

The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

April 2010

Volume 16 Issue 4



Reported by Marv Beeferman

The flu kept me away from the March meeting but all activities were well-documented by the able lens of Al Klase. We had some very well-executed homebrew entries as you will see by Al's photos and we also included the final standings tallied from the membership vote. This month's *Broadcaster* also includes a detailed article by Walt Heskes on the development and construction of his "HAMster" entry which earned him a first place in category 4 (vintage reproduction). Al also presented the winner's from last month's DX contest with their well-earned certificates.

The March 6th InfoAge auction brought in very respectful total cash receipts of \$10,911.24 that earned \$6145.83 for InfoAge and \$1918.66 for the NJARC. Here's Ray Chase's comments on all the "positives" of a very successful day:

- Flea market regulars and the general public commented that this is a good place to get "stuff" at reasonable prices.
- InfoAge got a good bit of its storage space back.
- InfoAge got a nice infusion of cash.
- NJARC made a good bit of money.
- The Estes family had a good time and made some favorable purchases as well.
- The weather was great.
- NJARC, InfoAge and our museums again gained some good publicity.
- After a last minute crisis, NJARC did not have to contend with supplying food for the auction. With the help of one of InfoAge's supporters, Mike Golub convinced a local restaurant that many of us frequent to handle the food concession. The restaurant has now created a new part of their



MEETING NOTICE

The April meeting will take place at Princeton's Bowen Hall (70 Prospect Ave.) on Friday, April 9th, at 7:30 PM. Directions to Bowen Hall may be found on the club's website (<http://www.njarc.org>). Clean up some of those old (or new) radio relics and curiosities from your collection that have been gathering dust and show them the light of day at our "Show & Tell" scheduled for this month. Add a little story and perhaps a few laughs and your fellow NJARC members will greatly appreciate it. We'll also be accepting nominations for our Executive Board election which will take place in June.

business. Many good comments were received regarding the food.

- The State of New Jersey got some added income.
- Everybody seemed to have a good time.

Many members pitched in to help and I'm sure that I will forget to acknowledge some for which I apologize in advance:



Under the watchful eye of Mr. Marconi (right), an NJARC club member checks out one of the March homebrew contest entries.

Steve Rosenfeld and John Dilks did another great job handling the clerking. Marsha, Edith and Dave Snellman handled the check-in and cash-out; I'm glad they were there to do it all. Runners were: Owen Gerboth, Phil Vourtsis, Robert Forte, Aaron Hunter, Richard Hurff, Pete Grave, Harry Klancer, Richard Lee, John Ruccolo, Sal Brisindi and as usual, John Estes. Vince Lobosco and Al Klase helped in other areas.

(And Ray Chase organized the event...Ed)

Ray also reports that the Jewish Hei-

tage Museum of Monmouth County (JHMOMC) has asked for our assistance in setting up a radio display in their museum in Freehold. They occupy the second floor in a restored and relocated barn at the rear of the Mounts Corner shopping mall, corner of Wemlock Rd. and RT 537. They have 4000 square feet and, while a converted barn does not sound like much, the facility is all new and is first class.

They plan an exhibit starting in May recognizing WWII veterans as well as the 65th anniversary of VE and VJ day. The theme will consider the importance of radio communication for home news as well as its importance to the military and long distance communication. Steve Goulart, Dave Snellman and Ray met with Michael Berman recently to get a preliminary briefing. The display would be up through early fall. Some possible sections would be a typical home setting, a display of 30s and 40s styles of radios, a possible small military display and a short wave listening station. We haven't decided on the radio displays yet, but the theme will be centered on the WWII era and just before it (1935-1946). The Museum has an extensive audio/visual facilities as well. We might even do a sit-down scheduled program on radio history.

A group from the museum has visited our Radio Technology Museum recently to see our capabilities. They are looking for display images like WWII ads showing servicemen and service-related subjects and record album covers with appropriate themes. A small display of a mili-

(continued on page 8)

THE JERSEY BROADCASTER is the newsletter of the New Jersey Antique Radio Club (NJARC) which is dedicated to preserving the history and enhancing the knowledge of radio and related disciplines. Dues are \$20 per year and meetings are held the second Friday of each month.

The Editor or NJARC is not liable for any other use of the contents of this publication.

