

The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

March 2016

Volume 22 Issue 3



MEETING/ ACTIVITY NOTES

Reported by
Marv Beeferman

The ON-LINE Broadcaster

The *Jersey Broadcaster* is now on-line. The majority of your fellow NJARC members have already subscribed, saving the club and your editor a significant amount of money and work. Interested? Send your e-mail address to mbeeferman@verizon.net. Be sure to include your full name.

At the February meeting of the NJARC, we enjoyed a wonderful presentation by Ron Hutchinson, co-founder of The Vitaphone Project. What exactly was Vitaphone? From Wikipedia comes the following explanation:

Vitaphone was a sound film system used for feature films and nearly 1,000 short subjects made by Warner Bros. and its sister studio First National from 1926 to 1931. Vitaphone was the last major analog sound-on-disc system and the only one which was widely used and commercially successful. The soundtrack was not printed on the film itself, but issued separately on phonograph records. The discs, recorded at 33 1/3 rpm and typically 16 inches in diameter, would be played on a turntable physically coupled to the projector motor while the film was being projected. Many early talkies, such as *The Jazz Singer* (1927), used the Vitaphone system.

Ron explained that the goal of the Vitaphone Project is to seek out the shellac soundtrack discs that accompanied early 1926-1930 Vitaphone (and other) talkie shorts and features and partner with studios, film archives and private collectors to get the associated films restored and seen again. Of particular interest are nearly 2,000 talkie short subjects featuring vaudevillians, bands, opera singers and comedians made by Vitaphone from 1926-



MEETING NOTICE

The next NJARC meeting will take place on Friday, March 11th, at 7:30 PM at Princeton's Bowen Hall (70 Prospect Ave.). Directions may be found at the club's website (<http://njarc.org>). Dust off those unusual pieces in your collection and show them the light of day during our "Radio Show & Tell" scheduled for this month. We'll ask you not only to "show" them but "tell" us a short story behind your selections. Nothing new to talk about? How about participating in a demonstration and discussion of some "hints and kinks" that have simplified your repair and restoration experiences? We'll also be recognizing the winners of the 2016 BCB DX Contest and continue to collect dues for 2016.

1929. In many cases, the 35mm picture elements exist without the accompanying soundtrack. In other cases, because of the fragility of the original films, only the soundtracks exist.

It is interesting to note that the club's Radio Technology Museum owns a 16mm copy of Prices's *Station B.U.N.K.* but not the recording. Ron pointed out that "home talkie" systems could be bought by the public where the 35mm film was converted to 16mm so it could be played on these "home theatres." The film that the museum has is one of these versions.



Ron Hutchinson explains the mechanics of the Vitaphone system.

Since its inception, The Vitaphone Project has located over 3,000, 12- and 16-inch shellac soundtrack discs in private hands, has assisted on the restoration of over 35 shorts and 12 features, and has developed nearly \$300,000 in private funding for restorations.

One of the restored shorts that Ron presented at our meeting was Georgie Price's *Don't Get Nervous*. Price was a vaudeville singer and comic who was a cross between Eddie Cantor, Al Jolson and George Jessel. One of his most well-known song recordings was *Barney Google*. He ultimately became President of the American Guild of Variety Artists, an emcee for all manner of charitable fund-raisers and a spokesman for fellow retired vaudevillians.



A Vitaphone "talkie" home projector using 16mm film (courtesy of Ron Hutchinson). Synchronization was accomplished by using the same drive motor for both the record player and projector.

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 \$25 per year and meetings are held the second Friday of each month at InfoAge or Princeton University.

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Thanks to member Dave Sica, you can watch the full version of Ron's talk at the following site: <http://bit.ly/Vitaphone-201602>. Also, member Jules Bellisio suggests that you might be interested in viewing the original Bell Labs demo film from 1926 at: <https://www.youtube.com/Watch?v=4yWXhpY76rU>.

