



The FLASH!



Dedicated to the Preservation and Education of Wireless, Radio, Television and Associated Equipment

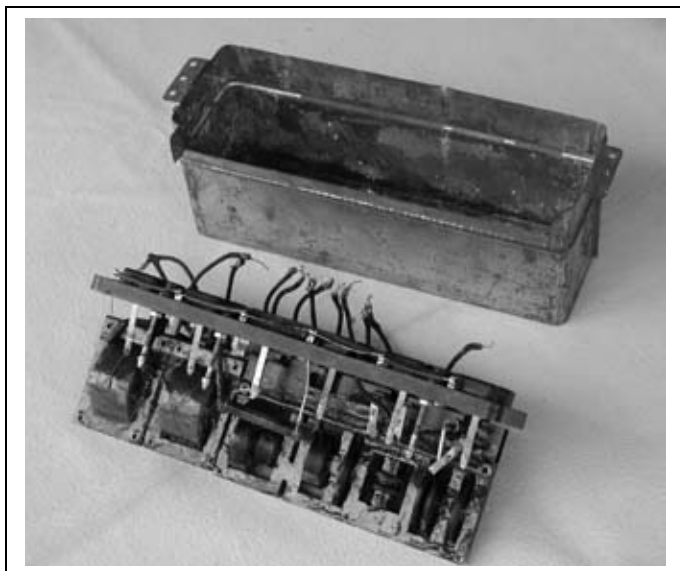
Volume 15, Issue 2

March - April, 2004

RCA Catacombs for Radiola 25 & 26 Receivers

By David Boyle, CRC Member

Webster defines "catacomb" as a place down under or an "underground" place for tombs. This may be the answer to the description given to the sealed metal can or "tomb" that contains most of the components making up as deflexed superhetrodyne receiver circuit. These components are potted in a solid wax block inside the "can".



These catacomb cans were used in several models of RCA radios in the years 1924 to 1928 (approx). Among these models were the Radiola 24, 25, and 26 (portable), Super VIII and the "portable" AR-812 (a giant of a set!). All of these sets used a 6 tube circuit employing UV199 tubes. RCA Radiola 28, 30, and 32 used a 8 tube version also employing UV199 tubes. Some catacombs may have been produced using UX 199 long pin tubes... but I'm

not sure. Some Brunswick radios also used RCA catacombs.

The objective of this article is to take out some of the fear and reduce your trepidation in proceeding to understand catacombs. Then go ahead and take on your own project of checking out and repairing 6 or 8 tube catacombs.

Over the years several articles have been written by fellow radio collectors on the trouble shooting, disassembly, and repair of catacombs. I have included a biography of these articles at the end of my article. Indeed, RCA published their own well know "service notes" on catacombs. One should seek out copies of these for your particular model number set. Here again, refer to the end of the article for additional information.

Over a dozen years ago, I purchased both a Radiola 25 and 26 for a fellow in Iowa. It was understood that the radios were complete but without tubes. One spare 6 tube catacomb can was included. The seller said that both radios did not work and that initial trouble shooting indicated problems with the catacombs. Over the intervening years I have been gathering Radiola 25 and 26 literature and articles on catacomb repair. Finally, last winter I no longer had an excuse not to delve into these radios.

Here is a little of what I've learned and accomplished listed in kind'a sequential fashion:

- 1) The catacomb contains most of the "active" circuits of the radio. The external components, located elsewhere in the radio are the controls, tuning condensers, oscillator coil, and of course, the speaker/headphones jacks and connections to batteries, antenna, and ground. All interfaces to the catacomb are through a screw terminal strip. Tube sockets protrude through the top. From this bakelite top, wires pass down to the terminal strip.

(Continued on Page 3)

COLORADO RADIO COLLECTORS ANTIQUE CLUB

Founded October 1988

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Volume 15, Issue 2

March/April 2002

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MESSAGE FROM THE PRESIDENT

Hello members, hope you all had a good holiday! Here we are getting ready for the March meeting and it seems to sneak up on me rather quickly.

Spring is again looming around the corner and with that is spring-cleaning, so I expect that the number of items at the raffle to increase.

