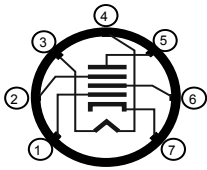


HOLLOW STATE NEWSLETTER

"For lovers of vacuum tube radios"



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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

Many thanks to those few of you who continue to send useful information for publication is *HSN*. It's never enough to insure a good 'backlog' of materials, but we continue to muddle on. As [continued on page 8]

THE ANTENNA COUPLER CU-286/FRR-33 BY COLLINS

Paolo Viappiani

The Antenna Coupler CU-286/FRR-33 was built in 1950-1951 by Collins Radio Company under US Government Order No. 21852-PH-50-93. It is an active RF preselector (rather than a true antenna matching device), provided with two separate channels (“A” and “B”, for two receivers) and with remote control facilities (8-channel gain settings and motorized tuning).

The CU-286/FRR-33 was designed for use in conjunction with two R-391/URR receivers and it was employed by the US Army also in the AN/FRR33 Radio Set.

Like in the “R-390” series, the 0.5 - 32 MHz tuning range of the Antenna Coupler is divided into 6 bands: 0.5 - 1; 1 - 2; 2 - 4; 4 - 8; 8 - 16; and 16 - 32 MHz. Each of the two main channels has its own coil turret assembly.

The CU-286/FRR-33 employs the same RF transformers as the first stage of the R-390 and R-391 receivers and a simplified array of “slug-racks” (similar to the R-390’s and R-391’s) for tuning. Two large knobs (similar to the R-391, with locking keys in their center for motorized tuning) are provided in the front of the unit for selecting the range in use and the tuning frequency of both channels simultaneously; a transparent window over each of the two round KHz and MHz dials allows the reading of the peak frequency and of the selected range from the front panel.

Each channel of the CU-286/FRR-33 is provided with a 5686 (a pentode connected in a cathode-follower configuration) in its active stage; the remaining tubes are a 5Y3WGT rectifier, a 6082 voltage regulator, a 6AU6 DC amplifier, and a 5651 voltage reference and are all pertinent to the power supply section of the unit.

On the rear panel are four balanced inputs for selecting two different antennas (“Ant 1” or “Ant 2”), two outputs (“Ch. A” and “Ch B”) plus many accessory sockets for AC power supply, remote control, etc.

The CU-286/FRR-33 performs very well in my shack; it is connected to two of my three R-390A’s and it shows very low noise and noticeable gain. My unit has a S/N of 80. I purchased it in 1977 from Barry Electronics, New York, and I paid about \$200 for a brand-new unit in its original packing; now the CU-286/FRR-33 is very rare and I have never seen it in an amateur installation. I have not had any trouble with my unit and only had to replace the original selenium rectifier (providing DC to the relays) with a silicon diode and dropping resistor.

I do not know if a similar Antenna Coupler (but without remote control and motorized tuning facilities) was also built later for R-390 and R-390A receivers; I have never seen or heard of such a unit. Should any reader know anything more on the matter, please contact me.

Mr. Viappiani is a new subscriber in La Spezia, Italy who has somehow stumbled upon HSN. He bought his first R-390A in 1976 and has become an enthusiastic collector of R-390’s and R-390A’s. He is the editor-in-chief of the Italian audio home-brew publication ‘CONSTRUIRE HiFi’, a contributing editor to several other Italian radio magazines, and has just completed his own work, ‘The R-390 & R-390A Handbook’, of which I’ll soon see a copy. Mr. Viappiani’s address is Via G.B. Valle, 7 - 19124 La Spezia, Italy.

MANUALS - SOME PLACES TO CHECK

Reid Wheeler

A fairly recent issue of the monthly “Popular Electronics” had an article on restoring ‘older’ electronic equipment in which they provided a list of manual sources. Some of these I was familiar with, but there were also a few new ones ... to me. With a stack of handy, home-made HSN letterhead and a book of stamps, I proceeded to see just what I could surface. The response was less than comprehensive, but what was received

looked like good stuff. Also, my request to all of you for manuals and manual sources in HSN #36 also netted some info. What follows (in no particular order) is the result:

The Manual Man (Pete Markavage), 27 Walling St, Sayreville, NJ 08872-1818 The current 28-page catalog (Issue #5) is free. Includes Collins 51J-3 & 4, 51S-1/1A/1F/1B; extensive listings of Hallicrafters, Hammarlund and National with a good smattering of test equipment. Sorry, but no credit card or COD orders; checks and money orders only. Pete sent me a nice cover letter indicating the current catalog will be update soon with several hundred more manuals. If you are interested in Lafayette or Heath manuals, they're not in the catalog but write or call as he has lots (he expects to offer Lafayette and Heath manuals via separate catalogs). Call him at 908-238-8964 evenings after 8pm EST and weekends. He also sounds like he might be a place to go for unusual or special request items.

