THE FLASH!
THE NEWSLETTER OF THE COLORADO RADIO COLLECTORS
ANTIQUE RADIO CLUB

Volume 37, Issue 1 | *Next CRC Meeting - January 11* | *Jan/Feb 2026*
Castle Rock Library

Replacing a Meter in Test Equipment

by Scott Thomas - CRC Member

Modifying a meter to measure a given current or voltage is pretty straight forward. However, replacing a meter within a piece of test equipment such as my Heathkit RF generator was a bit more complex, since you have to find a meter that meets both the circuit's resistance and full scale current requirements. Not to mention it needs to fit in the original meter's cutout. While a meter's full-scale current is usually obvious since it is provided on the meter's faceplate, it's resistance is not.

There are various ways to measure a DC meter's resistance the method that I like is what I call the 2-pot method. The first pot is used to set the meter to full scale and the second is used to measure the meter's resistance when it is adjusted so that the meter reads half scale. So basically you are using the fact that two equal resistors in parallel will each carry half the current supplied.

I placed two multi-turn potentiometers on a piece of wood so that I can easily adjust them. One is 50K ohms and the other is 10K ohms. These two values will allow you to measure meters in the 50 to 1000 microamp range. The more turns each potentiometer has the better. Initially, set the 50K resistor to max resistance and connect it in series with the meter under test and apply approximately 1.5 volts DC.

The FLASH! *(c) 2025, All Rights Reserved.*
Newsletter for The Colorado Radio Collectors Club, founded in the Fall of 1988
"Dedicated to the preservation and education of wireless, antique radio, television, and associated equipment"

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. Visitors are welcome!!
CRC MEMBERSHIP: Current annual dues are $20 and membership in the CRC runs from January to January. New memberships will be prorated to the following January. Members are entitled to attend meetings, participate in our Spring show and our Fall auction, and receive our newsletter, **The Flash!**. Submit dues payable to: ***Merril Campbell - 4723 Woodbury Dr. - Colorado Springs, CO 80915***
UPCOMING EVENTS: CRC Meeting January 11th at the Castle Rock Library 1PM

CRC Contact Information

President
Paul Heller 303-432-0434
phesopheon@comcast.net

Vice-President
Bill Lettow 480-730-6058
LETTOW@Yahoo.com

Treasurer
Merril Campbell 719-596-3482
campbell321 @juno.com

The Flash! Editor
Bill Potorti 970-342-3106
billpot@gmail.com

Newsletter Exchange Liason
Steve Touzalin
stevetou@comcast.net

CRC Facebook Group address:
https://www.facebook.com/groups/1132691767366259

eGroup posting address:
ColoradoRadioCollectors@groups.io

Website address: http://coloradoradiocollectors.com/CRC2/

Webmaster
Paul Heller
phesopheon@comcast.net

Message From The President

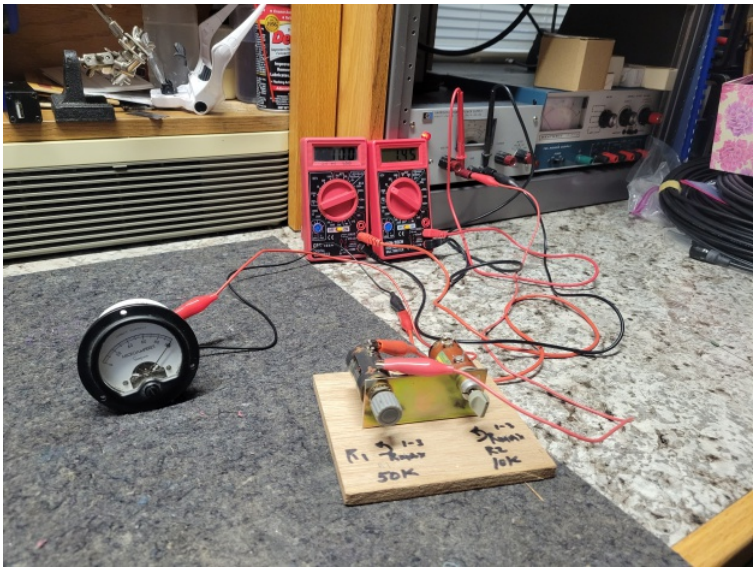
Greetings fellow club members and antique radio enthusiasts. It is such a pleasure to be able to write a short message to you every issue. The Flash is looking very good these days! Thank you, Bill Potorti, for all your hard work. As I may have said before, I encourage every club member to drop Bill an email of thanks or tell him when you see him at the meeting. His job is a labor of love, and we cannot thank him enough.

