

SHORT WAVE TREATISE

CATALOG NO.
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RADIO BARGAIN CATALOG
FOR RADIO SERVICEMEN
RADIO DEALERS
AND SHORT-WAVE
EXPERIMENTERS



RADIO TRADING CO.

101 HUDSON ST. NEW YORK CITY



UPPER LEFT: Section of our main office where all incoming orders are acknowledged, checked, carboned and prepared for the shipping room.
UPPER RIGHT: Section of our mailing department where all catalogs, flyers and other advertising circulars are addressed and prepared for distribution.
LOWER LEFT: Part of our shipping room where all orders are broken out, checked, rechecked and repacked for shipment.
LOWER RIGHT: Part of our test room where all merchandise is thoroughly tested before being placed in any of our catalogs or other advertising media.



A

GROWING CONCERN

thanks to you



Visit Our New Home

101 Hudson Street, New York City

8,000 Square Feet of Well Lighted, Thoroughly Ventilated Space,
Eleven Floors Above and Overlooking the Historic Hudson River.

Our new headquarters has all the desirable features and pleasant working conditions which make for swift, efficient service. When in town drop in and visit us. The street diagram below will show you just how to get here from the old place. Or you can merely ask anyone where City Hall is and then follow the plan to our new establishment.

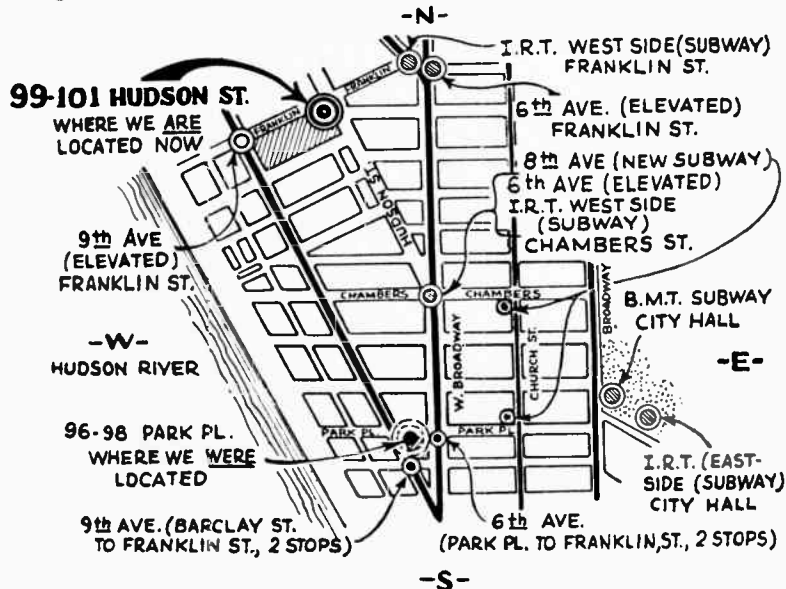
30 Years of Radio Experience Behind Us

YOUR FIRST ORDER will be the beginning of a long and cordial relationship; for the owners of this company, have been in the radio business for more than 30 years, and know the exact requirements of radio servicemen and short-wave fans, as well as the type of merchandise and service they would like to receive. This company fully appreciates that its continued growth and long life depends upon the good-will and satisfaction of its customers—and **YOU are our customer.** To this end we strive to make our relationship as mutually beneficial as possible.

SPECIAL ATTENTION TO SHORT-WAVE BEGINNERS

Regarding short-wave equipment and the art in general, we endeavor to be of as much assistance to our customers as possible. Short-wave beginners in particular, will find our relationship very educational and instructive. We have always been looked upon as "official advisers" to this class of radio fans since we have always taken it upon ourselves to give them the proper advice concerning what steps they should take or what sets they should buy in order to learn the art in proper sequence; from the simple crystal set to the expensive multi-tube short-wave receivers. Furthermore the short-wave beginners will find that considerable information is devoted to their interests in the editorial section of this and our other catalogs.

We wish to take this opportunity to thank our customers for their splendid patronage and co-operation which has made us the growing concern we are. However we must remember that in order for us to continue our mutually beneficial and cordial relationship we must all pull together. Remember the old adage—"all for one and one for all."



Follow This
Convenient
Street Plan
To Get To
Our New
Home Quickly

Your Attention, Please!

YOU will find this to be the most complete Short-Wave Catalog in print today.

Nor is it an accident that WE should print it. The reason is simple: The owners of this company were the first to sell short-wave material of any description in the United States. They know exactly what is wanted by short wave experimenters, and that is the reason for this catalog. This is the only catalog which gives such a tremendous variety of all sorts of short-wave material. We aim to give you only the best, regardless of price. Everything you will find listed in this catalog has been tested by experts. Nothing is left to the imagination or just to simple merchandising. Everything must be right before we offer it to you.

Having dealt with radio people for some thirty years, we know exactly what sort of material and what sort of merchandise, as well as what sort of short-wave information you require.

Any radio merchandise not found in this special Short-Wave Edition, will be found in our regular 108 page catalog. If you don't have a copy of our regular catalog, write for yours today. See page 51 for more catalog information.

HURRY! — PRICES ARE ADVANCING — HURRY!

Already prices of raw materials have gone up. In every State, city and town—in every hamlet—prices are noticeably advancing each day. Even in this very catalog it was necessary to increase certain prices. While in many instances, where the increase in price has not been so great, we have ourselves absorbed the difference, it is obviously impossible for us to continue this policy in all cases. We are therefore forced to make the following reservation: **ALL PRICES IN THIS CATALOG ARE SUBJECT TO CHANGE WITHOUT NOTICE.**

No One Under-Sells Us

We endeavor to give you the lowest prices on standard merchandise, and we do not allow our competitors to undersell us.

Important Instructions Before Ordering:

If you are located in the United States, and have bought from us before, you need not send money with your order, if you do not wish to do so. We will be glad to send your order C.O.D. by Parcel Post or Freight, as the case may be. On all C.O.D. orders the prices shown in this catalog are net, without deduction of any cash discount.

If you wish to make a considerable saving, we advise cash with order; in which case, we allow you to deduct.

3% Cash Discount

If you have not dealt with us before, it is then necessary to send us a 20% deposit, with all orders; the balance to go forward C.O.D.

Our only terms are net cash, F.O.B. New York (or city in which factory is located, as in some cases we ship directly from the factory to you).

We are a wholesale house, and buy and sell radio merchandise for cash only; we open accounts with no one. Our exceedingly low prices do not permit any other terms.

Please note that we sell only to the radio trade—Radio Dealers, Radio Service Men, Radiotricians, Professional Experimenters, Electrical Dealers, Music Dealers. Also to Government and State institutions, Broadcast stations and educational institutions.

WE DO NOT ACCEPT ORDERS FOR LESS THAN \$3.00. OUR VERY LOW WHOLESALE PRICES MAKE THIS RULE NECESSARY.

Export Orders

Orders from FOREIGN COUNTRIES must in all cases be accompanied by cash in full, including transportation, insurance and consular charges. If you prefer, you can remit by irrevocable letter of credit through a New York bank. In this case, you will give instructions to the bank to pay us on presentation of shipping documents. The bank in your own city has connections with New York banks, and they will be glad to handle this business for you.

SEND NO MONEY

It is not necessary to send remittance with your order unless you desire to do so. We ship C.O.D. any merchandise listed in this catalog except your first order, (see paragraph "Important Instructions Before Ordering").

Who We Are and Why We Are in the Best Position to Serve You

The owners of Radio Trading Company have been continuously in the radio business since 1908 (it was then called wireless). Through other affiliations, we are surrounded with highly trained radio technicians who are familiar with all the latest developments. That is also the reason why you will find in this book more real radio information,—"meat"—than in any other catalog in print. Before any item goes into our catalog, we put it through a severe test to make sure that it will perform under ordinary conditions in accordance with our guarantee.

How to Order

Use our order blank, which you will find in this catalog; extra order blanks are supplied with every order sent to you. Always write plainly, using ink or typewriter. Don't use pencil, if you can avoid it.

If goods are to be shipped by mail, include sufficient postage; otherwise shipment will be made by express, charges collect. If you send too much money, we will always refund the difference.

Substitution of certain items will be made only if we have your full permission to do this. We dislike to substitute, and where we have your permission we usually substitute articles of a much higher value; in which case you always get the full benefit. Order by catalog number, and always fill in prices.

How to Send Money

We prefer to receive remittances by money order (International Money Order in case of foreign orders) or Express Money Order. We accept new U. S. Stamps in any quantity and for any amount, as full payment of goods ordered; but we advise that letters containing remittances in either stamps or currency should be registered, since otherwise we cannot be responsible for their safe receipt.

When sending personal checks, we follow the custom of all mail-order houses, in that such orders are necessarily held up until the check has cleared. If you wish prompt service on check remittances, please certify your check. You can also, for a small fee, have money forwarded by telegraph.

Prompt Shipments

We make no claims of six-hour shipments after receipt of your order. No mail-order house can do so, regardless of claims which are made by some irresponsible houses. We do however ship with reasonable promptness the majority of our orders. If we did not do so we would not remain in business. The mere fact that a large percentage of our business comes from re-orders testifies to this fact.

Guarantee

We fully guarantee all items in this catalog to be exactly as illustrated and described by us. All merchandise is guaranteed to be in good working order and in all respects as represented. Any defective items or parts will be repaired or replaced promptly by us.

Orders Shipped Subject to Inspection

You need never buy a "cat in the bag" from Radio Trading Company. We are proud of our merchandise—you need not pay a penny before actually seeing what you buy. (Inspection privilege is allowed only on express shipments. The rules of the Post Office prohibit inspection of mail. If you wish to inspect the goods, your order must state so.)

We are at all times ready to adjust any claim of dissatisfaction with our goods on your part, or make an exchange—but we must request you NOT TO RETURN SUCH GOODS WITHOUT OUR WRITTEN CONSENT. Such returned goods must be in the original containers, and delivery charges must be prepaid.

All Prices Quoted Are Tax Paid

All prices in this catalog include all excise taxes, in accordance with the Act of June, 1932.

Customers' Privileges

From time to time, we publish special supplements of bargains, and other radio literature, which is not sent to anyone except to customers of record. If you wish to get such special offers, be sure to get on our customers' list. A single order will automatically put you on that list.

We Pay Freight On Orders of \$50.00

We will allow you freight charges up to \$2.00 per 100 lbs. (This special offer is open only to those states east of the Mississippi.) When your shipment arrives by freight, all you have to do is to send us your paid freight receipt or bill, and we send you either a refund check or credit you on a new order, at your option. Not valid if order less than \$50.00.

RADIO TRADING CO., 101 Hudson St., New York, N. Y.

Cash Discounts and free offers of any kind do not apply to Triplet products.

Who Are Our Customers?

EVERYONE naturally WANTS TO KNOW THE STANDING OF THE HOUSE with whom he is doing business. We have frequently been asked who our customers are.

By far the largest class with whom we deal are independent radio Service Men. Second in line are radio dealers, not only in this country, but in foreign countries as well. Third, we have thousands of radio experimenters and fans who build sets and who EXPERIMENT IN RADIO RESEARCH, television, sound amplification, etc.; and this particular class is growing daily.

It may also be of interest to you to know that the RADIO TRADING COMPANY EXPORTS TO PRACTICALLY EVERY IMPORTANT COUNTRY OF THE GLOBE.

We also value as our customers, many broadcast radio stations who deal with us right along.

In addition to this, we deal with a large list of Government, State and Educational Institutions, and we print herewith a list of the more prominent of such institutions.

In the list appended hereto, we have printed only the more prominent of a long list of institutions, just to give you an idea how far-reaching our service is today.

BROADCAST STATIONS

Radio Station	KDYL—Salt Lake City, Utah
"	KGFF—Shawnee, Okla.
"	KGFV—Kearney, Nebr.
"	KGNO—Dodge City, Kansas
"	KGPB—Minneapolis, Minn.
"	WBT—Charlotte, N. C.
"	WCAJ—Lincoln, Nebr.
"	WGIM—Mississippi, Miss.
"	WHBI—Memphis, Tenn.
"	WHO—Des Moines, Ia.
"	WJBW—New Orleans, La.
"	WKBV—Connorsville, Ind.
"	WKJC—Lancaster, Pa.
"	WLBG—Petersburg, Va.
"	WOMT—Wanitowoc, Wis.
"	XED—McAllen, Texas
"	CMKF—Holguin, Cuba
"	KCRJ, Jerome, Ariz.
"	KONO, San Antonio, Texas

COMMERCIAL INSTITUTIONS

Arizona Edison Co.—Bisbee, Ariz.
 Brooklyn Edison Co.—Brooklyn, N. Y.
 Canadian Marconi Co., Supt. Nfld. Division, St. John's, Newfoundland.
 Canadian Westinghouse Co., Ltd.—Hamilton, Canada
 Electric Power Maintenance Co., Toledo, Ohio
 General Electric Corp.—New Orleans, La.
 Gimbel Brothers—New York - Philadelphia - Pittsburgh
 Indiana Bell Telephone Co.—Logansport, Ind.
 Loew's Circle Theatre—New York City
 Louisville & Nashville R.R. Co., McKinnon, Tenn.
 New York Edison Co., New York City
 Remington Typewriter Co., Ilion, N. Y.
 Standard Oil Co. of N. J., 26 Broadway, New York City.
 Sear, Roebuck & Co., Main & Otterman Sts., Greensburg, Penna.
 Television Research Lab., St. Louis, Ma.
 Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

GOVERNMENT INSTITUTIONS

Canadian Government Motion Picture Bureau—Ottawa, Canada
 Chanute Field—Rantoul, Ill.
 Harlem Valley State Hospital—Wingdale, N. Y.
 Hospital Bureau of Standards & Supplies, 9 East 40th St., New York City.
 Middletown Air Depot—U.S. Army, Middletown, Pa.
 Naval and Dockyard Cinema, Ireland Island, Bermuda.
 N. Y. C. Children's Hospital, City of New York, Randall's Island, N. Y.
 Station Hospital—Ft. Sheridan, Ill.
 U.S. Coast Guard Air Station—Cape May, N. J.
 U.S. Naval Radio Station—New Dungeness, Wash.
 U.S. Naval Radio Station—Wailupe, Caku, T.H.
 U.S. Naval Training Station—Newport, R. I.

U.S. Naval Station, Marine Barracks—Cavite, P. I.
 U.S. Navy Recruiting Station—Altoona, Pa.
 U.S.N., Naval Torpedo Station—Newport, R. I.
 Walter Reid Hospital—Washington, D. C.

UNIVERSITIES & SCHOOLS

Army Veterinary School—Washington, D. C.
 Board of Public Instruction—Fort Myers, Fla.
 Bureau of Science—Manila, P. I.
 Braintree High School—Braintree, Mass.
 California Nautical School—Tiburon, Calif.
 Cornell University—Ithaca, N. Y.
 Denver High School, Denver, Iowa.
 Harcum School—Bryn Mawr, Pa.
 Honolulu Vocational School—Honolulu, T. H.
 Independent School District, Ames, Iowa.
 John Marshall High School—Los Angeles, Calif.
 Junior College of Augusta—Augusta, Ga.
 Junior High School—Kearney, Nebr.
 Lewis Institute—Chicago, Ill.
 Lincoln High School—Midland, Penna.
 Lincoln University, Jefferson City, Mo.
 Louisiana Polytechnic Institute—Ruston, La.
 Luther College, Decorah, Iowa.
 Marietta College, Marietta, Ohio.
 Michigan State College—East Lansing, Mich.
 National Radio Institute—Washington, D. C.
 Nebraska State Normal College—Chadron, Nebr.
 Nebraska Wesleyan University—Lincoln, Nebr.
 Needham Broughton High School—Raleigh, N. C.
 Parks Air College, Inc.—East St. Louis, Ill.
 Pennsylvania State College, State College, Pa.
 Pinehill Laboratory—North Scituate, R. I.
 Principal Union High School—Turtle Creek, Pa.
 Purdue University—Lafayette, Ind.
 St. Fidelis Seminary—Herman, Pa.
 St. Peter's College—Muenstro, Sask., Canada
 South High School—Worcester, Mass.
 State of Conn. State College, Storrs, Conn.
 State University of Iowa—Iowa City, Iowa
 State College of Washington—Pullman, Wash.
 Texas Christian University, Fort Worth, Texas
 The High School—Pottstown, Pa.
 The Rice Institute—Houston, Texas
 Utah State Agricultural College—Logan, Utah
 University of Chicago—Chicago, Ill.
 University of Minnesota, Minneapolis, Minn.
 University of Texas, Austin, Texas.
 University of Wyoming, Laramie, Wyo.
 University of Akron—Akron, Ohio
 Washington Trade School, 40th St., Pittsburgh, Pa.
 Woodberry Court School—Woodberry Court, Va.

PENITENTIARIES

Clinton Prison—Dannemora, N. Y.
 Kansas State Penitentiary—Lansing, Kansas
 Missouri State Penitentiary—Jefferson City, Mo.

SHORT WAVE TREATISE

Compiled By The Radio Engineering Staff of The

VOL. SW-1

RADIO TRADING COMPANY

1934

Text of this Section—Courtesy of Short Wave Craft & Radio Craft

GETTING STARTED IN SHORT WAVES

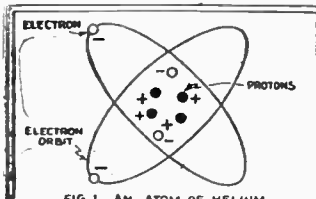


FIG 1 AN ATOM OF HELIUM

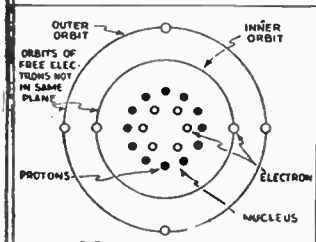


FIG 2 AN ATOM OF CARBON

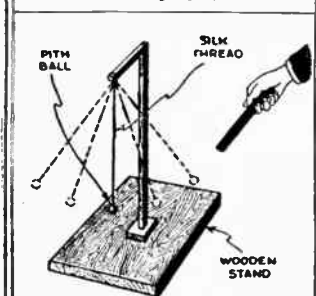


FIG 3 A STATIC EXPERIMENT

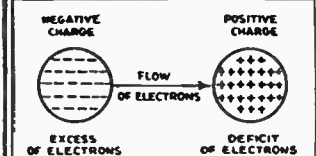


FIG 4 TRANSFER OF SURPLUS ELECTRONS.

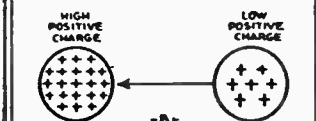
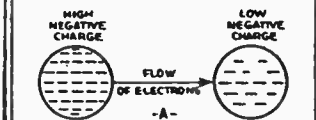


FIG 5 EXAMPLES OF ELECTRON FLOW

FIGS. 1 to 5
The diagrams above illustrate the basic electrical conditions occurring in the structure of certain atoms; also electron flow.

TO understand how radio signals are received, it is necessary to have a knowledge of electricity—the basis of radio. Suppose, then, we start by considering the subject from the very beginning.

Electrons

Matter is any substance having weight and volume. The air we breathe, the water we drink and the earth on which we live are all forms of matter. Matter of all kinds is composed of tiny specks which have been called atoms. These atoms, in turn, are made up of a number of still smaller particles of two kinds, and in order to start out with the right foot, we will give these particles their correct names—electrons and protons. The electrons are tiny charges of negative electricity, and the protons are charges of positive electricity. Do not make the mistake made by some people when thinking about electrons and protons. They do not carry the electricity; they are the electric charges. If a negative charge of electricity were divided into many small charges, eventually a minute charge would be reached that could no longer be divided. This final division would be an electron. So much for the electron and proton.

Normally, each atom contains a definite number of electrons and protons, in such a combination that the charges just equal each other. The atom is then said to be uncharged or neutral. Figures 1 and 2 show examples of normal atoms. However, if a force is applied to the atom, some of the electrons will be pulled away from it and it will have an excess of positive electricity compared to the remaining negative charges. Conversely, if a force is applied in the opposite manner, too many electrons are present in the atom and it is said to have a negative charge.

We can perform an interesting experiment at this time, to illustrate the effect of charging a body. For this experiment we need a rod of hard rubber (some fountain pens are made of this material), a glass rod, a piece of silk cloth and a small piece of pith from a corn cob. We suspend the pith on a silk thread, as shown in Fig. 3. Then we rub the glass rod vigorously with the silk cloth and bring it near the pith ball. It will be found that the pith ball will follow the glass rod—it is attracted by it. Then we allow the rod to touch the pith ball and notice that it now repels it. Now rub the rubber rod and bring it near the pith ball—it attracts it.

The glass rod receives a positive charge when rubbed and the rubber rod receives a negative charge. This is the reason why we notice the difference in the experiment. We learn that two like charges repel (the pith ball and the glass rod were both positive when they were allowed to touch) and unlike charges attract (the positively charged pith ball was attracted by the negative rubber rod).

Conductors and Non-conductors

Some materials, such as gold, copper, silver, brass, aluminum, etc., present very little opposition to the passage of electric currents. Others, such as cotton, silk, rubber, wood, mica, etc., will not readily pass a current. The first class of substances is called conductors. The atoms of most metals apparently do not have a very strong hold on the electrons which make up their negative charge. An external force can easily remove some electrons or add some to the normal number. The second class of substances mentioned is known as non-conductors. They have a strong hold on the electrons and will not readily change from their neutral state.

Potential

We have learned that like charges repel each other and unlike charges have an attraction for each other. If we translate this into terms of electrons, it will read: electrons repel each other but attract protons, and similarly, protons repel each other but attract electrons. Apparently the feeling of the protons and electrons is mutual.

If we charge a body with negative electricity (add electrons) a state of strained condition is set up in that body by the electrons repelling each other. Some of these "free" electrons move to the surface of the body to get away from the others. The more electrons we put into the body, the greater becomes the force of the electrons trying to escape. This force which tends to return a body to neutral is called a "potential." The same effect is noticed in a body from which electrons are removed.

To illustrate the effect described, suppose we refer to Fig. 4. The two balls shown are charged, one negatively and the other positively. If we touch these balls together, the excess electrons in the negative one will rush to the positive one. It follows directly from this that a current will flow, as we already explained, that electrons are electric charges. Several other examples of current flow are shown in Fig. 5. At A, the left copper ball has a higher negative charge than the right one, causing a current to flow from left to right. At B, the left copper ball has a higher positive charge than the right one and a current will flow right to left—the right ball has more electrons than the left one.

It will be noticed that the electrons move from negative to positive and since we know that electrons are electricity, it follows that the current is also from negative to positive. A number of years ago, before we knew as much about electricity as we do now, physicists experimenting with it decided that the current flowed from positive to negative and this illusion has been passed down to the present time and is still commonly used. We must keep this discrepancy in mind as it is important in understanding the operation of vacuum tubes and other electric devices.

The difference in potential, as that shown in Figs. 4 and 5, is measured in volts. Because a difference in potential always causes a current to flow, we sometimes call it an electro-motive force (E.M.F.) Current strength, that is, the number of electrons passing through an electric conductor per second, is measured in amperes.

