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NEWSLETTER

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PUBLISHER: Chris Hansen, P. O. Box 1226, New York, NY 10159. * * * * *

EDITOR: Dallas Lankford, P. O. Box 6145, Ruston, LA 71272-0018. * * * * *

CONTRIBUTING EDITOR: Skip Arey, P. O. Box C-4, Cinnaminson, NJ 08077. * * * *

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EDITOR'S CORNER

Hello again from hollow state land! I am sorry for the slight delay in getting out issue #13, but as you can see, I have been very busy redesigning the newsletter and arranging to have it typeset. The system I am using is called TeX and was developed by Dr. Donald Knuth, a professor of computer science at Stanford University. The particular software I use, which runs on an IBM PC, was developed by a company in California called Personal TeX. And the laser printer which printed this issue is a Corona Data Systems (Cordata) LP-300. The amount of electronics which supported all of this is probably equivalent to a *large* building full of tube type equipment, so it is evident that solid state has definite advantages. On the other hand, I keep hearing gossip that none of the most recent and best solid state communications receivers is quite the equal of the best of our beloved hollow state gear. For example, Bill tells me that he picked up a Hammarlund HQ-150 a few years ago which he now uses mainly on the BCB, and he would not trade it for any new receiver. He says it runs rings around a Drake R-7 on the BCB. And Chris remarked recently to me that the Sony 2010 is a big disappointment on the BCB, with noticeable overloading problems. I also recently picked up a DX-400 at a very good close-out price, and while it is useful for casual listening and for emergency use in the event of power failure, it just does not come close to my R-390A or HQ-180A for strong signal handling performance or for digging out the weak ones in the presence of background static or man-made noise. I often think that many of the younger DXers who have not been introduced to hollow state gear miss some DX because of the inferior performance of most solid state receivers.

Remember, this is your newsletter, and it exists only as long as you continue to supply us with material for publication. So please sit down and write us a card or letter with some information for the next issue.

SHORT CONTRIBUTIONS

AN/URM-25D: Fair Radio has a good supply of government reconditioned AN/URM-25D RF signal generators. I bought one which arrived in the original government cardboard packing container, with the unit and accessories in two separate boxes inside the container. The unit was *very clean* with all new "weather stripping" insulation. The lid contained the accessories plus manual. The manual and all accessories were *brand new*, still in their original sealed packages. The only things missing were one spare 1 amp slow blow fuse, and two easy-to-find hex wrenches. It was listed in the Summer Supplement To Catalog WS-85, and was an excellent buy at \$175 plus shipping. (Joe Bunyard)

ANTIQUÉ RADIO CLASSIFIED: This excellent monthly magazine will cease publication after the August 1986 issue unless 400-500 new subscribers are obtained by June 1, per an announcement in the March issue. The May issue stated that about half the needed new subscribers had been obtained. New subscriptions through August will be accepted on a pro-rated basis only at \$1.25 per issue, e.g., June-August \$3.75 (3 issues). If any HSN subscribers have an interest in older tube gear, mainly from the 1920's, '30's, and '40's, why not try a few issues? Send your check or money order to G. B. S. Enterprises, 9511 Sunrise Blvd., #J-23, Cleveland, Ohio 44133. You may not make the June 1 deadline unless Chris and I really hustle, but at worst you would receive the last three issues of a really fine publication. (Dallas Lankford)

GOSSIP: Much military electronics equipment is currently being bought up to fill orders going to small, third-world countries as reconditioned military supplies. Some large military surplus companies fill orders such as these regularly, doing much of the reconditioning themselves. Cabinets, for example, are a prime auxiliary item. An electronics surplus dealer in San Antonio regularly sends surplus scrap equipment to Japan by the container load. Individuals then come and take the equipment to their homes, remove every salvagable component from the equipment, return everything to the owner, and are paid for their labor. The dealer told me that he recently shipped an entire barn full of VTVM's, test equipment, cases, generators, etc., and is now filling it up again. (Joe Bunyard) [If you have been procrastinating about buying hollow state equipment or supplies, take heed. Ed.]

