



# The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

June 2015

Volume 21 Issue 6



**MEETING/  
ACTIVITY  
NOTES**

Reported by  
Marv Beeferman

## The ON-LINE Broadcaster

**The New 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](mailto:mbeeferman@verizon.net). Be sure to include your full name.**

I was unable to attend a few of last month's events but thanks to "cub" reporters Al Klase and president Richard Lee, this month's *Broadcaster* include stories on our homebrew/basket case restoration contest and latest Repair Clinic at InfoAge. Since I can't be at all places at all times, it's nice to know that there are some members out there who think of our club newsletter when they are out there attending a radio event. At your next hamfest or swapmeet or auction, try to remember a small camera (or use your phone) and take a few photos of some interesting points. Add a few words of explanation, send them to your editor and it would be very much appreciated.

This month's *Broadcaster* continues with an update on the progress of our CT-100 television restoration and additional tips on dealing with restoring a Pilot TV-37. Another story deals with dissolving tube base cement that has an interesting back story.

Recently, member Dave Sica picked up a bunch of big-pin tubes. Upon later examination, it turned out that two unused in-the-box globe UX-245's were included. When he went to photograph them (after being encouraged by president Richard Lee to sell them on ebay), Dave found one to be "a very rare three-pin version." Or I should say that it was actually a four-pin version with one of the pins broken off! As Dave continued:



## MEETING NOTICE

The next NJARC meeting will take place on Friday, June 12th, 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 the story behind your selections.

"Looking at the tube and imagining dollar signs flying out the window, I figured that there must be some way to repair a missing pin, but a quick internet search yielded no answers. So I did what I always do when I need counseling on matters tubular and contacted the tube chaplain (i.e., Lud Sibley)."

In thinking about Dave's problem and after a number of e-mail exchanges regarding tube pin replacement, Lud came up with the methylene chloride solvent method noted in the article. This provides complete base removal which allows a straight replacement of the whole base. Additionally, Lud says he has heard strong recommendations ("but not yet personally confirmed") that *Gorilla Glue* is by far the best choice for re-affixing tube bases.

With regard to Steve McVoy's restoration project of the museum's CT-100 TV, in addition to the story on page 5, some last minute information has just been sent to me by Dave Sica:

"Steve replaced most of the paper capacitors and the missing transformer. He temporarily installed an of/off/volume control but Mike Molnar is sending him one from his parts chassis. He replaced the electrolytics, rebuilt the HV cage and installed the missing tuner. He tested the seleniums and pronounced them OK. (That doesn't square with my understanding of vintage seleniums, but I'm going to defer to his experience on that.) He powered it up and the voltages from the power supply all look good. There is horizontal and vertical sweep, although the horizontal is way off frequency. There is only 4KV coming from the high voltage supply, but this is probably related to the horizontal frequency being off. There are several coils in the set that are

always bad; he's ordered replacements for those. This is astounding progress!"

Member Thomas Lee reports that, as noted in a recent jukebox forum, that many of the electronic components that RadioShack.com carried can be ordered at NTEPARTSDIRECT.com (NTE has been supplying RadioShack.com for years). These include transistors, diodes, resistors, LEDs, capacitors and much more. As an added benefit, the component selection is much more comprehensive than what was previously available at Radio Shack.

For those Hi-Fi enthusiasts who are willing to travel or ultimately find themselves in the area, June 13th marks the grand opening of the Vintage Hi-Fi Museum in West Hartford, CT (Exit 44, I-84 past Flatbush Ave.). The museum will feature "fine examples (some rare)" of mid-century-stereo design, the ability to listen to great music on early tube amplifiers and a collection of vinyl that visitors may peruse.

## Upcoming Events

July 10th: Monthly meeting at Princeton's Bowen Hall; Dave Sica video presentation and talk on his participation at Early Television Convention in Ohio.

July 25th: Summer Tailgate Swapmeet at InfoAge (NJARC/OMARC joint venture)

August 8th: Summer Repair Clinic at InfoAge

August 11-15th: AWA Convention

August 14th: Monthly meeting at Princeton's Bowen Hall; member Charles Blanding will talk about his history with local NJ radio broadcasting.

Sept. 18-19th: Kutztown swapmeet.

Nov. 7th: Fall swapmeet at Parsippany.

