

The Colorado Radio Collectors

Antique Radio Club

FLASH!

Volume 11

September



October

2000

Issue 5

NATIONAL INSTITUTE
OF
STANDARDS & TECHNOLOGY

Frequency-Time Broadcast Service

RADIO STATIONS
WWVB · WWV

FORMERLY...
NATIONAL

In this issue...

- ◆ Twin GE Radios? ◆ A Visit To WWV ◆ CRC Auction 2000 Info
- ◆ Build An Active Antenna ◆ Silvertone Chassis - Manufacturer's Index ◆

ABOUT THE COVER

If there's one entity or organization in the world that most anyone who has ever turned on a short wave radio has heard of, it has to be the National Institute of Standards and Technology's (NIST) WWV radio station. Turn to page 5 and take a tour of the WWV transmitter site with our guest author Wayne Heinen.

The Colorado Radio Collectors Antique Radio Club

Meetings: Unless otherwise noted in this journal, regular meetings are held on the second Sunday of every other month starting with January (except: 3rd Sunday of May) at 1:00PM at the VectraBank Building, Community Room, 1380 S. Federal Bl. The meeting normally includes business items, discussions, "show and tell", a raffle and a swap meet.

Membership: All dues are \$12.00 annually. Joining dues are prorated to June 1st. Contact club for foreign rates. Send dues and membership inquiries to the CRC Treasurer, Robert Baumann, 1985 S. Cape Way, Lakewood CO 80227, (303)988-2089, RGBdenver@aol.com

Article Contributions: Submission of articles are always appreciated. This would include historical and technical items as well as stories about individual collections. Articles may be written or e-mailed, and need not be in final form. Submissions and requests for information should be directed to the CRC "Flash!" Publisher, Larry Weide, 5270 E. Nassau Cir., Englewood CO 80110, (303)758-8382
lweide@ibm.net.

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Want Ads: Submission of Sell/Want ads are always free to CRC members. Non-members may advertise in the Flash! for \$0.20 a word. Display advertising is available by contacting the CRC publisher, Larry Weide, for info and rates.

Publishing Deadlines: All submissions must be submitted by the 1st of Feb, Apr, Jun, Aug, Oct and Dec. for publishing in the following months.

Thanks to the Pressworks for printing the Flash! - (303) 934-8600

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Upcoming 2000 CRC Events

Annual CRC Picnic - July 22nd, CRC Annual Auction - September 10th



Colorado Radio Collectors Antique Radio Club

Founded October 1988

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

Volume 11, Issue 5

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TABLE OF CONTENTS

A Chat with the President	2
The CRC Annual Auction - Info - by Larry Weide Once last chance, this summer, to find that great deal!	3
A Visit to WWV - by Wayne Heinen, guest author A very timely article	5
Which Twin Has the Transistor - by Wayne Gilbert Leave it to Wayne to ferret out those amazing enigmas	9
Mark's Corner - "Build an Active Antenna" by Mark Dittmar A very handy and useful instrument for anyone who plays their radios	13
An Index of Source Numbers - by Jerry Talbott, guest author A handy guide to the manufacturers of Silvertone radios	16
Collector Books for Sale - Great deals for CRC members!	18
The Open Trunk - Want Ads and For Sale Items	20

A CHAT WITH THE PRESIDENT

One Last Dip Before Fall

by Tom Kelley, CRC President

Hello again fellow club members,

Well, summer is almost over and boy, what a hot one it was! I hope you all found some "hot" radio deals - I did. I found mine on the internet eBay auction site. As usual there were plenty of shows this summer - Elgin, Rochester, etc. to go to. Hopefully we can get a report from some of the CRC members who went to them.

We had our club picnic on July 23rd. There was a good turnout and fun was had by all. Our illustrious Treasurer, Robert Baumann, brought some great swapmeet items which were quickly swapped away to lucky picnic goers.

Be sure to mark September 10th on your calendars as the date for the annual CRC auction. Just when you think the great deals are over, our auction will come along to give you one more chance to close the summer with a great find. See your July Flash for the auction flyer insert, or on this month's Flash page 3 for the details.

'See you at the auction,

Tom

**The Colorado Radio Collectors
Antique Radio Club
2000 Annual September Auction**

WHAT:

An auction of radios, television, documentation, parts, test equipment, and associated items. The public is encouraged to participate in both buying and selling.