W7FG Vintage Manuals, 3300 Wayside Drive, Bartlesville, OK 74006 Nice 13-page catalog (#3 - 1995) including extensive Drake, Hallicrafters, Hammarlund, Heathkit, National, Swan plus lots of military including the R-388, R-390/390A and R-392. Inquiries 918-333-7893; orders 1-800-807-6146 7 days a week, Visa & Mastercard OK. Also will try to fill special requests. You can also find W7FG on the internet at <http://newton.eigen.net/w7fg/>

HI Manuals, PO Box 802, Council Bluffs, IA This outfit has been in the manual business for quite a while and has one of largest listings and variety of electronic manuals I know of. Their current catalog (mine is K but I'm sure it's up to L at least; see their classified ad in the current 'QST') should be on any serious 'collectors' shelf. Cost is \$2.00 in US; outside US is \$3.00. No phone - you'll have to do this one strictly by mail.

Our readers offering assistance include:

John Schmelzer, 7900 Lafon Place, St. Louis, MO 63130 will sell copies of a 35-page 1976 commercial (not military) manual for the SP-600-JX17 for \$7 postpaid.

Dave Sundheimer, 13020 Lakeview Dr., Burnsville MN 55337-3831 has and will copy at his cost manuals for the R-388, R-390A, R-392, SP-600-JX17 and GRR-5. Dave also advises that "most large cities and universities have a depository library of government documents that can be accessed via your local library if it has an interlibrary loan process. You will need the TM number and the title of the document. If available, you will get the document for about 10 days. In my case, the manuals came from the Univ. of Minnesota and most Army manuals I have requested were available. I can copy it at the local office supply store at 3 cents a page - considerably cheaper than the government reproduction cost - and the copies can be inspected as you copy."

Doug DeWeese, 502 East 80th St., Tacoma WA 98404-1014; 206-472-3478 suggests (with experience) some other possible suppliers - Mike Horvat, PO Box 73, Stayton OR 97383 (Mike has quite a collection of stuff! and A.G. Tannenbaum, PO Box 386, Ambler PA 19002; 215-540-8055.

Shaun Merrigan, 14203-72 St., Edmonton AB, T5C 0R4 regarding military radio and test gear - Don Merz, N3RHT, 47 Hazel Dr., Pittsburgh PA 15228; 412-234-8819 (weekdays, EST or leave message) and e-mail 71333.144@compuserve.com.; test gear - W.J. Ford Surplus Enterprises, 21 Market St. N., PO Box 606, Smith's Falls, ON K7A 4T6; phone 613-283-5195; fax 613-283-0637; e-mail

testequi@magi.com; and <http://infoweb.magi.com/~testequi/> on the internet; and for Hammarlund, Hallicrafters, Collins and test gear manuals contact Robert Fowle, The Hammarlund Historian, 1215 Winifred, Jackson MI 49202-1946; phone/fax 517-789-6721 or e-mail hammarlund@vixa.voyager.net.

Jim Carrington, 378 Joost Ave., San Francisco CA 94131 writes that he has “just ordered and received 2 manuals for the R-390A from the National Technical Information Service of the US Department of Commerce. For orders call 703-487-4684 or fax at 703-487-4841. You must have the exact TM manual number before you order as they do not have access to a cross reference to equipment model number or don’t have the time to do this for you. The manuals I have received are:

TM 11-5820-358 -35 “Field and Depot Maintenance Manual for R-390A/URR” [\$27.00], and
TM 11-5882-358-20 “Organizational Maintenance Manual for R-390A” [\$19.50]

From various sources on the Internet you might try:

Aben, PO Box 4118, Jersey City NJ 07304 purportedly has original December 1961 TM-11-5820-358-35 R-390A Maintenance manuals;

Well, that’s it on the manuals for now. I may have stumbled across some additional sources via the Internet but I’ll have to do some more work on downloading from FTP sites. In the meantime, those of you who are ‘on the net’, why not do some searching of your own re: boatanchors and hollowstate gear and let me know.

