

THE COMMUNICATIONS RECEIVER

EDITED BY

William B. Fizette, K3ZJW

RR 1, Box 55, Henryville, PA 18332

All correspondence requires SASE for reply.



THE NATIONAL COMPANY RH-AIRPORT RECEIVERS

In the early years of the decade of the '30s the world was in the grip of the Great Depression, and the United States, in particular, was severely affected. Jobs and money were scarce and unemployment was widespread. But in the midst of this despair and general inactivity, a few pockets of prosperity based on rapidly growing technologies emerged and even continued to develop. One of these was aviation, and another was electronics. And where was a large pool of money to be tapped? Why, of course, the U.S. Government, which through the Department of Commerce was responsible for the regulation and safety of the embryo airline industry. The National Co., with as much experience in those early days as anyone else in manufacturing electronics components and complete short-wave receivers, bid for and won the contract to provide the airport receivers. The AGS receiver familiar to collectors was the outcome of the design and production efforts, and several hundred were built and sold to various commercial and government services, as well as a few to some well-to-do amateurs.

Not so well known, however, is the RH-series of receivers, which were actually based upon the AGS design, but with some distinctive mechanical improvements. The scarcity of these sets... only a relative few could have been built compared to the AGS and the HROs... means that few collectors have ever seen one or even know that they exist.

Chronologically, the RH-airport receivers were designed and manufactured to correct some of the design deficiencies of the AGS almost at the same time that the AGS was being promoted and sold in 1933. One of the more troublesome problems was the loose assortment of coils; three were needed for each frequency range, and it was easy to misplace or even insert the wrong coil. The end result was the mounting of the three coils of each set upon a heavy aluminum plate, making the coil-changing process much easier. Changes were also made to the antenna input and audio output circuits and to the tuning dial. At the same time the tuning range was restricted to two sets of coils, covering overall 2500 to 6500 kc.

DOCUMENTATION ISSUES

The receiver pictured in the photographs is a model RHP, with a contract date of March 27, 1933. My early efforts to document the set stalled with the

picture in the *QST* ad in July, 1933 and the reference in Ray Moore's 2nd Edition of *Communication Receivers*. Because the designations were different even though the sets looked identical, the obvious question was raised; what is going on here? A letter to Ray Moore gave me some answers, and he in turn referred me to an excellent article on the AGS by Henry Rogers, WA7YBS, in the July, 1991 issue of *Electric Radio*, in which this design variant is mentioned. Henry kindly sent me a copy of the original typed manual for the RHQ, and helped with other information. For readers who wish to study further, background articles on the AGS are recommended reading. Included are one in the *OTB* (Vol. 16, No. 4), two in *Radio News* (January and March 1933), and one by Bill Orr, W6SAI, in *CQ*, November 1975.

Inspection of this receiver and comparing it to the AGS showed the physical layouts of the two sets

Continued on page 12



The label of the RHP receiver.



The National Co.'s 1933 RHP airport receiver. Note the long name plate, type BX dial and extra coil set. (All photos and drawings accompanying this column courtesy William Fizette.)

— RHP RECEIVER

Continued from page 11

to be quite similar, with the exception that some of the front panel controls were interchanged and some of the hardware, such as switches, were different. It is also slightly smaller. The major difference is the use of a mounting plate for the three coils and a very precise guide mechanism to assure easy and positive insertion of the coils into the mating sockets. Another prominent difference from the AGS is the use of the type BX tuning dial, a variant of the original type B with a black-faced, 150-division dial, instead of the type N used in the AGS. At the time, of course, the famous PW dial was still on the drawing board. Why this change was made is a mystery.