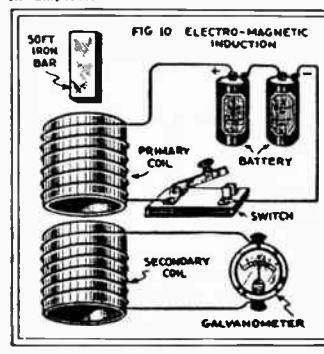


FIG 10 ELECTRO-MAGNETIC INDUCTION

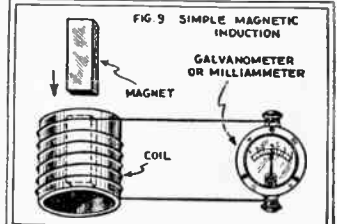


FIG 9 SIMPLE MAGNETIC INDUCTION
Magnetic induction is demonstrated by plunging the steel magnet into the coil.

Resistance

We have found that the current flowing through an electric circuit is dependent on the potential. We also learned that some materials will carry a current (lose and gain electrons) more easily than others. The opposition that a conductor offers to the passage of current is known as resistance. The resistance depends on the kind of material, the length of the conductor and the cross-sectional area. To be exact, the resistance increases directly as the length of the conductor. A standard unit of resistance has been set up and is called the ohm, in honor of the noted German physicist, George Simon Ohm.

If we analyze the above information, we learn that the current depends on the volts and also on the resistance. In 1827, George Simon Ohm put this relationship into terms of arithmetic and it is known as Ohm's Law. There are three forms of Ohm's Law. The first tells us that the current in a circuit is equal to the potential (volts) divided by the resistance (ohms). The second tells us that the resistance in a circuit is equal to the potential (volts) divided by the current (amperes) and the third tells us that the volts equal the amperes times the ohms. You will learn the application of these three formulas as you progress further into the subject of short-wave radio.

Production of an Electric Current

In the foregoing discussion, we have referred to a force (E.M.F.) that would cause electrons to be separated from atoms and move through a conductor to other atoms. This E.M.F. can be maintained by means of a battery or a generator. The former consists of plates of certain materials immersed in certain solutions that cause a chemical action, resulting in the production of free electrons at one of the plates. We will not go into the details of these chemical actions at this time. The interested radio fan can find this information in books on electricity or batteries. Several common types of batteries are shown in Fig. 6.

The other common source of E.M.F. is a generator which depends on the effect of induction and magnetism. We already encountered the effects of induction when we noted that the pith ball was attracted by the glass rod, even though it was not touching it in any way. Inductive actions are very important in radio, in tuning coils, transformers, etc.

Magnetism

When a current flows through a conductor, two principal effects can be noticed. The first is that heat is produced. The current encounters a certain opposition (resistance) in the conductor and part of the electric energy is used up in overcoming this "frictional" resistance. The energy used up in this manner makes itself evident in the form of heat.

The second effect is known as magnetism and we can best illustrate this by considering Fig. 7. This illustration shows a coil of wire wound around a bar of soft iron. A current from a battery is flowing through the coil. While the current is flowing, the iron bar will be found to have the power of attracting small pieces of iron and steel. When the current from the battery is not flowing, the iron bar loses its magnetic power.

(Continued Top Next Page)

ing, the iron bar no longer attracts the iron pieces. Thus we see that the current passing through the coil of wire has given it a new property which we call magnetism, and since it has this property only when the electric current flows, we call it an electromagnet.

Now, if we replace the soft iron bar with one of hard steel and allow the current to flow for some time, we will find that the steel will attract the pieces of iron even when the current flow has stopped. We have now made a permanent magnet. A careful examination of the soft iron bar will show that it also retains a small amount of magnetism, although in a smaller degree than the steel. The steel is said to have a higher degree of retentivity than the iron.

If we drop a permanent magnet into a box of iron filings, we will notice that there are two places on the magnet to which the most filings cling. See Fig. 8. These places near the ends of the steel bar are called the poles of the magnet. One pole is called the north pole and the other the south pole, or more exactly the north-seeking pole and the south-seeking pole, if we suspend the magnet from a thread. It will swing around until the north-seeking pole faces the north and the south-seeking pole faces the south. This is the effect used in the magnetic compass.

Magnets and magnetism are used in a number of different ways in radio receivers. Headphones and loud speakers contain magnets. The transformers used in radio amplifiers depend on magnetism. Even the actual transmission and reception of the radio waves depends on magnetic principles.

Induction

One of the greatest discoveries in electricity was the fact that a magnetic field

in motion will cause a movement of electrons which we know as an electric current. If we connect a coil of wire across an indicating instrument (such as a galvanometer, which indicates the presence of current) and run a permanent magnet through it, as shown in Fig. 9, the needle of the galvanometer will move, indicating the presence of current in the coil. The needle of the meter will quickly return to the zero position when the magnet is at rest in the coil. Then if we draw it out again quickly, the galvanometer needle will again move, but this time in the opposite direction. It will be found that the faster the magnet is moved, the greater will be the deflection.

If we substitute a piece of unmagnetized steel for the magnet, there is no current indicated. The difference between the magnet and the steel is the presence of the magnetic lines of force surrounding the former. This experiment shows that whenever a conductor is placed in the presence of a moving magnetic field, a current is produced. This current is caused by induction.

A similar action can be obtained if the magnetic field is produced by a current instead of a permanent magnet. Suppose we wind two coils in a place then end to end as shown in Fig. 10, one coil being connected to the galvanometer and the other to the battery, with a switch to open the battery circuit. When we close the switch, the galvanometer indicates a momentary current. Then open the switch again and the galvanometer needle shows another current, opposite to the first.

If we insert a piece of soft iron through the coils, the action is the same as before, but much stronger. This is the principle of the tuning coils and transformers used in radio reception. It will

be noticed that we did not move the coil as we did the magnet. The magnetic field, building up in the coil when we closed the switch, gave the necessary "moving" field to induce the current in the second coil or the secondary, as it is called.

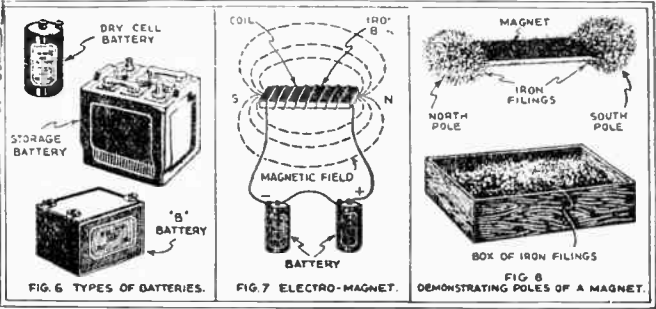
Direct and Alternating Current

Up to this time, we have limited our discussion to currents flowing in one direction in a conductor. This type of current is known as direct current. It will be remembered that when the magnet was plunged into the coil and withdrawn, the current reversed its direction when the magnet was withdrawn. To state this is another way, we can say that the direction of the current was alternating in one direction and then in the other.

This type of current is known as an alternating current.

Alternating currents are used extensively in radio. In fact, the radio waves themselves are alternating currents which reverse very fast, in the neighborhood of 1,000,000 times per second or even more. Currents which have a frequency (reverse their direction of flow) of less than 10,000 cycles (complete reversals) per second are known as audio frequencies, and those over 10,000 cycles per second as radio frequencies.

It is suggested that the reader perform the various experiments in this discussion in order to fix the facts firmly in mind, as these principles are all directly applicable to the operation of radio apparatus.



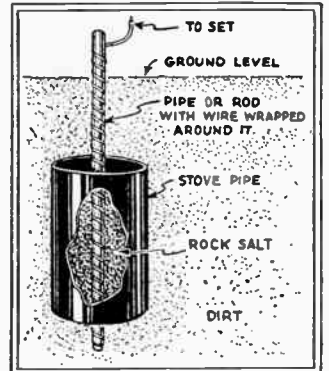
Three types of batteries: an electro-magnetic circuit; and the poles of a permanent bar magnet.

Helpful Short Wave Kinks

Courtesy Short Wave Craft Magazine

IMPROVED "GROUND"

This "ground" works much better than an ordinary one. The following material is needed: An iron pipe or rod about 5 feet long, about 20 lbs. of coarse (rock) salt, a piece of No. 14 wire about 15 feet longer than is needed to reach from the "set" to the ground, and a section of stove-pipe. A hole is first dug in the ground big enough for the stove pipe to slip in. The insulation is scraped from about 15 feet of one end of the wire. This end is coiled around the rod and the rod is put in the pipe as shown in the illustration. Soil is then thrown in the hole and rock salt is mixed with it in the pipe. The hole is then filled with soil.

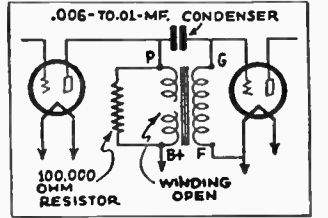


The loose end of the wire is then connected to the set in the usual manner. A few holes punched in the stove pipe will increase the efficiency as more moisture is admitted. The stove pipe keeps the salt from washing away and the salt draws moisture.—Elber Wehrheim.

BURNT-OUT A. F. KINK

It is usually the primary coil of A. F. transformers which burns out, but they can be very satisfactorily fixed by connecting a 100,000 ohm resistor across the primary terminals, and a .006 to .01 mf. condenser between the grid and plate terminals of the transformer. You can fix these transformers in a very short time by making some clips which may be mounted on the binding posts of the transformer, which will hold the resistor and condenser very nicely. These connections provide "resist-

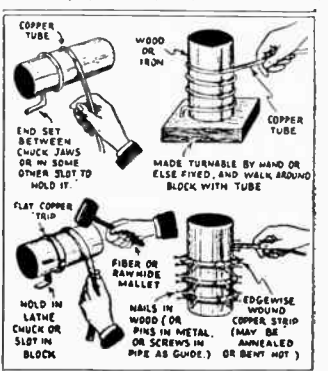
ance-capacity" coupling, with an "impedance leak" and will be found to give good



tone from even cheap transformers. But it will give slightly less volume. However by buy new ones when you can fix the old ones.—Alfred Oberstaedt.

WINDING TRANSMITTER COILS

A few hints are given in the accompanying illustration on how to wind copper tubing and strip for transmitter inductances. Copper tubing may be wound "cold" around a cylindrical form, one end of the tube being held in a lathe chuck for example, if a lathe is available. Flat

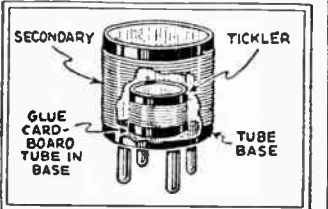


copper strip is wound around a form and the operation aided by means of a fiber mallet. Tubing may also be wound by

walking around a stationary form with it. Copper strip may be "edge-wise" wound between nails driven into a wooden form as shown, (or pins or screws in a metal drum or piece of pipe).

TICKLER INSIDE COIL

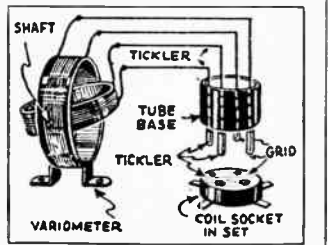
Tube-bases are often too short for both secondary and tickler windings. To over-



come this the secondary is wound on the tube-base and the tickler is wound on a one inch cardboard or bakelite tube which is glued inside as shown. Connections are made to the prongs in the usual manner.—L. H. Wilson.

"LONG WAVE" ADAPTER

Here is a description of a "long wave" adapter for short-wave sets using plug-in coils. It consists of a variometer or variable tuning coil and an old tube-base. The tickler leads of the variometer go to the tickler prongs of the plug-in coil form



(tube base) and the same with the grid leads. The variometer is mounted on a small baseboard with a panel. The set

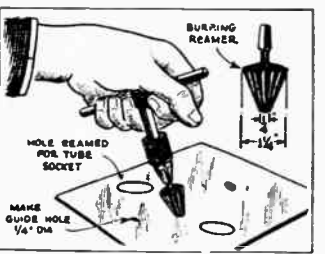
I used it with was the "Globe Trotter" described in SILICON WAVE (GAP), November 1932, page 400. In the first night's test many of the larger broadcast stations of eastern and central United States were logged.—Roy W. Neads.

SUBSTITUTE "MIKE"

I proceeded to build a low-power transmitter out of the junk box which contained many receiving set parts of varied sorts. I got along well and finally got "her" done. Then came the question of a "mike". What to use for the "mike"? The cheapest "mike" on the market at that time was well above five dollars, which was the one thing I didn't have. So instead of using the regular microphone transformer in the modulator, I substituted an ordinary audio transformer of "ancient vintage," and with this I was able to use an old Vewo magnetic "speaker unit" with a little alteration as a "mike". To say the least, the results were excellent and much better than could be had from most carbon "mikes". The only alteration is the diaphragm; the old one is taken out, and a new one is made from the tin of a coffee can. Cut it out the same size and sand-paper down quite thin, replace, and it's ready. The output is good and strong.—John Markovich.

HOLE REAMER

When drilling a chassis for tube sockets and inverted condensers, a plumbers' burring reamer will enlarge the holes easily. First use a 1/4 inch drill to make



the guide hole, then use the reamer to enlarge to diameter desired. Edges of holes can then be smoothed with a half-round file. Use the 1/4 to 1 1/4 inch size reamer, which can be run right through to make a tube socket hole. I bought a ten-cent store brace to use with the reamer.—Elmer R. Boyer.

Short-Wave Converter Operation

THE converter, adapter, and receiver all are the same thing to folk just breaking into the short-wave "game." Although our story is to deal specifically with the "converter," we will first define the other types of short-wave equipment.

Short-wave receiving apparatus, today, falls into three major classifications:

(a) The short-wave receiver, a complete, specialized unit designed particularly for the greatest efficiency at high frequencies (short wavelengths).

(b) The all-wave receiver—often a superheterodyne—designed for reception of both short-waves and ordinary broadcast programs at the throw of a switch or through the use of plug-in coils.

(c) The adapter, or converter, an accessory which, on being attached to a

FACTS YOU SHOULD KNOW!

A short-wave converter is no better than the receiver with which it is used. Why this is so is fully explained in the text. Many short wave fans are too quick to condemn short-wave converters before having given them a fair trial. This article will give you a thorough understanding of converters and their operation.

oscillator heterodynes with different incoming short-wave signals, resulting in a constant beat note or "difference-frequency" for any setting of the oscillator, or of both oscillator and tuning control, as the case may be. That is to say, by mixing the two (signal and oscillator) frequencies in a modulator or first-detector tube, an intermediate frequency is created. The converter's output post is connected to the antenna post of a standard broadcast receiver, which is tuned to this difference or intermediate frequency—which may lie between the extremes of 190 and 600 meters, depending upon the design of the converter unit, as previously explained.

Some converters incorporate a stage of R.F. or signal-frequency amplification, either unfiltered or filtered, as a fault-finding feature. It may be of interest to remark that a broadcast set using the superheterodyne circuit, when connected to a converter using the superheterodyne circuit produces a novel hook-up which may be analyzed as follows, using a simplified diagram of the circuit as an instance: one stage of signal-frequency amplification, a first oscillator, and a first detector (or modulator), all in the converter, followed by one stage of first intermediate frequency amplification (formerly the broadcast R.F. stage), second oscillator, second detector, second intermediate frequency amplification, third detector, first or power audio, all in the broadcast set. This may sound formidable, but all follow in natural sequence.

Converters will not work so well with supers, unless there is, in the broadcast set, some amplification ahead of the first detector to successfully transfer the converter beat signal. With a stage of amplification following the converter's output, the beat-frequency produced by the converter may be amplified at 1500 kc. The oscillator and modulator in the super will again change this to the lower frequency to which the intermediates in the super are adjusted.

Two main methods of changing the tuning hand are used in converters. One calls for a coil tap-switch, and the other, for plug-in coils. In the switching system,

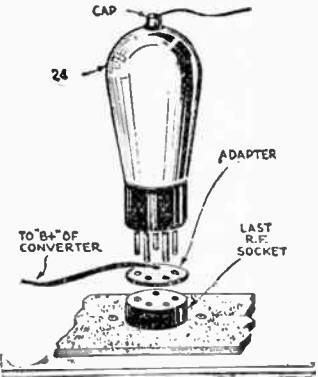


FIG. 4
The method shown affords a means of taking plate voltage from a set for a converter. It may be necessary to pass the lead through a shield.

standard long-wave broadcast receiver, makes a combination capable of reproducing also short wave programs, telephony, etc. The adapter has, generally, a circuit utilizing only the audio channel and reproducer of the receiver to which it is attached; the converter, properly, is a frequency changer, and uses also the R.F. channels.

The different types of short wave receivers may be classified, as to circuits, just as are the regular broadcast receivers. The same stations may be made also of the short-wave adapter; the adapter feeds a detected signal into a broadcast receiver at the detector input or output; and, usually, derives its power from the broadcast receiver to which it connects.

A short-wave converter, ordinarily, (but not necessarily) is self-powered; it connects to the input posts (antenna and ground terminals) of a broadcast receiver. Converter units are so named because they "convert" a short-wave program into a "broadcast wave" program; utilizing, to obtain this action, the superheterodyne principle of operation. The converter may be constructed either with or without a signal frequency-tuned input circuit.

It will be recalled that a short-wave converter consists, essentially, of a tuned local oscillator, and a modulator or first-detector. The

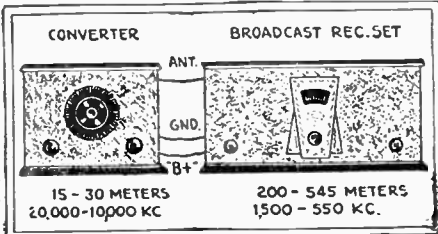


FIG. 3
A division on the converter dial covers a hundred kilocycles, as against ten kilocycles to a division on the set.

connection between the lever and contacts must be perfect. The introduction of resistance, through a faulty contact, may cause either lack of oscillation, broad tuning, or lack of selectivity.

Where the plug-in coil system is in use, the contacts of the pins and jacks must be kept clean.

The Limits of Efficiency

A little reflection will show that a converter cannot work to advantage unless the broadcast receiver to which it is connected is both selective and sensitive. We wish to emphasize this point; for it is one of the most important things in the successful operation of short-wave converters—to paraphrase: "Make sure your broadcast set is right, then go ahead."

While many receivers of present day design are supposed to afford equal amplification and selectivity throughout their entire tuning range, it has been found that the region around 1500 kilocycles usually affords the best results. Therefore, when the R.F. section of the broadcast set is connected to the I.F. amplifier of the converter output, the set's dial is to be

tuned to this frequency setting and only the converter's tuning dial adjusted to tune in the various stations.

Thus logging is possible, since only one dial, (1 (Fig. 1) is needed to tune in short-wave stations. Of course, if a broadcast signal is found at the selected frequency, the broadcast set's dial must be shifted a few points. Only under exceptional conditions will it be found necessary to shift the broadcast dial to a higher setting.

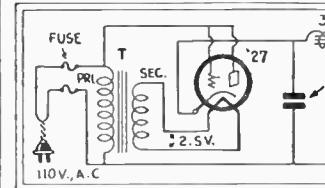


FIG. 2
A simple current supply unit, adequate for the plate voltage of a short-wave converter.

As previously stated, since the success of the converter depends upon the efficiency of the broadcast set, volume and selectivity adjustments of the latter should be made with care.

After all connections have been made and the assembly turned on a rushing sound should be heard. If this is not present, the receiver's volume control should be adjusted, either up or down; the latter, to control circuit oscillation which may exist in the broadcast receiver, and may be evident as a feeble hiss and lack of short-wave signals.

The dial of the converter should now be turned with extreme care. This procedure is of the utmost importance. It must be remembered that, if the broadcast set is selective, the converter will appear to be extraordinarily more so; and stations will be passed over if the dial is not rotated slowly. Even the loudest short-wave station that can be received, coming in very strong at a given position of the converter's dial, may be tuned out

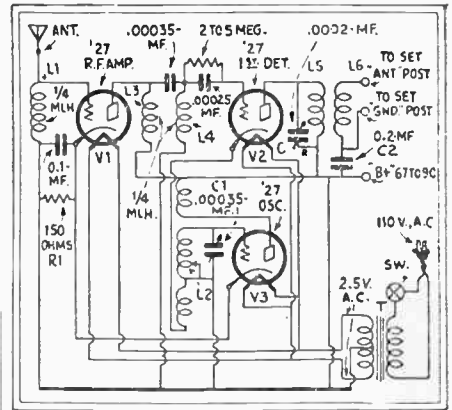


FIG. 1
A method of reducing interference, with an untuned input converter, is a tuned R.F. output transformer, C-L5-L6.

by a slight movement of the dial. A division on the converter dial covers a hundred kilocycles, as against ten kilocycles per division on the broadcast receiver's dial. (Fig. 3)

Let us now see what factors exist that may prevent the converter from performing satisfactorily.

Faulty Converter Action

It will sometimes be found that the converter acts only as a broadcast signal booster, instead of a short-wave signal mixer. This is because the oscillator in the converter is not peaking.

The first thing to check up is the tube. Strange as it may seem, it will be found to be the trouble maker practically every time. If you have no means of checking this up, your local dealer will help you out. If the tube is not the cause of trouble, the plate and filament voltages should be checked.

At this point we enter a new field. Some converters use the "B" voltage of the broadcast set; others are run from separate "B" batteries; and still others have their own "B" socket-power units. The use of the "B" voltage of the receiver will be discussed first.

If the receiver used is of the screen-grid type, the voltage is nearly always obtainable directly from the screen-grid lead of a tube. The looped end of the insulated converter lead, designated for that purpose, must be tightly wound over the screen-grid prong. Or, if a lug is at hand, the lead should be soldered to it and placed on the prong, making sure that the connection is solid. (Fig. 1)

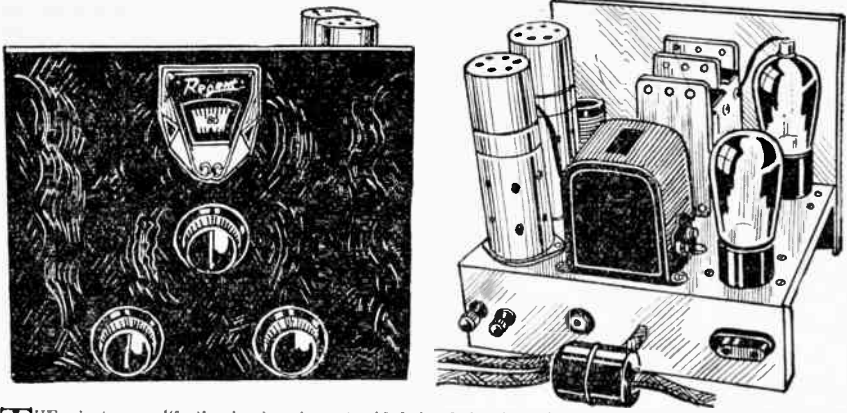
If the receiver uses only the "general purpose" types of tube, such as the '26 or '27, the plate voltages are taken from any one of the plate supply circuits in the radio-frequency section, of course.

In battery sets, the same methods of connection are followed for either screen-grid or standard type tubes.

Current Supply

Now, if you find that you cannot pick up from your receiver a potential above 40 volts, a separate battery may be introduced. Its negative post connects to the ground and positive post to the "B" lead of the converter. When doing this, it is also advisable to connect a 1-mf. condenser between it and the ground, to prevent circuit oscillation.