WHEN:

Sunday the 10th of September at 1:00PM

- * Seller's registration - 11:30PM - 12:45PM
- * Buyer's registration - 11:30PM - 12:45PM
- * Viewing - As items are delivered
- * Auction - Starts at 1:00PM Sharp

WHERE:

VectraBank Building
1380 S. Federal Ave. (at Arkansas), Denver, Rear Parking Lot

AUCTION RULES:

- * Only items described in "WHAT" above are eligible for the auction. In cases of disagreement, final decision of eligibility will be made **solely** by the C.R.C. auction referee at seller registration time.
- * The C.R.C. **assumes no responsibility** for the condition or ownership of any items and/or lots offered for sale in this auction.
- * Any item registered for sale by auction may not be sold outside of the auctioneer's control, and can not be removed from the sale once the auction commences.
- * There are no buyer or seller registration fees.
~~_____~~
- * Sellers can make a buy-back bid, on any lot(s) that they own, but **only once** during the course of bidding on **any particular** lot. A seller bid will be accepted as a buy-back bid only when offered with a seller buy-back bidding card - as differentiated from a buyer bidding card.

- * A commission fee of \$1 or 5% (which ever is greater) will be imposed on sellers for any of their own lot(s) that they buy back.
- * A commission fee of \$1 or 10% (which ever is greater) will be imposed on sellers for any of their own lot(s) effectively bought-back by using a buyer bidding card or by having the highest bid with **more than one** bid.
- * There is a seller's commission that will be equal to 1\$ or 10% (which ever is greater) of the "hammer" price on each lot sold to a buyer who is NOT the seller of that lot.
- * If there are no bids on a particular lot, then the seller may retrieve that lot without any charges or commissions.
- * All seller commissions will be deducted from and before the payment to the seller, and these commissions will become the property of the Colorado Radio Collectors treasury.
- * Buyers **can not** have possession of lot(s) until all fees for those lots are paid. Collection of buyers fees will commence at the conclusion of the sale of the last lot entered into the auction. A buyer's receipt is required for pickup of purchased lots from the lot/item display area.
- * Buyer fees will be collected before sellers are paid.
- * Sellers are free to make any auction purchases, but payment for these purchases will be paid and accounted for separately from the C.R.C settlement check for any sales.
- * Sellers will be paid **only** by C.R.C. check, and may elect to be paid by mail.



**Turn your old stuff into new cash at the
CRC 2000 Auction!**

operation is performed at the Fort Collins transmitter site on one of their reference clocks. These readings measure the differences between the reference clocks. By using some complicated mathematical formula the difference between the WWV reference clock and UTC is determined.

At one time a system called the line ten transfer system was used. In this older system a reading was taken on the leading edge of the tenth line of a particular TV station's horizontal sweep. This was done simultaneously in Boulder and Fort Collins and the differences between the leading edge of the horizontal sweep was compared to the pulse of the clocks in both locations. This gave the difference between the two clocks in Boulder and Fort Collins which then could be used to calculate the difference between the reference clocks and UTC.

The new GPS antenna is a helical enclosed in a small plastic bubble at the top of a mast on the WWVB building. The yagi that was used in the line 10 system is still mounted below it.

As we enter the WWVB building the first equipment we're shown is the GPS receiver and the associated microprocessor that takes the readings and records the difference between the WWV reference clocks

and UTC. The comparator system selects the reference clock that is the closest to UTC and has that on line. The best reference was running about 12 micro seconds fast according to the print out that Mr. Maxton ran for us. "However, that does not mean that we're transmitting 12 microseconds off. We enter corrections to the timing system so that we are transmitting the correct time."

From this point our tour becomes a look at two basically identical transmission facilities. Before we head down to the WWV building a few things of interest were noted at the WWVB building. There is a sign on the door to the clock and RF Oscillator room "Please, No Nylon Jackets" Jim explained "Some of the equipment in this room is rather sensitive to static electricity. That's why the sign and the fact that the room is totally shielded to keep stray RF out". The transmitters used at WWVB are affectionately known as "Blue" and "Gray" for their unique paint jobs. These were old military transmitters that were stripped down and converted to run on 60 kHz.

Because of the 35 mph winds that were blowing, we took the car down to the WWV building. Upon entering the building we were greeted by Technician Matthew Deutch, who took us to the repair

shop. There we met Charles Snider, the other Technician. Matthew proceeded to take us on our tour.

First we stopped at the clock and oscillator room. This is known as the "Screen Room" because it is shielded from all outside RF. Here there are racks with three identical sets of clocks. These are the ones that "time" WWV. Matthew explains "We are currently running our most stable clock. The others are constantly being compared so that we know that we are putting out the proper time".

