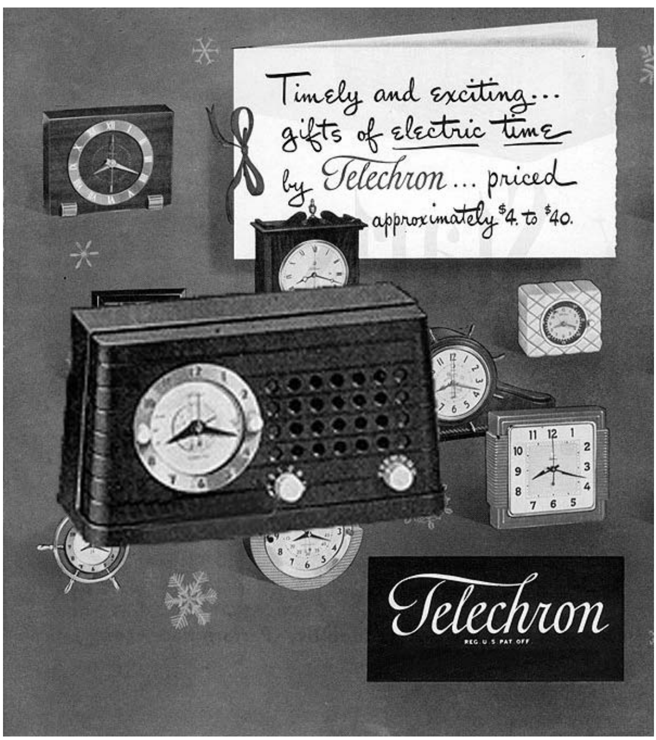
The Colorado Radio Collectors
Antique Radio Club

FLASH!

Volume 12 May ☺ June 2001 Issue 3



In this issue...

♦ The Telechron Clock Radio - First? ♦ Mark's Spark Radio Technology ♦
♦ Inductors and Transformer - How and Why ♦

ABOUT THE COVER

By the mid forties most radios had become commodity items. That is, price was the main difference. Then, along came clock radios that added additional function and new reasons to buy a radio. Turn to Wayne's article, on page 3, to read about the beginnings of this very interesting segment of radio development.

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 Museum of the Americas Bldg, 863 Sante Fe. (between 8th & 9th Ave's). 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. 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@attglobal.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**

Upcoming 2001 CRC Events
Regular Meeting July 8th, CRC Annual Picnic July (date TBA)

Colorado Radio Collectors Antique Radio Club

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

Volume 12, Issue 3 **May/June 2001**

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Spring is Busting Out All Over

by Tom Kelley, CRC President

Hello again fellow club members,

By the time you read this column our annual show will have come and gone. No doubt, it was a great success. Look for the contest results in the next issue of the Flash.

Summer will be coming along soon, and hopefully some of you will be able to get to one or more of the "big" shows around the nation. As some of you might know, the Muchow collection (one of the world's premier collections) will be auctioned off during the week of the Elgin radio event - in Elgin.

Mark your calendar for the May CRC meeting. Remember that, due to Mother's Day, our meeting is on the *3rd* Sunday of the month - the 20th. This meeting is special and important in that we will be electing 2001/2002 CRC club officers. You'll have a chance to contribute to the club as President, Vice President, Treasurer and Archivist. Don't forget this includes managing our cross subscription to the ARC.

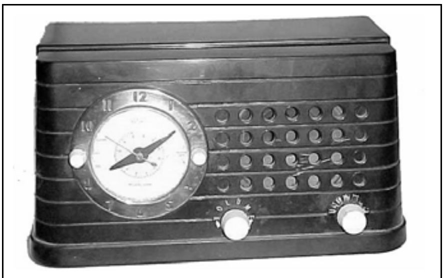
So, I hope to see as many of you as possible at our May meeting. Don't forget to bring something interesting for our "show 'N tell" and raffle.

Tom

Telechron 8H59, the First Functional Clock Radio

by Wayne Gilbert, CRC Member

There is very compelling evidence that, despite popular belief, the Telechron clock company, not the General Electric radio company, marketed the first functional clock radio. Yes, that ordinary little Bakelite radio that looks like it may have just fallen out of someone's bread baking pan is very likely to be a real collector's piece. Some may regret passing up these inexpensive nondescript radios; but not to despair, just try to imagine the feelings of the General Electric radio collectors who paid big money for their model 50 radio because they thought it was a collector's piece.



