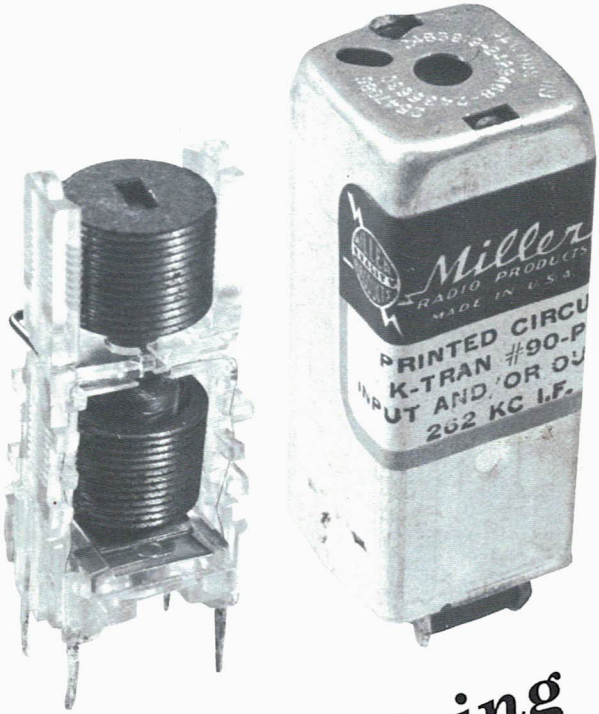
ANTIQUE RADIO CLASSIFIED

VOLUME 9 SEPTEMBER 1992 NUMBER 9



Repairing IF Transformers

THE NATIONAL PUBLICATION FOR BUYERS AND SELLERS
OF OLD RADIOS AND RELATED ITEMS - PUBLISHED MONTHLY

ANTIQUE RADIO CLASSIFIED

Antique Radio Classified (ISSN:8750-7471) is published monthly, 12 times per year, by John V. Terrey, One River Road, P.O. Box 2, Carlisle, MA 01741. Second-class postage paid at Carlisle, MA, and additional mailing offices. Telephone: (508) 371-0512, 9:00 AM to 5:00 PM ET weekdays; machine answers phone at other times.

Annual subscription rates within the U.S. are $27.00 by Second Class mail and $40.00 by First Class mail.

Annual foreign rates. By air: Canada - $43.00; Mexico - $43.00: Other foreign countries - $75.00. Surface mail: Canada - $35.00; Other foreign countries - $38.00 (Surface delivery to countries other than Canada may take two or more months and cannot be guaranteed.)

Two-year subscriptions are twice these rates and receive an extra month. Sample issues are available free on request.

POSTMASTER: Send address changes to Antique Radio Classified, P.O. Box 2, Carlisle, MA 01741.

PURPOSE. Antique Radio Classified is published for people involved in the radio collecting hobby. Its purpose is to stimulate growth of the hobby through the buying, selling and trading of radios and related items, and to provide a monthly forum for the interchange of ideas and information.

CONTACTING ANTIQUE RADIO CLASSIFIED. All correspondence should be sent to:

A.R.C., P.O. Box 2, Carlisle, MA 01741.

Send only UPS, Federal, etc. items to One River Road.

Telephone: (508) 371-0512; Fax: (508) 371-7129

Please no classified ads by telephone; thanks.

Your ads, renewals, letters, etc. can be handled faster and more efficiently if (1) each is on a separate piece of paper, and (2) your name, address and SUB# is written on each.

Unfortunately, A.R.C. is not staffed to answer letters with questions about antique radios or requests for advice. However, A.R.C. does solicit letters of interest to its readers and publishes them as space permits. A.R.C. assumes that permission is given to edit and to publish all correspondence and articles received unless otherwise indicated.

GUARANTEE. You may cancel your subscription at any time and receive a pro rata refund for issues not yet mailed. If errors to ads are made by A.R.C., upon request a free correction will be run in the next available issue.

PAYMENT. Please send in full payment with your order or ad. A.R.C. does not carry accounts; all subscriptions, ads, etc. must be prepaid. Pay in U.S. funds. Checks drawn on a U.S. bank, money orders, VISA or MasterCard ($10.00 min.) are preferred. Make check out to "A.R.C." U.S. stamps or cash are OK for small amounts. Canadian payers may send a Canadian check in U.S. funds, but please add $1.00 (U.S.) for bank charges. Subscriptions will be prorated to amount sent if amount is incorrect.

CHANGE OF ADDRESS. Please notify us 4 weeks in advance of a change of address. Send both your new and old address, and include your SUB# and effective date of your new address. Temporary address changes can be made also.

SUBMISSION OF MATERIAL. Antique Radio Classified welcomes and solicits information that pertains or relates to radio history or collecting. This may include articles, book reviews, photos, information on upcoming radio events, meetings, antique radio organizations, radio auctions and price reports, sources of old radio and restoration supplies, and other related and interesting material. All material submitted should be neat and verified for accuracy. Unless prior arrangements are made, all submitted materials may be edited, become the property of **Antique Radio Classified** and will not be returned.

MAILING OF ISSUES. U.S. subscribers can receive A.R.C. by First or Second Class mail (Second Class is the way most magazines are mailed). The mailing of First Class copies is staggered over one to four days with faraway copies mailed before local copies. Non-U.S. copies are mailed on the first day. Second Class copies are mailed on the last day. Mailing dates change each month, but mailing is usually completed by the 26th of the month. First Class copies usually are received by the fifth of the month; copies by Second Class mail, by the tenth.

ETHICS. No person involved in the production of A.R.C. is to act on any information in the magazine until the day after local copies are mailed.

DISCLAIMER. The publisher is not responsible for any buying and selling transactions incurred, or for any other use of the contents of this publication.

Antique Radio Classified subscription rates, frequency of publication, content, policies, size and ad details, and rates are subject to change at any time by A.R.C.

DISPLAY AND BUSINESS CARD ADS – DETAILS AND RATES

The deadline is the first of the month for display and business card ad artwork, payment and repeat requests.

Advertising is accepted only for early items related to radio, communication, etc. All items must be described fairly; reproductions, reprints and not-original items must be so identified. Advertisers agree to respond promptly to inquiries and orders, and to resolve problems promptly if the buyer is not satisified.

All advertising must be prepaid; see "Payment" paragraph above. Late ads will be run only if space and time permit. Since artwork is reduced to 63% in the printing process, **originals must be the artwork size listed below.** Do not send in artwork on art board or send negatives. Ads should be typeset or typed neatly with a carbon ribbon, black printing on white. No reverse type if A.R.C. is to make up the ad. If you want us to prepare your ad, include the one-time cost below for A.R.C. to make up the ad.

Photos should be at an 85 line screen; otherwise, add $10.00 per photo for screening. **Do not cut or trim photos or glue photos to artwork; submit separately.**

If you are confused by these requirements and terms, please contact A.R.C. before beginning to prepare your ad. We will be happy to advise you on your ad ideas, estimate how much the ad will cost, recommend an ad size, etc.

We assume that advertisers want all ads which are submitted to run without delay; therefore, we will run the ad and bill for any additional work required for the ad to meet these specifications. A late ad will be run beginning with the next month. "Tear sheets" will be sent only for 1/2 and full page ads, and if requested when the ad is submitted.

Business card ads are limited to one per advertiser.

The 3-month rates represent about a 10% discount, the 6-month rates, 20%. Placement requests for display ads: add 15% but call first. Clubs: write for discount policy.

Page	ARTWORK SIZE (SEND IN THIS SIZE) H x W (inches)	As Printed (size in magazine) H x W (inches)	Cost for 1-month	Cost for 3-months	Cost for 6-months	One-time Cost for A.R.C. to make up Ad (if requested)
Full	12 3/16 (or 10 1/2) x 7 1/2	7 3/4 (or 6 5/8) x 4 3/4	$169.00	$455.00	$799.00	$55.00
1/2 H	5 1/4 x 7 1/2	3 5/16 x 4 3/4	85.00	230.00	399.00	28.00
1/2 V	12 3/16 (or 11 13/16) x 3 9/16	7 7/16 x 2 1/4	85.00	230.00	399.00	28.00
1/4	5 1/4 x 3 9/16	3 5/16 x 2 1/4	43.00	116.00	199.00	14.00
1/8	2 5/8 x 3 9/16	1 5/8 x 2 1/4	22.00	60.00	99.00	7.00
Business Card	2 x 3 3/4	1 1/4 x 2 3/8	not avail.	31.00	55.00	5.00

EDITOR'S COMMENTS

It takes courage to attempt to repair an IF transformer. Daniel Schoo has it. In our lead article this month, he moves us step-by-step through a process most of us haven't dared to tackle. Of course, many of us are quite ready to refinish a cabinet or replace tubes, but when it comes to repairing the electrical guts of a treasured set, we hesitate and think twice. Thanks to Daniel, we might think again and plunge into yet another phase of our challenging hobby.

And while on the subject of tricky restoration problems, we include Ray Bintliff's compilation of information on the repair of old rubber push buttons. This article is the result of our readers' responses to John Chinsky's letter, published in the April 1992 issue of A.R.C, asking for help with this problem. We're pleased when the interaction of readers piques interest and prompts solutions.

Also this month, Dave Crocker describes one of his more interesting finds — the Insuline Corporation of America's 2-tube, AC set. Easily mistaken for a piece of quack medical apparatus, this unusual portable is an example of why it is a good idea always to open every box you see for sale on antique shop shelves.

Once again, Ian Sanders contributes an informative article on an interesting British set. The Marconiphone RB10 is a 1-tube plus crystal detector set in which the single tube is in a reflex circuit and performs both as an RF amplifier and as an audio amplifier.

What is the most common or popular set amongst collectors? Ron Boucher shares the data he has collected over the years on the types of radios that he sold through his mail order business. Answer: the RCA Radiola Model III.

A report on the Michigan Antique Radio Club Extravaganza meet and auction appears this month. In addition to the extensive listing of items in the auction, photos from the flea market and the equipment contest are included.

Our *Photo Review* this month pictures battery sets, AC table sets and consoles. The *Photo Review* is one of our most popular features, and we welcome photos from our readers. Please read the instructions on the *Photo Review* page if you have a photo you plan to submit.

Renew now and save! As mentioned in our July issue, rate increases for subscriptions and advertising are planned for January 1993. It will have been over a year since our last increase, and the additional revenue is necessary to keep A.R.C. a quality publication.

Thanks to all of you who add notes to your ads and renewals. We read them all and appreciate the overwhelmingly positive response. We also appreciate your suggestions, of which a common one is that we classify our ads. Because of the volume of ads which bunch up at the deadline (this month, 150 of the 700 ads in this issue arrived on the last two days), the ads must remain mixed, both to ensure timely publication and to contain costs.

In addition, informal polling indicates that the consensus is for a mixed format, which seems to encourage reading *all* the ads. For example, a recent letter from Mark McDonald, a new subscriber, puts a positive "spin" on the subject: "I really enjoy your publication and appreciate your fine service. ...Scouring all of the ads is a treasure hunt each time I read through an issue. Please keep it this way, as in my opinion, half of the fun of purchasing a radio is finding it."

Late Ads. Don't be disappointed! Send your ads in early. Each month we receive ads and faxes too late to be included in the current issue. The deadline is NOON on the TENTH of the month. As we state on the inside back cover of each issue, we hold late ads and place them in the next issue. We do not return them or notify the advertiser.

November 1992 — Our 100th issue. The current issue is the 98th since Gary Schneider began A.R.C. in June of 1984. Look forward to our special November 1992 issue which will be number 100! We are proud of what A.R.C. has become and appreciate the reception we have had from our readers. Always increasing our effort to make A.R.C. more than just a classified advertiser, we will continue to produce the finest magazine in the antique radio community.

