



The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

February 2008

Volume 14 Issue 2



**MEETING/
ACTIVITY
NOTES**

Reported by Marv Beeferman

THE ON-LINE BROADCASTER

The New Jersey Broadcaster is now on line. To date, 80 of your fellow NJARC members have subscribed, saving the club some \$1,400 per year. Interested? Send your e-mail address to: mbeeferman@cs.com Be sure to include your full name!

The club started out 2008 with a great turnout for our first Repair Clinic and some exciting news regarding "virtual" attendance at our monthly meetings. Read all about it in this February's *Broadcaster*. Hopefully, by now, Tom Provost is crunching the numbers on numerous BCB DX contest entries and you're putting those hints and kinks supplied by Al Klase at our January meeting to good use in working on your homebrew radio contest entry.

As stated in the "MEETING NOTICE," Dr. Alex Magoun will be providing us with his thoughts on Broadway's *Farnsworth Invention* (see the October *Broadcaster*). Some club members have already seen the play, so the discussion should be spirited. Some members have expressed an interest in attending and thanks to volunteer Sharon Chapman's initiative, West Windsor Community Education has organized a bus trip for a Saturday, March 29th matinee. You can call Diane at 609-716-500 (x5034) to reserve tickets, but act quickly...only 49 are available. You can also call Alex at 609-734-2636 for further information.

Dave Sica has informed us that the NJARC 15th Anniversary Video which premiered at our December holiday party is now available on the website (www.njarc.org/streaming). However, Dave says



MEETING NOTICE

The next meeting of the NJARC will take place on Friday, February 8th, at 7:30 PM at the David Sarnoff Library in Princeton, NJ. Contact President Phil Vourtsis at (732)-446-2427 or visit us at <http://www.njarc.org> for directions. This month's program will include a presentation by our own Dr. Alex Magoun, Executive Director of the Sarnoff Library, entitled "The Farnsworth Invention: What Matters about Fact and Fiction." We'll also continue to collect dues for 2008 so please have your check or cash (\$20) at the ready.

that upgrade IE7 to Internet Explorer has been reported to be causing some people trouble viewing video files (see <http://www.njarc.org/IE7.htm>). Dave suggests that downgrading your browser to version 6 might fix the problem (contact Dave for downgrade info) or installing the Firefox browser which plays the files just fine.

Dave has also announced that he's added a page to the website in memory of

this organization up from literally nothing. If you new Tony, Dave is asking to consider sharing some thoughts which could be added to the memorial page. Email him (davesica@juno.com) any stories, recollections, remembrances, etc. of some of our earliest meetings or swapmeets that you might have. Photos would also be appreciated.

John Rucolo had an interesting Info-Age story to relate. Last month, he had a nice chat with a woman museum guest who worked in the marketing department of Tung-Sol in the late 50's/early 60's. ("She still carries around a cute little Tung-Sol tape measure.") She was disappointed that there were no Tung-Sol tubes in our 30's display case. John says he'll do what he can to accommodate her. But John's main point was this: "That's the fascinating thing about the museum - everyone sees something different."

We continue to collect dues for 2008. If you haven't got around to it, dues are expected no later than March 2008. Renew at our next meeting or send a \$20 check (\$25 for joint membership) made out to "NJARC" to:

**Marsha Simkin
33 Lakeland Drive
Barnegat, NJ 08005**



The next stage in hi-tech radio communications? Not quite...David Sarnoff Library Director Alex Magoun enlists Dave Snellman to test a learning tool for an upcoming science project for 200 third-graders. (Photo courtesy of Nevell Greenough.)

Tony Flanagan (linked from the "What's New?" page or the "Club Information" page). For those of you who didn't know Tony, he was the single driving force behind the initial founding of the NJARC and was personally responsible for much of the sweat equity that went into building

Your internet address would also be greatly appreciated. We'll be updating mailing labels with the March *Broadcaster*, so you will be aware of exactly where you stand. Marsha says we're doing very well with renewals, so let's try for a 100% banner year.