"The cesium clocks put out a steady 5 mHz signal. This signal is multiplied or divided by "Time Code Generators" in order to provide the proper RF frequency for each of the transmitters 2.5, 5, 10, 15 and 20 mHz that WWV operates on. The audio tones and the time ticks are all derived from the cesium

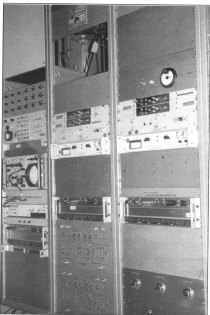
clocks. The time code generators control all of the audio portion. The tones, time ticks and time announcements."

The voice message console is where the voice recordings are made. The weather announcements, the Geoalerts and all other announcements are phoned in and recorded on the appropriate tape. The time code generator knows

what minute it is and switches on the appropriate tape. During the 18th minute we all get to hear the A Index, K Index and solar flux which helps us in propagation.

One thing that was surprising was the old drum recorder with the voice of Don Elliott

Heald was still operating. The new time code generators that were installed about a year ago have the new digitized voices that you hear.



Many people are unhappy with the new voice of the digitized system. Jim Maxton assured us that a another new voice was going to used and the digitized messages would be re-recorded by an announcer named John Doyle. We were treated to a preview and Mr. Doyle's voice sounds like it would be very pleasant to hear over WWV. The recent mention of WWV going to Daylight time a month earlier than they should have (See Communications in the May, 92 MT) was due to a error in programming of the new Time Code Generators. "Unfortunately, there is no display of the program that's currently running"

Next we viewed the transmitters of WWV. Each frequency has an on line and a standby transmitter. The new on line transmitters run Class C operation, while the old transmitters ran Class AB. The more efficient Class C transmitters really help out the electric bill. Prior to their use WWV ran an average of \$10,000 a month for electricity, now the bill is around \$ 7000. The transmitters are in a hallway that completely surrounds the shop. Outside of that hallway is another hallway. This allows access to the rear of the transmitters for repair. A full color schematic diagram of the transmitter's circuitry hangs on the wall. Through the second hallway

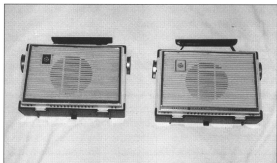
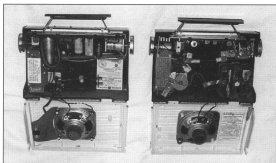
we were lead to the power distribution area. This is also where the backup generator is located. If power fails WWV and WWVB will continue to broadcast, as both have separate backup generators.

Next is the "antenna farm" for WWV. Each transmitter feeds a separate 1/4 wave vertical antenna. WWV employs two wide band backup towers for the 5 frequencies. We walked out the rear of the building and up a small flight of stairs to an observation platform. From the platform we could observe all seven of the towers that are used, as well as the feed lines that are mounted a foot off the ground. WWVB has a large top loaded antenna system consisting of four towers in a diamond formation and a backup of the same size. This was best seen from the road. We walked back through the WWV facility and passed the QSL board in from hall. This board sports ham & SWL cards from around the world. We said our thanks and so ends MT's Special Tour of WWV.

WWV and WWVB are unable to accommodate tours due to the lack of personnel. They do, however, have a publication, which is available for the asking that explains about WWV, WWVB, WWVH and the services that they provide. When writing request NIST Special Publication 432.

Which Twin Has The Transistor?

by Wayne Gilbert, CRC Member



The big mystery is not which of these radios has the transistors, as a close look will tell immediately. Also a simple "lift test" would confirm your choice, as the tube set is always heavier. But beyond the weight and the name plate it would

not be so obvious which of these radios was a transistor portable since both have the same cabinet, with only minor cosmetic differences, although one is a 1956 model and the other is a 1964. The bigger mystery is why either of

these radios was built at all, and why two such dissimilar radio technologies were housed in the same cabinets.

Neither of these radios is an outstanding player, and while beauty is solely in the eye of the beholder, neither one is likely to catch your collector's eye if you saw it in an antique mall. They're only collectors' items because they look so nearly identical, and they represent the transition period during which transistors replaced tubes in the world of portable and economy radios. They also tell in a subtle way how General Electric and other American radio manufacturers made this conversion economical for themselves and palatable for you, the consumer.

The idea of a portable model was not new. Hugo Gernsback had visualized pocket portable radios in the early 1920s, and by 1925 the Flapper generation provided a ready market for such a radio. Unfortunately, radio technology was hard pressed to match the consumer's desires. While a young swain might wow his date with music from a portable record player, radios were not so easy to use, and there might not even be a broadcast of suitable "mood" music at the appropriate time. That is if "the appropriate time" could be prolonged to the time it took to set

up a radio's antenna, ground, speaker, and power source.

