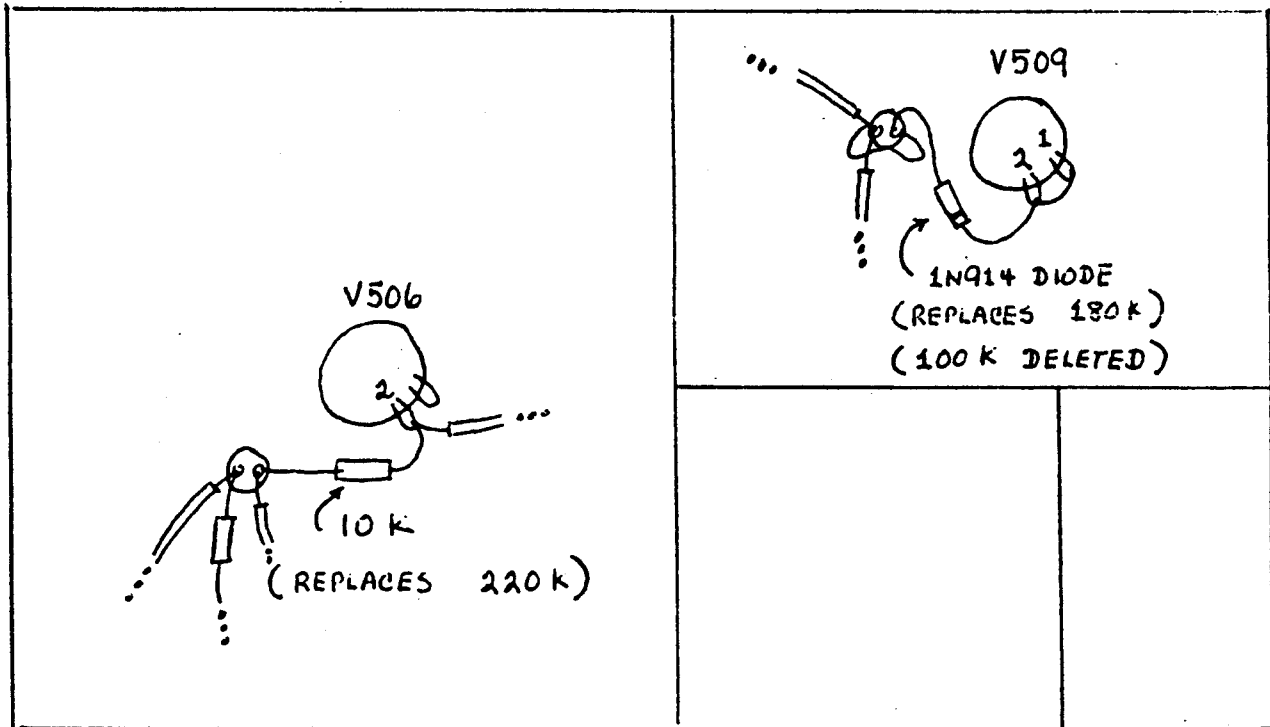
LOCAL COLOR FROM SKIP I think the very first time I ever tried my hand at anything electronic was when my five-tube bedside radio stopped "radio-ing" when I was in fourth grade. Like any bright young child I proceeded to take the back off, (Aren't you glad they had cord interlocks even back then?), thereby for the first time ignoring that most ignored little sticker "NO USER SERVICEABLE PARTS INSIDE!" "Ah ha!" I said, "Tubes!!" There are five tubes in here and I bet at least one of them does not work. Well, I pulled the tubes right then (fortunately the tubes and chassis were well-marked because at that point I did not think to check that out). I took my five tubes and got on my bicycle and went to the local TV store to have them tested. The store owner helped me used the tube tester and even helped me determine that the dead soldier was the 35W4. Ninety-eight cents later I was on my way home to perform my first repair. Two weeks later my grandfather gave me a transistor portable. I opened the back. NO TUBES. SIGH! Good thing I didn't have to fix it. And so began a lifelong obsession which leads us into (drum roll please to page 4)



BEFORE :



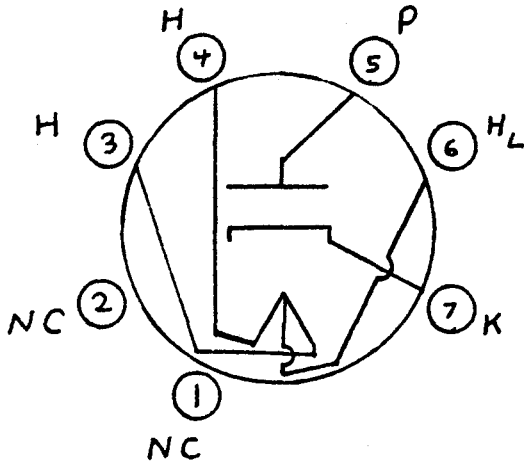
AFTER :



R-390A SSB/CW MOD (BOTTOM VIEW)

MEET THE TUBE

Today, kiddies, we look at the venerable 35W4. This tube is a half-wave vacuum rectifier of the miniature type most commonly found in the power supply sections of AC/DC receivers. It is equivalent in performance to the glass octal type 35Z5-GT. An interesting feature of this tube, and no doubt the reason it saw so much use in common garden-variety kitchen table radios is that it provides a tap for the operation of a panel lamp or pilot light. See, that's why the numbers glowed!



35W4

	w/o pilot	w/ pilot
Heater Voltage (AC/DC)		
Entire heater (pins 3/4).	35V	32V
Lamp section (pins 4/6)..	7.5V	5.5V
Heater Current		
Between pins 3 & 4.....	0.15A	-
Between pins 3 & 6.....	-	0.15A

This tube requires a miniature seven-pin socket and may be mounted in any direction, making it ideal for portable and mobile use.

Please keep in mind that I am not the only one capable of waxing nostalgic. If you have an anecdote that might lead to a "Meet the Tube" please send it in and we will tell the world about the tube that had such a profound effect on you and this hobby. As contributing editor I will continue to supply our newsletter with "Meet the Tube" as well as the occasional article, so continue to send "Meet the Tube" material to me at: P.O. Box 45, Beverly, NJ 08010.