HOLLOWSTATE ON THE INTERNET

Reid

Wheeler

In the last few months I have had Internet access where I work. The amount and variety of information which may be quite useful to owners of vintage hollowstate radio gear is extensive and I growing daily. I dearly love hollowstate gear from the ‘50s and ‘60s but I certainly don’t live 24 hours a day in such a state of nostalgia.

Some useful sites I have discovered include:

Western Electric Surplus - <http://www.westes.com/>

ARRL “In Your Neighborhood” - <http://www.arrl.org/neighborhood.html>

Tube sources: “Tubes to Go!” - <http://www.primenet.com/~rhwatts/tubes.html> and
http://www.paranoia.com/~ftlipg/HTML/FAQ/BODY/F_Tubes.html

W7FG Vintage Manuals - <http://newton.eigen.net/w7fg>

“Boatanchors” - <http://www.zynet.com/~johnb>

“Boatanchors FAQ” - <http://www.primenet.com/~rhwatts/boatancr.faq>

“US Naval Observatory Master Clock” - <http://tycho.usno.navy.mil/what.html>

There is also a "Boatanchors Mailing List" that you can subscribe to (\$12 annually) where you can post questions and seek advice on this topic. For no cost, you can review the daily archives of all the correspondence as well as getting subscription information. Go to:

<http://sunsite.unc.edu/pub/academic/agriculture/agronomy/ham/BOATANCHORS/>

CLASSIC TUBE TESTERS

Alan S. Douglas

[Originally printed in The Audio Amateur and reprinted here courtesy of the author]

Good tube testers have always been very expensive. 30 years ago, \$150 wouldn't have bought you very much, and some common models sold for \$500. But now that tube equipment has virtually disappeared, tube testers can be bought second-hand for a reasonable price.

There are two basic types: emission testers and mutual conductance testers. Emission types, which are much less expensive, apply a voltage to all grids and plates tied together, and measure the total cathode current (the better designs apply different voltages to various elements and measure only the plate current). Though an emission check will cull the obviously-worn-out tubes, it tells only half the story. A mutual conductance testers actually measures the amplification, applying a small AC signal to the grid and measuring the amplified signal at the plate. Simpler models use 60Hz AC as a signal. The more elaborate ones contain an audio oscillator and apply correct DC voltages to every tube element, using panel meters for monitoring.

Since a good mutual conductance tester costs no more now than a cheap emission tester, there is really no excuse for owning anything else. A number of brands were available in the 1950s and 1960s but Hickoks turn up most commonly now.

The key words to look for are "mutual conductance" or "transconductance". Don't be fooled by "plate conductance" or "Gp", or the word "dynamic". There were also hybrid designs: one, for instance, measured mutual conductance on the more common tubes, and emission on the rest. Rectifiers are always tested by emission only. There were also a number of mechanical designs: testers with lever switches, rotary switches, an array of pre-wired sockets and no switches, punch-card testers, and even a patch panel - all to connect the right tube elements to the right voltage supplies. Obviously, a tester made before the introduction of Nuvistors and Compactrons will not have sockets for either.

In addition to my most often used Hickok 6000A, I also have (and have used after repairing) a Western Electric KS15750-L1 (their version of the Hickok 539), a Weston 686 type 10A, and a Hickok 539C.

I have heard that Hickok won't respond to inquiries on old tube testers, but I've had nothing but good luck with them. Their address: Hickok Electrical Instrument Co., Dupont Ave. and E. 105th St., Cleveland OH 44108. Roll charts are, of course, not available. What they will sell you is a chart reprint in book form, which is only slightly less convenient than the rolled version. If you find roll charts, they tend to shred with use, especially as the paper ages. There is nothing you can do about it except avoid rolling them whenever possible. Torn edges can be taped with transparent tape (don't stretch it when applying), though you will probably regret it ten or 20 years from now. Mending tissue works better. Your best bet is to make a copy of the roll chart in page form and use that, or attach a chart of the most commonly-tested tubes to the lid of your tester.

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.