It was not until the late 1930s that radio technology began to catch up with consumer imagination when Emerson pioneered the field with a micro-midget table radio. It sparked a small boom in portable radio design, but the portables it inspired provided no way to enclose the batteries within the cabinet. Thus, while these portable radios might be smaller, have a handle and some kind of cover to protect its dial, they were likely to be lighter than the caddy of batteries necessary to power the set. This short coming was not overlooked by even the most ardent romantic beau, and the sales of these portables were predictably low.

In the Spring of 1933 Gernsback reported on one of the most interesting portables of this decade. As reported, it was a 7-tube vest pocket Superhetro-Ultradyne, called the "WestingMouse". The report was a disguised bit of satire by Gernsback and easily fooled only those readers who didn't notice the tubes were numbered APR-1, and who didn't associate these clues to the date of the Radio-Craft issue that reported this marvelous invention.

Although home experimenters and a few fringe radio manufacturers had produced a few

true portables, it was not until 1939 that they became a common commodity in the United States. The advent of World War II spurred innovations in the electronics and plastics industries, at last making the dream of a light weight portable radio a practicality, but shortages of tubes and other components restricted civilian production. Nevertheless, tube portables continued to improve throughout the 1940s and 1950s, many evolving into AC/DC portables that served the dual purpose of a family table radio and a portable for use at picnics and other entertainment outings.

The end of WW II not only freed up the manufacturing of electronic components, it also produced a boom in consumer spending that largely replaced the family radio with a new television. Once again the lowly portable was mostly an overlooked indulgence. It took until the era of semiconductors and Rock-and-Roll music to make the personal portable radio a reality.

In 1947, Bell laboratories invented the transistor that ushered in the semiconductor era, but it was approximately three more years before transistors could be practically produced. Even then the price of a transistor was about eight times the cost of a tube, and it was not until 1954 that Texas

Instruments, in conjunction with the I.D.E.A. company, produced the legendary Regency TR-I.

While this radio opened the gates to the development of small, inexpensive, cheap to operate, portable radios, it was the arrival of Rock-and-Roll music that provided the consumer demand for such a radio. Teenagers wanted to take their music with them, and parents gladly provided the money to get that trashy music out of the family living room. At last it was finally the right opportunity and conditions for the portable radio. Although the road to a good, cheap, portable radio was still to have its bumps, this combination of forces was irresistible.

So why did General electric produce this set of cosmetically twin radios? Although too big to be comfortable and too small to be satisfying, the model 670 first came out in 1956 as a tube portable, costing far less than GE's introductory transistor models and probably performing much better. But more importantly, it also provided GE with a quiet and unobtrusive opportunity to experiment with the new emerging technology needed to produce transistor sets, while reassuring the consumers that they were buying a familiar, reliable tube radio. They did this by using newly designed

smaller components, mounted on a printed circuit board, and placing this smaller chassis in a standard medium sized cabinet. While available in a variety of modern colors, it was less radical in appearance than the transistor pocket portables that most consumers were still wary of purchasing.

By 1964, General Electric had produced nearly fifty different model transistor radios, but advancing technology, and the sheer number of competitive transistor sets available had forced them to drop the price dramatically. GE obviously wanted to retain its place as a competitor as long as possible, but with the price being forced so low, their American-made portables were no longer a profitable enterprise. It appears that GE and other struggling American companies had to cast an eye to their surplus inventory of older portable radio parts to cut costs. GE's old model 670 fit all the needed criteria, as it had originally been designed as a cross-over portable. All that was required were a transistorized circuit, a few physical minor changes, and the new model designation. It was thus that GE's transistor model P881 was introduced to the public as a competitively low cost transistor set

in an easily identifiable (and surplus) cabinet.

Within two years, even with such creative market strategies, GE was no longer able to be competitive with the low cost import transistor portable radio market, but by that time their surpluses of old cabinets and components were sufficiently diminished to allow them to retire from the field. Little did they know, or even care, they had inadvertently produced a modern collectable pair of "twin" portables for radio enthusiasts.

Sources:

Schiffer, Michael Brian. *The Portable Radio in American Life*. The University of Arizona press. Tucson Arizona. 1991.

Lane, David and Robert. *Transistor Radios*. Wallace-Homestead Book Company. Radnor, Pennsylvania. 1994.

Kelley, Tom. President, Colorado Radio Collectors Club, Authority on General Electric Radios. Personal interviews, January-April 2000.



