THE FLASH!
THE NEWSLETTER OF THE COLORADO RADIO COLLECTORS ANTIQUE RADIO CLUB

Volume 36, Issue 5 | *Next CRC Meeting - September 21st* | *Sept/Oct 2025*
BBQ/Auction September 28

A UV199 Vacuum Tube Replacement

submitted by CRC member Steve Touzalin

I recently started work on a auction project radio that I had obtained at the 1924 CRC auction. The large TRF battery set, measuring 31 inches long, had the name "Serenado" printed on the metal plate located on the front panel. There was no model number indicated and I was unable to find any useful information about the radio anywhere. This very simple radio was missing all five tubes and needed some other minor repairs and replacements, and the case would have to be re-finished. I soon realized that this radio did not use 01A's or similar tubes, but needed five of the smaller UV199's, with short pins and a side bayonet pin. I had a few good UX199's on hand, but I did not have any good UV199's in my tube inventory. For those not aware, the tube pin layout for a UV199 is different than the pin layout for a UX199, and the UX199 base has longer pins and does not use a side bayonet pin. I would first have to locate five good UV199 tubes or find five dud UV199 tubes and make adapters or replacements before I could get this radio working.

The Seranado Set

After doing some research, I found a couple of sources that demonstrated the use of 3Q5GT tubes, re-based in UV199 bases, as substitutes. Bill Potorti also suggested possibly trying 5676's mounted in the UV199 bases as replacements. Other on-line forums I searched suggested using a miniature tube, such as a 3S4, in a small miniature tube socket mounted on top of the UV199 base. I already had two dead UV199's in my tube inventory. I was able to buy a lot of four UV199's which contained three duds and one good tube, giving me five duds to re-use their bases for replacements. I decided to try re-based 3Q5GT octal tubes as substitutes.

The tube holder for the UV199, 3Q5GT and 3LF4 tubes. It is held closed with duct tape.

Using a small piece of 1 " foam pipe insulation as a holder for the tubes, I began by removing the bases from the five dud UV199 tubes. I removed the solder from the top of the four pins using my soldering iron and a Desoldering Bulb. Next the wires inside the pins were loosened from the pins. The tube was then placed in a small sealed jar of 90% alcohol, pins down, being sure that the base was submerged. Usually the base would separate from the bulb with a slight twist after a few hours. A couple of the tubes had to soak overnight in the alcohol before the base was loose. I wore a leather glove on the hand holding the glass bulb when separating the glass bulb from the base. Almost the same procedure would be used to remove the 3Q5GT tubes from their bases. While wearing safety glasses, I used a cutoff wheel in a Dremel drill and cut off the ends of pins on the tube base of the 3Q5GT instead of trying to unsolder

(Continued on Page 3)

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Newsletter for The Colorado Radio Collectors Club, founded in the Fall of 1988
"Dedicated to the preservation and education of wireless, antique radio, television, and associated equipment"

CRC MEETINGS: Meetings are held on the 3rd Sunday of every other month starting in January (except May is the 2nd Sunday) at 1 :00 pm. The meetings consist of business, "show & tell", raffles, auctions, swap meets, technical discussions and other subjects of interest. Visitors are welcome!!
CRC MEMBERSHIP: Current annual dues are $20 and membership in the CRC runs from January to January. New memberships will be prorated to the following January. Members are entitled to attend meetings, participate in our Spring show and our Fall auction, and receive our newsletter, **The Flash!**. Submit dues payable to: ***Merril Campbell - 4723 Woodbury Dr. - Colorado Springs, CO 80915***
UPCOMING EVENTS: CRC Meeting September 21st at the Highlands Ranch Library 1PM
Auction/BBQ September 28th at the Tectonic Management Group.
Seller registration at 10 am, BBQ at 10:30, auction at noon.

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Message From The President

Hi everybody. I hope you're enjoying summer. I'm very aware that many of you cannot make it to our meetings. I'm always open to ideas about where we might occasionally have future meetings that others could attend. You'll notice that most often we are in Castle Rock, and sometimes in Highlands Ranch. These two locations are the best we've been able to find, and they are roughly centrally located between our base of club members and club leaders. Recently one of our members spoke up in our groups.io group to provide feedback for the auction. I was grateful to receive his suggestions. I feel bad that this particular individual lives so far away that he cannot attend our meetings, and I know that he is not alone in that regard. Some of you drive several hours, or more, to get to the auction and show. You come every year, and we are glad to have you join us.

If anyone has any ideas how we can better embrace our geographically remote members, let me know. They are just important to the health of our club as are the members who attend every single meeting.