If the converter (as shown in Fig. 1) has a built-in plate voltage supply, the rectifier tube, which may be either of the '27 or the '80 type, should be checked. Ordinarily, when used as a rectifier, the 27's plate and grid are tied together and connected to one side of the primary of the power transformer. The cathode is brought to the positive side of the "B" supply. For satisfactory filtration, condensers of high capacity are required. These may be of the 8-mf. "dry electrolytic" type. (See Fig. 2) Nearly perfect filtering is necessary; for, if a hum is present, it modulates the beat frequency, making tuning difficult.



Novel Short-Wave Receiver Using a New Tube Especially Designed for Short Waves—and a New Scheme of Equalizing Regeneration and Simplifying the Operation of the Set.

The "Regent-Four" Receiver

THE short-wave "fan" who has been troubled by lack of oscillation on certain parts of the wavebands covered by one or more of the coils will welcome this new receiver. It employs the new S-30 tube, which has similar characteristics to the regular 34 tube, except for a much lower internal capacity which is accomplished by bringing the plate terminal out of the top of the glass bulb. This reduction in the internal capacity facilitates oscillation on the very low wavelengths and also makes the regeneration control much smoother.

The second outstanding feature in the design of the Regent Four is the method of stabilizing regeneration. In operating a regenerative short-wave receiver, continuous adjustment of the regeneration control is necessary to maintain the set just below the point of oscillation, where it is most sensitive. If this is not done, the detector either goes violently into oscillation or the regeneration drops down until the set is very insensitive, depending on whether the tuning is toward the higher or lower frequencies.

The operation of such a set can be simplified a great deal and, at the same time, the sensitivity can be increased by a method that will automatically keep the detector near the point of oscillation.

Suppose we investigate some of the characteristics of the regenerative circuit to determine how this stabilization can be accomplished. If the size of the feedback coil is increased beyond a certain critical size, the detector tube will block and will not oscillate on certain parts of the scale, usually the high frequency end. This effect is manifested by dead-spots when tuning.

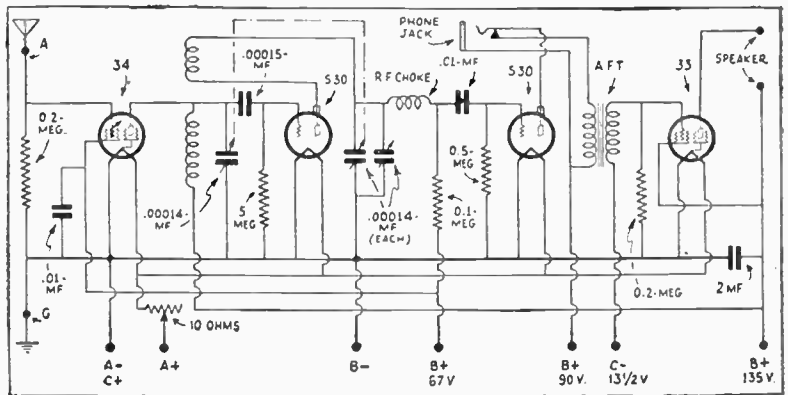
On the other hand, when the plate coil is reduced beyond a certain size, the set regenerates smoothly on the high frequency end, but will not oscillate at the low frequency end of the band. If a variable condenser is shunted across the plate coil for the purpose of controlling regeneration, an increase in the size of the condenser will, within certain limits, eliminate the lack of oscillation on the low frequency end of the band. However, this causes the regeneration to be unstable on the high frequency end due to the greater capacity across the coil.

The practical solution to the problem has been found in the use of two regeneration condensers one controlled by hand (in the usual way) and the other ganged with the tuning condenser. Now, at the low frequency end covered by any one coil, the sum of both condensers is available so that oscillation can be obtained to the end of the tuning scale—and on the high frequency end, the capacity of the condenser ganged with the tuning condenser is at its minimum so that the regeneration is not too great.

So much for the principle of operation. The circuit and the appearance of the set in which these principles have been incorporated are illustrated here.

It consists of four tubes of the 2-volt type, including two of the S-30 tubes previously mentioned, a 34 screen-grid tube and a 33 power pentode. All of these tubes are of the 2-volt variety, which permits the set to be operated entirely from dry batteries.

The power pentode tube is coupled to the first audio tube through a transformer—thus stepping up the output to full loudspeaker volume. The construction of the set is quite simple and anyone should be able to put one together from the data supplied. The complete receiver is listed in this catalog. It is available either in kit form or fully wired and assembled, ready to use.



Here is the way the various components of the "Regent-Four" are hooked up.

BUILD IT YOURSELF
See Page 19 for Details

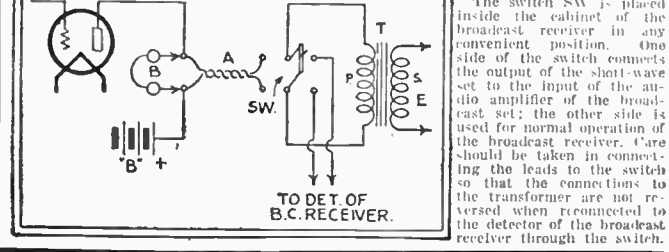
SHORT-WAVES ON YOUR PRESENT LOUDSPEAKER

TUNING IN SHORT WAVES

If one has a modern broadcast receiver equipped with a power amplifier tube and a short-wave set with at least one stage of audio amplification, foreign short-wave broadcast stations can be tuned in on the loud speaker of the broadcast receiver if the two receivers are connected together according to the simple diagram shown here.

One short-wave fan tunes in daily, by means of this combination, the afternoon programs from G5SW at Chelmsford, England, with volume and quality equal to a local station. Three stages of amplification are none too many because the level of back-ground noise is usually very low on the short waves. Howling caused by mechanical feed-back from the speaker may be avoided by using a longer speaker cord or, if necessary, placing the speaker in another room.

Referring to the diagram, the lamp cord "A" joining the two receivers, can be of any length, and if the sets are located in different rooms the phones "B," which are left connected all the time, can be used to find the station before putting it on the speaker.



What Is Band Spreading?

WHAT is generally meant by band spreading? Does one mean spreading the band over a greater portion of the tuning dial, the obvious interpretation. Well, yes, and then again, no, as the politician says. The phrase means spreading the band all right, but not crowding the band over the regular tuning condenser. Here's what it does mean.

Everyone knows that the total capacity of two condensers in parallel is the sum of the two individual capacities. This idea is made use of in band spreading. The ordinary tuning condenser—usually in short-wave receivers—has an additional, small three-plate condenser in parallel with it; this smaller condenser is so arranged that it may be tuned independently of the main tuning unit. Thus, the single assembly has two shafts, each going to separate dials on the panel of the set.

tuned to the approximate frequency of the station to be heard, while the exact frequency is obtained by tuning the smaller, auxiliary unit. In this manner a small band of frequencies is spread over the entire dial of the smaller condenser, and band spreading is obtained. Here are some figures:

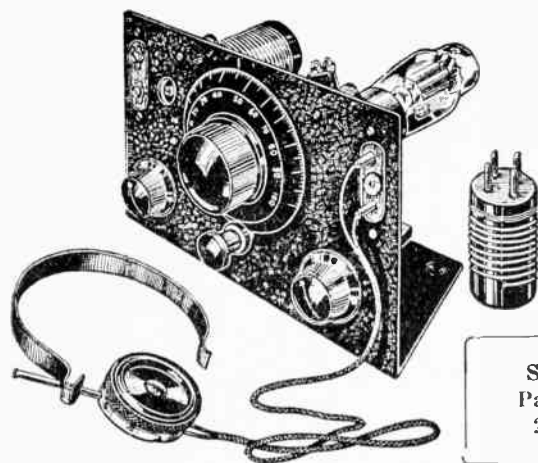
Suppose there is a 110 mmf. tuning condenser—a standard size—whose minimum capacity is 15 mmf.—also a somewhat standard figure. The change of capacity, then is 110 minus 15, or 125 mmf. If the plates of the condenser are in circuit, the change of capacity per degree of the tuning dial is 125 divided by 100, or 1.25 mmf., provided, of course, that the dial has 100 divisions.

Now suppose that the smaller unit has but three plates—a standard size—of the same size and shape of the larger unit. The capacity of this unit is, therefore, 35 mmf. The capacity change per degree on its dial is 35 divided by 100, or .35 mmf., assuming that the band spread dial also has 100 divisions. Thus, it is seen that one can get about 1.25 divided by .35 or 3.5 times as much spreading with the smaller than with the larger unit.

HERE'S A BREAK

for all

Short-Wave Beginners



See
Page
24

**YOU CAN BUILD THIS NEW
"19 Unimount Twinplex"
FOR LESS THAN \$5.00**

**15 TO 200 METERS
AND BROADCAST TOO**

A remarkable "2 tube" short-wave receiver built for less than \$5.00. That is the story of the Unimount Twinplex. The circuit of this little set is, by no means new, having been thoroughly described in the March, 1944, issue of Short-Wavecraft Magazine. Mr. N. H. Leason, our technical director built the "19" Twinplex by following that article. The results were splendid and so was the price — from the viewpoint of the radio dealer — he had spent \$75.00 and some odd cents for the component parts.

It occurred to him that if this same receiver could be constructed at a price more compatible with "deflated" pocket-books, literally thousands of short-wave fans would take advantage of its fine performance. So, 0-0-0 after wading through a maze of almost unobtainable figures and going into 14 brain-status, the inexpensive Unimount Twinplex came into existence — the only set of its kind in captivity!

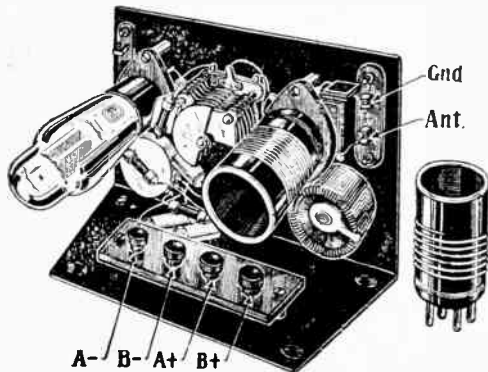
The total expenditure was \$4.95, not including the tube — quite a difference from the old price. And, withal, a considerable number of improvements have been made from the standpoint of design. All component parts have been laid out with a view to shortest possible leads; and so religiously has this view been carried out that less than 10 inches — inches, not feet — of hook-up wire has been used in the wiring process!

Talk about R.F. losses, stray coupling, feed-back and other short-wave "headaches" — this set has none of them. Even if this set wanted to get out of order of its own volition, it could not possibly do so. All component parts, tube, plug-in coil, condenser, regeneration control — everything — has been mounted on the front panel and in ideal relationship to one another. The panel itself has been simplified to such a degree that it requires but one right angle-bend; and this only to keep it in an up-right position.

The elimination of long leads, with their attendant stray coupling and body capacity effects has increased the sensitivity of the set enormously. On its initial test the set has received CPH, Rio de Janeiro; WYR, Atlanta, Ga.; XDA, Mexico; GZWM, Leicester, England, and amateurs in 36 different states. The writer can safely say, without fear of contradiction, that the operation of this modified "Twinplex" surpasses even that of the original one.

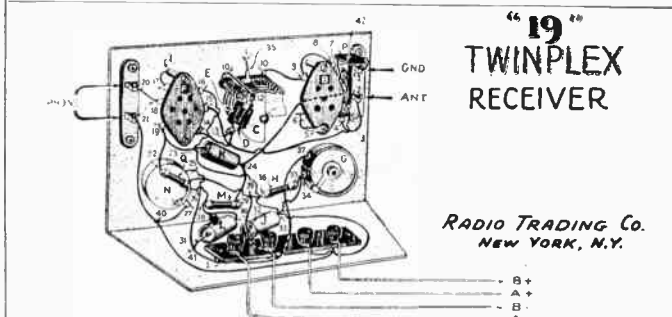
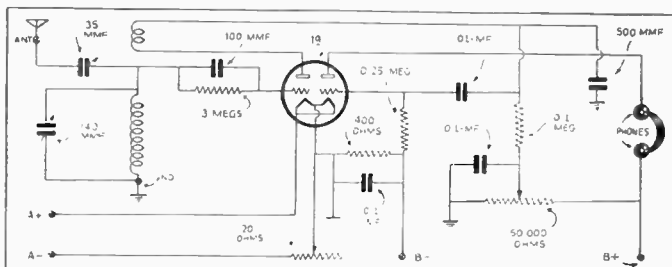
It is hardly necessary to go into the constructional details as the diagram and photographs printed herewith are self-explanatory. If this set could only speak it would give the "merry ha ha" to all other short-wave sets in its class. So-o-o-o you "short-wave" fans who have waited for a low-priced set — here is your chance.

This receiver will be found more fully described on page 21 in this catalog.

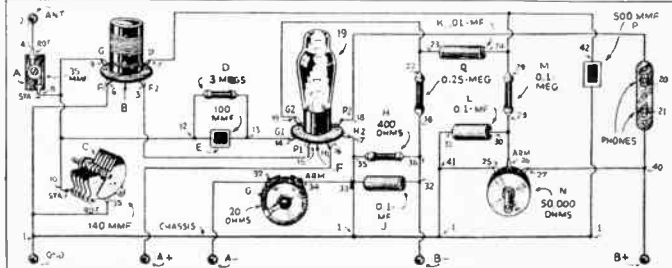


**NO MORE
SLEEP
FOR YOU**

— yes, you short-wave fans, from the minute you've hooked up this set and received your first foreign station — from then on you don't sleep any more.



**RADIO TRADING CO.
NEW YORK, N.Y.**



Detailed Construction Diagram

Even if you have never constructed a set before, or followed a radio diagram, the above detailed plan will permit you to construct this economical receiver "right off the bat" and without outside help. A set of 2 broadcast plug-in coils will give you full band coverage of the broadcast range.

DON'T FAIL TO READ THIS ARTICLE

Tuning-in foreign stations on short-wave receivers is an art in itself. Such factors as time of day, location, dead spots, etc., are important considerations. Equally important is the proper calibration of your receiver, enabling you to locate the approximate position of the given station on your dial. These and other considerations are treated comprehensively in this article.

WHEN the broadcast listener starts experimenting in short-wave reception, he finds many conditions to which he has not been accustomed; such as the sharpness of tuning with the most distant stations, the ever-changing reception conditions, and the broad spaces on his dials where he is at a loss to know what wave he may be tuned to. These three things have been the cause of many experimenters throwing up their hands in disgust and swearing that overseas broadcast reception is "just so much bunk." It is only after the operator has obtained a knowledge of short-wave tuning that he succeeds to any extent in getting good results; and this knowledge cannot be gained in a moment.

On the standard broadcast set of today, we have the wavelengths in meters or the kilocycles marked on our dials; we have also station lists showing exactly what wave each station operates on, and reception is simply a matter of turning the dials to the corresponding figures. Even if the wavelengths are not marked on our dials, there are many powerful stations of known wavelength which establish points of reference to guide us to the stations wanted.

But this is not true in short-wave reception. Many of the short-wave sets are marketed in kit form, and must be put together, either by the experimenter or by some "Service Man" whom the owner gets to do it for him. Each constructor makes slight differences in the layout of parts or in the choice of accessories, antenna, and so forth. At the high frequencies associated with short wave broadcasting, a receiver is very sensitive to the slightest changes; and therefore no short-wave set can be calibrated in advance like the medium-wave broadcast receivers. The manufacturer can give only approximately the waveband which each coil may be expected to cover, and lets it go at that. To give the newcomer in short wave a coil that will cover, say, three hundred channels as wide as those used in ordinary broadcasting, and ask him to find a station on the dial is a good deal like asking him to find a needle in a haystack. However, with a little patience, and the use of simple division, a set may be readily calibrated after it is once set up and working.

For constant short-wave reception it is absolutely necessary to calibrate the short-wave receiver. Short-wave stations can easily be "logged" on a calibrated set.

HARMONICS AND CALIBRATION

The short-wave beginner is usually surprised to begin picking up broadcast sta-

How to Tune for Foreign Short-Wave Stations

COIL No. TWO
Range 30 to 55 Meters (Approximately)

Dial Reading	Wave-length	Dial Reading	Wave-length
0		26	40.00
1		27	37.04
2	36.01	28	34.26
3	33.50	29	31.64
4	30.85	30	29.16
5		31	26.81
6	31.04	32	24.50
7	31.26	33	22.32
8	31.50	34	20.26
9	31.74	35	18.31
10	31.80	36	16.46
11	32.10	37	14.80
12	32.20	38	13.31
13	32.30	39	11.96
14	32.40	40	10.73
15		41	9.60
16	33.26	42	8.57
17		43	7.64
18	33.23	44	6.80
19		45	6.04
20	34.68	46	5.36
21		47	4.75
22		48	4.20
23		49	3.71
24		50	3.27
25		51	2.88

FIG. 1
How your log sheet might look, when transferred to a graph, intermediate positions on the dial may be obtained.

tions which he cannot find in the short-wave list. What he hears are the harmonics of stations broadcasting on the medium waves between 200 and 550 meters. This is often a nuisance, for they may be poorly modulated, and they are easily mistaken for a foreign station—and sometimes they interfere with wanted foreign stations. The last-named trouble is one which will have to be dealt with, as short-wave broadcasting becomes more general; but at the present time the experimenter will find these harmonics useful for the calibration of his dials.

Each harmonic has a definite wave, just as much so as the broadcast station's fundamental carrier wave. A harmonic must have exactly twice, three times, five times, nine times, etc., the frequency of the fundamental (corresponding, respectively to 1/2, 1/3, 1/5, 1/9, and so on, of the fundamental wavelength). Many of these harmonics can be heard with any short-wave receiver. When one of them is picked up, and the station identified, it is only a matter of division to determine the exact wave to which the receiver is tuned. By checking up a number of these harmonics, and the few known short-wave broadcasters, it is a very simple matter to draw up a calibration curve for each coil of any short-wave set.

Take a sheet of paper for each coil, and number each from top to bottom with figures corresponding to those on the tuning dial or dials, usually 0 to 100. (These numbers do not correspond to the settings of the regeneration dial.) Start with any one of the coils covering a certain waveband; and tune in the first station you come to. If it is a regular short-wave station, mark down its known wave exactly opposite the figure on your chart which corresponds to the dial setting. If the station is one which is not known to have a short-wave transmitter, then it is a safer bet that you have heard a harmonic. Look up the authorized wavelength of the station, and divide it by the number which will bring the result nearest to the wavelength to which the coil should be tuned. For instance, if the coil is rated by the manufacturer as covering from 30 to 55 meters, and your condenser setting is low, you are reasonably sure that the wavelength must be somewhere between 20 and 40

meters. If the station heard is working on a fundamental of 274.9 meters (1,000 kilocycles), you will see that dividing this by nine gives 30.54 meters (9,720 kilocycles) and this is the wavelength of the ninth harmonic, which you are presumably hearing. (The odd harmonics are usually of much greater strength than the even harmonics.)

Mark the wavelength found—30.54—on the proper sheet opposite the condenser dial reading. It is necessary to carry the wavelength out to two places; for a tenth of a meter covers considerable room on a short-wave dial.

Suppose we go up slightly on the dial, and find a harmonic of a broadcast station which is known to be working on 215.7 meters (1,390 kc.). Since the seventh harmonic of this station is 30.81 meters (9,730 kc.) we set down this figure opposite the second dial reading. In this manner we progress until, so far as we are able, we have calibrated the dial from top to bottom on our chart (Figs. 1 & 3); and so with each of the other coils until we are able to determine where any given wave may be tuned-in on our receiver; then we are enabled to search for stations right where they may be expected.

TUNING PROBLEMS

Our task is not ended, however, even when a foreign receiver will be calibrated. We must consider the great sharpness of tuning on short waves; compare it with the broadcast band. In the United States and Canada, about ninety-six broadcast channels are in use—one every ten kilocycles from 550 to 1,500 kc., inclusive. This gives one channel to a division on our dial, and each station therefore corresponds to a different reading. (Fig. 2)

It is not necessary to discuss the relation of kilocycles to meters here except to say that the frequency increases more and more rapidly as the wavelength becomes shorter. Between 15 and 80 meters there is more than sixteen thousand kilocycles separation, or sixteen times the width of the upper broadcast band. The average short-wave set covers this with three or perhaps four coils and as many revolutions of the tuning dial—from 0 to 100. If stations were operated on channels ten kilocycles wide, as in ordinary broadcasting, we would cover three to four hundred of them in one turn of the dial. On the smaller coils, the number is even greater. The station, therefore, covers only a small part of the space between two numbers on the dial. If we skim over the dials in the manner to which we are accustomed in medium-wave tuning, we will pass over many "noises" in our set which are really stations that would give good loud-speaker strength if properly tuned-in.

The proper procedure, therefore, in operating a short-wave set, is to calibrate the receiver in the method illustrated, and make notations where certain desired stations should fall on the dials. Note when these stations may be expected to operate; and tune for them at the proper times, on the proper dial readings. Pick up the signals by the "beat-note" method; that is, set the detector tube oscillating (by turning up the regeneration control) and pick up the carrier-wave or "squeal." After the carrier is found, keep the wavelength or tuning dial set in the exact center of the squeal; and turn the regeneration dial back past the point of oscillation. Then, very slowly, move it up again until the best reception is obtained.

The third point is, how shall we determine what stations to tune for? At the present time, most of the short-wave broadcast station are of an experimental nature, and their wavelengths, as well as schedules, are subject to sudden changes without notice. And, since distance means little or nothing in short-wave reception, the carrier-wave in its longer path is more subject to atmospheric conditions than the nearby medium wave broadcasts. Stations which can be heard with great volume at one season of the year are often unheard at another, regardless of the power which they use. The short waves, also, are peculiarly affected by sunlight; some being reduced in strength, and others greatly increased in volume on the arrival of darkne s.

Since reception is world-wide, means of communication are slow, and no universal language is yet in use, no accurate list of stations can be compiled. For that reason, short-wave fans have grown to depend on each other to keep posted on the various changes which are taking place. Organizations such as the "International Short-Wave Club" and the "Short Wave Scouts", comprising active short-wave fans have recently sprung up. Their

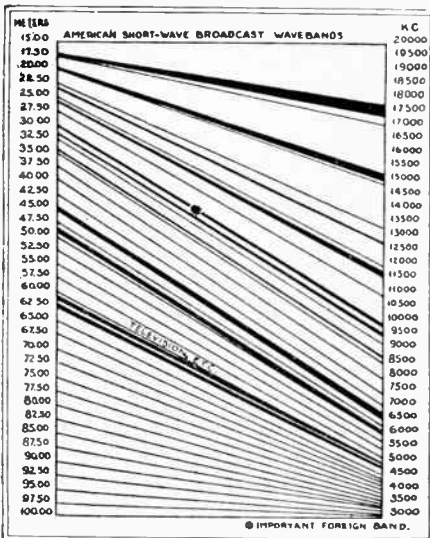


FIG. 2
The bold black bands show the short-wave broadcast channels. Note how they crowd at the lower end of the meter scale.

members gather and exchange the most recent information on short-wave broadcast operation. By this means, timely bulletins are available to members, and new stations are being daily discovered which appear on no lists.