I really like Scott Thomas' article in this issue about replacing a meter in test equipment. I have always wondered how to do this. Informative articles like this have always been the cornerstone of The Flash. Thanks, Scott.

A special note of thanks to our Vice President, Bill Letow, for running the November meeting, and for giving a very interesting presentation. Our club is more than just radios – it is the shared interests of all our members. I encourage any of you to do what Bill did: tell us something interesting that we did not know. If you want to make a presentation at any of our meetings, just let me know.

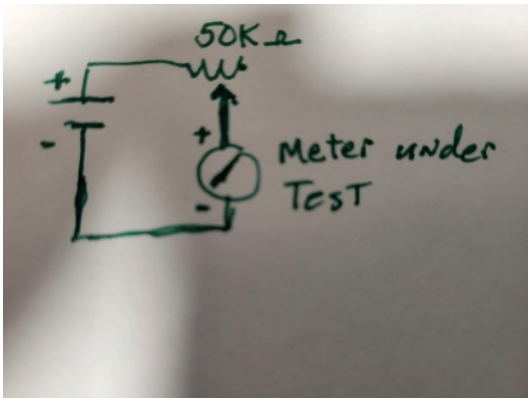
I wish you all a very good 2026! *Paul*

(Continued from Page 1)

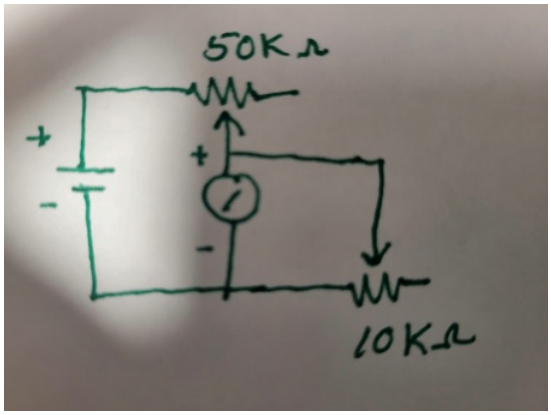


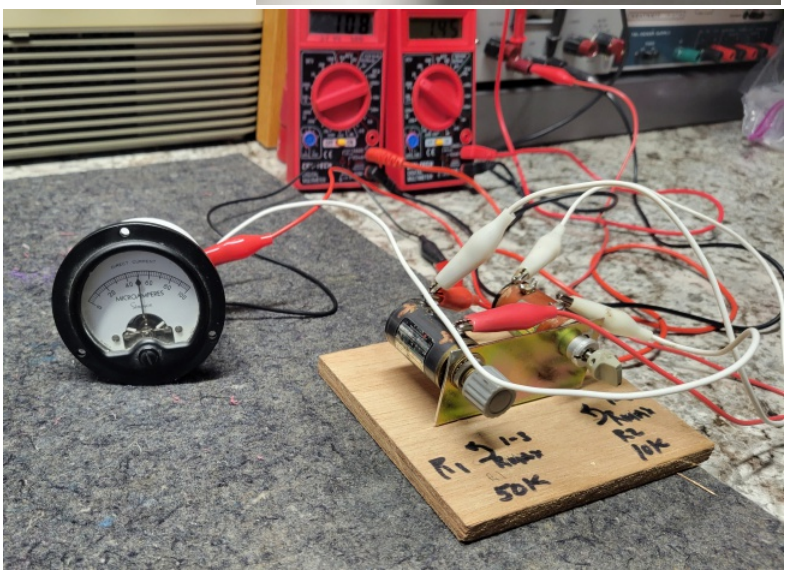
In my initial test setup, I added an in-line external current meter and voltage meter connected in parallel to ensure I knew what voltage and current I was supplying to my test setup. The voltage meter came in very important when it showed me that when I turned off my power supply, the voltage out actually went negative which was not good for the meter under test. I quickly learned to keep the power supply powered up and just disconnect my test circuit.