R-390A PARTS: R-390A less meters, 3TF7, and dust covers, visually inspected for completeness, \$145, from Fair Radio, per FW 1985 Catalog Supplement. (Dallas Lankford)

R-390A MOD?: The November 1985 issue of *Ham Radio* contains an article "External product detector improves receiver performance," by A. Nusbaum, W6GB, which includes an R-390A mod claimed to improve sensitivity and noise figure. Part of this mod includes removing the IF transformer shields, clipping the Q-reducing resistors which are in parallel with the tuned circuits, and peaking all IF transformers on 455 khz. This does not seem desirable for several reasons. One purpose of the Q-reducing resistors and stagger-tuned IF transformers is to provide a flat IF response, especially in the 8 and 16 khz band widths. Tampering with the original design may degrade flatness and increase signal levels at the detector (which in turn may degrade strong signal handling performance). I suggest that this mod *not* be done for those reasons alone. Also, clipping the IF transformer resistors can bend the internal IF transformer wires so much that they touch the shield, causing reduction or loss of gain. I encountered just such a problem recently. For about a year I had been trying to find a problem in a spare IF subchassis which manifested itself as an intermittent decrease in AGC voltage, and decrease in sensitivity. But all tube voltages and resistances measured normal (as compared to a known good IF subchassis). The intermittent nature of the problem made it extremely difficult and time consuming to

trouble shoot, so I had slowly begun to replace every capacitor on the IF subchassis under the assumption that the problem was caused by an intermittently bad capacitor. A few weeks ago I had removed the IF transformer shields to make a record of the values of the Q-spoiling resistors, and on *close* examination I discovered to my amazement that some of the resistors had been clipped on one side, and that the internal wiring had been bent slightly outward. After repairing the damage, no further problems have been experienced. Enough said? Just for the record, older IF transformers usually have 47K ohm resistors for R511, R512, R553, and R554, and 82K ohms for R522, while newer units have 39K ohms and 68K ohms respectively. Incidentally, do not change the resistors in your IF subchassis. Apparently there are at least two different IF transformer coil windings, "old" and "new," and the resistor values are different by design. The intermittent gain reduction problem may also occur with "mint" IF subchassis. If someone has carelessly handled an IF subchassis, the IF transformer shield may have been bent slightly inward so that the internal wires touch the shield. An easy cure is to wrap a turn or two of insulating tape around the internal structures (in particular where the solder joints protrude) which might touch the shield. El cheapo black vinyl electricians tape will work, but I prefer Scotch 27 glass cloth electrical tape. (Dallas Lankford)

DIGITAL DISPLAYS: Grand Systems, P. O. Box 2171, Blaine, WA 98230 makes what is undoubtedly the Cadillac of digital displays for the HQ-180 (and many other hollow state receivers). Unfortunately, it has a Cadillac price, \$279 plus \$5 UPS shipping. This is not your run-of-the-mill digital display. It counts every frequency in sight, i.e., the main tuning oscillator, the 2580 khz crystal oscillator which converts the 3035 khz IF to 455 khz, the 395 khz oscillator which converts the 455 khz IF to 60 khz, and the 60 khz BFO, and it adds and subtracts all frequencies as required to display the *exact* frequency (the display reads to 0.1 khz) to which your receiver is tuned, in all modes (AM, SSB, CW). In AM mode it is, of course, impossible to tune accurately to the carrier frequency. But if you zero beat an AM signal with your BFO on, then you know its carrier frequency to within 0.1 khz. (Al Merrill) The Torrestronics WTK-1 at \$135 plus \$7 UPS shipping, from Universal Shortwave Radio, 1280 Aida Drive, Reynoldsburg, Ohio 43068, is easier on the pocketbook. It works with many common receivers, such as the HQ-180, SP-600J, HRO-60, and R-4A/B/C, and Universal Shortwave Radio will send you a photo-copy of the connecting instructions for your receiver if you provide them with a SASE. (Dallas Lankford)

