ARCI NEWS

www.antique-radios.org

THE ANTIQUE RADIO CLUB OF ILLINOIS

Affiliated AWA
Antique Wireless Association

Volume 41, Issue 2
April 2021

APRIL SWAP MEET IS ON!

Details inside

ARCI LIVE ONLINE VIDEO MEETS

MONTHLY LIVE ONLINE MEETS
Generally, 3rd Saturday of the Month

10AM – 12AM CENTRAL

THE AGENDA FOR EACH LIVE ON-LINE MEET IS ISSUED PRIOR TO THE EVENT

Upcoming ARCI MEET SCHEDULE

SATURDAY, APRIL 17, 2021, 10AM CT
10:00 AM CT – noon CT. (Zoom meeting opens 15 minutes before)
Information at
remote-events@antique-radios.org

April 17, 2021	**10 am - 12 noon CT Virtual Meet**	**LIVE ONLINE**
May 15, 2021	**10 am - 12 noon CT Virtual Meet**	**LIVE ONLINE**
April 25, 2021	**6 am - 11 am CT Swap Meet** **Oudoor ONLY**	**American Legion Hall** **Carol Stream, IL**
June 2021	**Outdoor - TBD**	**TBD**
August 2021	***RADIOFEST - TBD***	**TBD** **Medinah Shriners** **Addison, IL**
October 2021	**Outdoor - TBD** **Business Mtg/Officer Election**	**TBD** **American Legion Hall** **Carol Stream, IL**
December 2021	**Indoor - TBD** **Business Meeting**	**TBD** **American Legion Hall** **Carol Stream, IL**

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THE ANTIQUE RADIO CLUB OF ILLINOIS

WELCOME TO ARCI

Visit ARCI on the WEB

Website: www.antique-radios.org

FaceBook: https://www.facebook.com/ARCI.org

YouTube:https://www.youtube.com/channel/UCEyMw9QGrvcquC1vZBvHWbQ

Join ARCI

http://www.antique-radios.org/membershipinfo.html
-or-
Use the application in this newsletter

Leadership

President:	Tom Kleinschmidt
Vice President:	Jim Novak
Vice President:	Tom Zaczek
Treasurer:	Rudy Hecker
Secretary:	open
Radiofest chair:	Steve Muchow
ARCI News editor	Maureen Blevins

Contact ARCI

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ARCI News is published bi-monthly, February through December.
Antique Radio Club of Illinois is a registered non-profit in the state of Illinois.

PRESIDENT'S MESSAGE

April swap meet

A group of ARCI volunteers debated the issues and assessed the Illinois guidelines for flea markets. As a result, we are having a swap meet. The announcement in this newsletter goes into the details. Please respect yourself and others by following the rules in that announcement.

February USPS mailed newsletter

I unknowingly corrupted a portion of the postal address list for the February newsletter. It mostly was wrong names associated with the mailing address. If you did not receive your February issue in the mail, we have a few extra copies that can be sent you. Please mail a note, email or call the club phone number if you did not get the February Newsletter in print. The contact information page is adjacent to the table of contents in this issue. Print copies are sent to ARCI members who requested them.

ARCI on-line meets

On-line meets continue to be enjoyed by many enthusiasts around the country. This is a great away to learn history and the how-to of radio. It is an aspect of radio collecting that you don't get at a swap meet and historically only at *Radiofest* seminars. We have been blessed with smart people that share their knowledge from coast to coast. How else could you get a live tour of radio collections in places like California, Wisconsin and Florida from the comfort of home? It is open to anyone with an interest in old radio.

Tom Kleinschmidt
President, ARCI

Electronic ballot: 59 Yes 0 No
Paper ballot: 2 Yes 0 No
Totals: 61 Yes 0 No

APRIL 2021 COVID RECOVERY SWAP MEET

RULES

1. **OUTDOOR** event only
2. NO INDOOR congregating, transacting, cavorting, loitering
3. EVENT is subject to CANCELATION WITHOUT NOTICE
4. **MASKS REQUIRED** - Face coverings must be worn at all times
5. SOCIAL DISTANCING
    a. 15 people per 1000 square feet
    b. YOU must maintain proper social distancing of 6 feet at all times
    c. SELLERS are ENCOURAGED to have two table widths between themselves and buyers
    d. Persons will be monitoring the event so please do not be offended should you be reminded and requested to comply with the state-imposed conditions listed above
6. Parking
    a. Use front and side lots to sell and park
    b. SELLERS to leave **one parking space between each other**
    c. BUYERS should park in space between sellers
7. FEES
    a. Must be an **ARCI member to SELL**
    b. Standard **Sellers Fee** applies
8. Hand sanitizer will be available upon entering and at various locations within the venue

ACTIVITIES

1. **OUTDOOR** swap meet
2. **DONATION SALE** and auction

25 April 2021
7AM – 11AM
AMERICAN LEGION HALL
570 South Gary Avenue
Carol Stream, IL 60188

***RESTROOM only** available inside*

We have a contingent of people who want a swap-meet no matter what and some that are remaining in lock down until Illinois is at Phase 5. We are aware that some of you will not attend based on health concerns. We fully respect and support your decision.

COVID is still not over. New strains and hot spots are still occurring. We will cancel the event as late as the day of if conditions dictate with **no** prior notice.

Future meets will go through the same scrutiny until COVID is behind us. *Radiofest* is a large group gathering and is under additional state constraints. Please see Steve Muchow's ***Radiofest*** article in the newsletter.

ARCI NEWS

NEW! ARCI YOUTUBE CHANNEL

Now on YouTube! We've taken the plunge and created the ***Antique Radio Club of Illinois YouTube channel***. We have posted the most recent four months of online meets so far.

You can find the channel at: Antique Radio Club of Illinois on YouTube
or
https://www.youtube.com/channel/UCEyMw9QGrvcquC1vZBvHWbQ

Check it out, subscribe, and stay tuned to the ARCI emails for more info!

RADIOFEST 2021 PLANNING UPDATE

By Steve Muchow, *Radiofest* Chair

RADIOFEST 2021

Friday, August 6 – Saturday, August 7
Medinah Shriners
550 N. Shriners Drive
Addison, IL 60101

Illinois continues to struggle in moving forward with its 5-phase "Restore Illinois" Plan. In the previous update (Feb 2021 ARCI NEWS), we stated that Phase 5 is the level needed to safely host an event such as *Radiofest*. In the same update, we discussed how the Illinois Governor had added additional metrics to be met in the form of "tiers" to get from the then current Phase to the required Phase 5.

In March, 2021, the metrics changed again in the form of adding a "Bridge" Phase that would also need to be met before moving to Phase 5. So, as of today (March, 2021), we are in Phase 4. Two conditions are required to get to the "Bridge" Phase:

1. 70% of people over the age of 65 must be vaccinated (currently at 66%).
2. There is no reversal in the Covid-19 hospitalizations and deaths for a 28-day monitoring period starting after the over-65 vaccinations are completed.

