

SOUND WAVES

VRPS Winter 2014

From the President



This is Nipper, a very large dog I became acquainted with during a long drive from Fort Smith, Arkansas, to Garland, Texas, as I prepared for the auction of a really nice radio collection this past fall. This fella made a great traveling companion, and I found myself talking to him on the journey. So, as this picture would scream, "Hey, lend me your ear!!" --do you ever get that twinge of nostalgia? Well I do...actually, I have it right now as I begin to focus my thoughts and plans for this organization on the eve of its 40th birthday. Fortunately, I have been around long enough ...and I am a packrat, so I don't throw away many things I probably should. In that pile is my stash of early *Reproducers*. Yep, that was the forerunner of our current *SoundWaves* publication. Sometimes I look back at issues written long ago and remind myself of what this organization looked like in years past. I don't want to wax all poetic or anything, but, frankly, what they say about the more things change, the more they stay the same. For example, the

10th anniversary issue of the *Reproducer* (January 1984) includes a summary of the first 10 years of this organization. I read with interest of the first four presidents...there have only been six different (including me). Two of them served the office on two non-consecutive terms. The issue had several things I wanted to make mention of. The March auction was called the Winter Auction...even though it was held on the 24th....guess that is why we changed it to the Spring auction. Dues were \$13.50...today \$20. How's that for keeping inflation in check? The organization was going through some major technology changes. The *Reproducer* was beginning to be produced on a computer, a Xerox 820 (was that a computer or a copy machine?). No more cut and paste from a typewriter. A few members were working on getting a bulletin board set up using 1200 baud modems. Yep, folks, this was pre-internet days. We used modems to dial into a hub computer and could exchange messages...can you say e-mail? Yours truly wrote the first computer program to mechanize our club's auctions. It was written in Basic and ran on my Apple IIe computer. We were really cooking! I see a few familiar names still hanging around today. George Potter was the editor of the *Reproducer*, Jim Collins used to travel from Oklahoma City to monthly meetings, and Les Sims was chief auctioneer. Sadly, so many of the folks mentioned in key roles are no longer with us, including J.W.F. Puett, Chevie Crandall, Bob Nelson, Ken Vander Woude, Ken Diebel, and Walt Jackson, to just name a few. Wonder if they all still get together to discuss old radios? The first convention in November, 1976, saw 100 in attendance. The good news about all of the nostalgic reminiscences is I can still see the positive impact of these pioneers and the ground work they laid in the first 10 years and their concerns about continuing to grow and move forward. These are still the thoughts we have today as we

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move into our 40th year. Help me make it a great year, one that will serve as a foundation for another 40 years. Good hunting.
—Jim

Notes from the October 19, 2013 meeting

President Jim Sargent conducted the meeting, starting with our member self-introduction go-around. He reminded us of our upcoming annual convention and the need to get our reservations. He filled us in on his rather extensive tour of meets and museums in the North and Northeast, including 75 to 100 antique malls. He said there were about 75 dealers at Chicago (down from around 175) and about 500 at the Rochester meet. He said the AWA meet featured many technical sessions. The new AWA museum has many exhibits with demonstrations of working items, including transmitters and black-and-white TV sets. A trip highlight was the Museum of Radio and Technology in Huntington West Virginia. A really fascinating and very extensive virtual visit can be made at: <http://www.ohio.edu/people/postr/MRT/>.

The program for this meeting consisted of discussions and display of materials related to radio contact verification. Club president Jim Sargent conducted the program, using a lot of material from his private collection. Amateur radio operators were (and still are) anxious to document their two-way communications. They used "QSL" cards mailed to each other to serve as proof of each radio contact. During the early days of radio, general-public listeners were eager to pick up radio broadcasts from as far away as possible – to establish "bragging rights" for the performance of their radio sets. Radio broadcasters were also interested in the distance their signals were reaching out with their program material and advertising. Their rates for advertising time could be tied to the size of the area their signals could reach. In 1924 the EKKO company in Chicago came up with a scheme wherein they published a catalog of radio stations with a blank space for each station, sold for \$1.75 to the public. In turn, they sold "reception verification stamps" to the radio stations. On hearing a particular station, people could write to them and explain, as proof, what program material they had heard. The station would then send them their EKKO stamp, which carried the station call-letters. The listener would then affix the stamp to its place in the catalog. Eventually, EKKO sold stamps directly to the listeners so that they could fill their books without having to actually hear the stations. By about 1940 the stamp fad waned and faded out. Jim showed us a number of examples of stamps and also the postcards that were used to communicate with the stations. A number of these stamps are available on e-Bay (search on "EKKO stamps"). The photos shown in the e-Bay listings show good examples of the stamps.

There are still a number of listeners who make a hobby out of "DX" (long distance) reception of signals from different sources, e.g. AM and FM radio and TV. New member Will Kutler showed us his leather-covered 1950's Stromberg Carlson portable radio. It sports several short wave bands. Externally, it looks similar to its RCA and Zenith counterparts (It might be a good candidate for DX work.)