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THE W2MQ HAMster

By
Walt Heskes



Last July, amid the clutter of many tempting salvaged radio parts broiling in the midday sun on Ray Chase's NJARC Infoage swapmeet table, was one dazzling chunk of black Bakelite - a glamorous vernier control. This remnant of the late 20's, the heyday of homebrew radio construction, was like a magnet drawing my eyes, my hands, and, ultimately, the money from my wallet. Far more than the typical unadorned control, this highly stylized piece was unusually ornate. It featured radially-oriented scrollwork at both the ten and two-o'clock positions, suggesting a pair of short, curling ears. At its center, a large, blunt stub of a control knob bore a strong resemblance to the snout of a pig.



As my fingers thrilled to the silky-smooth operation of the two-inch diameter control knob, its face splashed with filigree, its rim splined with many fine edges, my eyes savored the exciting

view in the dial window where a pair of dual logging scales moved in opposing directions. As the upper scale, marked with equal graduations from zero to 200, slowly rotated clockwise behind a small pane of glass, the lower scale, adorned with radial markings from one to ten, swept past in the opposite direction. One complete orbit of the upper scale brought ten cycles of the lower scale, increasing the logging accuracy of the instrument by an order of ten and providing the benefits of a band spread. On the flat, rear face of the device, a quarter-inch bore, drilled axially through a brass collar, would grasp the matching quarter-inch shaft of any variable capacitor and drive it at a precisely reduced speed.

Another "miner," digging through an adjacent pile of parts, tossed a quick glance and dubbed my piece a hogshead vernier; the name stuck. Beneath the decades of accumulated grime and caked-on dirt, the black hogshead vernier appeared to be complete with all parts in working order. "Wow! What a prize," I thought, as I carefully stuffed my new purchase into a bulging sack of radiocentric trophies, before sauntering onward to the goodies awaiting me at the next vendor's table.

Later that summer afternoon, the hogshead found itself deep inside a small cardboard box where it slept undisturbed for the next few months. Then, one rainy November afternoon, thumbing through the '69 ARRL handbook, I stumbled upon Lewis W1ICP McCoy's clever design for a crystal-controlled superheterodyne receiver capable of tuning both the 40- and 80-meter amateur bands.

Two stages of RF amplification preceded a mixer stage where a local oscillator signal was added to the incoming RF signal and converted to an intermediate frequency of 455 KHz. This was subsequently filtered via a pair of closely-matched crystals. The filtered frequency was amplified and then coupled, via a 455 KHz IF transformer, to a 1N34A detector followed by a single stage of audio amplification.

An onboard BFO circuit injected a 455 KHz note into the SSB and CW signals. McCoy claimed there was sufficient audio to drive a pair of high-impedance headphones. We admired the clever choice of a trio of 6U8A 9pin miniatures. As each 6U8A comprises both a triode and a pentode, this was a refined receiver, employ-

ing six separate tube circuits in only three envelopes.

Operation demanded both concentration and finesse, as a pair of ganged variable capacitors are first tuned for maximum RF noise in the general vicinity of a desired RF signal. Then, the oscillator capacitor is carefully adjusted to capture the modulation of that same RF signal. With both the oscillator and RF circuits tuned to the same incoming RF signal, an RF gain control is adjusted to amplify the incoming signal without also overdriving the RF amplification circuit into regeneration and causing painful squealing and unwanted audio distortion. In practice, tuning the vintage design receiver is a fast, simple, and extremely satisfying experience.

We envisioned packing the circuitry into a small metal box that could be carried to a friend's shack and connected to the local antenna system for DX fun. The chassis would be fabricated by soldering hand-cut sections of double-sided, copper-clad PC boards. To permit service access, the chassis had to be easily removed from its cabinet. In an early design, an enclosure that was created by carefully folding a sheet of perforated stainless steel was quickly discarded due to its dangerously sharp edges and lack of structural integrity. The final design would be a solid cabinet formed from bolted sections of hand-cut sheets of 1/16-inch aluminum (if we could find sufficient material in our scrap pile).



Crowning the list of parts was the hogshead vernier, which would drive the 5-35 pF variable capacitor of the oscillator tuning circuit. To illuminate the dial and provide power "on" indication, the hogshead dial window would be backlit with a number 47 pilot light.

Concerned about exceeding the 1.5 ampere current rating of the six-volt winding of the power transformer, we

quickly calculated that the 0.45 amp current drawn by each of the three filaments plus the 0.15 amps drawn by the bulb would total only 1.5 amps, an amount just equal to the rating of the supply. In operation, we have found that the transformer is slightly warm to the touch.

When we scoured our tube inventory for three 6U8A's, our primary and secondary caddies came up empty. Incredibly, after carefully pawing through a stash of unsorted tubes, we unearthed three boxed 6U8A's and, wonder upon wonder, they all tested good.