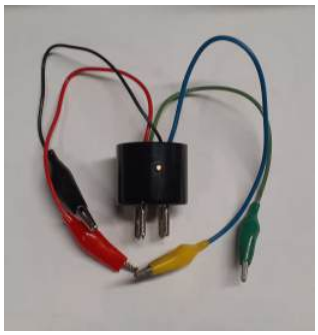
Paul

(Continued from page 1)

the pins. The octal bases are not needed and the wires are now easily unattached from the pins, the removed base is pictured below.The first 3Q5GT was also soaked in the jar of alcohol. (***Reminder: Alcohol is flammable! Be aware of where you are. Do not use while near a space heater... or other source of ignition***.)

The red arrow shows the seam on the 3Q5GT

The tube pin layouts for the 3Q5GT, and later for the 3LF4, were found in RCA Receiving Tube Manual No. 17 and also on several different online sources. When the 3Q5GT is removed from the base it must be noted where the numbered pin element wires are. On all the 3Q5GT tubes that I had on hand, the piece of metal used to form the plate inside the tube had a seam, which was inline with the key on the base, which was between pins 1 and 8 on the base. This was very helpful once the 3Q5GT glass bulb was removed from the base. I used the information in the sources listed at the end of this article, and added the recommended resistors to the bare 3Q5GT. Without going into any of the details, my first attempt at using a 3Q5GT failed. Using a 4 pin tube base used for 01A's with adapter wires, the new UV199 tested good using the settings for a UX199 in my tube tester. It later tested "short" after I had finished assembling it in the UV199 base. I removed the failed 3Q5 bulb from the UV199 base to re-use the base, and pondered my next move.



Adapter to test UV199 tube

I am "all thumbs" and do not have 3 hands, I struggled soldering the short thin wires exiting the glass bottom of the 3Q5 tube to the resistors and the extension wires. I happened to locate a forum discussing how to solder thin wires, where a product named "Blu Tack" was mentioned to hold thin wires, components and small circuit boards in place for soldering. It is also re-usable. I immediately purchased a pack. I used small pieces of the Blu Tack putty to temporally hold resistors and wires in place for soldering in the next phase presented below. I wish that I had found out about this stuff sooner! There were several similar products listed in an internet search that would probably work just as well.

I discovered that the 3Q5GT and the 3LF4 vacuum tubes are electrically identical except the 3LF4 is a loctal tube and the tube pin-outs are slightly different, the pin-outs are pictured below.

3Q5-GT/G

RCA

3Q5-GT/G

BEAM POWER AMPLIFIER

Filament	Coated		
Filament Arrangement	*Series**	*Parallel***	
Voltage	2.8	1.4	d-c volts
Current	0.05	0.1	amp.
Direct Interelectrode Capacitances (Approx.):◇			
Grid to Plate	0.6		μμf
Input	8.0		μμf
Output	6.5		μμf
Maximum Overall Length			3-5/16"
Maximum Seated Height			2-3/4"
Maximum Diameter			1-5/16"
Bulb			T-9
Base			Intermediate Shell Octal 7-Pin
Pin 1 - No Connection			Pin 5 - Grid
Pin 2 - Filament			Pin 7 - Fil.(-,series)
Pin 3 - Plate			Pin 8 - Fil.(-,parallel)
Pin 4 - Screen			
Mounting Position			Any

BOTTOM VIEW (G-7AP)

GENERAL DATA

3LF4

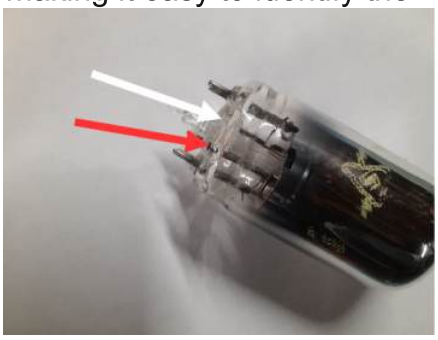
Electrical:			
Filament, Coated:			
Filament Arrangement	*Series**	*Parallel***	
Voltage.	2.8	1.4	. . dc volts
Current.	0.05	0.1	. . . . amp
Mechanical:			
Mounting Position.			Any
Maximum Overall Length			2-25/32"
Maximum Seated Length			2-1/4"
Maximum Diameter			1-3/16"
Bulb			T-9
Base			Lock-in 8-Pin
Basing Designation for BOTTOM VIEW			6BB

Pin 1 - Filament
Pin 2 - Plate
Pin 3 - Grid No.2
Pin 4 - No Connection
Pin 5 - No Connection
Pin 6 - Grid No.1
Pin 7 - Filament Mid-Tap, Grid No.3
Pin 8 - Filament
Plug - Base Shell

The 3LF4 is also 'silvered' inside the bulb, much like the UV199's I had on hand. My next attempt at a UV199 substitute would be with a 3LF4 loctal vacuum tube. Again with safety glasses on, I used a Dremel drill with a cutoff wheel to 'carefully' cut several small shallow notches in the bottom of the metal shell around the loctal tube. The tube was then also placed in the small jar of alcohol using the same procedure as for the 3Q5 tube. The notches allow the alcohol to easily reach inside the metal shell and dissolve the glue holding it to the glass bulb. With the 3LF4 tube, pins 4 and 5 are not used and pin 4 is not present, making it easy to identify the pin numbers once the metal shell is removed. The filament pins, 1 and 8, can be easily verified using a ohm meter.