Author's Note: There are still international short-wave broadcasters that offer to send letters of confirmation to listeners. I have heard such an offer from a station in Rome, Italy. You need to note the program material, time of reception and the frequency on your letter to them.

Bill McKeown

2013 VRPS Old Equipment Contest Winners

1. Regenerative Radios Homebrew - **Cleo Cherryholmes**
2. Regenerative Radios Factory Built - **Gilbert Hedge** - Zenith 1R and 3M
3. Crystal Radios Pre 1940 - **Charles Horvath** - Steinmetz Superior
4. Battery Receivers Pre 1928 - **Keith McManus** - L. G. Pacent Breadboard Radio Exhibit
5. Tombstone Receivers Pre WWII - **Mike Grimes** - David Grimes 1934 Model 565 Serenader
6. Cathedral Receivers Pre WWII - **Bob Slagle** - Pilot All-Wave Radio
7. Wooden Table Radios Pre 1950 - **Bob Slagle** - Stewart-Warner Radio
8. Non- Wooden Table Radios Pre 1950 - **Walt Zalesky** - Airline 242T
9. Transistor Radios Pre 1965 - **Larry Lamia** - Pair of Philco T7 Radios
11. Loudspeakers and Microphones Pre 1950 - **Sam Luscomb** - Glass Horn Speaker
12. Novelty Radios Tube or Transistor - **Dale Allen** - Emor Globe Floor Model Radio
13. Vacuum Tubes or CRT's Pre 1950 - **Tom Burgess** - Pearl Harbor Tubes and Exhibit
14. Restoration Category - **Kenny Black** - Three Airline Movie Dial Radios
15. Open Category - **Cecil Miles** - 1948 Hammond Solovox
Mike Grimes - Signed Letter from Edwin Armstrong Concerning FM
16. Radio Related Advertising and Ephemera - **Gilbert Hedge** - Zenith Arctic Expedition Ads
17. Homebrew and Kit Radios - **Tom Burgess** - Midget Radio Built from Plans in the Book "*Radio For The Millions*"

Special Awards

- **First Time Contest Entry** - **Kenny Black** - Three Airline Movie Dial Radios
- **People's Choice** - **Kenny Black** - Three Airline Movie Dial Radios
- **Best of Show** - **Keith McManus** - Pacent Breadboard Radio and Exhibit
- **Founder's Award** - **Bob Voss** - Early Version of Knight Kit Ocean Hopper Receiver

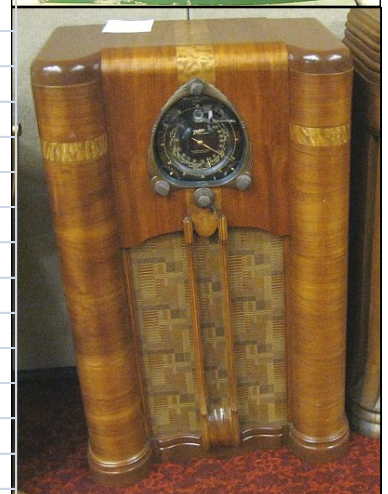
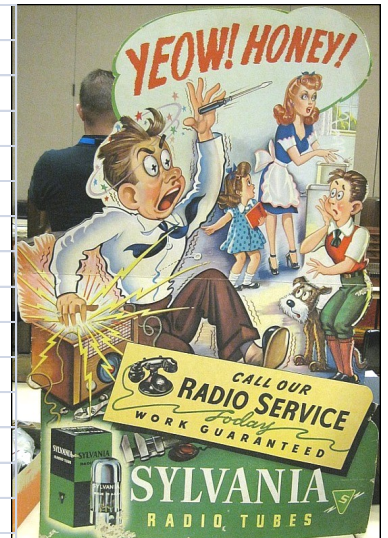


Best of Show

Highlights from the Auction at the 2013 VRPS Convention

There were nearly 1000 items offered for sale, totally nearly \$39,000 in sales. Almost \$500 in sales was donated to the club.