The Rogers article helps to sort out the confusion regarding the differing nomenclatures. Originally the AGS was designated the RHM, but changes were made and it was renamed the AGS. In the *QST* ad the two versions of the set with the modified coils are designated as the AGU and the AGL, possibly standing for "Aircraft-Ground-Upper" and "Aircraft-Ground-Lower," referring to the frequency coverages. However, the receivers supplied to the government were designated RHP or RHQ, depending on the particular modifications. The AGL is also sometimes referred to as the

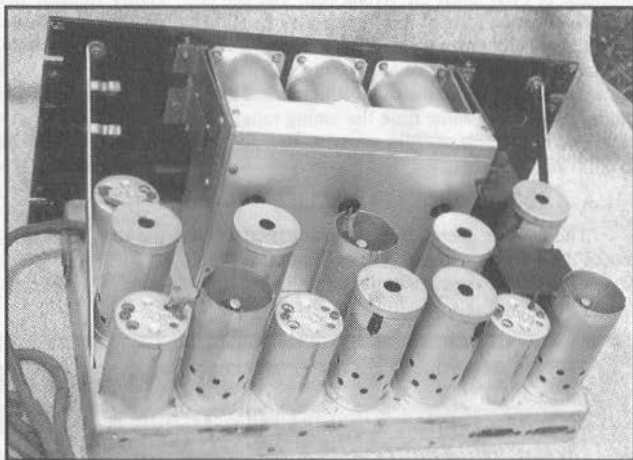
RIO. One correction: In the ER article reference is made to the "AGO"...this is a typo; it should read AGU, Serial No. 8.

PRELIMINARY INSPECTION

Inspection of this RHP receiver showed in every respect the famous National Co. dedication to quality and craftsmanship during Jim Millen's tenure as chief engineer and chief executive officer, with price being secondary to the manufacture of a receiver intended for continuous duty and requiring the utmost in reliability, as in press wireless and aircraft control. The sheet metal stock was heavy aluminum plate, precisely formed, and the tuning mechanisms and the process for careful and meticulous hand calibration of the inductances before the days of ferrite slugs was

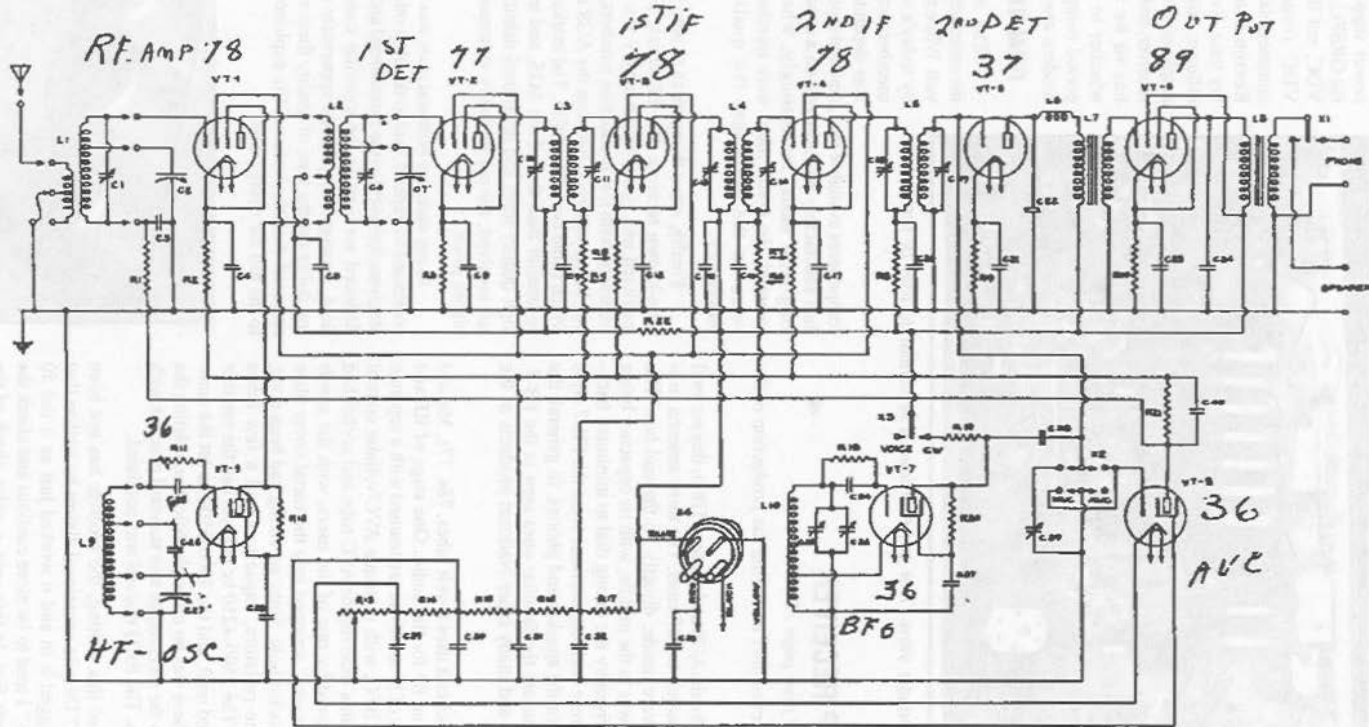
unique in the industry. (Refer to the AGS articles for the details.) The bottom plate was actually cut to insert into the chassis, and much of the chassis hardware was flat-head machine screws requiring countersunk holes. Where components had to be purchased (National made parts, but they didn't make everything) the approach was to obtain the very best available. These included the tubes, capacitors, resistors, miscellaneous hardware and even the wire. However, both the quality control and the level of development on some items, such as the resistors then available, were questionable, and Jim Millen once mentioned to the writer the problems they had with