Club Events. September is the month of the big one — The Antique Wireless Association's Annual Historical Radio Conference in Rochester, N.Y., from September 23 to 26. There will be 161 flea market spaces, with 30 set aside for single-day sellers. Although the conference officially starts on Wednesday, there always seems to be unofficial activity earlier in the week. A.R.C. will be there ready for action on Wednesday morning, so stop by and say Hi.

Happy collecting!

John V. Terrey

PRINTED WITHOUT COMMENT

Over the last sixteen months, we have received seven complaints about Tim Verthein (his letterhead also reads: Rapids Radio and Records, Sparky Fairlanes Nostalgia Shop, Ryan Radio Co.), 310 3rd Avenue, S.E. Grand Rapids, MN 55744. As of August 13, 1992, only three have been reported settled.

ON THE COVER

The cover this month gives only a hint of Daniel Schoo's successful efforts to dissect and rebuild IF transformers. In fact, his well-detailed and ingenious techniques are downright "uncanny."

Repairing Intermediate Frequency Transformers

BY DANIEL SCHOO

Daniel Schoo presents valuable information for the repair of tube-type superheterodyne radios. He explains the construction of IF transformers made in the 1950s and 1960s and follows a step-by-step procedure for making repairs to them. The procedures are generic enough to make repair of almost any IF transformer possible. (Editor)

From the 1930s through the mid-1960s, many manufacturers made tube-type superheterodyne AM and AM/FM radios. A familiar component in these sets is the intermediate frequency (IF) transformer seen in Figure 1.

INTERNAL CONSTRUCTION OF AN IF TRANSFORMER

Pre-World War II AM superheterodyne radios commonly used IF transformers with top-mounted screw adjustments similar to the IF "cans" shown in the 1941 model RCA Victor RC-462 chassis in Figure 1. However, from the late 1940s through the mid-1960s, many manufacturers used a novel design idea for intermediate frequency transformers. The construction of the IF transformer included built-in fixed capacitors which made the assembly of radios easier. In the 1940s and 1950s, Zenith, for example, used IF transformers that were slug-tuned types having a 1⅛" square footprint.

Mounted inside a phenolic base assembly were the integral capacitors used to complete the tuning circuits. The capacitors consisted of a circular wafer of mica 1 inch in diameter and about 2 thousandths of an inch thick with a silver coating on both sides. The silver coating was applied in a pattern and formed the plates of the capacitors.

To make the electrical connections, extensions of the base pins on the inside of the transformer were bent parallel to the base. The mica was laid out flat, close to the top surface of the base with some of the extensions on the top and some on the bottom of the wafer surface making contact with the silvering.

To complete the assembly, a phenolic disk was placed on the top, and the wafer and pin extensions were sandwiched in the middle with the transformer base on the bottom. The assembly was held together by a screw put through the center from the top and by a nut on the bottom. Individual lead wires of the coil windings were soldered to a part of each base pin that stuck up perpendicular to the base and in this way were connected to the capacitors. Assembly of this unit was faster and cheaper than using separate components. Also, various sized silvered areas on the mica made two, three or more capacitors of different values which used only one wafer.

Later designs used by most manufacturers in the 1960s were similar, but the can was scaled down to a ¾" square footprint. The base assembly of the smaller transformer was a molded plastic material instead of phenolic, and the capacitor/base assembly was held together with a rivet. One type of construction eliminated the top cap on the base and used spring contacts to hold the mica in place. On some transformers made this way, a covering of beeswax was poured over the top of the mica and contacts to seal out air and moisture.

A few of the ¾" transformers made by Zenith and others later in the '60s used a different base.

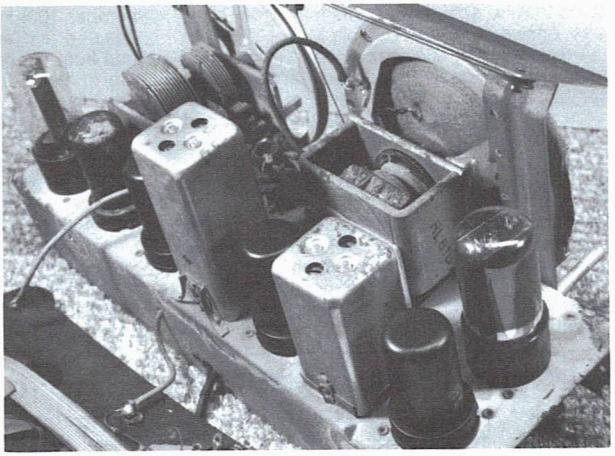


Figure 1. RCA Victor RC-462 chassis, showing two pre-World War II intermediate frequency cans.

They had temperature-stable, ceramic disk capacitors mounted inside, instead of the mica wafer.

THE PROBLEM

This form of construction was used for many years despite some problems that could develop after the radio was in service. Because the capacitor assembly usually was not sufficiently sealed to keep out air, after a period of time, depending on the exposure of the radio to atmospheric conditions, the silvering began to tarnish. Since silver tarnish is not electrically conductive, and the connection to the capacitor plates was made by physical contact, the capacitors started to go "open," breaking contact and intermittently detuning the transformer. Many of these transformers were replaced with similar types only to fail again later.

My first experience with the IF transformer problem was with a 1960s vintage Zenith AM/FM table radio, Model T2542, chassis 7M07, that I rescued from the trash. I did the usual things — replaced weak tubes and filter caps. The set worked well and had a good clear sound.

The trouble started when it began to play intermittently. On AM there was sound and the stations could be tuned, but the signal was very weak. On FM the signal disappeared completely. I suspected an intermittent tube, but after some checking, I discovered that the IF transformers were the cause. I managed to find a replacement for the first AM/IF transformer — a type with disk capacitors — at a longtime Zenith parts distributor. It cost me $13. I replaced the transformer in the radio, but that did not solve the problem.

I did a little research and asked around about IF transformers, to find out if anyone had repaired one. A friend who has run a service shop for many years told me that no service shops attempted to open up bad transformers and repair them. The standard accepted practice was to make repairs by replacement with the manufacturer's original replacement part or equivalent, which at the time was easy to get.

It would have been difficult to repair an IF transformer then because the capacitor values had not been published, and they were very difficult to determine with the equipment available at the time. Small stable capacitors were not available, and even if they were, to try repairing a transformer was not worth the time it would take. It became clear that the only approach for me was to take an IF transformer apart and see what I could learn about its construction firsthand. I dissected the transformer that I had replaced to determine how it could be repaired.

When I opened it up, I saw that silver tarnish covered the surface of a mica capacitor assembly in the base. Having had experience with silver switch contacts that had tarnished and become inoperable, I realized that the tarnish on the mica was a solid indicator of the cause of failure. Simply removing the tarnish would allow the same problem to develop again in a few years, so I devised a way to replace the mica-silvered ca-

(Continued on following page)

What is an IF Transformer?

The IF transformer is much like any other transformer with a primary winding and a secondary winding. It performs two basic functions in a superheterodyne radio. First, it couples the signal between the intermediate frequency stages, providing a DC isolation of the plate voltage on the primary side from the grid bias on the secondary side. Second, it is a tuned circuit which helps determine the bandpass characteristics of the receiver.

IF transformers are designed to meet several criteria. They must be tunable to the desired center frequency allowing enough range of adjustment to compensate for the variability of components. They must have a bandpass characteristic called "selectivity," wide enough to pass all of the frequencies present in a typical broadcast signal but narrow enough so that a station one channel up or down on the dial does not pass through along with the one selected. To do this, the physical dimensions of the coils, the size of the wire, the number of turns, the spacing of the primary and secondary, and the capacity values are all chosen to give the optimum characteristics desired.

Two basic means are used to tune transformers: (1) Fixed inductances — usually air core coils, both wound on a single hollow cardboard tube, with an adjustable capacitor connected to each to set the resonant frequency. These were most common in the older types of radios and were used through the '40s. They can be recognized as having two holes usually in the top of the transformer shell with recessed screws just below the surface for adjusting the capacitance.

(2) Adjustable inductance coils, both wound on a single cylindrical cardboard form with a short, powdered iron core inside each coil and with a fixed capacitor attached to each coil for resonance. These began to be more commonly used in the late '40s and early '50s. They are adjusted by inserting either a straight screwdriver into a hole in the top and a hole in the bottom, like the Miller K-Tran, or a hex key into a hole in the top and rotating the threaded cores.

Most of the hex types also have a hole in the bottom, but they can be adjusted using only the top opening by passing a special tuning tool through the top core and down into the bottom one. A nonmetallic tool made of a material like plastic or phenolic must be used to make the adjustment. A few hex types had a threaded shaft that stuck up from the top, and they were adjusted by turning the shaft.

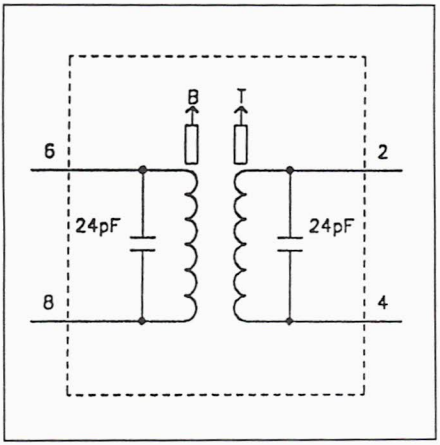


Figure 2. Diagram of a simple IF transformer design showing the internal wiring and the base connections.

(Repairing IF Transformers, continued)
pacitors with ordinary capacitors.

I studied the schematic diagram of a Zenith 7M07 chassis in Sams *Photofacts,* Set #778, Folder #10, published in 1965. Although the capacitors inside the transformer are not replaceable in the usual sense, the schematic listed the capacity values. With this information, I rebuilt each transformer one by one, and now the set works fine.

My next experimental subject was a 1950s Zenith AM/FM Model H723Z1 with the older style transformers. I bought the set out of curiosity to study the larger transformers and see if they could be rebuilt as easily as the smaller ones. In my search through the service information on this model, I discovered that neither Sams nor Zenith lists the capacitor values for the older type transformers. However, this turned out not to be a serious problem, as the values could be measured directly with a capacity meter.

Taking one of these older Zenith IF types apart, I discovered that the larger transformers are easier than the smaller ones to repair. Since little information is available on the older types, I thought it best to measure and document each one as I did the reconstruction so I could share the information with other collectors.

I have talked with other collectors to learn how common IF transformer failure is, and to find out what other people have done to get their radios working. Most people with whom I have talked have tried a few noninvasive fixes, such as spraying WD-40 into the transformer, but usually these were not very successful. Removal and replacement of the capacitor assembly is the only sure way to get a permanent repair.

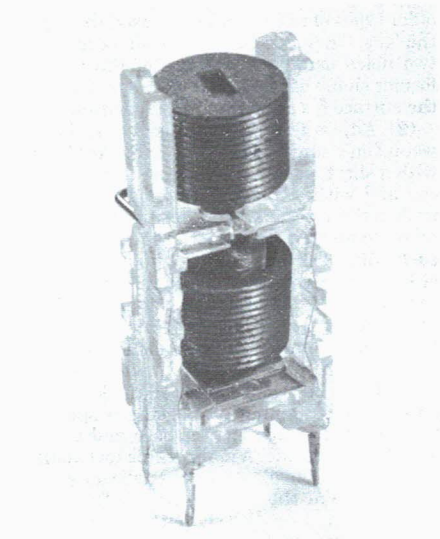


Figure 3. Miller K-Tran with the cover removed before rebuilding.