For whatever consolation it may provide, the Telechron 8H59 and the GE model 50 use basically the same GE radio, albeit in a different case, and both use a Telechron clock. And incidentally, Telechron was owned by General Electric, and had been since the early 1940s.

But whatever the pain, the original Model 8H59 was developed by Telechron clock engineers, after they saw the potential market for an electric clock radio while manufacturing electric radio timers during W.W. II (FYI, the radio timer they were manufacturing was basically a clock with timer functions that controlled the power to an outlet where your radio could be connected). At the end of the war they got GE management's permission to manufacture a few 8H59's, and these were put on the market in 1946 as a trial product. Although not particularly stylish, they were immediately very popular, with more than 237,000 sold by the end of 1947. It is a little ironic in that GE's management had allowed their Telechron clock division to test market the concept of a clock radio, and suddenly found themselves with a huge potential market success with no clock radios being sold under the GE radio brand name. They had to scramble to get a clock radio on the market as quickly as possible, so they used the 8H59's chassis and a

Telechron electric clock movement to produce the GE model 50 clock radio. Thus the GE model 50 was ready for the market approximately one year after the Telechron model 8H59 was announced.

It was (and is) a smart marketing ploy to have two internally identical products on the market at one time, vying with your competitors for the consumer's money. It's nearly sure to increase your share of the market, while providing you with a little known brand whose reputation can be sacrificed if you need to sell off your unsaleable surplus. Imagine how pleased GE's management must have been when both its Telechron and General Electric brands were best sellers on the market at once.

Soon GE allowed Telechron to release its only other radio, the model 8H67 to capitalize on the 8H59's success. This Telechron radio was also to have a fraternal twin, GE's model 60 series clock radio. The subtle question remained: were these GE radios with a Telechron clock, or Telechron clocks with a GE radio? Maybe they were both.

While Telechron was not a well know radio brand, it was an old, well-established name in the clock business. The Telechron clock business could trace its roots back to the turn of the 20th century, when Henry Ellis Warren began making clocks in Ashland Massachusetts. The company had, very early on, gained a reputation for being both reliable, innovative, and potentially very competitive to GE in the clock market. GE resolved this minor problem by purchasing a part of Telechron manufacturing business by 1917, and fully acquiring the company before the close of WWII.

Although owned by the larger company, Telechron's management must have been given a good deal of independence in developing and marketing, since it appears that they saw the success of the clock radio as just another business opportunity for the clock division of GE. It was probably much to the chagrin of GE's radio divisions that the Telechron clock division marketed their clocks to many of the radio division's competitors. By 1955 Telechron advertisements boasted that they had virtually captured the market and that they were providing clocks to at least 30 clock radio manufacturers.

General Electric's ads boasted the clever slogan "Don't be alarmed" for its model 50 radios. This early clock radio could waken you to the soft sound of music instead of the harsh rasp of an alarm, but it had its limitations. Although a clock radio, it was what could be best described as a radio with the first "off-on-auto" feature. It had no method to control remote appliances and, alas, no feature to turn itself off after lulling you to sleep with the sound of your favorite music. Technically, it was simply an inexpensive four tube TRF radio with permeability tuning and a copper chassis. It was sold in either a Plaskon or Bakelite cabinet, with one style being available with red accents (a.k.a., red knobs) and trim. Its twin, the Telechron model 8H59, was only available in a modest Bakelite cabinet.

The GE model 50 radio was phased out by 1951, but prior to its demise GE had released its more elegant successor, the model 60 series. The model 60 was a 5-tube superheterodyne radio, and even the early model 60's clock circuit included a sleep feature and an appliance plug to provide power for your coffee pot at a selected time. Telechron continued to be an innovative clock division and developed the snooze alarm, released in 1956 and used in many later GE clock radios. It's interesting to note that the snooze feature provided an unusual nine minutes more of sleep and a subject for all kinds of conjecture. Why nine minutes and not eight minutes or 10 minutes? Was 10 minutes too long to snooze, and eight minutes just too short? No one seems to know for sure, but speculation is that the choice of a nine minute snooze had something to do with the 60 cycle frequency of the American alternating circuit system.

The Telechron name was phased in and out of the General Electric's clock division several times before its plants were finally sold to Timex in the 1970s. The name was brought back for a very short time in the early 1990s before being finally discontinued in 1992.

General Electric, of course, continued to make radios with and without clocks for a number of years. It's known that they optimized profits by utilizing surplus and/or obsolete GE chassis and cabinets, and it's possible that they again marketed an exact twin to their radios under one of their other brand names. History has a way of repeating itself, particularly if it was a marketing success, as the Telechron clock radios definitely were.