Moving to Phase 5 requires that we are in the "Bridge" phase and that 50% of people over 16 are vaccinated. Once that has occurred, there will be another 28 day monitoring period to verify stable or declining Covid-19 metrics. All regions of the state will move through these next phases together based on statewide metrics. Vaccines are being administered and will, of course, play a role to improve the metrics. Clearly, even if all goes well, we will likely not shift into Phase 5 for months. If there is an undesired swing in the reported metrics, the plan status could even revert to an earlier Phase. I provided this "Restore Illinois" information so that we can all better understand the difficulty in planning for large event such as *Radiofest* with so many unknowns. It's also beneficial for all to be "on the same page" in understanding the impact of the "Restore Illinois" plan.

A year ago I don't think anyone thought we would still be facing Covid-19 restrictions a year later. ARCI stayed positive with the hope that things would improve by springtime and that *Radiofest* plans could continue. We are now faced with the same situation as last year and realize that timing of state-imposed restrictions is going to impact our hosting of *Radiofest* as we know it. ARCI continues to stress that safety of attendees is the most important aspect and we cannot and will not present *Radiofest* in its current form without following the published restrictions. Watch the ARCI web site www.antique-radios.org and

watch for mailings regarding the possibility of an August 2021 event of some type to be determined.

I highly encourage you to participate in ARCI's on-line live "ZOOM" meetings. The ARCI ZOOM Team is doing a super job and it's a great way to virtually get "back in the swing" with fellow collectors. Look for details on these meetings elsewhere in this issue of ARCI NEWS and ARCI's email notices.

If you have any comments or questions, please send them to me at smuchow@att.net.

ARCI ZONE

A Column on ARCI Special Items of Interest

By Tom Zaczek

ARCI Online Meet #10:

SATURDAY, APRIL 17, 2021

10AM CT

10:00 AM CT – noon CT. (Zoom meeting opens 15 minutes before)

Click here to Register

or

https://zoom.us/meeting/register/tJYvdu-rpzIuGtHleZzRJ27Ce1hzJghWZlDX

After registering, you will receive a confirmation email containing the link required to join the meeting.

IMPORTANT- You need to receive the confirmation email back because this link gets you into the meeting when the time comes. So, if you don't receive the confirmation email it could be that it is in your spam folder.

Reminder: ARCI is now on YouTube. All the prior Online Meets (through March 2021) are available for viewing. You can find the channel here:

https://www.youtube.com/channel/UCEyMw9QGrvcquC1vZBvHWbQ

Check it out, subscribe, and stay tuned to the ARCI emails for more info!

AGENDA (may be revised without notice)

9:45 AM – OPTIONAL PRE-MEETING – Time to get logged-in and troubleshoot any access issues.

10:00 AM – Meeting Agenda

- Introduction – *Tom Zaczek*
- We're on YouTube – *Matt Pollack*
- PRESENTATIONS
    - A Glass Encased 1925 TRF Radio- *Robert Lozier*
    - Tour of my Collection, Part 1 - *Charlie Wright*
    - Restoring an Early Car Radio– *Jeff Pennoyer*
    - Part 5 of the Radio Preservation Series: - *Tom Kleinschmidt*
- SHOW & TELL 1-to-3-minute informal presentation of something we can see … Join in and spend a few minutes to show your item!
- ITEMS WANTED----ITEMS FOR SALE
    - If you want to offer something for sale OR see if others have what you're looking for, please let us know when you register and use this time to discuss it. Thanks!
    - Please show your items that have not been shown recently
- OPEN SESSION: Non-moderated chat session as time permits

12:00 PM – Close

Planned ARCI live on-line video meets for 2021

Generally, the 3rd Saturday of each month 10AM CT--*(dates subject to change)*

Saturday, April 17th	Saturday, May 15th
Saturday, June 12th	Saturday, July 17th
Saturday, August 21st	Saturday, September 18th
Saturday, October 16th	Saturday, November 20th
Saturday, December 18th	

Join in!
Bring something to "Show and Tell" after the formal presentations. It's very easy. Just join the meeting, and during the open session, show it on your camera or with a photo and talk about it for 1 to 3 minutes.

Be a presenter!
Share your project and passion with a 10-minute or longer presentation. Send an email to remote-events@antique-radios.org with your idea. Photos help too.

Become a member of ARCI!
These meets are open to everyone interested in antique radio. You do not need to be a member of ARCI. If you like these meets, your support of the organization is truly appreciated. Please consider joining. Please click this link for the membership form: Antique Radio Club of Illinois (antique-radios.org)
or http://www.antique-radios.org/membershipinfo.html

I look forward to the upcoming meetings and hope you all get a chance to attend. I encourage you to be a presenter to share your experiences, knowledge, and passions about these old radios!

The ARCI On-Line Meeting Team
Tom Kleinschmidt, Bill Cohn, Matt Pollack and myself are the ARCI On-Line Meeting Team and can be reached via email at remote-events@antiqueradios.org


TELE
FUN
KEN
Radio
TELEFUNKEN

DeWald's Ham Radio Transceivers

David Wald founded DeWald Radio Company in New York City in 1921, and went on to manufacture a variety of consumer table radios, including some handsome Catalin sets, as well as televisions, and in the early 1960's, ventured into the Amateur Radio market as well as producing CB – Citizens Band – transceivers. In 1948 DeWald also opened an office at 624 South Michigan Avenue.

In addition to marketing equipment under the DeWald name, they also produced equipment branded for Allied Radio's Knight product line. Back in the early 1960's when I was a young ham operator, Allied, besides selling their own Knight Kits which included ham gear, also carried a number of "name brand" items in their catalog – Hallicrafters, Johnson, RME, as well as other well regarded manufacturers.

Allied also contracted with DeWald to produce a little Six Meter (50 MHz) AM transceiver under the Lincoln name – the L2754, a small low power radio employing only six tubes – two 6U8's, a 6AL5, a 6CX8, a 6V6GT and a 12AX7. It came with a small handheld ceramic element microphone made by Astatic. Switching from receive to transmit was by way of a send/receive lever switch. Transmit frequency was determined by a plug-in overtone type quartz crystal which produced a 25.1 MHz signal that a doubler stage multiplied up to 50.2 (although the oscillator design actually made the output frequency closer to 50.220 MHz). RF power output was a couple of watts.

The receiver was tunable with a small vernier control knob in the lower right hand corner of the front panel – it covered the entire 50-54 MHz allocation, a definite disadvantage since virtually all activity was down in the lower portion of the band, with very few hams ever venturing much above 50.4 (the self-designated mobile and calling frequency). Why only the lower portion of the band? Well, we all stayed away from our RF neighbor, TV Channel 2, which started at 54 MHz and we wanted to avoid that dreaded TVI (Television Interference, or as some called it, Tennessee Valley Indians!).

Interestingly, besides being available from Allied Radio under the Lincoln label, DeWald also supplied the same radio with a different front panel to Lafayette Radio in New York, which marketed it as the Lafayette HE-35!