Mark's

COLLECTOR

Build an ACTIVE ANTENNA

by Mark Dittmar
CRC Member

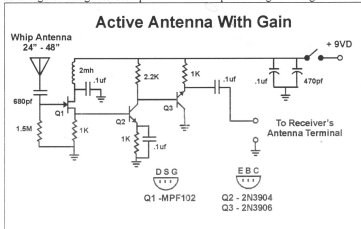
One of the problems faced by the radio collector, who enjoys operating the radios he/she owns, is that of an appropriate antenna and ground. While many of the smaller portables have a built in "loop" antenna at the rear of the set, most of the older sets will have terminals or binding posts with antenna and ground connections. The best thing to do, of course, would be to rig an external wire antenna, high and in the clear, at least 30 feet or so long, then pound a 6 foot copper rod into the ground, attach a wire to it, and attach the other end to the ground of your receiver. This will probably work great with any BCB radio. Aside from the difficulties inherent in putting up an outside antenna (like restrictive house covenants, space limitations, getting the feedline into the house, your spouse doesn't like the way it looks, etc), the radio has to be physically close to where the antenna feedline and ground enters the house. So if you have a bunch of different radios, scattered around the house, this does not work too well. Alternately, many collectors just attach a random length of wire to

the antenna terminal and run it on the floor or wherever else it is convenient, leaving the ground terminal disconnected. This will work to a point, and will certainly bring in the stronger local stations.

One solution to the problem of the antenna is to use an *active antenna*. In its simplest form, an active antenna is just a physically short whip antenna, coupled to an impedance transforming circuit and followed by optional buffer or amplifier stages. The impedance transformation is required because at the BCB frequencies we are dealing with, a short whip antenna (say 2 to 4 feet in length), has a rather high impedance, in the area of ten thousand ohms. Although it depends on the radio, the typical input impedance of the average receiver is much lower, let's say 500 ohms or so or less. So without the impedance transformation, there would be a large loss of signal due to the impedance mismatch. Basically, the function of the active antenna is to convert a given small signal voltage at a high impedance to about the same signal voltage at a low

impedance. Gain stages can then be added to boost the level of the low impedance signal voltage. Because of the impedance-transforming "property" of an active antenna, they can be *more* efficient than a simple wire antenna in converting a received signal level at the antenna to a corresponding level at the receiver's antenna input terminals. Active antennas also have the advantage of being less susceptible to

less than \$10. The circuit consists of a MPF102 FET, Q1, a 2N3904 NPN, Q2, and a 2N3906, Q3. RF from the short whip antenna, 24" to 48" in length, is coupled to the gate of Q1 through a 680 pf capacitor. Q1 has a high input impedance / low output impedance in this configuration, and converts the high impedance input signal voltage from the short whip to a low impedance signal voltage. RF from



noise because of their short physical size. Active antenna circuits can vary in complexity, with the simplest being a single FET acting as an impedance converter.

After searching through some old notes, I found the circuit shown in figure 1 for a 3 transistor active antenna. I'm not sure what the original source is/was, and I can't take credit for the design. It looked like a very simple circuit to build, and ALL of the parts could be had at Radio Shack for

Q1's source is DC coupled to the base of Q2, configured as a voltage amplifier with gain. The output of Q2 is directly coupled to the base of Q3, an emitter-follower, which matches and isolates the gain stage from the receiver's antenna input. L1, in the drain lead of Q1, is there to keep power noise from reaching Q1. I suspect that it may not be absolutely necessary, and a direct connection to the 9V supply could be made here.

The circuit can be put together easily using point-to-point wiring. As usual with RF circuits, it is a good idea to keep all of the lead lengths short. I built my version of the circuit on a scrap piece of perfboard, 2 3/4" long by 1 1/4" wide. I mounted the perf board on a piece of U-shaped aluminum, 1.5" high by 3.5" wide by 2" deep, just because that is all I had handy.

Mounted on the outside of the box and adjacent to the SPST on/off switch is a 9V battery clip which holds a single 9V battery. It would look neater mounted on the inside of the box, but there was no room. One female RCA phono connector is mounted on the box for the connection to the receiver. I made an RCA phono plug, with 12" leads terminated in alligator clips, to plug into the RCA jack on the box. Another female RCA jack is mounted on the box for the whip antenna. I made a whip antenna by soldering a 2 ft length of #10 AWG solid wire to the center pin only of an RCA phono plug., and plugging this assembly into the antenna jack on the box. The use of RCA phono jacks for the whip antenna input and receiver connections make the unit more flexible and allows for experimentation with different whip lengths.

