

# The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

May 2015

Volume 21 Issue 5



**MEETING/  
ACTIVITY  
NOTES**

Reported by  
Marv Beeferman

### The ON-LINE Broadcaster

The New Jersey Broadcaster is now on-line. To date, over 120 of your fellow NJARC members have 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 apologize for not getting out the *Broadcaster* last month but sometimes conditions beyond my control take precedence.

It is with great sorrow to announce the unexpected passing of longtime member Richard Hurff (aka "Mr. Majestic") on April 17th. Some thoughts regarding Richard's rich and full life can be found on page 5. Member Rob Reifenhiser posted the following comment on the Reflector:

"I thought a quick shout out for Mr. Majestic was appropriate. I am finishing up a Majestic 1250 now with some advice from Dick on color. My gut told me this was not a walnut radio, and Mr. Majestic confirmed it came in a brighter oak. Just replaced some missing veneer and I am about to apply some golden oak stain. Made me think of him. He was a real nice guy and a little bit of him will live on within this radio."



## MEETING NOTICE

### NOTE DATE CHANGE!

The next NJARC meeting will take place on Friday, May 1st, at 7:30 PM at InfoAge. Directions may be found at the club's website (<http://njarc.org>). This month we will hold our Homebrew and Basket Case Restoration Contests so be sure to remember to bring your entries. We'll also be holding a small auction.

Thanks go out to webmaster Dave Sica for a great guided tour of the club's website (NJARC.org) presented at the April meeting. Dave, supported by member Matt Reynolds, has not only received kudos from the NJARC membership but also from readers outside the club. In its new and expanded format, there's something for everyone. The Calendar of Events has been fully expanded and is constantly being updated. An "eBook Library" is available where you can find free downloads of rare books on telegraphy, wireless and radio, telephony, television and numerous other related topics. Dave has created a photo archive of twenty years of NJARC history and photos from swapmeets, clinics, picnics, parties and other club activities. You will also find links to numerous radio collecting and restoration websites, sources of information and much, much more. So take a look...you will not be disappointed.

Thanks also goes out to our Technical Coordinator Al Klase for providing us with an insider's look at the NJARC Reflector. This is another club resource that seems to be under-utilized. If you want to keep up-to-date on the latest topics and questions on the minds of our membership, this is the place to be. More importantly, it gives us a way to directly communicate changes in meeting dates, meeting topics, mini-auctions and cancellations due to bad weather. You can learn all about getting on the Reflector by going to the club website and clicking on Club Programs/NJARC Mailing List (e-mail Reflector).

If you haven't paid your 2015 dues to date, you will be removed from club rolls and will no longer be receiving the *Broadcaster*. A quick call to membership secretary Marsha Simkin at 609-660-8160 and a \$25 check will return you to

good standing. Don't let your NJARC membership permanently expire and give up all the club's benefits!

The Antique Radio Forum recently posted the topic "Show Us Your Radio Room." Below are some photos (just part of his collection) posted by member Mark Mittleman, a true battery set aficionado.



### Upcoming Events

- May 8-9th: Kutztown swapmeet.
- May 16th: Spring Repair Clinic at InfoAge
- June 12th: Monthly meeting at Princeton; Show & Tell.
- July 25th: Summer Tailgate Swapmeet at InfoAge
- 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.

