

The

# FLASH!

The "Colorado Radio Collectors Antique Radio Club" Newsletter

*Dedicated to the preservation and education of wireless, radio, television and associated equipment.*

Volume 31, Issue 5

Sept. Auction/BarBQ canceled

Sept./Oct. 2020

## Renew Your Faulty 1920s Tubes & Increase Efficiency

by Dave Laude, CRC Member

In this article I will show you how to not only restore those dead or weak 01As and similarly constructed tubes, but also to improve efficiency by extending the "A" battery life. I had initially intended for this article to be about transistor replacements for tubes and started writing an article until I had a rare moment of creativity. I happened to have a non-functional 01A tube whose glass envelope was loose on its base so I removed it and used the base for prototyping transistor circuits by soldering wires to the pins from the inside. I decided on a final reservation of using modern technology to process a radio signal in a 1920s radio. About a year ago a ham radio friend of mine unloaded his tubes on me. Some were ultra-miniature hearing aid tubes. I thought about departing with them, but then one day I realized one might fit into the recess I noticed at the bottom of the removed glass envelope if the vacuum seal tube was broken off. I found the tube fit with little room to



Early in 2019 I gave a "show and tell" at our meeting about this very subject, but at the time I was using a different tube, a 5702. Now I have found the 1AG4 tube with a much lower filament current. The 01A requires 250mA from the "A" battery. The tube I initially chose 200mA and the 1AG4 40mA with similar performance! This is especially important for me because I run my early 1920 sets only on batteries, like they were intended, and the "A" battery is where the largest current drain is (5 tubes @ 250mA=1.25A). Even though I use rechargeable batteries I'd rather not have to recharge every few days as I use a battery set almost every evening.

Other novel ideas have been used to fix these old tubes such as a transistor circuit wired into the base, adapter socket for another tube type (Flash Vol 30, Issue 2) and replacement of glass envelope with more modern tube connected to the original type base (Flash Vol. 29, Issue 1). Each has its own advantages and disadvantages. For me, the advantages of the concept presented here is that the tube looks the same from the outside, filament current is greatly reduced, and performance is practically identical to the 01A. Also, near instant warm-up. Disadvantage is more "A" battery current than a transistor and no noticeable glow. The 1AG4 can be found on e-bay for \$3-\$9 each. It is a pentode, but it will be wired to make it function more as a triode like the 01A. It could also be used to replace a tetrode. The only other required components are two small resistors.

*continued on page 4*

# Club Announcements

## MESSAGE FROM THE PRESIDENT

Hi CRC Club members,

Normally this edition of the Flash would be filled with details for the annual CRC auction / BBQ event and we would be planning our November end of year meeting. Hard to believe it has been 6 months since our last club activity - March meeting at Littleton Library. We had no idea at the time that this would be our last club activity for 2020.

Since March, with all our cancellations, the Flash has taken on a much larger role - essentially the only means of communications with club members. The articles continue to be high quality - such as last months edition with Larry Snyder's "Arguments against car radios in 1929" and Paul Heller's "Origins of Digital Communications".

Now would be a good time for all of us to write a new Flash article (I have one in the works, hopefully in the next edition). Something you are working on or a recent addition to your collection. Let the club know what you've been up to... Steve Touzalin (Flash editor) would love to get your articles / updates. Please submit your articles to Steve at [stevetou@comcast.net](mailto:stevetou@comcast.net) or Larry Snyder at [Lsnyder200@cs.com](mailto:Lsnyder200@cs.com).

To this end, a reminder to pay your club dues; Canceling club events has severely impacted our treasury. With little to no money coming in (from auctions, raffle tickets, club donations) we still have expenses in printing and distributing the Flash. Please, if you have not made your \$20 dues payment for this year then send your check to:

**Merrill Campbell, 4723 Woodbury Dr.,  
Colorado Springs, CO 80915.**

A big Thank You to those that have paid.

As we look forward to 2021 we all hope for a healthy climate and return to normalcy.

