

# SOUND WAVES

VRPS QUARTELY OCTOBER 2009

## From the President:

By Jim Sargent

Once again we note that time is a fleeting thing.



Summer is waning and Fall is sure to follow. With Fall we reflect upon another gathering of the faithful in Mesquite at the Hampton Inn and Suites. Yes, it's convention time. This event is always a wonderful time, and I do not expect anything less this year. Hopefully you have

your prize winning radios all cleaned up and ready to show and display in the contest. Anniversaries are nice, and I would be remiss in not reminding you that 2009 is our 35th year as an organized group of radio and phonograph collectors. Reflecting on this anniversary year causes me to mentally make note of the friends I have made over the years via this hobby and, just as important, those whose acquaintances were way too short. Registration packets are included with this mailing and are also available on our internet site ([www.vrps.org](http://www.vrps.org)) for your friends to print off and mail in. Your early registration

is important because it provides us the opportunity to adequately plan for our event. You will see by the enclosed agenda that, as in the past, we have a full three days of activities planned. Aside from the opportunity to see and renew old friendships, trade restoration tips and acquire new collectables, we will have the typical auctions, contests, displays, raffles, flea market and, as always, topped off with a banquet highlighted this year by a return engagement of Generic Radio. Many of you will recall this radio theater group from a few years back. Our own Larry Groebe and the other cast members have agreed to join us again in our anniversary year. For those seeing them for the first time, you are in for a real treat. They present radio drama, the theater of the mind, as it was in the golden age of radio. Those of our organization who hail from Tom Brokaw's "Greatest Generation" are fortunate enough to have personally witnessed radio as the primary media of home entertainment. Now all of us will have the opportunity to enjoy the artistic and theatrical talents of Generic Radio. Make your plans to be in Mesquite, and I will see you there.

## 2009 MONTHLY MEETING PROGRAMS

NOTE: Programs will be held at the Senter East Building; Irving, Texas, unless otherwise noted. Located in Senter Park, the actual address is 228 Chamberlain St. The park is bounded by S. Shady Grove, Senter Road, S. Delaware, and Chamberlain St. Refer to the WEB site. Programs start at 2pm. unless otherwise noted. Call us on the cell tellie if you get lost: 972-898-7251 or 972-742-8085.

### OCTOBER 17

Capacitors are always of interest in restoration of our old/antique tube radios. They are the first suspects in preparation and replacement parts for a project as they can cause a multitude of problems. Our member, Mike McCarty, will present history and working knowledge of capacitors, especially electrolytics. Bringing us up-to-date on modern replacements and reformation of old capacitors, should be of broad interest to everyone.

### NOVEMBER 20-22

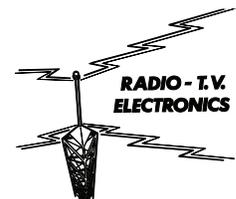
Fall Convention. Hampton Inn; Mesquite, TX. Make reservations now.

### DECEMBER 5

ANNUAL Christmas Party. JayCee Center for the Arts. 5-11pm.

Programs are subject to change, contingent on scheduling conflicts. As always, your suggestions for programs/content are welcome. If the programs do not fit your needs and you want something different, let me know. I need volunteers to organize other programs, so consider presenting a program yourself. Call me anytime or send me an email.

Mike Grimes  
972-898-7251 (cell)



## NOTES FROM THE BENCH

By Mike McCarty

### Heptode Converters (or Why on Earth does Anyone Need Five Grids?)



The Heptode Converter, a.k.a. Pentagrid Converter is a strange and marvelous beast, indeed. Here, in one tube, we find combined

the functions of electron coupled oscillator, mixer, amplifier, and gain control. It's an amazing device, combining complexity in simplicity, and one stands in admiration of those who conceived of it, and perfected it in its operation.

The converter grids are, perhaps, less well understood elements, as to their functions and relationships with each other. The grids are named simply by number, proceeding from the grid to the plate, in order, as G1, G2, G3, G4, and G5.

Now, to understand the operation of the heptode converter, one can consider it to be actually two tubes, which overlap and share elements.

Your attention is directed to the cathode and the first two grids, G1 and G2. These three tube elements form a triode, which is used as the local oscillator. G1 is sometimes termed "oscillator grid" and G2 is sometimes termed "oscillator plate", corresponding to their functions, respectively. G2 is actually used as a plate, and has a structure which is rather unlike the other grids', being a very "open" structure. While it is connected to a source of B+, it collects few of the electrons as they proceed to the plate element of the tube. Indeed, an oscillator needs a power gain of only just over unity.