Whatsamatter, Bunky? Ya say you're looking for a Very Low Frequency converter? VLF listening is really taking off these days (your technical/contributing editor can't figure out why, but live and let live. If you want to try your hand at the basement bands, a VLF converter can be purchased for a reasonable price -- an advertisement appears along with this issue for LF Engineering. Chris has purchased one and finds that it works quite well, considering the area in which he lives. More information on this facet of the radio listening hobby where neat old tube rigs seem to abound can be had by contacting "The Longwave Club of America, 45 Wildflower Road, Levittown, PA 19057." You will find in their journal, "The Lowdown," articles by some of our own esteemed users group members. From the few issues I have seen LOWFERS seem to be as creative at building and scrounging as all hollowstaters are. Tell them HSN sent you.

COMPUTER PROJECT FOR THE ADVENTUROUS I think I have come up with a project for one of our computer mavens. Could someone come up with a program by which one could dump in all of their tube substitution data from all their tube sub books for quick and easy call-up? While such a program would have limited commercial possibilities it might be neat to provide to the public domain through the pages of HSN. A simple but adequate challenge to all you PC people. If you accept the challenge please try to write it in generic (microsoft) BASIC. COMPUTERS IN HSN??? There goes the neighborhood!!

IN THE "NATION'S ATTIC" Speaking of tube-type computing, if you get to the American History Museum section of the Smithsonian during your vacation travels this year you will be treated to a beautiful display of ENIAC/UNIVAC class tube computers. Rack after rack of Hollow State Heaven. Big octal tubes, too, not minis. We are talking leading-edge technology here, folks. Real back to basics stuff.

SUMMERTIME CHORES -- For most of us, summer is not DXing time. Vacations need to be taken, children need to be squired to and from camp, barbecues are waiting to be fired up, and most of all DX is pretty poor overall. However, the hollowstater shouldn't neglect his (or her) receiver during the summer.

First, try to fire the receiver up as often as you can bear the heat, in order to keep the tubes, capacitors, and such from deteriorating from lack of use.

Second, since summer vacations are rolling around, the DXer should open up his receiver, dust it out top and bottom, and (if really ambitious), test the tubes and re-tube if necessary. These new-fangled hand-held vacuums are great for the dust-removal chores of the hollowstater -- they run for 10 to 15 minutes before needing a re-charge, and this is just right for one receiver or two. Need it be said that some dust is FLAMMABLE??

Third, clean contacts with approved cleaners, check for bad connections, make sure any parts which must be greased (gear trains in the R390, for example) are sufficiently lubricated.

Antennas may be checked in the summer also -- we often neglect the antennas with results that could be disappointing during winter storms. Check that connections are not corroded, that all insulators and other hardware are in good condition, and that the connections to the receiver are properly lightning-protected.

I would add that summer is the perfect time to buy more hollow-state equipment, but suspect that our various "War Departments" might not approve.

Other possibilities: if you live in an excessively humid area, you might have to check your equipment for mildew or fungus infestation! Best remedy for this: rejoin the rest of us in temperate climes (hi!) Insect infestation is also not unknown (if you don't fire it up enough to drive the critters out with the heat! A major cause of solid-state radio problems in some areas in NYC is that cockroaches take up residence and the radios don't generate enough heat to drive them away! Those "music boxes" can become "roach motels"! I believe that a mildewcide is available in spray form -- perhaps someone who has had this problem give us more details (in the FALL issue, when it's too early for next year and too late for this one, hi!). If anyone has insects in their R390, fire it up for a few hours and most of them will either be fried or will leave.

IT'S A SHORT ISSUE THIS MONTH. I hope that the membership will continue to support HSN by WRITING IN with articles and tidbits pertinent to Hollow State equipment. Send your material to Skip at the address on the front; he will forward it to our new Managing Editor, who will debut in the next issue. Thanks.

THE HOLLOW STATE NEWSLETTER, c/o Chris Hansen, P.O. Box 1226, New York, NY 10159

PUBLISHER: CHRIS HANSEN EDITOR: SKIP AREY, P.O. Box 45, Beverly, NJ 08010

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ERRATUM: In Dallas Lankford's article on page 2, a sentence was mistyped. The sentence which now begins: "The adaptor base. . ." should read: "The adaptor base had been ground down during manufacture (if one can call it that), and some of several pins on the adaptor base had been carelessly ground away." Sorry. ch

THE HOLLOW STATE NEWS-LETTER

AUTUMN 1985 NO. 11

SUBSCRIPTIONS: \$4 for one year (4 issues), \$8 for two years (8 issues), back issues \$1 each (all currently available), send check or money order payable to Chris Hansen (address below).

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The opinions expressed in The Hollow State Newsletter belong to the individual contributors and do not necessarily reflect those of the editors or publisher.

EDITOR'S CORNER

Dallas Lankford

Greetings from Ruston to all of our subscribers. As you can see, there have been a few notable changes. Skip is stepping down as editor and I have volunteered to take over the editing work. This means that future contributions should be sent mainly to me. Skip is staying on as a contributing editor, and plans to continue with regular columns about tubes. So information which is relevant only to Skip's column could be sent directly to him. Finally, we all owe Skip, the father of The Hollow State Newsletter, a big vote of thanks.

Do you know something about alignment, have a construction project, know suppliers' addresses for equipment, manuals or parts, want to buy or sell, have some useful modifications, or repair experiences? Well then share your information and experiences with everyone. Remember that HSN exists only through your contributions, so keep the letters coming. As you may recall, this newsletter originated as the R-390 User's Group, and changed into the Hollow State Newsletter with issue 4. So don't forget to keep us informed of your experiences with the R-390 and other industrial and military grade tube gear, e.g., R-388, R-389, R-390A, R-391, R-392, SP-600 (various models, including VLF), any Collins or Racal, etc. We also need contributions on any and all consumer grade tube gear, including National, Ammarlund, and Hallicrafters. And don't forget tube type test gear. Some of our ham subscribers could also tell us about hollow state transmitters.

SEND CONTRIBUTIONS NOW!

**COLLINS DISC-WIRE MECHANICAL FILTERS,
PART 1
Dallas Lankford**

Collins disc-wire mechanical filters for communications purposes are available in the frequency range of 60 - 500 khz with bandwidths of 0.2 - 16 khz. Most of those filters operate at or near 455 khz. The filters come in three varieties: symmetric, USB, and LSB. The vast majority of such filters which are generally available on the used and surplus market are symmetric filters. For tube type applications, source and load terminations of 100 K ohms or more (≥ 100 K) are required. So our discussions will be restricted to disc-wire, symmetric, 455 khz center frequency, ≥ 100 K termination, Collins mechanical filters. Listed below are some common mechanical filters of those kinds, and their specifications.