April is not far away and again we are working on details for our annual show. This is becoming a challenge, as the antique shows seem to be losing ground. I would like to try to get as much of the show tied down as possible this coming meeting, so if you are interested in having input for the show, don't miss the March meeting.

As well as continuing to need articles for the Flash, we also need to come up with ideas for programs, demonstrations, talks, and videos to have for the meetings, so if you have any ideas or want to volunteer let me know.

This is your club, and the more you get involved, the more interesting it will be for all.

See you March 14th!

Dennis

CRC OFFICERS 2003-2004

President

Dennis Laurence
(719) 278-9181
drl@pcisys.net

Treasurer

Charles Brett
(719) 495-8660
Brett3279@aol.com

Vice President

Archive/Books

Open Position
Brett

Charles

(719) 495-8660
Brett3279@aol.com

Flash! Publisher

Steve Touzalin
(303) 988-5394

Internet Egroup Mgr.

Mark Dittmar
(303) 403-0669

stevet@wideopenwest.com mark_dittmar@mator.com

CRC MEMBERSHIP

Annual membership in the CRC runs from **June to June**. Annual dues entitles members to a full year (6 issues) of the club publication "The Flash!". Membership provides participation in club events such as the annual April Show, mid-summer picnic, September auction as well as our semi-monthly meetings and swap meets. Dues also entitle you to club officer elections, excellent discount prices on current hobby publications and the Antique Radio Classifieds annual subscription raffle every May!

Current annual dues are \$12. New memberships will be prorated to renewal on the following June, i.e new members joining in May should submit \$12, in December \$5, etc.

CRC MEETINGS

Meetings are held on the second Sunday of every other month starting in January (except 3rd Sunday of May) at 1:00pm at the Museum of the Americas Bldg., 2nd floor, 863 Santa Fe (between 8th & 9th Aves.). The

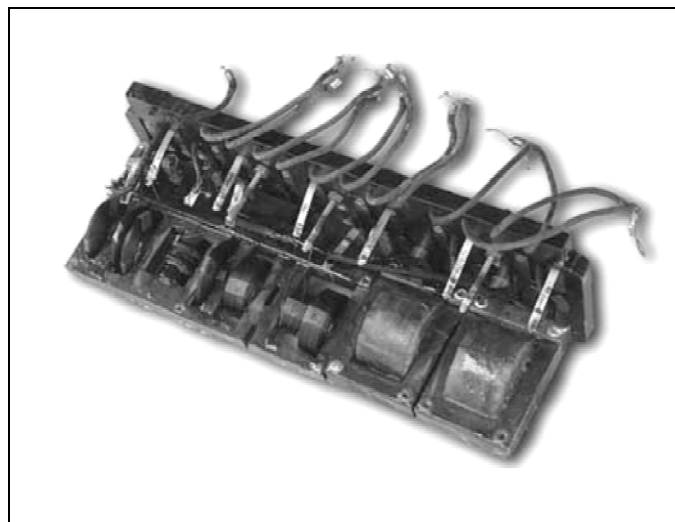
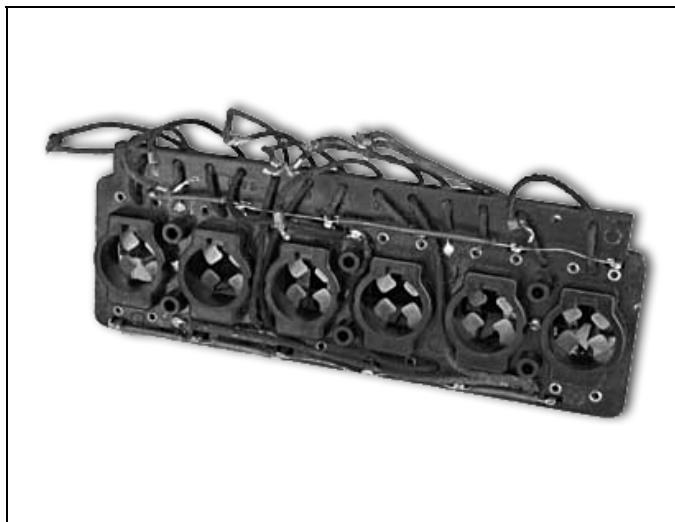
2) To trouble shoot and fault isolate a catacomb it must be electrically disconnected from all attached wires along the terminal strip. Keep track - draw a pictorial schematic of all connections for future reassembly.