Last month's *Broadcaster* article on Freed-Eisemann's "Marvel" crystal set and its link to the development of the Neutrodyne resulted in some interesting comments from member Dr. Alex Magoun:

The Freed-Eisemann case against WSA was settled in its favor on appeal to the NY Supreme Court in November 1922 with \$10 "costs and disbursements" on top of a \$150,000 judgment. WSA had been jointly owned by United Fruit Co. and GE since the spring of 1921 and WSA had licensed its patents to RCA at the same time. Did the Neutrodyne completely obviate the need for RCA's patents? I understand that as a TRF-type circuit, the Neutrodyne was not as clean as the superhet, but I imagine that it gave Freed-Eisemann some negotiating room with RCA - just as Victor Talking Machine's TRF and loudspeaker design helped that company in its licensing discussions.

In the February *Broadcaster*, president Richard Lee announced a "Most Cluttered Workbench" and "Most Organized Workbench" challenge with a nice prize going to the winners. So far, only one member, Phil Vourtsis, has stepped up to the plate with two submissions. Considering some 200 NJARC members, there must be other good examples out there waiting to be photographed and provide some stiff competition. Send your entries to mbeeferman@verizon.net and show some "workbench pride" (or embarrassment).



Phil Vourtsis and able assistant consult on another turntable problem.



Another view of Phil's workbench.

In addition to the show-and-tell scheduled for next month, we also invite members to bring in and demonstrate your favorite "hints and kinks" used in repairing and restoring your vintage (or modern) radios, phonos, test equipment, ephemera, etc. For those of you not familiar with the term, a "kink" is an unusual or eccentric idea in dealing with a problem.

Finally, next month's meeting or the March 19th Parsippany swapmeet (see page 8) may be your last chance to catch up with 2016 dues. After March 19th, your name will be taken off the NJARC roster if dues aren't paid.

Upcoming Events

- Feb. 20th: Winter Repair Clinic at InfoAge.
- March 11th: Monthly meeting at Princeton; Show & Tell and Hints & Kinks.
- March 19th: Spring swapmeet at Parsippany PAL
- April 8th: Monthly meeting at InfoAge; Bill Zukowski's microphone collection.
- April 15: Vintage Computer Festival at InfoAge
- April 30th: InfoAge Auction
- May 7th: Spring Repair Clinic at InfoAge
- May 13th-14th: Kutztown
- May 20th: Monthly meeting at InfoAge; Radio Scavenger Hunt
- June 10th: Monthly meeting at Princeton; capacitor nomenclature, CRT rebuilding, radio power supplies.
- July 8th: Monthly meeting at Princeton; agenda TBA.
- July 23rd: Summer tailgate swapmeet at InfoAge
- Sept. 16-17: Kutztown

MAJOR AUCTION TO BE HELD AT INFOAGE IN APRIL

By
Ray Chase

Our 5th InfoAge Radio Electronics public auction will be held on Saturday, April 30th. Since 2009, we have tried to have one of these auctions every 18 months or so but the museum's workload has prevented holding one the last two years. The items to be sold are donations to InfoAge that are surplus to the needs of the Radio Technology Museum (RTM) as well as quite a few items acquired by the NJARC.

There will be something for everyone; radios of all types and vintages, military items, audio equipment, test equipment, books, magazines, documentation and a surprisingly large collection of interesting tubes in large and small lots. We are extremely fortunate to have the late Richard Estes' son Cledis and Richard's brother John come to New Jersey to handle the auctioneering. The Estes family has supported the club and the RTM since our first auction in 2009 for which we are very grateful.

About 330-340 lots are to be sold and some items are still being added. The auction will be held in building 9032A at InfoAge with format and arrangements much the same as in the past. A detailed catalog will be available on-line at least two weeks before the auction. Viewing will be on Saturday the 30th from 8 AM to 10 AM when the auction will commence. If possible, we may have a viewing on Friday evening as well. More details will be available on flyers and the web and announced shortly.