The removed octal base and the notches in the loctal shell.

The pins on the bare 3LF4 tube were cleaned and small spiral connectors were handmade, using 24 gauge buss wire wound onto a 1/16" Allen wrench as a form, and used to solder the extension wires to the needed pins. Using the information in the sources listed at the end of this article, I soldered a 270 ohm resistor across the filament pins 1 and 8. I also soldered a 220kohm resistor between the screen (pin 3) and the plate (pin 2) as suggested in one of the listed sources. I added an extra 8 ohm resistor, soldered between pin 1, the + filament, and the outgoing extension wire. This should allow the 3LF4 subs to be mixed with real UV199's in the radio, and slightly reduce the gain. Extension wires were soldered to: pin 1 (+filament with the 8 ohm resistor), pin 2 (plate), pin 6 (grid), and pin 8 (- filament) on the bare 3LF4. Pins 4, 5, and 7 were not used. A small piece of heat shrink was placed over the exposed pin 7 to avoid contact with anything else. I used heat shrink on the other exposed wires. The extension wires were attached to the correct base pins in the salvaged UV199 base using a UV199 tube pin layout as a guide . I double checked the wire placements several times as I noticed that the tube pin layout for the UV199 found in The Cunningham Radio Tubes Manual, C-10, shows the Top View of the tube sockets while the tube pin layout in the RC-12 manual displayed the Bottom View of the tube sockets. Clear Gorilla Glue was used to attach the modified glass 3LF4 to the UV199 base, this was the glue that I had on hand, any similar glue or a hot glue gun would work. Next I soldered the protruding wires to the end of the tube base pins. The tube substitute tested at the maximum reading of the meter scale on my tube tester. The new tube may have too much gain, we'll see. I proceeded to make four more of the replacement tubes. Simichrome Metal Polish was used on the glass bulb of the glued 3LF4's to remove all the markings and tube numbers to mask the original identity of the counterfeit UV199's.



The white arrow above points to missing pin 4, the red arrow points to the nub that is pin 5 on the bare 3LF4.

Homemade connectors

RCA Cunningham Radiotron

Types V99 and X99

DETECTORS, AMPLIFIERS

The 99 types are three-electrode, general-purpose tubes designed for dry-cell operation. The low power consumption of these tubes makes them applicable to portable receivers and services where power economy is important. The two types have different bases.

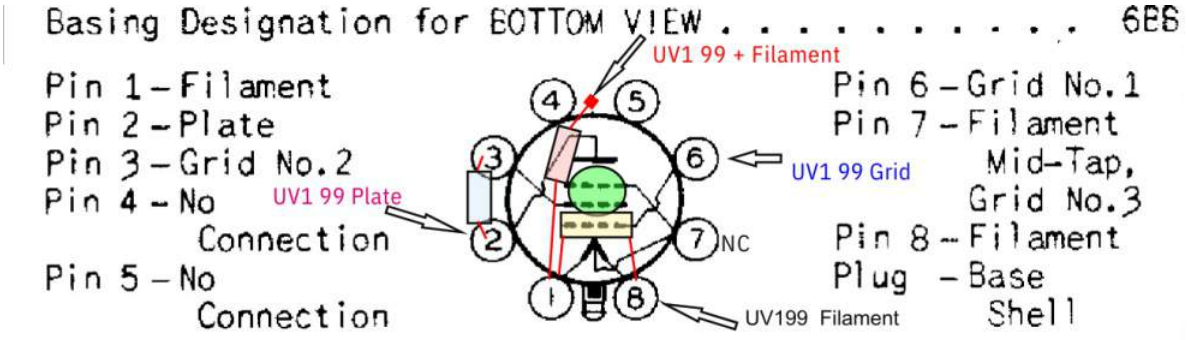
CHARACTERISTICS

Filament Voltage (D. C.)	3.0–3.3	Volts
Filament Current	0.060–0.063	Ampere
Plate Voltage	90 max.	Volts
Grid Voltage	−4.5	Volts
Plate Current	2.5	Milliamperes
Plate Resistance	15500	Ohms
Amplification Factor	6.6	
Mutual Conductance	425	Micromhos
Grid-Plate Capacitance	3.3	μμf
Grid-Filament Capacitance	2.5	μμf
Plate-Filament Capacitance	2.5	μμf
	Type V99	Type X99
Bulb (See Page 151)	T-8 (Fig. 3)	T-8 (Fig. 1)
Base	Small 4-Nub	Small 4-Pin

INSTALLATION

The base pins of the X99 fit the standard four-contact socket; the V99 fits only the small shell socket with bayonet slot. The sockets should be installed so that the tubes will operate in a vertical position. Cushioning of the sockets in the detector stage may be desirable if microphonic disturbances are encountered.