Edison Amberola upright cylinder phono, works, beautiful	\$1,000
Edison Gem – maroon color, nice, with horn	\$625
Zenith 40-125 console, Darth Vader, very nice	\$560
Philco model 70 grandfather radio, this was a true show piece	\$520
Federal model 159, gold hardware, circa 1921, nice	\$500
Zenith console, very nice, model 9S262	\$380
Simplex cathedral, nice	\$350
PhilcoPredicta barberpole TV, needs restoration	\$330
Craftsman chrome chassis tube amplifier	\$320
Edison Standard cylinder phonograph, very nice	\$300
RCA black Catalin radio, very nice	\$260
Atwater Kent model 735 tombstone, nice	\$250
Philco model 90 cathedral, nice	\$240
Zenith Transoceanic – “Bomber”, very nice	\$220
Bristol Senior horn speaker	\$200
Radiola V, 1923, nice and complete	\$200
Tower Cone speaker, very nice	\$190
Zenith cathedral model LH, early model	\$160
Truetone table top radio with unusual twin speakers	\$150
Military grade TV-2 tube tester	\$150
Radiola X, circa 1923 missing grill, otherwise complete	\$140
Two pink bakelite radios	\$140
Crosleymodel 124, “Playboy”, restored	\$130
Zenith tombstone model 807, nice	\$120
Philco model 20 cathedral	\$120
Grebe Syncrophrase model MU-1	\$120
Western Electric model 540 cone speaker, nice	\$120
Philco advertising clock, working and lighted	\$110
Globe 50 tubes, all tested good, three sold	\$110, \$110, \$90
Grunow model 450	\$100
Fada model 209	\$95
Montgomery Ward Airline cathedral	\$95
Atwater Kent model G horn speaker, good driver	\$85
Atwater Kewnt cathedral model 84, restorable, complete	\$85
Radiola 17	\$85
Western Electric 518W horn speaker	\$75
Zenith model 5S119, good condition, complete	\$70
Graybar (same as Radiola 60), nice	\$70
Crosley “Dashboard” radio, very nice	\$70
Sonochorde speaker, very nice	\$70
Crosley model V, one-tuber	\$65
Vogue picture records several	\$65, \$35, \$30, \$25
Radiola 103 speaker, no back bonnet, otherwise good	\$55
Radiola III, circa 1923, no tubes	\$55
20 good cylinder records	\$45
Early Globe 3-tube radio, missing some parts	\$45
J.W. Davis tube amplifier	\$40



Secrets of the Sages: How to modify a vacuum-tube audio output stage for higher fidelity.

By Patrick Jankowiak

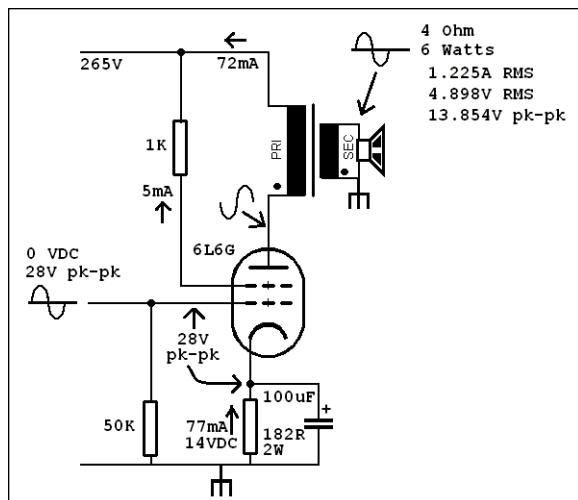
Many pieces of vacuum tube audio equipment that are not "Hi-Fi", but are otherwise reliable or rugged, have a rather small or inexpensive audio output transformer. These can be given a wider power bandwidth, smoother frequency response, and a higher slew rate without much expense or trouble. This translates into a clearer or less muddy sound from the speaker.

Most experimenters are familiar with overall negative feedback of the type taken from the output of the equipment and delivered to an early voltage amplifier stage. In the overall feedback system, the output voltage is sampled, attenuated, and fed to a point in the early voltage amplifier where it is 180 degrees out of phase with the voltage generated by the input signal. The overall loop is responsible for overall frequency response and voltage gain.

This article will describe a negative feedback scheme which surrounds only the output transformer and the power amplifier stage. Its purpose is to use some of the power from the output stage to correct for imperfections in the output transformer. This system delivers power, not only voltage, to the output stage cathode. At the cathode, this becomes a voltage inserted in opposition to the normal signal voltage present in the grid to cathode circuit. It is best applied in systems with a grounded cathode, but can be applied between the cathode and signal ground in a cathode-biased system. In a push-pull output stage, the power feedback is applied out of phase to each half of the circuit.

The two feedback systems are in no way mutually exclusive and the latter can be added reversibly to any amplifier. The gain reduction from cathode feedback must be 2 to 3 dB to be effective but there is no penalty to actual power output.

Figure 1 [Note: see full-size photos on VRPS web page by clicking link] shows a textbook single ended, cathode biased 6L6 amplifier making 6 Watts. This will be used to illustrate the principles. Specific power levels aside, this circuit is just like those found in many tabletop receivers and some consoles. The operating difference between a beam tube, Tetrode, Pentode, or Triode may be ignored for this purpose. In the figure, the various potentials and signals are labeled. The values are approximate to full output but are not closer than 10% in practice due to component variations. The reason that three "overkill" digits



of precision are used for some of the values is to maintain better precision through several sets calculations (don't worry, lengthy calculations are not needed in practice but are useful when explaining the circuit). The secondary winding of the output transformer supplies 4.9V RMS to the speaker load. This is 13.85V peak to peak. The peak to peak and DC voltages are important because the grid of the stage is driven against the cathode by an input voltage that is always considered in terms of the peak to peak and DC voltages between the two elements. The diagram is labeled with the important voltages and currents, and indicates DC levels that are added to the peak values.