Nursing our success, we located the needed sockets, capacitors, resistors, potentiometers, terminal strips, and hardware. Our dependence on prescription drugs easily yielded the three, one-inch diameter cylindrical pill containers needed as coil towers. They were easily secured to the chassis with a small bolt through a hole punched into the base of the cylinder.



The RF pre-selector circuit required a TRF-style variable capacitor comprising a pair of ganged sections each of equal capacitance. These can be difficult to find; however, lady luck prevailed. A previous radio project, long neglected, contained just the item we needed. In minutes, the tuning capacitor was liber-

ated from the older, forgotten project.

Spirits buoyed by such fine luck, I returned to the list and spotted the next challenge: a pair of Miller #4411 300uH slug-tuned RF coils on ceramic towers. One coil tuned the BFO note to 455 KHz while the other coil was tuned to maximize the RF signal output of the mixer into the crystal lattice preceding the IF amplifier. My spirits sank; obtaining the exact coil specified in a document written over 40 years ago would be very difficult, but obtaining a pair of those coils would likely be impossible.

I considered the option of modifying a pair of P-C70-RF slug-tuned RF coils because these reproductions are easily obtainable from Antique Electronic Supply, but an inner force drove me onward. As I began to search through my modest supply of RF coils scrounged from the junky stuff in the often-overlooked cardboard boxes stuffed out of the way under the tables at many swapmeets, I struck gold. Twice. Magically, a pair of Miller #4410 slug-tuned coils in factory fresh boxes appeared. What incredible luck!

Opening one of the boxes, I scanned the accompanying instruction sheet for technical data. The 230uH inductance of the #4410 coil was only slightly less than the 300uH of the specified #4411 coil. Perhaps I could graft additional litz wire to the free end of the coil and then jumble-wind additional turns to bring the coil up to specifications. Carefully, I modified each coil with more wire and measured the results with an inductance meter. Voila! In short order, I had converted the pair of #4410's into a pair of #4411's. Was it truly impossible to sew a silk purse from a sow's ear?

Only one obstacle remained: the crystals. Could I find a set of closely matched crystals to create the filters? I phoned International Crystal (I.C.) in Kansas City. Did they have any crystals in the 455 KHz range? Initially, the answer was a discouraging "No." I.C. had stopped producing most of their low-frequency crystals but, if I could remain on the line while the agent searched her inventory, she might find if something was still available. Within a few minutes of pleasant phone banter, she had located four different crystals within the required tolerances: 453.650, 455.000, 456.500 and 456.650. Theoretically, these four crystals could be used in pairs that would yield as much difference as 3000 Hz for SSB and as little

difference as 150 Hz for CW. Yet another stroke of good fortune, we thought. We promptly ordered the four crystals. They were not cheap.



Construction proceeded rapidly. Within a few weeks, the chassis had been fabricated, punched, and filled with parts. One advantage of using the copper-clad PC board was the ease of soldering discrete components to chassis ground. Any free space on the copper surface is suitable for a ground connection. Just like copper wire, the copper cladding draws solder quickly and easily. In that way, wiring is simplified and neater because there are no long runs to a common tie point.



All of the coils were wound in single layers using #30 enamel wire wrapped in one direction around the pill containers. The thin walls of the pill containers easily accepted the small punctures needed to make the start and end holes for anchoring the coil wiring. Later, when adjustments

to the coils were needed, it was easy to puncture new holes in the container walls to relocate the coil endpoints. To prevent the completed windings from loosening or separating, they were sealed with a thin layer of service cement.

Each leg of the four crystals was crimped to a spade lug that was secured by a screw to a terminal strip "tower" that was bolted to the chassis. Wiring from the crystal lattice tower was routed to a three-position rotary switch. The switching brought pairs of crystals into combinations of from 150 Hz to 3000 Hz. This provided the critical filtering that was needed to separate adjacent SSB signals as well as CW signals.

Finally, the wiring was complete and the rig was ready for operation. Before plugging in any of the tubes, the rig was powered up and given a "smoke" test. All seemed okay, so, the tubes were installed. Now, the rig was powered up and a set of Brandes high-impedance phones were connected to the audio output jack on the front panel. A suitable length of aerial was secured to the receiver via an SO-239 socket bolted to the rear apron of the chassis.

We tuned the rig and listened carefully. We heard nothing. Then, we retuned the rig, switched the crystals, and listened carefully. Again, we heard nothing. There was no RF or audio; the radio was dead. Disappointed, we checked for B+ and found that DC voltages were good throughout the circuit. We wondered what could have been wrong.