- ???
- Assuming that I have a signal generator with a calibrated output, how do I measure receiver sensitivity so I can compare it with factory specs? This might seem trivial but sensitivity is measured in terms of signal-to-noise ratio. How does one measure this ratio without elaborate equipment? If it is not possible to measure sensitivity with reasonable accuracy using simple test equipment, could a simple procedure be devised to compare sensitivity of one receiver to another in a consistent manner? In the case of an FM receiver, it's sensitivity is often spec'd in terms of the signal input for 20 dB of quieting. This can easily be measured by placing an AC voltmeter across the speaker terminals with no signal input and then turning up the volume until the meter measures some convenient level of noise voltage. Then one merely raises the signal input until the meter reads the number of microvolts for 20 dB of quieting. This is an example of the simple, reproducible-by-others type of sensitivity measurement I'm looking for, for an AM receiver.
- ???
- In previous HSN issues there has been much written about modifying the AGC circuit in various receivers. I never bother using the AGC switch (slow-med-fast) on my R-390A because I don't really understand the point of it. Give some examples of how to enhance the reception of various kinds of signals with the AGC time constant switch.
- ???
- When I replace the finals and driver in my ham transceiver I do a ten-hour burn-in with just the filaments on before neutralization. When replacing tubes in an R-390A or other radio should they have a burn-in time before adjustments are made and if so, for long? I found out from experience that this makes a difference in the PTO tube on my R-390A.
- ???
- I'm interested in a report or listing of all the known variants of the R-390 and R-390A receivers. I have seen a few - one was an R-1274, it was a Collins R-390A that had three oscillators outputted and relay switched. There are some special IF decks for the R-390 (mech filter/prod. det.) from the military. There are also some specially modified R-390A's for digital frequency readout. A reasonably complete compilation would be interesting.

SHORT SUBJECTS

ANTENNA CONNECTORS FOR R-390 SERIES [Les Locklear] For "C" to BNC connectors, try Texas Connectors, PO Box 940375, Plano TX 75094. Call Mike Currie at (214) 423-9625 for what's available and prices.

REBUILDING THE URM-25D [Walter N. Opdycke] I recently acquired two URM-25D's for the grand sum of \$10. One was to repair and the other for parts. First of all I recommend getting the rebuild notes from the publisher [*available from 'Selected Reprints' for \$1.00*]; these notes saved a lot of time and were a good guide to doing a complete restoration. I would emphasize that these generators should be rebuilt. The paper capacitors were all very leaky and continued use of them will probably burn out something that won't be easily replaced. Replace all the electrolytics as well. This includes C132 (25 mf, 25V) in the output section as well as the power supply capacitors.

Fair Radio Sales [419-223-2196] is a great resource for restoring the URM-25D. They supplied me a complete manual including the parts list. Of course, they do not usually supply the parts list but did so for a small fee [\$5] when I asked. They also will sell you used dial lamps for \$1.50 each. These are nearly impossible to get otherwise. There is no warranty with these. Get a few to be sure you get enough to work. A better solution in the long run would be to rewire the lamp circuit but I'll wait until the current bulbs burn out. You can get a complete set of UM-25D accessories such as the impedance adapters and dummy antenna if you ask.

The URM-25D is a very good repair instrument and is not that difficult to work on if you have the notes and the manual. For me, it's the best buy in RF generators.

LONG-SHAFT PHILLIPS SOURCES [Geoff Fors] I recently needed a long shaft Phillips screwdriver to remove the RF deck in my R-390A, and discovered that it isn't something the auto supply stores or hardware warehouses carried. I live in a small town, and other than flagging down a Snap-On Tools truck or driving to another city, I was stuck with mail order. I then discovered that they aren't a common mail order item either! The most inexpensive mail order source I found was MCM Electronics, Centerville, OH. They have 10" blade Phillips screwdrivers as follows:

- # 0 - part #22-1515 - \$2.09
- # 1 - part #22-1520 - \$2.09
- # 2 - part #22-1525 - \$2.09

They have a \$20 minimum order, so you might want to get their free catalog first by calling (800) 543-4330 and seeing if there is something else you can use.

The highest quality Phillips screwdrivers I have ever used are made by a French tool company called Facom. They have ergonomic cushioned handles, are strong, have a lifetime guarantee, and are a real pleasure to use. A set of two screwdrivers with 9-3/4 inch blades, in sizes #1 and #2, is available as part # FK306 for \$12.95 from Griot's Garage of Tacoma, WA at (800) 345-5789. They also offer a free tool catalog, catering to car collectors, and have no minimum order.