Slowly adjust the 50K ohm pot until the meter reads full scale.



Next connect the 10K ohm pot in parallel with the meter and adjust it until the meter reads half scale.





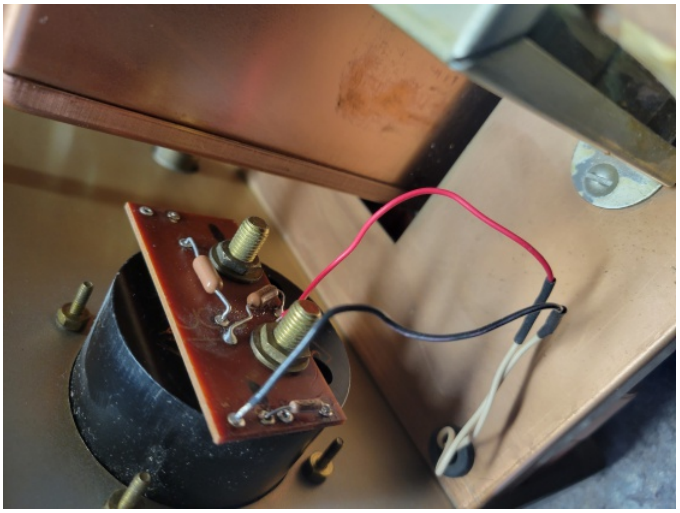
Now the 10K pot resistance setting will equal the meter's resistance. So you can disconnect the circuit and measure the resistance of the 10K pot.

So now that you have the meter's resistance you can see if it will work in your test equipment. Hopefully, you have the resistance of the original meter that needs to be replaced. In my case Heathkit provided this printed on its original meter's faceplate. I haven't seen this printed on any other meter that I have. As a side note, I replaced a meter in my Hickok tube tester and Hickok provide the meter's resistance in the user manual.

Just having a meter that has the same full-scale current reading doesn't guarantee that it can be used in a given circuit. The replacement meter's sensitivity must be equal or less that of the original. In my case, the original meter had a resistance of 500 ohms with a full-scale current of 200 microamps. So 500 times 100 microamps gives me a meter sensitivity of 100 millvolts. My replacement meter had a resistance of 1.559K ohms with a full-scale current of 50 microamps, so 1,599 times 50 microamps gives me a meter sensitivity of 85 millivolts so I was good to go on modifying it to work in the RF generator.

First, add a parallel (shunt) resistor to the meter so that the meter reads 200 microamps at full-scale. Since the shunt will have to carry 3 times the current of the meter, it has to be 1/3 the resistance of the meter or 520 ohms.

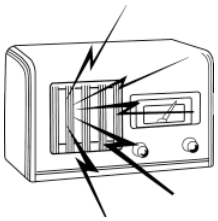
Next add a series resistance so that the replacement meter circuit will equal 500 ohms as that of the original meter. The resistance of the meter and shunt in parallel is approximately 392 ohms so I needed to add 108 ohms in series to my replacement meter circuit.



The photo shows the resistors added to the replacement meter to bring it up to the original meter's specifications.

I then used the 2-pot method to double check that the replacement meter circuit matched the original meter's specifications at 500 ohms and 200 microamps at full scale.

In my case, I was really lucked out since I could use the original meter's faceplate, since the original and the replacement meter were physically the same else I would have had to make a new faceplate. Larry Snyder in Flash Volume 31-2 provides information on how to make a replacement faceplate.



The Latest CRC Club News

Our last meeting on November 16th was at a new location - the Castle Pines Library.

Paul is still out of town, so VP Bill Lettow presided over the meeting. There were 20 attendees, as well as 1 visitor, Lucille Hughes, whose husband,Art,passed away. She was looking for help in disposing of his radio collection (an all too familiar situation). She had been in touch with Michael Cook, and donated several of her late husband's sets to our raffle bench. Hopefully we'll be able to help Lucille in her quest, perhaps in our Spring show (Vintage Voltage), which at this time is slated for April 19, 2026 at the same venue as last year, the National Western Expo.