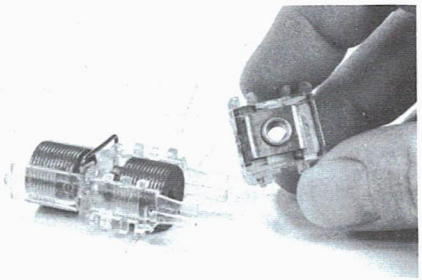


Figure 4. K-Tran with the coil assembly removed from the base.

The typical symptom of IF transformer failure is very weak reception, usually intermittent. Check the usual things like broken connections to the antenna and bad tubes. Inject a signal at the IF frequency one stage at a time, and if there is no gain in one IF stage, the transformer is the likely problem.

If you have a radio that has faulty IFs which are constructed with silvering on the mica, there is a good chance that they can be repaired. They are easy to recognize. They are all slug-tuned and have no external, fixed tuning capacitors connected to the base pins. A schematic for the set will show the capacitors connected to the coils of the transformer but almost never give the value of capacity.

THE REPAIR PROCEDURE FOR IF TRANSFORMERS

The procedure for repairing an IF transformer is straightforward. You will need a schematic diagram to identify which pins inside the transformer have the capacitors attached to them. Figure 2 shows internal wiring and base connections for the simplest IF transformer design. This design consists of two tuned circuits, adjustable

by screws or slugs. More typically, other designs might contain taps on windings and additional capacitors. If a schematic is not available, you can tell, with some experience, where the capacitors are connected by examining the inside of the transformer.

SMALL FOOTPRINT TRANSFORMERS

Start by making a simple sketch of the wiring to the base pins of the transformer you are going to repair. Use the color spot or molded pin number on the base at pin one as a reference, and show the orientation of the transformer in the chassis or PC board. If there is no spot or number, make a mark on the base to use as a reference. Note the color and routing of each wire and component.

Unsolder the wires and components from the pins. Unsolder the mounting tabs from the chassis, straighten the tabs and remove the transformer. If the transformer is on a PC board, unsolder it and remove it. Clean the solder off the pins so that later they can be slid up and removed from the base. Using a small screwdriver, gently pry the wall of the shell out from the base at the point where the mounting tabs are attached to the shell. Grasp the base and pull the shell straight off. Be careful not to jerk the shell off at an angle, possibly breaking the coil assembly inside.

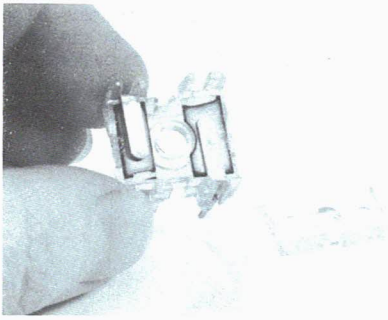


Figure 5. K-Tran base with mica wafer and contacts exposed. Note the tarnish on the mica.

When the base and coil assembly is out, as shown with the Miller K-Tran IF transformer in Figure 3, make notes of the coil wiring. Note which pins the top coil and which pins the bottom coil wires go to. Also, check which end of each coil winding goes to which pin, noting whether each wire is from the clockwise end of the winding or the counterclockwise end. Reconnection of a lead from a coil winding to the pin it came from is especially important if the coil has a tap.

Unsolder the wires and gently remove them. Mark the coil support post, base and cap assembly with witness marks; pull the coil support post from the base and set it aside.

The Miller K-Tran uses a plastic support assembly and ferrite cup cores on the outside of the coils. For the K-Tran, mark the frame and base on one side with a witness mark, unsnap the support posts at the base and remove the coil assembly, as shown in Figure 4.

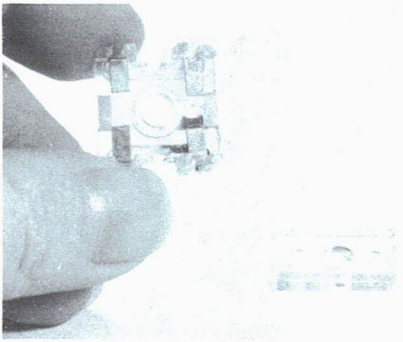


Figure 6. K-Tran base with mica removed and contacts trimmed.

If you know the capacitor values, drill out the rivet, discard it and remove the cap, as shown in Figure 5. Slide the contacts straight up, remove the wafer and discard it. If you do *not* know the capacitor values, do not take the base apart until you measure the capacitors. From the schematic, find the pins to which the capacitors are connected and measure the capacity with a digital capacitance meter. If the readings are well below the usual range of about 100 pF for a 262 or 455 kHz transformer, or 25 pF for a 10.7 MHz transformer, you will have to try to repair the capacitor assembly enough to measure it.

To repair the capacitor assembly temporarily for purposes of measurement, drill out the rivet, discard it and remove the cap. Slide the contacts holding the wafer up enough for clearance, note the orientation, and remove the wafer. The wafer can be cleaned by rubbing it gently with a cotton swab soaked in a silver cleaner like Tarnex. Do not rub it hard or the silvering will come off. Replace the wafer and the top cap. Hold the base assembly together, measure the capacities and write them down on the schematic for later reference. When you have the values recorded, remove and discard the mica wafer.

On many transformers like the K-Tran, the connection tabs for the capacitor overlap inside and will short to each other when the mica is

(Continued on following page)

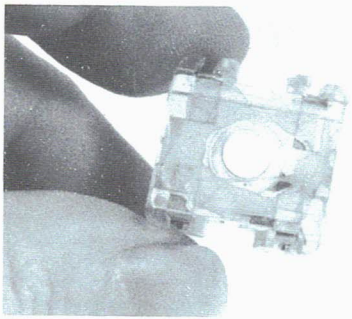


Figure 7. K-Tran base reassembled with glue.

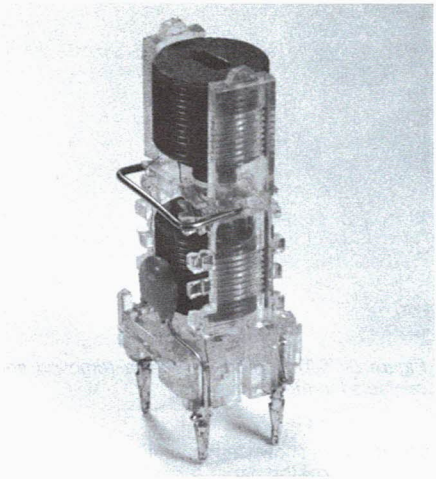


Figure 8. K-Tran reassembled with one capacitor installed.

(Repairing IF Transformers, continued)
removed. This is easily solved by clipping a little off of each end so that there is about a 3/16-inch gap between the ends when you reassemble the base without the mica, as noted in Figure 6. On many of the Zenith transformers, the tabs are set well apart from each other.

To reassemble the base, apply a bead of hot melt glue on the top of the base inside the outer edge. Be sure to cover all of the connection tabs with glue to hold them in place. Using the witness marks, press the cap back on to the base in the same way it was assembled originally. If any glue oozes out of the sides or into the center hole, remove it while it is still warm. Hold the cap in place until the glue cools, as shown in Figure 7. Align the witness marks, and push or snap the coil assembly back into the base. Refer to your notes and resolder the wires to the pins.

Now you are ready to install the new capacitors. Where space permits, always use silvered mica capacitors as replacements. They will give the best results because of their stability. A good alternative is an NPO-type, temperature stable, ceramic disk capacitor. They are slimmer and will fit into a K-Tran with limited space.

Trim each capacitor lead back to about one quarter of an inch in length. Bend the leads out and down so that they line up with the centers of the lead wire pins, and solder each lead to the proper pin. On the K-Tran, leave the leads long enough to reach down into the slots in the side of the base and solder them to the base pins just on the outside. Figure 8 shows K-Tran after reassembly. Be sure to push the leads back into the slot so they do not short to the shell. Push the capacitors back far enough to clear the shell when it is slid back on. Figure 9 shows a Zenith transformer after rebuilding.

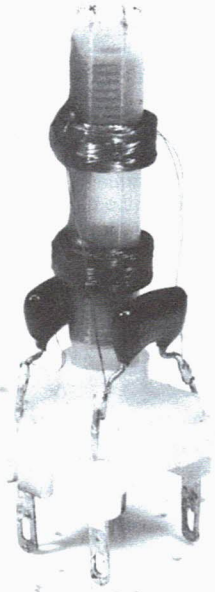


Figure 9. Zenith transformer after rebuilding.

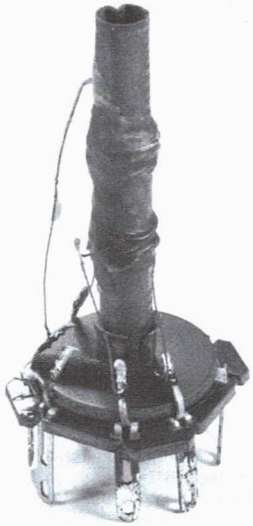


Figure 10. Zenith large footprint FM discriminator transformer with the cover removed and the wires removed from the pins.

Straighten the sides of the shell, slide it back down over the base and coil assembly, and push it home. Put the transformer back into the radio in the reverse order that you removed it. Refer to your sketch and reconnect the leads and components. It's a good idea to try the radio after each transformer is replaced. If the other transformers are not so bad as to keep the radio from working altogether, you can do a quick tuneup of the

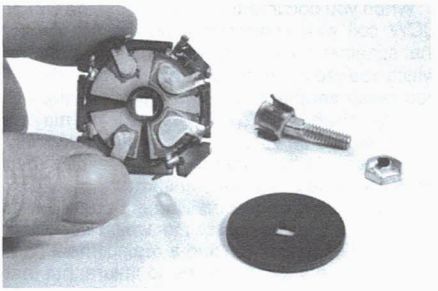


Figure 11. Zenith with the base disassembled showing wafer and contacts. Note the tarnish on the mica around the contacts.

repaired transformer and verify that the repair was successful before you move on to the next one. To make troubleshooting easier, start at the last AM IF or FM detector.

Putting the capacitors in a discriminator (FM detector) transformer is a little tricky because there are more than two inside. A careful assessment of the space available, the connection configuration and the size of the capacitors is needed to fit them in. Silvered mica capacitors are a little bulky, but with careful positioning you can get them in with room to spare. Mount the two secondary capacitors vertically on the lead wire pins and bring the center tap between the two around the side, attaching it to one lead of the primary capacitor just as in the original circuit. If the set has FM, a complete realignment on the IFs and FM discriminator (detector) will be necessary after the last transformer is in.

LARGE FOOTPRINT ZENITH TRANSFORMERS

The older style Zenith transformers are very easy to repair. Many of the procedures are the same or similar to the repair of a small transformer so I will explain these only briefly. Make a sketch and remove the wires and components. Use the arrow between pins one and eight (standard Zenith IF base numbering) as a reference.

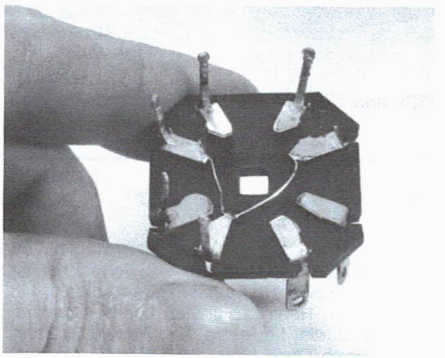


Figure 12. Zenith base with the mica removed and the contacts trimmed. Note the fine wires connecting three of the contacts.