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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LARGE TURNOUT AT JANUARY REPAIR CLINIC

By Marv Beeferman

The club had an outstanding response to our Repair Clinic on January 19th; the Sarnoff Corporation lounge was packed with "experts" including a fair amount of walk-ins in addition to the regular appointments. As our host, David Sarnoff Library Executive Director Dr. Alex Magoun noted: "Grizzled club veterans can scoff, but I've never seen it so full of people and equipment and radios..." Along with a photo journal of all the action, a short commentary on what actually took place is in order. There were some quick fixes, a few "head scratchers" and some "take homes," but, as usual, NJARC members had a very satisfying day.

- Walt Heske's son Aaron successfully recapped a little Emerson 448 battery portable set. The Heskes team got it running off batteries and they hope to show it off at our next show-and-tell.

- Nick Senker attacked a GE "Beam-O-Scope." Problems arose in finding a tapped volume control that was smashed so bad that no measurements of the original could be made. A close match was found in Walt Heske's stash but Nick is still looking for a direct replacement. Nick also got a Zenith G724 back to operation by replacing an open power resistor and restoring the B+.

- Tom Provost teamed up with Thomas Lee to work on a Zenith 5S150 console chassis. Following recapping, replacement of the tuning capacitor grommets and drive belt (using Tom's special home-made laminated belt), the radio was still not operational and is awaiting additional work.

- Owen Gerboth brought a very nice Emerson radio/phono combination back to life by simply replacing the filter capacitors. The unit went home with Phil Vourtsis (who else?) to repair the phonograph and replace its cartridge. Owen was not as successful with a Sears Silvertone 6170 battery set; after recapping and the replacement of two tubes, the radio was still not ready for prime time.

- John Tyminski repaired a Grundig Ma-

jestic, replaced bad capacitors on a Real-tone (transistor?) radio to get it working but left an RCA 1X56 as a work in progress.

- Aaron Hunter realigned a Crosley 516, but bad filter capacitors and brittle wires on a GE J71 had to wait for another day. After recapping and wirewound resistor replacement, a Majestic 20 still required additional work.

- Attesting to the fact that many radios wake up with just the application of power, Marty Friedman found no problems with a Philco 20 and Zenith AM/FM radio that were brought in to be checked out.

- Gary D'Amico and Bob Bennett were able to revive a Motorola 61T22 following recapping and transformer replacement.

- Scott Roberts had previously aligned his SX-111 at InfoAge with the help of Steve Goulart, but he still had concerns about the set working up to par. Bob Bennett and John Ruccolo started working on the radio but "communication receiver expert" Al Klase was soon recruited. It turned out that sensitivity was good on all bands; the only issue was the 20-meter band where the dial calibration was off. Al touched up the oscillator padder after desoldering the padder capacitor. (As explained by John, Hallicrafters soldered them after they set them.)

- As a change of pace, Mike Littman teamed up with Al Klase to work on a battery-powered, U.S. Army Signal Corps, SCR-625-C mine detector. I'm not sure what progress was made but I did hear some oscillations from their corner of the room. Perhaps we'll learn more at the next show-and-tell.

- Finally, we'll let Phil Vourtsis tell his own story:

"One of the more challenging radios to fix at the clinic was my Victor International table radio from around 1930. The radio had already been recapped a few years ago but I could never obtain adequate volume. First I checked the tubes and B+ and changed some resistors that were a little on the high side. Walt Heskes helped me with this and also tweaked the IF's but there was still no improvement. I borrowed Nick Senker's PM speaker and jumpered it across the radio's electromagnetic speaker; still

no improvement in volume. Then Al klase and Gary D'Amico checked alignment with a scope and declared that 'this radio is deaf.'"
"I brought the radio back home but couldn't stop thinking about it. I went down to my workshop and jumpered the speaker again with a 4 ohm speaker. Bingo! The volume was load and filled the whole room. I experimented with different speakers of other impedances and found the lower the impedance, the louder the volume. Now the radio sounds great...thanks to all who helped out."
A final note about housekeeping...the Sarnoff Corporation is going to begin holding its board meetings in the same area where we hold our clinics so we'll have to maintain a higher level of cleanliness. That means better policing of the floor around our work areas for bits and pieces of wire, screws, solder, etc. and ensuring that drinks and lunch leftovers are appropriately disposed of.