In conclusion, it may be said that reception of short-wave broadcasts directly from overseas is not so difficult as may be imagined; it is a commonplace occurrence today. It is possible to pick up programs in Siamese, Russian, German, Spanish, French and many other languages, in addition to English, to-day.

Now is the time for every radio fan of an enquiring turn of mind to start in this fascinating game; for it is becoming more and more commercialized every day, and the stage of thrills will soon be passed. As it is, the larger stations no longer welcome reports of reception, regardless of the distance covered.

There is, however, much room for experiment on short waves, and who know what developments are forthcoming.

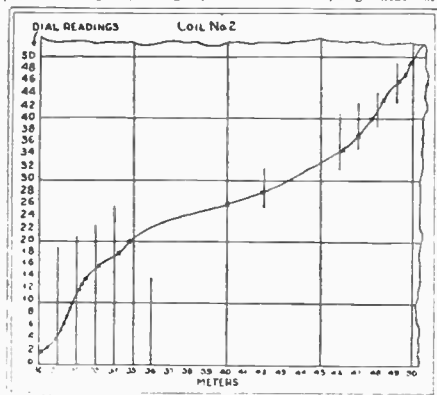


FIG. 3
The notes of the log sheet, transferred to a calibration chart for the coil.

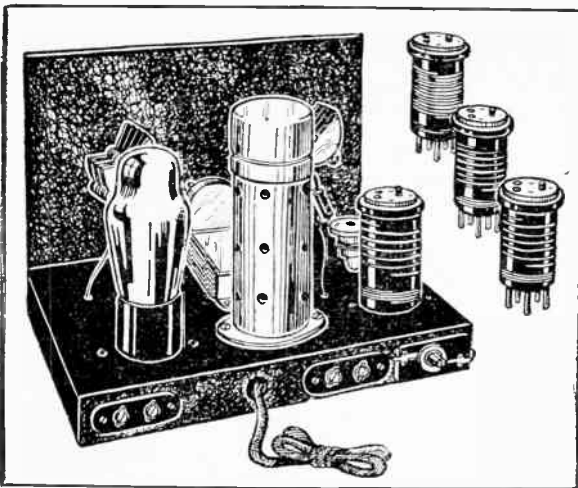
"Band-Spreading"

the 2-tube electrified

DOERLE SET

THE IDEAL RECEIVER FOR THE AMATEUR

See Page 32



It is the purpose of this article to present a method by which the 2 tube electrified Doerle can be revamped to conform with the Ham's most rigid requirements. In order for any set to comply with amateur requirements it is necessary that the set spread the various "Ham bands" over a goodly portion of the tuning dial. Operation in the amateur bands with an ordinary receiver not having band-spread is just about impossible, as the forty meter band, for instance, occupies only about five or six divisions of the dial and with the great congestion on this band this condition would be a very sorry one, indeed.

For the amateur possessing a receiver of an older type and wishing to build something more satisfactory for his purpose, we can very highly recommend this little receiver. It is very economical to construct and will give most gratifying results.

The original 2-tube electrified Doerle receiver used a type 57 detector and a 2A5 as the audio amplifier. While this tube arrangement produced excellent results, it was believed that there could be just a little more audio amplification to bring up these very weak signals. The new set utilizes a pentode amplifier, which will be discussed later.

To introduce band-spread, we made of the new Na-Ald coils recently introduced. These are five-prong coils, having the regulation tickler and grid coil. The grid coil has been tapped and to obtain band-spread the main tuning condenser is connected across only a portion of the inductance. A small padding condenser has been mounted in the top of the coil form and this capacity is connected across the entire coil in order to obtain a stabilized tuning circuit. This capacity is also used to tune the coil so the band will appear in the center of the tuning dial. These band-spread coils are listed separately in this catalog.

For those who have already built the 2 tube electrified Doerle it will be a comparatively simple matter to make the few changes outlined. The first procedure is to remove the four-prong coil socket and the five prong tube socket. The four prong socket will be discarded but the one used for the 56 tube will now be used for the five-prong band-spread coils, and is mounted where the four prong socket was formerly located. It will be necessary to obtain a 6-prong wafer socket to accommodate the 2A5 pentode amplifier tube. This will be mounted in place of the one used before for the 56. Mount the six-prong socket so that the filament terminals are facing the end of the chassis. The five-prong socket will be mounted with the filament holes toward the rear of the base. Mount the 57 tube in its manner with simplify wiring to quite an extent. The rest is easy. Just wire up the two sockets according to the diagram.

For the "Fans" who have not constructed the 2-tube Doerle, this set offers about the ultimate in 2 tube receivers; the builder will be more than thrilled with the results obtainable with this little "bandspread" two-tuber.

It will be noticed that there are two more changes in the new version of the Doerle, viz.: the addition of a potentiometer in the screen-grid of the detector tube, and the 57 detector is provided with a shield. The potentiometer was added because various makes of 57 tubes require slightly different voltages on the screen-grid. And then again on the higher frequency bands, it has been found that a slight change in screen voltage is necessary to obtain smooth regeneration. Then in many cases the builder may not have provisions for adjusting the voltage from the power supply where the potentiometer permits the voltage to be set for maximum sensitivity. The regeneration is then controlled with the throttle condenser.

When using a pentode, such as the 2A5 tube, it is necessary to shield the detector tube in order to prevent feedback between the two stages, which causes the pentode to howl. So don't forget to shield the detector tube! The same 470 ohm biasing resistor that was used in the 56 amplifier of the original set is used for the 2A5. While 500 ohms is the proper value for the 2A5 tube, the 2,000 ohm unit was used to lighten the load on the carbons, when used directly in the plate circuit of the pentode; the 2,000 ohm resistor provided less plate current to pass through the phones and the slight difference in volume is nothing to worry about.

However if an output transformer is available its use is preferred and then, of course, the 2,000 ohm resistor should be used. The by-pass condenser across this resistor should be one with a high capacity, around 20 mf. and with a working voltage of from 20 to 25. This condenser will be necessary if full volume and natural tone is expected from the pentode. Another item that stabilizes the pentode and eliminates "fringe howl" is the by-pass condenser from the plate to the B negative. This condenser also reduces tube hiss to a minimum.

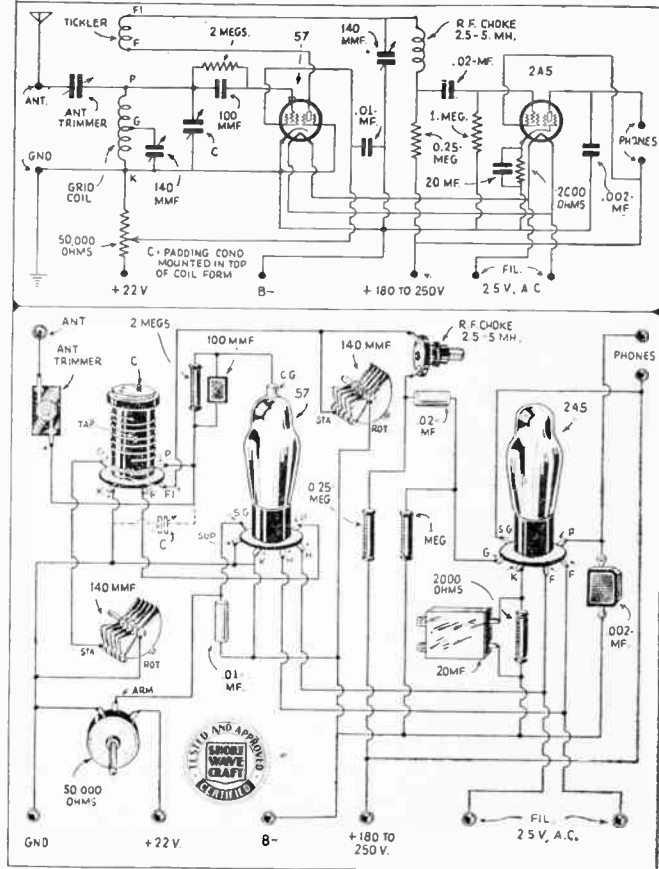
After the set is wired up it is advisable to check all connections to make sure everything is firm and in its right place. Connect the power supply to the set and we are ready to hear some real "tube" performance. Tuning is exactly the same as in the original set, except that the "band-setting" condenser mounted on the top of the coil form will have to be adjusted to bring the desired band within the range of the dial. This only needs to be done once on each coil; after the adjustment has been made no further attention need be given to it.

Any type of antenna will work with this set. The length can be anywhere from 2' to 100 feet. The antenna coupling condenser of course will have to be adjusted for best results. It is best in the beginning to set this condenser to minimum capacity and make adjustments after the "feel" of the set is acquired. As for results—the foreign broadcasts come in on the speaker in most cases and amateurs can be brought in with astonishing volume. A further description of this set will be found elsewhere in this catalog.)

Parts List—2-Tube Doerle Band-Spread

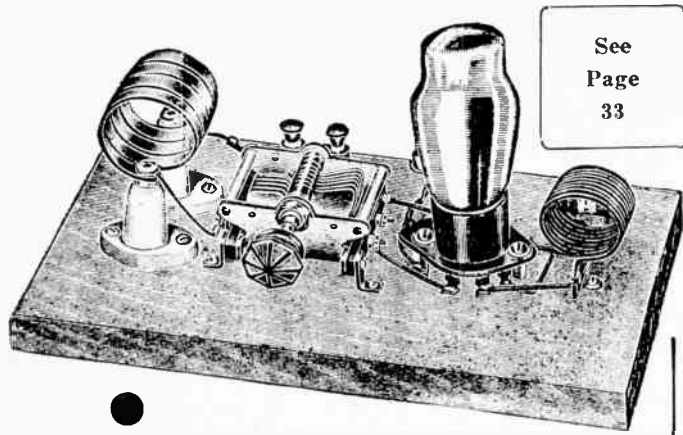
- 1—set of Na-Ald "band-spread" coils.
- 1—drilled metal chassis.
- 2—110 mmf. variable tuning condensers. Hammarlund.
- 1—antenna trimmer (low tin. cap.) 35 mmf. max.
- 1—.001 mf. mica condenser.
- 1—.01 mf. bypass condenser.
- 1—.02 mf. bypass condenser.
- 1—.002 mf. bypass condenser.
- 1—20 to 25 mf. 25-volt electrolytic condenser.
- 1—2 meg. grid-leak.
- 1—1 meg. grid-leak.
- 1—250,000 ohm resistor.
- 1—2,000 ohm resistor.
- 1—50,000 ohm variable potentiometer.
- 1—2.5 to 5 mh. R.F. choke.
- 1—5 prong wafer socket.
- 2—6-prong wafer-sockets.
- 1—antenna-ground terminal strip.
- 1—phone terminal strip.
- 1—5 wire battery cable.
- 1—57 tube.
- 1—2A5 tube.

All of the above parts will be found in this or our regular catalog. The complete receiver, fully wired, will be found on Page 32 of this catalog.



A 5 and 10 Meter Phone and C.W. "Push-Pull" Transmitter

See Page 33



SIMPLICITY is probably the most important item in a short wave transmitter—even more important than cost in most cases. The more parts there are, the more complications and the higher the losses. We present herewith the proverbial "answer" to every Ham's dream—a simple 5 and 10-Meter "Pigmy" Transmitter using but one 53 tube. This is a 1-tube "push-pull" transmitter, paradoxically as that may sound.

LOW-POWER transmitters seem to be the rage lately, especially for use on the ultra-high frequencies. With the advent of the 53 tube which is of the class "B" twin variety, low-power transmitters can be reduced to almost a skeleton and still be made to perform very efficiently on either "CW" or phone.

The 53 operates very nicely as a push-pull oscillator at frequencies as high as 40,000 kc. (5 meters) and has a fair power output when operated with around 300 volts on the plates. In operating condition the 53 acts somewhat differently from other tubes used in push-pull arrangement. And this difference is the plate current drops to a lower value when excitation or feed-back is reduced, and increases when excitation or feed-back is increased. Also the plate current is lowered when the plate circuit is loaded by the antenna. The above actions are due to the fact that the tube is designed to have a very high amplification factor, requiring no "c" bias of any kind. In other words this tube will act very much the same as a low "mu" tube having external bias batteries connected in place of the usual grid-leak resistance.

The 53 also has a 2 volt battery type "brother" which has exactly the same features except that it only requires 12 volts D.C. on the filament and 135 volts on the plates. This tube is known as type 19.

The transmitter shown in the illustration can be constructed using either the 53 or the 19. This 19 of course will have considerably less power output than the 53 on account of its lower plate voltage rating.

How Voice Modulation Is Applied

The outstanding feature of this little transmitter is the method by which voice modulation is applied. Around 70 or 80 per cent modulation can be obtained by inserting an ordinary 200-ohm, single-button microphone in series with the grid return lead. This is made possible by the relatively large amount of "c" grid current drawn by this type tube. It is impossible to connect the customary microphone transformer in this position, because the resistance of the transformer secondary would reduce the plate current to a value where there would be no chance of obtaining enough output to make the set worth while for transmitting.

With 300 volts on the plate, the plate current is around 100 milliamperes when the grid and plate circuits are tuned to resonance. For maximum output, however, the plate circuit is not tuned to the point where the plate current is the highest.

Adjusting for Maximum Output

Maximum output is obtained when the plate circuit is detuned considerably toward the high frequency side of this peak. This reduces the plate current to about 70 milliamperes, but this is still too high for continuous operation and will result in ruination of the tube. Therefore, we must provide more resistance in the grid circuit than the 200 ohms provided by the microphone. This is done by putting a resistor of about 1000 ohms in series with the "Mike." This resistance depends upon the plate voltage. With lower voltages (around 200) no resistor will be required, however it should be large enough to limit the plate current to 60 milliamperes. This value will be still further reduced when the antenna is coupled to the transmitter; a drop of around 10 or 12 milliamperes indicates a reasonable amount of coupling. Effort to obtain more coupling will result in decreased output and may stop the tube from oscillating.

Returning to the bias resistor mentioned above, it will appear, by consulting the diagram that there will be needed a suitable audio frequency bypass condenser across this resistor; a value of about .5 mf. will be satisfactory. Don't connect this condenser from one side of the resistor to B negative, unless the resistor is on the negative side of the "Mike," or there will be no modulation.

The diagram shows a small fixed condenser connected across the "Mike;" this is used only to make sure that there will be no radio frequency current in the microphone or microphone cord, because if there were, handling the microphone would cause changes in the frequency of the transmitter and result in unstable operation or serious frequency modulation. It might be well to state at this point that, under the new regulations, this type of phone transmitter can only be operated in the 5 and 10 meter amateur bands; (and by a licensed amateur operator).

Coils and Tuning Condenser

The diagrams clearly show the sizes and construction of the various coils for the five and ten meter bands. The main tuning condenser can be anything from a 50 to 100 mmf. The one shown in the photograph is a 100 mmf. single stator type. However, it is preferable that this unit be of the split-stator type in order that the rotor section can be connected to the "B" minus. This will eliminate the troublesome body capacity effect encountered in tuning when a single section is used. A bakelite wafer socket is shown, but it is advisable to use an isolantite socket because of its far better insulating qualities at these tremendously high frequencies.

In tuning up this transmitter, do not tune for any particular plate current peak or dip; use a flashlight bulb connected to a single turn loop, and couple this "pick-up" loop to the plate tank coil and adjust the plate tuning condenser until the light glows the brightest. Then check the frequency; if the frequency has to be changed, adjust the grid coil accordingly and retune the plate condenser as before. If the plate current is too high, adjust it to the value mentioned in the first part of this article by changing the value of the grid resistor.

With the above method of tuning it was possible to get this little transmitter to perform as well as the "orthodox" five-meter transmitter, using regular plate modulation with a total of five tubes, including the rectifier, while this one has really only two.

Actual Test

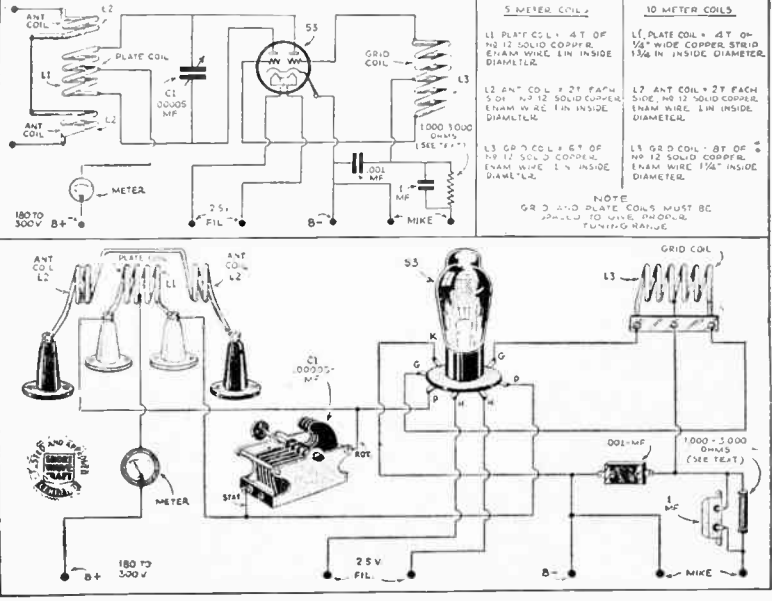
On the five-meter band the author was able to communicate with W2DFU located in Suffern, N. Y., a distance of about 15 miles from the transmitting location. The report was "QSA 5 R 7" on the loud speaker! The quality was reported as comparable with any five meter station received at W2DFU, which isn't so bad

when one considers the speech equipment used on this outfit—or rather should we say the lack of it! The antenna system used was all but the best for this type of work. It consisted of a single 8 foot rod with four foot feelers which is O.K. but it was lying on the floor of an attic not over 20 feet above the earth. So with a good antenna system this set should get out as well as any of the more elaborate types using approximately the same power.

Now let's go back to the type 19 mentioned in the first part of this paper. It can be seen at a glance that this tube should be the ideal thing for portable work when used in the arrangement here brought forth as the "5 and 10 meter transmitter." Using the new light-weight "A" and "C" batteries, it should be possible to construct a very compact one-tube portable transmitter that will do the same work that many another set would when using about three times the number of parts and weighing at least twice as much, not to mention the considerably larger physical size. So go to it lads, and let's see just what can be done with these new tubes, along the line of portable sets working on the ultra high frequencies. This 5 and 10 meter transmitter will be found listed in this catalog.

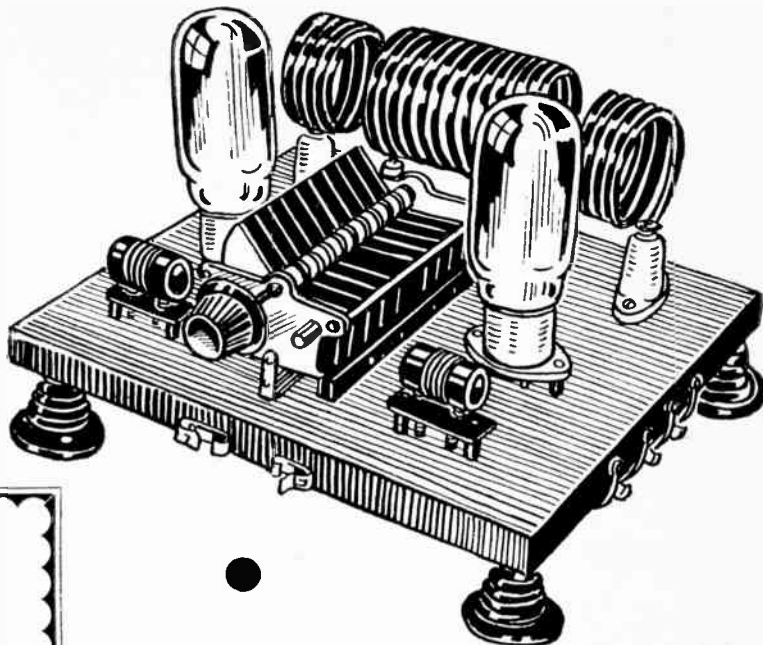
List of Parts

- 1—Variable condenser 50 or 100 mmf. Cardwell "Featherweight."
 - 1—Standoff insulators.
 - 1—53 tube
 - 1—Grid resistor (see text)
 - 1—By-pass condenser, .5 mf. used only when grid resistor is used.
 - 1—Bypass condenser, .001 mf. For microphone (see text).
 - 6—Binding posts.
 - 1—Base board (wood) 6x10 inches.
 - 1—Microphone and stand. Universal
- All these parts will be found listed in this or our regular catalog.



A Medium Power Transmitter

Using New Type Tubes



HERE'S a "nifty" little transmitter. Designed to use any of the popular transmitting triodes—anything from the old 45's to the new 203-A's. Note the simplicity of design and symmetrical arrangement of the component parts. Plenty of DX with an outfit of this kind—weather being favorable or otherwise.

THE average conversation between two newly acquainted amateurs starts off something like this: "How many watts do you get out of your 210's and how red do the plates get?" These words must have been ringing in the tube manufacturers ears and prompted them to put out new tubes having an output rating that is somewhere in between the 210 and the 50 watt (03A) tube. The tubes used in this transmitter are the new type 830, having an output of approximately twice that obtained from the average 210 type tube. This tube does not work with the same voltages as the 210 and therefore one would naturally expect the output to be somewhat higher. The type 830's in this particular transmitter has been used over a period of several months, with 800 volts on the plates, and the transmitter has emitted an extremely steady and pure signal. Due to the construction of the tube, together with its graphite plate, creeping—formerly caused by displacement of elements during changes in temperature of the tube, have been reduced to a minimum. In forming the layout used in this transmitter, a special effort was made

to place the parts so that a panel could be mounted in the front of the back. The usual push-pull layouts do not permit the use of a front panel and still maintain a symmetrical appearance. The tuning condenser is always mounted over to one side or the other and never directly in the center of the panel. By mounting the two tubes on either side of the tuning condenser, as shown in the photograph, it was possible to obtain a perfectly symmetrical layout which facilitates the use of a front panel.

The stand-off insulators supporting the plate tank coil are equipped with jacks to accommodate the banana type plugs, which are attached to each end of the plate coil. This allows easy changing of coils without the application of a pair of pliers. The antenna coils, of course, do not need to be changed and are not of the plug-in type. They are spaced about one inch from the plate tank coil and may be turned at various angles relative to the plate tank, in order to obtain a proper degree of coupling. Looking at the top side of this transmitter, we will see

that the R.F. plate choke, plate by-pass condenser, grid-leak, together with the filament by-pass condenser and center-tapped filament resistors have been incut on the underside of the board.

Referring to the circuit diagram it will be seen that a 10,000 ohm grid-leak is used and this proved to be the optimum value. Filament by-pass condensers are shown, although in many cases they may not be necessary. In this particular transmitter it was found that .001 mf. condensers gave a decidedly improved signal.

After this transmitter is completely wired and the coils are constructed as shown in the attached coil table, the plate tank condenser should be adjusted for a minimum of plate current. At this point a monitor should be used in checking the frequency. If the frequency is too low it is permissible to detune the plate-tank condenser to the high frequency side of resonance with the grid coil. Never tune the plate tuning condenser to the low frequency side of resonance with the grid coil, or a "poor quality" signal, with instability, will result! In other words the grid coil should be constructed so that resonance with a plate coil is at a lower frequency than the frequency on which one desires

to work. After the transmitter has been adjusted to the approximate frequency at which you wish to work, attach the antenna feeder to the antenna coils. Tune the antenna condenser or condensers, whichever the case may be, until the plate current rises to a value of about 100 mls. (M.A.). Now loosen the coupling between the antenna and plate coils until the antenna condenser can be rotated through resonance with the plate current reaching a value not higher than about 125 milliamperes. With the transmitter adjusted as outlined above, you should obtain a pure D.C. signal, very closely approaching the stability of the crystal. In fact "crystal" reports have been obtained with this transmitter.