Unscrew the nut in the center and remove the mounting bracket. Pull the can from the chassis. Bend back the retaining loops at each of the four sides by grasping them with long-nosed pliers and pulling them up and out.

Remove the transformer from the can. Make witness marks on the coil support post and brass coil holder in line with the arrow on the base. Note the coil wire connections to the pins as you would with a small transformer and remove the wires from the pins, as shown in Figure 10. Pull out the coil assembly and set it aside.

Measure the capacitors following the same procedure you would use with a small transformer. If the values do not measure out, unscrew the nut and pull the brass holder and center screw out. Remove the phenolic disk, slide up the contacts, note the orientation and remove the mica disk, as pictured in Figure 11. (Note the index arrow stamped in the upper right corner.) Clean the silvering, replace the mica, and reassemble the base with the screw and nut.

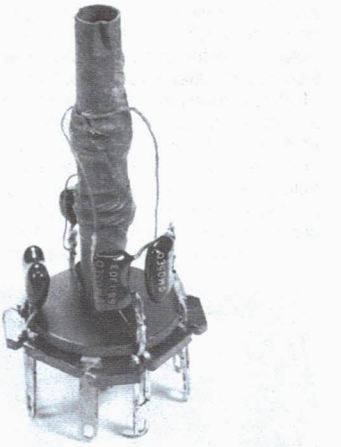


Figure 13. Zenith discriminator transformer reassembled with the capacitors installed.

After the capacitances are recorded, disassemble the base and remove the mica disk. In some transformers two or three of the contacts are connected by a common area of silvering on the mica, but this information is not shown on the schematic. These contacts will have to be reconnected with fine wire in the base assembly. Examine the mica disk and note which of the contacts were on a common area of silvering. Add this information to the schematic.

You will have to trim the contacts before reassembly or they will touch. Clip them back so that they have at least ⅛" spacing. Refer to the schematic and reconnect any contacts that should be electrically connected by soldering a fine wire from one to the other, as shown in Figure 12. Replace the phenolic disk, insert the screw, and align the witness mark on the coil holder with the arrow on the base. Replace the nut and be care-

(Continued on following page)

ful not to tighten it too much. Align the witness mark and push the coil assembly back into the coil holder.

Follow your notes and reconnect the wires. Using the schematic, trim the capacitor leads and connect them to the appropriate pins. As alternatives to the ones shown on the schematic, some of the contacts that you connected internally will now come in handy for attaching the capacitors. Note the mountings of these new capacitors, as shown in Figures 13 and 14.

Replace the shell and bend the loops back into place. Reinstall the transformer in reverse order. Power the radio through an isolation transformer and try the reception. To see how well the repair went, you can make a coarse adjustment to the tuning on the transformer for the best signal.

The process is not very difficult, but it does take time and attention to detail. To get good results, you must document everything you do. I drew my own schematic of each transformer and noted each coil connection top or bottom, clockwise or counterclockwise. I added the capacitor values and noted which pin numbers were internally connected. Careful documentation makes a good reference for later if you rebuild another set.

I should mention that sometimes not all transformers of the same part number are wound the same way. On some production runs, the coils would be wound clockwise, and on others, they would be wound counterclockwise. It does not make any difference most of the time which direction the coils are connected when you assemble them, but if there is a tap in the coil, it makes a big difference.

When you document a coil and note the CW or CCW coil wire connections on the schematic, that schematic applies only to the transformer on which you are currently working. At a later date, if you repair another transformer, recheck the coil polarity, which may be the other way and may be important. To be safe, always verify the polarity and reconnect the wires to the same pins they were connected to when you started.

A real sense of accomplishment comes from repairing something yourself for which it could be difficult or impossible to find a replacement part. IF transformers can be prone to failure, but that does not need to be the end of some nice old radio you can't bear to part with.

References:

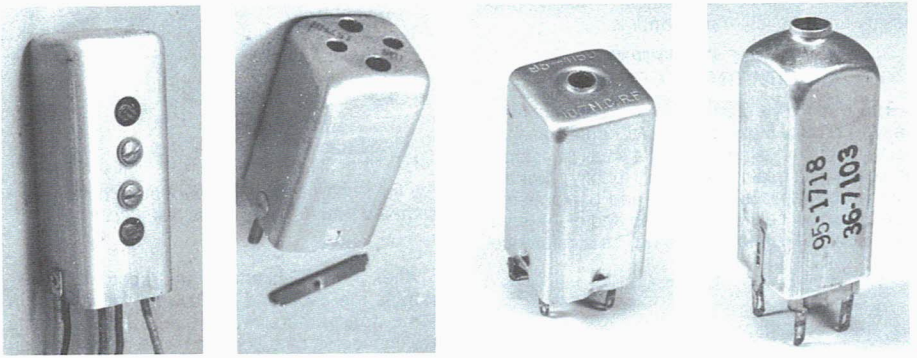
Sams *Photofact*, Set 778, Folder 10. Indianapolis: Howard W. Sams & Co., 1965.

Sams *Photofact*, Set 163, Folder 14. Indianapolis: Howard W. Sams & Co., 1952.

Zenith Service Data, 1946 through 1957. Chicago: Zenith Radio Corp.

(Daniel Schoo, 526 Colonial Dr., DeKalb, IL 60115)

Daniel Schoo is an electronics design engineer with a lifetime interest in antique technology, especially radio and television equipment. In addition to his collection of '30s and '40s radios and video cassette recorders, he has a collection of vintage vacuum tubes, neon lamps, and tube data books.



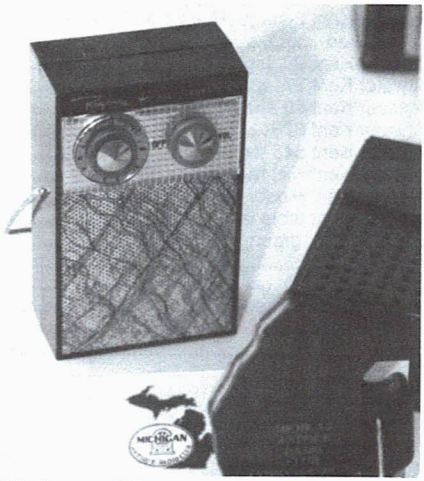
From left to right: Examples of typical 1930s, 1940s, 1950s, and 1960s IF transformer can covers used on radio chassis.

Coming Soon: Responses to Farago Letter

A.R.C. has been overwhelmed with responses to Jim and Nadiene Farago's letter published in our May 1992 issue. Currently, we are assimilating the answers we have received to the Faragos' 12 questions on how a number of electrical engineering standards evolved. The answers will be summarized in a future article. Many thanks to the following readers for their thoughtful and detailed responses: Dave Dameron, Manhattan Beach, CA; Robert W. Downs, Houston, TX; John Eng, La Palma, CA; Edward J. Engelken, San Antonio, TX; Wally Horton, Heath, OH; Stan Lopes, Concord, CA; Mike Martin, Louisville, KY; Ronald L. Oberholtzer, North Cape May, NJ; David S. Randall, Flushing, NY; John A. Reinicke, Bloomfield, MI; Rich Spencer, Winston-Salem, NC.

(MARC/AWA Meet & Auction, continued)

Michigan 1-tube battery set, vg 250
Mike radio WKGN, g 85
Mohawk 1-dial, NT,g 80
Motorola 10" TV 30
Mr. Peanut xstr radio, boxed, vg 85
National NC-240-D, g 130
National NC-57 comm rcvr, g 20
National SW-3 w/2 sets coils 220
Navigator Globe radio, vg 300
"On the Air" Pepsi bottle, all original 300
Philco 38-33B cath, original box, vg 170
Philco 46-420, small crack 30
Philco 48-200, g 40
Philco 49-501 200
Philco 60-B, g 100
Philco 84, g 105
Philco 89, g 90
Philco Model 39-80, g 30
Philco Model 44, p 60
Philco Predicta table TV, not working 90
Pin-It-Up radio 60
PLA-PAL trapezoid, wood 70
Radio Lamp of America, no shade, vg 275
Radio station clock, WRRR, lighted, vg 135
Radio station neon clock, WTVB 170
Radio station electric clock, WCUE, f 135
Radio Today magazines (20) 20
Raid adv. xstr radio 70
RCA 9-TX Little Nipper 190
RCA 9TC 247 TV 20
RCA 9X3, cracked 300
RCA 9X562 20
RCA 812K 40
RCA La Siesta radio, original finish 325
RCA Model 103 spkr, vg 70
RCA Nipper curtains 285
RCA plastic table radio, knob missing 20
RCA Radiola 17, no lid, NT 25
RCA Radiola 21, f 25
RCA Radiola 28 chassis, NT, as found 30
RCA Radiola 33, no legs 20
RCA Radiola loop antenna, no base 30
RCA Radiola Model 66, p 40
RCA Radiola UZ-1325 horn spkr 100
RCA sign, (sm. back lighted), rough 40
RCA table spkr, wood cabinet 40
RCA tube case 25
RCA tubes sign 45
Rider Manuals, Vols. 1, 2, 1-5 abridged 80
Scott Allwave 12, extra coils, vg 400
Scott Allwave 23, Tasman cabinet, g 900
Scott Newsletters, (1930s), (17) 200
Sears (made by Crosley) w/catalog 110
Sentinel 243-T farm radio 20
Shure #5 ring mike 105
Silvertone 4500 20
Silvertone 7004, brown Bakelite, g 50
Silvertone ivory Plaskon, 3 hairlines 60
Silvertone Model 4769 40
Silvertone tombstone, g 70
Sony TV-750, original box 30
Sparton Blue Mirror 5573 1850
Sparton Bluebird, e 1900
Sparton Junior 150
Sparton Model 5040 260
Stewart-Warner SW converter, g 40
Teletone 7" TV 55



This Regency TR-99 was the winner in the transistor contest.

Temple spkr, rough 35
Thompson J-60 3-dialer 35
Van Dyke tubes in boxes, (5) 30
Westinggale 52 80
Westinghouse Oscillograph, (1927) 50
Westinghouse Repwood tombstone, (1935) 130
Westinghouse/RCA Model RC, g 160
Zenith 61, refinished 80
Zenith 4K01, f 80
Zenith 6-V-27 tombstone, nice 185
Zenith 8-S-661, vg 60
Zenith Bakelite Deco/PB, e 115
Zenith H-725 30
Zenith M72 floor model 150
Zenith Model 5F134 farm radio, g 90
Zenith 5-D-011 35
Zenith table radio SD-029, NT 30
Zenith tombstone, painted black 150
Zenith Trans-Oceanics, (4), 3 w/o handles 85
Zenith Upside-Down, Bakelite, cracked 45
Zenith Zenette 4Z800GY portable 35

(Bruce Tanner, 35625 Stagecoach Dr., Okemos, MI 48864)

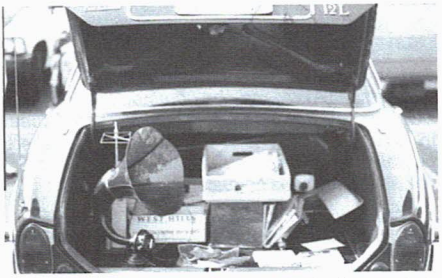
(Larry Babcock, 8095 Centre Ln., E. Amherst, NY 14051)

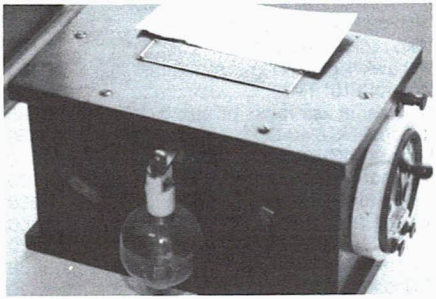
Information on joining the Michigan Antique Radio Club (MARC) may be obtained from Jim Clark, PO Box 585, Okemos, MI 48864. Annual dues are $12, a quarterly bulletin is published, and there are quarterly meets, as well as the annual Extravaganza.