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

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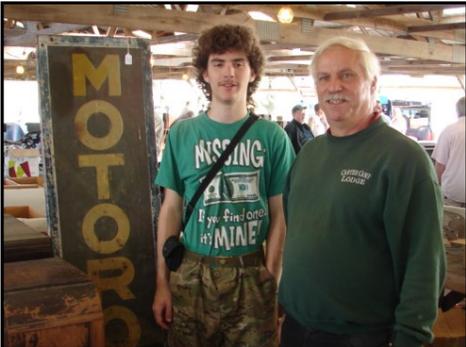
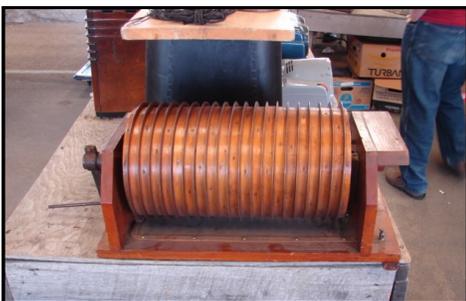
## KUTZTOWN IN THE SPRING

By  
**Marv Beeferman**

The NJARC was well-represented at Kutztown's Spring 2015 Antique Radio Meet. Sponsored by the Delaware Valley Historic Radio Club, buyers had a choice of close to 200 booths to peruse for that special bargain. This year featured a Friday auction with air conditioning tempering what was considered a "warmer than usual May show." The following photos tell only a part of the story, but you can get a more rounded view by watching Bob Bennett's "Radio Wild" video on YouTube or by visiting [hagstar.phanphare.com/6899114](http://hagstar.phanphare.com/6899114).

If you plan to attend Kutztown, you really need to start early, stay late and be dedicated and persistent to really come home with some interesting buys. But these days, I'm just as happy to get a good night's sleep, a good breakfast, roam the aisles for a few hours and get home early. I'm far from someone who I talked to who said he made about 20 trips through all the booths within the first hour he got there! However, just before leaving at about 2:00 o'clock, I put my money down on a 1916 Queen-Gray, Murray Loop/Wheatstone Bridge test set in beautiful condition. I find the workmanship, mechanical precision and historical importance of these types of instruments hard to resist and an important complement to my early radio collection.





## HOMEBREWS AND BASKET CASES

By  
Al Klase

Unfortunately, I could not attend the May meeting, but thanks to our Technical Coordinator Al Klase, our Homebrew/Basket Case Restoration contest was captured for your enjoyment and the NJARC archives. Hats off to all of you who participated...Ed

For Category 3 (Open), member **Nevell Greenough** entered a "Bender" semi-reproduction of the Moog Model 201 Theremin based on Robert Moog's 1954 *Radio-Television News* article. The unit is housed in a 1950's style guitar-amp cabinet using as much of the original circuitry as possible. It's a very impressive piece of electronics comprising 7 tubes and about 5 IF transformers. The "Bender" emblem is based on the "Fender" guitar amp design and was produced on a 3D printer. Revealing himself to be a closet musician, Nevell can even play the thing a bit. Leon Theremin would be proud!

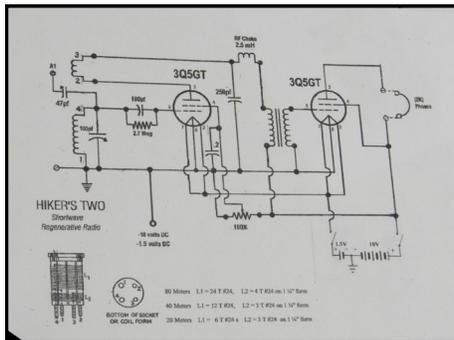


**John Ruccolo's** Category 4 (Vintage Reproduction) entry was billed as the "Smallest All-Electric Radio" in a Thomas Blanchard construction article from *Modern Mechanics*. It is based on the little-known 12A7 tube, a power pentode and rectifier diode in a single 7-pin envelope. It's a simple AC/DC regen with plug-in coils. The dropping resistor for the 12-volt heater is a cute bedside lamp holding a 40-watt bulb.

The article notes that "the set will cover both the short wave and broadcast bands, bringing in police calls, phone broadcasts, code and phone amateurs, and perhaps even a foreign station or two under good atmospheric conditions."



New member **Bruce Ingraham** showed off two very nicely done two-tube short-wave regens in homemade wooden cabinets. For competition purposes, we chose the "Hikers Two" based on 3Q5GT tubes to stay within the two-tube functions of Category 1 (Primitive Receivers).



Member **Al Klase** demonstrated a Steam-Punk crystal set now on display in our Radio Technology Museum. This is another example of Al's "Pretty Good Crystal Set" design. Connected to a 100-foot antenna, and driving a sensitive sound-powered headset, it gave a good account of itself. Folks seemed to enjoy pinning the 50-microamp "S-meter" in series with the detector by tuning in a strong local station. Not an "official entry," it was displayed to encourage the building and preservation of crystal sets. (See <http://www.skywaves.ar88.net/xtal/Xtal.htm>.)