MODEL NO. 8H59

Date Announced: 11-1-45 Mah. G.S.L. #836
4-1-47 Iv. G.S.L. #874

Date Discontinued: 1-5-48 Mahogany and Ivory G.S.L. No. 910

List Price

DATE EFFECTIVE		PRICE
11-8-46 G.S.L.#861 Mah.	Zone I - $29.95	Zone II - $31.45
4-1-47 G.S.L.#874 Iv.	31.95	33.55
4-21-47 G.S.L.#876 MAH.	31.95	33.55
4-21-47 G.S.L.#876 Iv.	33.95	35.65

YEAR	SHIPMENTS TOTAL FOR YEAR	TOTAL TO DATE
1946	90 405	90 405
1947	147 442	237 847
1948	794	238 641

Sources:

Kelly, Tom. General Electric clock radio collector and expert. Personal interviews, February, March 2001.

Kennan, Jay "Pappy". Telechron Clock expert. Emails February 2001.

Linz, Jim. Electrifying Time: Telechron and GE Clocks, 1925-55. Schiffer Publishing Ltd. Atglen Pennsylvania. 2001.

Web site: http://clockhistory.com/telechron/

Sales document - The Ashland Historic Society.

Mark's Corner

A Look Back At Spark Radio Part II

by

Mark Dittmar, CRC Member

The Spark Coil Transmitter

There are three fundamental hookups for the spark coil transmitter - these are shown schematically in figures 1 thru 3. The following abbreviations are used in the schematics: IC = induction (spark) coil, SG =spark gap, C= Capacitor, LC = Loading Coil and OT = Oscillation Transformer.

The first, and simplest, is the "straight" hookup shown in figure 1. In this circuit, the spark gap is connected directly across the secondary terminals of the spark coil, and the spark gap is in series with the antenna and ground (and perhaps a loading coil to alter the fundamental wavelength of the antenna). When the key is depressed, the high voltage of the secondary charges up the "capacitor" formed by the gap/antenna/ground. When the voltage across the "capacitor"

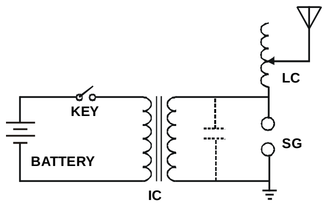


FIG. 1

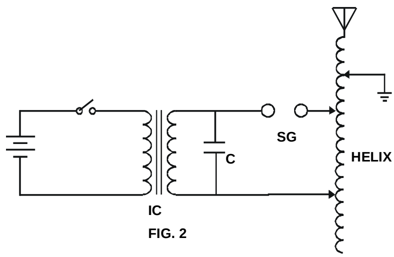


FIG. 2

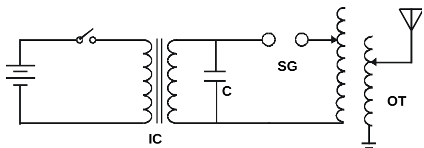


FIG. 3

reaches the breakdown voltage of the gap, the gap will “close” via a spark across the gap terminals, discharging the “capacitor” through the antenna. This circuit can cause tremendous interference to nearby receivers as it radiates a broad wave, ie, it emanates a broad range of frequencies. This is mainly due to the fact that the resistance of the spark gap is in series with the antenna circuit, and there is no method to tune the set other than by changing the antenna.

To remedy the problem of the straight connection, the spark gap, with a capacitor C, is put in a separate circuit and coupled magnetically to the antenna circuit. Two approaches are shown in figures 2 and 3. The first method uses an autotransformer or “helix” to accomplish this. The helix is BOTH the primary and secondary of an RF transformer. The primary or “closed” circuit is formed by C, SG, and that portion of the helix between two attached clips shown. The antenna or secondary circuit is made via another clip on the helix as shown in the diagram. In practice, the capacitor C would charge up to the breakdown potential of the spark gap (within the limits of the ability of the spark coil to charge C to the required voltage), which could be varied by varying the distance between the spark gap points. Once the breakdown voltage of the gap was reached, the gap would conduct, and the capacitor would discharge into the primary of the helix. The resonant circuit thus formed would be adjusted to the desired wavelength of operation. This RF energy was coupled to the antenna via the inductance formed between that portion of the helix between the antenna and ground clips. Note that the turns comprising the closed circuit are entirely distinct from those in the antenna circuit. No turns are common to both circuits, and by regulating the number of turns in common the coupling between the two circuits could be varied. Variable coupling was a *critical* feature for the proper operation of these sets - coupling too closely between the circuits would result in a broad wave or perhaps even the emission of two separate frequencies.

