HOLLOW STATE NEWSLETTER

"For lovers of vacuum tube radios"

Editor
REID WHEELER
5910 BOULEVARD LP SE
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RALPH SANSERINO
P.O..BOX 1831
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HSN is produced and published by and for the community of those who appreciate the fine accomplishments of the manufacturers of 'top of the line' vacuum tube communication radios and auxiliary equipment. Originally created by a group of R-390 users, *HSN* has expanded to include industrial, military and consumer grade receivers by Collins, Hammarlund, National, Hallicrafters and others. *HSN* includes tips, modifications, alignment and restoration advice, product reviews, parts, tubes and service sources, and subscriber buy/sell information - all provided by subscribers and friends of *HSN*. All articles and information shared through this newsletter may be reprinted only with permission of the author.

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EDITOR'S AND PUBLISHER'S CORNER

New materials continue to come in - thanks to all of you who have, and continue, to contribute. I still have some good stuff for future issues such as Dallas Lankford's 'Mod 3' for the R-390A mechanical filter bank, an update of the 51J-4 product detector and a switchable AGC article, and a meter option for the R-390A for the non-purist owner. I am also working on updating the *HSN Index* which will incorporate issues 31 thru 35 for distribution later this year. The *HSN* subscriber list and the finance picture both remain healthy; we should have no problems in remaining viable for the foreseeable future.

R-390A FILTER - MOD 2

Dallas Lankford

(1-12-94; rev 1-18-94)

Several things caused me to rethink my R-390A torsion filter mod. *[see HSN 30]* First, I never liked the idea of modifying the RF chassis because any repairs or adjustments to the mod require removal of the RF chassis, a time consuming process. Second, any changes to the mod, such as developing a noise blanker, would be difficult for the same reason. And third, trouble-shooting the RF chassis could require removal of the mod, which, again, would be difficult.

A much better place for adding such filters is at J518 and J513, where the 455 KHz output of the 1st IF transformer (on the RF chassis, following the last mixer) enters the IF chassis (see Figure 1). But when I did the first filter mod, I did not know the output impedance of the 1st IF transformer, so I could not develop suitable impedance matching for filters which might be installed at that point. Subsequently, I read in the Collins R-389/R-390 Engineering Report that the output impedance of the 1st IF transformer was 1000 ohms. Except for the tube differences, the R-390A last mixer, 1st IF transformer, and following crystal filter appeared to be similar to the R-390 circuits. So assuming a 1000 ohm output impedance for the R-390A 1st IF transformer, I developed impedance matching broadband transformers for 2000 ohm source and load filters, implemented my design, and found that it worked as well as my first filter mod. This mod, called mod 2, is shown in Figure 2.