Bottom line – how did it work? I never owned one, but several of my friends did, and I got to play with one for a while. It was okay for a "starter" set, but that wide tuning range was tricky and problematic, and I ended up modifying one of

my friend's radios by removing several plates from the receiver tuning capacitor, adding some fixed capacitance across it, and thus reducing the tuning range to about 50.1 to 50.5 – I also drew up a little paper label with the appropriate markings. That made it a bit easier to use – but if one wanted to transmit on another frequency, such as 50.4, it was necessary to purchase more overtone crystals, which were a lot more expensive than the good old FT-243 type 8.4 Mc. crystals that were so plentiful on the surplus market! By the way, these radios were often referred to as "Stinkin' Lincolns" – and with Allied Radio's "satisfaction guaranteed or your money back: policy, many of them ended up on the shelves of Allied's "surplus store" near the old Chicago Stadium on Madison Street, priced at around $20 as I recall, a good markdown from their original $54.95 price tag!

ARCI ONLINE
The Electradyne

Companion article to ARCI Live Online Meet of February 20, 2021
by Robert Lozier

Many old-time collectors of early broadcast receivers would recite the common dogma that the Dynergy (Dynamotive Radio Corporation, NYC) was the first mains powered American broadcast receiver. Well yes and no. It turns out that the Electradyne and Dynergy seem to have appeared in print at the same time in October/November 1924. But the Dynergy first appears as being for 120 Volts Direct Current only. It is the receiver only, requiring a separate horn speaker. In 1925 it is being advertised as for DC and AC operation apparently getting its power from a separate 'B' eliminator box. It still uses a separate horn speaker.

Back to the Electradyne. Its official name as shown on the large instruction sheet pasted to the inside back panel of the receiver is: "Electradyne Peerless Two Tube Super Reflex Receiver, Peerless Radio Corporation, 2527 Park Avenue, Chicago, Ill." Phone Ravenswood 1038. *(figure 1)*

figure 1

The cabinet contains a built-in horn speaker and has an AC mains cord coming out the back terminated in an Edison screw-base plug; not the two flat-blade plug we see today. One would think that all that is required is an external antenna. And you would be correct for this surviving example. Voila! An easy claim as the first self-contained AC mains powered broadcast receiver. But things are not so cut and dried here.

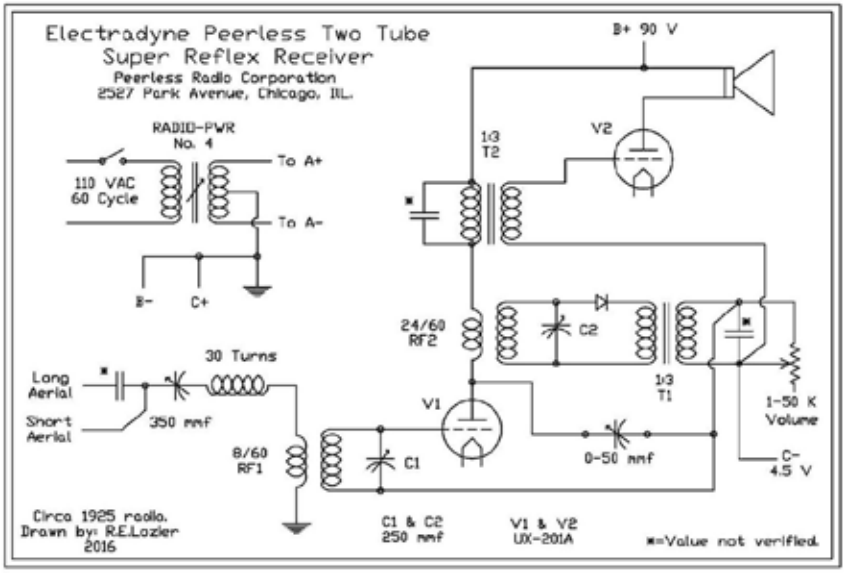
The first announcement and advertisement for the Electradyne seems to be in a November 1924 issue of *Talking Machine World*. The source of the announcement is from a distributor named Foreign and Domestic Electrical Commodities, Inc. New York City. The advertisement in the same issue proclaims: "The Set that uses the HOUSE LIGHTING CIRCUIT instead of "A" Batteries!"
In the distributor release it does mention that they are offering a FORDEC brand 'B' Battery eliminator that can eliminate the 'B' batteries needed for the Electradyne. A separate FORDEC advertisement is also in this same issue.

So maybe you can see that definition of what comprises “The First” needs more precise definition. It is sort-of like the controversy over wanting to call Marconi the “Father of Radio”. Well, there have been a seemingly endless stream of articles championing one person or the other. I choose to look at the issue by posing the question, who was the first person to successfully assemble a complete radio frequency communications system? When you gather the necessary documentation, it becomes conclusive that Marconi should receive credit as the “First successful System Integrator of Technology to achieve Radio Communications”.

It was clear that many other inventors and companies were trying to come up with AC mains powered broadcast radios. A year later, the magazine *Radio Retailing* for October 1925 has a one-page article “Lamp Socket” Radio to Have Important Place, it shows 10 receivers including the Electradyne.

So now time for me to explain this virtually unknown Electradyne. (Registered Trade Mark – 195-729 filed September 2nd 1924).

You see a two-tone mahogany plywood cabinet in almost a cube form containing a built-in horn type loudspeaker. A look inside surprisingly reveals that there are only two UX-201-A type vacuum tubes on the receiver chassis. In American practice of that time, this is virtually unheard of for a manufactured radio with built-in loudspeaker. On tracing the circuit, *(see Figure 2, below)* I find that the first vacuum tube is reflexed to amplify at the Tuned Radio Frequency and after fixed crystal detector rectification, the recovered audio signal is passed through the same tube for audio amplification. The audio is transformer coupled to a power output tube that drives the horn speaker. To add novelty to this radio, the tube filaments can



be powered by a small built-in adjustable voltage transformer called a "Radio-Powr". *(Figure 3)*

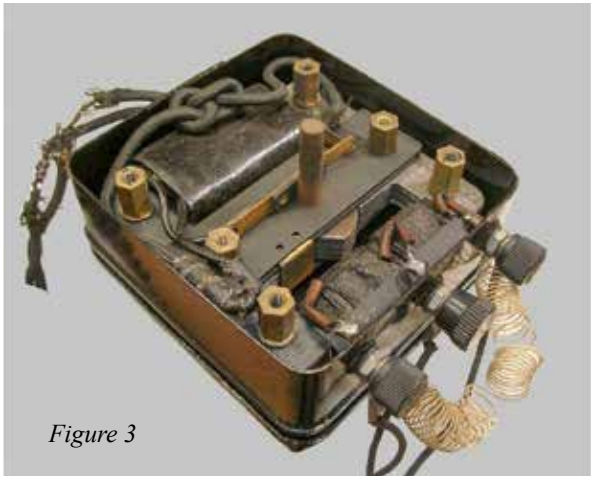


Figure 3

This uncommon transformer (I have never seen it used anywhere else.) has a 110 Volt primary installed on one of the outer legs of a laminated core. On the other outer leg, is a center-tap secondary winding with a loaded voltage rating of about 7 Volts maximum. What is more than unusual about this transformer, is that there is a center core with a large gap that is bridged by a rotatable laminated iron bar. This in effect, can shunt part of the primary magnetic field around the transformer secondary thus decreasing the output voltage.