The standard helix for 200 meters was simply a coil of wire wound on a wood or bakelite former - typical dimensions were 10” diameter and 7” high, with 7-10 complete turns of wire spaced about ½” to ¾” apart.

Wire gauges were usually AWG #4, or copper or brass ribbon may have been used. The typical helix had a maximum inductance of about 30 uh. In practice, from 1 to 3 turns were used in the primary circuit according to the capacity of the capacitor used. The antenna circuit usually required at least 5 or 6 turns of the helix, depending on the dimensions of the antenna. The frequency of the transmission was changed by moving the primary clip along the helix and thus varying the inductance which formed the resonant circuit with the capacitor C. The greater the number of turns between the primary clips, the higher the inductance and the lower the frequency of the primary circuit. Once the primary circuit was set at the desired frequency, the secondary circuit was tuned to resonance with the primary. The secondary circuit consisted of the "secondary" portion of the helix and the capacity of the antenna. Typical antennas of the era would have capacities ranging from 200 pf up to 1000 pf depending on the configuration. Thus, the antenna/ground clip was moved around until maximum output was indicated on a wavemeter (a simple device for measuring frequency, more on this in next column) or some other indicating device (like an antenna ammeter in series with the antenna or perhaps a small lamp shunted across the antenna circuit). Coupling was varied until a single, "sharp" frequency was obtained as indicated by the wavemeter. All of these adjustments interacted, so tuning up a spark coil transmitter on a given frequency was usually an iterative process.

Because of the simplicity of construction, the helix was often homebuilt. This was also true of the capacitor and spark gap for these simple sets, although these were also widely available from commercial sources like William B. Duck or Electroimporting Company. Capacitors were very easily made by using alternating layers of window glass and tin / aluminum foil. The value of capacitance used was determined chiefly by the *size* of the spark coil. In the July 1920 issue of QST, a monthly column entitled "The Junior Operator" has all the information required to build a spark coil transmitter based on the size (and hence secondary voltage) of the spark coil that was available. ¼" coils required a mere .001 uf, whereas a 2" coil required .008 uf. The article even has a table of pre-calculated capacities based on commonly available sizes of glass panes. Spark gaps for the coil-type of transmitter were invariably of the simple “straight” variety, consisting of two cylindrical zinc or zinc-alloy electrodes mounted on an insulating base. The distance between the gaps was made variable by a simple screw arrangement and an insulating knob. Sometimes the gaps had cooling “fins” attached to dissipate the generated heat if high powers were used. Keeping the gap cool was very important to the proper operation of the spark coil transmitter. The ideal gap is one that has infinite resistance in the off state, and “zero” resistance in the on state. Once the gap has been “turned on” long enough to discharge the capacitor, the gap needs to shut off as soon as possible. This prevents the oscillations induced in the *secondary* or open circuit of the spark coil transmitter from coupling back to the primary circuit. If this condition is not maintained, then a “sharp”, well defined wavelength cannot be achieved. When the gap gets hot, residual ionized gas in the gap can keep the gap conductive long after the capacitor has discharged. Sometimes fans were employed to blow cool air across the gap at the higher powers. Generally, this was not necessary at the low powers employed in the spark coil transmitter. Although beyond the scope of this article, there were a number of different types of spark gaps that better approached the “ideal” spark gap (non-synchronous rotary gaps, quenched gaps, etc). These type of gaps were used at higher powers and with AC transformer powered spark transmitters. Straight gaps were generally only used with simple low power spark coil sets.

Figure 3 shows the final basic spark coil transmitter arrangement. It is similar in principle to the helix set of figure 2, except that the helix has been replaced with an “oscillation transformer”. Two separate windings were used in the OT, one for the primary, and another for the secondary. Coupling was made variable by simply moving the two coils closer or further apart relative to each other as required. The OT took two forms: The first type consisted of two separate but concentric helices, an outer, primary helix consisting of a few turns of wire, and an inner, smaller diameter helix for the secondary. The secondary slid up and down a common shaft and could be locked into place once the proper coupling point was reached.

Fig. 4

A picture of one is shown in figure 4. The second form was called the "pancake" OT. The primary of the OT consisted of a flat spiral ribbon conductor wound on a pair of crossed hardwood or fiber supports. The secondary was similarly constructed, but was fixed in position. The primary could be slid towards or away from the secondary along a rod passing through the center of the spirals. Of course, moveable clips were attached to points along the spiral to obtain the required inductances.