Information on joining the Antique Wireless Association (AWA) may be obtained by writing to P.O. Box "E", Breesport, NY 14816. Annual dues are $10, "The Old Timer's Bulletin" is published monthly, and there are regional conventions, as well as the annual Historical Radio Conference.

Information on joining the newly formed E.H. Scott Historical Society (EHSHS) may be obtained by writing to P.O. Box 1070, Niceville, FL 32588-1070.

Atwater Kent 2-stage AF amp for breadboard, cracked 50
Atwater Kent 20, big box, NT, g 40
Atwater Kent 37, vg 40
Atwater Kent 60 and 20 compact 50
Atwater Kent 376 35
Atwater Kent 545 tombstone 80
Atwater Kent Kiel radio table, no radio 170
Atwater Kent Model 10 breadboard, vg 1200
Atwater Kent table lamp, wrong shade 70
Belmont 519, green, vg 70
Belmont 636 100
Belmont GD111 165
Bendix Catalin, green/black, no cracks 600
Benrus clock radio 20
Bonadyne 40
Buckingham, g 30
Bush Lane battery set, (1924) 30
Champion spark plug radio xstr 50
Champagne bottle radio, (1930) 195
Clarion 11801 40
Clarion 11802 175
Cord (Mir-Ray), unusual/rare, vg 1250
Coricidin Mortar pestle adver xstr radio 100
Crosley 124 cath, no grille cloth 140
Crosley 1930 advertising calendar 40
Crosley ACE 3-B 110
Crosley Buddy Boy 220
Crosley D-25 45
Crosley Model 5516, wood 50
Crosley Trirdyn 3R3, vg 30
Cunningham 301-A tubes, NIB, (9) 55
Dahlberg pillow radio, lime 165
Day-Fan Model 5050 35
Deitrickson 2R-3, rough 90
Detrola Model 568, chrome panel, vg 110
Detrola Pee Wee w/orig. box, vg 600
ElectroVoice Mercury mike and stand 50
Elvis Presley Thunderbird, NIB 45
Emerson 375 "5+1" Catalin, green swirl 500
Emerson 511 Plaskon (1947), green, g 85
Emerson 645 portable 70
Emerson 847 xstr (1957) 30
Emerson EP-405 Jewelry Box, clean 100
Emerson mini-port #558 warped top 40
Emerson 520 Catalin, brown, cracked 100
Emerson TV/radio clock sign, vg 175
Emerson Vangard 888 w/leather case 45
Emerson white Deco radio, small chips 150
Emerson ZX235 (Little Miracle), red, g 350
Fada 1005, blue. white, e 285
Fada Bullet, yellow/red 650
Freed-Eisemann NR-5, f 30


A Burns 205D horn speaker seen in the flea market.


This DeForest single audion set was the winner in the 1- to 3-tube battery set contest.

Freshman Masterpiece console 95
Garod 5A-3, g 20
GE A-53, g 40
GE L-50, refinished (?), vg 130
GE Model C122, cracked 50
GE Model C2418A Mickey Mouse 45
GE Model M-52 tombstone, g 50
GE Model M-52 tombstone, g 55
General Instrument Corp., late '20s set 45
Gloritone cath (US Radio and TV) 65
GM Little General cath 170
GM remote control/case only 30
Gonset GR-211 25
Gonset Model G43 communications rcvr 40
Grain Belt adv. radio 75
Graybar cath, g 145
Grebe Syncrophase MU-1, w/o chain 200
Grundig Rekord 196 40
Hallicrafters TW 2000, vg 110
Hammarlund HQ 110, w/manuals 70
Headphones collection, (3 pr) 20
Jennings portable coin op, missing mech 65
Jewell mini-tombstone, chrome grille 300
Kadette, Bakelite, e 150
Kadette Clockette Catalin, yellow swirl 850
Kadette Jr., brown swirl 250
Kadette Jr., red, e 700
Kadette portable w/carrying case 260
Kellogg RFL radio power supply 20
Kit radio, 3-knob, TRF 40
Knight FM comm rcvr 20
Kraft Miracle Whip xstr 25
Majestic radio, black plastic 50
McMurdo Silver 5C 170
McMurdo Silver 5C spkr 195
Melody Beer radio, restored 170

(Continued on following page)

A warning: *Auction prices are not current values. A listing such as this cannot adequately include the condition of cabinets, chassis, transformers, tubes, the operating status of the set, and the inclusion of incorrect, restored or replica components, etc. Auction prices are the result of the excitement of the auction process, the skill of the auctioneer and the specific interests of the participants. Nevertheless, auction prices serve as useful references and as another element in the value determining process. The possibility of error always exists, and if we are notified, corrections will be reported.*

MEET AND AUCTION REPORT

MARC — AWA EXTRAVAGANZA '92

July 10-12, 1992 — Lansing, Michigan

COMPILED FROM REPORTS BY BRUCE TANNER AND LARRY BABCOCK

The Michigan Antique Radio Club (MARC) and its cosponsor the American Wireless Association (AWA), held the seventh Extravaganza Convention at the Holiday Inn Conference Center in Lansing, Michigan, July 10-12, 1992. The gathering was a two and one half day event, beginning on Friday and running through midday Sunday.

The registration list officially shows 266 entrants, and since "family registrations" were popular, an estimated 500 or more were in attendance. Representatives attended from 26 states in the U. S., plus Canada and Italy.

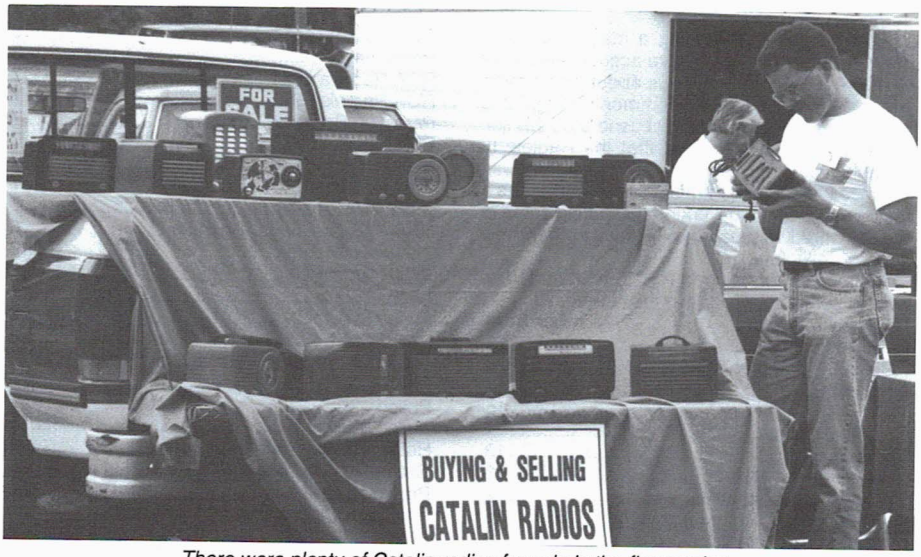
The theme for this year's meet was the E.H. Scott Radio Company and its heyday during the Big Band Era. Twenty-one Scott units spanning the early 1920s to the late 1940s were on display during the Saturday night social hour when a new "E.H. Scott Historical Society" was christened before an estimated 150 congenial collectors.

At the main auction on Saturday auctioneer Jeff Bub gaveled his way to $32,100. [The total, deleting buybacks, was $22,950.] High price items changing hands were an Atwater Kent Model 10 breadboard in excellent condition at $1200; an unusual and rare Cord (Mir-Ray) mirror table set at $1250; a green and black Bendix at $600; a Detrola Pee Wee with original box at $600; a red/yellow Fada Bullet at $650; a Scott Allwave 23 in a Tasman cabinet at $900; and a yellow swirl Kadett Clockette at $850.

The following list is a selection of items offered, with no attempt to delete "buybacks."

e=excellent, vg=very good, g=good, f=fair, p=poor, unk=unknown, BT=brass-tipped, NT=no tubes, NIB= new in box, cath=cathedral, spkr=speaker, xstr=transistor, xtal=crystal, rcvr=receiver

A.R.C., 1st 5 issues, (1984)	$45
Abbotware horse radio	205
Adv. sign, counter type	50
Adv. tube sign, counter type	50
Airline 04BR-514A, g	45
Airline 04BR-508A	90
Airline 7-tube, NT	60
Airline battery cath, large	35
Airline Model 62-337	30
Airmaster, wooden	50
Airophone	80
Akradyne 3-dialer, f	50
All American reproducer, cone spkr	90
All American Superhet, NT, g	120
Apex Superfive, NT, f	20
Arvin 540T	40



There were plenty of Catalin radios for sale in the flea market.

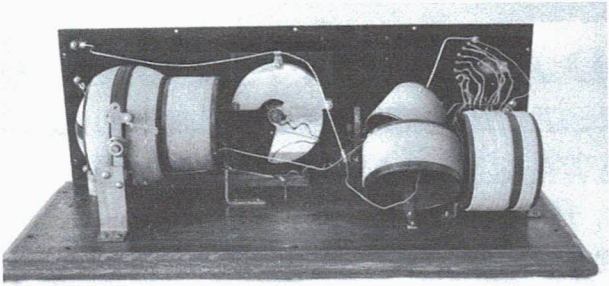


Figure 3. The Paragon RA-10 interior view. It is a tuner only, consisting of variometers, tapped coils and one large variable capacitor.

cluded that to "make it" in the collecting world, you must acquire at least one each of the following: first, a console — every real collector has at least one sitting around in the way. Besides, a console has a flat top upon which you can set another radio! Second, a cathedral like the one your grandparents had in the living room. Third, a Bakelite, like the one your mom had in the kitchen when you were a kid. Fourth, a coffin-style battery set from the 1920s, and fifth, an Atwater Kent breadboard.

Well, I'm four-fifths of the way there. Somewhere out there in some dusty attic or junk shop, at the next swap meet or auction, that AK breadboard is waiting, and when I get it, I can say I have "made" it — a real collector at last! Where in the world will I put it?

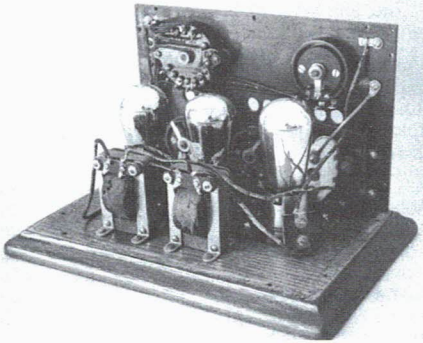


Figure 4. The Paragon DA-2 interior view. It is a detector/amplifier consisting of a detector and two audio stages using Type 01-A tubes. It appears that the lower left filament rheostat has been replaced with a compression type.

(Bill Harris, 1513 Bellechase Dr., Roanoke, TX 76262)

Bill Harris' radio interest began 35 years ago with a Knight-kit Space Spanner 3-tube regenerator BC/SW, which he built himself and which still works. A gift of the Paragon RA-10/DA-2 only three years ago initiated his interest in collecting and restoration. His diverse collection ranges from 1920s battery sets to transistors of the 1950s and '60s. Favorites include wood table models of the 1930s and '40s, especially cathedrals and tombstones.