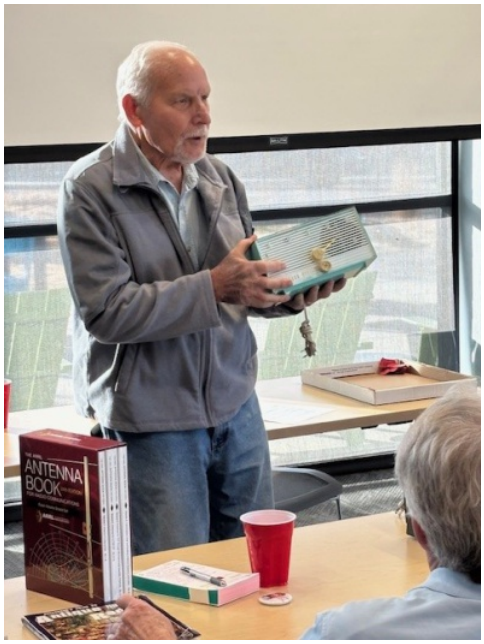
Merill reports that we have $8560 in the tresury, which led to a discussion of what to do with the money. Ideas ranged from catering the next auction to donating to worthy causes.

David Boyle spoke of the difficulty he has been encountering in making reservations for next year's meetings. Dates are tentatively set for this year, but Dave is looking for someone to take over the process going forward. Ideas were bandied about of having some of the meetings at different venues instead of the libraries, or even an occasional Zoom meeting. As always, feedback is welcome. Get in touch with one of the officers and give them your ideas and/or opinions.

At this time, the pizza showed up and we broke for refreshments. Rich sold raffle tickets and began the process. There were a lot of donated radios by Lucille as well as the usual sundry items brought in by members

RaffleTable

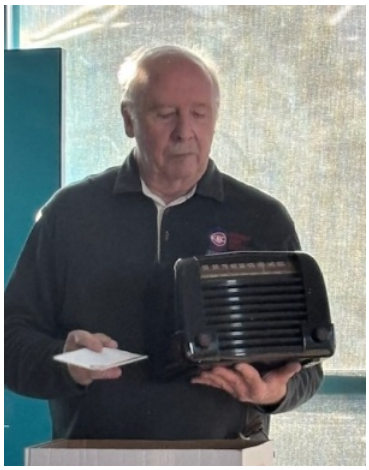
We had full tables, with many of the sets generously donated by Lucille Hughes from her husband's collection.



Show 'n Tell

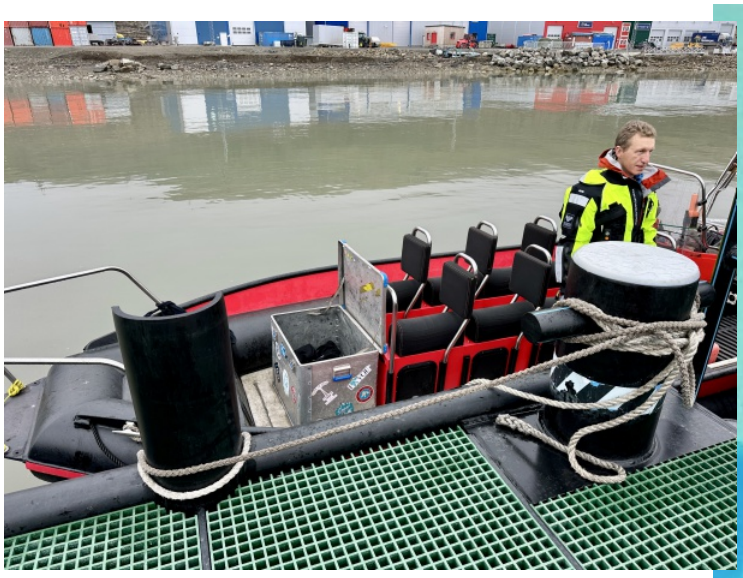
David Boyle brought in a Packard Bell radio that he had built as a freshman at a Cal Poly lab in electronics in the 1950's! He described how they would build one circuit at a time before putting it into a finished project.