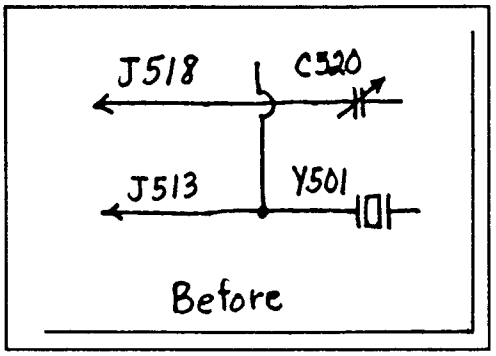

Figure 1

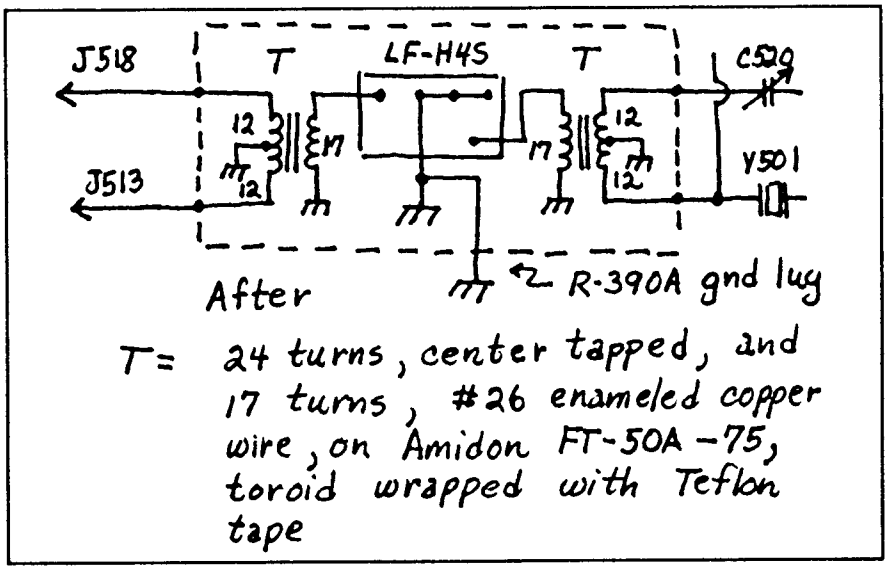

Figure 2

There is not much available space in the crystal filter compartment of the IF chassis, so I decided to use a tiny LF-H4S ceramic filter. The total number of parts required was four: the filter, two broadband matching transformers, and a PC board. Everything fit neatly on the tiny 5/8 by 1-9/16 inch PC board as shown in Figure 3.

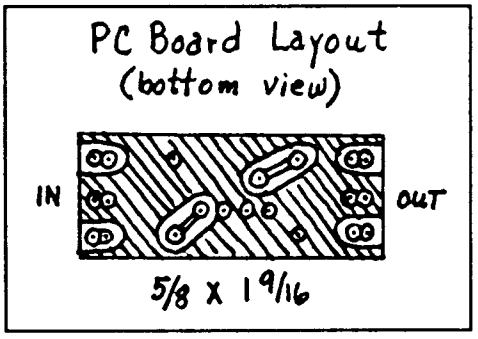

Figure 3

And like the first mod, signal loss was restored by adding a 100 ohm half watt resistor in parallel with R504 to increase the gain of the 1st IF amp (see Figure 4).

As with the first mod, and for the same reasons, close-in (within +/- 100 KHz) dynamic range of the R-390A is improved for non-crystal filter bandwidths, with more improvement as signal spacing becomes closer. For one RF chassis, the 20 KHz spacing ICP3 at 1.6 MHz was improved from -12 dBm to +2 dBm. For another RF chassis, the improvement was even greater, to +10 dBm. Apparently there is considerable variation in the potential ICP3 improvement from one RF chassis to another. A third RF chassis was tested, and the improvement in ICP3 was to +2 dBm. So it seems that +2 dBm is typical of the ICP3 improvement.

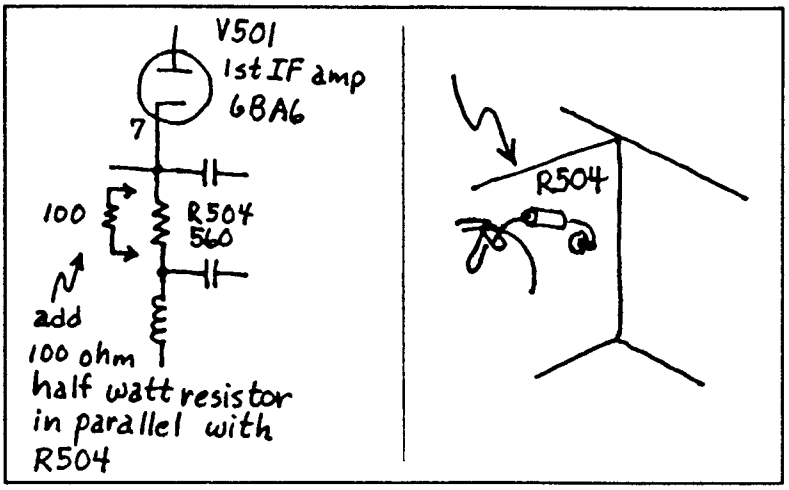

Figure 4

It appears feasible to use a Collins torsion filter for this mod,but a larger PC board, more parts, and a different mounting arrangement would be required. For these reasons, a torsion filter was not used.

