IMPROVE THE PERFORMANCE OF YOUR AC/DC SETS

John Eckland

Below are some useful circuits for improving reliability and performance of AC/DC sets using resistance line cords or ballast tubes. In some cases a partial or complete tube line-up change would be necessary. These changes are recommended for sets intended for continual or daily use. These conversions also apply for 'battery' editions of conventional AC/DC table sets. I recently received a Crosley bakelite table radio of the "American/Overseas" variety. Instead of the usual AC/DC or AC tube lineup, this set was to operate on dry batteries; 90 VDC for the plate supply and 1.5 VDC for the filaments. The tube complement was typical for a set of this type: 1A7, 1N5, 1H5, and 1A5. Here's how this butcher job began (AC radio renegades listen up!) I pulled out a chassis punch and removed the 3/8" slug for the rear apron of the Crosley chassis. I then installed a rubber grommet and threaded through a hank of 18 gauge zip cord, tying a knot in it. Next I installed a double 8AG fuse holder nearby on the inside apron and soldered the cord to one side of the holder. I could continue on, step-by-step, however I trust the following schematic will suffice.

Anyway, I selected a 6A8 to replace 1A7, a 6K7 for 1N5, a 6SQ7 for 1H5, and finally a 6Y6GT/G for the 'wimpy' 1A5 output tube. I fitted the set up with a new speaker assembly. Originally a 5" permanent magnet unit with a 25K Ohm/4 Ohm output transformer (very difficult to locate today) was used. Now the speaker is 5"x7" with a 4 Ohm voice coil and a 2000 Ohm to 4 Ohm output transformer. The latter is much easier to find.

I could have selected tubes for use in series string, however I chose tubes for use in parallel to minimize 'flashing' of the heaters during initial powerup. As I feel this greatly reduces the lifetime of tubes as well as pilot lamps. This undesirable flashing of heaters and lamps also occurs in sets with diode replacements for resistance line cords or ballasts. The optimum filament transformer selected to operate these tubes and several pilot lamps is rated 6.3 volts AC at 3 amps. In this particular chassis there is plenty of room to mount a filament transformer, output transformer and filter choke. These parts can be obtained from swapmeets and junked sixties' vintage table sets.

I used a 6Y6 output tube for compatibility with extant output transformers in most AC/DC sets, its copious supply and awesome power output of up to 3.6 watts! To improve the tone quality replace the volume control with a tapped type (as shown) as well as application of inverse feedback (also shown).

I cannot overemphasize that these sets present a shock hazard and must not be operated near a sink or any grounded appliances. I affix a sticker on the back of all AC or AC/DC table sets and inform the owner as well.

Photos of the completed chassis are shown. Although the radio is no longer 'original' the set plays beautifully now, and was fun to restore.

John Eckland restores vintage radios, televisions and hi-fi equipment as his vocation. He likes to 're-engineer sets', and has been involved in the old radio hobby since early childhood.

AC/DC Safety

Bill McGowan
Costa Mesa, CA

I read John Eckand's Article "Improve The Performance of your AC/DC sets." John rebuilt a Crosley Farm Radio.

In its original condition the radio did not present an AC shock hazard, as it was a battery set. John's article states several times that this chassis presents a shock hazard. But if you look at the schematic it is more than a shock hazard.

It is deadly. One side of the AC line goes to the chassis via a lamp fuse and the on-off switch. If the AC plug is inserted into a non-polarized wall outlet the wrong way, the chassis is at 117 VAC above ground. There are a lot of old houses which do not have polarized AC outlets. I have seen AC cords with non polarized plugs. Also, the face that a wall plug is polarized does not mean it is wired correctly. John added a 6.3 VAC filament transformer, a choke, and a new output transformer, which was a lot of work. He ended up with a deadly chassis. One solution would have been to use a standard power transformer with a 3 AMP 6.3 VAC filament winding. By using a bridge rectifier he could eliminate the choke, because he would now have full wave rectification. The choke would be replaced by a resistor of the right value and wattage to achieve the DC voltage required. The value of resistor would also depend on the AC secondary windings of the new transformer. I would try to buy one at an electronic swap meet. In that case, you really do not know what you are buying, but sometimes the values are printed on the case.

I have Westinghouse Model H-147 built in 1947. It is a standard 5 tube set using miniature tubes. I recapped the set and was surprised to see that I had a deadly chassis. See the schematic. Westinghouse must have realized it was a deadly chassis, as they used double-pole, single-throw on-off switch. I wonder how many people received the shock of their life when the set was on. (In 1947, polarized house wiring was not used as far as I know.)

I believe the easiest thing for me to do with this t is to lift the chassis grounds and install a floating ground buss. The floating ground buss is then connected to the chassis via a 150K resistor and 0.1 uFd cap. Philco was using this method by 1951. This circuit reduces the current to a safer value.

In all cases, anyone repairing AC/DC radios should use an AC isolation Transformer, which can be obtained from Antique Electronic Supply in Tempe, AZ. This will prevent you from receiving minor shocks if the capacitor from the floating ground buss is good, or a deadly shock if it is shorted.

Good Luck.