THE HOLLOW STATE NEWSLETTER

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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, Hammarlund, 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 ($\geq$100 K) are required. So our discussions will be restricted to disc-wire, symmetric, 455 khz center frequency, $\geq$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 HRO-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-4C[T1]	350-XL[T2]	TS-830[H]	901-DM[H]	IC-720A[G]	TS-820[G]	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:

 HSN is available at the price of $4 for one year or $8 for two years. Frequency of publication is quarterly (roughly) by season. Back issues 1-2 and 4-10 are available from the publisher at $1 apiece. Samples are available at the same price (the most recent issue will be sent). Inquiry sheets are available for a SASE. The above prices are for US/Canada/Mexico. Residents of other countries should double each price: $8 for one year, $16 for two, back issues $2, samples $2 or 4 IRC's. Inquiry sheets available for 4 IRC's.

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