In 1924, the popular radio magazines of the day frequently had construction articles and announcements about reflex circuit radios. Remember that before mid-1924 there were only two, then three, allotted AM broadcast frequencies. In metropolitan districts, stations were time-sharing frequencies and soon complaining loudly about not being able to expand their broadcast activities. But, in that regulatory environment, tuner selectivity for designers of commodity receivers was not all that important. Sensitivity was a much greater selling point. These reflex circuits usually had just one or two tuned circuits.

This is the case with the Electradyne. It was also a pretty good bet for the makers that there was a market for a simple "local" set for metro areas. But by the close of 1924, the lack of selectivity and the rapid increase in interest of receiving out-of-town stations on the expanded number of broadcast channels, would have nearly decimated their potential market. There was, a very different environment in other parts of the world, especially Europe. They had broadcasting models financed by listener licenses with a single national network and maybe one regional or large city station. There, the notion of a Local Set with little selectivity or sensitivity continued to be a significant part of the market into the mid-1930s.

The reflexed stage is transformer coupled to a fixed, Carborundum brand detector. For best sensitivity, this type detector needs to have 200 to 800 mV bias voltage across it but this circuit makes no provision for such bias. From the detector, the audio is transformer coupled to an audio output tube driving a horn loudspeaker using a Burns brand driver.

Figure 4

So, there you have the radio and its configuration as described on the large instruction sheet pasted inside the plywood lift-out rear cover of the cabinet. But there is more! *(Figure 4, above)*

What is also in the cabinet behind the horn speaker bell is an AC powered 'B' battery eliminator that does indeed make it a fully self-contained AC powered receiver (less antenna). Maybe the first of its kind…. How did it get there?

Figure 5

Patented May 15, 1923

Inspection reveals that all of the components of the eliminator circuit are contained in the Timmons "B-Liminator" *(Figure 5, left)* that they claim was the first 'B' eliminator on the market; having been patented May 15, 1923 and referenced in the P. D. Lowell et al patent 1,455,141.

This is one of the very few surviving 'B' eliminators to originally use a UX-201-A

triode as a half wave rectifier. The emission of a '01-A was certainly being taxed to the limits for this service, but for this simple radio, it placed only about a 15 ma. load on the provided 90 Volt advertised output.

I have found no mention of Timmons selling custom components like capacitor blocks, chokes, transformer, etc. of their eliminator to the retail trade. This suggests to me that Premier may have made a deal with Timmons to buy components to install in their radios instead of a retail customer having bought the parts and modified his set after the fact.

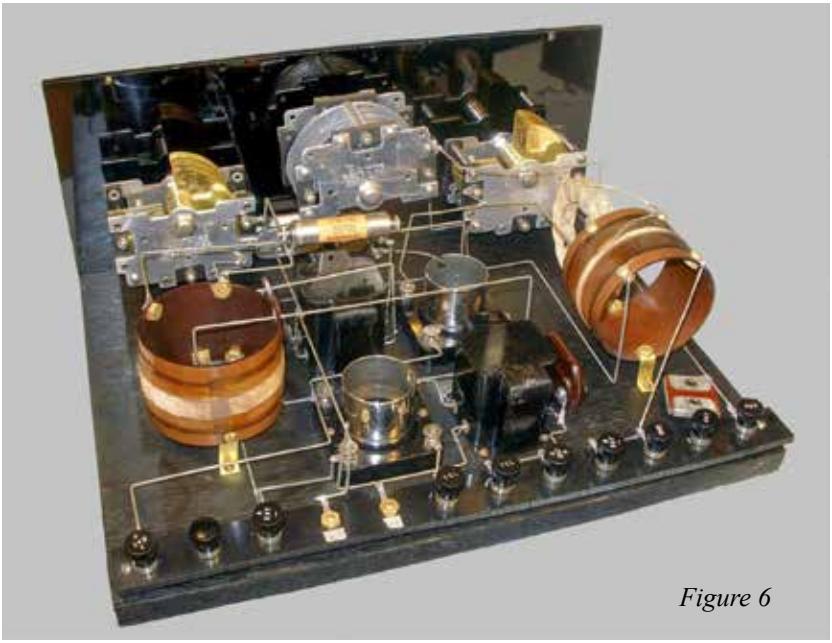


Figure 6

Regardless, the radio chassis and 'B' eliminator are very nicely laid out. *(Figure 6)* For thorough cleaning, all the parts were removed from the chassis. I noted that the wood panel is stamped 1183. The cynic in me thinks that this may have been only the 183rd panel made since no other sets seem to be known surviving.

The Montrose brand tuning capacitors have yellow brass rotor vanes that had green patches of corrosion and were otherwise dull with oxidation. For many years I have used an ultrasonic cleaner; and in that cleaner a solution of sodium bisulfate acid dissolved in water to clean yellow brass and dull nickel plated items. (This is the acid used in spas and swimming pools. Cheap and widely available at Walmart and home centers.) This is generally satisfactory but sometimes come out having a 'pink blush' on bare brass that must be polished-off. That can definitely be a problem if trying to get between capacitor vanes. Only a few years ago I stumbled across a YouTube video directed to jewelry makers. In it, I learned that instead of using plain water to dissolve your granular acid, use cheap over-the-counter 3%

hydrogen-peroxide solution available at any Pharmacy. It does a remarkable and fast removal of oxides leaving a bright natural yellow brass color. Nickel plate comes out bright. Of course, after any cleaning, rinsing and force drying I give parts a spray coat of clear lacquer.

On reassembly of the radio, I dared to bring the radio up on a Variac with a Dim-Bulb current limiter and Amp meter. I placed a voltmeter across the RADIO-POWR adjustable transformer and adjusted the tube filament voltage to 4.5 Volts. I have two, 4 and 5 KW stations less than 2 miles away. A few twiddles of the knobs and the stations were blasting their way through the horn. The stations are on 1060 and 1190 kHz and could just barely be separated. Nothing else could be heard. These stations broadcast 24/7 except for Midnight to 6 AM Monday morning… I tried to DX then and could barely detect a 50 KW station only about 25 air miles away. Yes indeed, this receiver is definitely a "Local" but Oh-So interesting radio. In my half-hour sessions of operation, the components of the 'B' eliminator circuit remained 'cool as a Cucumber'. I am thrilled that this receiver with no parts substitutions remains an accurate historical reference of the technology of the day and has the added bonus of still being operational 95+ years later.

The cabinet has its original finish on 90+% of its surface. There was some flaking of the finish on the bottom edges of the cabinet and along the top front edges. These areas were lightly sanded, stained to match and I used a fine air brush to apply clear lacquer tinted with a few drops of "Honey Amber" wood dye. A light rubbing with a rotten stone charged gauze pad blended the old and new finish nicely.