3) It can be a little confusing because the wire numbers embossed on the top of the catacomb adjacent to the tube sockets ---where the wires egress the can on the way to the terminal strip are numbered differently than the #1 thru #16 on the strip. This will be obvious when the metal shield is removed from the top of the catacomb.

4) Troubleshoot the catacomb in accordance with published schematics, referenced articles, and RCA Victor Service Notes 1923 – 1928. Basic trouble shooting involves continuity and resistance measurements between tube socket contacts and terminal strip terminals. See chart 1.

5) Repairing failures will require opening up the can and removing the bakelite top and attached “guts” as an assembly: 1) Remove all screws holding the shield over the bakelite tube socket deck. 2) Resolder or punch out the two solder (RCA) seals on either side of the shield can end flanges/tabs. 3) Carefully remove the can from the bakelite tube deck. Try prying the can away from the wax block. A gentle tap with a rubber hammer may help. 4) I suggest melting the wax with an industrial heat gun. Let the melted wax drip into a disposable container. Work your way around the whole “block”. 5) It takes about an hour to carefully and patiently get about 95% of the wax melted away. 6) You are not doing a good job if you don’t burn your fingers at least 5 times. 7) Be sure to not touch the delicate coil and transformer leads. Refer to included photos. Here again, contrary to other published opinions, melt all the wax away. Not just the area you think may involve a repair. Why do it over again someday?

6) Chart 1 can be used to assist in trouble shooting. Note; continuity and terminal number data varies between various printed sources. Your own experience and observations will ultimately guide you through this. As usual, for old 1920’s radios, the audio transformer plate side is always a suspect failure point. The 6 tube catacomb contains 7 capacitors, 1 resistor, 6 distinct coils --- some with multiple windings, and 2 audio transformers.



Point to Point Resistance - Chart 1

G1 to 1	Open
G1 to 6	52 Ohm
G2 to 5	13 Ohm
G3 to 6	160 Ohm
G4 to 10	Open
G4 to 11	Open
G5 to 6	6K Ohm
G6 to 6	5.82 K Ohm
P1 to 6	Open
P1 to 12	41 Ohm
P2 to 4	< 1 Ohm
P3 to 12	71 Ohm
P4 to 10	1.05 K Ohm
P4 to 11	< 2 Ohm
P5 to 13	< 2 Ohm
P6 to 15	< 2 Ohm
12 to 3	20 to 60 Ohm
12 to 14	20 to 60 Ohm