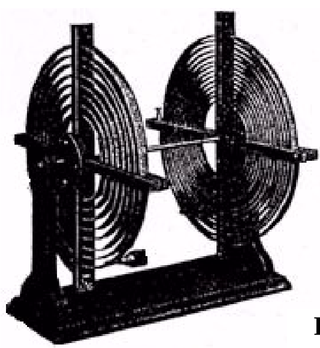


Fig. 5

A picture of the "pancake" style of OT is shown in figure 5. Adjustment of this type of transmitter is identical to that described above for the helix, except that variation of the coupling is more straightforward.

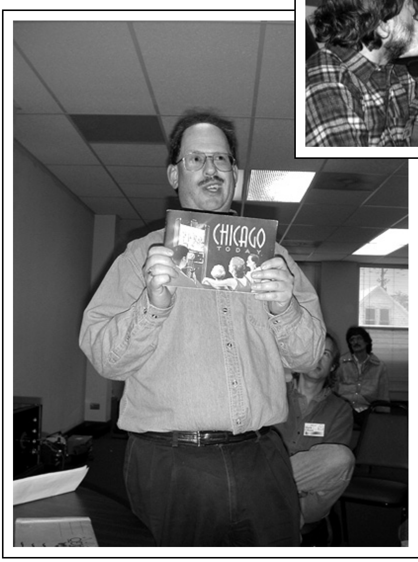
One other point I would like to make before I wrap up this column is the distinction between the frequency of the closed circuit and the *spark* frequency. The frequency of the closed circuit is the actual radio frequency being emitted, eg, 1500 khz. The spark frequency in the case of the spark coil is the number of breaks per second of the spark coil's interrupter, typically anywhere from 30 hz on up to a couple hundred hertz. The spark frequency in essence modulates the RF, so that the spark frequency is reproduced in the receiver. Therefore, a spark frequency of 100 hertz at the transmitter would result in a 100 hertz tone being heard at the receiver when the receiver is tuned to 1500 khz.

In the next issue, I'll discuss the construction of my replica transmitter.

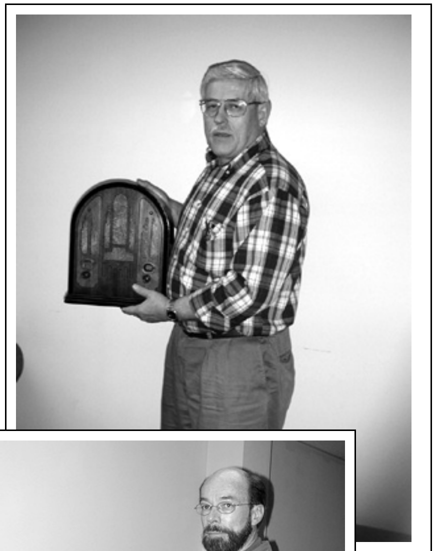
The May Meeting of the

Barney Wooters discusses his 1920/1 Grebe RORD and RORK

Tom Kelley, our Pres, begins the metting raffle



Neil Galenski displays some of the great radio related documents he's recently found



David Soliday with his AK 944

Tom Pouliot's Ultradyne L-2 1925 superhet

Mike McCutcheon sets up internet access for the CRC members during the meeting

INDUCTORS AND TRANSFORMERS IN OLD RADIOS

A Continuing Technical Series by David Boyle, CRC Member

Part 1 of 2

Section 1

Starting with the principles:

Current flowing through a conductor (wire) creates a magnetic field. If the wire is formed into a coil, the same current will produce a stronger magnetic field. Also, if the coil is wound around an iron or steel core the field will be stronger yet. The relationship between the strength of the magnetic field and the intensity of the current flow causing it is expressed as the inductance of the coil. Inductance is a property of the coil and is determined by its shape and dimension. The unit of inductance is the henry. The general term for a component having inductance as its principal property is inductor.

If a current through a coil is made to vary in intensity an induced emf (electromotive force, i.e. voltage) will appear across the terminals of the coil. This emf is entirely separate from the voltage that is causing the current flow. I'll try to explain this a little clearer. For inductors the more important aspect of the operation of a coil is its property to oppose any change in current through it. You may recall my article last year on capacitors. Simply stated capacitors oppose changing voltages so inductors produce an opposite affect. Anyway, back to inductors. When a current flows (elections) through a conductor, a magnetic field starts to expand from the center of the wire. These lines of force move outward, through the conductor into the air around it. As these lines of force sweep outward through the conductor, they induce an emf in the conductor itself. Please refer to figure 1. This induced voltage is always in the opposite direction to the direction of the originating current flow.