The remaining challenge was what to do with the sheer Rayon grill cloth? Not only was it drastically faded but it was splitting and hanging loose. The cloth was glued across the opening of the horn using traditional hide glue. I simply brushed water along the glued areas and waited 20 or so minutes for it to soften enough to lift with tweezers and a spatula. In the corners of the gluing there were fingernail sized multiple layers of the cloth embedded in the glue. This cloth was also up against the inside of the cabinet so had been shielded from light and atmosphere. Careful washing with just a little bit of dish soap positively revealed that the cloth was dyed Chartreuse! How did I know that the cloth is Rayon and not silk? A burn test… Rayon smells like burnt paper. Silk smells like burnt hair.

So off to find some Chartreuse Rayon…. No joy there…. No one is weaving Rayon anymore. Some years ago, (before the Internet) I was restoring a circa 1927 German made N&K loudspeaker with destroyed royal purple Rayon grill cloth. I looked in every cloth shop I came across for a number of years and never found anything close. One day a helpful lady asked if I had tried to find it at a bridal shop? Being a life-long bachelor, the thought had never occurred to me! I went to the most prestigious bridal shop in Charlotte and Bingo! One of the staff

was soon showing me bolts of royal purple Rayon and silk… The exact hue and weave I needed.

Figure 7

So maybe if I could no longer get Rayon, would silk work? A look on e-Bay has me finding that I could order a half meter of Chartreuse silk for $9 post-paid from Hong Kong. I could certainly afford a gamble like that…. It turned out to be almost exactly the weave I needed! All that was necessary was to soak the silk in strong tea to dull the color a bit. Problem solved and the set was ready for exhibition.

With some research, this radio went from being just a quirky bit of mid-1920s hardware to the realization that it may actually be the first self-contained AC powered home broadcast receiver offered for sale in the American market. Here we see that being "First" does not necessarily bring you fame and fortune.

The Electradyne - A Chicagoland product of late 1924. Possibly the very first AC mains powered self-contained broadcast receiver for the American market.
By Robert Lozier – KD4HSH, kd4hsh@carolina.rr.com *– March 2021*

RENEWALS

DO YOU KNOW WHEN YOU WILL EXPIRE?

Or, more specifically, your ARCI Membership?

The address label shows your expiration month. It takes time to process renewal requests, so please renew at least one month BEFORE the month indicated on the label. This also helps ensure that you will continue receiving your *ARCI NEWS* without interruption.

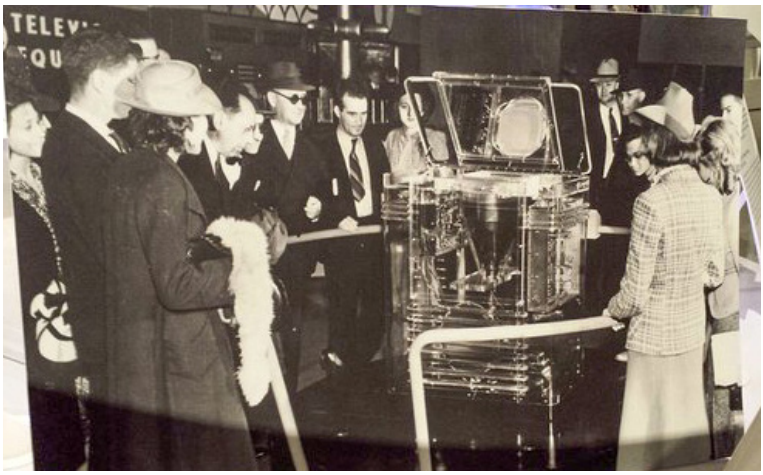
Look on page 36 of this newsletter for the renewal form.

By Gary Hoover

From the telegraph to the modern age, high technology has seen continuous innovation, followed by the rise of numerous competitors, then consolidation into fewer companies, and finally decline. Here is one of our favorite stories.

The advent of television rivals the automobile, airplane, telephone, personal computer, and Internet in its impact on the lives of people. Few technologies touch as many people on a daily basis around the globe as much as TV and its descendants cable, satellite, and streaming.

By the 1920s, when radio first rose to prominence, inventors and researchers were already working on radio's natural child, television. Major companies including General Electric and Westinghouse began to bring together vacuum tube and the other technologies required to make television a reality, but it was the Radio Corporation of America (RCA) that led the way. At the 1939-40 World's Fair in Flushing Meadow, Queens, New York, RCA premiered television, thrilling the millions of visitors to the Fair.



Introduction of Television to the Public at New York World's Fair 1939

To understand television, we need to first take a glimpse at the evolution of radio.

Radio Wars

RCA itself was born out of efforts to consolidate (monopolize?) the radio industry just after World War I. Engaged in patent battles over the emerging technology of radio, General Electric convinced competitors Westinghouse, American Telephone & Telegraph, and United Fruit (which used ship-to-shore radio on its

banana boats) to merge their radio interests into one powerful company which they controlled: RCA. This effort had the support of the US government, particularly the Navy, which wanted to ensure that future radio inventions were American, not controlled by the British Marconi Company which was the "first-mover" in radio. Thus, the British were forced to sell their American operations and related patent rights to the newly formed RCA in 1919.

David Sarnoff

But RCA soon achieved independence from GE and its other owners under the brilliant leadership of David Sarnoff, a Russian Jewish immigrant who had started with the Marconi Company at the age of fifteen. Under RCA control, Sarnoff created the National Broadcasting Company (NBC), the dominant network in the early years of radio. In order to get music to play on his network, Sarnoff also bought the Victor Talking Machine Company, the leading maker of phonographs and records, with large manufacturing facilities in Camden, New Jersey. When the massive Rockefeller Center mixed-use complex opened in Manhattan, it was in large part "Radio City." The tallest building was named the RCA building, opened in 1933, and the company had its NBC studios in Rockefeller Center at "30 Rock," where they remain today.

In a pattern common to new consumer electrical technologies, radio took off rapidly. The first commercial radio station, Westinghouse's KDKA in Pittsburgh, came on the air in 1920. Within five years, over 600 stations were in operation.

RCA Victor, Camden, New Jersey

Sales of radio receivers to consumers rose from $50 million in 1923 to $207 million in 1926 and $366 million in 1929 (over $5.5 billion in 2021 dollars). While RCA was a leading maker of those receivers, with a market share of 15-20%, it dominated

the more complex manufacture of the tubes and other components, as well as collecting patent royalties from other makers. Again in a typical pattern, there was a "goldrush" into the new technology: over 600 companies assembled and sold radio receivers in the 1920s. Continuing in the normal pattern, there was a shakeout: competition and the Depression wiped out most of the early radio makers like Atwater Kent and Grigsby-Grunow as well as later entrants. Only 18 radio manufacturers and assemblers remained in business by 1934.

In addition to RCA, the largest of those surviving radio makers were Philadelphia's Philco and Chicago's Zenith. Smaller competitors included Motorola (which specialized in car radios) and Crosley.

Television Comes Along

Immediately after its 1939 World's Fair premiere, RCA tried to sell television receivers to the public. But there were few programs to watch and the tiny sets were expensive, so this time the market did not take off. Nevertheless, all those in the radio industry knew that television would succeed sooner or later.