My Closet Boulder Radio

by Wayne Gilbert, CRC Member

~~~~~  
Only an avid collector can understand the feeling that I had when I saw a Boulder Radio for auction on eBay last winter. My heart nearly stopped was it possible that this was one of the missing models that were known to have been manufactured by the Boulderadio Manufacturing company, but never located. Could the seller just had misspelled Boulderadio through carelessness or ignorance? Since there was not enough time to email the seller and get more definitive information, I would just have to depend on my gut feelings!

With only hours left in this listing, I would have to act fast if I wanted to buy this radio. Since the current bid was for a mere \$20, quickly I submitted a bid of \$50 and then watched the price rise to \$55. Someone else must have seen this radio and also believed it to be a real Boulderadio. I re-bid, raising my maximum bid to \$70; I would still consider this price a steal for any model Boulderadio. When I checked again an hour later, the current bid had risen to \$75, and again the Boulderadio was going to belong to someone else if I didn't raise the amount of my maximum bid. Had someone in the CRC read my article in the Flash about Boulderadios and decided to buy this one? I resolved, then and there, never to write another article about any Colorado-made radio. I would show the ungrateful slug who was bidding on my radio! The picture on eBay wasn't so good, but even in this fuzzy picture it was possible to determine that this radio had a Bakelite chassis. In a perfect frenzy, I decided that this radio must be a prototype, or maybe a yet unfound model of the Boulderadio series of sets. I raised my maximum bid to \$100 and watched to see where the price would settle.

Moments passed, and finally the bid settled at eighty dollars -- I was the high bidder again. Now all

I had to do was sweat out the last couple of hours until the auction ended. Maybe my bidding opponent wouldn't check the current bid price quickly enough to outbid me. Or, maybe \$75 was all he wanted to pay. The hours crawled by, sixty-second minute by sixty-second minute, while I incessantly checked and rechecked the bid price to see if I had been outbid again.

But then the doubts began to grow. Was it really a Boulderadio? In all of my research I had not found any reference to any Boulderadio radio having a Bakelite chassis. In fact, that was the identifying feature of a Boulderadio; they all had a wooden chassis, shaped like a miniature upright piano. And as far as I knew, all early Boulderadios were superhets, but I couldn't tell from the photo if this radio was or not. My anxiety and nervousness mounted.

The Boulderadio Manufacturing company had been established in Boulder, Colorado, in 1926, by Colorado University's Wallace Cassell, along with three of his engineer friends, and a lawyer. Although the stated purpose of the company was to engage in buying, selling, designing, (and) manufacturing of radios, it was clear to even the most naive buyer that the unstated purpose of the company was to manufacture and sell a cheap superheterodyne radio, without the benefit of an RCA license. This could only be legally done if the radio were sold as a kit and, only then successfully, if the kit could be easily constructed by the least experienced novice-a pair of challenges presumed to be



met by the 8-in-line model Boulderadio.

As far as is known, the 8-in-line was the first radio manufactured and sold by Cassell's new company, and while it was sold in several different styles of cabinets, it was clearly a kit radio, and all styles had the unique wooden piano-shaped chassis. The eBay radio had a Bakelite chassis and came without a cabinet, not good signs for me, the current high bidder. Of course, there were known to be other models of the Boulderadio which had not yet been located, and there was also the chance that Cassell


had thrown together a prototype 8-in-line, built on a Bakelite chassis. My emotions alternated between elation, at the thought of a possible new Boulderadio discovery, and pre-buyer remorse at the prospect of having let my emotions run away with my billfold.