This oscillator is of the sort one sometimes calls "electron coupled". That is, the output of the oscillator is not connected externally to other tubes for further processing. However, as there is only one electron stream inside the tube, the behavior of that one stream, being influenced by the oscillations taking place in the cathode, G1, and G2 elements, affects the behavior of the output of the tube taken from the plate, though the plate does not itself participate in the oscillation as an active element. In effect, the cathode and first two grids form a sort of electron gun which shoots a variable density electron stream into, and provides the space charge for, another tube, which is a variable gain pentode.

The pentode is formed by the cathode, and G3 (the "mixer grid"), G4, G5, and the plate. G3 serves as the control grid for this pentode, with G4 serving as the screen grid, and G5 functions as the suppressor. This pentode serves as the mixer, and as such it intentionally has a non linear transfer characteristic. It also amplifies all the signals present in it, including the difference, or IF. The output of the tube comes from the plate of this pentode, which is also the plate of the tube as a whole.

The local oscillator signal is injected into the pentode portion of the tube, as described above, where it mixes with the received signal, which is applied to G3. There the IF signal is developed, and amplified to a degree which is controlled by the DC bias on G3. G4 and G5 behave as conventional pentode screen and suppressor grids, respectively, as mentioned above.

Since the screen grid G4 needs to be connected to a source of B+, as does the oscillator plate G2, one finds some tubes in which they are internally connected, as in the 12SA7.

## Notes from the September 19, 2009 Meeting

There was a good turnout in anticipation of the meeting subject – Crosley Radios. Club President Jim Sargent opened the meeting, welcoming new members and guests - one guest came all the way from Oregon (visiting his brother). Jim reminded us to get ready for the Annual Convention November 20, 21 and 22, and that the convention-theme contest category will be Crosley Radio. The topic of the October 17 meeting will be CAPACITORS. Jim also announced his upcoming auction of a very large portion of the collection at NEON RADIO in Lockhart, Texas on October 10. (Follow the link on our VRPS website to see photos of the very large number of items to be sold. Also, see [neonradio.com](http://neonradio.com)).

Program Director Mike Grimes showed a video about the amazing history of Powel Crosley. The lengthy video presented a chronology of Crosley's endeavors over a long span of time, including later years when he had branched out into many fields outside radio and television. Mike stopped the video as it moved into the later history of Crosley. Members had brought a large array of Crosley items, and he wanted to reserve time for everyone to talk about them. Hopefully, the DVD that we watched will become available to everyone. Some of Crosley's efforts were short-lived, such as airplanes, but there were Crosley automobiles, refrigerators and stoves (that some of us remember). He built station WLW which eventually, at 500,000 watts, became the most powerful in the world. He also owned the Cincinnati Reds.

In early 1921 Crosley took his young son to purchase a radio and was shocked by the price-\$130.00. He was certain that he could build a more affordable radio. At first, Crosley got into the parts business, selling Precision Equipment Company's ACE-brand equipment. He made cabinets for them and gradually produced more and more of his own articles. His first radio items were ACE look-alikes. First production radios were sold in 1921 - the "Harko", a simple crystal set. His "book condenser" became a unique trade mark of all the Crosley parts, along with the basket-weave coil with its in-and-out sliding adjustment for the amount of regeneration. He also created the type V-T tube socket, made of porcelain. The first tuning condenser (Model "A") was of plywood construction. Then the B model had a metal mounting, the C model used porcelain plates (really rare, today), and finally the D model used hard rubber for the plates and was produced through 1924. There was a special model made to fit inside the "PUP" cabi-

net. In 1923 he purchased Precision Equipment Company and its ACE line, bringing with it an Armstrong license to make regenerative sets, in accordance with patent no. 1,113,149. In 1923 Crosley reverted to the ACE name for regenerative sets because of RCA insisting that the original name of the licensee appear on the product. There were sets made for Sears under the Meteor name. The old Model V (Roman numeral 5) became the well known Model 51, the V plus one stage. Some models were sold by the Canadian DeForest-Crosley company, including the Model 50 and accessory 50A amplifier, with bus-bars to connect the two. There were also portable models made to carry the batteries and headphones inside. By 1924 his factory was making the Sears SR-8 and a very small SR-2, using metal plate condensers. There were also several versions of Crosley "Musicone" loudspeakers by then. In 1925 the Crosley "PUP" was introduced at \$9.75, with 'phones an extra \$3.00. The recommended tubes – WD-12 (Remember that tubes were not included in those days). Many versions of the Trirdyne model also appeared. A number of TRF sets were made – avoiding the license fees. Some console sets appeared, also. In 1927 AC sets came out – the Band Box, the Gem Chest (and oriental style), and in 1928 the Jewel Box and the Show Box. In 1928 Crosley increased his WLW station power to 50,000 watts. He was very aware that broadcasting was the key to selling more radios.