**PRESIDENT:**  
Richard Lee  
(914)-589-3751

**VICE PRESIDENT:**  
Sal Brisindi  
(732)-308-1748

**SECRETARY/NEWSLETTER EDITOR:**  
Marv Beeferman  
(609)-693-9430

**TREASURER:**  
Harry Klancer  
(732)-238-1083

**SERGEANT-AT-ARMS (WEST):**  
Darren Hoffman  
(732)-928-0594

**SERGEANT-AT-ARMS (EAST):**  
Rotating

**TRUSTEES:**  
Ray Chase (908)-757-9741  
Phil Vourtsis (732)-446-2427  
Bill Zukowski (nocusr@optonline.net)

**TECHNICAL COORDINATOR:**  
Al Klase  
(908)-892-5465

**TUBE PROGRAM CHAIRMAN:**  
Al Klase  
tubes@njarc.org

**SCHEMATIC PROGRAM:**  
Aaron Hunter  
(609)-267-3065

**CAPACITOR PROGRAM:**  
Matt Reynolds  
(567)-204-3850

**RESISTOR PROGRAM:**  
(To be announced.)

**WEB COORDINATOR:**  
Dave Sica  
(732)-382-0618  
<http://www.njarc.org>

**MEMBERSHIP SECRETARY:**  
Marsha Simkin  
33 Lakeland Drive  
Barnegat, N.J. 08005  
(609)-660-8160

## POOR WEATHER DOES NOT DISCOURAGE SWAPMEET CROWD

By  
Marv Beeferman

Constant rain did not discourage buyers and sellers from attending the club's March swapmeet at the Parsippany PAL. It was a little touch-and-go as dire weather forecasts predicted the possibility of a complete bust, but the building was practically filled and the majority of attendees, albeit a little damp, went home happy. I ended up with a beautifully restored Radiodyne (Western Coil and Electric Company) Type WC 17 battery set and a nice assortment of battery set parts offered by the club.

Below are few of the photos that hopefully captured the day's events. However, you can view a near-professional video production offered by Bob Bennett at his You Tube site "Radio Wild." But you'll have to forgive Bob from pulling his video's introduction from the depths of melodramatic fiction writing... "It was a wet and rainy day."









## MUSEUM/INFOAGE UPDATE

By  
**Marv Beferman**

On March 21st, the NJARC's RTM (Radio Technology Museum) sponsored a vintage radio exhibit at the Middletown Public Library in support of New Jersey's first Makers Day. Makers Day is a statewide event celebrating, promoting and introducing the maker culture and the values associated with making, tinkering and STEM-based learning (Science/Technology/Engineering/Mathematics).

Hosted by libraries, schools, museums, colleges and independent "maker spaces," attendees are invited to enjoy an array of exhibits and hands-on workshops and jump in to create both physical and digital creations - from art to engineering. Activities at the Middletown library included robotics, pottery making, radio technology demonstrations, bookmaking crafts, science experiments, 3D printer demonstrations, incubator and chicken egg demonstrations and paper crafting.

As reported in the InfoAge *Marco-nigraph* for May/August by Ray Chase, participants were NJARC members Ray Chase, Harry Klancer and Al Klase. Displays included a circa 1924 "homebrew" three-tube working radio that illustrated that amateur radio and broadcast band "Makers" were active over 100 years ago. Also included were several crystal sets and other homebrews from later dates. Al Klase was instrumental in setting up the necessary equipment to insure that "actual" radio signals could be picked up in the library's windowless community room. Ray went on to say that:

"We also had a display of Heathkit items to show the impact of the widespread home building of electronic devices that started right after WW II. Harry Klancer brought a Raspberry Pi mini controller that is inexpensive and can be adapted and programmed to perform a multitude of common tasks. Al brought a device the size of a thumb drive that plugged into a laptop making a complete wideband searchable radio and spectrum analyzer."

Ray also said that "it is interesting to note that external headphones or headsets are foreign to a generation used to ear buds. Same is true in regards to 'tuning a radio;' slowly rotating a knob is alien to our pushbutton bred society."

Thanks to members like Ray, Al and Harry for their efforts to further the cause of NJARC and InfoAge outreach by promoting an interest in science for young people and the importance of maintaining the history of technology. After seeing the following photos posted by Al Klase, member Dave Sica remarked: "It's like looking into a time machine and seeing myself in 1960. Except I never had it so good!"