Continued on page 14

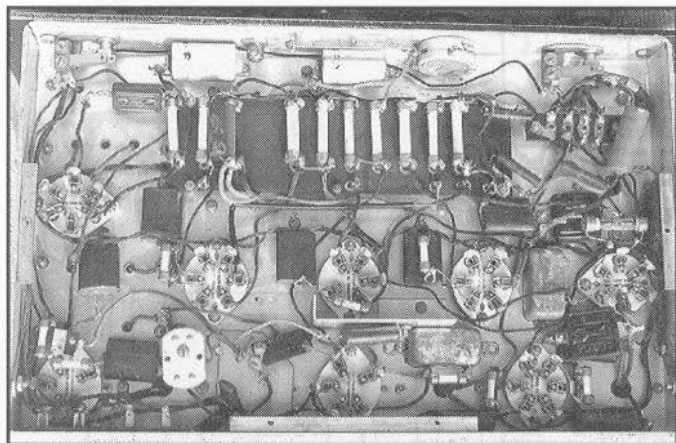


Rear view of the RHP receiver.

SCHEMATIC DIAGRAM TYPE R.H.Q. RECEIVER



The circuit of the R.H.Q. taken from the original manual.



Below chassis view. The general layout is similar to that of the parent AGS.

— RHP RECEIVER

Continued from page 12

resistors, even later on during the production of the HRO.

Unlike the AGS and the later HRO, this set used an audio output transformer. The three antenna connections were inside, directly on the coil box. The oscillator was in the middle, with its capacitor being directly driven by the tuning dial to minimize backlash. The rear deck connections were the FB-7 style tip jacks for the speaker and phones. In general, the components are the familiar ones seen in the FB-7, the HRO, and many other National products of the period.

The circuit uses 6-volt tubes, 78s, 77s, 36s and 37s, with an 89 for the audio. One stage of RF and two stages of IF at 500 kc are teamed with a separate HFO and BFO, with a unique AVC/volume control circuit. In this receiver the AVC tube and socket had been removed by one of the users, with the words "AVC removed" stamped into the metal cover plate over the socket hole. Some servicing had been done, with some resistors, capacitors and a few tubes changed. The 2500-4250 kc coil set had the number 12 stamped on it, and the 4000-6500 kc set the number 42. There was no other identification relating the coil set to the receiver, as was standard practice with the HROs. The RCQ manual was not dated.