TYPE	PART NUMBER	PASS BAND (khz/db)	STOP BAND (khz/db)	RES. CAP. (pf)
F455-N-20	526-9163-002	2.0/6	4.0/60	110
F455-N-40	526-9160-002	4.0/6	8.0/60	110
F455-N-80	526-9161-002	8.0/6	16.0/60	110
F455-N-160	526-9162-002	16.0/6	32.0/60	80
F455-FA-05	526-9494-000	0.5/6	3.0/60	130
F455-FA-09	526-9446-000	0.9/6	4.0/60	130
F455-FA-15	526-9495-000	1.5/6	3.5/60	130
F455-FA-21	526-9427-000	2.1/6	5.3/60	130
F455-FA-27	526-9500-000	2.9/6	6.2/60	130
F455-FA-31	526-9496-000	3.1/6	6.5/60	130
F455-FA-40	526-9497-000	4.0/6	8.5/60	130
F455-FA-60	526-9498-000	6.0/6	12.6/60	130
F455-FC-60	526-9522-001	6.0/3.5	25.0/60	130
F455-Y-05	526-9521-010	0.5/6	3.0/60	130
F455-Y-21	526-9337-000	2.1/6	5.3/60	130
F455-Y-31	526-9338-000	3.1/6	6.5/60	130
F455-Y-40	526-9339-000	4.0/6	8.5/60	130
F455-Y-60	526-9340-000	6.0/6	12.6/60	130
F455-Y-80	526-9341-000	8.0/6	18.5/60	130
F455-Y-160	526-9343-000	16.0/6	27.5/60	130

N filters are used in R-390A's, and are perhaps the most common on the used and surplus market. The last three digits of the part numbers of the N filters may be different from the numbers given above. Part numbers, pass bands, stop bands, and resonating capacitors values for the N filters are inferred from measurements, the 1970 NAVSHIPS manual drawings and parts list, and individual filters markings. N filters have a metal case with flange mount. Measured skirt attenuation is typically well in excess of 100 dB.

FA filters originated in the early 1960's as an "inexpensive" ham and experimenter filter, although some now sell in the \$200 range for a new filter. They are occasionally available in Ham Trader Yellow Sheets for \$30 - \$60. FA filters have a plastic case, and it is important that the two ground lugs have a common signal ground. Measured skirt attenuation is typically well in excess of 100 dB.

Y filters are seldom seen on the used and surplus market, and are included mainly for completeness. The Y case is a metal cylinder, similar to the N case, but slightly smaller, and with no flange.

Data for the FA and Y filters above is taken from various Collins publications. There is also a series of FB filters which are identical to the FA filters above, except that the FB filters have measured pass band and stop band values marked on each filter. Pass band and stop band values may vary from filter to filter. The FA and Y values above are minimum pass band and maximum stop band values respectively. For example, an individual F455-FA-21 filter might typically have a 2.4/6 pass band and 4.6/60 stop band. Collins mechanical filters are very reliable, with a mean time before failure on the order of 2000 years based on field measurements. Insertion loss for the FA and Y filters is specified as 25 and 20 dB maximum respectively, but are typically much less, about 8 dB. I have no information about N filter insertion loss, but it is probably similar to FA and Y filter insertion loss.

THE HAMMARLUND HC-10 CONVERTER

Paul Gunn

Here is some information on what I think is one of the best units for SSB I have ever seen. The Hammarlund HC-10 converter is a compact unit about 9" wide, 9" high, and 7" deep. It uses 10 tubes, and there are plenty of controls for signal processing and shaping: SLOT FREQUENCY, SLOT DEPTH, AM & CW / SSB, PASSBAND TUNING, AVC OFF / SLOW / MED / FAST, POWER OFF / ON, AUDIO GAIN, adjustable NOISE LIMITER, BFO tuning, SIDEBAND UPPER / LOWER / BOTH, and bandwidth 0.5 / 1.0 / 2.0 / 3.0. The HC-10 is fed from the receiver IF, and will accept any IF frequency between 450 and 500 khz. I completely agree with Paul that the HC-10 is an excellent piece of equipment. It is also excellent for AM reception. The HC-10 is mainly the 60 khz IF strip, AGC, and audio circuit of an HQ-180, preceded by a slot filter and converter which are adjustable in the 450 - 500 khz range. The HC-10 is easy to connect to an R-390A - you merely run a cable from the 455 khz IF output (BNC connector) on the back of the R-390A to the input (RCA jack) of the HC-10 on its chassis rear. The HC-10 manual also describes how to connect it to some receivers. I have been very pleased with the HC-10 when used with my R-390A. It provides more AM selectivity options than before (0.5, 3.0, and 6.0 khz at 6 dB down), a slot filter for eliminating or reducing hets, and simplifies tuning SSB signals. I also find the audio quality of the HC-10 better (higher fidelity) than the R-390A. Ed.]

SHORT CONTRIBUTIONS

TORRESTRONICS TK-1 DIGITAL DISPLAY KIT: I recently constructed the TK-1 digital display kit for use with my HQ-180. To minimize interference to the '180 I had to build the buffer amplifier as recommended by Torrestronics. (Edward McFadden) [Would you mind sending an address for Torrestronics, and perhaps providing us with more details? Ed.]

POWER SUPPLY HASH: For individuals who may have purchased older tube type receivers which have been converted to use a solid state 120 volt AC power, but seem unusually noisy, try soldering 0.01 mF 600 V (or more) disc capacitors across each diode. Also try soldering the same type capacitors from each leg of the AC line to receiver/power supply chassis. This approach has worked well with power supplies for the BC-348, BC-453, and similar receivers. (Edward McFadden)

RECEIVER DATA: For those interested in modifying older receivers, a few articles are available through the National Radio Club. For a catalog of reprints and publications, send 50 cents U.S. or 3 IRC's to NRC Publications, Dept. W, P.O. Box 164, Mannsville, NY 13661. The NRC Receiver Reference Manuals, Vols. 1 and 2, are \$2.50 each, and contain all

sorts of information, including detailed reviews of the R-388 and R-390A, a survey of Hammarlund receivers, construction and modification projects, and much more. (Wayne Heinen)

AUDIO PROCESSING: You say that you are having trouble understanding the "muddy" audio with the 2 khz filter in your hollow state receiver? My remedy is running the audio through a 10 band Radio Shack stereo equalizer, and then through a stereo amplifier. I can frequently improve intelligibility by cutting down the bass, and raising up the midrange. My tape recorder is connected back through the amplifier using the tape monitor button [? Ed.]. I equalize the audio I'm hearing, and the audio I'm taping, which permits me to equalize the audio on my playback of the taping. (Wayne Heinen)

SATISFIED CUSTOMER: I finally came up with enough mad money to purchase an R-390A from Fair Radio after they sent me a flyer advertising excellent, extra-clean units, checked, for \$400 each. The unit I received far exceeded my best expectations! It is original in every sense, and appears to be unused. (Joe Bunyard, Nov. 84) [Thanks for the comments Joe. This kind of information is very useful. Let me add that I have generally been very satisfied with my purchases from Fair Radio, and when there were problems with an order, they have always quickly and courteously corrected the problems. Fair Radio's supply of R-390A's fluctuates, and prices vary, depending on supply, demand, and equipment condition, so potential customers should write them for current prices and availability. Ed.]