## CT-100 UPDATE

By  
Marv Beeferman

In the May issue of the *Broadcaster*, we talked about member Dave Sica's efforts to get the Radio Technology Museum's RCA CT-100 television restored. He said he was planning to conduct an in-person inspection of the chassis at the Early Television Convention in conjunction with a scrounging through the museum's several parts chassis. Well, Dave says he has good news to report:

"As planned, I took our original CT-100 chassis to the Early Television Convention to be examined by the experts. There it was looked at by both Steve McVoy and Pete Deksnis. Both noted that due to its earlier service as a donor chassis, it was missing a good number of the most difficult-to-find parts. But Pete said that he would be able to replace the missing tuner and a number of other parts, while Steve felt confident that he had most, if not all, of the needed parts on one or the other of his two donor chassis. Besides these resources, NJARC member Mike Molnar told me that he has two CT-100 parts chassis in his garage and that there are other surplus parts scattered throughout the collector network."

"There was, unfortunately, no time during the event to actually scrounge the missing parts, let alone install them. As I was getting ready to leave for home, I told Steve that I'd pick up the chassis and hoped that we could discuss the parts issue soon. Instead, he suggested that I leave it on the bench in the museum's shop and he would just replace the missing parts himself. Based on the historical performance metrics of my own restoration projects, I believe this will speed up the project by at least an order of magnitude."

"Bob Dobush offered to bring the reconstituted chassis back to New Jersey

on one of his trips east. There is also the possibility that I may be returning to Ohio when we schedule the 'firing up' of the CRT rebuilding lab. This could be as early as a few weeks from now. And of course, worst case, I expect to be back at the TV museum next spring."

On May 15th, Dave reported the following:

"I just got off the phone with Steve McVoy and he informed me that his intention is to fully restore the CT-100 chassis for us. This includes replacing the missing 'unobtainium' parts, the substantial amount of labor involved and his expertise in knowing how to do his job properly."

Well, as Dave says, things do keep looking better and better and our CT-100 is likely to be operational in the foreseeable future. To learn more about Dave's trip to Ohio (and his presentation of Richard Brewster's "Zworykin's First Two RCA Lab Notebooks"), try to attend the July meeting. We'll also learn about member Mike Molnar's Field Sequential Color Camera and Dave's DuMont 15" Color Prototype.



The CT-100 at the Early Television Museum. Its original price in 1954 was \$1,000 but, after heavy advertising failed to sell many sets, its price was dropped to \$495. Shortly after that, RCA perfected its 21-inch tube, and recalled most of the CT-100s, swapping them for the new 21-inch set for free. It is estimated that about 160 still exist today, hopefully one eventually being at the NJARC Radio Technology Museum.

## THE NJARC MAY RADIO REPAIR CLINIC

By  
Richard Lee

*Your editor wasn't able to attend the May Repair Clinic, but president Richard Lee was on hand to record the activities, take some pictures and provide the ever-popular "radio bagels"...Ed*

- Member Charles Blanding worked on non-member Rich Phinex's Hallicrafters S38-D, performing the usual filter cap replacements. He also joined Steve Calandra in solving problems with some Dynakit 70 equipment.
- Member John Ruccolo changed the filter caps and line cord on non-member Jerry Myer's 42-62 Philco tabletop; the radio was left working.
- Member Harry Klancer added a new speaker and filter caps to a non-member's 1948 Emerson tabletop.
- Member Tom Cawley's Model 268-C Magnovox console took the team of Chuck Paci, Don Irish, Al Klase and Jules Bellisio to deal with its reception problems.
- Member Bob Bennett worked on a group of member Bob Masterson's tabletop sets - a Firestone, Sonora, Pilot and Emerson.
- Member Ray Chase continued work on a console donated by Lisa Starnes.



## HAVING FUN SMELLING HOT ROSIN AND SOLDER

Member John Dilks was going through some old photos and came up with this great shot of his appearance on WMGM-TV's Channel 40 "Let's Talk Antiques with Ray Mansfield" out of Wildwood and Atlantic City. Ray Mansfield (aka Charles Mathers) passed away in 2011 and was not particularly fond of antiques but learned a lot by producing and doing research for the show. Like John, from time-to-time, you'll find a few of our members being interviewed on local TV and radio shows and being the subject of magazine and newspaper articles.