After completing the active antenna, I decided to try it out on my "R.P.C. Western Air Patrol" farm set [see **July/2000 Flash - Ed**]. I first tried out a simple 64" long wire, attached loosely to a window, as a baseline to see what kind of improvement an active antenna would make over the old

"throw-a-wire on the floor" antenna. The 64" wire, attached directly to the antenna terminal of the set, worked about as well as one would expect, picking up the strong local stations with no problem. One of the few AM BCB stations I like in the Denver metro area is a classical music station on 1280 KHz - KVID. With the 64" antenna on the farm set, this station is quite weak at my location. I then removed the 64" wire and connected the active antenna in its place, with the 2 ft wire whip described above. My 1280 KHz "test" station was now loud and clear, and a quick scan of the dial showed that a number of other stations were now easily received that were not audible on the 64" wire. More experiments are planned with other antique radios in my collection

In summary, I found that the active antenna just described is easily and quickly constructed and a very significant improvement over a random indoor wire for AM BCB sets. Give it a try, and let me know how it works for you.

Mark

An Index of Source Numbers

A guide to the Manufactures of Silvertone Chassis

**by Jerry Talbott, Guest Author
Member of the Northwest Vintage Radio Society**

[I want to extend my appreciation, and another tip of the CRC hat, to Jerry Talbott, a member of the Northwest Vintage Radio Society, for allowing us to reprint part of his article that appeared in the May 2000 edition of the NVRS newsletters, "The Call Letter" - Ed]

For many years large retail department stores, such as Sears and Roebuck and Montgomery Ward, have sold their own unique and recognizable consumer electronic brands. As many of you know, the actual manufacturers of these radios, phonographs and TV's were other companies that had contracts with these retail outlets.

Sometimes it's difficult to find replacement parts for a particular radio of this type, and it's very helpful to know the actual manufacturer when searching for the appropriate and/or substitute part.

The source numbers in this index correspond to the first three digits of the chassis number on a Silvertone radio. Of course this is old information, but most valuable for a restorer's purposes.

INDEX OF SILVERTONE SOURCE NUMBERS

<p>Source No. 100 Stuart-Warner Corp 1825 W. Diversity Pkwy. Chicago, Ill.</p>	<p>Source No. 109 Detrola Radio Corp. 3630 W. Fort St. Detroit, Mich.</p>	<p>Source No. 121 Zenith Radio Corp. 3620 Iron St. Chicago, Ill.</p>
<p>Source No. 101 Colonial Radio Corp 254 Rano St. Buffalo, N.Y.</p>	<p>Source No. 110 Air-King Products Co 40th Ave. & 21st St. Long Island, N.Y.</p>	<p>Source No. 122 Warwick Radio Mfg. Co 1700 W. Washington Blvd. Chicago, Ill.</p>
<p>Source No. 102 Majestic Radio & TV Co (Formerly Case Elelec. Co.) Marion, Ind.</p>	<p>Source No. 117 G. & G. Radio Corp 5801 Dickens Ave. Chicago, Ill.</p>	<p>Source No. 123 Crosley Distributing Corp. 160 E. Illinois St. Chicago, Ill.</p>
<p>Source No. 104 Corona Radio & TV Co. 420 N. Sacramento Blvd. Chicago, Ill.</p>	<p>Source No. 118 Wholesale Radio Service 100 - 6th Ave. New York City</p>	<p>Source No. 124 Operadio Mfg. Co St. Charles Illinois</p>
<p>Source No. 105 Continental Radio & TV 325 Huron St. Chicago, Ill.</p>	<p>Source No. 119 Automatic Radio Mfg. Co 1201 E. Lake St. Minneapolis, Minn.</p>	<p>Source No 132 Arvin</p>
<p>Source No. 106 Sentinel Radio Corp 2222 Diversity Blvd. Chicago, Ill.</p>	<p>Source No. 121 Zenith Radio Corp. 3620 Iron St. Chicago, Ill.</p>	<p>Source No. 478 Tele-Tone</p>
<p>Source No. 108 Automatic Radio Mfg. Co 112 Canal St. Boston, Mass.</p>	<p>Source No. 120 Sterling Sales & Mfg. Co 2845 Prospect Ave. Cleveland, Ohio</p>	<p>Source No. 528 Warwick</p>

Collector Books for Sale

CRC Members get specially reduced prices on popular collector books. Place and receive your order at club meetings. If ordered for mail shipment add \$1.75 postage for each book ordered. For information and ordering: Charles Brett, (719) 495-8660, brett3729@aol.com. *This listing has item and price updates - void all other listings.*