With their experience in radio, Philco and Zenith were quick to follow RCA into the television business. These competitors, along with the second major broadcast network Columbia Broadcasting System (CBS), skirmished with

RCA over the technical standards for television, but RCA's system won out when the National Television System Committee (NTSC) adopted the RCA approach.

Then, as the nation converted to war production, the manufacture of television sets was banned by the government in 1941. Technical innovations developed during the war like radar made TV better, but the war put TV on hold.

After adjusting to peacetime production, establishing more TV stations, and developing more programming, television was again ready to roll by the end of the 1940s, beginning in New York City. (If you watch the wonderful 1948 film noir *The Naked City*, shot live in the streets of New York, you will see apartment residents hanging out of their windows, sitting on fire escapes, talking to neighbors. Just a year later, such scenes became nearly impossible to film, as TV drew people indoors.)

In 1948, about 800,000 television receivers were sold. Two years later, 1950 sales were 7.5 million and remained at 5-6 million per year for the next decade. Another goldrush was on. As in radio, RCA made tons of money on the patents flowing out of its large research laboratories and by making the picture tubes and other key components. Radio receiver brands General Electric, Westinghouse, Philco, Zenith, and Motorola all entered the TV set fray alongside RCA.

Zenith TV, 1950

These natural competitors from the radio industry were joined by other brands. One was Fort Wayne, Indiana's Magnavox, a maker of radio speakers and other parts. Another name was DuMont. Inventor Allen DuMont of New Jersey had actually produced the first all-electronic TV in 1938. DuMont made television sets and set up a broadcasting network; both efforts failed and ended in 1956.

An important new name was Admiral, a late entrant into the radio industry and

the brainchild of aggressive Chicago entrepreneur Ross Siragusa. The company used plastic cabinets instead of the wood used by other makers, bringing out the 10-inch Consolette TV in 1949 at a price of only $249.95, a hundred dollars less than competitors (but even then, the Consolette cost almost $3000 in 2021 dollars). Admiral Corporation's revenues tripled between 1948 and 1950.

Sears, Roebuck and Montgomery Ward also sold large numbers of TVs made by various manufacturers. Yet another competitor was Sylvania, the maker of lightbulbs and one of the few makers of TV tubes, competing with RCA.

Sears, Wards, GE, Westinghouse, Philco, and Admiral also offered an array of "white goods" (laundry and kitchen appliances) in addition to "brown goods" (such as televisions, radios, and phonographs). RCA even dabbled in these fields, buying an interest in white goods leader Whirlpool.

The Rise of Color TV

These many companies produced black-and-white television sets throughout the 1950s, with Zenith becoming the largest maker, producing over a million sets a year. At the same time, all realized that color TV would come along sooner or later.

RCA and its labs spent $130 million developing its color system, which narrowly beat out a system proposed by rival CBS. While both color TV's (costing over $1000) and color broadcasting (very rare) had been available since the mid-1950s, color did not take off until the early 1960s. By 1962, a million color sets were in use, generally selling for $6-700 ($5-6000 in 2021 dollars), over three times the price of a black-and-white television.

At first, RCA held as much as 70% of the market for color television sets, but the other producers quickly joined the fray. By 1964, RCA's share fell to 42%, followed by Zenith at 14%. Yet RCA made most of the picture tubes and other components, earning a profit of $35 on each picture tube that it sold to its competitors.

With this history and its outstanding research labs, in the 1960s RCA was the

world's largest producer of consumer electronics and the most technologically advanced company in the industry. But the company was not to remain on top.

The Collapse of the American Consumer Electronics Industry

In 1964, US makers produced 94% of the color TVs sold in the United States. In 1975, that percent had dropped to 67% and by 1987, just 17% (vs. Japan's 42% share). Today, the RCA brand is a minimal vestige of its former self.

As business historians, our top question is, how and why did RCA lose its leadership and ultimately disappear from the industry? Were the Japanese companies Sanyo, Sharp, Sony, and Matsushita (Panasonic) just cheaper than the American makers? Or better?

As it turns out, there was more to the story than just Japanese prices and intelligence. According to eminent business historian Alfred Chandler in his excellent book *Inventing the Electronic Century: The Epic Story of the Consumer Electronics and Computer Industries*, much of the blame lies with the US government and with RCA management itself.

Despite being initially formed with the full backing of the Federal government, RCA's dominance of the industry continually attracted the attention of Federal trustbusters (the Federal Trade Commission and the Anti-trust division of the Justice Department). In 1958, the government forced RCA to offer its patents royalty-free to its American competitors, though foreign companies had to pay full royalties. As is so often the case when legislators and regulators bear no burden or responsibility when things go wrong, there were unintended consequences to this action.

Without the ability to invent new things and profit from them for the life of a patent, RCA had little incentive to keep pioneering and innovating in consumer electronics, as it had done for decades. At the same time, to continue the company's important royalty revenue stream, RCA aggressively peddled its technologies to Japanese firms including Sony and Matsushita and to European companies led by Philips of the Netherlands. (Philips bought Magnavox in 1974, giving the company strong US distribution.) The entire American television industry was thus weakened both by fewer new innovations and by more foreign competition.

At the same time, RCA management began to lessen its focus on consumer electronics. In 1968, David Sarnoff's son Robert took over the reins of the company from his father, though David remained a major influence in decision-making. Losing its patent edge over competitors in consumer electronics, RCA pursued two initiatives: (1) to take on IBM in the mainframe computer business; and (2) to become a "conglomerate."

The conglomerate idea was all the rage on Wall Street in the 1960s. Promoted

by investment bankers who profit most when companies are bought and sold, the idea was that any good management team could run any kind of business and that operating totally unrelated businesses enabled companies to diversify away from the risks of being in only one industry. Litton Industries, Beatrice Foods, International Telephone & Telegraph (ITT), LTV, Gulf & Western, and many others became giant conglomerates, buying up everything from hotel chains to insurance and typewriter companies. In RCA's case, the company bought a carpet maker, car rental leader Hertz, the makers of Banquet frozen dinners, and top American book publisher Random House, among others. The Radio Corporation of America had no expertise in any of these fields.

Neither of these strategies worked. RCA's 601 mainframe alone cost $100 million to develop but only sold four units. After such huge losses, RCA sold its computer business to rival UNIVAC.

The conglomerate concept ultimately proved unsound. When the conglomerate builders retired or died, their successors gradually sold off the diverse businesses and returned to focusing on whatever industry had the greatest opportunity or what they were best at. (General Electric belatedly became a conglomerate by rapidly expanding into financial services under CEO Jack Welch and is still recovering from that era of diversification.)

In this context, RCA failed to keep moving ahead in consumer electronics, while the foreign companies kept innovating. The company's efforts to pioneer in tape-based video recording fell behind those of a small company named Ampex. Ultimately, the Japanese Victor Company (JVC), controlled by Matsushita, developed the highly successful VHS system. Initiatives in the laserdisc field were equally unsuccessful against the Japanese. In CDs and DVDs, Philips and Sony led the way.