NJARC GOES VIRTUAL

By Marv Beeferman
and Dave Sica

As many members are aware, the club maintains a video library of taped NJARC meetings that are available to the entire membership. However, we are very fortunate to have a very enthusiastic Webmaster who always likes to stay in synch with the latest technology. At our June 2007 meeting and auction, members found an odd concoction of video and computer equipment in the front row that allowed Dave Sica to originate another antique radio club first... a meeting streamed out live on the web. Video and audio was available on the Internet and we had two members who "virtually" attended the meeting.

We received "QSL" reports from President Phil Vourtsis tuning in from North Carolina and New Jersey expatriate Jon Butz Fiscina who was watching the proceedings in Texas. The picture was small and grainy and Dave commented that "know I know a little how John Baird must have felt with his tiny first-generation television images." Dave said that there were some special challenges in sending a signal out from the Sarnoff auditorium, but in the end it worked! The stream proved to be a bit intermittent; it quit unexpectedly a few times during the evening and had to be restarted, resulting in not even so much as a "please stand by" for our viewers. But viewer feedback was positive as reported by Jon Butz Fiscina:

"I watched the auction from Texas thanks to Dave, and only wish I could have bid on some items. The experiment went well; I just hope costs and other problems could be worked out in the future to broadcast future meetings for those who live in foreign lands."

Then Dave asked three \$64,000 questions: Is this something that people would even be interested in? How many people who are unable to make the trip to Princeton or InfoAge because of distance, physical limitations or maybe just lack of time might find it convenient to participate in the meetings in a "virtual" way? How many people who are not club members because they're not in the NJARC geographic area might want to join the club if they could participate on the Internet? Member Jerry Dowgin seemed to have summed up all the positive responses: "Great job! I miss 2 or 3 meetings a year because I am out of state and this option would be much appreciated. I also think it would serve to increase membership by giving prospective members an opportunity to see our meetings."

Dave continued to experiment with streaming our meetings throughout 2007 and into 2008 with encouraging results. During the January 2008 meeting, Phil Vourtsis was able to enjoy all of Al Klases's Tech Talk without interruption. The connection stayed up throughout, there were no freeze-ups, the video was relatively clear and the sound intelligible. However, participation has been mostly on an "invitation only" basis. Dave noted that the bandwidth necessary to stream video was considerable and he didn't want to incur significant cost to provide a service that wasn't yet a proven member benefit. But things change fast on the

web, and things just got a whole lot better for streaming video.

Starting with the February meeting, we'll be taking advantage of a new service that makes live video services available for the same price as the on-demand videos at You Tube, and its free! Using this resource, Dave plans to launch the club's first true "broadcast;" that is, available in real time to anyone, anywhere in the world. Whether you are one of our many members in other states, get home too late to hit the road to Princeton or just don't feel up for a two hour drive, meetings will only be a mouse click away! Here's how it works:

- On the club's web site (<http://www.njarc.org>) you'll now see a window right on the home page. When we're broadcasting, live video of the meeting will appear in this window and any number of people will be able to tune in simultaneously.



- You'll need a broadband connection for a satisfactory viewing experience.
- You'll also need to make sure that you have the latest version of Flash Viewer (free download).

Other than the above requirements, you're ready to go. So, if you don't plan to attend this month's meeting, just sit back in your favorite easy chair, log on to our site and enjoy!

SO WHAT'S THE DEAL WITH DEAL?

By Al Klase

Most of us are vaguely aware that something radio related happened at Deal Beach, New Jersey, a few miles north of our own Radio Technology Museum in Wall, Township. Closer inspection reveals that the real cradle of broadcasting was actually in our back yard.