3TF7: Yes, we are still making a fuss about the 3TF7. Joe Bunyard noted in November 1984 that Fair Radio had a good supply at \$10 each. Jay Mathisrud also noted last November that he was able to obtain all R-390A tubes, including the 3TF7, for an average of \$2 each, and suggests checking with different suppliers. In early 1985 my supplier, formerly D.R.P. Electronics, was sold to Daily Electronics, and the price of 3TF7's jumped from \$2.50 to \$10 each. I was also informed that when their current stock was depleted, the price would rise to \$38.90. (Dallas Lankford)

CAPEHART: As many R-390A fans know, Capehart assembled R-390A's. But did you know that Capehart also manufactured jukeboxes and home phonograph systems, and that the founder, Homer E. Capehart, was a U.S. senator from Indiana? (Jay Mathisrud)

DRAKE R-4C: The Drake R-4C is considered by many to be an excellent receiver [It sure is, see the receiver comparisons below. Ed.]. This last version of the 4-line receiver has 6 tubes and a number of semiconductors. It covers the ham bands, and has passband tuning. Radiokit, Box 411, Greenville, NH 03048, (603) 878-1033, sells several modifications for the R-4C, including a general coverage adapter kit, catalog is 50 cents. R-4C's are found at hamfests in the \$200 range. Be sure to get the matching speaker. Earlier 4-line receivers (R-4/A/B) are less expensive. Drake still supplies parts and service for these receivers. One QST ad suggests protecting your R-4C investment by installing a set of Tubsters for \$138. A set of glass tubes can be gotten for around \$12. Guess which is the wiser investment? (Jay Mathisrud)

SOME MODIFICATION ARTICLES: In going over some of my remaining collection of CQ magazines, I came across several articles which may be of interest to the gang. 1. "Modifying the R390A/URR," CQ (Jan. 1965), describes using a 7360 product detector, IF noise limiter, and provisions to add a Q-multiplier. 2. "A product detector for military receivers," CQ (Mar. 1967), has step-by-step instructions for the SP-600-JX, R-388, and can be used for 75A series or 51J series mods. 3. "More on updated improvements

for the 51J receivers," CQ (Dec. 1968), is an in depth article, quite good. (Ed Kowalski)

CHICAGO AREA NOVICE EXAM: I am a member of USAF MARS (Military Affiliate Radio System), and a ham radio operator. If any of the Chicago area readers would like to take their novice amateur radio exam, I am a qualified volunteer examiner and will be glad to give them the exam. To arrange an exam, write me at 8041 N. Hamlin, Skokie, IL 60076-3403, and include a phone number where you can be reached. We can then arrange for you to take the exam at my house. Have your application form from the FCC in Chicago. You'll get a 20 question multiple choice exam, and a 5 WPM code test, no charge. (Larry Cotariu)

WANTED / FOR SALE

WANTED: Power transformer for R-388. Paul Zecchino, 35 Pond Road, Narragansett, RI 02882.

WANTED: 51H receiver [? Ed.] in good, mint, or restorable condition. John White, Box 1372, Burnsville, MN 55337.

WANTED: Military gear: TRC-10, PRC-1, and MBM; also original manuals for ARQ-1, RAX, and ARQ-8. Hugh Miller, 11206 - 1 NE, Seattle WA 98125.

WANTED: Q-multiplier plans to add a notch to R-390A, and for exalted carrier reception; a replacement audio output transformer for a Hammarlund SP-200X, and an RBC receiver, Wayne Heinen, 4131 S. Andes Way, Aurora, CO 80013.

WANTED: SP-600-JX or HRD-500 in good working shape, with manual, at a fair price, Ed. Kowalski, 3300 Chesterfield Road, Philadelphia, PA 19114.

SELL: Replacement meters for R-389 and R-390A, \$60 a pair, N. E. Litsche, P.O. Box 191, Canandaigua, NY 14424, (716) 394-0148 [via Jay Mathisrud, who notes he has not tried the product].

EDITOR'S REMARKS: A good place to buy, sell, and trade equipment and parts is the HAM TRADER YELLOW SHEETS, P.O. Box 356, Wheaton, IL 60189-0356: 24 issues (1 year) \$10; mini-subscription \$2 (4 issues) for potential subscribers. Among the best Q-multiplier articles are CQ (Jan. 1955), pp. 11-14, CQ (Mar. 1955), pp. 29-30, 50, and QST (Apr. 1956), pp. 39.

R-390A VERSUS NRD-515, R-7(A), & R-70 Dallas Lankford

If you have ever wondered how the R-390A dynamic range compares with other general coverage receivers, Sherwood Engineering, 1268 South Ogden St., Denver, CO 80210, has provided some answers. The first page of their general catalog lists 38 receivers from which I have selected seven general coverage and seven Ham receivers/transcievers, together with some of Sherwood's measurements.

The following abbreviations are used in the tables below: NF = noise floor (dBm), B = blocking (dB), S = sensitivity (micro V), FS = filter stopband (dB), SS = test signals spacing, WDR = wide dynamic range (dB, 20 khz SS), NDR = narrow dynamic range (dB, 2 khz SS), S1 = 100 khz SS, S2 = 50 khz SS, S3 = 5 khz SS, S4 = 3 khz SS, S5 = 2.5 khz SS, F = modified with Sherwood filter, T1 = receive tuning range 1.5-5 and 6-30 mhz, T2 = receive tuning range 2-5 and 6-23 mhz, T3 = receive tuning

range 3.4-5 and 6.5-29.7 mhz, H = Ham bands only, and G = general coverage receive.