Mike Cook  
CRC Club President

### Meeting Locations (Unless noted otherwise)

**Please check website  
for latest updates!!!**

Littleton	Castle Rock
January	May
March	July
September	November

### CRC MEETINGS

Meetings are held on the 2nd Sunday of every other month starting in January (except May is the 3rd Sunday) at 1:00 pm. The meetings consist of business, "show & tell", raffles, auctions, swap meets, technical discussions and other subjects of interest.

### CRC MEMBERSHIP

Annual membership in the CRC runs from July to June. Dues entitle members to attend meetings, "The Flash!" our newsletter, participation in our spring show and Fall auction. Current annual dues are \$20. New memberships will be prorated to the following June.

### Upcoming Events

Sept CRC meeting -**canceled**

Sept CRC Auction -**canceled**

Nov CRC meeting -**canceled**

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# The Overnight TV Ratings

submitted by CRC member Don Andrus

The following is an anecdote from 50 years ago when I was working for IBM in New York City as a Customer Engineer, primarily repairing punch card data processing equipment in customer's offices. One day I was asked to go out of my normal territory to service an IBM machine at a company called Arbitron. I'd heard of Arbitron — the company that produced the radio and television market share reports, often referred to at that time as the 'Overnight Ratings'. That was about all I knew about them when I arrived at their office on west 57th street.

On the third floor of a non descript office building I quickly resolved the customers complaint, and then, after asking, was enlightened on how Arbitron, determined who was watching which of the 12 VHF and one UHF TV channel that served the New York City area in 1967. Cable TV had arrived, but in 1967 only to provide a better quality signals from the existing channels. With so many 'skyscrapers' and apartment buildings, ghosting and signal quality was a problem in areas of the city.

The method Arbitron was using at that time was termed Significant Area Sampling. By sampling families in the New York City, Chicago and Los Angeles areas, they felt the data collected could be extrapolated to indicate what people were watching throughout the nation. A competitor, the A.C. Nielson Company, used a sampling system which relied on people keeping a written diary of the TV programs they watched each week. The Nielson families were located throughout the U.S.. Arbitron preferred to use a technological approach to sample who was watching what at any given moment, as it was known that the written diary method was not always complete, or correct, and therefore not that accurate.



A thousand families in the NYC area had TV sets modified by Arbitron. The Arbitron technicians modified the sets by adding an additional external wafer switch to the back of the turret tuner in each set, along with installing a small 'black box' inside the set. This was done at Arbitron's TV repair shop where they also preformed any TV repairs needed to the set, at no charge to the owner. The Arbitron families were paid a small amount each month to be in the sampled group. The free TV repair service and this small payment was mainly to compensate them for putting up with the

annoying sound of a small stepping relay occasionally ratcheting around in the 'black box' installed inside their TV set..

In the home, Arbitron technicians connected the 'black box' they had put in the modified set to a leased phone line. Once each half hour an electro-mechanical



nightmare of stepping relays and continuous loops of punched teletype tape at the West 57th Street location dialed each of the

1000 families to interrogate the 'black box' in their set. A series of pulses would be returned, if the set was on, and the number of pulses returned indicated which of the 12 channels (2 to 13), or the one UHF channel was being viewed at that moment. No computers used here. This was all a huge electro-mechanical data collection enterprise.

The returned information was punched into both paper tape and IBM cards which were then tabulated to determine how many sets were turned on and how many were watching each channel, at any given time, 24 hours a day. This information was displayed, real time, on a large electric bar graph display in the reception area of their office, mainly to impress potential customers to the service they I could provide. The tabulated data was then published and made available to subscribers of the Arbitron TV Rating service. With it they could determine the media share each program and a station was receiving at any given time. This was important to the stations, to their advertisers, and to the FCC who used this information in considering new station applications, and to prevent any one network or owner from having more than a 25% media share of a geographic location.

Although the Arbitron ratings were considered the most accurate in, at that time, the three geographic areas Arbitron served, the less accurate Nielson ratings were also an important consideration because of their much broader National coverage area.



A.C. Nielson eventually bought out Arbitron and the rights to their name, and soon developed and began to employ much more sophisticated technology to monitor who was watching and listening to what in all media markets.