The measured attenuation characteristics of a typical LF-H4S ceramic filter are shown in Figure 5. The solid line is for a stand-alone LF-H4S measured in a carefully constructed test fixture with BNC connectors

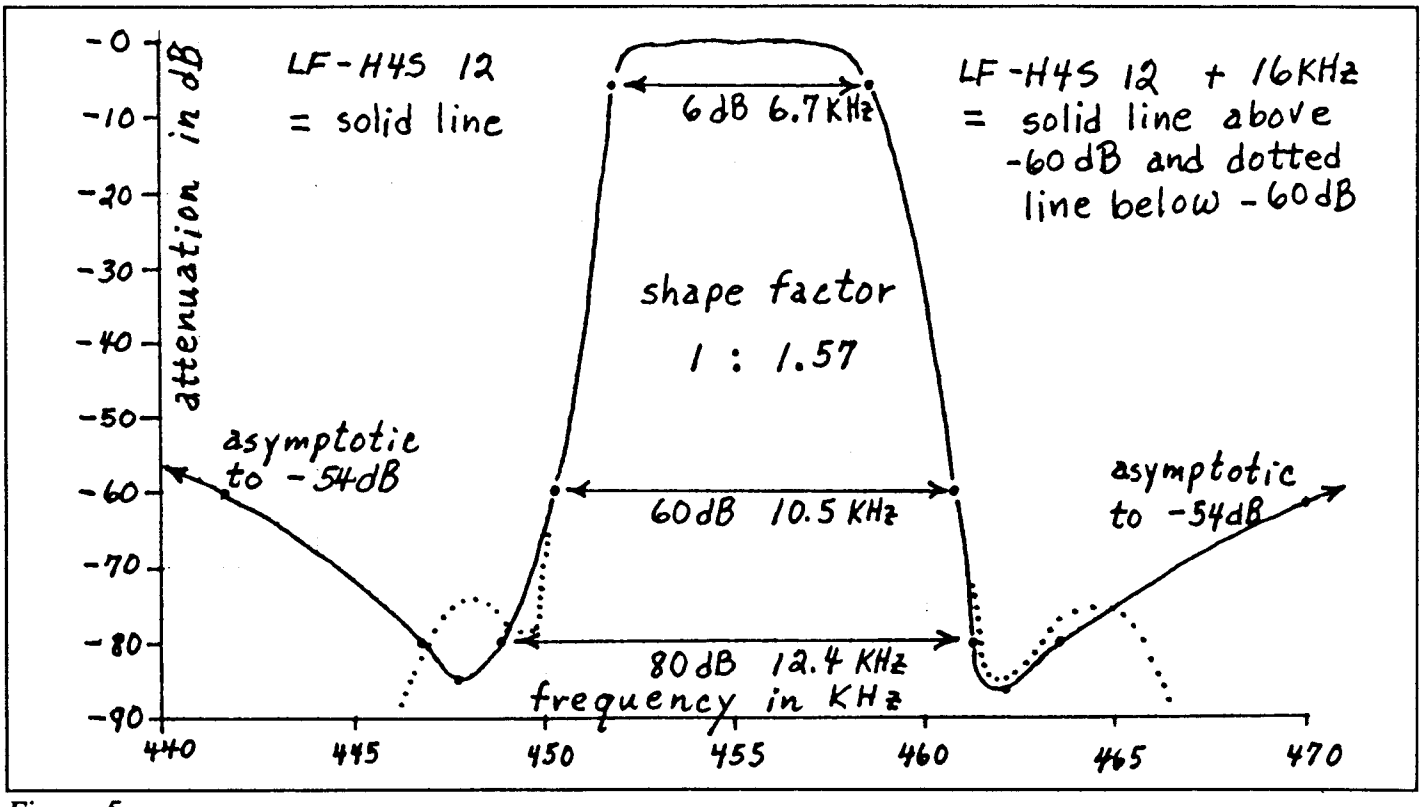

Figure 5

and RF tight input and output chambers. An LF-H4S installed in an R-390A and cascaded with a 16 KHz bandwidth R-390A filter is shown by the dotted continuation below the -60 dB attenuation points. Above -60 dB attenuation there was no difference between the stand-alone LF-H4S and the installed LF-H4S

cascaded with the 16 KHz BW R-390A filter. As can be seen, there is remarkably little signal leakage around the installed LF-H4S filter despite the rather long (2.5") leads from the output of the LF-H4S matching transformer to the input of the crystal filter. I had considered using miniature coax in place of these two open wire leads, but these measurements demonstrate that there would be little gained by using miniature coax. My ultimate plan is to remove the 16 KHz BW filter anyway, and to use the 8 KHz BW filter cascaded with the LF-H4S, in which case the humps on each side of the LF-H4S notches will be eliminated by the 8 KHz filter skirts. As can be seen from Figure 5, the stand-alone attenuation of the LF-H4S filter leaves something to be desired below about 447 KHz and above about 462 KHz, namely, the attenuation comes back up from deep notches to about -54 dB. However, when cascaded with other filters, as is done in this R-390A mod, the attenuation characteristics of the LF-H4S below about 450 