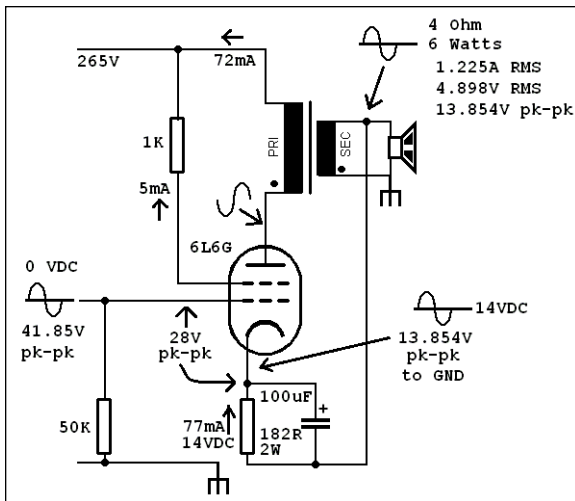
Not all class A output stages use a cathode bias resistor bypass capacitor but it simplifies the understanding of the circuit operation to consider that the only voltage present across the R-C circuit between the cathode and ground is the DC bias of 14V and that any degenerative audio voltage otherwise appearing across the 182 Ohm resistor is bypassed to ground (nullified) by the 100uF capacitor. (In this circuit, 100uF is enough

to cut the degeneration across the 182 Ohm resistor to about half at 50Hz, plenty low for a console.)

Figure 2 [Note: see full-size photos on VRPS web page by clicking link] shows the same circuit, but with the secondary winding of the output transformer inserted between the ground end of the cathode bias arrangement and ground. The 77mA cathode current does flow in the speaker and OPT winding but the magnetic effect is trivial. The 13.85V peak to peak voltage is applied in a manner that drives the cathode voltage positive when the grid voltage has been driven positive, and the reverse is also true. The grid drive voltage to the stage must be increased by this additional 13.85V to a level of 41.9V in order to attain the same 28V pk-pk grid to cathode voltage and make the same 6 Watts. This is where, in some cases, the preceding circuit may need attention. If it can not produce this extra voltage without distortion, there are several remedies that can be applied.

The simplest is to increase the driver plate supply voltage and at the same time increase its plate load resistor and the power stage's grid resistor values by the same percentage (always observe the tube manual's "maximum grid No. 1 resistance" value in any case; it will still work. This modification may also increase the gain of the driver stage. If the

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same gain is needed from the overall circuit, then the extra 2-3dB gain has to be made up somewhere. The "RC coupled amplifier" sections in the tube manuals is helpful.

VRPS Online only diagrams:

[Figure 3](#) shows a 50 Watt push-pull public address amplifier, the Stromberg-Carlson APH-1050. This model has good fidelity in its own right, and applying the cathode feedback modification made the amplifier respond much faster and made it sound more clear or transparent. A-B blind listening tests using one unmodified amplifier and one modified one, a directly-connected CD player as a source, and an inexpensive 12" 3-way "hi-fi" speaker, resulted in the modified amplifier being picked as best sounding each time.

[Figure 4](#) shows the modified schematic of the same amplifier. Serious students of tube audio amplifiers will recognize that using transformer windings to feed back corrective signals to power tube cathodes and other

tube elements was used by Quad, McIntosh, and many others. Finally, this modification permits low idling current and does not carry the low-power/inefficiency penalty of the so-called Williamson or Ultralinear "screen grid taps" output circuit.

The following articles on one of the author's web sites fully discuss the modifications made to several power amplifiers of limited fidelity, the reasoning for each change, and the results obtained. **Note: URLs are ".htm", not ".html".**

1. Improving the Stromberg-Carlson APH-1050 Public Address Tube Amp
<http://www.montagar.com/~patj/aph1050.htm>
2. Improving the RCA MI-12188A Public Address Tube Amp
<http://www.montagar.com/~patj/mi12188a.htm>
3. Improving the Stromberg-Carlson AP-80 Public Address Tube Amp
<http://www.montagar.com/~patj/ap80.htm>
4. Improving the Stromberg-Carlson AP56 and AP55 Public Address Tube Amps
<http://www.montagar.com/~patj/ap56.htm>

Secrets of the Sages: Working with Zinc Die Cast (Pot Metal)

By Larry Lindsey

I was given a Radiola 33 which is a 1929 rectangular metal radio with long metal legs. The top and the four vertical edges of the radio are covered in a decorative trim made of pot metal. I should say that the used to be covered. Many of the pieces were broken off (some were missing) and the pieces remaining on the radio were in sad shape. I had no idea what I was going to do with this radio.

At the convention in Mesquite I saw two other 33's with bad pot metal parts and because I was off my medications, I thought it would be a good idea to see if I could make one radio out of three. I bid on and got them because no one else wanted them. Everyone knows that the chances of finding those pot metal parts in good condition are about the same as winning the lottery.

Pot metal is one metal that most people think cannot be repaired and in many cases they are correct. Who knows what the alloy recipe was in 1929 but all the pot metal I have encountered in these old radios did not stand up over time. I had one Stromberg Carlson tuning gear that just crumbled like old cheese. I have a Kolster that has all the tuning mechanisms made of pot metal and they were still functional but cracking badly. I reinforced it with epoxy and crossed my fingers. My Radiola 33 trim was warping badly and was brittle as glass. Being made in thin strips caused it to break in several places.