How can you help? In addition to the need for runners, parking lot guides, clerks and general "schlepers" on the day of the auction, the items to be sold are stored in various places around InfoAge and need to be gathered up and brought to building 9032A before the 30th. With a good turnout of volunteers, this can be accomplished on Wednesday the 27th and possibly Thursday the 28th. Please note these dates on your calendar. If you can provide a pickup truck or van, it will be very helpful.

This event is a major money raiser for the NJARC, so please help make it a success. Contact me directly with any questions and offers to assist at ray-dio862@verizon.net or 908-472-3329.

BROADCAST BAND DX CONTEST RESULTS ANNOUNCED

Member Tom Provost has compiled the results of our 2016 Broadcast Band DX Contest and they are listed below. Thanks to Tom and Technical Coordinator Al Klase for sponsoring this year's contest. Participation was not as great as expected with most entries coming from repeat entrants. If you have any suggestions to inspire other members to take part in next year's contest, they probably be well appreciated by Al. With the DX-pedition taking place a month before the week of the contest and lectures and handouts provided by Al on successful DXing, there probably isn't much more that can be done on the informational end. Was it the snowstorm that limited participation? Let's discuss some of your ideas at the March meeting. (MDS = Most Distant Station)

2016 NJARC BCB DX Contest Results

Category A- Crystal Radios

***Winner**

Nevell Greenough 3,802 pts Reproduction Skywaves HPF02 Crystal Set using random wire antenna, MDS 890 kHz WLS Chicago, IL 708 mi.

Edward Suhaka 133 pts. Commercially made Crystal Set using 42 ft. aluminum rain gutter for ant. MDS 710 WOR NY, NY 38 mi.

Category B - Primitive tube receivers - 1 or 2 tube

***Winner**

Marv Beeferman 7,169 pts. DeForest Crosley 50 1-tube using 30 ft. random wire ant. MDS 850 kHz KOA, Denver, CO 1,615 mi.

Category C - 1920's Battery sets

***Winner**

Marv Beeferman 7,769 pts. AC Dayton XL-5 using 30 ft. random wire ant., MDS 1160 kHz KSL Salt Lake City, UT 1,968 mi.

Category D - Other Tube radios sold for home entertainment

***Winner**

Phil Vortsis 7,349 pts. Braun TS2 table radio using built-in rotor loop ant. MDS 820 kHz WBAP, TX 1,037 mi. (from Myrtle Beach, SC)

Category E - Amateur, commercial and military tube type radios

No entries

Category F - Any radio of your choosing

***Winner**

Dave Snellman 11,662 pts. Sony 2010 portable using Quantum Loop V3.0, MDS 750 kHz RCR, Caracas, VZ 2,097 mi.

Joseph Serafina 8,480 pts. Radio Shack 390 portable using built-in loop, MDS 1040 kHz WHO Des Moines, IA 1014 mi.

Al Klase 7,536 pts. Drake R8B using Skywaves Shielded Loop ant., MDS 1040 kHz WHO Des Moines, IA 1014 mi.

Category G - Light weight - any radio weighing less than 1 pound

***Winner**

David Snellman 9,173 pts. County Comm GP5/SSB using accessory loop, MDS 870 kHz Radio Reloj, Cuba 1,279 mi.

FEBRUARY CLINIC "REPAIRS" THOSE WINTER BLUES

By
Marv Beferman

There's nothing better to shake off those winter blues than a hot soldering iron, radio bagels, radio pizza and the warm environment of good friends with a common interest. Our February Repair Clinic at InfoAge was just such an event with repair successes, perhaps a little frustration at times, pleasant conversation and the mutual exchange of ideas and solutions...and we have the photos to prove it. (I've tried to relate the photos to the numbers in the text.)