KHz and about above 460 KHz are of little concern because the following filter takes over. When you use the 8 KHz R-390A BW in combination with the LF-H4S you get an outstanding 6 KHz nominal BW. Gone are the annoying 5 KHz hets which you normally get with the R-390A 8 KHz BW when tuning the SW bands. The 4 KHz and 2 KHz R-390A BWs perform about the same as before. In every way this mod is as good as the previous mod using the 6 KHz Collins torsion mechanical filters. Actually, it is better, because it is simpler to implement, and no alignment is required other than adjusting the R-390A 1st IF transformer for maximum signal with a stable signal tuned to the center of the LF-H4S passband.

The toroids must be mounted upright (as apposed to flat) on the PC board; otherwise the finished PC board will not fit into the available space (see Figure 6). The transformer lead lengths should be kept as short as possible to minimize signal leakage by re-radiation. The 5/8 inch length of the wires from J513 and J518 to the PC board and the 2-11/16 length of the wires from the PC board to the crystal filter are the lengths of the insulation, not counting additional wire length for making the connections to lugs and the PC board. The input wires should be soldered to J513 and J518 first, the PC board slipped onto those two wires and soldered. The input wires are curved into a semicircle so that the bottom of the PC board is directly above J513 and J518. Then the output wires are soldered to the crystal filter lugs, and the remaining connections to the PC board are made.