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Can pot metal be straightened, I didn't have a clue and there was almost no information on the internet. Can it be put back together; well the internet had a few people offering rods and flux that they claimed work. I decided to start experimenting and got out my oxy-acetylene torch. As everyone knows, this is a torch that will reach the 700 degree melting point of pot metal in a heartbeat and the place where you were heating will disappear then end up of top of your foot. Not a good thing.

I have a flat steel table with nice square edges so I would place a piece of steel of just the right weight on the pot metal, heat it with the torch, while controlling the heat by standing back far enough and found that the metal would eventually "relax" and flatten out against the table. If I put on too much weight, the piece would break; not enough weight and nothing would happen. I found that a little heat made it lightly smoke (probably old paint), a little more heat and it would "sweat" small beads of a shiny metal, too much heat and it melts away. Luckily that last step never happened. Eventually by using all types of jigs and fixtures, I had corrected the waves, curls, twists and un-square corners. It was now time to take all these pieces and make one good one.

I ordered some rods and flux from the internet and paid them more money than the radio is worth (still not on my medications). I cut and pieced the strips so that the decorative patterns would match. I squared the edges with a bench disc sander and beveled the backside for the filler rod. I practiced on one scrap piece which turned out ok so I was ready. I had to weld from the backside so I aligned the two pieces as best as I could but could not see if the patterns on the other side were perfect or not. The welding went ok but I was not able to perfectly match those patterns on the other side. When it came time to join the last two pieces of the rectangle, they didn't come anywhere near matching up. Just think; if all four corners are not perfectly square, or all sides were not perfectly straight, it would amplify this misalignment. I identified the problem areas, applied gentle pressure and the right amount of heat and was able to bring them into alignment and make the weld. After some filing, and some paint, the piece looks pretty good but I've got to be very careful because if I drop it I'll be picking up pieces.

One thing I have noticed is that pot metal swells, or grows, as it ages. My trim had studs that went through holes in the metal lid. When I cut and fitted the pieces, I matched the pattern on the trim exactly but the studs and holes on the final piece didn't come close to lining up. This swelling, with the studs anchored in the metal lid, probably caused the original piece to buckle, crack and break.

Once again I'm restoring a radio that makes no economic sense but I did prove to myself that I could straighten and join pot metal. The entire process was like trying to disarm a bomb; one false move and things go south in a hurry.



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SOUND WAVES

MONTHLY MEETING PROGRAMS 2014

NOTE: Programs will be held at various locations in Irving, Texas. Make note of the location as they may change from time to time. Senter East, 228 Chamberlain St.; or Garden and Arts, 906 S Senter Rd. Maps are located on the WEB site, EVENTS page. Programs start at 2pm. unless otherwise noted. Call us on the cell tellie if you get lost: 972-898-7251 or 972-742-8085.

JANUARY 18 SENTER EAST Building

Radio: "Out of Thin Air." We will view Modern Marvels DVD which depicts the evolution of Radio from the early inventors. This will cover the history and the pioneers of communication by Radio.

FEBRUARY 15 GARDEN & ARTS Building

Early, modern, unique, unusual, and/or interesting radio test equipment will be the topic. Bring any test equipment that you think would be of interest. You may demonstrate, describe or show how it was used in trouble-shooting radios.