Coil Table for Transmitter

Grid coils "close wound" on 1 inch dia. bakelite tube.

20 meters 7 turns No. 28 D.S.C. each coil.

40 meters 18 turns No. 28 D.S.C. each coil.

80 meters 35 turns No. 28 D.S.C. each coil.

Plate coils.

20 meters 4 turns

40 meters 6 turns

80 meters 12 turns

Antenna coils have 4 turns each of 3/16 copper tubing wound with an inside diameter of 2 1/4 inches.

Plate coils made of 1/4 inch copper tubing inside diameter of coil is 2 1/2 inches.

Parts for Transmitter

1.—set of coils (see coil table)

1—.00041 to .0005 mf. transmitting condenser (Hammarlund, Cardwell)

2—.001 mf. fixed (mica) transmitting condensers (2,000 vt.)

2—.001 mf. fixed (mica) transmitting condensers (2,000 vt.)

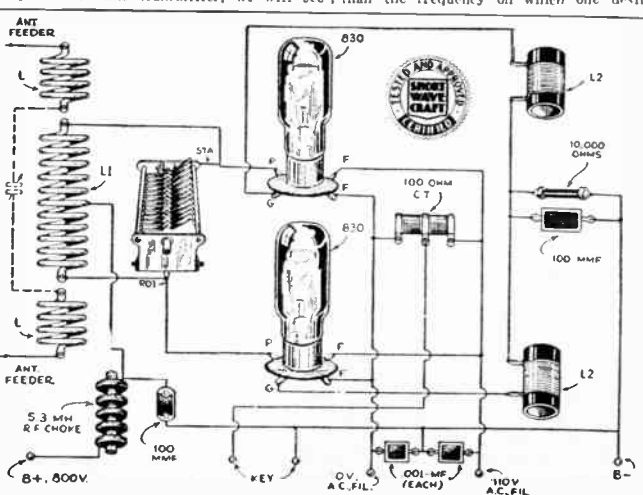
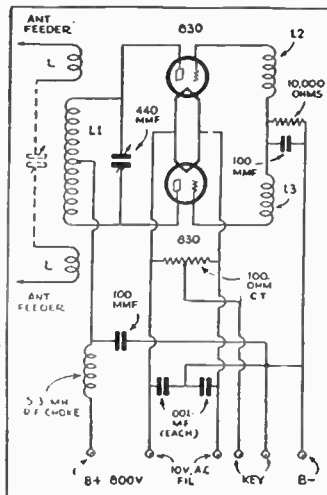
1—100 ohm C.T. resistor.

1—10,000 ohm 20 watt grid-leak.

2—4 prong isolantite sockets (Hammarlund)

2—type 830 tubes. Sylvania.

These parts will be found either in this or in our regular catalog.



Short-Wave Transmitting Antennae

MANY Amateur Radio operators are in difficulty when it comes to erecting efficient antenna systems for their transmitters. Some are not fortunate enough to have "back yard space." Others are hindered by power lines and other nuisances which prevent them from "getting out."

In this article we will try to clear up one of the outstanding faults of amateur radio equipment.

Proper Insulation Important

A properly insulated antenna will increase the efficiency of any transmitter. Antenna systems should be erected in the open if possible. Wire for both antenna and feeders should be of single strand copper, No. 12 gauge. No. 14 wire may be used if No. 12 cannot be

secured. Feeder wires should be kept at least a foot and one half from buildings and wires. Insulators should be used and these should be fastened together for insulating one end of the antenna. Never connect transmitting antennas to metal poles. The antenna current will be absorbed by the pole, and there will be a change in frequency for which it is hard to compensate.

The 80 meter band is usually the most popular for the beginning "Ham," and therefore all antenna data is given for this band. Of course, if higher frequencies are to be used, changing the given antenna lengths by 2 will be for the 40 meter band, and by 4, the 20 meter band. A transmitter may be operated on a fundamental wavelength of say 40 meters, and yet the antenna may be of 80 meter length. The transmitted note will be in the 40 meter band, but as a harmonic of the antenna.

The "Zepp" Antenna

Figure 1 illustrates the Zepp Antenna. It is well known among amateurs and is one of the most popular types. It is a non-directional type of antenna and works well on any band.

The "Flat top" should be as high as possible. An angle of 90° should be made between the antenna and feeders for at least one third of the total feeder length. The "spacers" between the feeders can be small wooden sticks, 1/2" x 1/2" x 12". Pine, which has previously been boiled in paraffin, is preferred. Glazed Porcelain or Isolantite would serve most excellently. On each end a slit of one inch is cut, so that the feeder wire will fit tightly. To prevent the "spacers" from slipping, a small nail may be driven in the end after the wire is placed in the slit.

The Single Wire Feed antenna is shown in figure 2. This system is used mainly on the T. N. T. (tuned plate, fixed tuned grid) circuit and similar circuits.

Cut the antenna to length and then double it. Mark the wire at this point. From here measure exactly 18 feet and attach the feeder. It should be well soldered and made secure, or it will change frequency if moved. Figure 3 shows one of the current feed systems. It is a well balanced antenna and is easily erected. The "spacers" are the same as described in figure 1. An angle of 90° must also be kept between the "flat top" and the feeder wires.

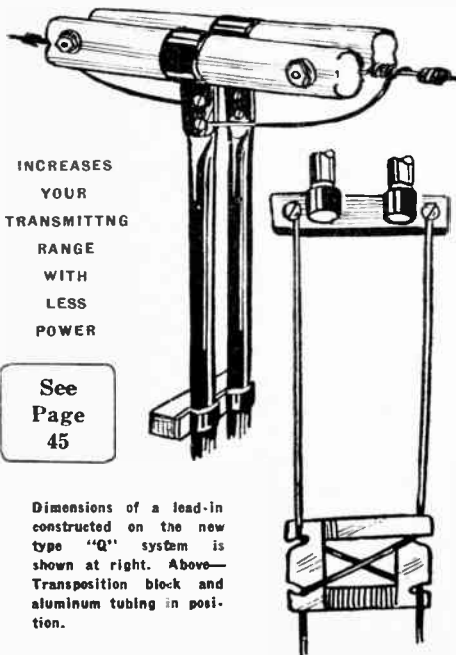
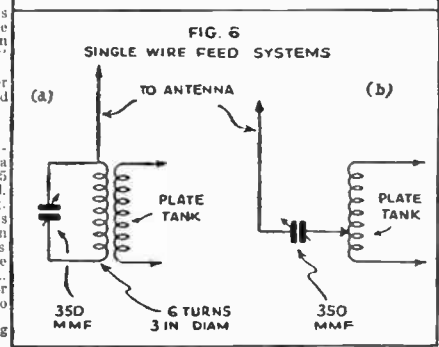
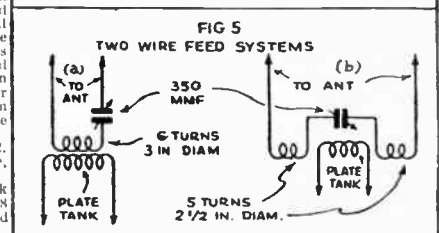
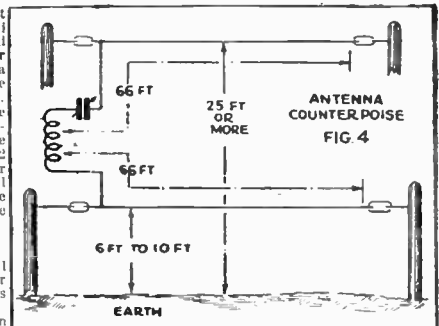
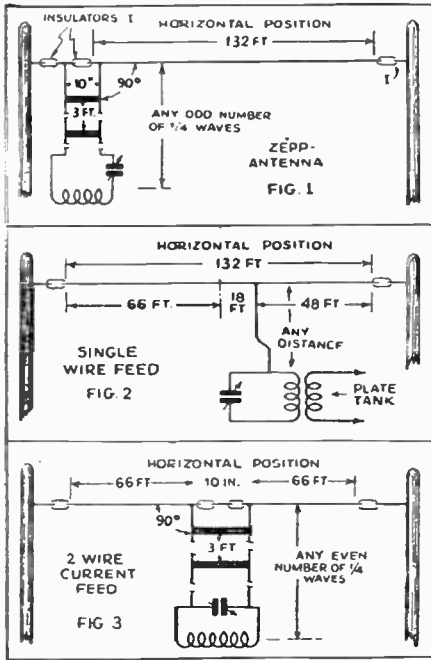
The Antenna-Counterpoise system, figure 4, is another great favorite, especially with those who live in crowded cities.

Current Versus Voltage Feed

Figure 5 illustrates two kinds of Current Feed Coupling. (a) uses a single coil and works on any antenna except the single wire voltage feed antenna. Figure 5 (b) is the best known hookup and is highly recommended.

Figure 6 illustrates two kinds of Voltage feed coupling. These couplings are to be used on single wire feed systems only. (a) is the best type and will insure protection against illegal coupling. (b) is a common type but is very dangerous. A very good variable condenser must be used in the antenna circuit to prevent short circuit. Direct coupling between the antenna and the transmitter is illegal in the United States. (This does not apply to Hertzian antennas.)

The antenna coils may be made from 1/4" copper tubing or from No. 12 wire wound on a cardboard tube.



Antenna Impedance-Matching Link

MATCHING radio frequency feed-lines to transmitting antennas has always been quite a problem to the amateur. It is a well-known fact that the amount of energy transferred from the feed line to the antenna proper, is entirely dependent upon the degree of impedance matching between the transmission line and the antenna. The illustration clearly shows a new commercial feed-line impedance-matching system which should find much favor among the transmitting amateurs.

The entire antenna system when using this impedance-matching device, is a half-wave, current-feed doublet. While not the most flexible antenna system that can be constructed the doublet is one of the most efficient. The method of matching consists of placing two aluminum (or copper) tubes, 1/2 wavelength long, in parallel and separated approximately 1 1/2". These tubes are 1/2" in outside diameter and are held parallel by small insulating blocks with adjustable clamps. The spacing between these two tubes must be varied so that compensation can be made for various changes in the main feed-line such as wire size, and spacing between the parallel wires.

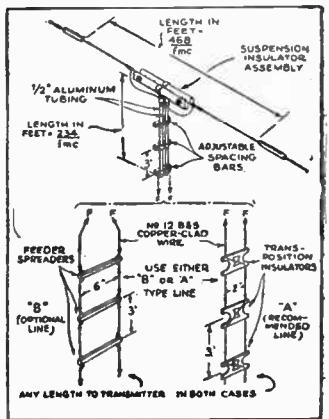
This system is extremely light in weight and no difficulty should be experienced in supporting it with the antenna wire alone. However copper clad, rather than solid copper wire, is recommended because of the greater strength of copper-clad wire over solid copper, thus ensuring less stretching due to the weight of the feeder system. The impedance-matching section is termed quarter-wave but its exact physical length is only 90% of that length.

One can readily appreciate the value of such a matching system when we find that the impedance of the average transmission line using a pair of No. 14 conductors spaced six inches apart is approximately 629 ohms and the impedance of a half-wave antenna is only 75 ohms. When we study the above figures we can readily see that most amateur stations have been depending entirely upon "brute force" because the actual radiation of an antenna with no matching device is 50% less than that obtained with a system such as outlined herewith.

The length of the main feed line connected to the aluminum rods is not important and no appreciable losses have been experienced with lengths up to several hundred feet.

Transposition blocks or regular spreaders can be used in supporting these transmission wires.

YOUR short-wave receiver or transmitter is no better than the antenna with which it is used. A complete line of short-wave receiver and transmitting antenna equipment will be found in the pages of this catalog.



AIR COOLED VACUUM TUBES

Type	Purpose or Use	Filament Volts	Filament Amperes	Normal R. F. Output, Watts	Voltage Amp. Factor	Plate Resistance, Ohms	Mutual Cond. Micro-mhos	STATIC CHARACTERISTICS				CLASS A OPERATION			
								Plate Volts	Screen Volts	Grid Bias Volts	Plate Current Amperes	Plate Volts	Screen Volts	Grid Bias Volts	Plate Current Amperes
102D	Voltage Amp.	2.25	.95		30	60000	500	130		1.5	.0007	150		3	.00026
203A	Osc. and R. F. Amp.	10	3.25	100	25	6000	4200	1000		10	.072				
201A	Osc. and R. F. Amp.	11	3.85	350	25	6300	4000	2000		32	.125				
205D	A. F. Amplifier	4.5	1.6	5	7.3	3750	1950	350		20	.035	370		30	.050
210	Osc. and Amp.	7.5	1.25	15	8	5450	1550	425		39	.018	600		58	.018
211	General Purpose	10	3.25	100	12	3400	3530	1000		50	.072	1000		52	.065
211B	General Purpose	10	3.25	100	12	3400	3530	1000		50	.072	1000		52	.065
211C	General Purpose	10	3.25	100	12	3400	3530	1000		50	.072	1000		52	.065
242A	A. F. Amplifier	10	3.25	100	12.5	3500	3600	1000		52	.072	1000		50	.085
261A	General Purpose	10	3.25	100	12	3400	3530	1000		50	.072	1000		52	.065
264A	A. F. Amplifier	1.5	.300		7.0	11800	595	100		7.0	.0026	100		7.0	.0026
276A	General Purpose	10	3.0	100	12	3400	3530	1000		50	.072	1000		52	.065
825	High Frequency Osc. and Amp.	7.5	3.25	40	10	10000	1000	1000		70	.040				
830	Osc., Amp. and Mod.	10	2.15	40	8	4000	2000	425		35	.020	425		35	.020
831	Oscillator and R. F. Amplifier	11	1.0	550	14.5	6450	2250	3000		121	.133				
841	Osc. and V. Amp.	7.5	1.25	15	30	63000	450	425		6	.0007	1000		9	.0022
842	A. F. Amplifier	7.5	1.25	7.5	3	2500	1200	425		100	.028	425		100	.028
848	A. F. and R. F. Amp.	2.5	2.5	7.5	7.7	4800	1600	425		35	.025	425		25	.025
844	Osc., Amp. and Mod.	2.5	2.5	5	75	125000	600	500	180	6	.013	425	180	45	.028
845	Mod. and A. F. Amp.	10	3.25	100	5	1800	3000	1000		147	.075	1000		147	.075
849	General Purpose	11	5.0	500	19	3200	6000	3000		132	.100	2500		104	.110
850	Oscillator and R. F. Amplifier	10	3.25	100	550	200000	2750	1000	200	0	.0195				
851	General Purpose	11	15.5	1250	20	1400	15000	2000		65	.300	2000		65	.270
852	Oscillator and R. F. Amplifier	10	3.25	100	12	10000	1200	2000		108	.050				
860	Oscillator and R. F. Amplifier	10	3.25	100	200	180000	1100	2000	500	30	.050				
861	Oscillator and R. F. Amplifier	11	10	550	300	143000	2100	3000	750	20	.130				
865	Oscillator and R. F. Amplifier	7.5	2.0	15	150	200000	750	500	125	0	.018				

WATER COOLED VACUUM TUBES

207	Osc. and R. F. Amp.	22	52	6000	20	3500	5700	10000		310	.750				
820B	Osc. and R. F. Amp.	22	34	5000	16	4000	4000	7500		300	.400				
846	Short Wave Osc.	11	51	1400	40	18500	2160	6500		50	.250				
858	Osc. and R. F. Amp.	22	52	10000	42	8700	4800	18000		155	.750				
863	Osc. and R. F. Amp.	22	52	15000	50	7200	7000	10000		20	.750				

RECTIFIERS

				Max. Peak Inv. Volts	Max. Peak Plate Curr.	Type of Cooling
217A	Half Wave Rect.	10	3.25	3500 Volts	0.600 Amps.	Air
217C	Half Wave Rect.	10	3.25	7500 Volts	0.600 Amps.	Air
866	Half Wave Rect.	2.5	5	7500 Volts	0.600 Amps.	Air
866A	Half Wave Rect.	2.5	5	10000 Volts	0.600 Amps.	Air
872	Half Wave Rect.	5	10	7500 Volts	2.5 Amps.	Air
872A	Half Wave Rect.	5	6.75	10000 Volts	2.5 Amps.	Air
869	Half Wave Rect.	5	20	20000 Volts	5.0 Amps.	Air
869A	Half Wave Rect.	5	20	20000 Volts	5.0 Amps.	Air

GRID CONTROLLED RECTIFIERS

867	Gen. Industrial	2.5	3.75	1000 Volts	0.600 Amps.	Air
873	Gen. Industrial	5	7.5	1000 Volts	2.5 Amps.	Air

Notes: *Grid Connects to Cap at Top of Tube. †Low Interelectrode Capacity.

AIR COOLED VACUUM TUBES

Type	CLASS B OPERATION				CLASS C OPERATION				Max. Grid R. F. Amps.	Type of Base	Type of Filament	Maximum Overall Dimensions in Inches
	Plate Volts	Screen Volts	Grid Bias Volts	Plate Current Amperes	Plate Volts	Screen Volts	Grid Bias Volts	Max. Plate Current Amperes				
102D										Special 4-Pin	Coated	2 3/8 x 4 1/2
203A	1000		35	.130	900		180	.175	7.5	Std. 50 Watt	Thoriated	2 3/8 x 7 3/8
204A	2000		70	.160	2000		175	.275	10	Std. 250 Watt	Thoriated	4 1/8 x 14 3/8
205D	350		46	.050	400		80	.050	2	Special 4-Pin	Coated	2 3/8 x 4 1/2
210	600		80	.066	600		125	.070	5	Medium 4-Pin	Thoriated	2 3/8 x 5 5/8
211	1000		75	.130	1000		200	.175	7.5	Std. 50 Watt	Thoriated	2 3/8 x 7 3/8
211B	1000		75	.130	1000		200	.175	7.5	Std. 50 Watt*	Thoriated	2 3/8 x 8 3/8
211C	1000		75	.130	1000		200	.175	7.5	Std. 50 Watt†	Thoriated	2 3/8 x 7 3/8
242A									7.5	Std. 50 Watt	Thoriated	2 3/8 x 7 3/8
261A	1000		75	.130	1000		200	.175	7.5	Std. 50 Watt	Thoriated	2 3/8 x 7 3/8
264A										Small 4-Pin	Coated	1 3/8 x 4
276A	1250		100	.130	1000		200	.175	7.5	Std. 50 Watt	Thoriated	2 3/8 x 7 3/8
825					1000		150	.080	5	Medium 4-Pin, Grid and Plate Caps	Thoriated	2 3/8 x 6 1/8
830	750		70	.060	750		180	.110	6	Medium 4-Pin	Thoriated	2 3/8 x 5 3/8
831	3000		185	.167	3000		300	.350	10	Std. 250 Watt and Flex. Lead	Thoriated	6 3/8 x 17 1/8
841	450		8	.036	450		30	.060	5	Medium 4-Pin	Thoriated	2 x 5 5/8
842					350		150	.060	5	Medium 4-Pin	Thoriated	2 x 5 5/8
843	350		40	.020	350		100	.040	2	Medium 5-Pin	Heater	2 x 5 5/8
844	500	150	5	.020	500	150	7	.030	2	Medium 5-Pin	Heater	2 3/8 x 6 1/8
845					1000		250	.175	7.5	Std. 50 Watt	Thoriated	2 3/8 x 7 3/8
849	2000		95	.260	3000		600	.350	6.7	Std. 250 Watt	Thoriated	4 1/8 x 14 3/8
850	1000	175	8	.100	1000	175	150	.175	7.5	Std. 50 Watt and Plate Cap	Thoriated	2 3/8 x 8 1/2
851	2000		85	.475	2000		200	1.0	10	Std. 250 Watt	Thoriated	6 3/8 x 17 3/8
852	2000		150	.060	2000		250	.100	10	Med. 4-Pin, Grid and Plate Leads	Thoriated	4 1/8 x 8 3/8
860	2000	300	50	.060	2000	300	200	.100	10	Med. 4-Pin, Grid and Plate Leads	Thoriated	4 1/8 x 8 3/8
861	3000	500	60	.167	3000	500	200	.350	10	Std. 250 Watt and Flex. Leads	Thoriated	6 3/8 x 17 1/8
865	750	125	30	.022	750	125	75	.060	5	Medium 4-Pin and Plate Cap	Thoriated	2 3/8 x 6 1/8

WATER COOLED VACUUM TUBES

207	13500		700	900	9000		2000	1.0	20	‡	Tungsten	5 x 20 1/2
820B	6400		390	470	10000		960	1.2	20	‡	Tungsten	3 1/2 x 16
846	7000		150	450	5400		400	0.5	20	‡	Tungsten	3 1/2 x 9
858	18000		350	1.0	14400		3500	1.0	40	‡	Tungsten	6 1/2 x 24 1/2
863	12000		250	900	12000		2000	2.0	30	‡	Tungsten	6 1/2 x 20 1/2

RECTIFIERS

GENERAL INFORMATION												
217A		High Vacuum								Std. 50 Watt	Thoriated	2 3/8 x 7 3/8
217C		High Vacuum								Std. 50 Watt	Thoriated	2 3/8 x 8 1/2
866		Mercury Vapor								Medium 4-Pin	Coated	2 3/8 x 6 3/8
866A		Mercury Vapor				Shielded Filament				Medium 4-Pin	Coated	2 3/8 x 6 3/8
872		Mercury Vapor								Std. 50 Watt	Coated	2 3/8 x 7 3/8
872A		Mercury Vapor				Shielded Filament				Std. 50 Watt	Coated	2 3/8 x 8 3/8
869		Mercury Vapor								Std. 250 Watt	Coated	5 1/8 x 14 3/8
869A		Mercury Vapor				Shielded Filament				Std. 250 Watt	Coated	5 1/8 x 14 3/8

GRID CONTROLLED RECTIFIERS

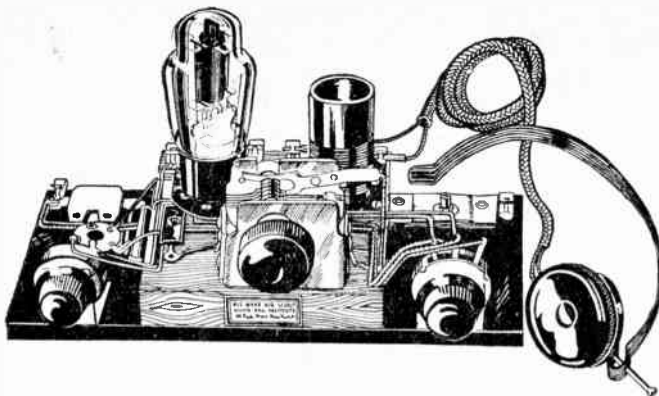
867		Mercury Vapor				Grid Bias 2 0--3 5 Volts				Medium 4-Pin	Coated	2 3/8 x 6 3/8
873		Mercury Vapor				Grid Bias 3 0--6 0 Volts				Std. 50 Watt	Coated	2 3/8 x 7 3/8

†Sold Without Water Jacket.