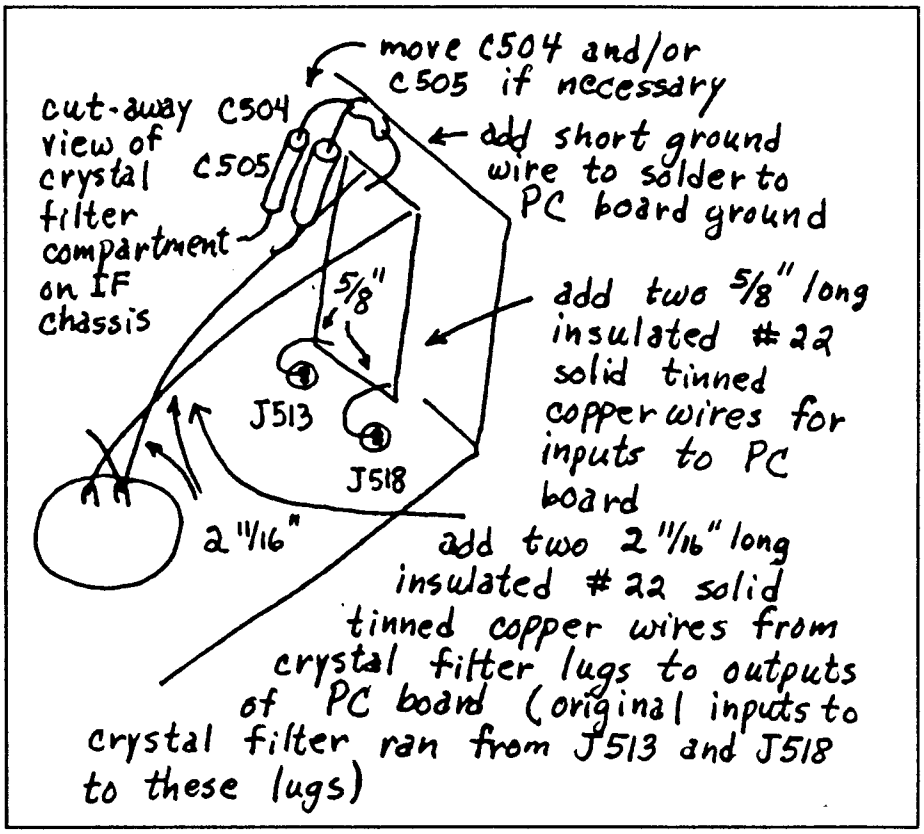

Figure 6

[LH-H4S ceramic filters are available from Kiwa Electronics, Attn: Craig Siegenthaler, 612 S 14th Ave, Yakima WA 98902, (509)-453-5492 for about $15.]

R-390A CONTRACT ORDER - AN UPDATE

Les Locklear
1122 36th St, Gulfport MS 39501-7116
[an earlier version of this article was published in Electric Radio #71]

Last fall a friend purchased an R-390A with the following contract number, N00024-84-C-2027, serial no. 2 manufactured by Fowler Industries for Avondale Shipyards (located west of New Orleans, LA). This R-390A was manufactured in 1984!

After many long distance calls by the owner and myself to Avondale Shipyards, San Diego Shipyards Electronics Repair Facility, Veedor Root Co., Walter Chambers and others the following information was revealed.

Fowler Industries was located in Port Jervis, NY. The R-390A's were built for Avondale Shipyards, which had a cost-plus contract with the US Navy. According to a Veedor Root Co. representative, they shipped the mechanical/digital frequency counters to Fowler Industries in 1983 and 1984. No records exist of how many counters were shipped, so it would be difficult to find out how many R-390A's were built on this contract. The counter assembly is a discontinued item. Fowler Industries is no longer in business. A very heipful technician at the San Diego facility checked his computer listing and said Fowler Industries was previously Clavier Corp.

Wally Chambers said that the US Navy still uses R-390A's aboard ships larger than a frigate, mainly due to the extremely high RF fields which tend to wilt the front ends of solid state receivers. A quick telephone call to the LBTF (Land Based Test Facility) at Ingalls Shipbuilding in Pascagoula, MS confirmed this, as recent construction of the USS Boxer (an LHD) had R-390A's installed.

The 1984 R-390A is identical to other R-390A's, but the mechanical filters were manufactured by a company named Dittmore-Freimuth Corp. They began manufacturing mechanical filters when the Collins patent expired. In 1968, Dittmore-Friemuth also manufactured R-390A's on contract DAAB05-68-C-0040 *[this info courtesy Dennis Gibbs].*

Via an associate of Wally Chambers comes the absolute latest - in 1960, the US Naval Signal Intelligence Station in Germany received three new R-390A's. Upon uncrating, a most unusual nameplate was noted; they bore the name of the famous ladies cosmetic manufacturer, Helena Rubenstein. As this person had worked on R-390A development at Collins, he got the following story from a friend there: In the late 1950's, Helena Rubenstein became interested in securing lucrative government contracts. At that time, the US Navy was buying R-390A's in small quantities while the Signal Corps was doing the same in larger numbers. Helena Rubenstein successfully bid on an 80-unit US Navy contract. Like the dog who chased the Volkswagen, they went to Collins for assistant and made a deal for Collins to produce the units but to put on the Helena Rubenstein nameplate. As of yet I still don't have any dope on the contract number.