199 tube specifications from the RCA RC-12 tube manual



This is the glass evacuation tube extending from the bottom of the 3LF4.

This is the 270 ohm resistor in my article, it is on the bottom of the tube.

This is the 220 kohm resistor in my article, mounted verically.

This is the 8 ohm resistor that I added in my article. Mounting this way, on the bottom of the tube, I was able place the exiting + filament wire to a location that was easier to insert in the UV199 base.

I used small pieces of heatshrink tubing on anything that was a possible source of a short once assembled.

The top tube is a real UV199 tube, complete witha radio shop sticker froma shop in Lincoln, Nebraska. The bottom tube is a re-based 3LF4.

While in the process of making the remaining four tube substitutes, I was able to purchase four UV199 tubes with good filaments and emission at a very decent price. I now have 5 real UV199 tubes and 5 counterfeit UV199 tubes to try in my radio. After adding a new On/Off switch, and repairing one of the control rheostats on my set, I was now ready to at least see if the radio and my tubes worked. An original UV199 (on top) and a counterfeit UV199 (on the bottom) are pictured to the right.

The Serenado chassis did have the battery wires already labeled. Using a battery set power supply, the A+ voltage was set at 4.5+ volts (to simulate a series of three 1.5 volt A batteries) and the filament rheostat was set at the maximum resistance setting, the C- voltage was set at -4.5 volts, and there was only one B+ connection which was set at 90+ volts. The B- wire was connected to the A+ connection on the chassis. A voltmeter was also connect across the filament connections on one of the tube sockets to monitor the actual filament voltage. The five counterfeit UV199 tubes were placed in the five tube sockets. After the antenna wires and headphones were connected, the radio was powered on. The voltmeter indicated 2.15 volts across the filaments, and after a few more seconds the radio worked. The filament rheostat was adjusted for a reading of 3.3 volts on the voltmeter, the antenna gain was reduced, and the radio worked great! After several minutes of tuning in different stations, the B+ voltage for the radio was reduced to 45+ volts to see if the radio would still work with reduced B+ voltage. The radio also worked great on the reduced B+ voltage, due to the gain of the re-based 3LF4's. While not needed here, reduced B+ voltage may be needed in other radios.

I used the same voltage setup as above, A+ at 4.5 volts, C- at -4.5volts and the single B+ connection was set at 90+ volts. The filament rheostat was set at the maximum resistance and five real UV199 tubes were placed in the radio. After applying power and a brief warm-up period, the

the filament voltage was increased to 3.3 volts. The radio did not work as well as with the counterfeit UV199 tubes, possibly due to the condition of the real UV199's, but the radio did work very good. I next substituted a counterfeit UV199 tube for each of the real UV199 tubes, one at a time in a different location, leaving four real UV199's in the radio. The fake UV199's worked very well in each situation with increased volume and reception. The best results were with four real UV199's followed with a counterfeit UV199 as the final output tube. It would appear the real and counterfeit UV199 tubes are compatible, at least in this radio. I also tried the reduced 45+ volts for the B+ voltage with five real UV199 tubes in the radio, but with no success.

Conclusion:

I was very pleased with the results of the counterfeit UV199 tubes. They look good in the radio and would probably fool a lot of people to the fact they are not actually real UV199 tubes. They performed as they should have with the rheostats already in the radio, which some have said is often a problem with substitute tubes. And this radio will now work when I am completely finished with it. I can not guarantee that these re-based tubes will work properly in other radios, but I would definitely be willing to try them in other radios. The 3Q5GT vacuum tubes should work exactly the same as 3LF4's if they were used, and would probably be easier to assemble now using Blu Tack as an aid. I am unsure if the added 8 ohm resistor that I used was necessary, but based on the results that I experienced I would include the added 8 ohm resistor in any future 199 tube replacements. This procedure should also work for UX199 tubes if the proper base and tube pin-out is used. I hope this helps and encourages others to try this process for 199 tube replacements or adapters.

Sources:

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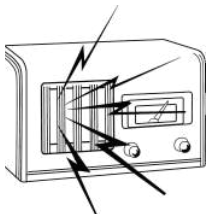


The Latest CRC Club News

Our last meeting was at the Castle Rock Library on July 20th. We had 25 members attending. Paul Heller officiated. We also had 4 visitors, Fred Mooney KA1DGL (who gave a presentation later in the meeting, and Dave Given K0IRP, both from the Garden of the Gods Amateur Radio Club (GGARC). We are all invited to attend their meetings- goto GGARC.org for more information. Also present were Don Wood and Bruce Taffet.