Later that week, when WB2BEW dropped by to play radios, we demonstrated the deafness of our new rig. He suggested removing the crystals from the circuit between the mixer and the first IF amplifier and replacing them with a small .01 mfd capacitor. Now, in essence, the two stages were resistance coupled.

Instantly, the rig came alive. There were RF signals coming in on the 40-meter band. There also was some life on the 80-meter band. Over the next few days, we tested the circuit using various combinations of crystals and capacitors. Ultimately, we abandoned the crystal filtering scheme and replaced it with resistance coupling using a single 0.006 mfd capacitor which appeared to provide more gain than did the .01 mfd cap.

Turning our attention to improving the performance of the receiver, we focused

on refining the coils. We started with the 40-meter band, which had seemed to work better than the 80-meter band. Tuning a signal generator to 7.000 MHz, we fully meshed the plates of the oscillator tuning cap. Then, we adjusted the preselector for maximum audible noise and listened for the oscillator tone through the phones. Painstakingly adding wire to the oscillator coil in fractions of a turn, eventually, the coil inductance was increased until resonance was reached and the tone could be heard. Now that the radio could be tuned to the lower edge of the 40-meter band, we retuned the signal generator to 7.300 MHz, the upper end of the 40-meter band, and fully unmeshed the plates of the oscillator tuning cap. Again, we listened for a tone on the receiver. At the upper end of the band, the coil could be modified by removing wire in fractions of a turn until the signal tone could be heard in the phones at the receiver. Eventually, this "cut and try" method gave us acceptable 40-meter coverage from 7.005 MHz to 7.330 MHz. We confirmed our measurements using the frequency counter feature of an MFJ-259 antenna analyzer.

We repeated the process for the 80-meter band and, although we achieved coverage from 3.550 MHz to 3.990 MHz, RF signals from the 40-meter band continued to overwhelm the 80-meter band. Then we accidentally discovered that the preselector was being peaked for audible noise at entirely the wrong location on the dial. Once we corrected the preselector adjustment, 80-meter signals became clearly readable.

Shortly after we began operating the rig, we added a PM speaker and a switch to cut out the high-impedance phones when the low impedance speaker was engaged. A 6C4 triode was added to the circuit to increase the audio gain. No longer necessary for switching the defunct crystal filtering scheme, the rotary switch was removed and replaced by a 500K potentiometer with an AC power switch. A separate SPST switch was added to remove B+ from the triode plate of the 6U8A in the BFO circuit, thus disabling that feature when AM broadcasts are being received.

The aluminum cabinet is finished in a flat maroon lacquer that was purchased to refinish the interior panels of our 1980 Chevrolet Monte Carlo. Four rubber feet are bolted to the underside of the cabinet. A chrome carry handle, salvaged from a kitchen cabinet, is bolted to the right side

panel. Four rubber feet are secured via adhesive to the left side panel. This arrangement allows the receiver to be parked on its left side panel during transport and storage.

A surplus brass-tone plumbing fixture was reformed into a "Y" bracket, and bolted to the rear panel, allowing the power cable to be wrapped and stowed neatly when the receiver is not in use. An RCA jack, on the rear apron beside the SO-239, provides a low-impedance audio output signal that is useful for driving an external amplifier or a CW code reading device, such as the MFJ-461.



Instructional decals were created using the Visio (TM) graphics application. A circular decal atop the receiver is a nomograph that maps numerals on the hogshead logging scale to the approximate radio frequencies of both the 40 and 80-meter amateur bands. A copy of the complete schematic is glued to the underside of the cabinet. Wallpaper paste was used to secure the decals to the panels.



In a futile attempt to restore the crystal filtering to the circuit, using the 3 KHz filter, the audio was beset with intrusive ringing that could not be damped. We still regret the unfulfilled promise of sharp selectivity via the crystal filters. It is the single outstanding deficiency in an otherwise highly successful and satisfying project.

NJARC 2010 HOMEBREW CONTEST RESULTS

Category 1 - Primitive Receivers

- 1st Place John Acacia: Crystal set with loose-coupled, three-winding coil.
- 2nd Place Al Klase: Skywaves portable research crystal radio with travel kit.

Category 3 - Open

- 1st Place Tom Provost: 5-tube, "allwave" regenerative receiver w/RF stage and regulated screen voltage.
- 2nd Place John Ruccolo: Depression-style, late 1930s, beginner's ham transmitter. No modern parts (all parts are vintage, unused or NOS).
- 3rd Place Angelo Napoli: All-American 5 superhet ("My version of a cathedral/tombstone radio.")