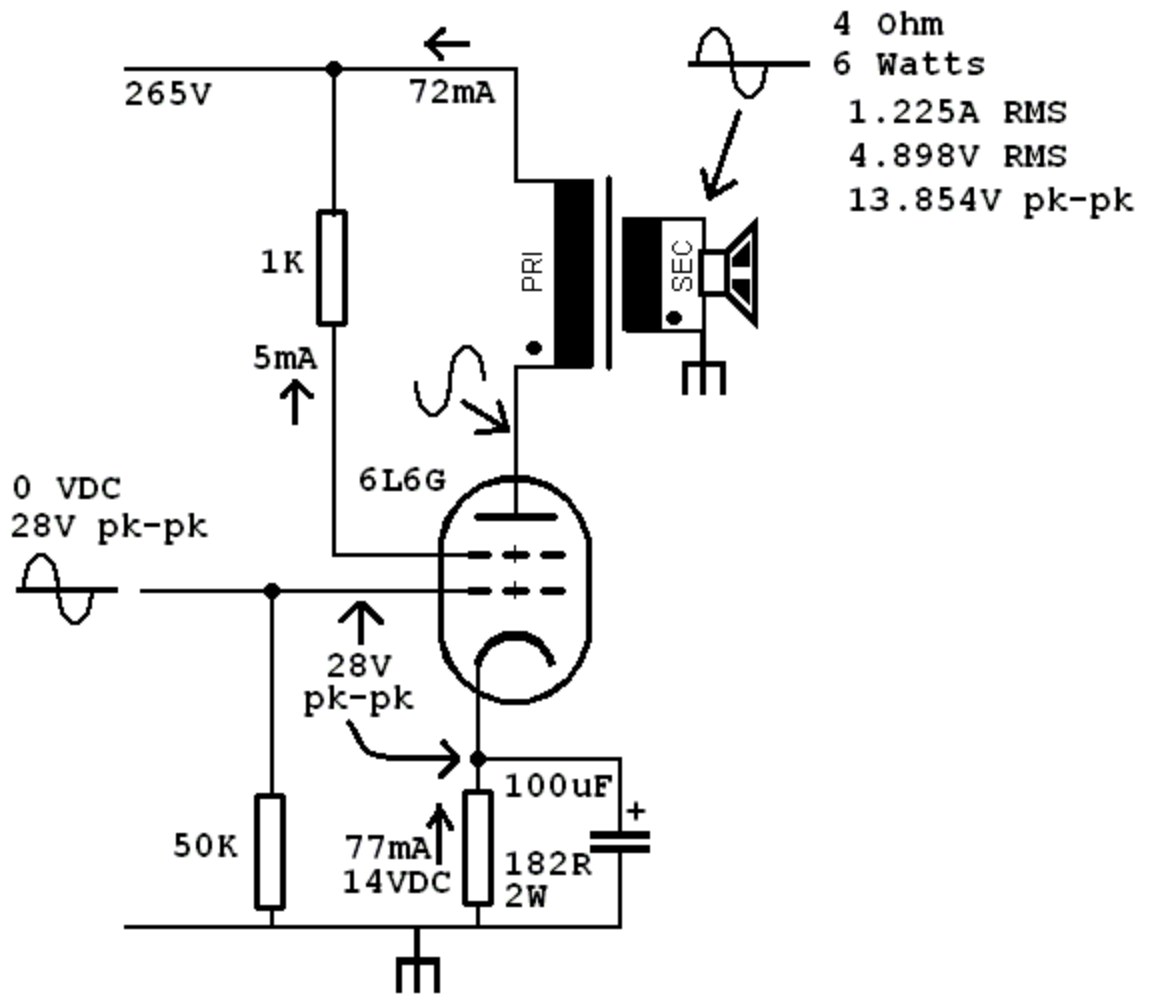
MARCH 15 SENTER EAST Building

Spring Auction. 7am to 5pm.

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.

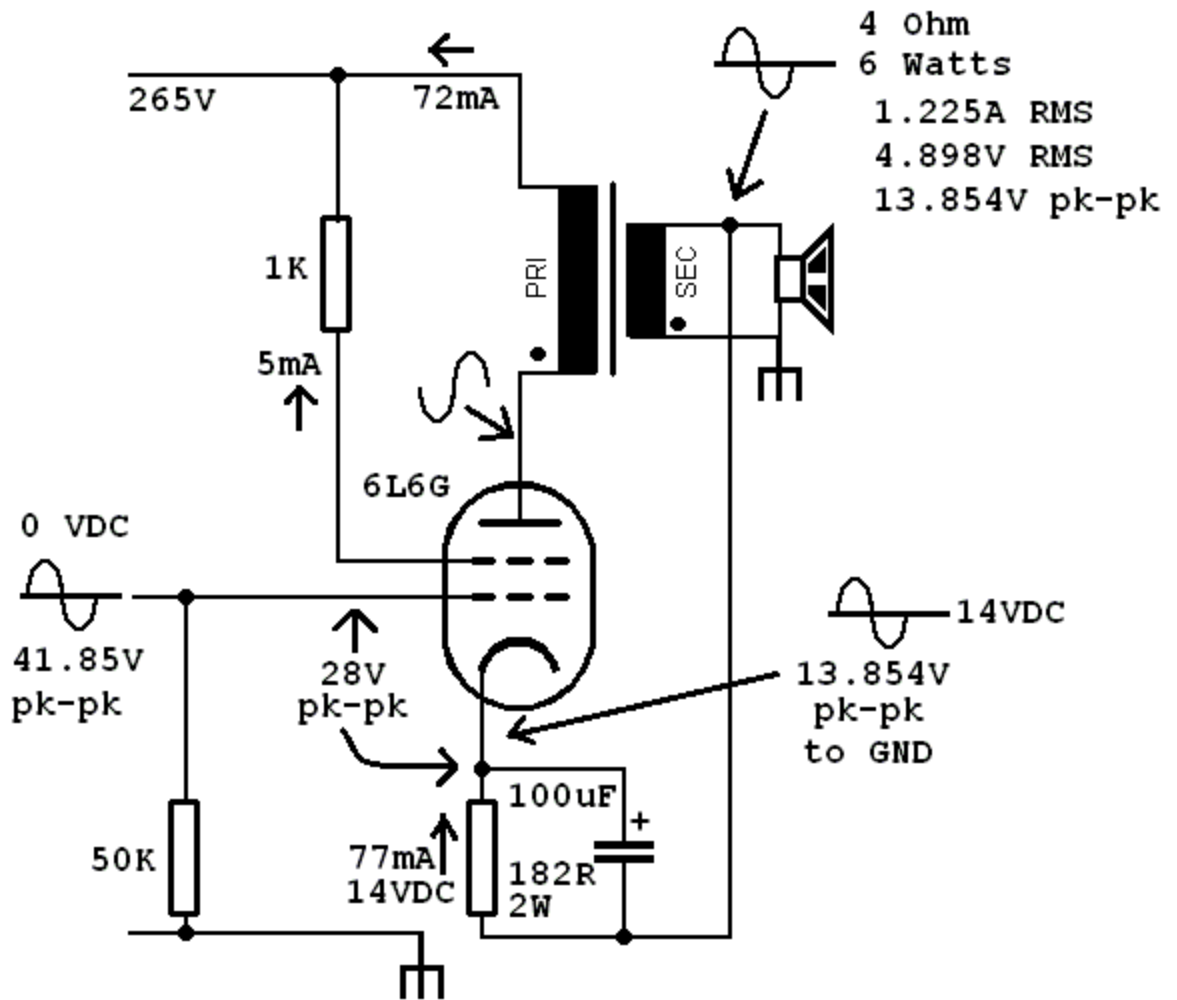
Call me anytime or send me an email. Mike Grimes 972-898-7251 (cell), or K5MLG@verizon.net.