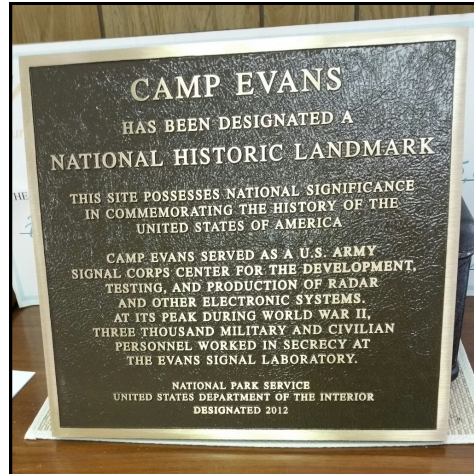
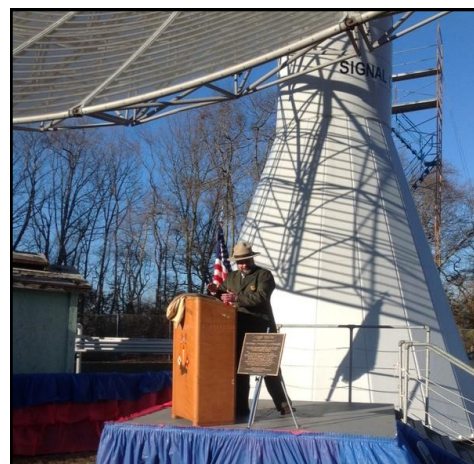
Previously, on January 27th, the NJARC Radio Technology Museum participated in the OTES PTA Science Fair at the Ocean Township Elementary School in Oakhurst. InfoAge along with other local groups were invited to set up displays that complemented student science projects. Participating were Jules Bellisio, Harry Klancer and Ray Chase who guided students through hands-on displays in basic technology from the museum.

In 2012, InfoAge was designated as a National Historic Landmark. The nomination summary stated the site's significance as follows:

"Named Camp Evans when the U.S. Army Signal Corps acquired the property in 1941, this site functioned as an electronics development, testing, and production facility during World War II, and continued in that general capacity for several decades. During the war Camp Evans became one of the principle U.S. sites

associated with the development of radar. The central core of the larger World War II-era facility remains largely intact, and is slated for preservation. The area conveys a strong sense of time and place, and meets NHL Criterion I as the best extant historic property associated with the nationally significant development of radar."

On April 1st, National Park Service Superintendent Thomas E. Ross unveiled the Camp Evans National Historic Landmark Plaque on the 55th anniversary of TIROS (the first successful low-earth orbital weather satellite that was tracked at InfoAge by the TIROS antenna and ground terminal). Following the ceremony, attendees were given a preview of the upcoming InfoAge Space Exploration Center (iSEC). The space, with its first stage scheduled for a late summer opening, will feature a TIROS dish operations classroom and an interactive exhibit describing the site's history.



Volunteers at The Radio Technology Museum are constantly striving to provide first-class examples of major advances in radio, television, electronic entertainment and radar history. Obviously, the most impressive are "working" examples. But as most of you are aware by dealing with



your own restoration projects, time, environment and the availability of replacement parts are very uncooperative to this end. Even more limiting, however, is to get someone to take on the task. Fortunately, we do have a few dedicated volunteers that step up to the plate when the need arises.

Our first example is the restoration of the museum's CT-100 television and member Dave Sica's efforts toward that end. As Dave wrote in a recent update:

"Thanks to the detailed photos supplied by (NJARC member) Harry Klancer the other day. I've received preliminary analyses of the restorability of the museum's CT-100 chassis from two people well qualified to speak as experts on the subject: Steve McVoy of the Early Television Museum and Pete Deksnis, the acknowledged king of the CT-100 world and the fellow who originally made the set available to us."

"Based on the photos, both felt that although there are many unique parts missing due to its earlier life as a parts donor, the chassis in the set was very likely to be restorable. My other option was to source a complete chassis for restoration, but the expense of finding the missing components for this chassis would be fairly low."