CATALOG: For anyone who likes to tinker, I highly recommend the Jensen Electronics Tool Catalog, free from Jensen Tools, Inc., 7815 S. 46th Street, Phoenix, AZ 85044. They have almost every imaginable tool, including multiple spline wrenches needed for working on R-390A's and other military surplus equipment, pinpoint oilers, miniature wrenches, hundreds of kinds of screwdrivers, diagonal cutters, etc. (Todd Roberts)

R-648/ARR-41: This is an interesting military surplus radio which is available from Fair Radio and other sources from time-to-time. The ARR-41 is a newer, updated replacement for the famous BC-348 aircraft receiver, with several refinements, including 190-550 khz plus 2-25 mhz tuning range, mechanical digital tuning similar to the R-390 series, Collins 1.4 and 6.0 khz mechanical filters, diode tuning BFO, Collins PTO, and slug-tuned RF and IF stages. It is a great little receiver, and does a nice job on SSB. The main disadvantage is that it requires a 24 volts at 2 amps for the tube filaments, plus 250 volts DC at 100 ma and 150 volts DC regulated for the PTO and BFO. An excellent power supply construction article is on page 96 of the November 1978 issue of *73 Magazine*. The service manual, NAVAIR 16-30ARR41-502, is highly recommended. (Todd Roberts)

COSMOS PTO: I am so elated to have discovered that the Cosmos Industries PTO (blue label) has an end point adjustment! [Me too!! Ed.] As I recall, after finding nothing to adjust under the "proper" (slotted hex bolt) cap screw, I previously neglected to look any further. [I made the same mistake, and compounded my mistake by publishing an article

which stated that the Cosmos PTO has no end point adjustment. Ed.] The Cosmos end point adjustment slug is *behind* the transformer, and under a cap screw which is smaller than a regular looking screw. This small cap screw has a rubber grommet seal akin to the usual seal on the slotted hex bolt. I needed a small jeweler's screwdriver to angle into the hole after that cap screw was removed. (Dick Truax) [Dick has made a wonderful discovery. Many of us had assumed the Cosmos PTO, a late model R-390A PTO, has no end point adjustment. It is merely hidden behind the Z702 transformer. When doing an end point adjustment on a Cosmos PTO, it might help to remove the Z702 shield. Ed.]

R-390A 200 KHZ CRYSTAL: If your 200 khz calibrator crystal goes bad, and you can not find one on the surplus market, try Sentry Manufacturing Company, Chickasha, OK 73018, phone (405) 224-6780. An acceptable type is SC-6 (0.002% commercial grade). (Dick Truax)

51H: I had an ad in HSN #11 wanting a 51H receiver. You added a [? Ed.]. I am wondering what the model number of the Collins receiver before the 51J series was? See the enclosed advertisement from Rockwell referring to the 51N. The other page I have enclosed is from a Collins 51S-1 and 651S-1 sales catalog, printed February 1976, where they refer to the 51H as their first general coverage receiver in 1946. I was told by a fellow who said he knew just about as much about Collins as Art Collins himself that Collins never made a general coverage receiver prior to the 51J series. I would appreciate anything you could share with me. (John White) [I wish I could help, John, but I am mystified. Maybe one of our subscribers knows something and will share his information. Ed.]

3TF7: New 3TF7's are \$39 each from Unity Electronics, P. O. Box 213, 107 Trumbull Street, Elizabeth, NJ 07206. They also have a nice assortment of antique tubes, some mounted on polished transparent acrylic bases, and a few large, old transmitting tubes made into table lamps! The top-of-the-line lamp uses a #357A World War II era transmitting triode, total height 19 inches, for \$79. It looks nice in their catalog. Has anyone actually seen one of these lamps? (Dallas Lankford)

A SURVEY OF HAMMARLUND RECEIVERS, Part 1

Dallas Lankford

This is a revision of an article which I published in *DX News* in 1979. When I returned to BCB DXing in 1976 after many years absence from the hobby one of my pressing needs was for a good receiver. I had kept my eye on receiver developments over the years, but none of the newer (unmodified) receivers seemed to have specifications, especially AM selectivity, indicative of outstanding BCB performance. Moreover, a glance at the IDX column in *DX News* revealed that older tube-type receivers, mainly Collins and Hammarlunds, were still very popular among BCB DXers. Since that time I have used the HQ-180A, HQ-150, and HQ-100A and have been very pleased with the performance of each of these fine old receivers.