Figure 1 from "How to modify a vacuum-tube audio output stage for higher fidelity."



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Figure 2 from "How to modify a vacuum-tube audio output stage for higher fidelity."



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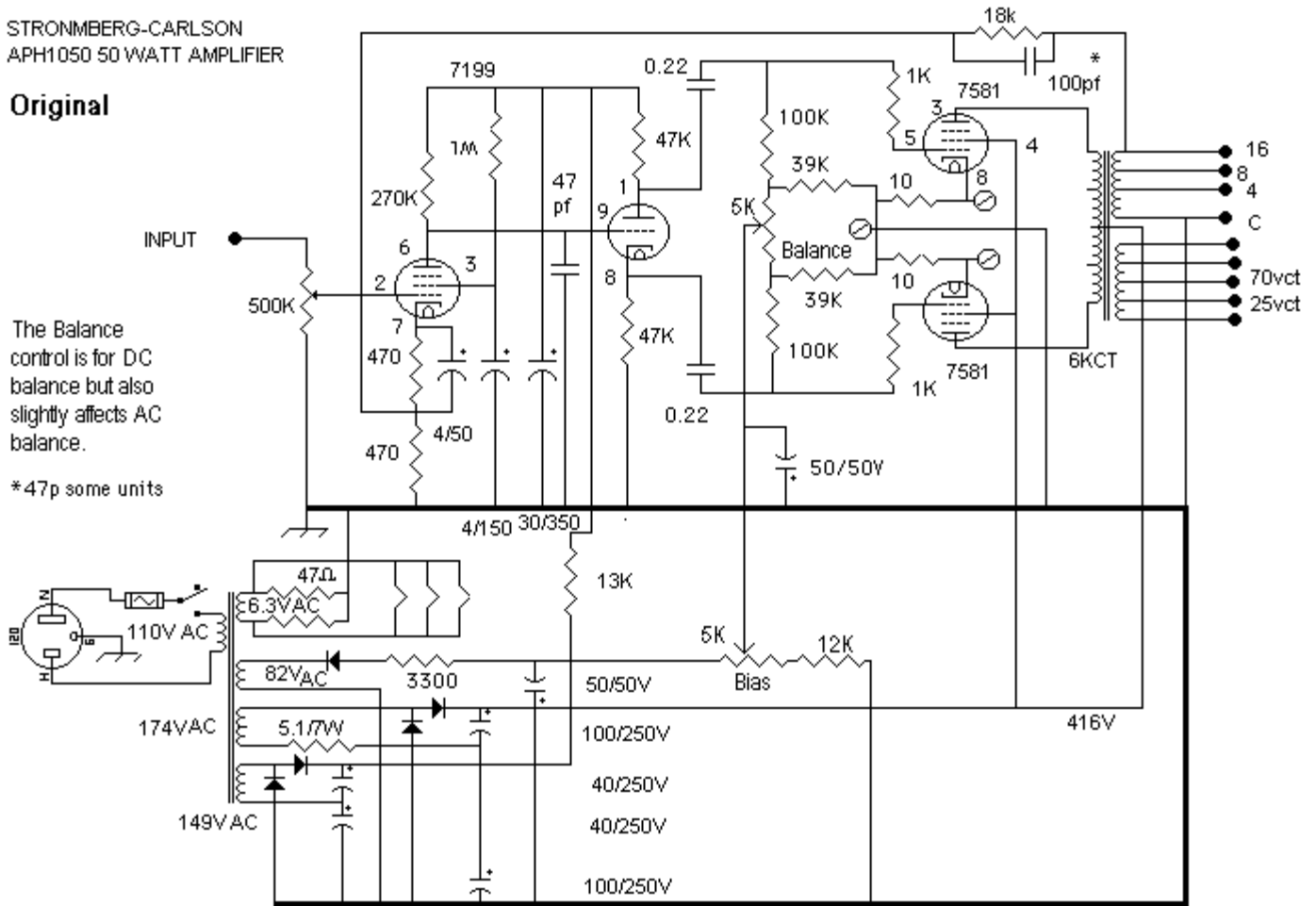
Figure 3 from "How to modify a vacuum-tube audio output stage for higher fidelity."