Category 4 - Vintage Reproduction

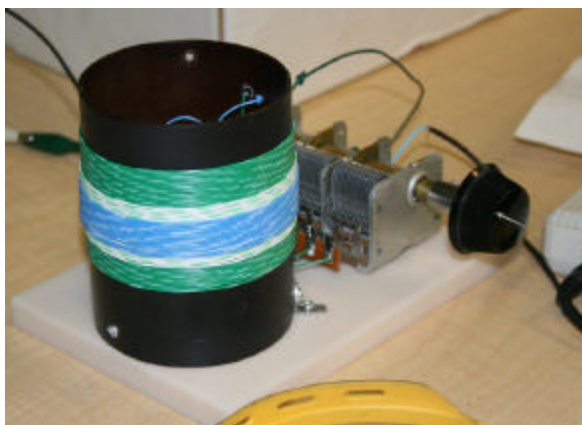
- 1st Place Walt Heskes: The "HAMster," a 4-tube, 40/80-meter receiver with BFO and unique "hogs head" vernier tuning dial.
- 2nd Place Harry Klancer: A "bicycle radio" built from the book *Radio for the Millions* (late 1930s).

Category 5 - Tube/Audio Equipment

Sal Brisindi: Single-ended, 6BQ5 stereo amplifier. (Work on this project was begun on the Tuesday before the contest.)



John Acacia



Al Klase





Tom Provost



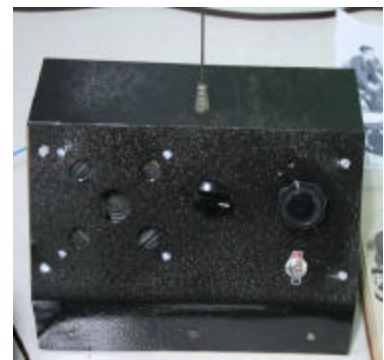
John Ruccolo



Angelo Napoli



Sal Brisindi



Harry Klancer



Walt Heskes



Photos courtesy of Al Klase

INFOAGE AUCTION



The principals; Fred Carl, Ray Chase and Richard Estes.







New Jersey Antique Radio Club's

SPRING SWAP MEET

**Parsippany PAL Building
Smith Field
Route 46 & 33 Baldwin Road
Parsippany, New Jersey 07054**

Saturday, April 24, 2010

**Walk around auction starts at 11:30 am.
Bring in your attic treasures for free appraisal!**



**Expert Antique Radio Repair Available.
Refreshments Available.
Easy ground level access.**

**(70) 8 ft. Tables
\$20.00 for members
\$25.00 for non-members
Reserved Additional Tables \$15.00
At the Door \$20.00**

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OR MAPQUEST.
(33 Baldwin Rd., Parsippany, NJ 07054)**

**Open to the Public
8 AM to 12 noon
Vendor setup at 7:15 AM
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dio heritage dating from the early 1970s when Boonton marked the 50th anniversary of the Radio Frequency Laboratories. Alex has encouraged Mr. Loughlin to consider InfoAge as the site for the electronic equipment he has saved from the company.

DX Contest Winners Recognized



Tom Provost



Rich Mueller



Al Klase



Gary D'Amico

(Jewish Heritage Museum...continued) tary communications center is planned using a Morse code setup which we could help support.

Incidentally, we were recommended by Paul Zigo of Brookdale Community College. The college runs a WWII Studies program that is quite interesting. Check it out at brookdalecc.edu. More info on the display and areas where you can help will follow.

NJARC Executive Board elections will take place in June, and nominations will be accepted at the April and May meetings. You must be a paid member for 2010 to nominate a candidate or to vote. All positions are open. Even if we have only one nominee for a position, election

will be confirmed by secret ballot cast by all attendees at the June meeting.

Although not a requirement, some of our nominees have provided a short statement to the *Broadcaster* stating their thoughts on the club's future and how they plan to implement their agenda.

Alex Magoun reported recently that he had lunch with the son of the founder of the Boonton Radio Corporation, Robert Loughlin, "a fine man with a terrific memory." As a follow-up, Alex says that most of his recollections have to do with the sale to Hewlett-Packard (he being part of the package) but he remembers his father's associations with Armstrong, Stuart Ballantine, David Sarnoff, etc. Alex was loaned a set of histories of the town's ra-