When at last the auction ended, I was the owner of a new, old Boulder radio. You can only imagine my delight to find that the seller would let me pick it up from his home, just a few short miles south of Denver. Arrangements were quickly made, and very soon I was on my way to actually acquire my new find, consuming rolls of anti-acids on the trip. The seller dragged the radio out of the back of the barn (usually a good sign) and I inspected it quickly. There was nothing on the radio to identify it as a Boulderadio, but, as the seller quickly pointed out, the radios tubes (all 01As, another good sign) all had a label to verify they had been tested by an employee at the Switzer's Electric Store, located at 1918 14th St. Boulder, on 6/19/1937. This was conclusive proof, at least to the seller, that it was indeed a radio from Boulder (a Boulder radio), just as he had described it.

Professor Cassell stopped manufacturing his 8-in-line superheterodyne radios by 1930, probably because his Boulderadios were infringing upon RCA's patents, but enough radios had been produced to give modern collectors some idea about their performance and quality. The 8-in-line was advertised and sold as a kit that could be assembled by the normal purchaser within approximately 15 minutes. Modern day experience has shown that the instruction sheet accompanying the radio could indeed be read by two experienced collectors in approximately 15 minutes, but the assembly and setup probably always took much longer. It was also a radio that was touted for being a better than most performer, and easy to use. Both of these claims are also generally questioned by modern collectors of these radios.

I've owned my Boulder radio for about a year now and there is little evidence that this radio is in any way connected to the Boulderadio Manufacturing company, as a prototype, an economy model, or even as their worst nightmare. I still hold out hope that my Boulder radio will someday be identified as a not-previously discovered model made by Boulderadio; however, until that time, it will remain stored in a closet as a keeper Boulder radio, and I dream about how wonderful it would have been if it were a real Boulderadio.

**YOUR NEW  
SCREEN  
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*should be equipped with*  
**MY-224  
SCREEN GRID  
DETECTOR**

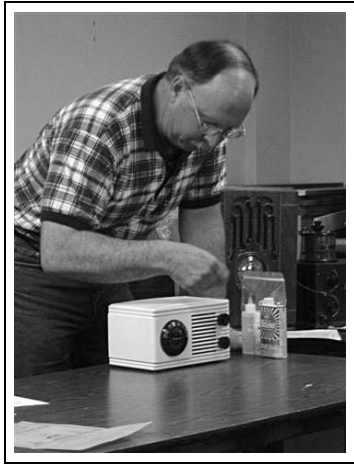


*because  
They are  
built stronger  
start quicker  
won't short...  
serve better...  
live longer...*

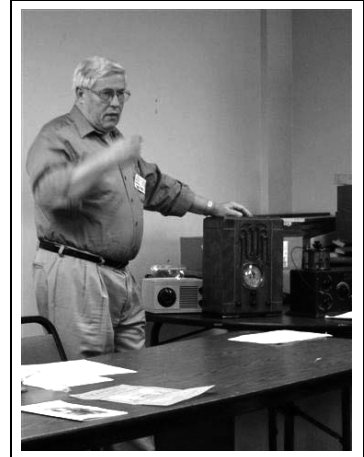
**MARVIN  
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# January/04 CRC Meeting "Doings"



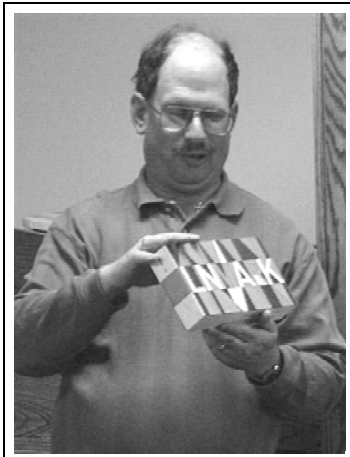
Merrill Campbell explains his Maquire 1938 radio restoration



David Solliday brings his fine Aetna 500 restoration for show



Tom Pouliot receives a very well deserved CRC service award



Neil Gallensky finds a Japanese Linmark radio - in the box



Tom Pouliot powers up his 1921 Paragon RA10 and VA2



Charles Brett sits in as temporary meeting chair for the January meeting



Barney Wooters show us his rare Kennedy model 311 1923 portable *[Because of expressed interest in the subject, during our Jan/04*

## Rejuvenating Older Tube Filaments

by Larry Weide, CRC Member

*meeting, I'm reprinting my article originally published in the November '97 issue of the Flash]*

Although many things can go wrong with an electron tube, the most typical failure is an open filament or the filament's electron emission has weakened beyond usefulness. In the early days the filament was used as the actual electron source, whereas most "modern" tubes use the cathode element for the electron source and the filament is used as a "heater" - a common filament synonym. Of course an open filament means you've just become the proud owner of an oddly shaped fishing float. However, with some older tubes there is hope for a "weak" filament.

Fairly early in the tube design process it was discovered that the oxides of certain rare-earth elements were efficient producers of electrons when heated. Unfortunately these compounds are neither good conductors of electricity nor particularly strong physically. Consequently they were used as coatings on Tungsten filaments. This coating practice is also used on cathode equipped tubes. However, it turns out there were a few tube types that used filaments that had the electron producing material, Thorium, actually imbedded in the Tungsten as well as being used as a coating. Impregnated Tungsten was known as Thorated Tungsten. It's this type of tube filament that has a chance to be rejuvenated by a technique known as "Flashing". Fortunately, this group of tubes include the ubiquitous type 01A.

The flashing process consists of two steps. First there is a relatively high "flash" voltage application to the filament, then a lower "aging" voltage is applied - each for a specific voltage and time duration depending on the tube type. Fig. 1 is a chart showing the voltage and duration values for each tube capable of using this process. Be VERY careful to note the tube types that CANNOT use the flashing process and, in fact, may be damaged by it's use. You might be interested to know this technique was worked out many years ago in the labs of RCA.