Mike Grimes turned over the program to Randy James, an avid collector of Crosley radios. Randy had brought along and put on display a cross-section of his extensive collection. First he showed a ca. 1935 rep-wood Treasure Chest. Next was a Crosley chair side – a metal cabinet containing a Fiver chassis. He showed a rare wood-panel version of the 51 and an ACE V with the sight hole for the tube. Then he showed a rare set of "books"- actually what looks like a set of books, but each one opens up and contains a hybrid transistor/tube radio made by AVCO in the 1950s. Another radio looks like a set of books, but opens up to expose a fairly large "Library Universal Books" table radio. His very nice Crosley Widget rep-wood radio is about half the size of a Buddy Boy. Randy showed and demonstrated a very unusual Model 2-C radio that has only two tubes and uses the cardboard front panel as the speaker. Inside

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## Crosley Fiver 517 Restoration

By Tom Johnson

### Fiver 517 History and Condition:

"Fiver", a reference to a five tube chassis, was a nickname Crosley applied to a wide variety of models between the early and late 1930's, and included a variety of cabinet styles, including multiple versions of tombstones and table models. Cabinets were made of wood, bakelite and metal, so the name "Fiver" covered a number of model numbers and cabinet styles. A variety of knob styles were also employed to further muddle the true definition of "Fiver" even within the same model or year of production. The radio restored here is a Model 517 wood table model from 1937.

When acquired, this example was complete except for a missing tuning knob, and some long ago craftsman had drilled a 1/2" hole in the cabinet for a headphone jack. Otherwise, there were only minor cabinet re-glue repairs to be made but the cabinet had been "antiqued". Popular in the 1960's and 70's, "antiquing" basically meant a coat of paint followed by a darker "wash" that was then burnished to make the piece appear old. This radio obviously had been deprived of its original good looks.

### Cleanup:

The first order of business was to remove the chassis from the case and survey whether the electronics had been previously repaired or modified. It had not. A vacuum and a bristle brush started the process. After removing the tubes, the topside of the chassis was cleaned with glass cleaner and a small brush, taking care not to remove any manufacturing stamps on the chassis. A dry cloth removes the moisture as you go. Common lighter fluid (Ronsonol, Zippo, etc) is then used to remove oil and wax-based stains, etc, taking the same precautions around stamps and paper stickers. Before returning the tubes to their sockets, they were tested and the envelopes carefully cleaned with a damp cloth while avoiding removing any markings. Do not use glass cleaner on tubes as it will almost always remove the markings. Contact cleaner was sprayed lightly down the tube sockets.

### Lubrication:

All mechanical parts were cleaned with lighter fluid or contact cleaner to remove residue from wax and lubricants, and DeOxit was sprayed into the volume control. Light machine oil was applied to the tuning shaft, and tuning condenser bearing. DeOxit was used on the tuning condenser wipers.

### Refurbishing the electronics:

All paper caps were replaced with modern 630 volt types and new electrolytics were substituted for the old filter caps. To avoid having new components "float under the chassis, terminal strips were employed as anchor points for the new filter caps. The old selenium rectifier was replaced with a modern 1N4003 rectifier diode but the original was left in place for appearance sake. The IF transformers were peaked-up, and RF alignment was checked to assure stations appear where expected on the dial. A new power cord was installed and the electronics were complete.

### Refinishing the Case:

#### Stripping:

The brass dial trim ring, speaker mounting studs and grille cloth were removed from the cabinet before the antiqued finish was stripped. Formby's Furniture Refinisher and fine steel wool were used in this process. Fortunately, the original stained surface was intact and in fairly good condition beneath the paint, although stripping took the original varnish along with the paint. No problem though; the original color coat was the important thing.

#### Refinishing the Brass Trim:

The brass dial trim and speaker mounting studs were soaked in CLR overnight in a small pan to remove the old paint without abrasive action. CLR will remove varnish, paint, etc, given time, and while it will leave the brass dark, this is easily polished out. Brasso was used to polish the stripped brass to a high luster before applying a protective coating of clear high gloss laquer.

#### Filling and Sanding The Case:

Cosmetic issues included the hole for the headphone jack and a couple of small veneer chips at the lower back corners of the case. The latter were judged too small to justify veneer splicing, so all openings were filled with Micro Fill, a super-fine grained filler which is apparently no longer manufactured. New old stock can sometimes be found through online hobby dealers. Filled areas were next block sanded smooth with

surrounding surfaces, and the veneer filling was sanded square at the edges using #320 paper on a small wood block.

**Color Staining The Case:**

Even when the original color is still in place, the tops of cabinets are often bleached by sunlight, etc, and may no longer match the rest of the cabinet. This radio had a slightly bleached top and a couple of wet glass rings that a quick wipe down with a light colored stain too care of and evened out the tone. The stain won't do much for the Micro Fill areas, so we'll have to get creative during the refinishing process.