AT&T started developing reliable vacuum tubes and appropriate circuitry in 1913 to be used as repeaters (audio amplifiers) to enable long-distance telephone service. Indeed, the first transcontinental circuit went into commercial service in early 1915. Almost simultaneously, the corporation began to apply the vacuum tube to multiplex telephony to make more efficient use of the long-distance lines. This is what we now refer to as frequency-division multiplex, and amounts to radio-telephone transmission down wires. The story is filled with familiar names like Hartley, Colpitts, and Heising.

AT&T also leveraged their RF expertise to investigate radio-telephone transmission in the 50-100KHz range. A transmitter was installed at Montauk, Long Island and a receiving station at Wilmington, DE. The first successful transmission took place on April 4, 1915.

Encouraged by these results, the decision was made to attempt Transatlantic voice transmission. A three kilowatt transmitter, using hundreds of Type "W" 50-watt tubes in a linear RF amplifier, was hastily installed at the U. S. Navy antenna site in Arlington, Va. Reception teams were dispatched to California, Hawaii, and France. By the end of October, 1915, signals were heard at all three sites including the Eiffel Tower, and public demonstrations were presented. The operating frequency was 50KHz.

A considerable amount of radio-telephone development for the military took place during WWI. After the armistice, AT&T returned to seeking applica-

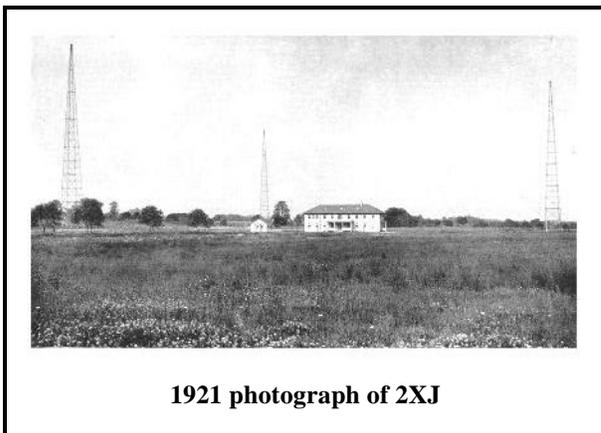
tions of radio to the telephone business.

Famed Bell Laboratory engineer Lloyd Espenschied picks up the story:

"Upon the conclusion of World War I, Ma Bell started looking around at what to do with its radio experience. They decided to develop connections to ships, extending the land line to ships at sea. That was a project that took us down the Jersey coast to Deal Beach." (1)

In 1919, shore stations with 1KW AM transmitters operating near 400 meters (720KHz) were installed at Deal, NJ and Green Harbor, MA. Deal eventually had three such transmitters for simultaneous operation. 500-watt stations were also installed on two steamships plying the Baltimore-Philadelphia-Boston route. (2)

Espenschied continues: "Building these coastal stations we found amateurs inland were responding, writing; 'Send us some more, what is your schedule going to be?' Before we knew it, we were catering to the amateurs. Word of this got to J. Carty (AT&T Chief Engineer) and he thought it was quite undignified, especially since by that time we had an agreement with the GE Company to give them the freedom of supplying the equipment to the amateurs. So these experiments from Deal Beach and also from New York City, which were reaching out and getting responses from the amateurs, were called off, much to the chagrin of our engineers who were following their own noses in the true pioneering spirit."



1921 photograph of 2XJ

By November 1920, when the first radio broadcasting station, Westinghouse's Pittsburgh station KDKA, inaugurated service by sending out the returns of the Harding-Cox presidential election, Western Electric already had three experimental stations - 2XB at West Street,

NYC, 2XF at Cliffwood, New Jersey, and 2XJ at Deal Beach, New Jersey. These stations were sending out test messages to each other and to the few radio operators and ships and ambitious radio amateur buffs who happened to be listening. (3)



An enterprising Asbury Park experimenter equipped his roller chair with a loop, detector and amplifier to supposedly receive Deal Beach broadcasts.

