THE HOLLOW STATE NEWSLETTER

SEPTEMBER 1984 NO. 7

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

I 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 compléments 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.

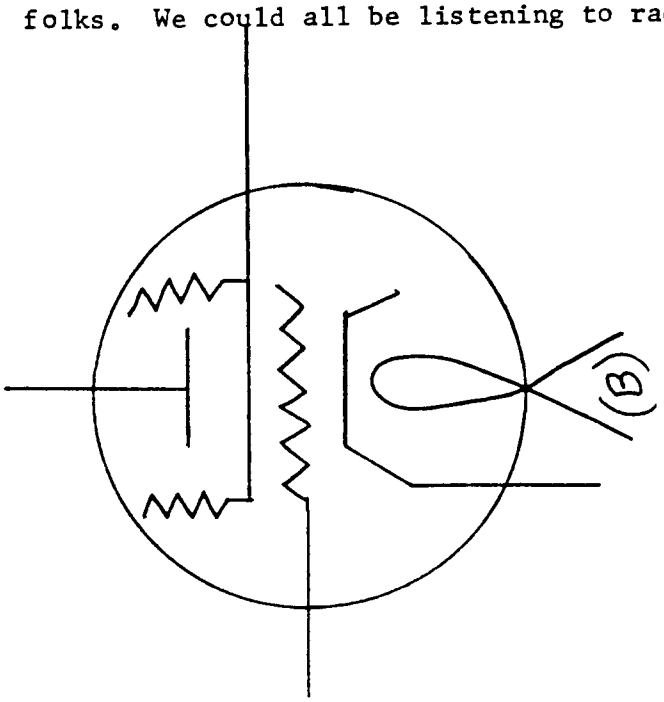
6DC6 : 1 tube, subs 6HQ6, 6HJ6, 6BJ6, 6GM6.
6C4W : 3 tubes, subs 6C4, 6C4WA, 6135, 6AB4, 6DS4.
5814A: 7 tubes, subs 5814, 5814WA, 6680, 7730, 12AU7, 12AU7A, 12AU7WA, 12AT7, 12AT7A, 12AT7WA.
5654 : 2 tubes, subs 5654W, 6AK5, 6AK5W, EF95, 6096.
5749 : 5 tubes, subs 6BA6, 6BA6W, EF93, 6660, 6HR6, 6AU6, 6AU6A, 6HS6.
6AK6 : 4 tubes, subs 6AU6, 6BA6, 6HR6, 6HS6.
0A2 : 1 tube, subs 0A2WA, 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.

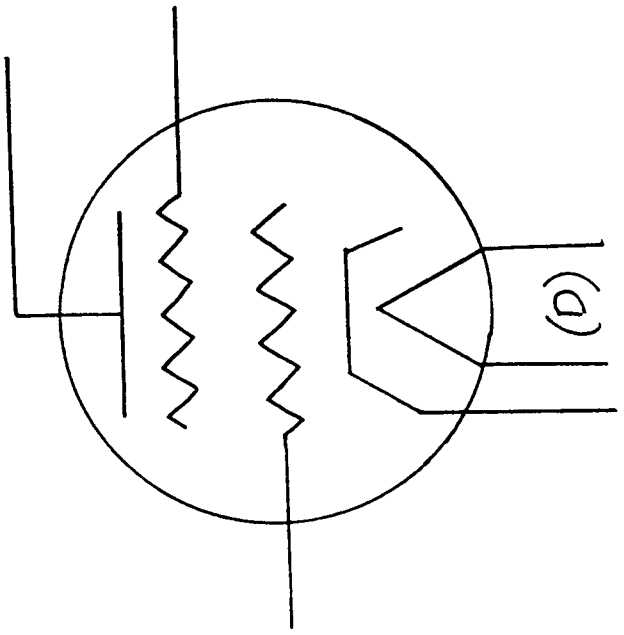
DOES ANYBODY KNOW HOW TO REPLACE THESE TUBES WITH FET'S OR OTHER SOLID-STATE DEVICES?? SHARE THIS INFORMATION THROUGH THE HOLLOW STATE NEWSLETTER.

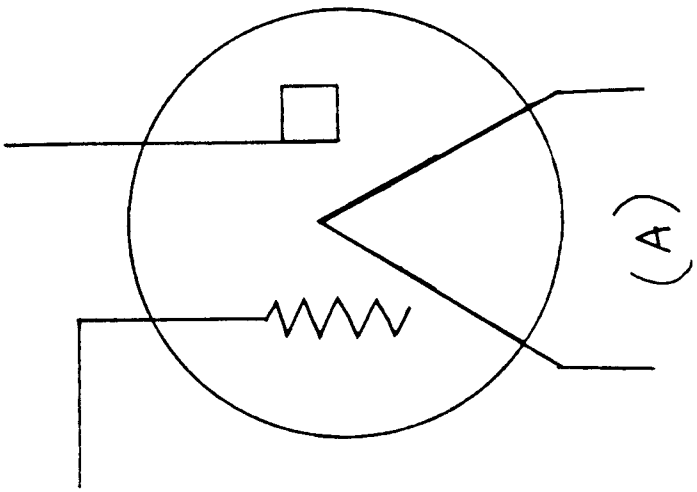
WE COULD ALSO USE TUBE SUBSTITUTION INFORMATION FOR THE HAMMARLUND HQ RIGS AND OTHER POPULAR TUBE RIGS.

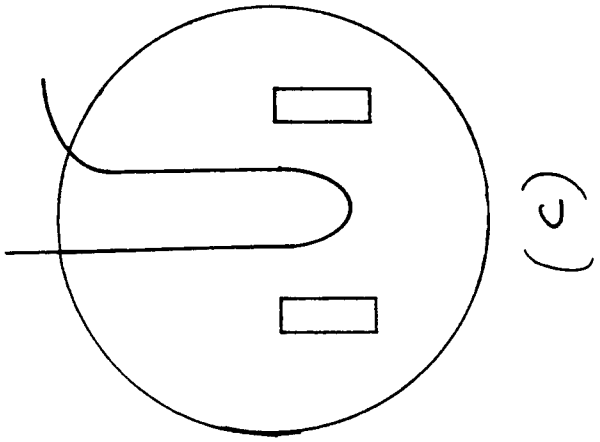
Another supplier of surplus rigs has loomed over the horizon (my, what a terrible sentence!) N.E. LITCHE, P.O. BOX 191, CANANDAIGUA, NY, phone 1-716-394-0148. They are selling checked R390A's for $250, CV-1982 SSB converters for $80.

MEET THE TUBE this issue brings our first guest host, Sue Coulter. In addition to clueing your editor in to the incredients 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 ol' 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).

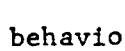
WAYNE HEINEN has just one thing to say to all of us: BEWARE OF CLOTH!!!! It seems that a recent firing up of his HQ129X led him to discover a problem he had not dealt with, but which all of us will experience at some time. The cloth wire insulation will give way, especially around the pilot light sockets 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 ½" or even ½" 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 unsolding. 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 lub is solder applied.

Correct technique is to apply the iron tip to the lug and solder (rosin core) nearly but <u>not</u> 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 lub 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 o. 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.

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

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