Those who attended the Rocky Mountain Fan/Radio meet on June 14th described their experiences, all positive. It sounds like this was very successful meeing of 2 different types of collectors and may become an ongoing thing. Thanks to Sean Duffy for providing the venue.

We have $8114.30 in the treasury.

Steve Touzalin brought in a couple of copies of the newsletter of the Michigan Radio Club. This was folowed by a discussion of swapping newsletters with other clubs. Steve already has been able to do this with a few clubs already. Bill Lettow, when he was in his club in Arizona, described their experiences with other clubs and had suggestions of other clubs for us to approach.

The date of the auction came under discussion. Since Steve T. had received very few entries as of the meeting, it was thought that the date in August may be partly to blame (it's usually in September). After clearing the new date with Rich Kuberski, the date for the auction was moved to September 28th.

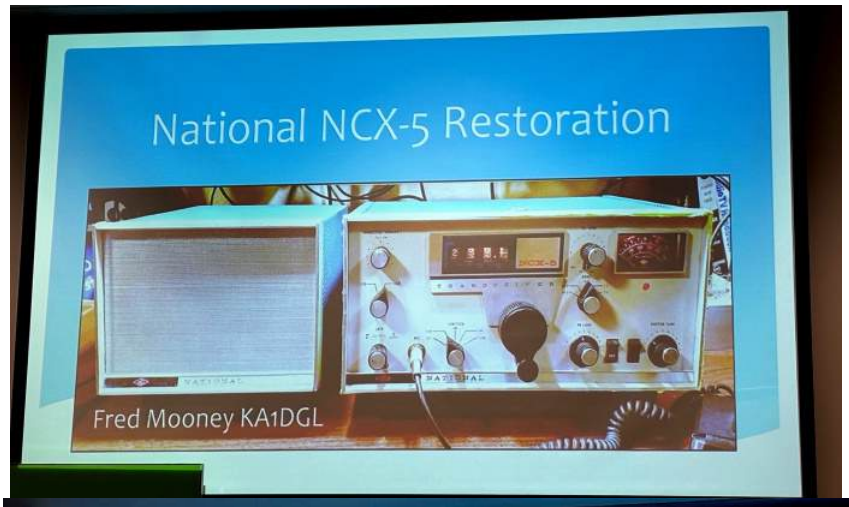
Roles for the auction were assigned- cook(s),auctioneer(s),computer work, who's getting the food, etc. Volunteers are always welcome. There was also discussion on how to handle the end of the auction to make the checkout process more efficient.

We took a break,and readied ourselves for the raffle.

The Raffle Table

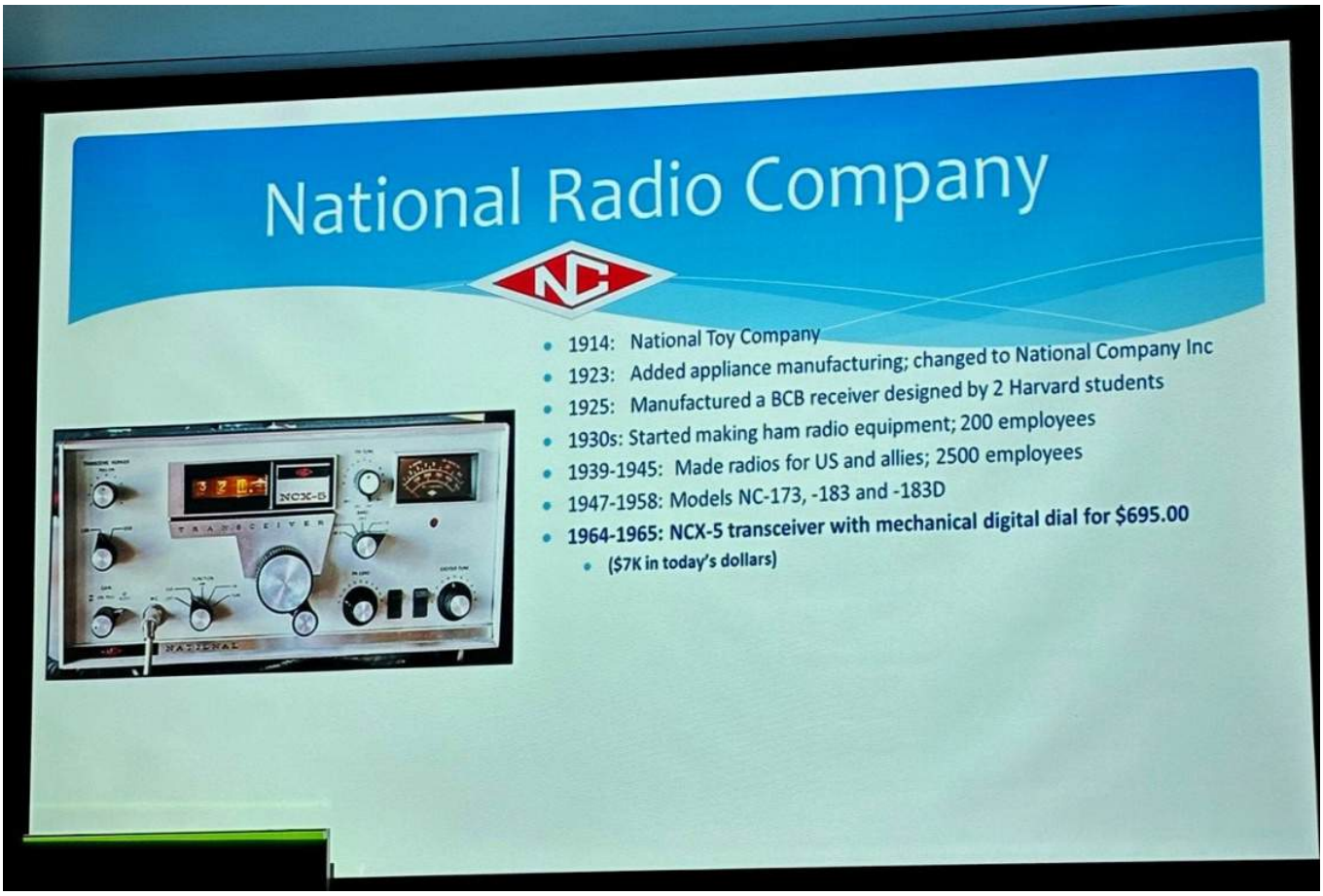
Radios,a speaker, a battery, lots of books and odds and ends