"They are planning to conduct an in-person inspection of the chassis at the upcoming Early Television Convention in conjunction with a scrounging through the museum's several parts chassis. We already know that not all of the needed parts are contained in those chassis, but Pete feels certain that everything should be obtainable through his contacts within the network of collectors. NJARC member Mike Molnar also has several parts chassis and has offered his assistance."

"So, in the space of a year, the status of the set has gone from a 'likely-never-going-to-run-again' static display to 'almost-certainly-restorable.'

"Then comes the huge task of actually restoring it and getting it working. Surely that will be a big enough project to keep me off the streets and out of trouble for a long time."

It looks like Dave could use a well-deserved hand; any takers? The rewards of seeing a restoration come to life again can be very rewarding and the museum has a significant backlog of radios and TV's that could benefit from the efforts of some enthusiastic volunteers. Dave may be reached at 732-382-0618 or at [dave.sica@njarc.org](mailto:dave.sica@njarc.org).



**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.**

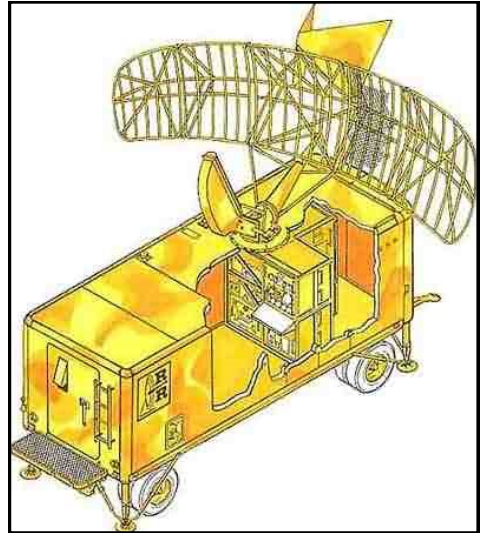
In a *Broadcaster* article some months back, we started to follow NJARC member Ray Chase's efforts in restoring a TPS-1D radar. His ultimate goal is to set up a "semi-working" example of this important piece of WW II history in one of the semi trailers outside of building 9010A. Up to that point, Ray had completed the following:

- Wiring of a motor-generator set to supply 400 cycle primary power.
- Inter-unit cabling of the radar's six independent units so that initial power-up could be started.
- Changed out the main chassis of the power supply unit with a working spare and replaced eight tubes.
- Installed a 28 VDC fan and power supply to replace the 400 cycle fan.

In the latest volume of the *InfoAge Marconigraph*, Ray reports that all circuits have been energized and no fuses have blown. He tried activating the antenna rotational controls but the drive motor would not budge. Since the antenna base is allegedly "right out of its crate," Ray believes that the problem may be in a missing connection in one of the several interlocking relay circuits and illustrates the difficulty of trying to integrate units from varying pedigrees and

different manufacturers. But Ray is confident about the ultimate outcome: "...we have good technical documentation so it is just a matter of dogging it out through the various circuits."

If you're interested in giving Ray a hand with some of the troubleshooting and learn a little about radar from a true expert, contact him at 908-757-9741 or [raydio862@verizon.net](mailto:raydio862@verizon.net).



**The TPS-1D was a high-powered air search radar designed to detect aircraft and other targets up to 160 nautical miles. The set was transportable and could be moved in two, 2-1/2 ton trucks or in a 1-ton or 1/2-ton trailer.**

## RICHARD HURFF PASSES

By  
Marv Beeferman



It is with much sadness that we report the loss of NJARC member Richard Hurff of Haddon Heights, NJ on Friday, April 17th. Affectionately titled "Mr. Majestic" based on his persistent and often frustrating attempts to deal with restoring one of



antique radio's most unforgiving problem radios, Richard always maintained a bright outlook and could be counted upon to bring his unique sense of humor and engaging storytelling to any situation.