What makes Hammarlund receivers so popular in the BCB DXer community? The most important reason, I think, is that all of the Hammarlund receivers have adequate to excellent AM selectivity together with good dynamic range. Without both of these features, a receiver will not be a good performer on the BCB. Many newer receivers are deficient in one or both areas. Granted, one can modify some of the newer receivers by installing ceramic or mechanical filters, or by making SSB selectivity available for AM reception, but these modified receivers are no better than the top-of-the-line Hammarlund receivers with regard to AM selectivity and dynamic range.

Hammarlund receivers, like most tube radios (except the Collins 51J and R-390 series), do drift a bit on the higher SW frequencies, and frequency readout accuracy gets worse as frequency increases, but the drift is only a problem for CW and SSB, and if the receiver has a 100 khz calibrator, then the frequency readout is adequate for finding any AM

broadcaster. Simple solutions for these problems are to buy or build a crystal controlled converter for the high frequencies you desire and buy or build a digital display.

In the following table I have summarized the main features of interest to DXers for tube-type Hammarlund receivers of the past thirty years or so. These features include receiver model, approximate first year of production, bands (frequency range), primary selectivity, and additional remarks of interest. The following abbreviations are used in the table—BANDS (frequencies in mhz): A = 0.54–1.32, 1.32–3.2, 3.2–5.7, 5.7–10, 10–18, 18–30, B = 0.54–1.35, 1.35–3.45, 3.45–?, C = 0.54–1.6, 1.6–4, 4–10, 10–30, D = 0.54–1.05, 1.05–2.05, 2.05–4, 4–7.85, 7.85–15.35, 15.35–30, SELECTIVITY: X = crystal filter, Q = Q-multiplier, LC = IF transformers, REMARKS: 1 = bandspread inoperative on BCB, 2 = passive notch filter, 3 = active notch filter, 4 = product detector for CW/SSB, 5 = regulated B+, 6 = dual conversion on BCB, 7 = dual conversion on higher SW bands, 8 = triple conversion on higher SW bands.

RECEIVER	YEAR	BANDS	SELECTIVITY	REMARKS
HQ-129X	1946	A	X	1(?),5
SP-600JX	1950	B	X,LC (455 khz)	1(?),5,7
HQ-140X	1953	A	X	1(?),5
HQ-150	1956	A	X,Q	1,3,5
HQ-100	1956	C	Q	5
HQ-160	1958	A	Q	1,2,4,5,7
HQ-145	1959	C	X	2,5,7
HQ-180	1959	D	LC (60 khz)	1,2,4,5,6,8
HQ-100A	1961	C	Q	5
HQ-180A	1962	D	LC (60 khz)	1,2,4,5,6,8
HQ-200	1969	C	Q	4,5

The single conversion Hammarlund receivers all have 455 khz IF's and the multiple conversion receivers all have a 455 khz strip at some point in the IF's. In all Hammarlund receivers, primary selectivity is obtained in one (or two in the case of the HQ-150) of three ways—by a five (or four in the case of the SP-600JX) position 455 khz crystal filter, a 455 khz Q-multiplier, or multiple tuned circuits in a 60 khz IF strip. The crystal filter has 6/60 db band widths of about 4.4/11, 3.6/10.6, 2.8/10.2, 1.0/9.4, and 0.5/9.2 khz/khz, while the Q-multiplier is continuously variable from about 2.9/26 to 0.3/18 khz/khz. The 60 khz IF strip in the HQ-180(A) provides 6 db band widths of about 6, 4, 3, 2, 1, and 0.5 khz with a 60/6 db shape factor of about 2.5/1. The SP-600JX has 6 db band widths of about 13, 8, 3, 1.3, 0.5, and 0.2 khz.