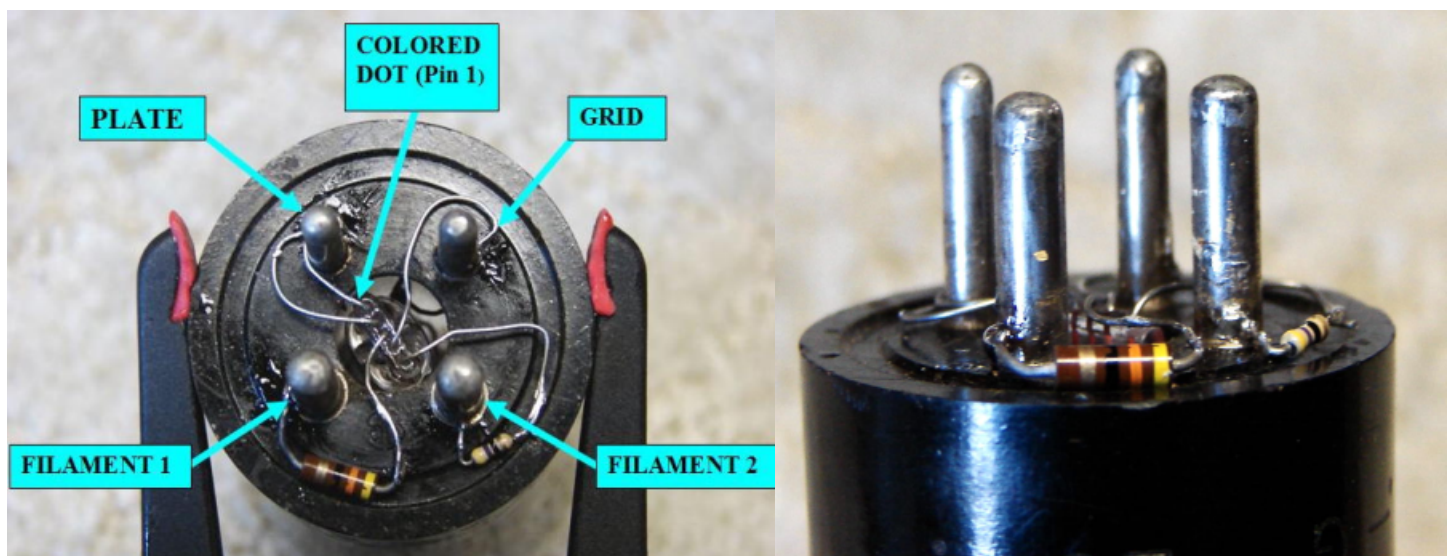


(continued from page 1)

When I made my first one I didn't connect the wires on the pins close enough to the base since every radio I had seen using 01As had bayonet sockets where contact was made at the tips of the pins and so plenty of room. However, after restoring a Radiola 20, I found it used the later style tube socket that required the pins to recess into the socket and my modified tube barely held in so I changed the wiring to be very close to the base.

In the circuit are two resistors that I will now explain. You don't need to understand this to build it, but our club has members with various degrees of electronic skills and some may want to know why two resistors rather than one. First, why any? We need to knock down the 5V filament required for 01As to 1.25V for the 1AG4 at 40mA. Doing the math results in a 94-ohm filament series resistor. Second, why two? This is more complicated. Both tube types have a directly heated combined cathode and filament unlike most modern tubes where the filament heats a cathode enclosing, but electrically insulated from it and therefore it takes more time to heat up. One reason for this type of tube is for AC sets. If the filament/cathode is powered from AC the AC will enter the received signal path via the cathode resulting in enormous "HUM". For our tubes of interest, the filament is the cathode, but powered by DC. The tube is "biased" or made to operate at an optimal DC plate current according to the control grid to average cathode voltage so we must try to replicate this. The grid voltage is set by the radio design. The cathode/filament voltage for a 01A is spread between 0V on one end and 5V on the other resulting in an average of 2.5V. For the 1AG4 the spread is only 1.25V. So to give the 1AG4 an average of 2.5V we "suspend" the filament between 0V and 5V with two resistors resulting in about 1.9V and 3.1V thus averaging 2.5V. This two-resistor configuration solves a potential problem where the filament voltage at the socket pins could be either polarity. Either polarity will result in the same average voltage with respect to the grid and so is indifferent. Some recommended values are 43, 47 or 51 ohms for each resistor with any combination of those for a pair. Wattage rating needs to be at least 1/10 watt so 1/8 or 1/4 will do.