1. **Phil Vourtsis** worked on the 78 RPM direct-drive turntable of a 1939 Stromberg Carlson radio/phonograph combination. Although the unit needed a new cartridge, a cleaning and lubrication got the turntable running again. Phil also attacked a Dual CS-5000 turntable belonging to Vitaphone Project co-founder Ron Hutchinson (see page 1). Some consider this three speed, semi-automatic, belt-driven system one of the best turntables ever made by Dual. With help from Al Klase and Jules Bellisio, a replaced filter capacitor and blown resistor got it working again. Also on Phil's plate was the adjustment of a few of his and Chris Pistilli's 45 players. Finally, with the help of Nevell Greenough, Phil got his Leader LBO-506 dual trace scope working.

2. **Nevell Greenough and Chuck Paci** confronted numerous problems with a Realistic STA-235 stereo receiver. The left channel was completely missing and the right channel was distorted. Corroded PC board traces were found on the driver transistors in both the left and right driver amplifiers. Nevell was able to fix the traces with jumper wires and the right channel distortion was cleared. The volume control for the left channel was not working and the problem was traced to a bad transistor (open emitter-base junction) in the preamp section. Both channels now work and Chuck would like to offer a well deserved "hats off" to Nevell for his repair skills.

3. **Charles Blanding and Rich Phoenix** worked on restoring Rich's Silvertone

Model 4763 table radio from 1937. The radio was dead to start with due to a bad line cord and some poor connections going to the AC switch. Once this was fixed, there was only static and no oscillation.

A new 6A8 restored the oscillator and stations appeared but the radio was weak and the dial was way out of calibration. The dial pointer was adjusted and the oscillator trimmer was tweaked to get the stations where they belonged on the dial.

It was then found that the radio was way more sensitive and played at full volume if the antenna was connected to the grid of the converter stage rather than the antenna terminal. There seemed to be a problem with the input antenna coils, but time ran out before the defective component could be located. The radio will also need a new grille cloth once electrical repairs are completed.

4. **Bob Bennett** worked on member Chris Pistilli's 1954 Emerson 779B. The radio needs a 500 Kohm potentiometer/switch which wasn't available at the clinic so Bob decided to take the radio home for further work. Bob also brought home a National Union (of Orange N.J.) 5100 belonging to a non-member. A replaced bad 12SA7 and some recapping brought the radio back to life but further recapping was required. Finally, Bob's "homework" also included a non-member's Emerson Stradivarius CH-246 which needed complete recapping. The name "Stradivarius" comes from the fact that the beautiful Ingraham cabinet is in the shape of a violin with its cutouts (called "F holes").

5. **Ray Chase** tackled a 1929, two-chassis, Brandes B16 TRF broadcast receiver. Among its 8 tubes, Ray found 45's incorrectly replacing 71A's. Also replaced was an open bleeder and tapped resistor in the power supply, a bad on/off switch and a bad line cord.

6. **Max Theis**, with assistance from **Tom Cawley**, worked on an RCA SHF-7 "New Orthophonic Console" phono. A good sounding hi-fidelity unit and somewhat sought after, it uses a power transformer combined with a 5Y3GT rectifier, 6AV6, 6CG7, and two 6V6GT audio output tubes. The pair replaced the electrolytics on the amplifier and dismantled and cleaned a finicky changer. Old grease was removed and replaced, the motor bearings reconditioned, shafts polished and the idler cleaned.

7. The trio of **Len Newman, Paul Hart and John Ruccolo** repaired a "humming" Philco 38-3XX (1937-38) receiver by replacing its filter capacitors. This 9-tube superhet with two SW bands had what

was termed by Philco as "Magnetic Tuning" (automatic frequency control) for eliminating drift and "pulling" stations to properly centered tuning.