Before you get "flash happy", you're going to want to make sure the tube you're about to flash REALLY needs it. Flashing a good tube will materially reduce it's remaining useful life. So, run your suspect tube through it's paces on a tube tester first. In this case we're only interested in filament emission values. Figure 2 is emission test data to provide minimum guidelines for determining if a tube has impaired filament emission. Although you could use this information in lieu of access to a tube tester, note that Fig. 2 is unfortunately not as complete as Fig. 1. If you use the Fig. 2 data in a simple

hook-up, remember to tie the grid to the plate first as if the tube were a diode.

O.K., now it's time to flash! It's unimportant if the flash voltage is AC or DC. Perhaps the easiest source of an adjustable voltage would be your tube tester. Just make sure that if you do use a tube tester DO NOT press any test buttons, as flashing must be done without any plate current flowing. Other voltage sources might be a Variac (a continuously adjustable AC transformer), or a variable DC power supply. In any case, your voltage supply should be capable of 2 - 3 times the normal filament current draw for the tube being flashed. Using Fig. 1, simply apply the flashing voltage, then apply the aging voltage. The object of this process is to drive whatever Thorium is left in the Tungsten to the surface as a replenishing oxide. Be aware that the actual results you get will be dependent on the individual tube and it's condition prior to flashing.

**TUBE REACTIVATING CHART - FIG. 1**  
**NOTE: TUBES THAT CANNOT BE FLASHED**

| Tube Type | Flashing Voltage (Volts) | Flashing Time (Seconds) | Aging Voltage (Volts) | Aging Time (Minutes) |
|-----------|--------------------------|-------------------------|-----------------------|----------------------|
| '99       | 12                       | 10                      | 4                     | 30                   |
| '20       | 12                       | 10                      | 4                     | 30                   |
| '22       | 12                       | 10                      | 4                     | 30                   |
| '01A      | 16                       | 10                      | 7                     | 30                   |
| '00A      | 16                       | 10                      | 7                     | 30                   |
| '40       | 16                       | 10                      | 7                     | 30                   |
| '71       | 16                       | 10                      | 7                     | 30                   |
| '10       | 16                       | 10                      | 9                     | 30                   |

11, '12, '00, '26, '27, '45, '50, '80, '81, '71A

**EMISSION TEST DATA - FIG. 2**

| Tube Type | Filament Voltage (Volts) | Plate Voltage (Volts) | Minimum Current (Ma) |
|-----------|--------------------------|-----------------------|----------------------|
| '99       | 1.1                      | 50                    | 6                    |
| '20       | 2.2                      | 50                    | 15                   |
| '01A      | 5                        | 50                    | 20                   |
| '00A      | 5                        | 50                    | 14                   |
| '40       | 5                        | 50                    | 14                   |

Submission of Sell/Want ads are always free to CRC members. Non-members may advertise in the Flash for

# Collector Books for Sale

Special CRC prices. Order at club meetings. Mail order shipments: add \$2.00 postage for each book ordered. Info/order: Charles Brett, 5980 Old Ranch Road, Colorado Springs 80908, (719) 495-8660, [brett3729@aol.com](mailto:brett3729@aol.com). *void all other listings*

|                                                                                                              | Retail  | Club    |
|--------------------------------------------------------------------------------------------------------------|---------|---------|
| RADIOS, (GENUINE PLASTIC) OF THE MID CENTURY<br>Jupp & Pina, hard bound, 219 pgs., 1998 PG., 450+ color pics | \$30.95 | \$28.00 |
| ANTIQUE RADIOS, COLLECTOR'S GUIDE - 4th EDITION<br>Bums, 1997 values, revised & updated, new photos, 248 pgs | \$18.95 | \$15.00 |