The Most Common Radios — 10-Year Mail Order Data

BY RON BOUCHER

After 10 years of running a mail order radio business by computer, I have accumulated a lot of different data. I got curious about which radio or speaker had been most commonly bought and sold during this period. When I generated this list, it was to no one's surprise that the Radiola III came in first.

Since then, I have terminated my "career" as a radio vendor and am working on making some of the software I've created available to other dealers and collectors.

It may be interesting to A.R.C. readers to see what is commonly traded in the Northeast!

Radio or Speaker	Number Sold
RCA Radiola III	25
RCA 100A Speaker	20
Philco 60B	17
Philco 84B	15
Crosley 51	14
Philco 20B	13
Freshman Masterpiece	13
Atwater Kent E Speaker	12
Atwater Kent 20	10
Philco 89B	9
Atwater Kent F-2 Speaker	9
RCA UZ-1325 Speaker	8
RCA Radiola IIIA	8
Philco 54C	8
RCA Radiola 18	7
RCA Radiola 17	7
RCA 100 Speaker	7
Philco 80B	7
Master's Art RT-200 Telephone Novelty	7
Atwater Kent 40	7
Atwater Kent 30	7
Tower Meistersinger Speaker	6
Teletone Speaker	6
RCA Radiola 20	6
Philco 70B	6
Philco 610	6
Hallicrafters S-20R	6
Atwater Kent 35	6
Philco 90B	5
Philco 620	5
Philco 37-610	5
Hallicrafters S-19R	5
Grebe Synchrophase MU-1	5
Browning Drake 5R	5
Atwater Kent E-2 Speaker	5
Atwater Kent 33	5

(Ron Boucher, PO Box 541, Goffstown, NH 03045)

RADIO RAMBLINGS...

The Paragon RA-10/DA-2 "My Start as a Real Collector"

BY BILL HARRIS

It all started when my wife's cousin gave me this old radio pictured in Figures 1 to 4. He had found it in a storage shed while clearing out his parents' belongings. Since I am an amateur radio operator, he thought I might enjoy fooling around with this set, so instead of chucking it, he brought it to me.

"Well," I thought, "I'm not really into old radios, but sure, I'll take it rather than let it be thrown away." So up to the attic it went, and there it stayed for several years.

Then one day, while looking for something else, I came across the old radio and decided to see what it would look like if it were cleaned up a bit.

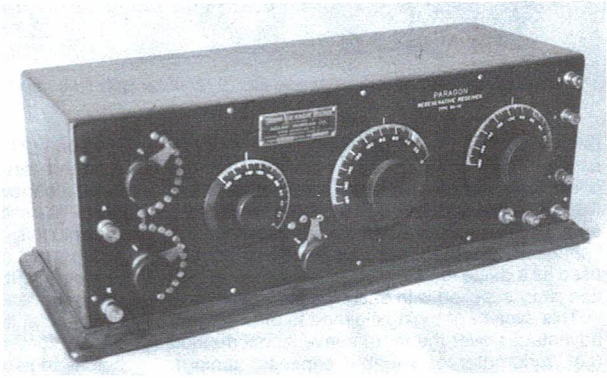


Figure 1. The Paragon RA-10.

Figure 2. The Paragon DA-2.

The two-piece unit looked pretty old — wood cabinet, Bakelite panel and dials, battery operated. "Let's see," I thought. "Its name is Paragon; this one says RA-10 regenerative receiver and the other, DA-2 detector amplifier." Since I was not a collector at the time, this nomenclature didn't mean very much, other than that this was just an old radio.

However, after removing three pounds of mud dauber's nest, refinishing the wood cabinets and cleaning up the Bakelite front panels, I thought the old radio looked good, really good. I reflected on how it might have looked when purchased new and taken home where family members were anxious to listen to this new thing called radio.

That was really fun, and I was hooked. I had been introduced to the world of radio collecting!

Now I had to learn all I could about old radios and those early days. I joined the Vintage Radio and Phonograph Society of Irving, Texas, so I could hobnob with longtime collectors. I purchased all the books I could find on collecting: price guides, Alan Douglas, Morgan McMahon and others. I learned about TRFs, battery sets, Catalins, cathedrals, Bakelites. I went to vintage radio auctions and conventions, attended swap meets, and read *Antique Radio Classified* from cover to cover. I learned about Atwater Kents and Pooley cabinets, winding coils, repairing speaker cones, and which local AM radio stations play old-time radio and big band. I've learned a lot!

I've learned that the Paragon set I first acquired and restored to working order was made by the Adams-Morgan Company of Upper Montclair, New Jersey, and that the RA-10 was introduced in 1920 and the DA-2 in 1922.

I can now polish a Bakelite cabinet in no time at all. With my trusty soldering iron, I can change the filter and paper caps in a flash. With steel wool and naval jelly, I can make the chassis look as good as new. Zip-zap with the signal generator and vacuum tube voltmeter, and the set is aligned and ready to go from the shop to a display shelf.

Shelf? There's no more room on the shelf. The shelf is full; the piano top is full; even the piano bench and the floor are covered with radios. There are radios sitting on radios!

After almost three years of serious collecting and talking with dozens of collectors, I have con-

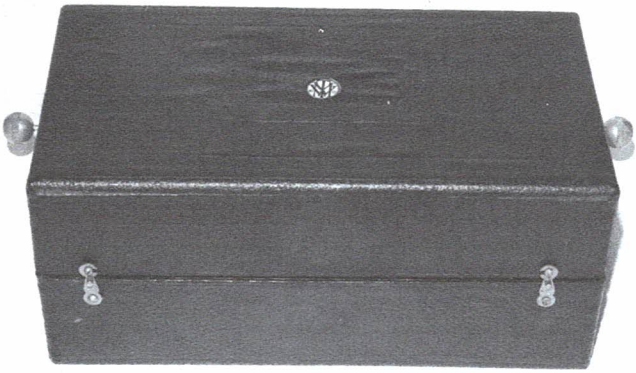


Figure 2. The Marconiphone RB10 receiver with lid closed.

per spades across the surface of the block in exactly the same manner as for the V2. The effect of the spade is to reduce the inductance of the coil in proportion to the area of the coil covered by the spade. Like the V2 receiver, the spades are attached to graduated rods which are used as a guide to tuning, together with a calibration chart supplied with each range block.

This system of tuning claimed to offer several advantages over the more conventional method (i.e. variometer of variable capacitor tuning). These included sharper tuning, higher efficiency than was possible with a variometer and also improved stability with less susceptibility to hand capacitance effects — "even when working near the point of oscillation."

The panel provides sockets for two pairs of headphones, and a 3-position aerial selector switch allows for the use of two different antenna lengths (60-100 feet and 50 feet or less). The third position is a safety feature which grounds the antenna when the set is not in use.

The circuit diagram of the RB10 in Figure 3 shows the reflex arrangement similar to the earlier V2. The anode circuit of the valve is tuned for high frequency amplification with both the antenna and tuned anode coils (L1 and L2) being mounted within the removable range block. The crystal detector is of the carborundum and steel contact type and is polarized by a 1.5 volt dry-cell housed beneath a slide-on metal cover in the center of the panel. The DEV valve used in the RB10 receiver is of the "dull-emitter" type, and is physically modeled on the early Marconi V24 configuration.

In this design, an axial filament was brought out to connections at opposite ends of the cylindrical glass bulb, with grid and anode contacts diametrically opposite one another at the side. This rather cumbersome arrangement was intended to cut down stray capacitances by separating the leads as much as possible. In order to ensure that the valve was inserted correctly, the anode contact was painted green, as was the bolt head securing the corresponding anode clip to the receiver panel.

According to Jonathan Hill, an adaptor was available which permitted a valve with a standard 4-pin base to be used in place of the DEV type. The filament of the DEV was rated at 0.2A at 3.0V, and the recommended anode voltage range was 20-45V. To power the set, a matching black battery unit was available. This unit was slightly larger than the receiver itself and contained thirty "small" cells for the high tension (B) supply and two "large" cells for the low tension (A) supply.

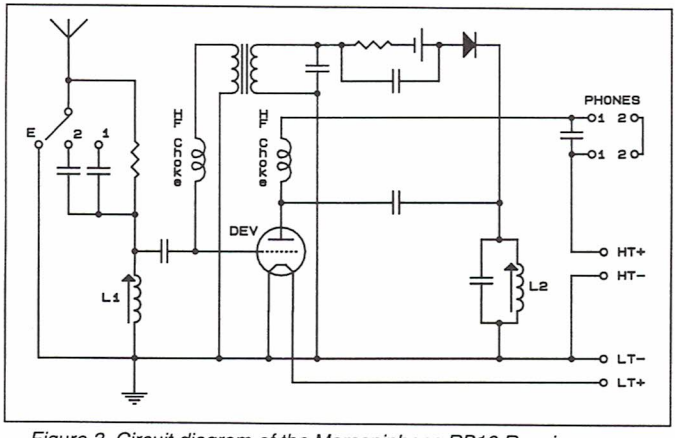


Figure 3. Circuit diagram of the Marconiphone RB10 Receiver.

(Ian L. Sanders, 16725 Wild Oak Way, Morgan Hill, CA 95037)

References:

Constable, Anthony. *Early Wireless.* Tunbridge Wells, Kent: Midas Books, 1980.

Hill, Jonathan. *Radio! Radio!* Hampton, Devon: Sunrise Press, 1986.

Ian Sanders has been collecting and restoring early 1920s crystal and battery receivers since 1974. He specializes in British sets of this period, and would be happy to try to answer any reader's inquiries on this subject.

The Marconiphone RB10 Receiver

BY IAN L. SANDERS

The Marconiphone Model RB10 receiver, shown in Figure 1, was introduced in England by Marconi's Wireless Telegraph Company, Limited, in February 1923. Built by the Plessey Company of Holloway (as were all pre-1926 domestic Marconi sets), it is a 1-valve plus crystal receiver for headphones, using a reflex circuit similar to that of the well-known 1922 2-valve Marconiphone Model V2 [See A.R.C. August 1991]. In this arrangement, the single valve is used as both high- and low-frequency amplifier, and ". . . by this means the equivalent of three valves is obtained enabling the use of reaction to be dispensed with, resulting in exceptionally pure quality of reproduction."

The receiver is housed in a wooden, black rexine-covered cabinet measuring 11 x 6 x 5 inches, as pictured in Figure 2. Somewhat unusual is the fact that there is no known example of a Marconiphone RB10 carrying the ubiquitous BBC stamp or post office registration number typically found on British receivers of this vintage. Tony Constable in *Early Wireless* claims that the registration number and stamp have been erased from surviving models, and it is certainly most unlikely that the set would have originally been marketed without such identification.

It seems probable, then, that when the registration requirement ended in September 1924, the number was removed from sets offered to the public. However, it is not clear why the BBC stamp was removed, since this was a rather prestigious mark of approval; it is equally mysterious why no earlier sets bearing the registration number have turned up in collectors' hands.

The RB10 shared many of the physical features of the Marconiphone Crystal A receiver introduced in 1922, including the same cabinet, tuning arrangement and detector. The valve, crystal detector, two fixed resistors, and antenna selector control are mounted on an ebonite panel. Recessed into the lid of the Crystal A cabinet is a white, circular, ivorine badge bearing the intertwined initials of Marconi Wireless Telegraph (MWT).