Richard was a graduate of Ursinus College and Lehigh University. As an English Literature teacher at Audubon High School, he supported countless former students through his contributions to their education. Along with being an active member of the NJARC and antique radio collecting community, Richard was also a member of the NJ Education Association and numerous other clubs and organizations.

Richard's diverse interests included the collection of antique automobiles with a passion for Studebakers. Photography, the Victorian era, genealogy, original Enrico Caruso recordings and a quest for knowledge were among his many other hobbies. He was an avid world traveler whose journeys took him to all corners of the earth in search of culture and adventure.

We could always count on Richard to find unique relationships between his love of history and literature and radio collecting. Who else but Richard could find a link between Shakespeare and Bernard Carlson's book *Tesla: Inventor of the Electrical Age* which he reviewed at our February meeting? Who else but Richard could amaze us with his knowledge of Victorian England as he described his spherical audion at a 2014 Show & Tell?

But to truly know Richard was to share his life experiences "up-close." I was very lucky to be in this situation when we shared the round trip to the AWA convention some years back. Listening to Richard's stories over a twelve hour period about all the places he visited and his passion for his various hobbies and interests might, on the surface, seem boring to some. But Richard is a one-man encyclopedia and his experiences are an education in themselves. Hopefully, many of you have similar stories that we can share at the May meeting.



**Richard and his long-time friend and sidekick Aaron Hunter yuk it up at a recent repair clinic.**

**A WORD FROM  
OUR CAPACITOR  
PROGRAM  
COORDINATOR**

I have made several announcements at our last few meetings that the NJARC Capacitor Program is organizing a special order of capacitors that we don't normally carry. We are close to finalizing our first order.

Many of you have mentioned to me in passing that you are working on a set (radio, television, test equipment, etc.) that needed a capacitor value that the club did not stock. As most of you know, many electronic supply houses have minimum order limitations and shipping costs that may make buying those unique values you need to finish a project cost prohibitive. Therefore, it is my intention to get the maximum input from club members to see if we can get a larger order together and help members save some money and effort. (Unfortunately, this venture is limited to electronic parts only, not trim/cosmetic pieces like knobs.)

At present, significant interest seems to be centered on HV television capacitors, especially those for the Pilot TV-37 television. Others have mentioned they are working on Hallicrafters TV's. There also seems to be an interest in restoring sets like the Philco Predicta.

I have already established a list based on the above requests and I'm getting ready to place an order. Additional focus of the order also includes electrolytic and paper replacement capacitors, but I would be glad to include more mica and ceramic values if you have specific needs. You can contact me to see what's on the present list and if you need a value that's not included, I will try to add it to the order.

I am also asking club members to assist me in coming up with opportunities to combine values to maximize practicality and cost. As an example, we might decide to order a .005mfd/6000volt capacitor to cover both the 6KV and 3KV requirement for a Pilot TV. I especially need your help in identifying those capacitors that "don't normally fail" like ceramics and micas that still might important in stocking for applications and circuits where in-tolerance values are critical.

A listing of capacitors that we presently stock and associated pricing is available on the club's website. Just click on "Club Programs" at the top of the page and then "Capacitor & Resistor Program." We stock most standard electrolytic values up to 450V and poly values up to 630V. We also have a large variety of new low voltage capacitors for those of you working on transistor-based projects. The majority are rated at 50V and are Nichicon branded. Capacitors valued at 1 mfd to 100 mfd should be small enough



**"Mr. Majestic" at work.**



to fit most transistor radios and the larger ones are useful for other projects where ratings of 50V or lower are required.

If you are a NJARC member and unable to attend regular meetings, I am willing to ship orders as long as you cover the cost of shipping and postage.

So send me your requests and let's see what we can come up with to help each other get those sets back on the air!