Because of its opposing direction it is called a counter emf or a back emf. This back emf is present as long as the original (applied) current flow is increasing. However, if the current caused by the applied emf decreases, the induced emf tends to send a current through the coil circuit in the same direction as the current from the applied emf. The effect of the inductance, therefore, is to oppose any change in the current flowing in the coil/circuit. It accomplishes this by storing energy in its magnetic field when the current in the circuit is increasing, and by releasing the stored energy when the current is being decreased.

Rise in current plotted against a time base For an inductive circuit

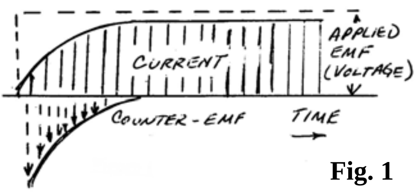


Fig. 1

Section 2

Coils and Inductors:

Every conductor, even a piece of straight wire has inductance, albeit extremely small. A given length of wire will have a much greater inductance if wound into a coil form. Three turns or loops of wire will have nine times the inductance of a similar sized single turn or loop (generally). As you can tell, the inductance (L) increases as the square of the number of turns or coils (N). In old radio applications single-layer air core coils with a length approximately equal to the diameter are used.

A formula that will give the approximate inductance of such a air core coil in micro henrys (mh) is:

$$L = \frac{r N}{9r + 10Ln}$$

Where L = micro henrys, r = radius in inches, N = turns, Ln is the length of the coil in inches.

Iron-core coils:

A short discussion is now needed to explain several important physical concepts and terms. Suppose a coil is would on an iron core such as in figure 2.

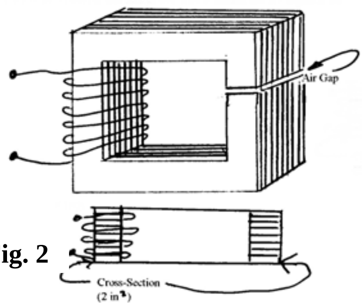


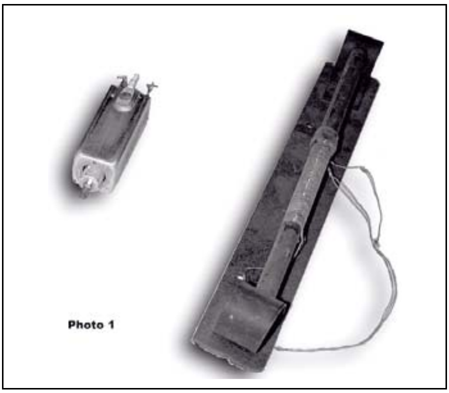
Fig. 2

When a certain current is sent through the coil it is found that 80,000 magnetic lines of force is in the core. Since the area is 2 in sq., the flux density is 40,000 lines per in. sq. Let's remove the iron core and keep the current the same then measure the lines of magnetic force at 50. The ratio of the flux density with a given core material with that of air is called the permeability of the material. In this example the permeability of the iron is 40,000/50 = 800. The inductance of the coil is increased 800 times by the use of the iron core. The permeability of a magnetic material varies with the flux density. Increasing the current through the coil will proportionally increase the flux but at very high densities increasing the (magnetizing) current may no longer make a appreciable increase in flux. When this occurs the iron/magnetic material core is said to be “saturated”. Saturation causes a rapid decrease in permeability. Note; air core inductors do not reach saturation, air does not saturate! In old radios, iron core inductors and transformers are used chiefly in power supply and audio circuits. They usually have direct current flowing through them and the variation in inductance with current is undesirable. This may be overcome by placing a slight "air gap" in the core (again, refer to figure 2). The air gap introduces so much reluctance (resistance) in the magnetic field that it makes it difficult to make the core carry the number of magnetic lines of force necessary to produce saturation. The gap also decreases the inductance of the coil.