References:

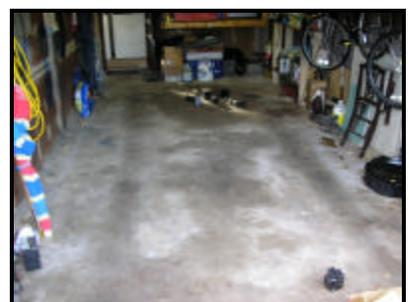
- (1) Espenschied, Lloyd, An Interview Conducted by Julian Tebo and Frank Polkinghorn, IEEE History Center, June 2, 1973
- (2) Fagen, M.D., ed. A History of Engineering and Science in the Bell System: The Early Years (1875-1925). New York: Bell Telephone Laboratories, 1975
- (3) Telephone - The First Hundred Years, by John Brooks (Harper, Row publishers, 1975, ISBN 0-06-010540-2)
- (4) *Radio News*, August, 1920, page 74

FREE STUFF

It is highly suggested that you either cut this panel out or hide this month's Broadcaster from your better half...we wouldn't want this type of information to be too broadly distributed...Ed

What do you do when your collection reaches overflow? Well, give away what you no longer have a use for or know will never get on your restoration bench. This is exactly what member Ed Ledner did when he announced his garage "unsale" for January 5th. The only criteria was that you take only what you need, don't push and leave an empty garage. Don't believe it? Well, we have the pictures to prove it.

FREE STUFF



**A JOB WELL DONE...
WITH ONLY A COUPLE OF
LEFTOVERS**

**BEFORE
YOU BEGIN**
**Immediate recapping may
not always be a
a first course of action.**

By Marv Beeferman

Recap!...recap!...recap! That's the admonition, similar to the standard real estate adage with regard to location, offered to novice radio restorers. In most cases, it makes a lot of sense, as attested to by Nick Senker in a recent NJARC Reflector posting:

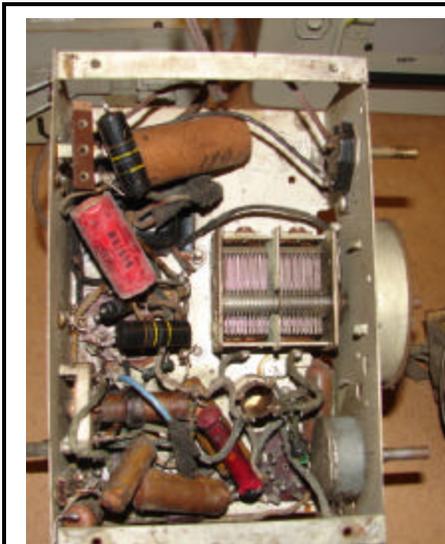
"I have never been a proponent of wholesale recapping of old receivers because I have repaired so many sets that worked fine after replacing the offending part(s) while leaving the old caps (including paper ones) in place. That is, not until this weekend: I was working on a 1940s Sparton table radio and, after replacing some missing tubes, the set came on with a loud hum and garbled reception. Recognizing this as bad filter caps, I replaced the electrolytics and some burnt resistors. I also replaced some paper caps that were in the way of my work area.

The set was turned on and it worked fine; the hum was gone and the reception was very good. I played it about an hour and then reinstalled it into its cabinet. However, the next time I turned it on, it worked about a minute and then quit! Removing the chassis again, I started checking voltages and found the screen voltage very low and the supply resistor running very hot (one that I just replaced). The screen supply had five take offs and I systematically clipped each one until it was clear which one was causing the problem (the fifth one I clipped). Yes, it turned out to be a shorted paper capacitor!

The moral of the story is that if I had replaced the caps in the first place (a relatively easy task and one which I ended up doing anyway), I would have avoided this problem. In addition, I now had to reconnect all the leads I clipped, a tedious and messy job as the leads were short and difficult to get at. This was twice as much work as recapping.
My advice: recap!"