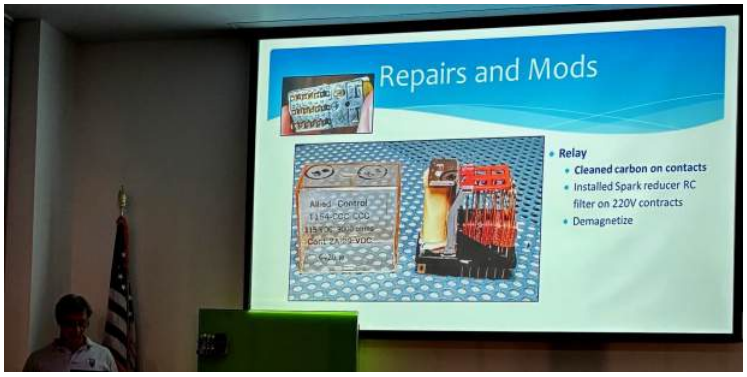
Fred Mooney of the GGARC was nice enough to offer a presentation on the repair of a transceiver, specifically the National NCX-5.



Being a Massachusetts native, Fred has a special connection to the National Radio Company.

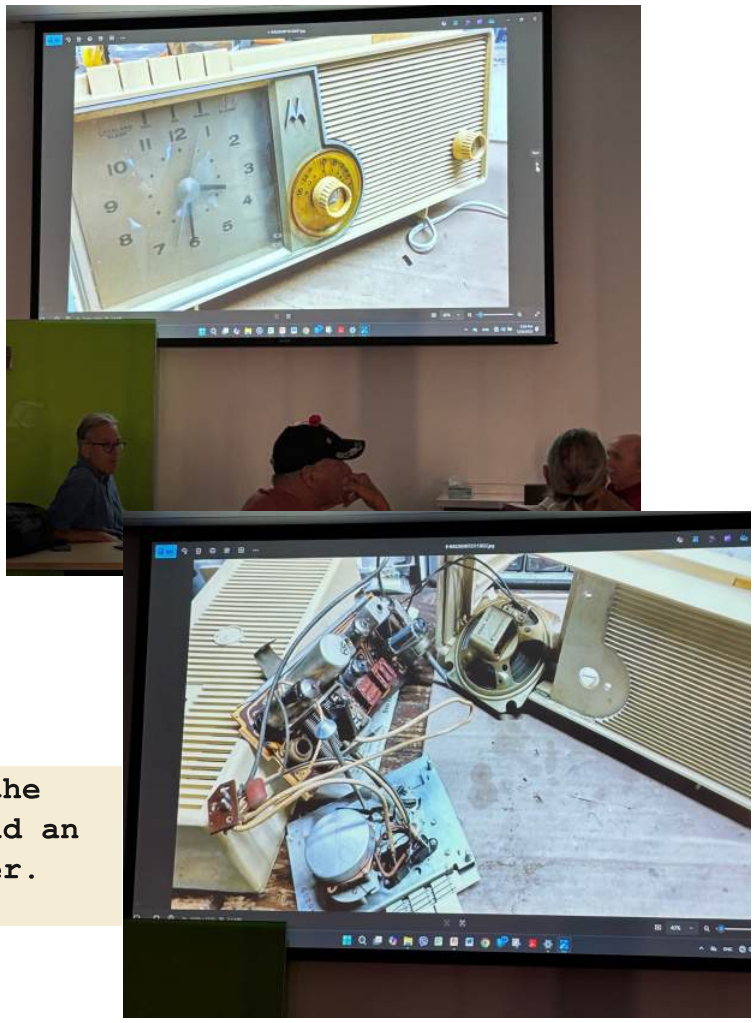
He proceeded to give us some history of the company.