| GUIDE TO OLD RADIOS, POINTERS... - 2nd EDITION<br>Johnson, 277 pgs, 1995-96 prices                           | \$19.95 | \$15.00 |
| ANTIQUE RADIO RESTORATION GUIDE - 2nd EDITION<br>Johnson, 144 pgs, repairing, refinishing, cleaning          | \$14.95 | \$12.00 |
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| ZENITH RADIOS THE EARLY YEARS 1919-1936, Cones<br>1997-98 Price Guide, 223 pgs, 100's Photos, Desc., Hist.   | \$20.95 | \$22.00 |
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| Machine Age to Jet Age, Radionama's Table Radio Guide - III, 33-'62<br>Stein, 256 pgs., 100's of b/w photos  | \$29.95 | \$24.50 |
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| COLLECTOR'S GUIDE TO VINTAGE TELEVISION<br>Dudral & Glenn Bubenheimer, 200 Pgs, 1999                 | \$15.95 | \$13.00 |
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| ANTIQUE RADIOS COLLECTOR'S GUIDE 5th EDITION<br>John Shusser, 264 Pgs, 2001                          | \$19.95 | \$15.00 |
| RADIOCRAFT JUBILEE - REPRINT OF 1938 EDITION<br>Hugo Gernsback, Vestal Press                         | -----   | \$12.00 |
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| TABLETOP RADIOS - Vol. I<br>Mark V. Stein, 240 Pgs, 2002                                             | \$29.95 | \$22.00 |
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| THE FABULOUS VICTROLA "45"                                                                           |         |         |

|                                                                                                 |         |         |
|-------------------------------------------------------------------------------------------------|---------|---------|
| Paul Vourakis, 176 Pgs, 2002                                                                    | \$29.95 | \$22.00 |
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| ZENITH ILLUSTRATED CATALOG AND DATABASE 1936 - 1945<br>Cones, Bryant & Blankship, 182 Pgs, 2003 | \$29.95 | \$22.00 |
| THE ALL AMERICAN FIVE RADIO<br>Richard McWhorter, 92 Pgs, 2003                                  | \$19.50 | \$15.00 |
| E.H. SCOTT...THE DEAN OF DX, 2ND EDITION<br>Marvin Hobbs, 240 Pgs, 2003                         | \$29.95 | \$27.50 |



# The Open Trunk

Member submitted advertisements



\$0.20 a word. Display advertising is available by contacting the CRC publisher for info and rates.

-----  
**WANTED:** Push button parts for an 1939 Emerson bakelite 03-5A1. Probably the same as other 03-5xx & 07-5xx models. Will buy or trade for a parts radio.  
**Larry Weide**, (303)758-8382, lweide@attglobal.net  
**03/04**

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**WANTED:** Cabinet & speaker for my Hammarlund SP600. Thanks in advance. **Dick Stewart**, 719-392-9694, StewartWCF@AOL.COM **03/04**

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**WANTED:** Russian or foreign radios and/or radio gear, working or not. Contact **Robert Sticher**, (303) 410-9819. Thank you. **03/04**

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**WANTED:** Old Colorado and Denver radio history info. I have quite a number of 1930's-40's radio magazines to trade for earlier radio documentation.  
**Wayne Gilbert** (303) 431-6774, wagic@aol.com  
**10/03**

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**WANTED:** Any WWII Japanese radio, working or not. Thanks. **John A. Miner**, (303) 759-9152  
**10/03**

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**WANTED:** Morse keys/bugs/paddles, Allied Radio/Knight Kits, "heavy metal" communications gear (Hallicrafters, Hammarlund, etc.) **Robert Baumann** (303) 988-2089, rgbdenver@att.net  
**10/03**

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**FOR SALE:** Five tabletop radios, including Airline, Stewart-Warner, Motorola, RCA clock-radio, some work, some don't, one with schematic. **Dan Smith** (303) 321-8779, after 7:30 p.m. **10/03**

Hi folks,

Looking for that certain radio? Looking for that hard to find part? Looking for elusive information? Want to sell or trade something?

This is the place; The CRC newsletter "Open Trunk". So by all means, if you have an item to sell or you need something, then put your ad in the Flash's "Open Trunk". What the heck, ...

*It's Free!!*

**Next CRC Meeting - Mar. 14th - Museum of the Americas**  
**863 Santa Fe - 1:00pm**  
***Tailgate Sale After the Meeting in the Museum Courtyard***



**Colorado Radio Collectors**

**Antique Radio Club**

**417 S. Queen Cir.**

**Lakewood CO 80226**

**FIRST CLASS MAIL**