	<u>Retail</u>	<u>Club</u>
RADIOS, (GENUINE PLASTIC) OF THE MID CENTURY Jupp & Pina, hard bound, 219 pgs, 1998 PG, 450+ color pics	\$39.95	\$28.00
ANTIQUA RADIO, COLLECTOR'S GUIDE - 4th EDITION Bunis, 1997 values, revised & updated, new photos, 248 pgs	\$18.95	\$15.00
GUIDE TO OLD RADIOS, POINTERS... - 2nd EDITION Johnson, 277 pgs, 1995-96 prices	\$19.95	\$15.00
ANTIQUA RADIO RESTORATION GUIDE - 2rd EDITION Johnson, 144 pgs, repairing, refinishing, cleaning	\$14.95	\$12.00
RADIO, EVOLUTION OF THE - VOLUME ONE 227 pgs, 118 in color, More than 800 radios pictured and priced for 1992, picture from the collections of CRC members Jim Berg and Johnny Johnson	\$22.95	\$18.00
RADIO, EVOLUTION OF THE - VOLUME TWO All different from Volume One, 226 pgs, Color, Radios of the 1920s to 1960s, with 93-94 values, pix from CRC member Jim Berg	\$24.95	\$19.00
TRANSISTOR RADIOS, COLLECTOR'S GUIDE VOL II Bunis, 1996 prices, Full Color	\$16.95	\$13.00
ZENITH TRANSISTOR RADIOS, 1955-1965 Smith, 1998 PG, 160 pgs, 226 color pics, info, descr.	\$29.95	\$22.00
THE ZENITH TRANS-OCEANIC (THE ROYALTY OF RADIOS) Bryant and Cones, 160 pgs, 1995	\$29.95	\$22.00
ZENITH RADIOS THE EARLY YEARS 1919-1936, Cones 1997-98 Price Guide, 223 pgs, 100's Photos, Desc., Hist.	\$29.95	\$22.00
RADIOS BY HALLICRAFTERS, revised 2nd edition Dachis, 1999 values, 220 pgs, 1000+ pics, id's, history	\$29.95	\$22.00
CLASSIC TV'S, PRE-WAR THRU 1950'S 86 pgs, color & b/w pics, descriptions, etc.	\$18.95	\$15.00
Machine Age to Jet Age, Radiomania's Table Radio Guide 'III, 33-'62 Stein, 256 pgs, 100's of b/w photos	\$29.95	\$24.50
TRANSISTOR RADIOS, 1954 TO 1969 Norman Smith, with prices, 160 pgs, 1000 photos, 1998	\$29.95	\$22.00

PHILCO RADIO: 1928 - 1942 Ramires & Prosis, 160 pgs, 828 pics & drawings, 1993	\$29.95	\$22.00
RADIO AND TV PREMIUMS Jim Harmon, 256 pgs, 200+ photos, 1997	\$24.95	\$19.00
RADIO MANUFACTURES OF THE 1920'S VOL I Alan Douglas, 225 pgs, 1988	\$24.95	\$19.00
RADIO MANUFACTURES OF THE 1920'S VOL II Alan Douglas, 266 pgs, 1989	\$29.95	\$22.00
RADIO MANUFACTURES OF THE 1920'S VOL III Alan Douglas, 285 pgs, 1991	\$29.95	\$22.00
CRYSTAL CLEAR VOL 1 Maurice Sievers, 282 Pgs, 1991	\$29.95	\$22.00
CRYSTAL CLEAR VOL 2 Maurice Sievers, 252 Pgs, 1995	\$29.95	\$22.00
RADIO TUBES AND BOXES OF THE 1920'S George A Fathauer, 112 Pgs, 1999	\$26.95	\$20.00
70 YEARS OF TUBES AND VALVES, 2ND EDITION John Stokes, 264 Pgs, 1997	\$29.95	\$22.00
RADIO DIAGRAM SOURCEBOOK Richard Gray, 264 Pgs, 1996	\$18.95	\$15.00
THE RADIO COLLECTOR'S DIRECTORY AND PRICE GUIDE, 2ND ED. Robert Grinder, 524 Pgs, 1995	\$26.95	\$21.00
COLLECTOR'S GUIDE TO VINTAGE TELEVISION Durbal & Glenn Bubenneimer, 200 Pgs, 1999	\$15.95	\$13.00
NOVELTY RADIOS, VOLUME 1 Marty Bunis & Robert Breed, 223 Pgs, 1995	\$18.95	\$15.00
NOVELTY RADIOS, VOLUME 2 Mary Bunis & Robert Breed, 199 Pgs, 1999	\$19.95	\$15.00
----- new ----- new ----- new ----- new -----		
COMPLETE PRICE GUIDE TO ANTIQUE RADIOS: PRE-WAR CONSOLES Mark Stein, 235 pgs, 100's of b/w photos	\$29.95	\$22.00