The Boy's All-Wave Air Scout Kit

REQUIRES NO RADIO KNOWLEDGE TO BUILD

- POLICE CALLS
- AMATEUR CALLS
- FOREIGN RECEPTION
- QUIET BATTERY OPERATION
- ONLY ONE TUBE
- RANGE 10 to 550 METERS



COMPLETE—NOTHING ELSE TO PURCHASE

- EXTREMELY SIMPLE TO BUILD
- HIGHLY SENSITIVE
- POWERFUL—SELECTIVE
- MODERNISTIC DESIGN
- ECONOMICAL OPERATION
- COMPLETE INSTRUCTIONS & DIAGRAM

This wonderful little set has been designed especially for short-wave fans who are just getting started in the radio art. With this in mind, the circuit has been made so simple and so fool-proof that one cannot possibly make any errors. A complete set of detailed instructions and pictorial illustrations permits this receiver to be assembled in a very short time. This is the ideal way of getting the "low-down" on radio—BY ACTUAL PRACTICE.

This powerful little set brings in all standard broadcast stations, as well as police calls, amateur pleasantries, foreign stations, code, commercial phone stations and many foreign broadcast programs. A letter from one of our customers lists GSB and GSA England; PHI Holland; DJA Germany and HJLABB Columbia, S.A., as being among the many which he has already received. The inexpensive batteries will last for many months without replacement.

Realizing that schematic diagrams are of little or no use to the beginner, we have made provisions to have each individual part of the kit properly color coded so that it is but necessary to connect red to red, black to black, etc., in the wiring operation. If this color coding is implicitly followed, you will be surprised to find that the set will work "right off the bat" when the batteries are connected and the tube inserted. This

very same receiver is being used by thousands of Boy Scouts and other young boys organizations who are rapidly becoming more and more interested in this intriguing hobby.

The complete kit includes, one plug-in coil, all component parts, base, pedestal, hardware, single earphone and concise instructions. The hardware is attractively painted in modernistic design. Five plug-in coils are made to cover the range of from 10 to 550 meters as follows; coil No. 1—200 to 550 meters; coil No. 2—70 to 200 meters; coil No. 3—40 to 80 meters; coil No. 4—15 to 45 meters; coil No. 5—10 to 20 meters. Coil No. 1 is furnished with the set. Coils 2, 3, 4, and 5 may be obtained at an additional price of 40¢ each. Batteries required for operation are two No. 6 dry cells and one 45 volt "B" battery. Shipping weight, 4 lbs.

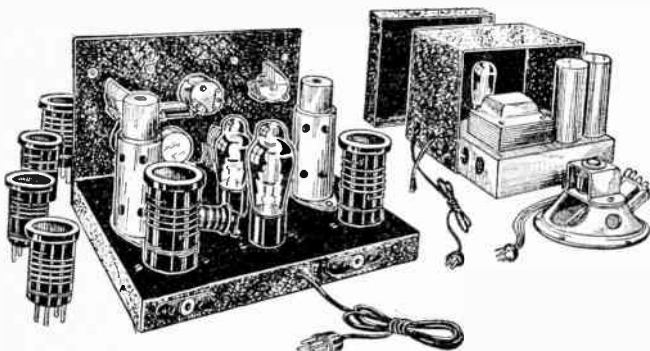
LOWEST PRICED ALL-WAVE KIT IN THE WORLD

Cat. No. S-214 All-Wave Air Scout Kit. Less tube, but including plug-in coil and earphone.

YOUR PRICE ONLY **\$4.75**

No. S-619 Type 30 Tube. YOUR PRICE **\$0.75**

A REAL GO-GETTER



5 Tubes—Completely A.C.—Nothing Else To Buy

All stations come in with real loud speaker volume—on a 6" dynamic speaker which is furnished with the receiver. Dual regeneration for C.W. reception as well as for phone, is one of the many features. The receiver employs 1-58 high-gain R.F. stage followed by a type 57 screen grid detector. The detector is then resistance-coupled to the 56 first audio tube and thence to the powerful 2A5 power output tube. It is the use of this latter tube which affords dynamic speaker operation. Each tuned circuit is independently controlled, thereby improving sensitivity tremendously. Elusive short-wave stations are brought in just as easily as if they were coming from around the corner.

Only the best of parts are employed; for instance, octagonal-ribbed plug-in coils (2 sets, 4 coils per set), genuine Hammarlund variable condensers, special vernier variable condenser, Hammarlund R.F. chokes, R.M.A. color-coded resistors, etc. The R.F. and detector tubes are fully shielded as is the specially designed short-wave power pack which is enclosed in a handsome black, crackle-finish metal housing. The connections between receiver, speaker and power pack are obtained through the medium of convenient connection plugs. The receiver itself is constructed on a beautiful black, crackle-finish chassis. The tuned circuits are controlled by high-ratio Kurz Kasch vernier dials. The small vernier condenser aids materially in the separation of crowded stations inasmuch as it affords extremely precise tuning. This receiver may be had either in kit form or completely assembled ready to use. Set measures 8" deep x 10 1/2" wide x 7" high. Power pack measures 6 1/2" deep x 5" wide x 7 1/2" high. Shipping weight, 20 lbs.

No. S-219 Five-Tube "Go-Getter" A.C. Short-Wave Receiver In Kit Form Less Tubes But Including Power Pack and Speaker. **\$19.25**

No. S-220 Five-Tube "Go-Getter" A.C. Short-Wave Receiver Completely Wired Including Power Pack and Speaker But Less Tubes. **\$23.50**

No. S-222 Set of Six Months Guarantee Tubes Comprising 1-58; 1-57; 1-56; 1-2A5 and 1-80. **\$3.40**

ABSOLUTELY FREE!



Your choice of this or any other of the free short-wave books listed on other pages may be had—FREE OF CHARGE—with the purchase of any one of the short-wave receivers listed in this catalog. Please understand that only one book is given with any one set. If you purchase two receivers; you are entitled to two books. "The Short-Wave Beginners Book" is one that will solve your problems if you are new in the short-wave game. Contains everything you desire to know in regard to short waves, from the early stages up to the present state of the art. Contains 40 pages and over 75 illustrations. Makes an excellent reference book for regular short-wave fans.

FARADAY THREE-TUBE A.C. SHORT-WAVE RECEIVER

For 110 Volts, 50-60 Cycle A.C. Operation
Range 15 to 200 Meters

For an A.C. short-wave receiver, this wonderful set is unsurpassed. The usual trouble occasioned with short-wave sets operated from A.C. was the excessive noise and hum which originated in the power pack.

These disturbances have all been eliminated so that now hum-free signals may be received which are comparable in every respect to signals intercepted by battery receivers.

Only three tubes are used; one of which is a type 80 rectifier. The new Triple Grid 58 tube is employed as a regenerative detector and the type 56 as a power tube.

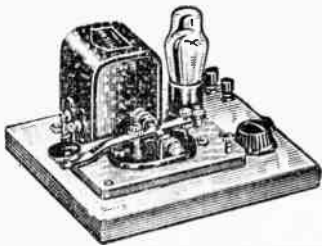
The amplification obtained from these new tubes and the regeneration produced is more than sufficient for extra loud earphone volume. In fact, many local stations and even a few distant stations may be obtained on the loudspeaker.

Four plug-in coils are used to cover the wave length band of from 15 to 200 meters. In ordinary regenerative short-wave circuits using the old type tubes, the quality of the signal is slightly impaired as the regeneration control is advanced towards the point of oscillation. In this receiver, however, the quality does not suffer inasmuch as the high voltage-amplification factor of the type 58 Triple Grid tube makes it unnecessary to advance the regeneration control to the very limit of non-oscillation. This is quite an important advantage and should not be overlooked. This means a considerably larger amount of undistorted volume than is obtainable with a battery receiver of the same number of tubes.

The chassis is housed in a handsome black, crackle-finish case with illuminated vernier tuning dial. The case measures 11" x 6 1/2" x 7". Ship. wt. 11 lbs.

List Price \$27.50

No. S-7350 Faraday Three-Tube A.C. Short-Wave Receiver, less tubes **\$15.95**
YOUR PRICE



LEARN CODE THIS REAL WAY

This little device is not a sounder nor is it a high frequency mechanical buzzer, but an honest-to-goodness audio-frequency oscillator which emits a signal comparable in all respects to the one heard on the air. This signal may be regulated from approximately 300 to 4000 cycles so that a note can be chosen which is most comfortable for the ear. This audio oscillator consists of a 230, 2-volt tube which, through the medium of an audio transformer is made to oscillate at audio frequencies. Provisions are made for attaching headphones into the circuit. All component parts including the telegraph key are mounted on a metal sub-chassis. Requires but 2 No. 6 dry cells and a pair of earphones to operate. The use of an audio-oscillator is the only logical and the only real way of learning the code since the signal produced is exactly the same as the one which the learner will be hearing later on under actual operating conditions.

Shipping weight, 7 lbs.
 No. S-246 Code Oscillator Less Tube and Head-phones. **YOUR PRICE \$2.75**
 No. S-1679 Feather-weight Headphones. **YOUR PRICE \$1.05**
 No. S-618 One 230 Tube. **YOUR PRICE \$0.70**

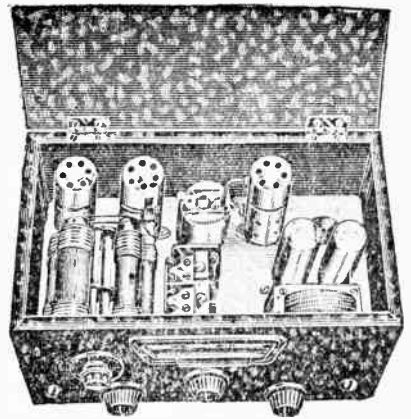
10 TO 200 METERS WITH NO PLUG-IN COILS

- Full-Tuning Scale on Each Band
- Beautiful, Crystal-Finished Cabinet
- Tunes Down to 10 Meters
- Built-in Power Supply
- Hinged Top

This particular unit is more sensitive than the average run of converters inasmuch as it contains a stage of radio frequency amplification ahead of the oscillator and mixing tubes. Can be operated in conjunction with any type of receiver including super-heterodynes.

Will make any good broadcast receiver a super-sensitive short-wave super-heterodyne. No need to purchase an expensive short-wave set—merely connect this converter to your broadcast receiver and secure World-Wide Short-Wave Reception.

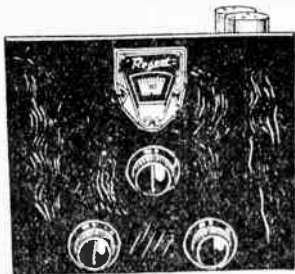
CONTAINS FEATURES FOUND IN NO OTHER LOW PRICE CONVERTER. Incorporates the "Best" coil and switch assembly, which spreads each band across the entire dial scale, producing the ease of tuning of your broadcast receiver. A stage of intermediate frequency amplification is included, producing ample gain even with relatively insensitive receivers and providing perfect coupling between the converter and receiver. A built-in power supply prevents overloading the receiver, and insures correct operating voltages. Effectively isolates the circuits in the two units. Carefully planned throughout by experts with years of short wave experience. Tested component parts prevent breakdown—insuring long trouble-free service.



ADAM'S 4 Tube Super-het Short Wave Converter

The entire chassis is placed into a beautiful crystal finished cabinet. Hinged cover permits access to chassis. Uses 1-56; 2-58's; and 1-80 tubes. Measures 8 1/2" x 13 1/2" x 8 1/2". Shipping weight, 18 lbs.

No. S-248 4-Tube Adam's Super-Het Short-Wave Converter In Kit Form, Including Blueprint. **YOUR PRICE \$17.95**
 No. S-249 4-Tube Adam's Super-Het Short-Wave Converter, Completely Wired. **YOUR PRICE \$22.95**
 No. S-250 Set of Matched Tubes, 1-56; 2-58; 1-80. **YOUR PRICE \$2.75**



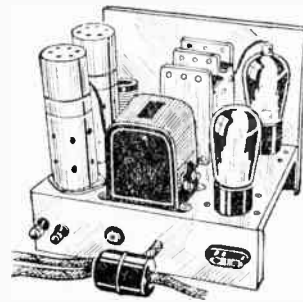
The "Regent-Four" Receiver

See
Page 9

Economical 2-Volt
Operation

Here is a novel short-wave receiver using a new tube especially designed for short waves and a new scheme of equalizing regeneration and simplifying the operation of the set. The short-wave fan who has been troubled by lack of oscillation on certain parts of the wave-band covered by plug-in coils will welcome this new receiver. It employs the new S-30 tube which has similar characteristics to the regular 30 except for a much lower internal capacity. This is accomplished by bringing the plate terminal out of the top of the glass bulb. This reduction in the internal capacity facilitates oscillation on the very low wave lengths and also make the regeneration control much smoother.

Another outstanding feature of this receiver is that it automatically stabilizes regeneration at all times, keeping the set below the point of oscillation—AT WHICH POINT IT IS MOST SENSITIVE. Uses 4 tubes namely, 1-34 R.F. pentode, 2-S-30's and 1-233 power pentode output tube. In actual performance it will equal and in many cases even surpass 5 and 6 tube receivers. Three 45 volt "B" batteries and two No. 6 dry cells must be employed. These dry cells will last a long time because of the low current consumption of the tube. Incorporates a high ratio vernier dial. Four plug-in coils tuning from 15 to 200 meter are furnished with the set. All com-



ponent parts are of the highest quality including Hammarlund variable condensers. These parts are all mounted on a metal base, the front panel of which is beautifully finished in black crystalline. Measures 7 1/2" x 8 1/2" x 7". Shipping weight 15 lbs.

TWO-VOLT EQUI-Regenerator Battery-Operated SHORT WAVE RECEIVER

15 to 200 Meters

SPECIFICATIONS

No. S-251 4 Tube Regent Short-Wave Receiver In Kit Form Including 4 Plug-In coils and Blueprint But Less Tubes **YOUR PRICE \$9.95**
 No. S-252 4 Tube Regent Short-Wave Receiver Completely Wired **YOUR PRICE \$11.95**
 No. S-253 Set of Matched Tubes 1-34; 2-S130's; 1-233 **YOUR PRICE \$4.50**
 No. S-254 Set of Batteries 3-45 volt Standard "B," 1-22 1/2 volt "C" 2 No. 6 Dry Cells **YOUR PRICE \$4.34**

YOUR FIRST ORDER—

— — — will be the beginning of a long and cordial relationship; for the owners of this company, having been in the radio business for more than 30 years, know the exact requirements of radio servicemen and short-wave fans, as well as the type of service and merchandise they would like to receive. This company fully appreciates that its continued long life depends upon the good-will and satisfaction of its customers. To this end we strive to make our relationship as mutually beneficial as possible.

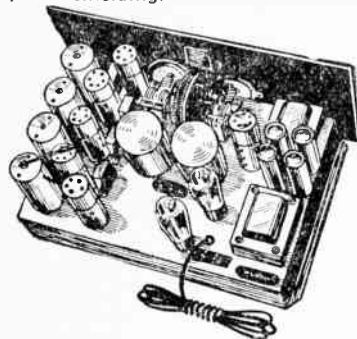
Regarding short-wave receivers and the art in general, we endeavor to be of as much assistance to our customers as possible. Short-wave beginners in particular, will find our relationship very educational and instructive. We have always been looked upon as "official advisers" to this class of radio fans since we have always advised them just what steps they should take or what set they should buy to learn the art in proper sequence, from the simple crystal set to expensive multi-tube short-wave receivers. Furthermore they will find that considerable information is devoted to their interests in the editorial section of our catalogs. However, in order for us to continue our excellent relationship, we must pull together—"one for all and all for one".

RADIO TRADING COMPANY, 101 HUDSON STREET, NEW YORK, N. Y.

NEW 1934 HAMMARLUND COMET "PRO"

Professional Short-Wave Superheterodyne Receiver HIGHLIGHTS

Sensitivity of better than 1/4 microvolt per meter. Selectivity of 1000 times at 10 K.C. off resonance. Noise lever so low as to be negligible. Has intermediate frequency oscillator for CW reception which is also valuable as a "station finder" in searching for weak phone stations. Band spread tuning at all frequencies within the range of the receiver. Smooth control of sensitivity. Tone control for tone and noise suppression. Vernier tuning controls. Isolantite coil forms, coil sockets and condenser insulation. Litz wound intermediates. Complete shielding.



The Comet "Pro" are high frequency superheterodynes designed to meet the exacting demands of professional operators and advanced amateurs interested in reception of both code and phone within the range of from 15 to 200 meters (20,000 K.C. to 1,500 K.C.). Although designed for commercial communications, airports, broadcasting, police and other equally important services, the "Pro" is so easily tuned that even the veriest novice can readily tune any station from over the entire world.

That the "Pro" more than meets every possible requirement is evidenced by its use in the following services: American Airways, Army and Navy Units, Eastern Air Transport, National Broadcasting, Columbia Broadcasting, Bell Laboratories, International Telephone & Telegraph, and many more.

The present models include certain improvements made possible through the use of the new "50" series tubes, employment of a recently developed electron-coupled type of oscillator, and new air tuned intermediate frequency transformers and oscillator units. These major changes plus a number of minor refinements result in improved selectivity, even greater sensitivity and absolute maintenance of peak efficiency regardless of temperature or atmospheric conditions. Single signal characteristics on C.W. are afforded by a new beat frequency oscillator with panel control. The new, outstandingly effective, three watt heater-type pentode, the 2A5, is used in the special audio system to provide humless reception at speaker volume or at reduced volume on head-phones.

A 16 page booklet giving complete technical details and performance data supplied free with each purchase.

The four available models are:

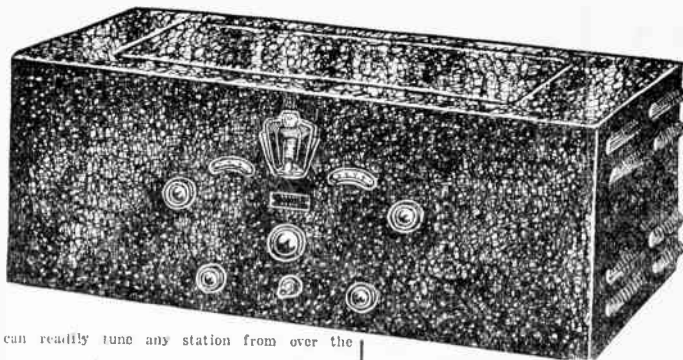
Standard, Standard with Automatic Volume Control, Crystal and Crystal with Automatic Volume Control. These models are fundamentally alike as to circuit and general construction. Tubes employed in the A.C. models are 2-57's, 4-5's, 1-2A5 and 1-80.

THE CRYSTAL MODELS

These models possess all the advantages of the standard models plus the additional selectivity and "single signal" feature afforded by a quartz crystal filter which may be cut in or out by means of a foot panel switch.

In the first place it permits the receiver to be operated as a standard receiver without sacrificing any of its original sensitivity and selectivity. Secondly, it provides series and parallel selectivity simultaneously. This permits parallel elimination of a strong heterodyne without sacrificing the sharp, peaked characteristic of the series connection. In the third place, this greatly increased selectivity is accomplished with substantially no loss in signal strength when receiving pure C.W. signals.

Comet "Pro's" are also available in battery models. Write for quotations.



Specifications

No. S-200 "Pro" A.C. Receiver in metal cabinet, less tubes. List \$150.00

YOUR PRICE \$88.00

No. S-201 "Pro" A.C. Chassis, less tubes. List \$135.00

YOUR PRICE \$79.38

No. S-202 "Pro" A.C. XTAL Receiver in metal cabinet, less tubes. List \$139.00

YOUR PRICE \$111.72

No. S-202 "Pro" A.C. XTAL Chassis, less tubes. List \$175.00

YOUR PRICE \$102.90

No. S-204 "Pro" A.C. AVC Receiver in metal cabinet, less tubes. List \$180.00

YOUR PRICE \$105.84

No. S-205 "Pro" A.C. AVC Chassis, less tubes. List \$165.00

YOUR PRICE \$97.00

No. S-206 "Pro" A.C. XTAL-AVC Receiver in metal cabinet, less tubes. List \$220.00

YOUR PRICE \$129.36

No. S-207 "Pro" A.C. XTAL-AVC Chassis, less tubes. List \$205.00

YOUR PRICE \$120.54

The above receivers are designed for 110-115 volt, 50-60 cycles A.C. Receivers for different voltages and frequencies available at an additional cost of \$5.88.

Brandes Matched Headset

An accurately matched set of headphones, each unit consisting of high-flux magnets surrounded by field windings of 2000 ohms resistance. Ruggedly constructed of light weight metal and highly polished imitation Bakelite ear caps. Complete with 6 ft. cord. Ship. wt., 2 lbs.

Cat. No.	Type	YOUR PRICE
S-1678	Brandes Matched Headset	\$1.49
S-1845	Cannonball Dixie Headset	1.10
S-1846	Master Cannonball Headset	1.50
S-1847	Single Dixie with Cord	.60
S-1848	Single Dixie with Cord and Headband	.80



"FARADAY" THREE-TUBE SHORT-WAVE BATTERY RECEIVER

Range 15 to 200 Meters

Stations thousands of miles away are well within the range of this receiver. All local stations as well as many distant ones will be heard on the loudspeaker.

The chassis is housed in a hand some black, crackle-finish, metal cabinet, having a full-vision vernier dial and three control knobs which are viz., tuning, regeneration control, and filament control.

Takes but a few minutes to connect this receiver without even the use of tools. A 7-wire color-coded battery cable is used for making the few simple connections.

The circuit itself is of the regenerative type, featuring simplicity of tuning while retaining the advantage of radio frequency amplification ahead of the regenerative detector. The R.F. amplifier tube is a type 31 screen-grid tube, assuring extremely high gain.

The receiver is sold complete with a set of four low-loss short-wave plug-in coils. Cabinet dimensions with cover closed are 11" x 6 3/4" x 8". Shipping weight, 10 1/2 lbs.

No. S-7353 Faraday Three-Tube Short-Wave Battery Set. **\$13.45**

No. S-7354 Complete set of accessories for above set including two-6 month's guaranteed Neontron 230 tubes; one Neontron type 34 tube; one pair of ear-phones; two-No. 6 dry cells; three-standard 45 volt "B" batteries. **\$7.15**



FARADAY FIVE-TUBE A.C. SHORT-WAVE RECEIVER

A Most Modern and
Up-to-date Short-
wave Set

Short-wave sets costing fifty dollars or more can hardly do more than what this excellent set will do!

It is, without reservation, one of the finest A.C. short-wave jobs on the market. What with its high selectivity, its maximum degree of sensitivity and absolute noise-free A.C. operation it is hard to find a set in its class which will ever approach it.

Along with the improvement of alternating-current tubes has grown an increasing demand for short-wave receivers which need not depend upon batteries for power. This set is an outstanding example of this class of receivers.

All the latest type special purpose tubes are employed in its circuit. The new type 58 triple grid tubes with their extremely low in-er-electrode capacity as well as the special 59 triple grid power amplifier are used to full advantage.