For years I have heard that 13 manufacturerss built R-390A's. However, after adding Fowler, Dittmore-Freimuth and Helena Rubenstein to the list brings the count to 12 different manufacturers.

With the above information, the contract/order number genesis list is as follows:

YEAR	MANUFACTURER	ORDER NUMBER
1954	Collins	14214-PH-51
1954	Motorola	363-PH-54
1954	Collins	375-PH-54
1955	Collins	08719-PH-55
1956	Motorola	14-PH-56
1958	Motorola	14385-PH-58
1959	Stewart-Warner	42428-PC-59
1959 +/-?	Helena Rubenstein [Collins]	** Unknown **
1960	Stewart-Warner	20139-PC-60-A1-51
1960	EAC	23137-PC-60
1961	Capehart Corp.	21582-PC-61
1962	Amelco, Inc.	35064-PC-62
1963	Teledyne/Imperial	37856-PC-63
1963	Stewart Warner	DA-36-039-SC-81547
1966	Communications Systems	FR-11-022-C-4-26418 (E)
1967	Clavier Corp.	DAAG05-67-C-0016
1967	EAC	FR-36-039-N-6-00189 (E)
1968	Dittmore-Freimuth Corp.	DAAB05-68-C-0040
1984	Fowler Industries	N 00024-84-C-2027

There were so many spare contracts let that I wouldn't even try to attempt to list them.

This information should lend come credence to the rumors that have circulated for years that R-390A's were still being manufactured into the 1980's.

This article would not have been possible without the invaluable assistance and information from Wally Chambers who is a "vault" of knowledge on R-390A's, and last, but certainly not least, Victor Hatharasinghe, the proud owner of the "shiny, like new" 1984 R-390A. Had he not purchased this receiver or asked questions, this information may have gone undiscovered.

Anyone who has any additional information, especially on the Helena Rubenstein contract, please feel free to contact me.

One more item: I am expecting information on the availability and details on a **1985** 2-part R-390A manual set. Word is the Naval Publication Center in Arlington VA has, and is selling, this manual which is likely an updated reprinting and possible restructuring of the NAVPERS manual which most of us are familiar with. With post-1967 sets still in use and some additional factory modifications, it was probably provident for the newer manual to be published. The numbers for the two volumes are EE125-AB-OMI-010 and EE125-AB-OPI-010; no prices yet and I don't have the address.

QUESTIONS AND ANSWERS FROM OUR READERS

This section will present questions from subscribers for which responses are solicited. If you can help in providing answers, suggestions or just plain good advice - please send them to the editor for inclusion in the next issue of HSN.

??? Does anyone know how the National Company's serial number system worked; and whether it can be used to date receivers? Also have a restorable SuperPro which has lost its nameplate. Its a table model with dust cover, aluminum front panel w/black crackle finish with the usual 'SuperPro' legend, white 0-5 signal strength meter (not backlit), separate RF, IF and audio gain controls plus tone control, uncalibrated BFO, glass UX-base tubes and a 'bolt-on' crystal filter assembly. Came with an ancient, yellowing schematic plus notes for Models SP-10 and SP20-X. Serial number engraved on chassis is 843. Can anyone identify? [Neil Clyne, Middlesex, UK]

Ans. Although not in the Q/A column, reader Gerald Murphy (Scottsville NY) respondes to the AGC Time Constant Capacitors article (HSN #34, pg 8) - "Please refer to HSN #9, pg 4, for a more sophisticated repair of this problem which preserves all the original component positions and is not difficult to complete". *[Can't disagree with Mr. Murphy on this one - ed.]*