Both companies take charge cards and have very fast delivery. As mentioned above, Snap-On and Mac Tools also offer highest quality long reach Phillips screwdrivers, at the high end of the price range, although they do come with a lifetime guarantee.

SOFT LACQUER STICKS A PROBLEM? [Les Locklear] Are you having problems when using lacquer sticks of having the tip go soft and mushy? Put them in a zip-lock type bag and put them in the refrigerator, then you can sharpen the tip and get them into even the finest engravings on from panels or marking on knobs.

PUBLICATIONS OF INTEREST

THE RACAL HANDBOOK by Rinus Jansen. A review of Racal Communication Equipment, 1956-1975, published by GC Arnold Partners, 9 Wetherby Close, Broadstone, Dorset BH18 8JB, England. 13 pounds sterling + airmail shipment, VISA/MasterCard charges accepted from international customers.

At present, this is the only Racal resource available to the vintage equipment enthusiast. Originally printed in the Dutch language, this booklet has been translated into English and published by the same people who produce "Radio Bygones" magazine. Available only in paperback form, the 102 "A4" pages (approximately 8 by 12") are bound between cardstock covers. All photos are good quality black and white reproductions from original Racal sales literature and service manuals. The book begins with a biographical discussion of the Racal company, and detailed technical discussions of its initial product, the RA-17 receiver. Subsequent chapters are largely devoted to single-page coverage of many other Racal products, including receivers, transmitter-exciter and many accessory adapters, the majority of which are solid state.

The author admits that because of the tremendous variety of products produced by the Racal organization during the period of the book's focus, it was impossible to include them all. Coverage of products from Racal's Silver Spring, Maryland plant is nearly nonexistent, but such equipment was very similar to British counterparts, and there is probably very little of it in Europe where the book is primarily circulated.

The appendix includes one-line identifications of Racal model number, many of which are not otherwise featured in previous pages. My only criticism comes from this section; there are scores of models not listed. Since the author had access to Racal's own archives, it would have been most helpful had he at least included a one-line description of every Racal product produced during the time period, even at the cost of extra pages.

The use of original factory artwork is a cut above the "old magazine ads snipped out and pasted into a scrapbook" format, and the absence of any "inflated price guide" opinions were a welcome relief. Overall, even with overseas shipping added, this book is a good value and represents an excellent introduction to Racal and its products. Hopefully the author will eventually continue with a second volume offering additional material. [Geoff Fors, PO Box 342, Monterey CA 93942-0342]

RADIOS BY HALLICRAFTERS by Chuck Dachis. Even if you are not a Hallicrafters collector, this is a terrific book to browse through. Photography is excellent and it's all there, everything Hallicrafters has built. Chuck has done an excellent job compiling the material and getting it published. Highly recommended! Available from Electric Radio, PO Box 57, Hesperus CO 81326 for \$29.95 plus \$3.00 shipping. [Les Locklear]

WANTED TO BUY / SELL / TRADE / WHATEVER

For Sale: Military extender cables for R-1051 receiver audio/IF modules (needed to adjust AGC), new, \$14.00 ea. ppd. CONUS. Wanted: Restorable front panel for R-390/URR; shock mounts FT-154 for BC-348 and MT-284 for ART-13. [Geoff Fors WB6NVH, Box 342, Monterey CA 93942; 408-373-7636, FAX 408-373-2345]

Wanted: Source for parts to repair slot frequency control on HQ-180A [Charlie Gaharan, 504 Thoroughbred Drive, Thibodaux LA 70301]

Wanted: URM-26 signal generator [Ward Rehkopt, 116 Fairway Dr, Belmond, Iowa 50421]

EDITOR'S AND PUBLISHER'S CORNER (CONTINUED)

you will see in my article about the Internet, there appears to be somewhat of a 'resurgence' in hollowstate gear, also known as 'boatanchors'. If the amount of material on the 'net is any indication of interest, we will

be in business a long time ... and for those of you who are on the net, how about writing up something useful for those *HSN* subscribers who are not! A final remark I have changed 'platforms' from WordPerfect version 5.1 (DOS) to Microsoft Word 6 for Windows. Those of you who are current or potential contributors to *HSN* may certainly feel free to make your submittals by disk in the Word 6 format.

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