Good advice Nick, but it may not apply in all cases. At the January Repair

Clinic, I brought in a Grunow model 470 receiver to work on. It's a simple four-tube set that, with a little cabinet work, looked to be a relatively easy project. However, when I looked under the chassis, I found quite a mess. I counted some 11 capacitors and at least 4 resistors that would need replacement. In addition, it sported a dreaded electrodynamic speaker with its rim stiffened with black enamel.



I counted some 11 capacitors and at least 4 resistors that would require replacement.

For those unfamiliar with electrodynamic speakers, here's a little primer. It has a field coil that is wound on the on a center pole-piece which is part of the speaker assembly; DC current creates a strong magnetic field to operate the speaker. It also has a buck coil in series with the speaker's voice coil. Because the field coil is used as a filter choke in the radio's power supply, it can have a high hum component which could be heard in the speaker. To reduce hum, the buck coil (consisting of a few turns of wire) is wound on the pole-piece and stationary to the field coil. It is connected in series with the voice coil in such a manner that any AC component induced in the voice coil by the field coil is out of phase with the AC component induced in the buck coil. The two will tend to cancel out reducing the hum. Sometimes the buck coil is referred to the "hum bucker coil."

In addition to its electrodynamic speaker, the radio uses a power supply typical of those found in many Philco

sets. The transformer sits on top of the chassis with a socket for a type 80 rectifier. Three windings are provided; one for tube filament voltages and the dial light, one for the rectifier cathode, field coil and grid voltages and one for plate voltages.

So, here's the \$64,000 question. Does one spend significant time, energy and money replacing a significant number of capacitors and resistors only to find that the two most important (and hardest to replace) components are not dependable? Well, one might say "just slowly fire her up and see what happens!" But with the probability that all capacitors are bad and that a lot of resistors are questionable, the transformer and speaker, if operable, are placed in jeopardy if voltage is applied to the set. However, after giving it a little thought, an alternate approach to immediate recapping might be in order.

Rider shows the speaker field coil at 1500 ohms with a 400 ohm center tap. The buck coil in series with the voice coil should read less than 10 ohms. Since my speaker was connected to a terminal board, disconnection was quick and easy so that all the coils could be isolated. I took my measurements with an analog voltmeter (VOM) and found a 1520 ohm field coil, a 365 ohm center tap, a 580 ohms buck coil primary and an 8 ohm series buck coil/voice coil. I also got the typical "clicking" noises when I measured the buck coil resistance. So far, so good.

However, testing shouldn't end here.



Since the speaker was connected to a terminal board, disconnection was quick and easy.

Large and neat play narrow with insulation (it's not uncommon for a field coil to short to its pole piece). How do I know that my speaker coils will hold up to the applied voltage and resist shorts between coil windings? Again, I could use the "fire her

up and see what happens" approach, but, in its present condition, this radio is going nowhere without full capacitor replacement. A full test calls for some insulation resistance measurements using my trusty ZM-11/U. With voltage set at 150 VDC and reading between one coil end to the speaker frame, both the field coil and buck coil primary read greater than 1000 Megohms. To avoid damage to the buck and voice coils, insulation resistance was not measured. However, based on my previous resistance measurements, these coils should be just fine. (I could also have used my ZM-11/U capacitor leakage function to read leakage in mA at the applied voltage, but you get the picture.)

For those of you working with signifi-

speaker. Unseating the tube causes the B+ voltage on the plate pin of the output tube to rise, which causes a surge in the primary of the output transformer. This surge is induced in the secondary and energizes the voice coil of the speaker, producing the click. This check **does not** indicate how well the speaker will function, but merely that the output transformer and voice coil windings are not open.

A quick field coil check is, with power applied to the set, to bring the blunt end of a piece of iron (such as a nut-driver) near the center pole piece. A good operating field coil will have a strong pull on the wrench. An open coil will have either no or slight attraction due to residual magnetism.