**Case Refinishing:**

Refinishing is definitely more art than science, and I prefer satin laquer for refinishing because it's easy to work with, very forgiving and offers a nice soft patina that mimics old naturally aged finishes compared to say, urethane. The original wood grain was a light tone with natural dark streaking, and mimicking this streaking provided an opportunity to cover the filled cabinet blemishes. First, two thin coats of Deft were applied for a base coat then, like applying makeup, asphaltum (asphalt thinned with lighter fluid) was used to create faux wood grains over the problem areas by simply using a fingertip to create fake dark wood areas over and around the blemishes and blend them into the surrounding grain patterns. The black color band around the top of the case was also repainted on top of this laquer base coat using model car enamel and a small artist brush followed with a clean cloth and paint brush cleaner to remove any over painting.

Next, "sanding coats" of laquer were applied over the paint work. Six thin coats of Deft were applied to provide a thick enough coat to avoid sanding through into the color coats during wet sanding. Then, wet sanding was done every several coats of laquer by mixing a couple of drops of common household liquid detergent with tap water and lightly hand sanding using #600 wet or dry paper until the entire surface had a dull, even appearance. This sand-and- recoat process was repeated until the surface was sufficiently smooth and even to apply a top coat to preserve the surface. The top coat was applied and not sanded but instead burnished to a soft dull hue with super fine steel wool, then further burnished with a clean cotton cloth to a soft patina.

Once the case was finished, the grille cloth was replaced, the trim replaced, and the chassis reinstalled. The result was a fun project that yielded a nice little Crosley Fiver, the makeup notwithstanding, near in appearance to the original.



**Cont. from page 3**

the cabinet is a driver like those in many early cone speakers, with the driver wire attached to the back of the cardboard front panel instead of a speaker cone. The tubes are each dual-element types, a 12A7 and a 6F7. Randy used capacitors to replace the line-cord resistor – a good way to avoid adding an undesirable additional heat source inside a radio cabinet. Other items included a Model 50 and 50A pair, two Crosley brand headphones, a Musicone speaker and a Crosley “Temperator” electric heater that looks like a Musicone speaker. The heater has a built-in electric fan. Randy explained that the Crosley “PUP” that he showed us is not extremely rare, but the original box for one is very hard to find, and some lucky collectors have them with their radio. He showed a photo of a Crosley store front with a big sign in the window stating that over 75 million radios had been sold since the advent of television.

One of our newer members showed his 1940 Crosley with mechanical pre-sets. This nicely restored and very stylish radio has a vertical tuning dial at center (We had seen it at the July Repair Session). The dial has no WLW marking on its dial, as was most often a feature on Crosley radio dials.

Ed Janssen showed us his Crosley service manual covering many models– a real asset when restoring these sets.

Walter Zalesky showed his beautifully restored mini-tombstone Model 516 AM/SW AC set. The dial has blue and red design details. The bezel seems to be rather close to the bottom of the cabinet front, but the slightly tapered sides produced a very nice style.

George Potter showed us a copy of a publication about Crosley by one of our founding members (Puett). It was written by another founding member John Alford, and George is getting some copies to be made available to members. He showed a brochure, The Simplicity of Radio, from the ‘30s showing Crosley box sets and consoles. He also showed us some ephemera related to Crosley’s airplane endeavors – a plastic model of his 1933 airplane called La Cucaracha..

Jim Sargent showed his 1924 Crosley 51 portable. Its leatherette covering is in remarkably good condition.

Tom Johnson showed his beautifully restored Fiver from the late ‘30s. It is a “lefty” design (dial on the left - unusual). Look on pages 4 & 5.

The author showed a home brew made with Crosley parts, featuring Crosley’s early V-T porcelain socket.

Jon Butz-Fiscina showed a photo of Crosley’s Moonbeam C/N: 4 airplane (an internet search yielded a restored one in Lexington, KY). He showed his Model 529 (later 538 as price went up) and a Musicone

speaker. He mentioned that the dynamic versions of these speakers almost always have open field coils. Jon said he has found a good source of leather or leather-covered handles.

**Author’s Notes:**

CincinnatiMagazine.com has a very interesting archived article about Crosley.

It’s interesting to note that Armstrong’s patent circuit diagrams do not show the typical “tickler coil” arrangement for providing the oscillator feedback. Instead, there is the tuned-plate-tuned grid circuit that relies on capacitive coupling within the tube, and a circuit using a coupled set of coils in the cathode circuit of the tube, instead of the plate circuit.

A high school friend and I rode around in his aunt’s Crosley car. It was very small for the time, but bigger than today’s so-called Smart Car. It was the cheap rag-top version.

My first radio, made from junk parts, used a Crosley book condenser for tuning.

Bill McKeown

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## PICTURES FROM SEPTEMBER MEETING