He went on to describe the repair process -it has 37 stages! Many components are no longer available and he showed some modern replacements he found, ofentimes from overseas.
The test equipment that he uses was also touched upon.
Thanks, Fred, for an entertaining presentation.

Show 'n Tell



Rob Beyer gave a presentation on the repairs to his Motorola C5W. It had an option to turn on your coffee maker.

Merril Campbell and some of his sets he's repaired

Crosley 56 TXL

Zenith 5J217

Admiral 5A32

The Muter Company existed from the 1920's to 1970, out of Chicago,Illinois. They made many electrical components, including a power resistor with the trade name Candohm which many of you may be familiar with.
In the 1920's Leslie Muter,Sr. produced a novelty item called a 'Grid Leak Drip Pan' to hang underneath grid leak resistors.

Muter Grid Leak Drip Pan

Uniform Leakage

[Maybe]

Automatic Control

[Perhaps]

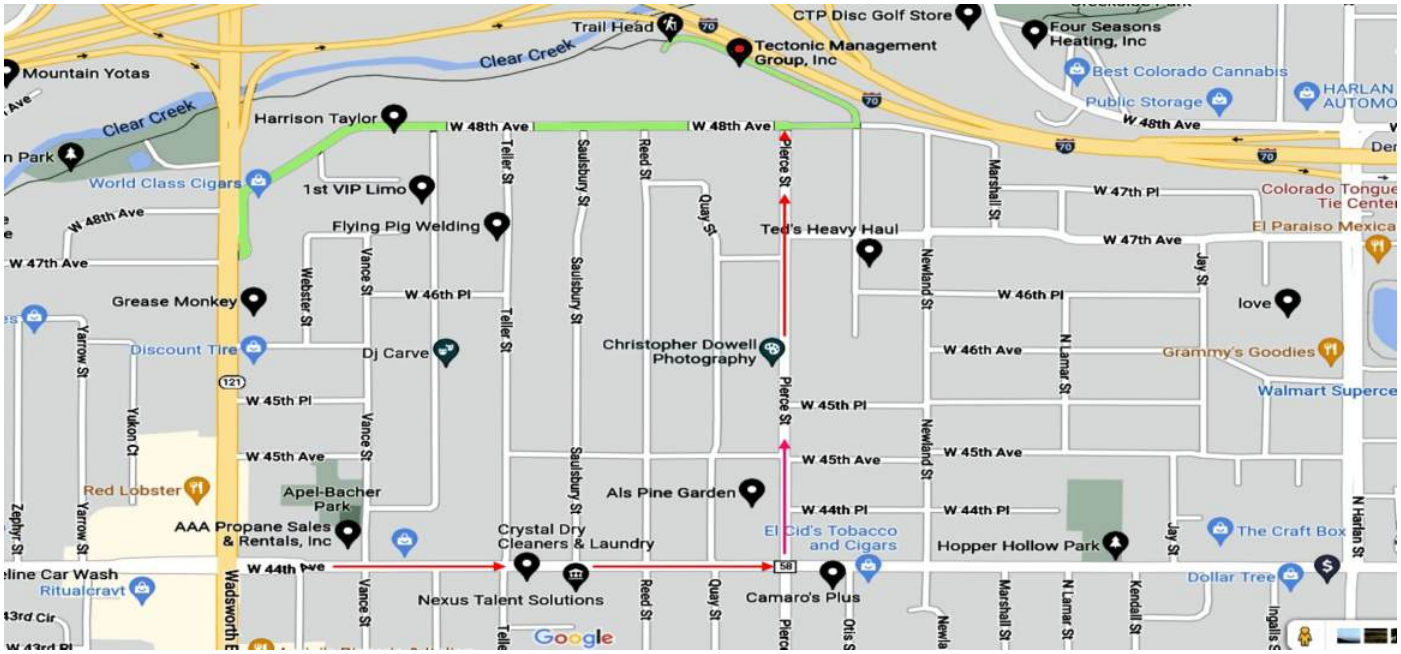
Patented and Patents Pending—Who Cares?