"The Open Trunk" Classified Advertisements

◆ See IFC for ad details ◆

WANTED: 1940 Deutsche Arbeits Front (DAF) 1011 • Radione 1939 portables R-2, & R-3 • Any VE-301 • Any Japanese 1930's radio • Zenith T-O bomber or sailboat • Hoffman "Nugget" sub min tube pocket radio • WWII axis powers clocks or watches. Will pay your price. Condition not important. **John A. Miner** (303) 759-9152 voice, (303) 759-5438 FAX hohum@uswest.net

FOR SALE: Reproduction Philco Cathedral cabinet parts. Front panels, rear arches, bottom moldings. Grandfather clock finials, colonial clock top trim and finials. Reproduction 90, 70 and 20 (std) cabinets. Other needs such as other style moldings from your sample. Inquire. **Dick Oliver**, Antique Radio Svc., 28604 Schwalm Dr., Elkhart IN 46517. (219)522-4516

WANTED: The female power (battery) plug for a Kemper portable K-52. Similar to octal except has 7 pins and two round locating pins (edge and center). • Knobs for a Crosley 601 bandbox. **Mark McKeown**, (303) 278-3908 mmckeown@tde.com

FOR SALE: • Zenith R-7000, the very last trans-oceanic made. Call for details. (303)730-8539

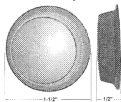
WANTED: Stewart-Warner model R-123 chassis, used in receiver models 1231 to 1239 (see Riders volume 6 page 6-2 for picture of chassis). • Chassis for AK 217, and Majestic 371. **Jerry Tynan**, (303)642-0553 jtynan@worldnet.att.net

FOR SALE: Copper Rod, save \$\$\$\$\$\$, several diameters available to make your own soldering iron tips (or I can for you). • Radio repair and restoration service. **David Boyle**, 1058 Colt Cir., Castle Rock, CO 80104 (303)681-3258

WANTED: GE clock radios, models 935 & 936. **Tom Kelley**, 971-1/2 Pleasant St., Boulder, CO 80302 (303)444-1837

WANTED: Old horn speaker parts, drivers and incomplete units. Also, old light bulbs with tip and good filaments. **Charles Combs**, 508 E. Daniel St., Albany MO 64402 ph/fax (606)726-3038

WANTED: Crosley knob



Knob has brass female threaded mount
Wayne Gilbert (303)465-0883

WANTED: Mountain Dew BB-92 •
Napoleon Cognac BB-93 • Peachtree
Cream BB-97 • Scotch Seven BB-100
• Mr & Mrs "T" BB-106 • 7-UP
Vending Machine • Pink Panther
BB-390 • Battlestar Galactica BB-447
• Batman BB-353 • Mickey Mouse
(Breed 1 Plt 115)

Ron Smith, 145 Carr St., Lakewood
CO 80226, (303)274-7522

WANTED: Old Radio magazines for
my research library in Antique Radio.
Need pubs like Radio Design, Radio
Age, and Radio Craft -1920's thru
1940's. Will provide home, or purchase
singles or full sets at a fair price. Also
interested in publications from various
companies; Aerovox, RCA, Sylvania,
Bell Labs, etc. Likewise, need old test
equipment literature and manuals.
Charles Brett 5980 Old Ranch Rd.,
Colorado Springs CO 80908
(303)495-8660

WANTED: 2nd I.F. Trnsfmr coil,
Grisby/Grunow ch. 460. Goes in
Majestic Century Six, models 461-463

Bunis 1/pg95. This trnsfmr coil is
secondary audio and AVC, with six
leads. **Jay Kussman** 8023 Blucksberg
Dr., Sturgis, SD 57785
(605)720-7519, nipper@rapidnet.com

WANTED: Telegraph/Morse keys,
bugs, paddles and any books or
documentation. **Robert Baumann**,
(303)988-2089, rgbdenver@aol.com

WANTED: Escutcheon for a
Jackson-Bell Swan cathedral - pictured
here and in Bunis #4 page 116.



Ed Brady, 1333 White Rim Pl. NE,
Albuquerque NM 87112
(505)292-048, cebrady2@yahoo.com

FOR SALE: Drake 2C rcvr. excellent
condx \$100 • Heath HW 100 Xcvr
w/book \$100 • HN-31 dummy load
\$20 • Eico HF 81 audio amp \$20 •
J-37 WWII key, \$35 • CDE HAM M
series 2 rotator, Just serviced \$80 •
TR-22 rotator \$40 • 816 tube new in
box \$15. **Lys Carey** 303-986-5420

Colorado Radio Collectors
Antique Radio Club
5270 E. Nassau Cir.
Englewood CO 80110



FIRST CLASS



Don't forget the CRC
annual Auction
September 10th!

The September meeting is *the annual auction*
on Sunday September 10th at 1:00 PM
VectraBank Building at Federal and Arkansas