Now I'll tell you step by step with photos on how to build these. For electronics, it is a very simple project most anyone can do if one can drill holes and solder. You might consider first removing the glass envelope from the base as described in the Flash articles referenced above. The steps below assume no removal. Refer to photos as needed.



1-First pick a candidate tube such as the 01A or another similar envelope shape 4 pin tube.

2-On the base, to center the hole, mark a point exactly between the pin's inner edges. It is important to be accurate as after drilling there will be little margin between the hole and the pins and compromising the pins could lead to breakage.

3-First drill with about a 1/16" bit being careful to do so accurately. Starting with a big bit may wonder to one side. Next drill with about 1/4" and then finally with 25/64". If you don't have 25/64" then drill to 24/64" (3/8") and then use the bit as a router, use a Dremel tool or a round file to enlarge the hole slightly until your 1AG4 barely fits.

4-Break vacuum seal stem off if not broken off from drilling and remove. Use a flat tip screwdriver to reach inside and break off any remaining stem to minimize the extent to which the 1AG4 will protrude out of the base. Test depth with 1AG4.

5-Reach into the opening with a tool and break the wires off near the base and push them out of the way to the side. If you know the tube failed from an open filament you probably don't need to break any wires. If each pin is an open circuit with respect to all others, then no need to break wires.

6-Prepare pins for soldering by grinding off a small area of the the surface to which you want to solder. The metal color seems to change from silver to bronze as if plated by silver. The bronze seems easier to solder too. I also drilled tiny holes to set the wires into for a better appearance and hold.

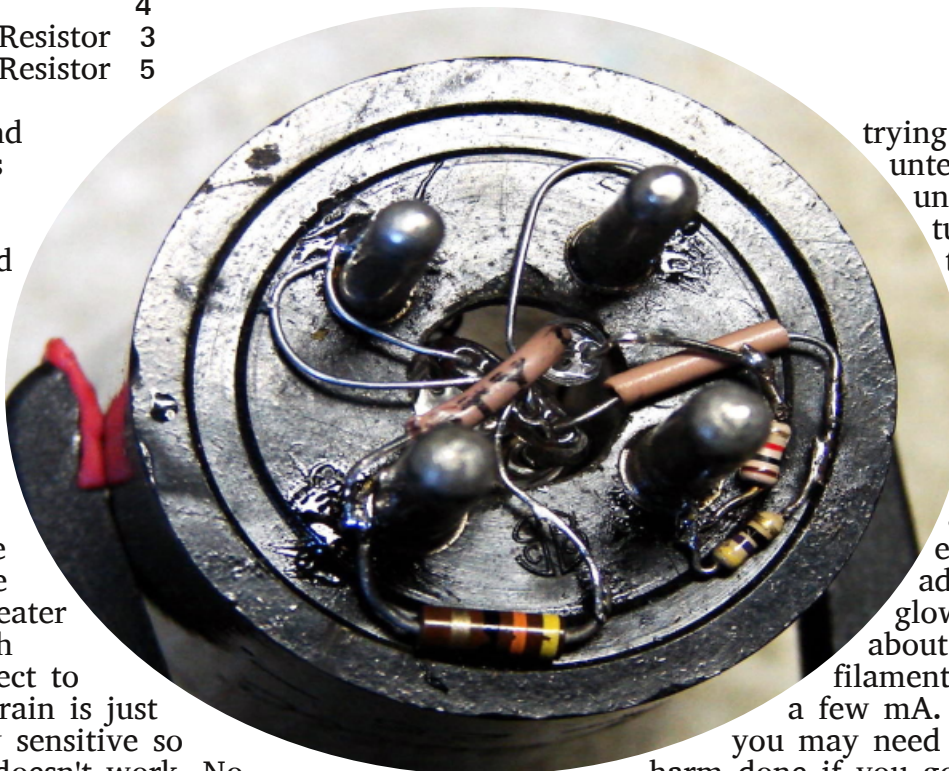
7-Solder as shown in the photographs. For orientation note that the 1AG4 tube has a colored dot near pin #1 and that the fat pins on the 01A base are the filament pins With an ohm meter you should read about 100 ohms between the filament pins.