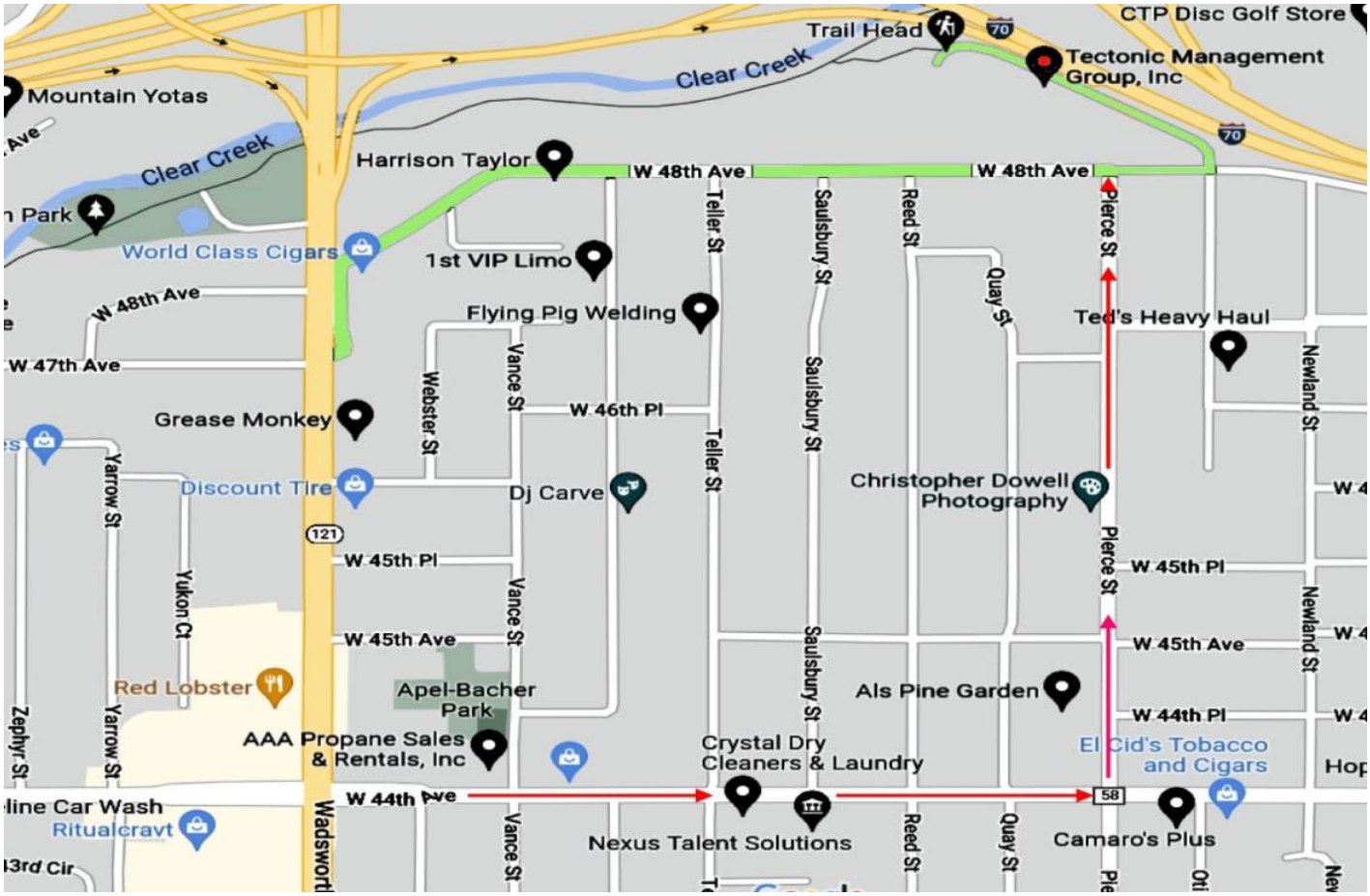
THE tremendous strides of radio during the past year are only exceeded by this remarkable invention. No single radio item has ever been able to accomplish so much, in doing so little. The ability of the Grid Leak Drip Pan to perform as well as anticipate irregularities in remote parts of the set with which it is not connected is almost beyond human comprehension. In fact, the inventor himself could never advance any real necessity for its use.

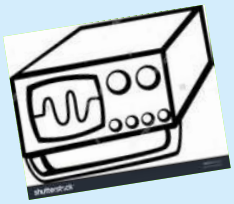
Via the Ed Taylor Radio Museum

1925 ANNUAL BBQ/AUCTION
SEPTEMBER 28TH, 1925

TECTONIC MANAGEMENT GROUP INC., 6695 W 48TH AVE, WHEAT RIDGE, CO







Classified Ads

Ads are free for CRC members. To place an ad send your ad description along with personal contact information to the Flash Editor or or one of the CRC officers.

FOR SALE: New old stock & quality used vacuum tubes. Please refer to my business card pictured to the right. Thank you! Sean Duffy (573) 999-6187 acmetubesupply@gmail.com

CRC Meeting - September 21st, 1 PM at the Highlands Ranch Library

Address: 9292 S. Ridgeline Blvd, Highlands Ranch, CO