## DISSOLVING TUBE BASE CEMENT

*The following article was obtained from the June, 2015 (Vol. 17, No. 3) issue of the "Tube Collector," the bulletin of the Tube Collectors Association published by Ludwell Sibley. It was tagged "For the First Time in any Radio Publication."...Ed*

Occasionally, there is a need to remove the base from a vintage tube - often to fix a broken pin, or for another reason like re-basing a 5Y3GT into an 80. The problem is how to dissolve the cement that holds the bulb to the base.

The traditional cement on tubes (and light bulbs) is powdered marble in a phenolic binder ("Durite No. 275"), plus rosin and shellac. The ingredients were wetted with alcohol, then heated to 150 °C or so to cure the mix after basing.

There has not been good doctrine in antique-electronics media (print or Web) on subverting the cement. Acetone has

been recommended but, on test, it simply turned brown from dissolving some component from the cement. The cement was weakened (embrittled) somewhat, but the effect was insufficient.

However, methylene chloride (dichloromethane) as found in some paint strippers, does attack the cement, turning it into a brown soup. The version of stripper sold in liquid form gets down into the space between base and bulb and goes to work. (The "paste" version is too viscous to flow properly.) The tube needs to stand, with the base covered, for two or three days to get the full effect. After that, laying the tube on its side lets the cement flow out.

The stripper contains other solvents: typically methanol, toluene, and acetone. It's flammable, so "handle with care."

*Methylene chloride is the least toxic of the simple chlorohydrocarbons, but it is not without health risks, as its high volatility makes it an acute inhalation hazard. It can also be absorbed through the skin. Ensure you follow the stripper's directions and warnings if you decide to use the product...Ed*

## RESTORING THE PILOT TV-37

### PART II

By  
Marv Beeferman

Our first installment in the May *Broadcaster* dealt with the difficulty of testing and/or obtaining a replacement 3KP4 CRT and protecting the CRT from filament burnout. We'll continue with the restoration of a TV-37 with other suggested methods for protecting the CRT filament and capacitor/resistor replacement.

It has been suggested that the addition of a 6.3 volt transformer and resistor in the CRT filament string has a few drawbacks. The first, and one which I do not see that problematic, is that you have to create a space to mount the transformer and drill into the chassis to secure it. You also need to mount the high power resistor in a location where it would get proper cooling. A more serious drawback is that while the transformer does reduce the cold start surge, its output will usually be high unless you use one specifically rated at 600 mA. Also, it does not protect against line transients (not such a big deal).

A lower cost, less intrusive and what has been suggested as a "better regulated solution" is to use a simple bidirectional TVS (Transient Voltage Suppressor) diode. This is basically two back-to-back zener diodes. By carefully selecting the breakdown voltage, not only do you eliminate the cold start surge, but you are now clamping the voltage on the filament to a set maximum. Therefore, regardless of what the line voltage is or the transients on it, the CRT filament will always be protected. No modification to the chassis is required and the fix can be installed in a very short time!

Since we want a 6.3 Vrms on the filament, we need to clamp at about 8.9 volts maximum. In practice, we actually want to clamp at a bit less than this to limit the maximum rms voltage, so a standard 8.2 volt TVS (1.5KE8.2CA) is used. The diode is simply added across the CRT filament leads at the 25Z6 socket. With this diode in place, the filament voltage should never get above about 7 Vrms regardless of the line voltage or during a cold start.

A final solution, and what might be

considered by some as “overkill,” is the addition of a CL-90 thermistor on the AC line between the power switch and the filament string. The thermistor presents a higher resistance when cold, which decreases to almost nothing after warmup. This “soft start” moderates the current surge. Thermistors were a standard feature in the Philco Predicta and other later TV’s.

So what filament fix should I choose? Any should be satisfactory. The conservative transformer/resistor solution is a little more expensive, intrusive and more work intensive. The TVS /Thermistor solution is cheap, nearly invisible, fast and reversible. Either way, you’ll be protecting a valuable investment.

### Capacitor/Resistor Replacement

I have grouped capacitors and resistors together since the position of these components may require that you might want to alternate between the two during the restoration process purely for ease of replacement. The good news is that the TV-37 is easy to work on. Without a power transformer, it is very light and can be serviced upside down on the bench. (Make sure you have removed the CRT!) The bad news is that there are no short cuts! Television circuits are much more critical with regard to component values than radio circuits and be prepared to replace close to 90% of the TV-37’s in-nards.