Popular opinion has it that steeper skirted selectivity is superior to shallow skirted selectivity, and that must be true to some extent, otherwise there would be no need for highly selective IF's. Thus one would expect the crystal filter and 60 khz IF to be about equal in the selectivity department, and the Q-multiplier to be a distant third. However, my ears rate the Q-multiplier and crystal filter about equal, and the '180's 60 khz IF slightly better, though not enough to make much difference in hearing most DX. This contradicts popular opinion, but apparently the Hammarlund Co. thought highly enough of Q-multiplier selectivity to make it the primary source of selectivity for their 1958 delux model, the HQ-160. And several top veteran DXers have used the HQ-100(A) or HQ-200.

Several Hammarlund receivers come in newer "A" models, whose main difference from the older models is that B+ is rectified by silicon rectifiers rather than a tube rectifier.

And many had a clock option or the option of one or more fixed crystal tuned positions, i.e., so-called "C" and "X" models. This makes nomenclature rather complex, e.g., HQ-180(A,C,X,AC,AX). There are also other differences between older non-A and newer A models. For example, early HQ-180's did not have a vernier fine tuning control which varies the 395 khz conversion oscillator about 3 khz and improves SSB tuning.

The notch (slot) filter on some models is a very useful feature on some occasions. Adjacent channel splatter and TVI can sometimes be reduced significantly, and annoying hets (when listening in the wider selectivity positions) can be almost completely eliminated. The Q-multiplier notch filter on the HQ-150 does not seem to be quite as effective as the passive notch filter on the HQ-145(A), HQ-160, and HQ-180(A), but is still very useful.

The HQ-150, HQ-160, and HQ-180(A) all have a built-in 100 khz calibrator which is nice for locating SW stations or calibrating the bandsread tuning for the ham bands.

The HQ-180(A) has a product detector and audio-derived AGC with slow, medium, and fast release times, which makes it the only tube-type Hammarlund receiver specifically designed for CW/SSB. The other Hammarlund receivers tend to overload when tuning around with the BFO on unless the RF gain is frequently adjusted. Why this should be I don't know (even my old inexpensive Hallicrafters SX-110 did not have this problem), but the Hammarlund receiver manuals point this out (I suppose so that users will not mistakenly conclude their receiver is operating improperly).

To a first approximation, Hammarlund receivers can be placed in two categories, economy and delux. I would classify the HQ-100(A), HQ-145(A), and HQ-200 as economy models, and the others as delux to a lesser or greater extent. The distinction is not clear cut, as can be seen by comparing features, and which receiver may appeal to an individual DXer is often a matter of personal preference. In my opinion, the HQ-180A takes top honors, though some DXers rate the SP-600JX and HQ-150 as equal or better on the BCB.

PUBLISHER'S CORNER

Gee, my poor old IBM wide-carriage Executive is blushing -- thanks to Dallas for improving the already-good typeface of HSN.

Just a word on the Hammarlunds -- I have a HQ-150, modified by Bob Foxworth, which I run with his own home-brew frequency readout and a McKay Dymek DP-40 tuner. I swear by it (not at it, hi!). I retubed it recently for less than \$50 (that includes spares), and I'd put it up against any HQ-180.

Speaking of retubing, the tube source list will be coming up in the Fall or Winter edition.

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We're currently working on a BEST OF HSN ISSUES 1-4, to be available probably with the Fall issue. Those of you who have already ordered sold-out back issues will get one; those who were unable to get those back issues will be able to buy this digest for \$2.75 -- we plan for 8 pages (rather than the usual 6). Foreign price will be \$5.50. Watch for it!

THANK YOU FOR YOUR SUPPORT. We couldn't do this without you.

Chris Hansen for the staff of HSN.