Matt Reynolds  
capacitors@njarc.org  
resistors@njarc.org  
567-204-3850

## RESTORING THE PILOT TV-37; NOT A WALK IN THE PARK

By  
Marv Beeferman

If you read Matt Reynold's note on stocking unique capacitor values for specific applications, you'll notice that there are a group of NJARC members who are interested in replacements for the Pilot 3" television. I myself have two examples in an unknown state that haven't been energized since I purchased them many years ago. As with most projects that I consider undertaking, I decided to search the web to see exactly what might be involved. What I discovered was that it's no "walk in the park," i.e., restoration involves much more than capacitor replacement. Many components, usually not considered requiring replacement by radio standards, need to be changed out for best performance. I also discovered that even if you get the TV to produce an image and sound, there is much more that can be done with regard to alignment that can significantly improve picture quality.

The following information is **not my own**; it comes from a condensation of numerous web searches of restoration information from those much more talented than I am. My intent is to provide, in the simplest way possible, exactly what a TV novice like myself and any other NJARC members in the same boat might be up against to tackle a TV-37 restoration. I also will try to provide what directions others recommend to accomplish the task.

### History

In 1919, Isidor Goldberg founded the Pilot Electric Manufacturing Co. in

Brooklyn, New York to manufacture parts and kits for home radios. ("Pilot" no doubt derived from Goldberg's earlier job as a test pilot for Curtiss Aeroplane and Motor Corporation and Curtiss Airways.) By 1936, Pilot products were being sold in more than 90 countries.

The Pilot Candid TV-37 was introduced in 1948 and was the first set to sell for less than \$100. With a tiny three-inch picture tube, it is barely watchable by modern standards but its compact size and unusual design makes it a favorite of collectors. Set accessories included a glycerine-filled magnifier to enlarge the viewing area and a pressboard carrying case. The chassis held 21 tubes in addition to the electrostatic deflection picture tube.

The set was designed by German-born immigrant Werner F. Auerbacher. In an oral history conducted by the IEEE History Center in 1996, Auerbacher noted the company's initial resistance to a three-inch screen but he was able to convince the company that it was "a question of viewing distance," especially if the definition was high enough. If you notice, the front of the set is slightly tilted because the TV was meant to be "read like a book" that was sitting on a table. Three things that helped contribute to the ability to reduce the size of the TV-37 were a continuous tuner, the availability of miniature tubes and the elimination of a power transformer.

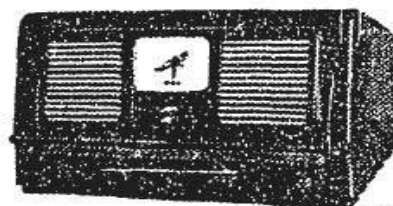
Although some collectors consider the TV-37 as a "bait-and-switch gimmick" for selling a more expensive set, this was far from the truth. The set was specifically designed for people living in crowded urban areas and particularly college students. The set was innovative and basically well-designed. In his interview, Auerbacher notes that the set was relatively successful. "What knocked it out finally, after it was on the market for about two and a half years, was that Motorola came out with a five-inch set at the same price." Auerbacher estimated that there were between fifty to seventy thousand TV-37s sold during this period.

### 3KP4 Anyone?

The TV-37 uses a narrow, long 3KP4 three-inch CRT that makes the chassis



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Television  
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plus \$1.55 tax

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and makes in our show  
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look more like an oscilloscope or early spectrum analyzer than any contemporary sets that had typically 7" CRT's. In fact, the green phosphor version 3KP1 was designed for oscilloscope service. It appears that the Pilot was the only consumer television to use the 3KP4 and, as a result, they are scarce and costly. Good luck in finding one!

Here's the problem. The heaters of the TV-37's 21 tubes and the heater of the picture tube are all connected in series. With full line voltage applied, a large surge of 10 or more volts is placed on the picture tube's 6.3 volt filament. As a result, many Pilots found today have an open picture tube filament. (We'll talk about dealing with this problem later in the article.) However, even with a good filament, you still can't be sure that the tube has good emission which would



make the picture too dim to watch.