In this process, the other American makers of consumer electronics were sold out or buried by foreign competitors. Admiral was purchased by Rockwell and Philco by Ford; both new parent companies lost interest in the consumer electronics businesses. Some of the brand names have lived on after being purchased by new companies which saw value in the old brands. For example, one can still buy Westinghouse televisions online, though that great company is now long gone and split into many pieces. Selected niche American companies, as in high fidelity audio systems, live on. (Apple's "designed in California, made in Asia" approach is a very different, unique story.)

Ironically, in 1986, RCA was purchased by its founding parent General Electric for $6.3 billion, without the government stopping the deal. GE kept the gem of the company, NBC, but by 1988 had sold off its television and consumer electronics businesses to the French Thomson company (also ironically descended from Boston's Thomson-Houston, a forerunner of GE). Thomson later parted with these operations and brands. The historically strong RCA Victor record business was sold to the German Bertelsmann empire. The RCA building in Rockefeller Center became the GE building, and is now the Comcast building (current owner of NBC).

And thus, RCA's glorious history of innovation, changing the lives of millions, came to an ignominious end. Yet consumer electronics marches on, in the hands of such current leaders as Apple, Samsung, LG, and Huawei. But given the ever-evolving nature of technology, how long will these companies stay on top?

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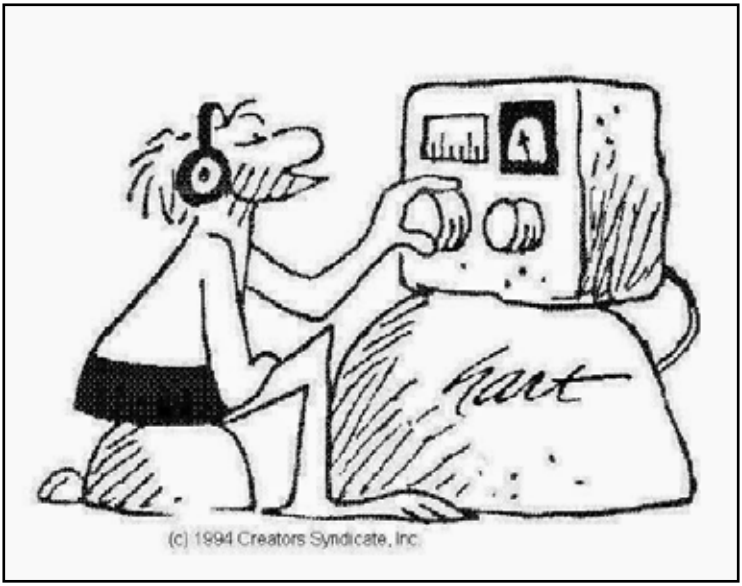
Before Zoom: The Author, Seated Left, Defers to Big Sister Alice on TV Choices, 1956, While Awaiting Arrival of the Personal Computer and the Internet



Philco Radio and the Changing of "State of the Art" Technology

by David Kruh

Working as I do here for the global leader of high-performance signal processing solutions, I often speak or write about Analog Devices and how our semiconductor products represent the "state of the art." The challenge for ADI (in fact, for any company seeking a technology advantage) is to advance that state of the art and make it commercially viable. As I've learned in my hobby of antique radio restoration, the same was true in the early days of mass-market consumer radio. The technology might be 80 to 90 years old but, as I'll show you now, we can see great examples of how circumstance and ingenuity led some companies to find - or miss - that sweet spot.

From its founding in 1892 as the **Helios Electric Company** (manufacturing carbon-arc lamps) then, in 1906, as the **Philadelphia Storage Battery Company** (making batteries for electric vehicles) and finally, in 1919, adopting the name by which we know it today, the **Philco Company** (when it turned its attention to providing consumers with storage batteries for the burgeoning radio industry), the company was always looking for technology that could meet the needs of the market. For example, because those early batteries were expensive and messy (they required the monitoring and refilling of liquids) in 1925 Philco would introduce the first "Battery Eliminators." Today we call them power supplies. Back then it was a boon for those home owners who had electricity because now they could run their radios directly from a wall socket. (Just a quick side note: many in rural areas did not have power in their homes and still required batteries to run their radios. Philco continued to market their batteries to serve that market and maintain their brand so that when New Deal projects such as the TVA brought power to farms across the South, Philco was the preferred brand when home owners upgraded.)

In 1926 Philco decided to get on the broadcasting bandwagon, but it took almost three years before they released their first radio. That's because they saw how radio manufacturers, such as Atwater-Kent, were individually (and expensively) assembling their products and, as a result, having to charge high prices, limiting the market and, by extension, the radio audience. The planners at Philco saw how Henry Ford was dramatically reducing the cost of manufacturing with assembly lines, which they co-opted for the mass production of their radios. According to Wikipedia, only a couple of, only a couple of years after introducing their first mass-produced radio in 1928, Philco was already the leading maker in the country, grossing $34 million with the sale of over 600,000 radios. For the mass market these included the well-made, beautiful, yet inexpensive "Cathedral" model,

The Philco Mystery Controller was the first mass-market remote

and for customers who liked cutting edge tech they developed and sold an innovative, one-tube wireless remote, which they marketed as the "Mystery Controller."

Then, came the war...

Following U.S. entry into World War Two in late 1941 the economy, still moribund due to the Great Depression, was jolted into a frenzy of war-related production. Philco was among the top 100 providers to the government for the next four years, as they pushed aside the design and manufacture of just about any product that was not war-related. In 1945 the war ended, and as restraints on commercial production were lifted manufacturers, Philco among them, looked for products they could quickly produce and sell to a country anxious to enjoy the benefits of peacetime. Both of the following radios are Philco model 46-250, meaning that they were produced that first full year after the end of hostilities. They look the same, don't they?

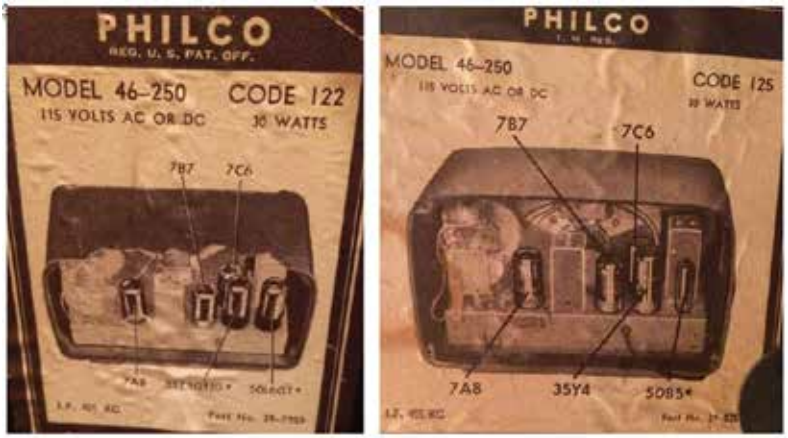
From 1946, two Philco model 46-250 radios (author's collection)