In case the photo is not clear use this table:

01A	1AG4 Pin #
Plate	1,2
Grid	4
Filament 1 Resistor	3
Filament 2 Resistor	5

I don't recommend on a radio that is are too many Instead replace a working radio and substitutes you time. There is no B battery these Forty-five volts plenty.

I noticed a gap of the 1AG4 large small LED, so I've one to emulate heater LED in series with resistor and connect to photo). Current drain is just LED's are polarity sensitive so connections if it doesn't work. No first time. Be sure to use insulation on wires as any shorts could damage something.



trying this initially untested as there unknowns. tube in a test the built one at a need for high voltages with replacements. should be

along the sides enough for a added an amber glow. Just wire an about a 1K ohm filament pins (see a few mA. Note that you may need to reverse LED harm done if you got it wrong the

For questions or comments please contact me at: [dlaude1@msn.com](mailto:dlaude1@msn.com).



Wayne Russert sent the Flash staff a comment on Larry Synder's article on early car radios in the Jul/Aug issue of the Flash that we wanted to share with everyone - Flash Editors.

**"Outlaw Car Radios -** My Dad installed a radio in our 1931 Model A Tudor in the '40's. He ran the antenna wire up the windshield post and soldered it to the chicken wire that Ford used to hold up the oilcloth roof. Of course, it only worked when we were parked and he would lay the ground wire out and pour water on it. Amazing what folks did back then to pick-up a couple of local stations."

114
THE COUNTRY GENTLEMAN
October, 1928

# ATWATER KENT

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2) EMCO Model 20DT Dual Trace Oscilloscope.  
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[djboylesr@msn.com](mailto:djboylesr@msn.com)

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Thank You,  
Ron Smith

**WANTED:** Emerson "Mae West" radio.  
Call Gary Stone 720-771-2080,  
[redson68@hotmail.com](mailto:redson68@hotmail.com)

Thanks!

**WANTED:** I am searching for a vintage Sony PS-F9 Vertical Record Player sometimes referred to as a Sony Flamingo Record Player. Please contact Jonathan Brown at [jbrown220@aol.com](mailto:jbrown220@aol.com) or call 303-514-9900 Thank you.

**WANTED/LOOKING FOR:** I need the Stancor P-6012 (zenith p/n 95-1117) xfmr used on Zenith 9F22 chassis,- or a chassis for parts with P-6012 on it. Thanks! Rob 729-229-6247 [robmooda@gmail.com](mailto:robmooda@gmail.com)

**Did you know....**

**The Spectrum Monitor** is an *online* publication, that features a monthly column on "Adventures in Radio Restoration". Located at:  
<https://www.thespectrummonitor.com/>



**SUBMISSION OF ARTICLES & AND ADVERTISEMENTS**

Classified Ads for The Open Trunk and articles of any radio/electronic or historical related subject to be published in the Flash are encouraged and welcomed. The article(s) should be submitted in **Microsoft Word, OpenOffice, RTF, or as plain text**. Submit to Steve Touzalin by email at: [stvetou@comcast.net](mailto:stvetou@comcast.net) or Larry Snyder at [lsnyder200@cs.com](mailto:lsnyder200@cs.com) or by postal mail to 417 So. Queen Circle, Lakewood CO 80226.

Formatting isn't necessary, but if you do, set the font to Times New Roman, size 10, left justified. If you have graphics (.jpg files) to be inserted, please name them and be specific about how you would like them placed. We will do our **best** based on space limitations.



## CRC Meeting Sept. 13th - canceled

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Check the eGroup emails and the club web site for any meeting changes.

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