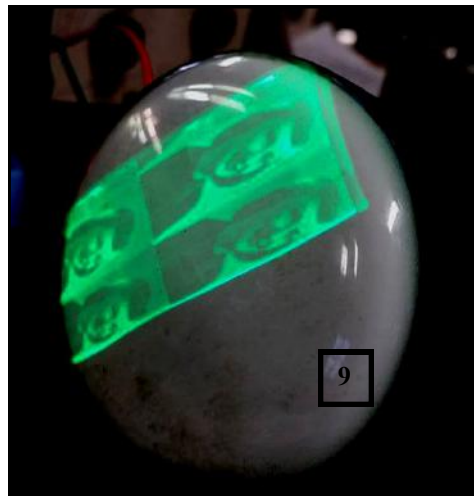
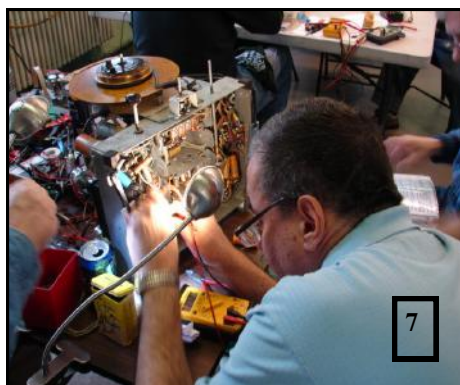
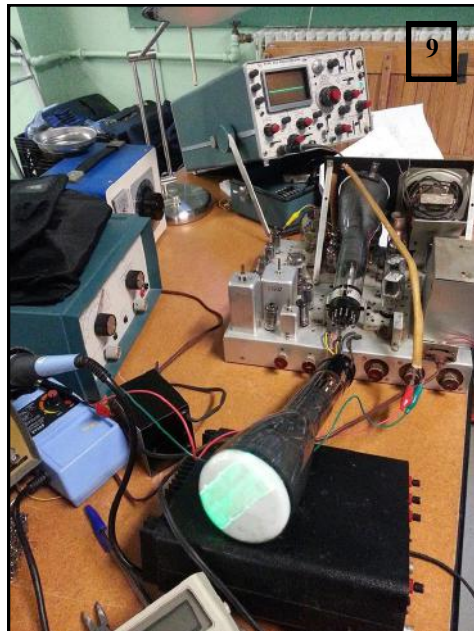
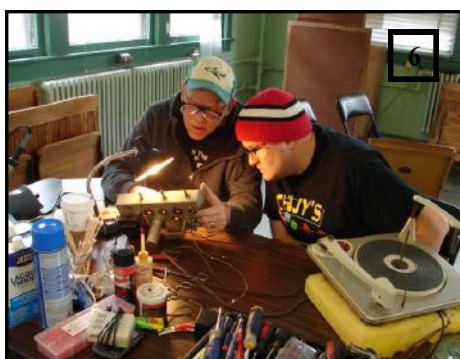
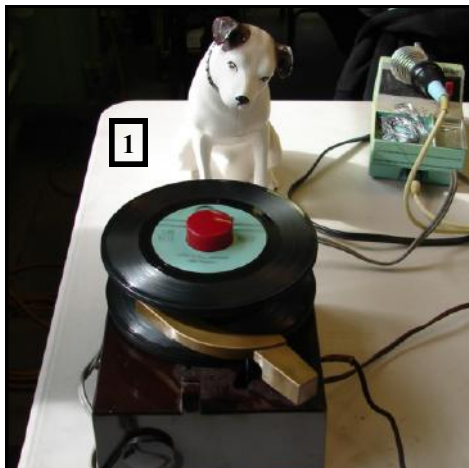
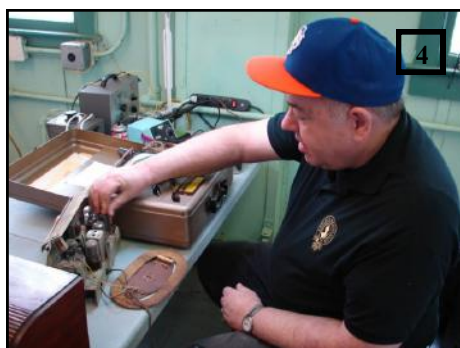
8. Your editor, **Marv Beferman**, was given some free time and in-between taking photos and getting members to document their work, I was able to recap 85% of a Truetone D3840 AC/DC portable. This is a cute little radio that I got at a recent club auction and it sort of looks like a miniature Zenith Transoceanic (less the SW bands). I didn't check operation since I don't like to energize a radio until I'm sure it doesn't hide any shorted capacitors.