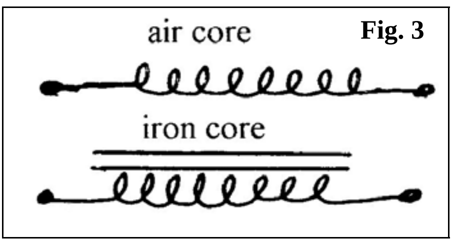
Eddy currents and hysteresis:

When AC flows through a iron core coil an emf will be induced, as previously explained, and since iron is a conductor a current will flow in the core. Such currents are called eddy currents which represent a waste of power and cause heating due to the inherent electrical resistance of the iron material. These losses can be reduced by laminating the core by cutting the core material into thin strips and then electrically insulating them with paint, such as varnish or shellac.

There is also another type of energy loss in an iron core: the iron tends to resist and change in its magnetic state, so a rapidly-changing current, such as AC is forced to continually supply energy to the core to overcome this "inertia". Losses of this sort are called hysteresis losses. Both eddy current and hysteresis losses in iron increase rapidly as the frequency of the AC current is increased. For this reason only ordinary iron cores can be used at power supply and audio frequencies --- up to 15,000 Hz (cps). Even so, a high grade ($$) iron or steel is necessary if the core is to perform well at the high frequencies. One of the many reasons old radios were "low-fi", not "hi fi". Iron core inductors are completely useless at radio frequencies (RF). In order to use iron material at RF frequencies you have to grind the iron into a powder and mix it with a insulative binder. This stuff is then usually molded into a "slug" or cylinder form on which the coil is wound. By this means cores can be made that will function at least up to 100 MHz. By pushing the slug in and out of the coil the inductance can be varied over a considerable range (tuning and alignment as we know it). Photo 1 are examples of iron slug coils



Choke coils:



The ability of a coil to oppose any change in current is used to smooth out varying or pulsating types of currents. In this application the inductor is known as a choke coil, (fig. 3) since it chokes out variations of amplitude. For radio-frequency ac or varying DC an air-core coil is used, but for lower-frequency circuits greater inductance is required. As a result, iron-core choke coils are to be found in audio-frequency (AF) and power frequency (60 and 120 Hz) in old radio applications.

Note: Figure 2 is a representation for a iron core choke coil. In old radios the power supply "smoothing" choke was either a discrete unit or was the field coil on the electro-dynamic speaker or both.

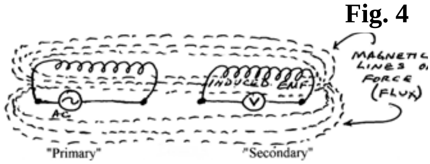
Mutual inductance:

Yes, we're finally getting to transformers! A single coil has a given value of inductance or self-inductance. A coil has one henry of inductance if an average current change of one ampere in one second produces an average back emf of one volt in it.

If one coil is placed near a second, it will be found the alternating or varying currents in the first produce moving magnetic fields that will induce voltages in the second coil. The further apart the two coils are, the fewer the number of lines of force that interlink the two coils and the lower the voltage induced in the second coil.

When an average current change of one ampere per second in the first coil can produce moving fields that will induce one volt in the second, the two coils are said to have a mutual inductance of one henry, regardless of the value of the two coils themselves. The mutual inductance can be increased by placing the two coils closer together or by increasing the number of turns of either coil. In power transformers the two coils are arranged so that almost all the lines of force of the first coil cross the turns of the second coil and a high mutual inductance results. Figure 4 is a representation of mutual inductance (transformer) action.

Fig. 4



The efficiency of coupling is expressed as a coefficient. This value can never exceed 100% or unity. Iron core coils/transformers can have a coefficient of coupling approaching 100%. These are called closely coupled. If the mutual inductance is small the coils are said to be loosely coupled.

Air core coils/transformers can approach coupling coefficients of .6 or .7 if the coils are wound over each other but will be much less of the two coils are separated. Refer to photo 2 below for an example.

Photo Not Available

The designers of old Tuned Radio Frequency (TRF) radios really had to concern themselves with the adverse affects of loose coupling. You might say that loose coupling is by design but "stray" coupling between adjacent circuits is bad. On the old 3 stage "3 dialer" TRF radios the RF coils were mounted as far as possible from each other and were placed at 90 degrees to one another to minimize stray coupling. Some 1920's used loose coupling between R.F. coils to induce controlled regeneration. Other manufactures used variometers for R.F. tuning. In all cases coupling capacitance had to be considered and factored into the design. Photo 3 is a Variometer typical of those in use up to approximately 1928

Next month's installment will address transformers.