The heart of the circuit is the regenerative detector which, aside from resulting in extremely high selectivity, has the added advantage of tuning by the carrier "whistle" method.

Another striking feature of this set is the untuned antenna circuit which eliminates the necessity of adjusting an antenna trimming condenser each time a new plug-in coil is used.

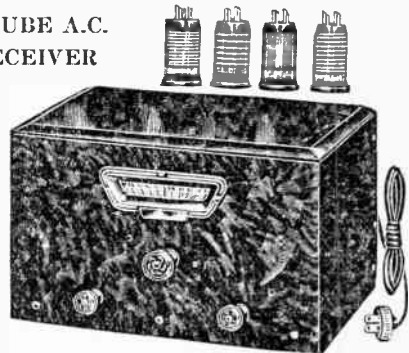
The tubes employed are two-58's, one-56, one-59, and one-280. The first tube is a radio-frequency amplifier with an untuned input but with a tuned output. This R.F. stage is then fed into a regenerative detector which in turn is resistance-coupled to the 56 first A.F. stage, and finally to the 59 triple grid power amplifier in a "class A series" pentode connection.

Approximately **THREE WATTS OF POWER** are available for operating one to three full dynamic speakers or as many as six magnetic speakers.

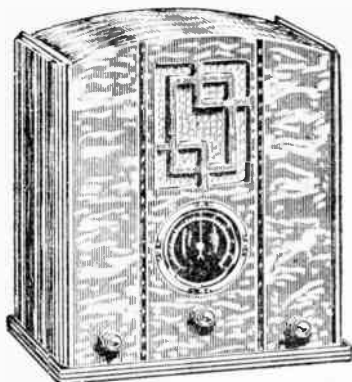
An earphone jack is provided in the plate circuit of the first A.F. tube for ear-phone operation.

Both chassis and special noise-free power pack are mounted in a single, handsome, black crackle-finish case with illuminated vernier dial. Measures 15 1/2 x 8 x 8 1/2 inches Shipping weight, 20 lbs.

No. S-7357 Faraday Five-Tube A.C. Short-Wave Receiver. **\$25.95**



Here's A "Sweet" All-Wave Combination



THE RECEIVER

- ILLUMINATED AIRPLANE TUNING DIAL
- MODERNISTIC IN-LAID CABINET
- LATEST TYPE TUBES
- FULL-SIZED DYNAMIC SPEAKER
- 10 K.C. SELECTIVITY

A specially developed high-gain T.R.F. circuit assures 10 K.C. selectivity with tremendous amplification. The set uses 2-58; 1-57; 1-2A5; 1-80. Mechanically and electrically the Paramount 6-Tube receiver is built to the pinnacle of perfection. A full-sized dynamic speaker acoustically placed in the receiver assures full power of the output tube. Furthermore, a full-range tone control permits the variation of tone to any desired pitch. It measures 10" x 14" x 8 1/2". Shipping weight, 24 lbs.

No. S-242 6 Tube Paramount Receiver. Less Tubes. **\$16.95**

YOUR PRICE
No. S-243 Set of Match Tubes 2-58's; 1-57; 1-56; 1-2A5; 1-80. **\$4.70**

The Paramount 6 TUBE RECEIVER

plus a

Super-heterodyne Short Wave Converter

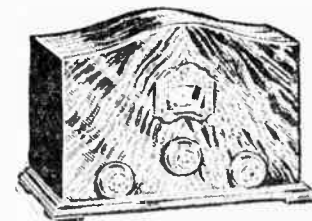
equals an

Ideal 15 to 550 Meter Set-Up

The Paramount 6 Tube receiver was designed expressly for the purpose of operating in the regular broadcast band. **THIS IT DOES PERFECTLY.** The super-heterodyne short wave converter was designed expressly for covering the short-wave range of from 15 to 200 meters. **THIS IT TOO DOES PERFECTLY.** It is logical to understand, therefore, that when these two highly efficient instruments are properly connected together and operated in unison, the combination will afford perfect reception from 15 meters way up to 550. In other words they then constitute an ideal all wave outfit.

One has to go far to meet up with such a perfect arrangement. The converter once connected to the receiver need never again be detached. When operating in the regular broadcast band, a knob on the converter automatically turns that instrument off and permits the receiver to function as any other regular receiver will. When short-wave reception is desired the converter is switched "on". This converter does exactly what its name implies. It actually "converts" the T.R.F. receiver into a full-fledged short-wave super-heterodyne. It goes further than this. It adds an extra stage, in the form of a type 2A7 pentagrid oscillator and mixing tube. This tube intercepts the short-wave signals, mixes or "beats" them with the local signal generated by the same tube, thereby producing an intermediate frequency which is in the broadcast range. This is essentially the super-heterodyne principle. It is this principle which makes the entire combination the "sweetest" ever presented. Short-wave programs from the far corners of the earth—stations which you never even knew existed will come in with a clarity and volume which will surprise you. Not only that, but they will come in regularly—whenever they are on the air—at the same setting of the receiver and converter (we recommend that you read the article, "How To Tune For Foreign Short-Wave Stations" in the editorial section of this catalog). Shipping weight, 34 lbs.

No. S-244 All-Wave Combination Comprising Paramount 6 Tube Receiver and Super-heterodyne Converter Including All Tubes. **\$29.95**

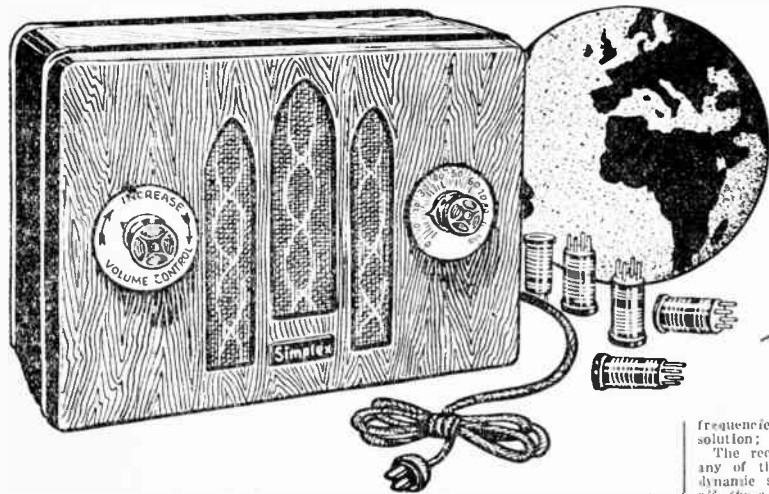


THE CONVERTER

- SUPER-HETERODYNE CIRCUIT
- BUILT-IN POWER SUPPLY
- LATEST TYPE TUBES
- TWO-TONED CABINET
- RANGE 15 TO 200 METERS

The most important of the many features of this super heterodyne converter is that it has a built-in power supply. This necessitates but two external connections (antenna and ground) to the receiver with which it is to be used. Furthermore it need not be disconnected from the receiver when regular broadcast reception is desired. A switch on the converter throws the outside antenna either to the converter or to the broadcast receiver, as desired. Furthermore when not in use this converter can be switched "off" without affecting the receiver in any way. This makes for very economical operation. Employs the latest type tubes, such as 25Z5 rectifier and 2A7 pentagrid which acts both as local oscillator and mixing tube. Sold complete with tubes and 2 plug-in coils which cover the range of from 60 to 200 meters. A special coil may be had at an additional price to cover the lower range of from 15 to 60 meters. It measures 6 3/4" high x 7 3/4" wide x 4 1/2" deep. Shipping weight, 10 lbs.

No. S-11 Super-Heterodyne Converter. **\$9.90**



ALL-WAVE RECEIVER

15 TO 2700 METERS

works from any source including batteries!

Here is a **TRULY ALL-WAVE** receiver; all-wave in the strictest sense of the word. It has the enormous range of from 15 way up to 2700 meters. Just consider what this means. 15 meters approaches the ultra short wavelengths; from there the range of the set continues on up through the amateur bands, television bands, police and airplane bands right into the regular broadcast band and from there further up in the upper channel of foreign speech and music broadcast bands; this, mind you, all with a 4-tube miniature receiver. That is why we say it is an "all-waver" in the strictest sense of the word.

Not only that but the receiver will work from any source of electricity whatever, be it an electric supply main, storage batteries, 32 volts farm lighting plants, or what have you. The special adapters listed below will adapt this receiver to any and all of these electrical sources. The receiver uses only the very latest type of tubes such as, 6F7, which is a dual pentode triode tube (actually 2 tubes in one), a 43 power output tube, a 77 high-gain tube and a 25Z5 rectifier.

A series of 7 coils are used to cover the tremendous reception range. These plug-in coils are conveniently plugged into the right side of the cabinet. The very fact that plug-in coils are used speaks well for the receiver. Anyone at all interested in radio knows that it is most difficult to cover such a wide range of

frequencies with a tapped coil and selector switch. Plug-in coils are the only solution; and that is why they are used here.

The receiver employs a sensitive regenerative circuit which works equally well on any of the bands. The instrument is a high-grade, low-priced receiver having a dynamic speaker, built-in antenna and provision for phonograph pick-up. Yet with all these remarkable features the receiver consumes as little as 40 watts on 110 volts and 80 watts on 220 volts. It is as economical to run as it is efficient in performance, and that's saying a lot. The receiver is housed in a steel cabinet, burr-walnut finish. Measures 8 3/4" wide, 6" high, 3 3/4" deep. Ship. wt., 12 lb.

No. S-321-V Universal All-Wave Receiver Including Tubes But Less Coils, 110 Volt A.C.-D.C. Operation. List Price \$21.50. **\$12.64**

YOUR PRICE
No. S-322 Set of 4 Plug-In Coils (15 to 200 meters) List Price \$4.00. **\$2.35**

YOUR PRICE
No. S-323 Set of 3 Plug-In Coils (200 to 2700 Meters) List Price \$3.00. **\$1.76**

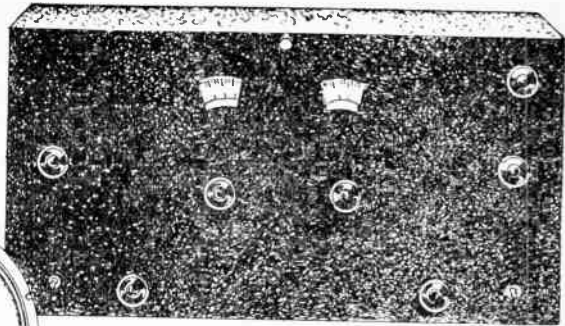
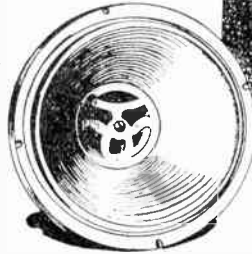
YOUR PRICE
No. S-324 All Electric Auto Adapter With Suppressors, for use in automobiles or boats. List Price \$12.50. **\$7.35**

YOUR PRICE
No. S-325 220 Volt A.C.-D.C. Adapter, for use on 220 volt electric supply outlets. List Price \$1.50. **\$0.88**

YOUR PRICE

5B McMurdo-Silver Short-wave Superhet A Powerful 8-Tube Professional Receiver

Gets Foreign Speech and Music
Technical Features



Requires No Plug-in Coils

The 5B superheterodyne has been developed to meet the requirements on which all other amateur and commercial superheterodynes fall down. Yet withal, this 5B is priced lower than any of its competitive sets. The inconvenience of changing plug-in coils to change bands is definitely eliminated with the use of the specially-constructed switch and coil assembly. **Wave bands are changed by the simple turning of a knob on the front panel.** Image-frequency interference from services outside the amateur or commercial bands is eliminated by the 58 tuned R.F. stage—a feature found in no other competitive receiver. The 5B superheterodyne is designed to be used either with or without a crystal filter. Amateurs are already familiar with the difficulty of adapting crystal control to receivers which are not specifically designed for it. Furthermore, a specially matched Jensen 8" dynamic speaker is supplied so that fidelity of reproduction is achieved. The entire chassis is mounted in a handsome black-crackle finish metal cabinet with special illuminated dial.

Tuning ratio of dials, 6 to 1.

No. S-5B McMurdo-Silver Professional Short Wave Superheterodyne Complete With 8 Raytheon tubes, Jensen Dynamic Speaker and Cabinet. Ready to Operate.

YOUR PRICE \$59.70

No. S-208 Special Biley Crystal ground to 365 Kc. in Biley holder and special receiver alignment for individual crystal supplied. List Price \$15.00.

YOUR PRICE \$9.00

Sensitivity: Guaranteed sensitivity of 1 micro-volt absolute or better.

Selectivity: Every 5B receiver has a selectivity curve of 22 k.c. wide, 10,000 times down without crystal, or 50 cycles wide with crystal.

Circuit: Short wave superheterodyne, using a 58 R.F. amplifier, 2A7 first detector and electron-coupled oscillator, 2-58's i.f. amplifier stages, 56 second detector, 58 audio-beat oscillator for C.W. reception, 2A5 Class A power output stage and 5Z3 rectifier.

Wave Length Range: 10 to 193 meters or 1550 to 30,000 kilocycles. Colored dial scales indicate operating ranges. **Requires no plug-in coils.**

SPEAKER: Full-size Jensen dynamic speaker, accurately matched to the 58 class A output power tube affords true fidelity of reproduction of all voice and music frequencies.

Band Spread Tuning: All stations can be tuned on main dial and then spread out on left vernier dial. Band spread 200 degrees for 80 and 160 meter bands and 100 degrees for 20 and 40 meter bands.

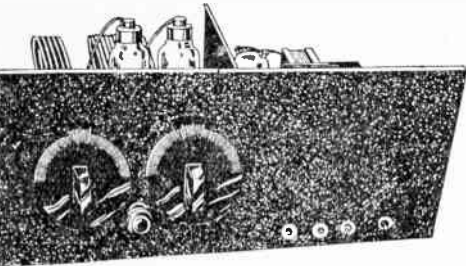
Crystal: If desired the 5B can be supplied with special Biley Quartz crystal and Biley holder, and with i.f. amplifier aligned to exact crystal frequency. Additional charge.

Fidelity: The over all antenna-to-speaker fidelity without crystal is uniform to 4 decibels from 30 to 4000 cycles—or absolutely uniform over the entire fundamental musical range at the loud speaker output. Yet by means of the crystal control, 50 cycle selectivity can be had at will.

Power Output: Three watts.

Dimensions and Weight: 16½" long over all, 10" deep and 8¾" high. Shipping weight 40 lbs.

Finish: Crystalline black on all parts except tube and r.f. shields which are polished aluminum.



**McMURDO
SILVER
100 WATT
R. F. AM-
PLIFIER**

The type 10A r.f. output amplifier may be operated as a 50 or 100 watt r.f. amplifier when driven by a suitable exciter such as the 9A oscillator-amplifier listed at the right.

It consists of a pair of Raytheon RK-18 fifty-watt tubes in a conventional neutralized r.f. stage arranged in parallel for simple neutralizing. This amplifier has used grid circuit (for connection directly to the output circuit of a preceding amplifier stage), a tuned plate circuit, and a tuned antenna circuit. It may be used as a 50 or 100 watt self excited oscillator transmitter. The amplifier uses 20-200 watt professional copper tubing plate and antenna inductances, and is complete with neutralizing condenser.

The power supply uses a high voltage heavy duty power transformer, 25 henry, 5 ma. filter choke, ten microfarads of 1000 volt Dubilier Pyranol Filter capacity, and one Raytheon RK19 full wave high vacuum rectifier. It develops 950 volts at 50 ma. or full rated plate power for the two RK18 tubes. It may be operated with one or two RK18's as preferred for either 50 or 100 watt r.f. output.

The 10A amplifier has fixed 67½ volt battery bias which prevents damage to its tubes in the event of oscillator failure when operated Class B. Additional grid leak as is available at the throw of a switch for "Class C" operation. Plate and grid current measuring jacks at low potential are provided.

Panel space is available above the plate and antenna dials for two 2 inch meters r.f. plate and antenna current if desired. Size 10" deep on standard 8" x 19" aluminum relay rack panel. Ship. wt., 35 lbs. List Price, \$99.50

No. S-209 101A 100 watt r.f. amplifier, complete with antenna coil and one 150-200 watt (Type 18) inductor for any of these amateur bands: 1.7 to 2.0 mc., 3.5 to 4.0 mc. or 7.0 to 7.3 mc. Specify which.

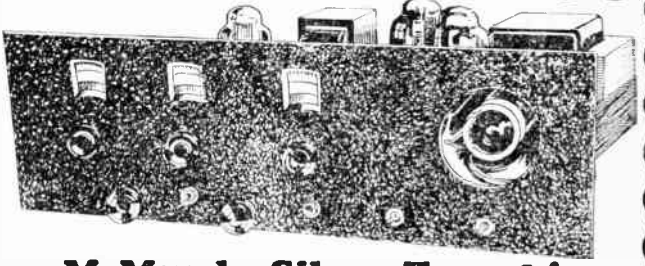
OUR PRICE \$59.70

No. S-210 Raytheon RK18 Tubes (2). List Price, \$10.65.

OUR PRICE \$6.39

No. S-211 Raytheon RR19 Rectifier Tubes. List Price, \$7.00

OUR PRICE \$4.20



McMurdo-Silver Type 9A 5-Band Oscillator Amplifier

This unit is essentially the five band "Triton" five band exciter, developed by James Lamb of QST, put into practical and simple commercial form on a 7" x 19" black-crystalline aluminum relay rack panel and 10" deep steel chassis.

It consists of a 58 oscillator tube driving a 58 Class "B" r.f. amplifier doubler tube. The oscillator may be operated either crystal controlled or in an electron-coupled circuit upon the simple shift of a switch. With suitable crystal or plug-in coil, it will operate in the 1700, 3500, 7000, 14,000 or 28,000 kc. amateur bands. It is provided with plug-in coils for crystal tank (or electron-coupled oscillator) and plug-in coil position for its plate circuit.

The 58 amplifier-doubler is provided with a plug-in plate coil, accessible from the front panel. The amplifier output is available either direct from its plate circuit or through a link-coupling coil.

The tuning controls are, left to right, electron coupled oscillator tuning, oscillator plate tuning and amplifier plate tuning. At the bottom is the electron-coupled crystal-oscillator change switch, oscillator plate-current jack, oscillator plate-coil switch, amplifier plate-current jack, phone-C.W. switch and on-off switch.

The self-contained power supply uses a 523 rectifier to deliver 400 volts to oscillator and amplifier tubes through a two-section choke input filter system, insuring a pure D.C. note.

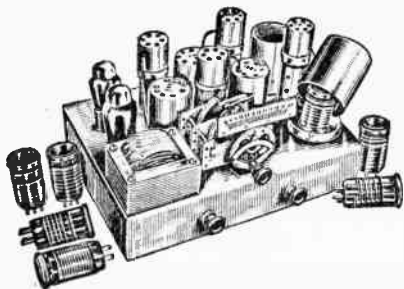
Used directly as a low powered transmitter to feed an antenna, the 9A driver will deliver five to ten watts output on all bands. Ship. wt., 30 lbs.

No. S-212 9A Oscillator Amplifier. Complete With Choice of One Plug-in Coil, permitting operation on any one amateur band, and two tested 58 and one 523 Raytheon tubes. List Price, \$84.50

YOUR PRICE \$50.70

No. S-213 Set of six additional plug-in coils permitting operating in all five amateur bands at will. List Price \$ 0.00

YOUR PRICE \$6.00



Deluxe 6 Tube Super-Het. Short Wave Receiver with Dynamic Speaker

Full Band Coverage—15 to 550 Meters

We present herewith one of the finest and most sensitive super-heterodyne short-wave receivers ever designed. If you have been skeptical about the reception of foreign broadcasts, this receiver will convince you that such programs CAN be received,—REGULARLY—night after night, at the same point on the dial with the same coil. You can travel around the world by merely sitting in your easy chair and turning the dial of this De Luxe Super-het receiver. You will listen to London, South America, Paris and Moscow whenever they are on the air. However the fascination is not only limited to foreign broadcasts. Police calls from hundreds of cities, airplane messages and amateur exchanges will thrill you. If you have never listened to short waves before, you will find opened to you a new realm of thrilling entertainment.

Reception of regular broadcast stations from 200 meters and up, is possible with an extra pair of plug-in coils. The design of the receiver is such that it will work equally well on both the short waves and broadcast bands, thereby assuring a complete ALL-WAVE RANGE of from 15 to 550 meters.

RADICAL AUDIO DESIGN

The audio amplifier uses a 2A5 tube driven by a 55, resulting in powerful amplification and loud speaker operation. A full-wave rectifier, the type 80 tube,

- **Single Dial Operation!**
- **2 A 5 Power Output!**
- **Advanced Super-het!**
- **Low Noise Level!**
- **Latest Type Tubes!**

and
AUTOMATIC VOLUME CONTROL

Gets Foreign Speech and Music

supplies the necessary plate current. As a super-heterodyne it has a novel feature of **AUTOMATIC REGENERATION CONTROL** which is a tremendous aid in tuning-in the weaker stations so that they may be heard with equal clarity on the loud speaker. Side-band cutting has been reduced to an absolute minimum and yet maximum selectivity has been retained. This 6-Tube Short-Wave Super-Heterodyne embodies all the recent developments in short-wave work. The super-heterodyne circuits employs the latest type tubes (1-2A7; 2-58; 1-55; 1-80 and 1-2A5) which afford adequate volume, single dial operation, low noise level, no back-ground noise, easy tuning of both short and long wave bands, and a business-like appearance.

The receiver is shipped complete with 2 sets of octagonal-shaped, low-loss coils (4 coils per set). If bought in kit form, a blueprint is furnished at no additional cost. Measures 14" x 8½" x 10¼". Shipping weight 25 lbs.

No. S-232 6 Tube De Luxe Super-Het. Short-Wave Receiver In Kit Form, Less Tubes, But Including Blueprint and Coils.
YOUR PRICE \$24.50

No. S-233 6-Tube De Luxe Super-Het. Short-Wave Receiver and Coils, Completely Wired, Less Tubes.
YOUR PRICE \$29.50

Universal A.C-D.C. Portable Short Wave Receiver



15 to 200 METERS
• WORKS EVERYWHERE

BUILT-IN POWER SUPPLY

The Three-Tube Portable Universal receiver will operate anywhere that 110 volts A.C. or D.C. is available. Extremely light in weight and hence may be carried anywhere. The circuit is one of the most recently developed. Uses 1-78; 1-43 power pentode amplifier tube and 1-25-Z-5 rectifier tube. For the reception of more distant stations; we recommend the use of headphones for clear reception. Only the highest quality parts are used throughout the entire construction of the portable.

The high-ratio vernier dial permits precise adjustment of the tuning condenser. The regeneration control is smooth and easy.

Four plug-in coils are furnished which tune the entire wave bands from 15 to 200 meters. Police signals, ship-to-shore signals, airplanes, foreign reception, amateurs, etc. are all included in the range of these coils. There are no dead spots on any coil when tuning. A broadcast band coil may be supplied for those desiring to listen to regular broadcasts. Measures 8" x 11" x 6½". Shipping weight, 15 lbs.