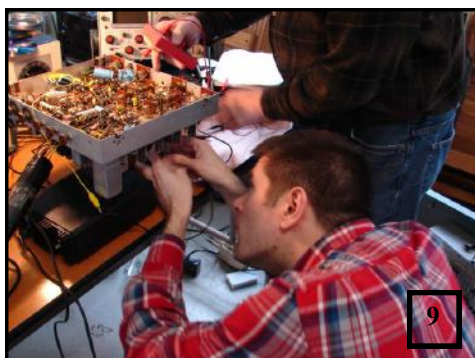
9. **Dave Sica** and **Matt Reynolds** worked on a real tough nut to crack, Matt's Pilot TV-37 television. Matt had previously installed a TVS diode (essentially the same thing as two back-to-back zeners) to protect the CRT filament from overvoltage based on Darryl Hock's recommendation on Videokarma. (Dave said that he and Matt made a whole new batch of "TVS converts" when he described it to the group.) However, just to be on the safe side (working TV-37 CRT's are like gold), a "sacrificial" CRT was connected and sat outside the TV while the good one stayed bolted in the set but disconnected.

Because the set was blowing tubes as soon as it was plugged in, the set was run at 50 volts with a Variac and the filament string was followed along until the problem was found - a cold solder joint in the filament wiring. The screen finally lit up but with a mess of a raster.

A scope showed a strong 200 kHz oscillation present throughout the entire IF string. The signals were suspiciously pure and stable in frequency and amplitude. After spending quite a bit of time trying to determine the feedback source and about ready to give up, casual conversation revealed that Matt had not yet installed the high voltage cage that was originally missing and supplied by Dave. With the shield back in place, IF and video signals appeared in the proper places. Dave said "I don't know for a fact, but I'll bet a nickel that the HV oscillator runs at exactly 200 kHz!" (Dave was quite correct...the high voltage oscillator is located right next to the vertical and horizontal sweep tubes and without a shield, the picture gets really messed up.)

The TV was left with what seemed like the horizontal and vertical oscillators both running at exactly double their proper frequencies. With not many components in these circuits that could be at fault, the cause wasn't that obvious. However, this will have to wait until another day.





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TEACHING AN OLD DOG NEW TRICKS... THE WE 100-TYPE LOUDSPEAKER SETS

By
Marv Beeferman

Thanks to member Steve Rosenfeld for providing the majority of the material used in the writing of this article. Letters in parenthesis refer to photos on page 7.



Ron Hutchinson and Bob Tevis during a lighter moment while Phil Vourtsis repairs Ron's Dual CS-5000 turntable.

I picked up what was labelled a Western Electric (WE) "100F Loud Speaker Set" at a cleanout some years ago. From its looks, I thought it might be some type of intercom and it did not look very interesting. There wasn't much on the internet at first describing its function but the "Western Electric" brand forced me to hold on to it. However, an article in *The AWA Journal* for January 2016 (Vol. 56, #3) by Dick Parks titled *The Western Electric 100-F Amplifier* made me revisit my find. I was quite surprised what I found.

The WE 100-type loudspeaker sets were actually used as telephone amplifiers in railroad signal towers, way stations and train dispatcher's offices to supplement the usual telephone installations. They were designed to amplify incoming speech so that a telephone connected to them would produce sufficient volume to be heard at a distance of several feet, thus relieving the way station operator or the train dispatcher of the necessity of wearing a headset. This arrangement not only eliminated the physical discomfort and annoyance of wearing a headset continuously on duty, but it gave the operator greater freedom of movement. It also did away with surges in adjacent power lines causing objectionable noises directly on the ear with a headset.

The input impedance of the amplifiers were such that a relatively large number of amplifiers could be connected across a telephone line without introducing excessive losses. Otherwise, losses could interfere with conversations carried on between stations at extreme ends of the telephone line.