To avoid spending a significant amount of time and money in chassis restoration only to find that the CRT is bad, it is vital that you evaluate the condition of the CRT before you even consider digging into the guts of the television. Here you have a few options.

First, you can find a fellow collector with a fantastic disposition who is willing to swap out the CRT in his working set with your CRT. This is probably the most reliable method to evaluate its status. Second, you can try to locate someone who has experience in testing the 3KP4. Your best bet is probably club member John Tyminski, but capacitor coordinator Matt Reynolds has told me that his first attempt has failed. This may have been the result of an equipment problem and perhaps John has made some progress since then.

There are some high-end CRT testers like the Jackson 707 that will test the 3KP4 for grid emission, merit, gas, shorts and leakage. The Antique Radio Forum describes how to test a 3KP4 using a Sencore CR70. I'm sure there are other solutions out there and it would be a huge advantage if the club's many resources could be directed at finding resolution to this roadblock.

If you find that your 3KP4 is dead but you still want to restore your TV-37 while waiting for the heavens to open and a good CRT is laid at your feet (or the Early Television Museum's rebuild facility is up and running), you do have another option. Some Pilot owners substitute the more common 3KP1 picture tube if their original 3KP4 is burned out. It can also be used for testing purposes during restoration. The 3KP1 is electrically interchangeable but it was designed for 1940s oscilloscopes with green screens.

Unfortunately, the 3KP1 is not an ideal substitute. A green phosphor tube is darker than a white one, making normal viewing a challenge. The slow-response green phosphor also creates trails on fast-moving objects.



The 3KP4

**RCA**  
**3KP1**  
**OSCILLOGRAPH TUBE**  
ELECTROSTATIC FOCUS      ELECTROSTATIC DEFLECTION

**3KP1**

**DATA**

**General:**  
Heater, for Unipotential Cathode:  
Voltage . . . . . 6.3 . . . . . ac or dc volts  
Current . . . . . 0.6 ± 10% . . . . . amp  
Direct Interelectrode Capacitances (Approx.):  
Grid No.1 to all other electrodes . . . . . 8 μf  
Deflecting electrode DJ<sub>1</sub> to  
deflecting electrode DJ<sub>2</sub> . . . . . 2.5 μf  
Deflecting electrode DJ<sub>2</sub> to  
deflecting electrode DJ<sub>3</sub> . . . . . 2.5 μf  
DJ<sub>1</sub> to all other electrodes . . . . . 11 μf  
DJ<sub>2</sub> to all other electrodes . . . . . 8 μf  
DJ<sub>3</sub> to all other electrodes . . . . . 7 μf  
DJ<sub>4</sub> to all other electrodes . . . . . 8 μf  
Faceplate . . . . . Clear Glass  
Phosphor (For Curves, see front of this Section) . . . . . P1  
Fluorescence . . . . . Green  
Phosphorescence . . . . . Green  
Persistence . . . . . Medium  
Deflection Method . . . . . Electrostatic  
Deflection Method . . . . . Electrostatic  
Overall Length . . . . . 11-1/2" ± 1/4"  
Greatest Diameter of Eulb . . . . . 3" ± 1/16"  
Minimum Useful Screen Diameter . . . . . 2-3/4"  
Weight (Approx.) . . . . . Any  
Mounting Position . . . . . J-24  
Eulb. . . . . Medium-Shell Magnal 11-Pin (JETEC No.811-66)  
Base. . . . . J-24  
Rating Designation for BOTTOM VIEW . . . . . 11M