As of this writing, the receiver has not been "fired up." Despite occasional claims by writers that they "plugged it in and it worked just as it did 50 years ago," I tend to be more cautious and check the components first. In this case, a quick check of the resistors, the white ceramic style with the cast metal ends, showed erratic values. I also noted that the

power supply specified, the GRSPU, delivers 180 VDC, not the usual 250 VDC from the more common National packs. Reason enough to take my time. Even more significant, this is clean example of a relatively rare receiver, and the decision has to be made as to whether to replace bad period components with modern ones.

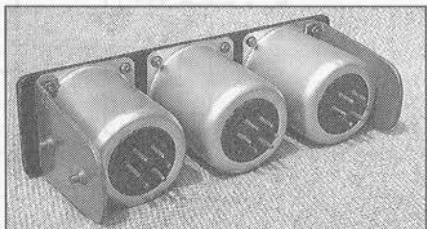
FINAL THOUGHTS

The manual lists the sensitivity as 1 micro-volt. While not very good by today's standards, remember that this design was dependent upon the

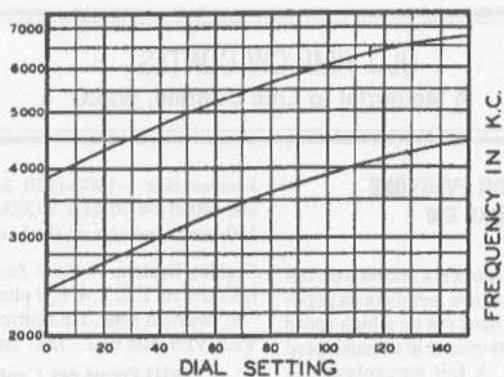
components available then, and that it provided more than satisfactory performance on a continuous-duty, long-term basis. Interestingly, when the HRO emerged, the 6-volt tubes were rejected for several years on the basis that the quality was not satisfactory.

Finally, some thoughts as to why this is such a little-known receiver. The ER article points out the restricted use, probably on a very few government contracts, with low production numbers, and the timing, being squeezed between the AGS and the HRO which came out in late 1934. The market appeared to be smaller than that of the AGS, and in view of the high quality level and additional manufacturing detail involved, the set probably commanded an even higher price.

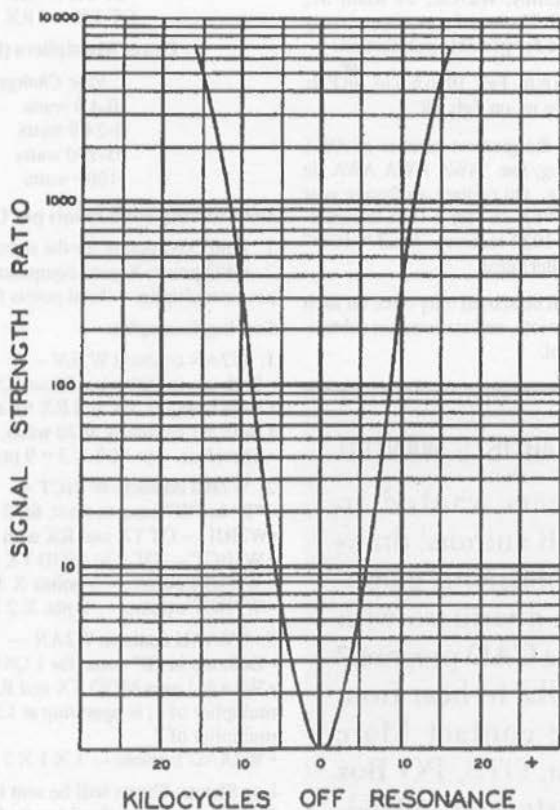
In any case, the National plate was full, and they continued to expand, and to develop other and better receivers for world-wide commercial and government financed services in the growing communications field, managed by persons apparently ready to pay top dollar for the type of quality these receivers represented. And the National Co. exploited this market to the hilt for many years.



A detail view of the RHP plug-in coil set.



AVERAGE FREQUENCY RANGE



AVERAGE SELECTIVITY

Dial calibration and selectivity plot for the RHQ.