In general, the 100-series A, B, C, D, E and F loudspeaker sets consisted of a two-stage, resistance-coupled amplifier and a midget, Jensen speaker mounted in cabinets of various finishes. The sets operated on a 105-125-volt power supply, either dc or 25- to 60-cycle ac. On

the front was a grilled opening for the loudspeaker, a pilot light, a volume control and power switch. The rear of the cabinet was enclosed by a brown, enamel finished, metal plate perforated with round holes. A number of ventilating slots were provided at the top of the cabinet for air circulation.

The model 100F is probably the most sought after set, obsoleting earlier A-E versions. If you come across any of these with the label missing, differences are easily recognized.

- In the 100A, B and C versions, the ventilation slots in the top of the cabinet extend forward from the rear of the cabinet rather than from side to side.
- The power switch in the early models was provided with an intermediate "standby" position which applied a reduced voltage to the tubes. This reduced voltage arrangement was provided to conserve power and tube life when it was desired to have the set ready for use at short notice. With the power switch in its intermediate position, the pilot lamp would glow dimly and the output of the amplifier was short-circuited. The set was ready for use 5 seconds after the power switch was turned to "on."
- The early sets were equipped with a 25Z5 rectifier, 77 or 78 first stage amp and 43 second stage amp. Because of problems with certain sets (distortion and loss of volume), the 77 or 78 tubes were replaced by a Raytheon CK 108. The 100F uses a 25Z6GT, 6SL7GT and 25L6GT respectively.
- The 100A has a gain of 70 db as compared to 60 db for the later sets. This was done to prevent crosstalk and noise.
- In the 100D and later sets, the power supply resistance was increased to 15 ohms to extend tube life where line voltage was above 115 volts.
- In the 100E set, the chassis was directly connected to one side of the line cord.
- The 100F set had many safety features and cooling improvements that the earlier sets did not have. In particular, the chassis was connected to the power line through a .01 mfd capacitor. Also, certain filament and plate circuit resistors were included in a plug-in type ballast unit to avoid exposed line terminals (D).
- Earlier speakers were electrodynamic instead of fixed magnet and mounted by springs instead of fixed angle brackets.
- The instruction plate of earlier models was metal; the 100F has a decalcomania.
- A small metal plate bearing the following instructions is attached to the top of

the cabinet of the 100C, D and E: "FOR BEST RESULTS USE LOWEST SETTING GIVING SATISFACTORY VOLUME. Ask Distant Person to Talk Clearly as Though Addressing an Audience. BELL SYSTEM"

So what is the appeal of the 100F amplifier? In spite of the fact that the 52 ohm input winding (600 ohm input impedance) of the WE 282A transformer would be a pretty hefty load for most stereo amplifiers, there are audiophiles around the world who hook up a pair of these to their systems and happily listen to the "stereo tube sound" of these little speakers (E). Unfortunately, the absence of cathode bypass capacitors and the low value of the coupling capacitor to the grid of the 25L6 (D) means that this amp has a pretty narrow audio bandpass. In fact, its frequency characteristic is rated "uniform within +/-5 db from about 300 to about 3000 cps." Output power is about 0.4 watts which "should be satisfactory for groups of listeners of about 75 to 100 persons under favorable conditions."

In a few cases, the 100F has been modified and delegated to other non-traditional uses. These include a signal tracer, guitar amplifier, etc. In these cases, the internet community usually jumps on the owner to sell the unit, get a new replacement and pocket the profits!

The cost of a single 100F will vary

depending on condition (especially the cabinet) as well as whether it comes with the original knobs, WE decal and rear cage. Historically, U.S. ebay prices have ranged between \$400-600 in perfect condition whereas overseas prices can go as high as \$700 to \$1,000. Why? Western Electric is the holy grail of the tube universe. Basically, people are buying the Western Electric name and its high quality parts. They are definitely not buying a high-end audio item!