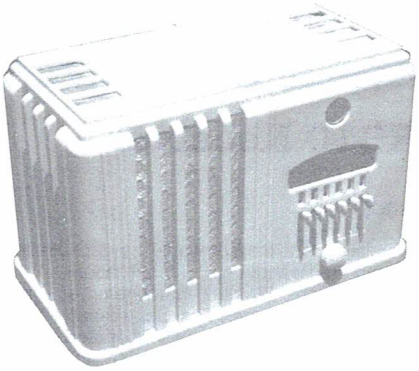
Surviving RB10s generally have a patch over the badge, and Jonathan Hill in *Radio! Radio!* points out that this is probably because they were sold after July 1924, by which time the retailing of domestic Marconi receivers was taken over by the Marconiphone Company. The set in my collection, shown in Figure 1, does have a black patch on the lid, but it also has a circular cutout in the patch revealing the white badge with the MWT emblem.

Figure 1. Marconiphone RB10 receiver with lid open and spare range block.

The RB10 covered a tuning range of 185 to 3200 meters by means of the same slide-in "range blocks" used with the V2 receiver. The complete tuning range requires a total of eleven range blocks. The selected range block is inserted in a slot at the back of the control panel, and there is provision for one spare block to be stored inside the lid.

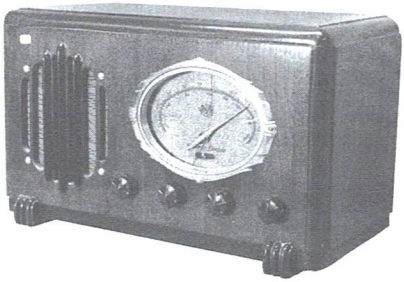
Each range block contains two pancake-type coils. The set is tuned by moving a pair of flat cop-

PHOTO REVIEW

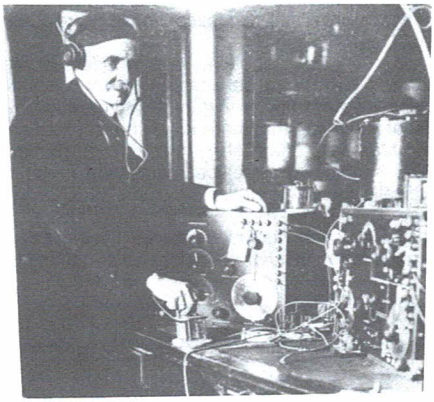


WARD'S AIRLINE MODEL 62-290 - The back of this set matches the front in appearance. The chassis is installed through the bottom of the cabinet and consists of 5 tubes. Probably made in 1938, the set is very pretty when turned on in the dark: the green tuning eye, the red dial face, and the soft glow of the cream-colored cabinet really stand out. *(Jim Watson - Coarsegold, CA)*

BELMONT MODEL 151 - This is a typical Belmont design with the tuning knob on the right side and the push buttons across the front. It is a 5-tube, AC/DC chassis. These radios always have an unusual, eye-catching appearance. It is a 5-tube, AC/DC chassis. *(Walter V. Worth - Wollaston, MA)*



NOTHERN ELECTRIC MODEL 626 - This Canadian set, not common in the U. S., was manufactured in 1956 by a sister company of Western Electric. It is a 7-tube AC-only radio with a pretty dial and oval escutcheon. *(Walter V. Worth - Wollaston, MA)*



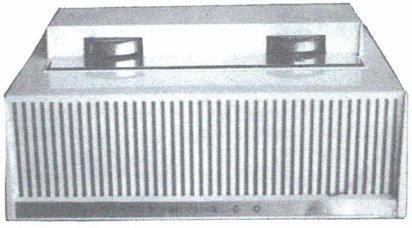
RECORD ALBUM WITH RADIO PHOTO - This radio-related photo is on the cover of the Capitol Disc Jockey Album of January 1970. It depicts early radio equipment. Does anybody recognize the operator or the equipment? *(Gary Arnold - Marion NC)*

MIRACO ULTRA 5 BY MIDWEST RADIO CO. - Made in 1925 at a time when the rage was 1-dial tuning, this set was a hold-over design. This 3-dial TRF set was advertised along with the "Unitune" for the same price — $49.75. The case is of solid walnut and the panel is silk screened with gold. *(Walter V. Worth - Wollaston, MA)*

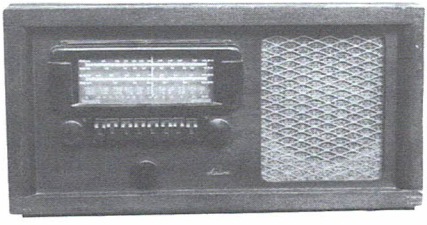
PHOTO REVIEW

This column presents in pictorial form many of the more unusual radios, speakers, tubes, advertising, and other old radio-related items from our readers' collections. The photos are meant to help increase awareness of what's available in the radio collecting hobby. Send in any size photos from your collection. Photos must be sharp in detail, contain a single item, and preferably have a light-colored background. A short, descriptive paragraph **MUST** be included with each photo. Please note that receipt of photos is not acknowledged, publishing is not guaranteed, and photos are not returned.

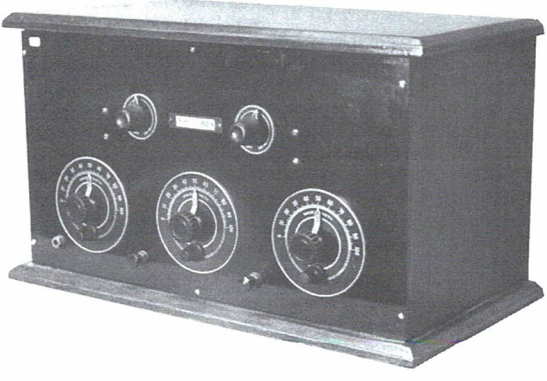
SILVER MARSHALL CHASSIS #30 - Only the grille cloth is not original in this circa 1930 floor model. The radio uses the following tube types: (4) #24s (3 RFs, 1 detector); (1) #27 (1st audio); (2) #45s (push-pull output); and (1) #80 (rectifier). Like many sets of this era, it has phono connections. The schematic is in Riders, Volume 1. *(G. Hausske - Wheaton, IL)*



PHILCO MODEL H 838-124 - This 1954 set is of "step-down" design with thumbwheel controls. *(Doyle Roberts - Clinton, AR)*



WARD AIRLINE MODEL 64BR1808A - Made in 1947, this big table set is a great performer. It has 4 shortwave spread bands and uses 8 tubes. Two of them are 6K6s in push-pull. *(Doug Burskey - Mansfield, OH)*



JOSEPH W. JONES - This 5-tube battery set may be a Model J125 of 1925 vintage. The coarse dial pointers are helped by the separate vernier knobs underneath. These sets are nicely designed and put together. The case, a reproduction I made, has room for all batteries inside. *(Walter V. Worth - Wollaston, MA)*

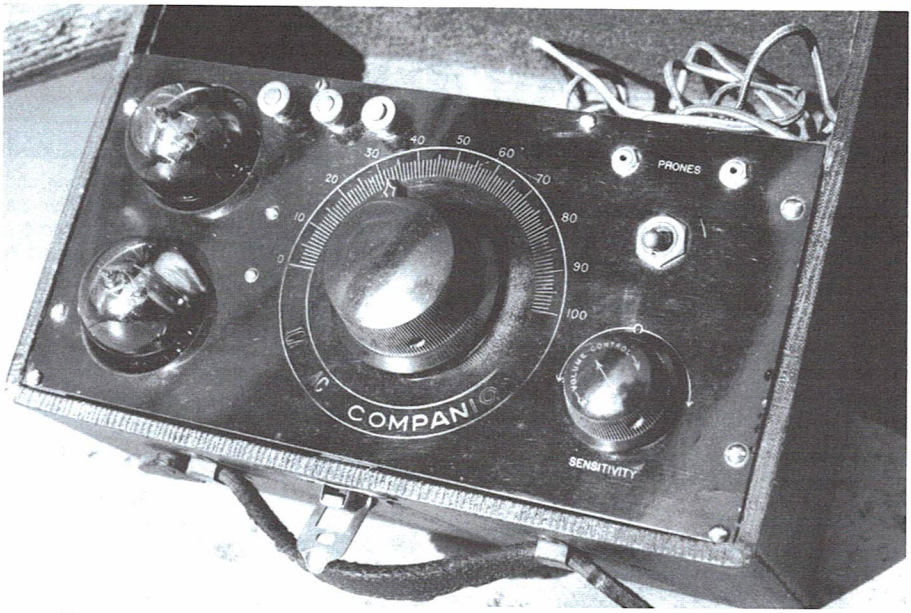


Figure 3. Close-up of the AC Companion panel. The 2 Arcturus Blue tubes are to the left.

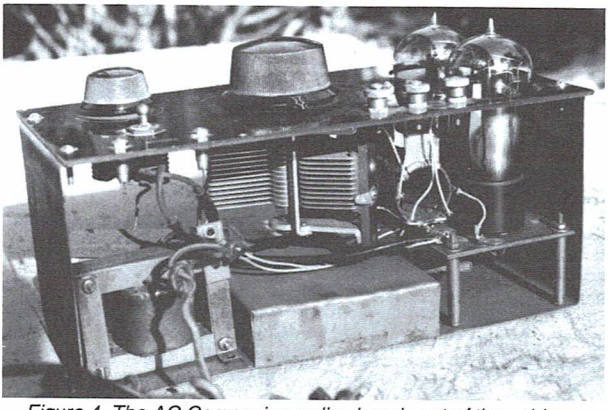


Figure 4. The AC Companion radio chassis out of the cabinet.

gold stamped lettering.

Since finding this set, I have seen another, identical in design except for a wrinkle-finished metal panel.

DATED DESIGN

Look at Figure 3. The panel layout and design has all the earmarks of radios in the mid-1920s. However, Morgan McMahon's *Radio Collector's Guide* dates the set at late 1931 for the 1932 season, a time when the cathedral radio was the mode. It looks six years behind the times!

I replaced the standard Type 27 tubes with Arcturus Blue, tipped-top 27s. This gives the set an even older appearance.

Figure 4 shows the panel and chassis removed from the case. The binding posts look like early Fada design. The large dial is the kind I have seen on mid-1920s 3-dialers. Under the panel is a power transformer of simple open construction, a 12-plate variable condenser, an antenna coil, a smaller regeneration condenser, a metal box containing a potted filter condenser, and next to that, a choke.

Regeneration circuit? In 1932? I found no Armstrong patent license tag anywhere, a fact which led me to believe that the Insuline Corporation was not worried about infringement. Was it because RCA had given up chasing down users of the outmoded regeneration circuit? By this time, the superheterodyne was the preferred circuit of most radio manufacturers.

My guess is that the AC Companion was a kind of kid's radio — something you would see advertised for the Boy Scouts when they wanted a radio a step above a simple crystal receiver. A question that comes to mind is — how many AC outlets can you find when you're hiking out there in the woods?

(Dave Crocker, 60 South St., Duxbury, MA 02332)

Dave Crocker is a staff member of A.R.C. and a consultant to companies such as Polaroid. He has been active in collecting radios for over 22 years. Most of this time was spent on researching and collecting sets of the Crosley Radio Company.

WITH THE COLLECTORS

The Insuline Corporation of America's AC Companion Portable

BY DAVE CROCKER

While rummaging through an antique co-op one day, I came across the black, leatherette-covered box shown in Figure 1. It was approximately 11" long, 8" deep and 6" high. My first thought was that it was some kind of test equipment or "quack" medical device. Upon opening the lid, I was still not sure what it was. Two shoulder-type, clear glass tubes stuck out of a polished panel with one large center dial. A smaller knob marked "sensitivity," a toggle switch and some binding posts, shown in Figure 2, were additional features. The lettering on the main dial was faded and hard to read: "ICS" (?), "AC" (?), "COMPAN...NY (?)."

Noting a power cord with an AC plug, I was convinced I had found something I do not usually collect — test equipment. But it sure looked interesting, and the price was right, so I bought it.