Merill and his Mantola 15A14 from 1940 that he stripped the paint from and refinished



Special Presentation

After Show 'n Tell, Bill Lettow entertained us with a wonderful presentation about his and his wife's trip to an abandoned Russian coal mining settlement on Svalbard, an archipelago far to the north of Norway. Pyramaden is a town founded by Sweden in 1910 and sold to Leninist Russia in 1927. Mining operations were shut down in 1998 and it is now basically a museum and tourist destination.



The inflatable that Bill et al took to get from Longyearbyen to Pyramiden. It took hours on choppy waters to get there

Bill after the harrowing Zodiac ride

Abandoned Coal Facility

Welcome to Pyramiden

Pyramiden is named for the pyramid shaped mountain near the town. In the 1950's, over 1000 people lived and worked there. There were schools and stores and dormitories, everything a small community needed. Now there are many abandoned buildings, from dimly lit indoor swimming pools to buildings taken over by birds, as well as derelict coal car rail lines running up into the hills. Interestingly, although this site is closed down, this area of the world is still open to claims.

Bill and wife on either side of their omnipresent guide (who carries a gun to ward off polar bears)
Some of the many glaciers can be seen in the background.

The backside of a bust of Lenin faces the buildings.

Thanks, Bill, for an informative and entertaining presentation

Sources for Antique Radio Parts and Info

Acme Tube Supply - CRC member - vacuum tubes - http:// acmetubesupply.com
Just Radios - Resistors, capacitors and schematics- https://www.justradios.com/
Tony's Capacitor Corner - Various parts - http://www.tuberadios.com/
Nostalgia Air - Free schematics - http://www.nostalgiaair.org/
The Voice of Music - Phonograph supplies - https://www.thevoiceofmusic.com/
Renovated Radios - Vintage and Reproduction parts - http://www.renovatedradios.com/index.php?
Antique Electronic Supply - Various parts - https://www.tubesandmore.com/
Mark Oppat's Old Radio Parts - Various parts - https://www.oldradioparts.net/index.html
Old Phone Works - Cordage - https://oldphoneworks.com/collections/bulk-length
Surplus Sales of Nebraska - Various parts -https://www.surplussales.com/
Radio Grille Cloth - Grille Cloth- https://www.radiogrillecloth.com/
Radio Nerds - Military Electronics info - http://radionerds.com
Tube Depot - Vacuum tubes - http:// tubedepot.com
Vacuum Tubes, Inc. - Vacuum tubes - https://vacuumtubesinc.com/
Snake Head Vintage - Vintage look cloth covered power cables-
https://www.etsy.com/shop/SnakeHeadVintage
Radio Museum - Informational - http://radiomuseum.org
World Radio History - Informational - https://www.worldradiohistory.com/index.htm
Antique Radio Parts - Various parts - https://www.antiqueradiosandparts.com/
Radio Daze - Vintage and reproduction parts - https://www.radiodaze.com/
Everything Radio - Reproduction radio backs - https://everythingradio.com/shop/
Mouser Electronics - Various components - http:// mouser.com

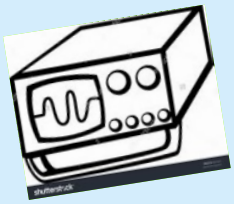
and, of course, eBay

This is not an exhaustive list. I'll be publishing this periodically. If anyone has sources to add, please email me at billpot@gmail.com
Bill

WIRELESS TELEGRAPH

The "Telimco" Complete Outfit, comprising 1 inch Spark Coil, Strap Key, Sender, Sensitive Relay, Coherer, with Automatic Decoherer and Sounder, 4 Ex. Strong Dry Cells, all necessary wiring, including send and catch wires, with full instructions and diagrams, $8.50. Guaranteed to work up to one mile. Send for Illust. Pamphlet & 64-page catalogue.

ELECTRO IMPORTING CO., 32 Park Place, New York



Classified Ads

Ads are free for CRC members. To place an ad send your ad description along with personal contact information to the Flash Editor or or one of the CRC officers.

FOR SALE: New old stock & quality used vacuum tubes. Please refer to my business card pictured to the right. Thank you! Sean Duffy (573) 999-6187 acmetubesupply@gmail.com

CRC Meeting - January 11, at the Castle Rock (Miller) Library

Address:100 S. Wilcox Street, Castle Rock, CO 80104