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.***

	Retail	Club
RADIOS, (GENUINE PLASTIC) OF THE MID CENTURY Jupp & Pina, hard bound, 219 pgs, 1998 PG, 450+ color pics	$39.95	$28.00
ANTIQUE RADIOS, 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
ANTIQUE 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, pictures 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, pixs 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 gps, 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 & Prosise, 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**

COMPLETE PRICE GUIDE TO ANTIQUE RADIOS: PRE-WAR CONSOLES
Mark Stein, 235 pgs, 100's of b/w photos **$29.95 $22.00**

TUBE TESTERS AND CLASSIC ELECTRONIC TEST GEAR
Alan Douglas, 166 Pgs, 2000 **$25.95 $19.50**

RADIOS - THE GOLDEN AGE
Philip Collins, 119 Pgs, 1987 **-------- $15.00**

U.S. SCOUTING COLLECTIBLES
George Cuhaj, 323 Pgs, 1999 **$24.95 $19.00**

THE PLATING MAN'S ELECTROPLATING MANUAL, 2ND EDITION
Don Culver, 38 pgs, 2000 **-------- $10.00**


GOING TO FIX IT YOURSELF !! AN ENGINEERING GENIUS - EH ??— WELL, I'M CALLING THE RADIO MAN BEFORE YOU KILL YOURSELF, YOU OLD FOOL !!!
— AND HE'S MADE ME MISS "CROONING JACK" AGAIN !!
OOF!
LEAVE IT TO US, FATHER — AND SAVE YOURSELF NO END OF GRIEF!

"The Open Trunk" Classified

◆ **See IFC for ad details** ◆

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: Silvertone tube shield top for model 1320, 1322 or 1324. Sloted, 1-7/8" dia.
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: 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 (660)726-3038

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

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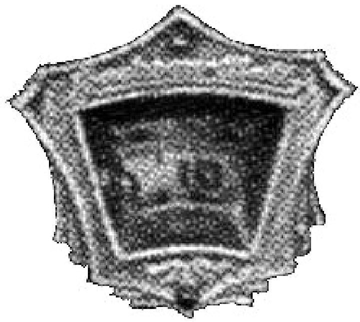
WANTED: Communications gear, manuals, parts & catalogs from manufacturers such as Hallicrafters, Hammarlund and kit makers. Also, telegraph/morse keys, bugs & paddles. Cash or trade (including transistor sets. **Robert Baumann**, (303)988-2089, rgbdenver@aol.com

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)292-0487, cebrady2@yahoo.com

FOR SALE: 4,600 Radio & TV tubes, ***New in original boxes***, $920.00 (.20 ea) Sold as LOT only. Approximate value of $20,000 if priced in "Antique Electronic Supply Catalog". **Norm Bernicky**, (719)550-5810, Colorado Spgs. norm@norbern.com

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WANTED: Novelty **tube** radios, such as books, horses, lamps houses, kegs etc. **Ray Windrix**, 617 N. Murray Bl., Colorado Springs Co 80915, (719)597-5098 or (719)596-7196

WANTED: Hoffman Nugget pencil tube pocket radio • Japanese WWII morale receiver. Will pay your price. **John A. Miner**, (303)759-9152 hohum@qwest.net

FOR SALE: 1935 RCA tombstone T6-9, $135 • 1937 Philco cathedral MD37-60 $140 • 1946 Philco Transitione 46-200 $40 • 50's Motorola yellow leatherette & plastic portable 5P23WB-1 $30 • RCA "12,000 Miler" table wood 56X5 $50 All excellent and working.
Clyde Benge (303)683-0624, cbenge@usewest.net

FOR SALE: 2 TRF radios - brands unknown. One is complete and in very good condition, the other is missing the top but otherwise appears complete. Both for $120. **Bob Schineller**, 303-682-1749 or rgschin@aol.com

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FOR SALE: Victorian House, 16 oz. furniture finish rejuvenator. A remarkable product for cleaning/feeding all wood finishes. removes most water and heat marks and covers scratches. Removes dirt and wax and puts oil back into dry finishes. Contact **CRC treasurer Robert Baumann** with quantity desired. Club will order a case of 16 bottles when at least 10 have been pre-paid at $10/bottle.

WANTED: White or beige knobs for a GE 401/410/411. They look like the smaller size of Reese's Peanut Butter Cups. **Mark Gibson**, Loveland CO (970)593-3032, mark_gibson@hp.com

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

Colorado Radio Collectors
Antique Radio Club

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Don't forget, CRC dues are due in June!

The May meeting is on Sunday the *20th* at 1:00 PM
Museum of the Americas, 863 Santa Fe (between 8th & 9th Ave's.)