GENERAL COVERAGE RECEIVERS

Model	R-390A	NRD-515	R-7(A)	FRG-7700	R-1000	NRD-93	R-70
NF	-137	-138	-135	-130	-130	-141	-129
B	130	103	145	123	119	128	132
S	0.2	0.1	0.3	0.2	0.2	0.15	0.4
FS	>85	>80	>85	>65	>70	>80	>90
WDR	81	95	97 ⁸¹	83 ⁸²	76	94	86
NDR	79	77	75	64 ⁸³	64 ⁸⁴	63	62 ⁸⁵

HAM RECEIVERS/TRANSCIEVERS

Model	R-4CT ¹	350-XLT ²	TS-830 ^M	901-DM ^M	IC-720A ^B	TS-820 ^B	75-S3B ^{T3}
NF	-139	-131	-129	-135	-137	-137	-146
B	133	117	122	124	138	115	122
S	0.15	0.2	0.1	0.15	0.15	0.2	0.1
FS	>140 ^F	>95	>85	>85	>80	>80	>85
WDR	85 ^F	81	84	87	93	79	88
NDR	85 ^F	81	81	80	78	78	74

Dynamic range measurements were made using two equal strength test signals, nominally 20 khz apart for the wide measurements, and 2 khz apart for narrow measurements. In some cases, because of filter band widths or synthesizer noise, wider test signals separations were used. With all other things being more or less equal, high narrow dynamic range is the deciding figure of merit for ranking a DX receiver. Notice especially that the wide dynamic range figures are frequently not good indicators of narrow bandwidth performance. As we see above, the R-390A wins first place for narrow dynamic range performance against the best of recent solid state general coverage receivers. Sherwood Engineering does not provide measurements for any other tube type general coverage receivers.

PUBLISHER'S CORNER

Chris Hansen

Well, it's back to the antique IBM as your Publisher welcomes Dallas Lankford as the new Editor of the Hollow State Newsletter. We hope to continue to serve you, but you have to cooperate. . .by contributing. Send your articles to Dallas at the address on the masthead. Send address changes and subscriptions to Chris Hansen (me!) at the address also on the masthead. And now, the usual:

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NEXT ISSUE WILL BE THE WINTER "WONDERLAND" ISSUE. . .AVAILABLE AROUND JANUARY/FEBRUARY. HAVE A WONDERFUL DX SEASON, AND REMEMBER, YOUR CONTRIBUTIONS OF MATERIAL MAKE THIS NEWSLETTER POSSIBLE.

Chris Hansen, for the Staff of HSN

THE HOLLOW STATE NEWS-LETTER

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NO. 12

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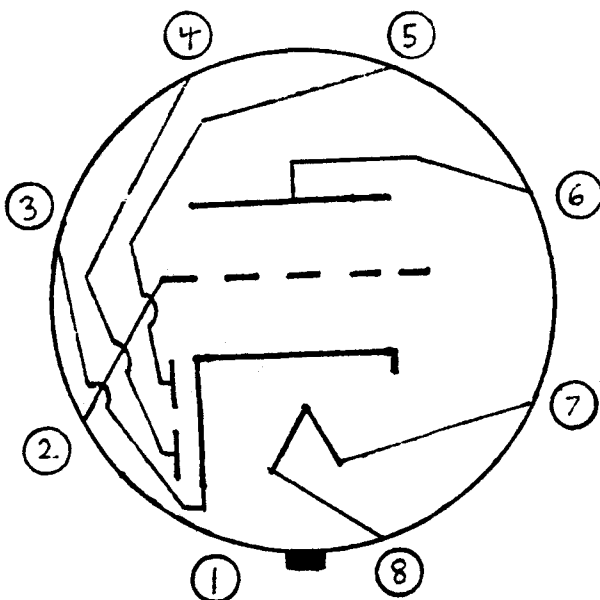
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MEET THE TUBE

Skip Arey



12SQ7

Greetings campers. It is I your former Editor, turned Contributing Editor, and resident sage of tubetype lore. Best of luck to our own Dallas Lankford as he renders forth with his editorial duties in the name of our obsession. This episode of Meet The Tube brings us the 12SQ7 or 12SQ7-GT. What? You don't remember the tube?? Sure you do. Many of us encountered it or one of the other twin-diode, high-mu, triode bottles as the main component of a code practice oscillator. Such a circuit using a 35Z5 rectifier is often found in the back of old RCA tube manuals. The metal type 12SQ7 and the glass-octal type 12SQ7-GT were used as combined detector, amplifier, and AVC tube in AC/DC radio receivers. Heater voltage is 12.6 volts AC or DC at 0.15 amperes. The only directly interchangeable tube for the 12SQ7 is the OBC3.

SHORT CONTRIBUTIONS

R-390A DESIGN: The past week I received a very exciting package in the mail which contained two Collins engineering reports on the R-390 family of receivers. The reports have been reproduced and offered for sale by Frank Gentges, AK4R, 9251 Wood Glade Dr., Great Falls, VA 22066. The engineering report on the design of the R-389, R-390, and R-391 is \$15 postpaid, and the engineering report on the R-390A is \$10. The first report contains all sorts of information, such as the development of the receivers, why they designed them as they did, problems encountered and solutions, problems for future study, circuit descriptions and discussions, and many photos. The report is about 3/8 inches thick. One example of what's in the report - original specs called for the R-390 to be immersion proof. Initial tests found so much heat was generated inside the sealed cabinet that a cumbersome external cooling system was needed. Subsequently, this spec was dropped by the Signal Corps, and a separate receiver, the R-392, was developed to meet the requirement. This report was just declassified in May through Frank Gentges' efforts, and he deserves a pat on the back and a 3TF7 for taking the initiative to reproduce these fine documents. The second report is mainly a Collins study to reduce the cost of the R-390, resulting in the R-390A. Again, lots of detailed information and photos. These reports are a must for the R-390 aficionado - fascinating reading, well worth the price. (Jay Mathisrud) [I certainly agree with your comments about these reports from what I have seen. The second report is titled "Cost Reduction Program For Radio Receivers, R-390/R-391()/URR," Final Progress Report, Period Covered To: 20 Feb. 1956. The report is 31 pages of single spaced text, plus 28 pages of pictures (35 figures). From comments in the text it is apparent that the period covered is actually to about Sept. 1956. Also, five figures are missing: functional diagram for the mechanical tuning of the R-390A and R-391A, schematics for the R-390(XC-3) and R-391(XC-2), and the final cost analysis for the R-390()/URR. I guess the government is still keeping some details secret. (Ed.)]