Later, under closer inspection, it turned out to be a 2-tube portable radio, rather cheaply made, using two Type 27 tubes — one for detection and one for rectification.

Not placing too much value on the little set, I connected a pair of phones to it, plugged it in, and flipped the toggle. To my amazement, it worked! (My apologies to the pros for not using a Variac for this procedure, but I was rather impatient.)

Further research revealed that ICS was the Insuline Corporation of America, a company active in radio, crystal sets and early TV scanning devices, from the late 1920s to the late 1930s. My mystery set, the AC Companion, was Insuline Corporation's first AC set and sold for $25 in 1932. Two other Companions were offered — a 220-volt model and the Universal Companion of AC/DC design; both were portables.

The AC Companion has a compartment alongside the panel for headphones and storage of the AC cord. The whole interior of the set is lined in a blue-purple, velvet-like material. The velvet material in the cover lid is stamped "Companion." The panel is a high gloss Bakelite with

Figure 1. The AC Companion in its leatherette box and single leather band headphone.

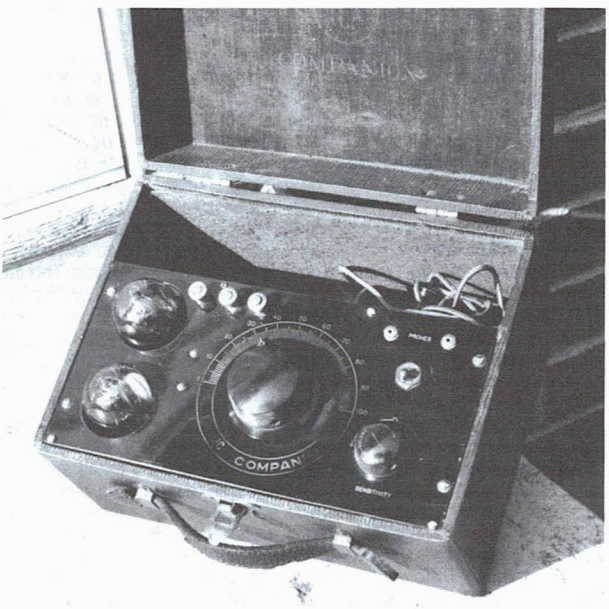


Figure 2. The AC Companion with the cover open. The power cord can be seen in the storage compartment.

RESTORATION TOPICS

Repairing Electrically Conductive Push Buttons

COMPILED BY RAY BINTLIFF

(From responses to John Chinsky's letter in the A.R.C. April 1992 issue sent in by Paul Isvolt, Robert Perlstein, Daniel Schoo, David P. Smith, and Tom Tatzlaff)

In the April 1992 issue of A.R.C., John Chinsky asked for help from readers in connection with the repair of conductive rubber push buttons. Several responses were received and a variety of suggestions were offered. The following information is a composite of those suggestions.

The electronic industry refers to this type of push button as an "elastomeric push button." They are utilized in calculators, computers and other consumer applications that are not subject to adverse environmental conditions. The advantages of these push buttons include low cost, mechanical simplicity, ease of assembly and nearly "bounce-free" contact action.

These push-button switches consist of two basic parts — a push button and a set of switch contacts on a printed circuit board. A typical push button is made of non-conductive silicone-rubber or polyvinyl-rubber and contains an elastomeric conductive insert in its base. It is this conductive insert which makes electrical contact with the printed circuit board. These inserts are made conductive by the addition of a carbon or silver filler in the plastic material during their fabrication.

The push buttons, designed to switch low voltages and currents, usually fail because dirt particles prevent the conductive inserts from making an even mechanical contact with the printed circuit board. This interference results in a poor electrical connection as well. Corrosion of the switch contacts on the printed circuit board may also be the cause of poor electrical contact.

As you might expect, the need for cleaning the push buttons and the associated printed circuit board was the most common recommendation from A.R.C. reader's responses. The recommended cleaning agents were alcohol or circuit board cleaner. Isopropyl alcohol is a more effective cleaner than rubbing alcohol which contains more water. The use of the lubricant WD-40 was discouraged.

Most readers advocated the use of cotton swabs for application of the cleaning agent and emphasized the need to remove all cotton fibre after cleaning. One reader proposed the use of a lint-free cloth. When applied from an aerosol can, a printed circuit board cleaner eliminates any problem with fibres left by a cotton swab or cloth.

Regardless of the method of application, all residue must be removed from the printed circuit board and push buttons. More than one application of the cleaner may be necessary.

If a circuit board exhibits corrosion, it was suggested that very fine (0000) steel wool be used to polish the board's copper switch contacts. The polishing should be accomplished using dry steel wool and very light pressure. Although very effective, steel wool has some serious disadvantages. Steel particles will be dislodged during the polishing operation and could prove troublesome. Imagine a hundred or so tiny conductors dropped into a radio!

Further, the steel wool will leave an oily film which must be removed. It would seem that steel wool should be used only for very badly corroded boards and that great care should be taken to avoid secondary problems created by loose steel particles. Some alternative polishing methods come to mind, such as crocus cloth or a pencil eraser. Neither of these will leave conductive particles behind, but both will require that the board be cleaned after the polishing is completed.

Other methods for cleaning the conductive inserts were also suggested. One reader reported successful results by washing the buttons in a solution of mild dish soap and water, followed by a thorough water rinse. After rinsing, the buttons should be patted dry with a lint-free cloth. Another suggestion called for lightly scuffing the face of the conductive insert with very fine (#400) wet or dry silicon carbide finishing paper to remove any dirt particles that may have become embedded in the insert. The paper should be used dry.

In addition to the recommended methods for cleaning the inserts, it was suggested that conductivity could be restored by applying conductive paint on the face of the inserts. The specified materials included silver print conductive paint, used for the repair or modification of printed circuit boards, and aquadag which is used to recoat the external conductive coating on TV picture tubes. The silver paint is available in bottles or as a "conductive pen." Nickel paint is also available and is likely to be cheaper than the silver paint. Aquadag is available in aerosol spray cans under the name of "TV Tube Koat."

In conclusion, proper cleaning of the PC board and push buttons is essential. The method(s) used may vary depending on the condition of the switches involved. Cleaning agents should be tested on a small area to make certain they will not damage the items to be cleaned. Excessive use of cleaning materials may affect the resiliency of the plastic push buttons. All cleaners should be used with adequate ventilation. Skin contact should be avoided. Restoration of the conductive push-button surfaces with conductive paints may be necessary if cleaning fails to remedy the problem.

(Ray Bintliff, c/o A.R.C., P.O. Box 2, Carlisle, MA 01741)

CLASSIFIED ADVERTISING POLICY

ONE FREE 20-WORD AD for subscribers in each issue; additional words are 15¢ each. See details below. Classified ads must be received (not just postmarked!) by **NOON** on the ad deadline. Late ads are held for the following issue. Please enclose correct payment with all ads. Stamps or cash are OK for small amounts. (Canadian and other foreign advertisers, please see "Payment" on page two for methods.) "Free words" cannot be accumulated from month to month; free words must be requested when ad is submitted.

Please write each ad on a separate sheet of paper, especially when included with other A.R.C. correspondence. Include SUB# with ad. Ads may be sent in advance; but, write each ad on a separate piece of paper and indicate the month (or successive two months) you want the ad to run.

Please write legibly and use both capital and small letters. Do not use dashes between words. Some numbers and letters can look alike, for example 1, l and I (the number one, the capital i and the small L.) Write the following characters clearly (especially in model numbers): 1, l and I; 0, O, o, Q and D; r and n; 6, b and G; V, U, u, v and Y; A and R; 5, S and s; 2, Z and z. We try to correct spelling errors, so when using an uncommon word or manufacturer which looks similar to a common word or manufacturer, note it so that we do not "correct" it. Editor's comments are in [brackets].

Advertising is accepted only for early items related to radio, communication, etc. All items must be described fairly; reproductions, reprints and not-original items must be identified as such. Advertisers agree to respond promptly to inquiries and orders, and to resolve problems promptly if the buyer is not satisified.

Publisher reserves the right to edit ads without notification to the advertiser and to reject ads for any reason. Publisher is not responsible for errors due to illegibly written ads or for any other reason. Since club activities receive free advertising on the *Coming Radio Events* page, the free 20 words may not be used for club activity ads. See inside front cover for additional information.

CLASSIFIED AD DETAILS

Deadline: NOON – 10th of the month!

Classified ads must have a standard heading such as WANTED, FOR SALE, FOR TRADE, FOR SALE/TRADE, SERVICES, MESSAGE, HELP, AUCTION, MEET, etc. This heading is the only bold or all-capitalized words allowed in the ad. Capitalize only manufacturer names, model names, etc. Wanted and For Sale ads are mixed together to encourage the reading of all ads, including the Wanted ads. This standard ad format makes scanning the ads easier.

Before writing your ad, please look over the ads in a recent issue of A.R.C., and try to write your ad in the same style. Full name and address is required in all classified ads; we will add it if you forget.

To encourage varied content of the ads, the same classified ad may be run only once per issue and for only two consecutive months. (To run an ad longer, use a boxed classified or display ad.)

Classified Ad Rates per Month

Subscribers:
- First 20 words: **FREE***
- 15¢ per word for extra words over 20 **plus**
- 10¢ per word for a shaded ad (count all words including free words).
- * Subscribers may take 20 free words on only one ad each month.

Non-Subscribers:
- 30¢ per word **plus**
- 10¢ per word for shaded ad.

Please do not forget to send in the extra 15¢ per word when your classified ad runs over the free 20 words; your payment will be appreciated, and it will help to keep A.R.C. healthy.

BOXED CLASSIFIED AD DETAILS

Deadline: 1st of the month!

Boxed classified ads can run unchanged for three months or more. No words are free. Ads may be shaded and may include bold and all-capitalized words freely. The ad need not begin with For Sale, etc. Minimum run is 3 months, prepaid.

Boxed Classified Ad Rates per Month

Nonshaded ads:
- 25¢ per word for all words,* none free, **plus**
- 10¢ per word for each bold word **plus**
- 10¢ per word for each all-caps word.

Shaded Ads (All words are bold at no charge):
- 35¢ per word for all words* **plus**
- 10¢ per word for each all-caps word.

Non-Subscribers:
- Add 20¢ per word to above costs.

*Three words can be bold-all-caps at no extra charge.

PHOTO & DRAWING DETAILS

Deadline: 1st of the month for all ads with drawings or photos!

Drawings and photos are encouraged as the response to your ad is much larger and the reader knows better what you want or are selling. Send in your drawing or photograph, and A.R.C. will reduce it or enlarge it as needed.

Photo and Drawing Rates per Month

$8.00 per month for each photo or drawing
(If ad is canceled, this amount cannot always be refunded.)

CHANGES & CANCELATIONS

Please check your ads carefully before sending them in. Once ads are received, it is not always possible to refund the amount sent, pull the ad or make changes.

IMPORTANT — COUNTING WORDS — IMPORTANT

The **standard headings**: WANTED, FOR SALE, etc., count as **one word** each time used in an ad. **Name, address** and (one) **telephone number**, count as **6 words**, regardless of length. Ham call letters and business name can be included in the 6 words and do not count extra. Full name and address is required in all classified ads – it does not cost extra! Each additional word, abbreviation, model number or number group, extra telephone numbers, etc. count as one word. Hyphenated words count as two words.

SECOND CLASS

A.R.C., P.O. Box 2, CARLISLE, MA 01741

RETURN POSTAGE GUARANTEED

CLASSIFIED AD DEADLINE SEPT. 10TH