Now, on to the power transformer, starting with a good visual and physical examination of the wiring. But what's this? As a close friend of mine would say, "Danger, danger Will Robinson!" All the transformer lead insulation was found to be brittle and basically crumbled to the touch. Indeed, one wire (not the ground) was completely devoid of insulation as it entered the transformer internals. The transformer may still be operable, but I don't trust wooden case radios with transformers in this kind of condition. For ease of mind, nothing less than removing the transformer, trying to open its metal enclosure and seeing exactly what I'm dealing with will do. Conclusion? This radio isn't worth much more of my time until I'm ready to give it my full attention; recapping will be placed on hold until that time comes!

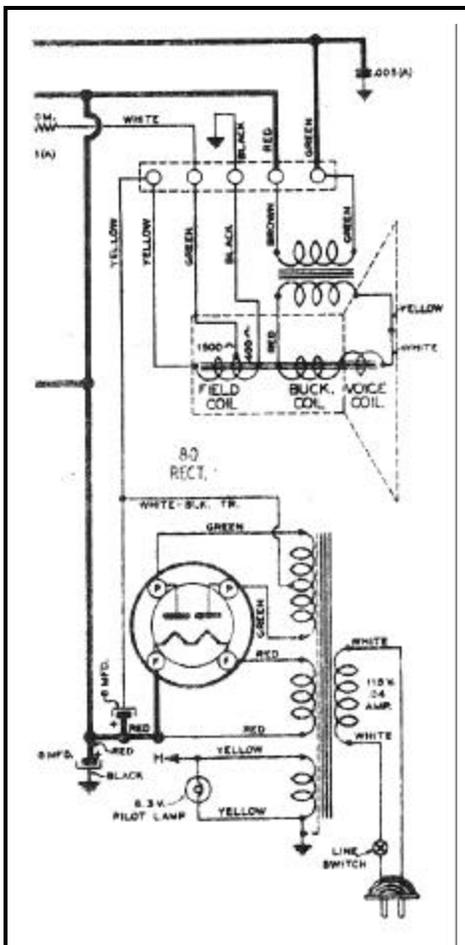
However, I won't end the story here. If I had some confidence in the power transformer, it would be a simple matter to ensure power supply reliability. First, some primary and secondary resistance readings to check for opens and shorts (easy to get to through the rectifier tube socket). Then, with the rectifier removed, it would be a simple matter to verify good filament voltage under load (no bad capacitors to detract from this test). To avoid any surprises in the future (the kind that Nick Senker found), this test would continue for a few hours. After filter capacitor replacement only, I would then isolate the remainder of the radio (except for the field coil) from its power supply (remember, full capacitor replacement has not yet taken place) and load the remaining supplies with power

resistors. Since the radio draws 65 watts, calculating the proper loads would be simple.

With all systems go, I could now approach full capacitor and resistor replacement with confidence and continue on to cabinet refinishing.

At first thought, some members might consider my "pre-capping" concerns a little excessive; but let's consider the alternative. I spend significant time, money and energy recapping and refinishing what ultimately turns out to be a \$75 radio. I turn it on, play it for about an hour and then, similar to Nick Senker's experience, it quits. Now I'm trying to find a replacement speaker or power transformer or figuring out the details of replacing my electrodynamic speaker with a PM speaker. Meanwhile, the radio sits dead on its shelf.

I was a little disappointed in not getting this radio up and running. With all the chatter on the NJARC Reflector lately concerning the origin of the 455 KHz IF, the Grunow 470 adds a bit of history to the conversation. This radio has an IF of either 465 or 490 KHz (supposedly marked on its chassis). As explained in the radio's service instructions, the reason for these IF's was interference caused by commercial code stations in some locations - 490 where interference was in the neighborhood of 455 KHz and 465 where interference was in the neighborhood of 500 KHz.



Critical components: note how the field coil is used as a filter choke for the receiver's power supply.

cantly more reliable radios with electrodynamic speakers, there is a "quick check" for speaker operation. If you pull the audio output tube with power to the receiver, a click should be heard in the



Image courtesy of Jim Hauskins

The Grunow 470 - an image of things to come, but on hold for the moment.