AM PRESS/EXCHANGE: The AM Press Exchange is the only amateur radio publication devoted to amplitude modulation. Each month there are articles on AM transmitters, older receivers, surplus conversions, AM happenings on the Amateur bands, and free ads. It also keeps AM operators informed of threats to their operating privileges. Sample copies are \$1, and subscriptions \$9, from AM Press Exchange, Route 1, Box 281, Woodlawn, TN 37191. (Jay Mathisrud)

MANUAL SOURCES: (1) Mike Consalvo, 7218 Roanne Drive, Oxon Hill, MD 20745, send SASE for current list, (2) Wayne D. Russell, 9410 Walhampton Dr., Louisville, KY 40222, send SASE for current list, (3) Military Technical Manual Service, P.O. Box 15062, Long Beach, CA 90815-0062, send \$3 for a 60 page catalog. (Joe Bunyard)

3TF7, 26Z5W PRICES: As of November 12, 3TF7 @ \$15 each, 26Z5W @ \$5 each, from Daily Electronics, P.O. Box 5029, Compton, CA 90224. (Joe Bunyard)

ANTIQUES: Antique Radio Classified, 9511 Sunrise Blvd., # J - 23, Cleveland, Ohio 44133 publishes a very nice bulletin, \$12 per year (12 issues). The two issues I have received so far were 24 pages each of reduced type, similar in format to many MW and SW club bulletins. The print quality and layout is very well done. A bulletin typically contains about half wanted/for sale ads, and about half articles with pictures. Picture quality is excellent. Emphasis seems to be on radio receivers of the 1920's and 1930's, but tubes, speakers, headphones, and other parts are also included. If you are interested in antique radios, write them for information and a subscription form. The information packet I received

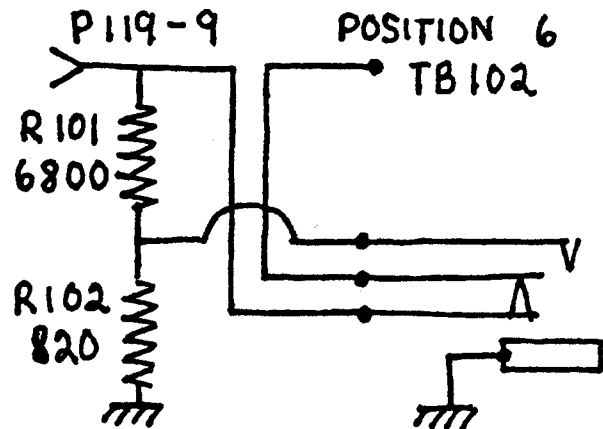
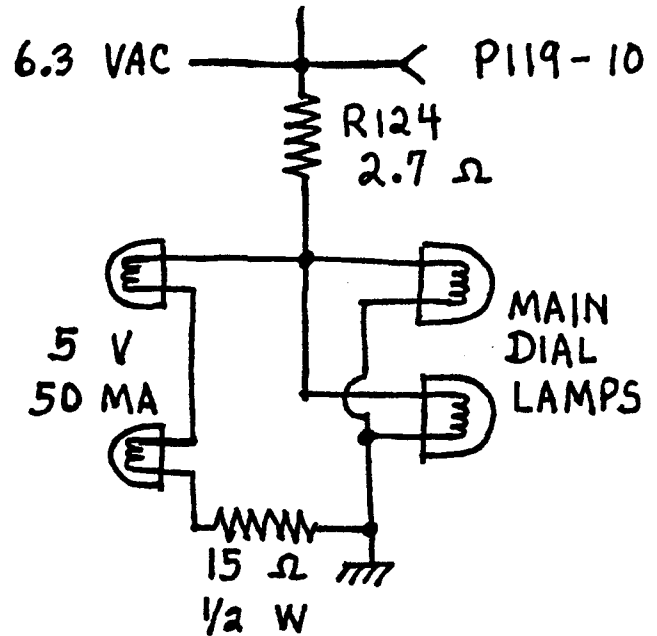
also contained an address list of antique radio clubs throughout the USA. In case you didn't know, two useful guide books for antique radios and parts are Vintage Radio, 1887 - 1929, and A Flick Of The Switch, 1930 - 1950, by M. E. McMahon. Both books are available for \$9.95 each, plus postage, from Fair Radio, P.O. Box 1105, 1016 E. Eureka St., Lima, Ohio 5802, phones: 419/223-2196, and 419/227-6573. (Dallas Lankford)

PARTS SOURCES: (1) Electronictown, Inc., 440 7th Ave., P.O. Box 2048, San Diego, CA 92112, phone: 714/232-9379, ATTN: Murray Anker, very helpful on military gear, has tubes, LS-166/U's, connectors, etc., reasonable prices, (2) Unity Electronics, Inc., P.O. Box 213, 107 Trumbull St., Elizabeth, NJ 07206, phone: 201/351-4200 and 212/571-0870 for information, or 1-800/631-7346 to place an order. (Joe Bunyard)

R-390A METER LIGHTING: I was unhappy with the lack of meter lighting in my R-390A, and feeling adventurous, I installed small 5 volt 50 ma lamps inside the meter cases. A schematic of the meter lighting mod is given below. First, remove the meters from the receiver, tagging leads. This can be done without removing the front panel with patience. Remove the front plates from the meters, and then gently remove the circular glass plates. They may be cemented, so be careful not to break the glass. I used a tiny jeweler's screwdriver to gently pry the glass plates loose. After the glass plates are removed, the meter movements can also be removed and set aside out of danger.