The problem with given specific recommendations for capacitor/resistor replacements is that there are several variations of the TV-37’s circuitry. You may find it difficult to find the schematic that actually represents the set you own, so you might find differences between a component’s marked value and that found on a schematic. The best bet is to actually measure the value of the removed component and compare it to its marked value. If you don’t have a capacitor checker, it might be time to consider investing in one. In the end, always be conservative in your choice of a replacement. (In some cases, you might have a little wiggle room if you can’t find an exact replacement.)

All paper capacitors should be replaced with 630 volt film or ceramic capacitors or equivalents. Many restorers leave mica and disc ceramics alone, but since you’ll be digging deep into the TV’s chassis, it’s not a bad idea to check them anyway. Although not generally known to fail, ensuring that they are in good shape increases your confidence in all of the TV’s circuitry. The 0.0015 mfd capacitors throughout the I.F. stages appear

to be similar to ceramics but they probably could be replaced with .0011 mfd film capacitors.

All filter and electrolytic capacitors should be replaced. It might be difficult to find replacements for the two capacitors mounted below the speaker on the top of the chassis since they are physically short. You might have to resort to “restuffing” the originals or mounting substitutes below the chassis. Also note that these capacitors (C2 and C3) are installed with their positive leads connected to chassis ground. This is different than what you’ll see in many radios and TV’s. Don’t install them backwards!

The high voltage capacitors present somewhat of a challenge. Exact replacements will be difficult to find, although a persistent web search may prove productive. You should contact the club’s Capacitor Program Coordinator Matt Reynolds (capacitors@njarc.org) to see how much progress he has made in obtaining the more difficult HV values for the TV-37.

Some examples provided by other restorers indicate that exact values for HV capacitor replacement may not be all that critical. In one case, .022 mfd, 6000 volt caps replaced 470 pfd filter caps. In another case, the 5 nfd, 3 kV coupling caps to the deflection plates were replaced with 50 nfd, 1 kV Z5U ceramic caps (Cera-Mite 565R10HKS50) since its breakdown voltage is much greater than its rated voltage.

It should be noted that the leads of the 3 kV filter cap following the 1B3GT HV rectifier need to be positioned and soldered without sharp points to avoid corona discharge. This cap is located inside the HV housing. In addition, be careful in reading schematic values. The Rider schematic notes capacitance values in the numeric form “.005” uF instead of “.005” uf. This can make a .005 uF look like 0.05 if the period is faded out.

Expect to be replacing quite a few out-of-tolerance resistors. Most are 1/2 watt carbon composition types. You might want to overlook the low value decoupling resistors, but that’s your call. The color codes on many resistors may prove to be unreliable because the color of the stripes change over the years. Some of the worst color changes are yellow changed to light green and purple changed to gray. Again, careful measurements and following the correct schematic to double-check values is critical.

You might find that some of the 3 ohm resistors in the filament strings may have drifted by up to 50% and decide to leave them alone because of today’s

higher AC voltages. This is a poor decision since the result will be a drop in heater string filament voltage and CRT filament voltage. Low heater voltage for particular tubes in a heater string results in low tube performance and may affect various aspects of set operation. For example, a low filament voltage for the 6BA6 video amplifier will reduce its gain. (Note: Some good tubes simply have a disproportionately lower internal resistance at lower operating current which will show a low voltage drop in the series string and should be replaced.)

Finally, operating the series strings at full voltage is also very important because tubes are manufactured to have a specific current draw only at their specified operating voltage (i.e., 300 mA at 6.3 volts). If the tubes are operated at a lower series string current due to excessive external string resistance in the 3 ohm resistors, some tube heater voltages will drop more than others due to the different I/V curve characteristics of the tube heaters of different types or from different manufacturers.

Don’t be shy about replacing resistors because many problems can be masked by those that are out-of-tolerance resulting in a slow and tedious troubleshooting session. As one restorer noted:

“Working through the high voltage, sweep and video sections, I found more and more bad resistors. As I replaced them, the picture gradually stabilized and improved in brightness and contrast.”

The restoration of the TV-37 continues next month. We’ll be looking at specific problems unique to this television (HV power supply, video IF, sound IF, FM ratio detector, contrast) and how to solve them. We’ll also look at how to perform a basic alignment and minor adjustments to obtain that perfect picture.



**A Pilot TV seen at the May Kutztown Radio Swapmeet.**



## New Jersey Antique Radio Club and Ocean Monmouth Amateur Radio Club

# Summer Tailgait Swap Meet

## NJARC and OMARC Joint Venture



InfoAge Science History  
Learning Center and Museum  
2201 Marconi Road  
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# Saturday July 25th, 2015



**40 Spaces Available**

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