STRONMBERG-CARLSON
APH1050 50 WATT AMPLIFIER

Original

The Balance control is for DC balance but also slightly affects AC balance.

*47p some units



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Figure 4 from "How to modify a vacuum-tube audio output stage for higher fidelity."

STRONMBERG-CARLSON
APH1050 50 WATT AMPLIFIER

AS MODIFIED BY
PATRICK JANKOWIAK

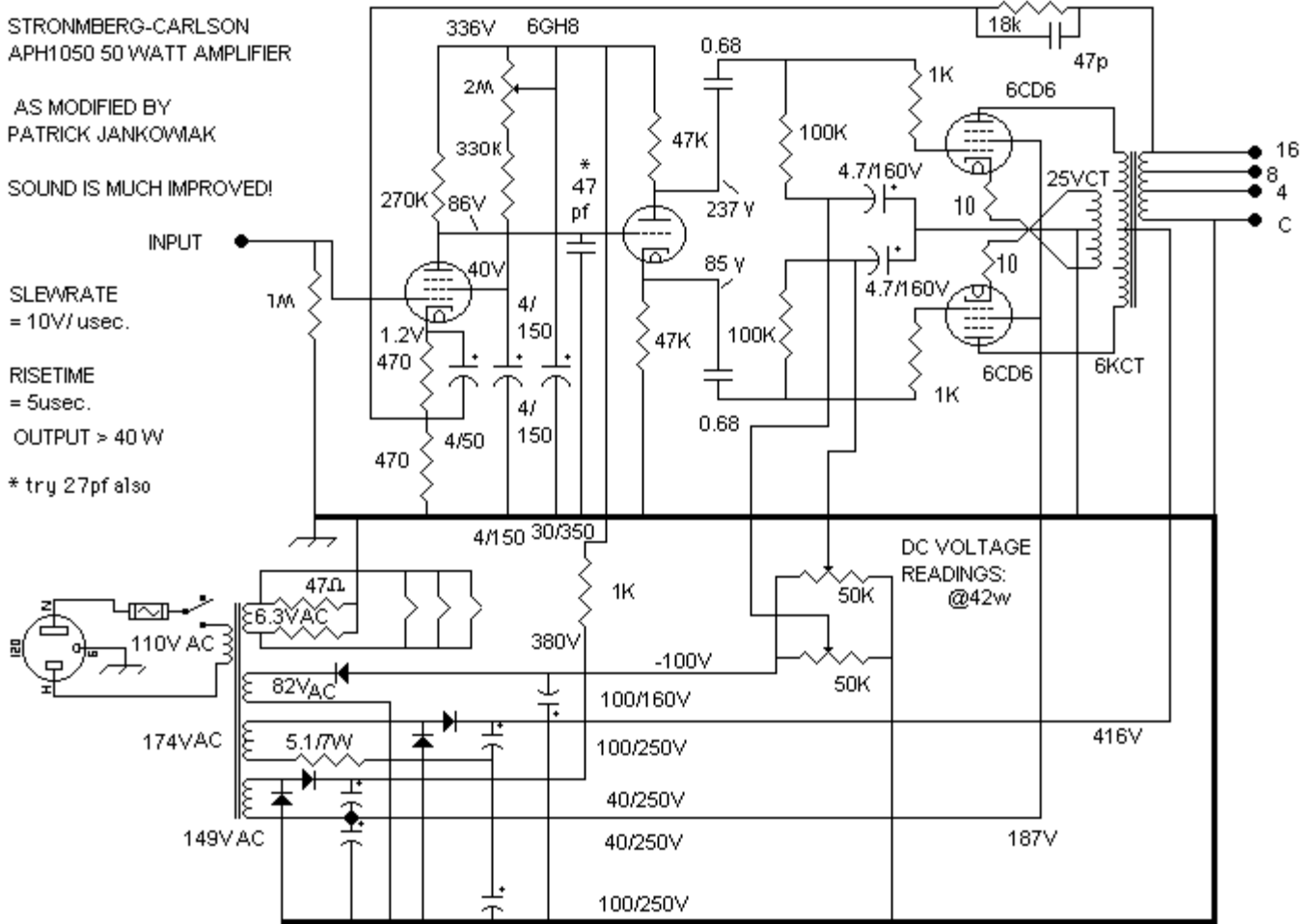
SOUND IS MUCH IMPROVED!

SLEWRATE
= 10V/usec.

RISETIME
= 5usec.

OUTPUT > 40 W

* try 27pf also



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