In my meters it was necessary to clip off a small appendage on the movement spring to make room for the lamp near the very front of the case. A small hole is drilled through the rear of the metal meter case for the wire and lamp installation. I took AC power from the low voltage end of R124 which is a dropping resistor for the main dial lights. It is located on TB101 on the front panel, and the connection can be made without front panel removal. I used a series connection with a 12 ohm 1/2 watt series dropping resistor, hoping to reduce any heat generated (none is apparent), and obtain long lamp life since replacing them will obviously be a pain. I placed the 12 ohm resistor at the end of the line, and grounded it to a solder lug attached to the line level meter mounting screws. Paint on the front panel must be scraped off to make a good electrical contact. Whew! It sounds complex, but it isn't - just don't try to hurry. (Gerald Murphy)

R-390A SPEAKER DISCONNECT: The original phone jack on the front panel can be replaced speaker disconnect jack. Just unsolder the wire from position 6 of TB102 and run two switching wires to the front panel along the partition between the PTO and AF sections. (Gerald Murphy)

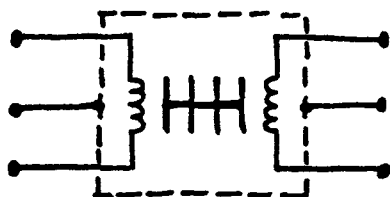


R-390A EXPERIENCES: Greetings from a fellow R-390A afficianado. I am typing this from my home located on a salt pond in a marshy area near Narragansett, RI. Reception here is nothing short of excellent. Equipment presently includes two R-390A's and three R-388's, and antennas are numerous longwires and whips. There are also a few scanners, and the obligatory CG and Ham rigs. The 390's cap a dream I've had since being exposed to them at a Navy COMMSTA twelve years ago. Both came from Fair Radio Sales. One is built by EAC, vintage 1960, and has always been good. The second was built by Motorola, ventage 1956, and has been to say the least been a dog. A 390 isn't much to brag about if its sensitivity is only capable of pulling in the local AM'er on a twh hundred foot long wire. Since it was sold "checked" by Fair, and they are very good about that, I started digging. [I wasn't under the impression that Fair was all that thorough, with "checked" meaning "someone turned it on and it seemed to work OK". A lot may be left for the customer to do, as is related in this experience. Ed.] Of course, all tubes checked fine on a commercial tube tester, and about half later proved to be bad. I shudder to think how many tubes I've chucked out because the tester said they were "bad." The only way is to substitute with a known good tube. However, sensitivity was still poor, and improved only slightly after alignment. Selectivity and stability were excellent. Then I read the HSN suggestion about substituting a 6BA6/5749 for the 6DC6 RF amp (V201). With this change, sensitivity improved dramatically. I made the substitution on the other rig with even better results. Also, for greater audio gain, I substituted 12AT7's for 12AX7's [5814A's ? Ed.] in the audio module. And one night while rummaging through a tube treasure box given me by my fine lady friend, I located several 6J6/6101 tubes. These are twin triodes similar to the 6C4 mixers in the R-390A. I used 6J6's for V203 and V204, and wham, signals were jumping out of the set with formidable power. The substitute tubes run plenty cool, and there is no strain on the receiver. (Paul Zecchino)

HQ-180 DIODE MOD: I recently bought a much used HQ-180, # 1808, and made a few mods. The first priority was getting rid of the 5U4-GB, and its fifteen watts of heat. I couldn't find any 2000 volt solid state diodes, so I went with RCA's rated at 1000 V 3 A, mainly because it seemed they would dissipate heat better than the 1 A units. The diodes were mounted topside using subminiature phone plugs soldered to one end each of the diode leads. These are then plugged into the 5U4 socket at pins 4 and 6. They just fit. The other ends are tied together and go to a 250 ohm 20 W resistor, again mounted topside with a 8/32 bolt through the center and chassis about 3/4 inch in front of the 5U4 socket. From the other end of the power resistor, another lead goes to another subminiature plug, which in turn goes to pin 2 of the 5U4 socket. The B+ voltage was about 275 before the mod, and about 260 after the mod. The power resistor dissipates about 4 W, so the mod should run cool and last. (Al Merrill)

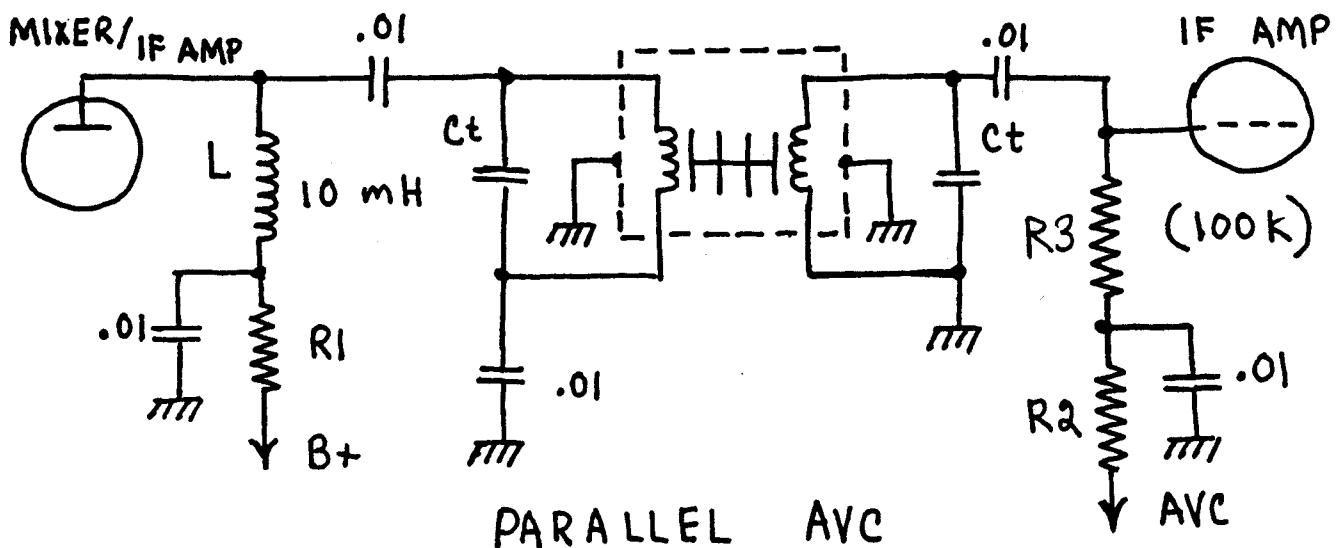
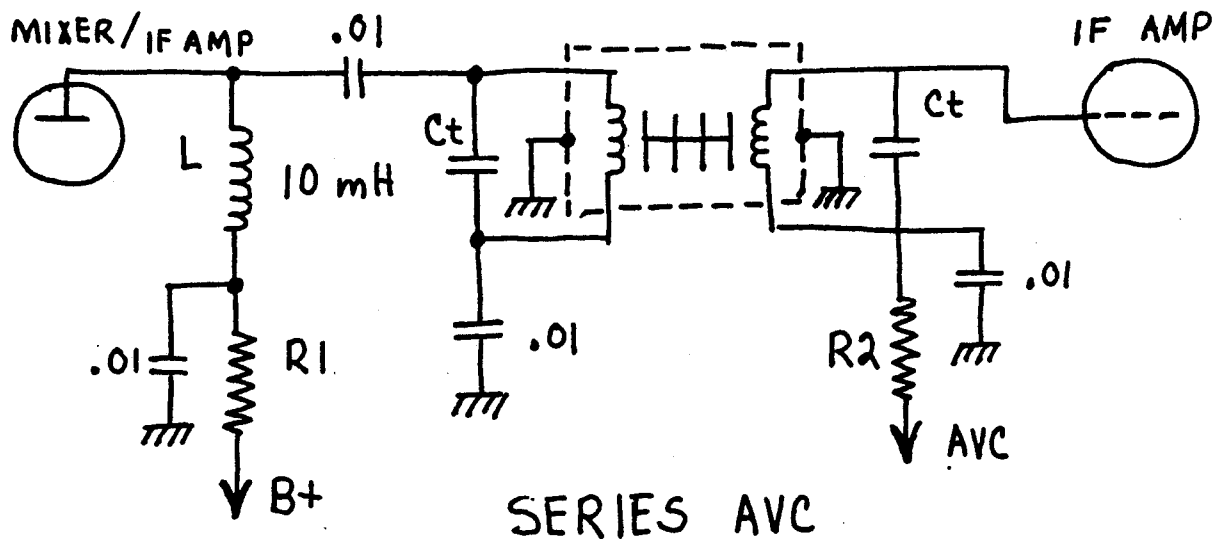
COLLINS DISC-WIRE MECHANICAL FILTERS Part 2 Dallas Lankford