Pin 1 - Heater	Pin 8 - Deflecting Electrode DJ <sub>2</sub>
Pin 2 - Grid No.1	Pin 9 - Deflecting Electrode DJ <sub>1</sub>
Pin 3 - Cathode	Pin 10 - Internal Connection Do Not Use
Pin 4 - Grid No.3	Pin 11 - Heater
Pin 5 - Deflecting Electrode DJ <sub>3</sub>	
Pin 6 - Deflecting Electrode DJ <sub>4</sub>	
Pin 7 - Ultor (Grid No.2, Grid No.4, Collector)	

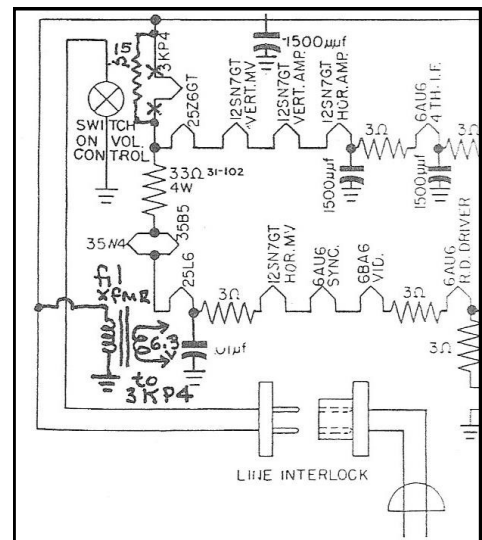
*DJ<sub>1</sub> and DJ<sub>2</sub> are nearer the screen  
DJ<sub>3</sub> and DJ<sub>4</sub> are nearer the base*

4-56      TUBE DIVISION      DATA 1  
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

warmup faster than others and, for a few seconds, face an overvoltage.

One way to deal with this is to disconnect the CRT filament leads from the CRT filament socket and substitute a 15 ohm, 20 watt wirewound resistor in the filament string. (See attached diagram.) Some restorers have shown success with a 12 ohm, 5 watt resistor or a 10 ohm, 10 watt resistor. Mount the resistor on top of the chassis where the IF tubes are located for better ventilation and heat dissipation.

Now mount a 6.3 volt, 600 mA (or greater) filament transformer to the rear of the high voltage cage. Another possible location is the vacant space between the 25L6 HV oscillator socket and the 1B3 HV rectifier socket. Ground one end of the primary and run the other lead alongside the chassis where the other AC wires run. Connect this lead to the switch on the volume control. Then connect the CRT filament leads to the transformer output.



At this point, you probably have removed the 3KP4 for testing. If the TV gods were looking favorably on you and you have a good CRT, package it up and store it in your safe deposit box. If you have access to a 3KP1 and you want to use it for testing your restoration progress, don't install it just yet. It is best to perform all physical work with the CRT out to avoid breakage.

**Solving the Filament Problem**

A good place to start in your restoration is to prevent future tube and CRT filament burnouts from surge voltages. This issue is a result of varying filament resistances found in even identical tubes. With some tubes having a lower cold resistance than others, upon power-up, the inrush surge will cause some tubes to

Well, it looks like we've run out of room. We'll continue with dealing with the filament problem in our next installment. Until then, I'd appreciate any input that you might have regarding restoring the TV-37. I can be reached at: mbeeferman@verizon.net 609-693-9430

**RCA**  
**3KP4**  
**OSCILLOGRAPH TUBE**  
ELECTROSTATIC FOCUS      ELECTROSTATIC DEFLECTION

**3KP4**  
**TO**  
**3KP1**

The 3KP4 is the same as the 3KP1 except for the following items:

**General:**  
Phosphor (For Curves, see front of this Section) . . . . . P4—Sulfide Type  
Fluorescence . . . . . White  
Phosphorescence . . . . . White  
Persistence . . . . . Medium-Short

In general, operation of the 3KP4 at an ultor voltage less than 1500 volts is not recommended.

The PERSISTENCE CHARACTERISTICS of the P4-sulfide phosphor are the same as those shown for the P11 phosphor at the front of this Section

**3KP1 = 3KP4 except for the phosphor.**