Both radios are housed in Bakelite cases with only two knobs; one was a combined On/Off Switch & volume control, the other for tuning up and down the AM radio band here in the U.S. Inside, both have an almost identical "All American Five" design found in most tube radios built from the 1930s onward. AA5 radios

eliminated the big, bulky power transformers prevalent in the large consoles that were popular before the war, which greatly reduced the cost of manufacturing and owning a radio, something especially important during the Depression. The "trick" to an AA5 was, first, to reduce the number of tubes needed to the bare minimum. I'll cover this in a future blog, but for now it's important to know that in the 1920s and 1930s our improved knowledge of tubes (and what caused them to distort a signal) allowed designers to build tubes that combined two or more stages of the receiver into one tube, which helped to bring the tube count down to five. That typically included an RF converter, IF amplifier, audio detector/first amplifier, audio output, and rectifier which enable the most cost-efficient, best sounding radio.*

Was there a drawback to the AA5? Well, there was that nagging problem of electric shock. That's because one side of the power line was connected to the metal chassis, so you didn't want to touch it when the radio was plugged in and turned on. And who wouldn't want an appliance like that for the wife and kids? *(Full disclosure: I received a couple of lessons on AA5 power supplies the hard way. Hurt like hell, too. You'd think I'd have learned after the first time. Or the second. Or the... never mind. That was one of the selling points of Bakelite, by the way - it's a great insulator.)*

Okay, so now let's talk about these specific radios and how they play into the story of changing the "state of the art." As stated before both are the same model number (46-250) but, as we see from the stickers affixed to the base of each radio, there is a difference in the code numbers. These numbers are also called chassis numbers, which delineate versions of the basic circuit employed in each radio:



Product stickers for the two radios

The primary difference between the two chassis is that the 122 on the left uses a mix of "Octal" and "Loctal" tubes, while the 125 on the right uses Loctals and what is called a miniature tube. Octals, as you can see above, have a black base that was made with Bakelite. They had thick pins that fit snugly into metallic

sleeves arranged circularly in a Bakelite socket that was mounted on the chassis. Octals were the workhorse of radios for decades. Loctals were a relatively new type of tube developed by Sylvania in the very late 1930s for use in automobiles. They had an aluminum alloy base that, as the name implies, locked into place in the socket. As detailed in a Wikipedia page on tube sockets, Loctals had the advantage of being "pin-for-pin" compatible with the older Octal tubes. Interesting to note that pin-for-pin compatibility is a selling point still used today in the field of semiconductor manufacturing.

Loctals are in both versions of the 46-250 we're talking about today, taking the roles of RF converter, IF amplifier, and audio detector/first amplifier stage. But chassis 122 on our left still has two Octal tubes: a 35Z5 for the rectifier and a 50L6 for the audio amp. This tells us that the 122 is an older model, as it is well-known that manufacturers such as Philco did not want to throw away their stock of older components. But, as the three loctal tubes indicate, Philco's stock of old Bakelite tubes for the first three stages must have reached a point where it was financially viable to use the newer loctal technology.

As it turned out, the move to Loctal tubes is a great example of incorporating "state of the art" that sometimes fails to live up to the promise. The tubes, according to Wikipedia, were "...prone to intermittent connections caused by the build-up of electrolytic corrosion." And if you tried to take advantage of the pin-for-pin compatibility, you found the smaller pins of the Loctal tubes in the bigger Octal sockets had a tendency to "wobble." So much for an upgrade. Those problems would not surface for a few years, and Philco would use loctals in many of the home tabletop radios they built after the war.

So loctals have kind of a sketchy history, and demonstrate one challenge of developing new technology that may, at first, be considered "state of the art" but later turns out to have many flaws that diminish its marketability. However, we will now see how the story of the audio output tube will, no pun intended, light the way forward not just for radios but all electronics. We turn again to Wikipedia, which explains that "in 1938 a technique was developed to use an all-glass construction with the pins fused in the glass base of the envelope. This was used in the design of a much smaller tube outline, known as the miniature tube..." The advantages of the mini tube are echoed today in the semiconductor industry where companies (such as Analog Devices) build and market products that use less power and therefore dissipate less heat (in the case of the mini tube, because the filaments were that much smaller.)

Despite the reduction in size the mini tube outperformed its predecessors and so for the next version of model 46-250, Philco designers tweaked the audio output section of the radio to accommodate a next-generation mini tube, the 50B5. Clearly the 50B5 presented enough of a cost benefit because, as you can see in this close-up of the chassis where the Octal 50L6 previously sat, Philco installed

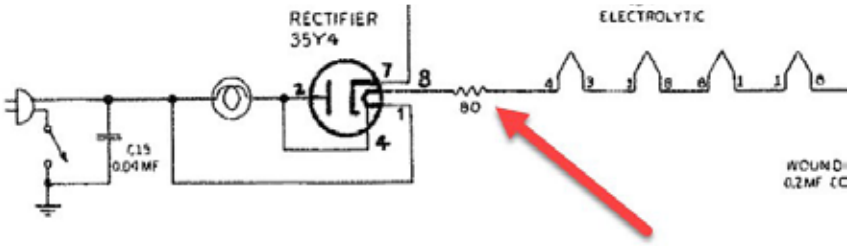
a mini tube socket in its place. One can see that an Octal-sized hole had already been punched into the 125 chassis, requiring the riveting of the smaller mini socket inside:

Mini Socket adapter
the Audio Output tube

Lower power dissipation and smaller tube size meant that Philco, along every other radio manufacturer who wanted to stay competitive, would abandon Bakelite cases and start housing their radios in cheaper, lighter, and less expensive plastics developed during the war. They were not as resistant to heat, but didn't have to be. State of the art and commerce often walk hand-in-hand, which they did in the case of Bakelite vs. Plastic and octals vs. loctals vs mini tubes.

Me? I have a few colored plastic pieces in my collection, but I like the old school Bakelites with the bigger, hotter octal tubes. As one of my ADI colleagues is fond of saying, "real radios glow." You can hear the 46-250 125 chassis in action in this YouTube video: https://www.youtube.com/watch?v=_aELSBfGI0o

* The AA5 design worked (shock potential aside) because the filaments of the radio's five tubes were connected in series and the voltage drops across the tubes came close to line voltage (a number that changed over the years - there's another blog for another day, for now let's just settle on 120V as the voltage drop goal). Since the leading number in a tube designation is the voltage drop across that tube, we can see the Philco 46-250 adds up to 106V. Philco added a 2 watt 80 ohm resistor to the series of tube filaments to drop the additional 9V. And yes, that meant that inside the cabinet not only did we have heat dissipating from the tubes, but also off that resistor. That's why radio backs had large openings, to provide air for cooling.



Close-up of the Philco 46-250 power supply showing the 80 ohm resistor

The article is from a blog authored by David Kruh and was originally posted on Analog Devices EngineerZone community in The EngineerZone Spotlight blog *on 29 May, 2018.*

You may find a listing of David Kruh's blogs here: https://ez.analog.com/search?q=radio#serpauthor=61394&serp=1

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