There is apparently no universally agreed upon schematic symbol for mechanical filters, so we have adopted the symbol below.



The FA, FB, and N series filters all have 3 lugs at the input and output. Apparently it does not matter which end of these filters is used as input or output. The filters can be connected for balanced or unbalanced operation at input or output.

There are two basic mechanical filter circuits, depending on whether AVC feed is series or parallel, which are shown below. L is an RFC choke of about 10 mH (the R-390A uses 12 mH), R1 is the usual B+ line resistor (2200 ohms in the R-390A), Ct are the terminating capacitors, including stray capacitance, which depend on the filter (130 pf for FA and FB filters, and 110 pf for N series filters), R2 is part of the AVC circuit (22K in the R-390A which uses parallel AVC, and 100 K in an HQ180(A) which uses series AVC), and R3 is part of the series AVC (100 K for an HQ-180A). The terminating capacitors Ct usually consist of a fixed mica in parallel with a 50 pf trimmer so that filter response can be optimized. In early R-390A's, only fixed 110 pf micas were used, while in later R-390A's fixed 82 pf micas in parallel with 50 pf trimmers were used for the 2, 4, and 8 khz bw filters, and a fixed 51 pf mica in parallel with a 50 pf trimmer was used for the 16 khz bw. Some other arrangements are also possible. Recently I encountered 8 and 16 khz bw filters made by Motorola (with a yellow label) which used no fixed mica, and which were tuned to resonance with only the 50 pf trimmers. I have used the FA series filters in one of my HQ-180A's with fixed 100 pf micas in parallel with 50 pf trimmers. All capacitors should be rated at least 500 VDC. The 0.01 mf filter input ground capacitor in the circuits below is my "fail-safe" mechanical filter protection mod. Together with the 0.01 coupling capacitor, it provides double protection of the filters from B+ voltage which would otherwise wipe out the filter input coil.



For current new prices (be prepared for a shock) and information on mechanical filters, write to Rockwell International, Electronic Devices Division, 4311 Jamboree Rd., P.O. Box C, Newport Beach, CA 92660. Refer to 526 part number only. Used and unused filters are occasionally available in the Ham Trader Yellow Sheets in the \$20 - \$50 range. A complete set of four N-series filters (plus a lot of other R-390A spare parts) can be obtained from Baytronics by buying their incomplete R-390A for \$75 plus shipping (sans meters, PTO, and power supply). If you already have an R-390A, the filters can easily be checked by pulling the IF subchassis from the Baytronics unit, and putting it in your R-390A. The incomplete Baytronics unit represents a very good value for someone who wants several filters with a wide range of bandwidths. And for the adventurous, the R-390A switching could be reused to add multiple mechanical filters to another receiver. Or if one of your filters is weak (has excessive loss), you might want to trade it out. N-series filters are also sturdier than the others, and so are better suited for the experimenter.

PUBLISHER'S CORNER

Chris Hansen

Hi there, all you potential contributors!! Dallas is one of the best writers in the hobby today, and we've got him here, but he can't do it all alone. If we were to add one issue to the subscription of every contributor to the Spring 1986 issue, would you go to your (typewriters/legal pads/brown paper bags) and write something??? PLEASE! Seriously, we need your input to make HSN a bigger success than it already is. We await your contributions, and we will indeed add one issue to the subscription of EVERY contributor, whether we use it in the spring issue or keep it in the bank for later when we are DELUGED with articles. On another subject, yours truly is going to survey tube retailers for the next issue of HSN. We'll have our Second Sort-Of-Annual Gala Tube Issue at last!!! I'll try to get addresses, payment/refund policies, and sample prices for tubes we all need and want. Look for it! I am in need of the knob for the BFO Pitch control on my R390A and also the cable which goes from the IF stage to the IF Output jack (J116) on the rear panel of the R390A. Name your price or I'll trade a set of two meters for your R390/R390A in mint condition with hardware. Two other pairs are for sale. Contact your publisher at the address on the front of the newsletter.

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FROM MY R390A MANUAL: Demolition of Material to Prevent Enemy Use: II, 172: Methods of Destruction: Use any or all of the methods listed in a through f below to make the equipment completely useless. a. Smash. Smash the controls, tuning mechanism, tubes, . . . b. Cut. Cut the power cord, the antenna lead in cable; use an axe, a handaxe, or a machete. c. Burn. Burn cords, cables, and manuals; use gasoline, kerosene, oil, flame-throwers, or incendiary grenades. d. Bend. Bend the panel, the cabinet, and the main frame. e. Explosives. If explosives are necessary, use firearms, grenades, or TNT. f. Disposal. Bury or scatter the destroyed parts in slit trenches or fox holes, or throw them into streams.

PLEASANT DREAMS FROM:

*Chris Hansen of the staff of Hollow State
Newsletter!*