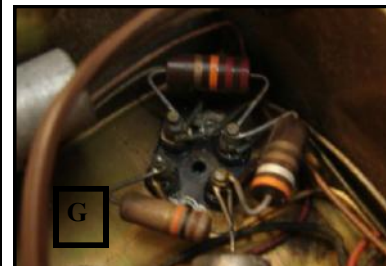
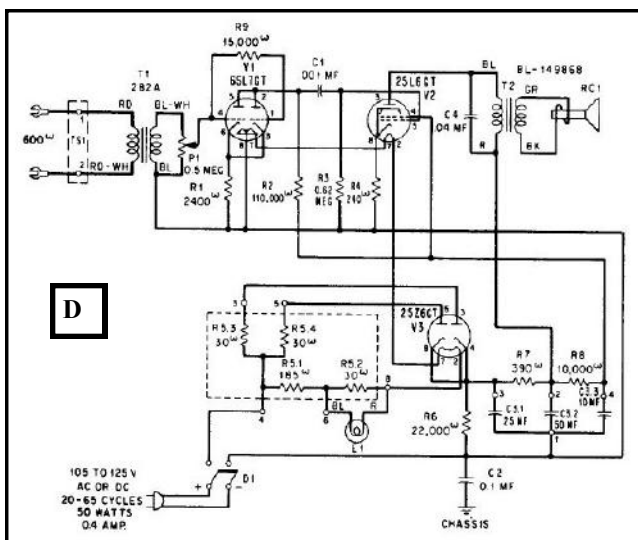
Externally, my 100F was in very good condition (A-C) but had a few internal issues. Date codes indicate it was built in late 1959. The 25L6 amplifier tube had a short and the 25Z6 rectifier tested weak. The interstage coupling capacitor, power line capacitor and output transformer capacitor (reduces gain at higher frequencies relative to that a 1000 cps) all tested good. However, the power supply three-section electrolytic filter capacitor showed the telltale signs of leakage...a white powder around its base. Unfortunately, resistors R6, R7 and R8 prevented testing each section individually and their mounting configuration (very short leads) would make easy disconnection and re-connection quite a chore. (G) To maintain that "Western Electric originality" that is vital to a good sale price, it looks like I'll have to remove the top of the capacitor, dig out its contents and add

new electrolytics. Fortunately, this won't affect that "pure sound" (ugh!) that audio-philosophers fantasize about.

The voltage reducing series resistors (R5.1 and R5.2) and the rectifier plate protective resistors (R5.3 and R5.4) are all contained in a plug-in ballast unit that inserts in a tube socket. Fortunately, this tested good since they sell for up to \$90 on the internet. (B, D)

The original owner had disconnected the input transformer and replaced it with a .01mfd capacitor. (F) He had also attached external leads to the speaker. It appears that he might have been using the unit as an audio amplifier and wanted to reduce the 600 ohm input impedance of the transformer to provide a better match to his system. I returned the unit to its original configuration after confirming that the DC resistance of the transformer primary and secondary was in spec.

I don't plan to energize my 100F until the capacitors are replaced and new tubes installed. Then, its on to a burn-in test and perhaps sale on the internet. The earlier 100F's had a dark brown case but mine has a light, maple look. Perhaps this will fetch a slightly higher price. Keep on the look-out for these sets...they don't seem like much but demand a pretty steep price here in the U.S.A. and even quite a bit more on the Asian market.





New Jersey Antique Radio Club's

Spring Swap Meet



Parsippany PAL Building

33 Baldwin Road

Parsippany, NJ 07054

**Just off Route 46,
Adjacent to Smith Field**



Saturday March 19th, 2016



Refreshments Available

(70) 8 Foot Tables

\$25.00 for members

\$30.00 for non-members

Reserve Additional Tables \$20.00

At the Door \$25.00

Open to the Public

8am to 12 noon

Vendor setup at 7:15 AM

\$5.00 ENTRANCE FEE

CLUB DONATION

For Directions

Visit our website: www.njarc.org

or Mapquest

33 Baldwin Rd Parsippany NJ 07054

Vendors Make Your Reservations Now!

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