SHORT SUBJECTS

SP-600 SERIAL NUMBERS [from Alan Douglas] This is right up there with trivial pursuits, but I've been curious how many SP-600s were really made, when, and for what purposes. After collecting a few numbers from friends, I find that they are consecutive and they match the code dates on the electrolytics almost perfectly. So it should be possible, by adding more numbers and data, to determine exactly how many SP-600s wre made for which contracts or as civilian models. Any perhaps to figure out what the JX-numbers mean, which is not explained in the manuals or advertising. I would welcome postcards with trhe relevant information, which I'll compile for the next HSN. Or, for an SASE, I can send a current copy of the list.

I realize it's a drag (to put it mildly) to remove and SP-600 from its cabinet or rack, just to read off the code dates under the chassis, and since (so far) the dates seem to match the serial numbers anyway, I'd be happy to receive any information on your receivers (or your friends') even if it doesn't contain the code dates.

Serial	Code	Dates	JX-	Military Model if any, or other info
3488	8-52		JX14	R-274C/FRR SN7604 Order 3376-Phila-52
3594	2-51	5-51	JX7	civilian, in cabinet

6125	1-52	1-52	JX6	R-274B
9202	10-52	12-52	JX6	R-274B/FRR SN1292CHC NObsr-52039
9836	9-52	10-52	JX14	R-542
13629	4-53	10-53	JX17	diversity
15188	3-54	3-54	JX6	R-274B
17913	3-55	4-55	JX17	
20468	9-59	11-59	JX21	
20992	8-60	5-61	JX17	
22016	3-62	6-64	VLF31	VLF model

The first serial number is on the interior plate, the second one on the panel. Note the military plate for SN 9202: "CHC" is the Navy code for Hallicrafters, isn't it? Did Hammarlund subcontract for Hallicrafters? Why didn't Hallicrafters simply supply R-274/FRR (SX-73) receivers, a better set in many ways (but not all)? I'd particularly like to see info on SP-600s with low serial numbers. *[you may correspond with Mr. Douglas via Box 225, Pocasset MA 02559]*

TUBE PIN AND SOCKET CLEANING - In relating his story of bringing a near-dead Racal RA117 back to life, subscriber Neil Clyne suggests that "a judicious squirt of switch-clean lubricant down each tube socket, followed by reinsertion of the tube and juggling it around in the socket to clean the pins. Seemingly, high-voltage and heater supplies can get through a fair amount of crud on a tube socket, but not low-level RF or IF signals". Sounds reasonable to me.

PUBLICATIONS OF INTEREST

"ELECTRIC RADIO" - SOME SUGGESTED REPRINTS - Subscriber Joe Ursini of Euclid, OH writes to suggest several back issues of ER would be of use to R-390A owners: #24 (April 91) 'History, development and electrical design of the R-390A'; #25 (May 91) 'Mechanical design and service hints of the R-390A'; #26 (June 91) 'R-390A modifications, AGC mods, I.F. amp mods, R.F. subchassis mods'; #30 (Oct 91) 'Collins linear PTO - development and manufacture'; #31 (Nov 91) 'Collins linear PTO - maintenance'. Back issues are $3.00 each from ER [PO Box 57, Hesperus CO 81326]. *Readers should also look to back issues of HSN for R-390A PTO service and various other mods, especially AGC mods - opinions differ [ed.]*

WANTED TO BUY / SELL / TRADE / WHATEVER

This section is reserved for HSN subscribers in good standing (i.e., you're paid up according to Ralph) looking to connect with HSN readers for mutual benefit. All deals are between individuals; HSN doe not evaluate the accuracy of any statements or claims herein. No 'business' ads, please. Items printed will be on the basis of available space.

Wanted - R-390A; EAC model in good condition. HQ-180A manual, original or copy but not HQ-180 one with 180A addendum sheets. [Jeff Hambright, 65 Summit Rd, Sparta NJ 0787, 201-729-8015]

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