No. S-238 Universal A.C.-O.C. Portable Short-Wave Receiver In Kit Form Including Case, Metal Panel, Plug-in Coils and Blueprint, less tubes.
YOUR PRICE \$9.95

No. S-249 Universal A.C.-O.C. Portable Short-Wave Receiver Completely Wired, Less Tubes.
YOUR PRICE \$11.95

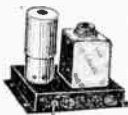
No. S-240 Set of Matched Tubes 1-78; 1-43; 1-25-Z-5.
YOUR PRICE \$3.25

No. S-241 Broadcast Coil.
YOUR PRICE \$0.79

No. S-234 Set of Matched Tubes, 1-2A7; 2-58's; 1-55; 1-80; 1-2A5.
YOUR PRICE \$4.95

No. S-235 Set Of Coils Covering The 200 to 500 Meter Band.
YOUR PRICE \$1.50

BEAT NOTE OSCILLATOR

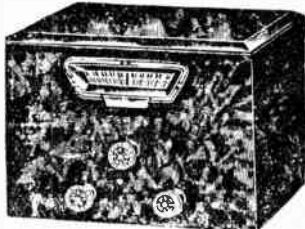


This unit is a tremendous aid to tuning of super-heterodyne receivers — especially short-wave super-hets. It generates a carrier wave which, when mixing with the signal carrier produces a whistle or beat. The presence of the whistle

indicates a station which ordinarily could never have been detected. Attaches to any super-heterodyne receiver through the medium of an adapter.

A Beat Frequency Oscillator is incorporated only in the very latest type of super-heterodyne receivers. Bring your set up-to-date by this simple inexpensive method. **WHEN ORDERING SPECIFY THE MAKE AND MODEL NUMBER AS WELL AS INTERMEDIATE FREQUENCY OF YOUR RECEIVER.** Ship. wt., 5 lbs.

No. S-255 Beat Note Oscillator.
YOUR PRICE \$8.95



tune, and oscillation is always under full control of the operator. The full vision illuminated dial is extremely accurate their allotted positions at all times.

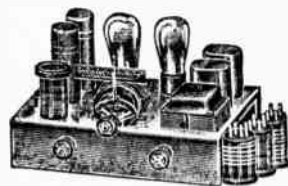
Uses 1-56 triode, 1-58 triple-grid amplifier, 1-80 type rectifier and 1-47 power pentode output. Equipped with four octagonal shaped plug-in coils covering the wave lengths of from 15 to 200 meters. The entire chassis is built into a shielded metal cabinet to eliminate hand or body capacity. Measures 8¾" x 13½" x 8½". Shipping weight, 22 lbs.

No. SW-236 4 Tube A.C. Short-Wave Receiver In Kit Form Including Coils, Cabinet, and Blueprint, less tubes.
YOUR PRICE \$17.95

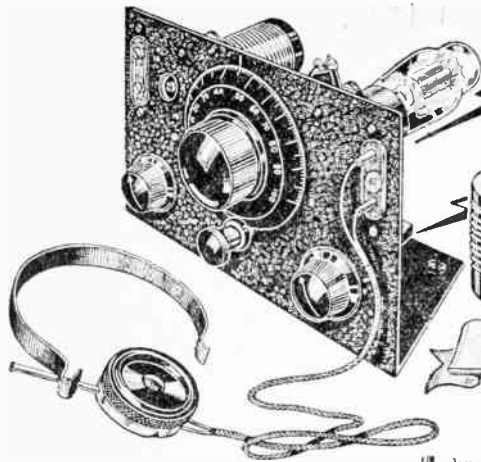
No. SW-237 4 Tube A.C. Short Wave Receiver Completely Wired Including Coils, less Tubes.
YOUR PRICE \$19.75

Four Tube A. C. Short Wave Receiver WITH BUILT-IN POWER SUPPLY 15 to 550 Meters

With this inexpensive short-wave receiver you can tune in and enjoy loud speaker reception of all the interesting highlights that short waves have to offer—police signals, ship-to-shore signals, foreign broadcasts, airplanes in flight, amateur phone and C.W. signals, etc. The entire power pack unit and tuner is built on a single chassis. No additional wiring necessary for operation. The receiver is exceedingly simple to



Chassis removed from Cabinet. Note the efficient arrangement of parts.



WORLD-WIDE RECEPTION WITH THE FAMOUS TWINPLEX Short-Wave Receiver



2-Sets in-1

Economical 2-Volt Operation

ONE TUBE NOW PERFORMS DUTIES OF TWO TUBES

Short waves are the talk of the hour. The whole country, nay, the whole world, has gone crazy to receive foreign stations, stations as far as 12,500 miles distant. Usually, such reception is had only with expensive multitube sets.

However, for years, radio engineers have bent every effort to simplify short-wave radio sets, while at the same time the world's radio scientists have striven to perfect new radio tubes. Only recently, the invention of the "19" tube has made it possible to perform the function of two tubes in a single tube. Then came the invention of the TWINPLEX, a radio circuit of unheard of sensitivity, using the "19" tube; it is now possible with a single tube of this type to receive short wave stations from all over the world, loudly and clearly,—REGULARLY,—night after night, day after day, always in the same place on the dial.

THE UNIMOUNT PANEL

Every radio man knows that in a short-wave set it is highly important to have the wiring as short as possible. By inventing a radically new design, that is, by mounting tube and coils all on the front panel, it has become possible to shorten the connecting wires considerably with the result that an unheard of signal sensitivity has now been achieved for the first time, in a single-tube set.

But the TWINPLEX is actually a two-tube set; yes, we repeat, A FULL-PLEGGED TWO-TUBE SET AT THE PRICE OF A ONE-TUBE SET.

JUST IMAGINE TWO TUBES IN ONE GLASS ENVELOPE. That is the story of the new "19" tube. It is a 2-volt tube, which has a double set of elements, making it equivalent in every respect to two separate tubes. That explains the amazing performance of this remarkable little receiver. And not only that, but the current consumption of this tube is so small, that a pair of ordinary 6-volt cells will last for many weeks without replacing them.

BROADCAST RECEPTION TOO

This set has been so designed that it will receive ordinary broadcast stations too, stations which come in with great volume, particularly local stations. These come in so loud that if you have a loud-speaker, this little one tube set will actually give you loudspeaker reception, something unheard of until the advent of the TWINPLEX set.

With this set, we furnish regularly, two coils, one a short wave plug-in coil, which receives all the popular stations in the 33 to 67 meter band, and a broadcast coil which receives practically all broadcast stations except a few on the very high waves.

ALWAYS REMEMBER, THAT YOU ARE BUYING A TWO-TUBE SET FOR THE PRICE OF A ONE-TUBE SET.

The operation of the set is simplicity itself. Yet, it will bring in short-wave stations from every part of the world—stations which you never even dreamt existed before. The stations will come in loud and clear. Instruction sheet with detailed schematic pictorial diagrams shows you how to build the set in a few hour's time, and once you have completed the set, FROM THEN ON, YOU DON'T SLEEP ANY MORE.

The price of the TWINPLEX is so radically low that low all short-wave enthusiasts who have ever wished to own a good short wave set can buy this receiver without the slightest doubt in their minds but what IT WILL PERFORM 100 PERCENT. This means that all the usual "bug" have been ironed out by us—and ironed out in such a thorough manner that you may order the TWINPLEX with full confidence that in practically every location,—ANYWHERE—They will do their stuff.

ONLY FIRST CLASS PARTS USED. It may be possible to buy similar parts of this completed set cheaper, elsewhere. We, too, could have employed inferior parts and lowered the price accordingly but this we refrained from doing because then we could not **GUARANTEE RESULTS.** Only first class material, such as Hammond tuning condensers, Polymet mica condensers, R.M.A. resistors, etc., are employed. All component parts are mounted on a beautiful black, crackle finished chassis of unique design. The tube and coils mount in a horizontal position with an eye to compactness and simplicity of wiring. The illustrations clearly show the professional appearance of the set and the unusual mounting of the various parts. The set itself is so small and compact that it may be recessed into a panel, or mounted into a desk drawer so that only the front panel of the set shows.

The "19" TWINPLEX is available only in kit form and comprises all parts to properly build the receiver in from 1 to 2 hours. **ANYONE CAN DO IT.**

No. S-308 Famous Twinplex Short-Wave Receiver Including Single Headphone and Plug-in Coil, but less Tube. **ONLY \$4.95**

YOUR PRICE
No. S-306 Complete Accessories For TWINPLEX Receiver, Comprising 1—Type 19 Tube, 2—No. 6 Dry Cells, 2—45 volt "B" Batteries. **\$3.56**

Absolutely Free

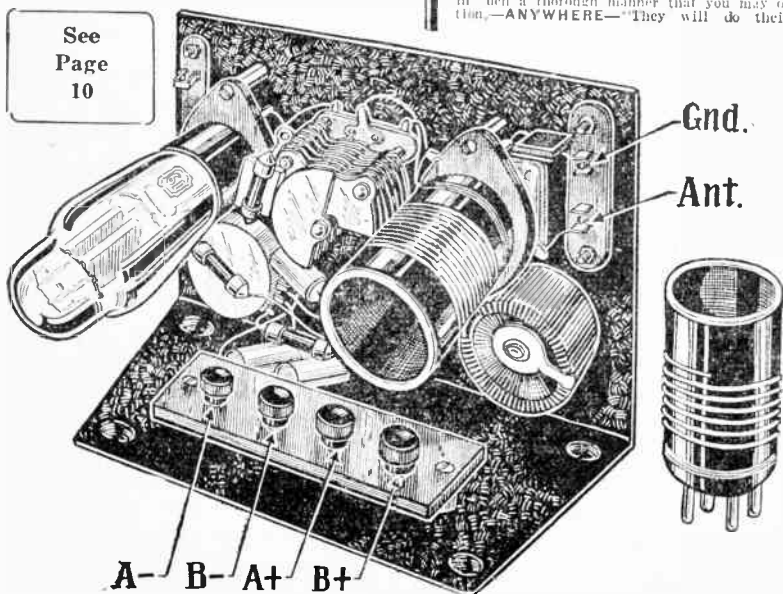
With the purchase of this receiver you will receive—**ABSOLUTELY FREE OF CHARGE**—this book, which is so essential to the beginner. It contains everything that you wish to know in connection with short waves, leading you in easy stages from the simplest fundamentals to the present stage of the art in short waves as it is known today. Contains 40 pages and over 75 illustrations. Size 7 1/2" x 10". It is an ideal reference book for the beginner and old-timer as well.

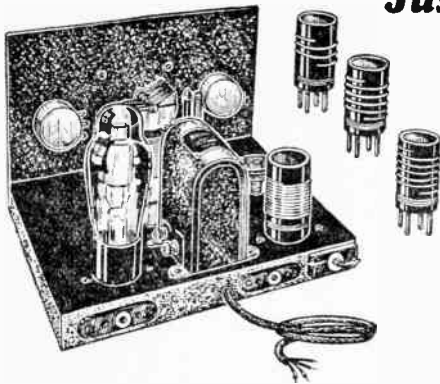


Here's Why YOU SHOULD OWN THE Famous Twinplex

- 2-Tube Performance
- Economical Operation
- Very Easy To Build
- New Radical Design
- Guaranteed Performance
- Uses New "19" Tube
- Gets Foreign Speech and Music

See
Page
10





Just Imagine!

**2-TUBES
in one
GLASS BULB**

that's the
"TWINPLEX"

15 to 200 Meters

**Receives Foreign Speech
and Music**

The new type 53 tube makes possible this Twinplex "double-action" receiver. This tube actually contains 2 separate tubes in the same glass envelope. Just imagine what this means! It means that a 2-tube receiver can now be built for the price of a 1-tube set. This is exactly what has been done in the Twinplex receiver. A comparison of prices with the Duorle 2-tube receivers listed in this catalog will immediately substantiate this statement. And what's more, it actually performs like a 2-tube set. The circuit is practically the same as the 2-tube Duorle—extremely simple and therefore entirely fool-proof. You will receive stations which you never knew even existed before. We have received many letters from satisfied users of the Twinplex receiver praising it to the skies. And justly so, for it is a wonderful little set. It affords full band coverage of from 15 to 200 meters which includes the amateur bands, police and airplane calls, foreign reception and numerous code stations.

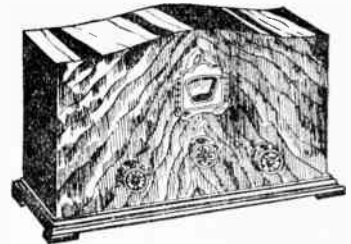
Only the finest quality parts such as Hammarlund variable condensers, Kurz-Kasch high-ratio vernier dials, etc., are employed. All these parts are mounted in a beautiful, crackle-finished metal chassis which entirely does away with "hand capacity."

The receiver is universal in operation which means that it may be operated either with batteries or with an A.C. short-wave power pack. 180 volts is required for the plates of the tubes and 2½ volts, either A.C. or D.C., for the filaments. For a fan who is first starting in the short wave game, the Twinplex is the most economical receiver with which to begin. Measures 6" x 6" 6¼".

No. 2115 Twinplex "Double-Action" Short-Wave Receiver Completely Wired and Tested, including diagram but less tubes. Shipping weight, 9 lbs. **YOUR PRICE \$7.50**

No. 2117 Accessories Only for A.C. operation—including 1 Special Hum-Free Power Pack; 1-80 Rectifier Tube; 1-53 Tube and one set of matched Headphones. Shipping weight, 12 lbs. **YOUR PRICE \$10.35**

No. 2118 Accessories Only for Battery Operation including 1-53 tubes; 3-45 volt "B" batteries, 4-No. 6 dry cells (arranged in series parallel) and one set of matched Headphones. Ship. wt. 15 lbs. **YOUR PRICE \$6.25**



**SELF-POWERED SHORT-WAVE
CONVERTER**

**Complete—Nothing Else To Buy
20 to 200 Meters**

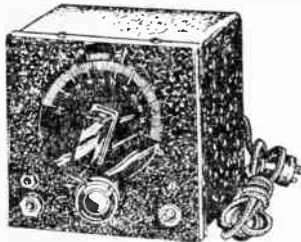
This compact device, in its handsome walnut cabinet, when properly connected to any radio will actually "convert" it into a full-fledged short-wave superheterodyne receiver. Imagine what this means. Whereas formerly short-wave attachments made use only of the audio stages of a receiver, this converter utilizes both radio frequency and audio frequency channels (in other words the entire receiver), resulting in maximum efficiency, sensitivity and selectivity.

This universal converter can be operated on either A.C. or D.C. 110 volts. Contains its own power supply utilizing a type 37 tube as a rectifier and the new type 6A7 Pentagrid converter tube, which serves the double function of oscillator and mixing tube. The converter is designed to use 2 plug-in coils covering a range of from 60 to 200 meters. This range assures excellent reception of police calls, airplane reports, amateur pleasantries, foreign reception and many other interesting broadcasts. The unit is housed in an attractive, walnut cabinet measuring 6½" high 7¾" wide and 4¼" deep. It need not be disconnected from the regular broadcast set. When regular programs are desired, a simple switch on the front panel takes care of this automatically. Sold complete with R.C.A. tubes and the necessary plug-in coils.

No. 11 Self-Powered Short Wave Converter for A.C.-D.C. Operation. Complete with tubes. **List Price \$17.50**

YOUR PRICE \$10.29

**McMURDO-SILVER AMATEUR
FREQUENCY MONITOR**
Operates on 110 Volts 50-60 Cycles A.C.
Complete—Nothing Else To Buy



The type 4A electron-coupled frequency meter permits the accurate and positive adjustment of amateur transmitters in any desired frequency in the amateur band. It may also be used to monitor the quality of the transmitted signal and to accurately determine the frequency of any signals that may be heard on the station's high-frequency receiver. The fundamental range of the electron-coupled oscillator is 1600 to 2100 k.c., with the 1700 to 2000 k.c. amateur band spread from 29 to 60 degrees on the dial. This feature obviates the necessity of using the extreme capacity ranges of the tuning condenser in the interest of extreme frequency stability.

Strong harmonics are developed on the 3.5 to 4.0, 7.0 to 7.3, 14.0 to 14.1, 28 and 56 megacycle amateur bands with ample bandwidth for easy and accurate use. Full A.C. operation minimizes operating voltage variations. Fully shielded in solid steel case and provided with headphone jack, output-coupling jack, on-off switch, tuning dial and A.C. cord and plug. Furnished with approximate calibration chart and ten similar blank charts large enough to be easily read. May be calibrated from "marker stations". Measures 6" square. Shipping weight, 9 lbs.

List Price \$32.50

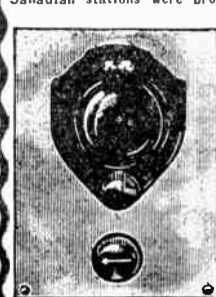
No. 4-A McMURDO-SILVER Amateur Frequency Meter Monitor complete with 56 and 58 Eveready Raytheon tubes. **YOUR PRICE \$19.50**

**WORLD FAMOUS
Oscillodyne
1-Tube
WONDER SET**

15-200 Meters

And a wonder set it is at that! Although the circuit of this unique little receiver is of the regenerative type, it acts like a super-regenerative set; yet it does not belong in that class. Due to its peculiar circuit it has the sensitivity and selectivity of many 2 and even 3-tube short-wave receivers. Read what the editor of the Short Wave Craft Magazine says about this set in the April, 1933, issue: "We are pleased to present to our readers an entirely new development in radio circuits—the Oscillodyne. This circuit which is of the regenerative variety, acts like a super-regenerative set. Its sensitivity is tremendous. The editor, in his home on Riverside Drive, New York City, in a steel apartment building, was able to listen to amateurs in the midwest, USING NO AERIAL AND NO GROUND. With the ground alone, a number of Canadian stations were brought in, and with a short aerial of 40 feet, many foreign stations were easily pulled in."

Here then is a set which brings in stations thousands of miles away; a set which frequently brings in Australia, loud enough to rattle your phones and with power to spare; a set which if you do not wish extreme distance will bring in stations several thousand miles away without aerial or ground. And the many hundreds of testimonial letters from short-wave fans who have either built their own or have purchased them, fully substantiate these remarkable results. The receiver may be used either with batteries or A.C. power pack. Requires a 23" tube for battery operation and a 227 for A.C. operation. Available either completely wired ready to use or in kit form. Four pages of detailed instructions and diagrams are included with each set. The aluminum panel is 6" high x 4½" wide. The bakelite base is 5½" long x 4½" wide. Shipping weight, 3 lbs.



No. 2146 Official One-Tube Wonder Set, completely wired and tested. **YOUR PRICE \$7.20**

No. 2147 Official One-Tube Wonder Set, in kit form, with detailed construction plans. Shipping weight, 3 lbs. **YOUR PRICE \$6.35**

No. 2148 Complete Accessories, including the following: one 37 tube; set of standard headphones; four No. 6 dry cells; two 45-volt "B" batteries. Shipping weight, 22 lbs. **YOUR PRICE \$5.50**

OFFICIAL DOERLE WORLD-WIDE Receivers

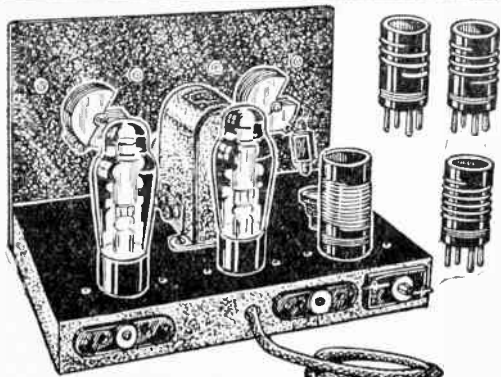
- And They're Still Going Over Big!

Two Tube 12,500 Mile Doerle Receiver

Uses 2-Volt, Low Drain Tubes
Wired or Kit Form

FOR YOUR OWN PROTECTION—

We are the ONLY company authorized by the publishers of Short Wave Craft Magazine to manufacture and sell these Official Doerle Short Wave Receivers. We therefore feel obligated to caution you against the purchase of so-called "Doerle" receivers or receivers which are merely designated as "12,500 Mile Short-Wave Set," "3 Tube Singnal-Gripper" or any other names which were originally associated with the Official Doerle Circuit. These receivers are sold at lower priced because they contain inferior parts. To help remedy this condition we have gone to the expense of having a special name plate made. It is reproduced below. EVERY GENUINE OFFICIAL DOERLE SHORT-WAVE RECEIVER MUST HAVE THIS METAL PLATE ATTACHED TO THE FRONT PANEL. DO NOT BUY ANY SO-CALLED "DOERLE" RECEIVER WHICH DOES NOT HAVE THIS PLATE.



NOTHING BUT PRAISE FOR THESE SETS

"SURE WORKS SWELL"

Gentlemen:
Last year I bought a Doerle short-wave kit, and constructed it myself, of the 2-tube type. It sure works swell. I have received the following stations: VK2ME, W8NK, EAT, W3XL, W1XAZ, VE9-L, XERR, KEE, GSC, YVIBO, VK3ME, DJA, IZRO, Delmar Robinson, 603 E. Maple, Cushing, Okla.

SOME LIST!

I have just completed your Doerle two-tube. I received the following on the loudspeaker: NDA, LQA, GMB, VE9DR, VE9FV, KK-Q, W1XAZ, W2XAF, W3XAL, W3XAU, W8XK, W8XAL, W8XP, W9XAA, Bermuda, Honolulu, Budapest, Hungary, and "hams" in 38 states, Maurice Kraay, R.F.D. 1, Hammond, Ind.

THIS IS GOING SOME!

Today is my third day working the Doerle set, and to date I have received over fifty stations. Some of the more distant ones I shall list. From my home in Maplewood, N. J., I receive the following: WVR, Atlanta, Ga.; W8K, Ohio; W9BIM, Ft. Wayne, Ind.; W5AYS, Elgin, Ill.; W8ERK, Girard, Ohio; and best of all, NDA, Mexico; PZA, Surinam, South America; TIR, Carthage, Costa Rica; G2WV, Leicester, England. I have also received stations in P.Q., which I have not found listed in the call book. Jack Prior, 9 Mosswood Terrace, Maplewood, N. J.

A DOERLE ENTHUSIAST

I have just completed my two-tube Doerle—and it surely is a great receiver! It works fine on all the wavbands. Nobody could wish for any better job than this one. I can get W8NK and W9XAA to work on the loud speaker at night, and the cble stations come in with a wallop behind them. Samuel E. Smith, Lock Box 2-1, Graven, Mich.

FRANCE SPEAKS ETC., ON LOUDSPEAKER

I hooked up my two tube Doerle Kit and I received France, Rome, Spain, Germany and England on the loudspeaker as well as over 100 amateur phone stations. I am very pleased with the receiver and would not part with it for anything. I have listened to many factory built short-wave receivers, but believe me, my DOERLE is the set for me. Arthur W. Smith, Springfield, Mass.

REGULAR FOREIGN RECEPTION

A few days ago I purchased one of your TWO TUBE DOERLE WORLD-WIDE SHORT WAVE RECEIVERS. I just want to tell you that this set does all you claim. In the short time I have had the set, I have brought in stations in England, Germany, France and South America, Daventry, England, and Nauen, Germany can be picked up daily with very strong volume. THE DOERLE IS A FINE SET. Arthur C. Gluck, Brooklyn, New York.

Practically every short-wave fan is by this time familiar with the famous Doerle receivers. So many of them have been sold and so persistently have they been advertised that now the newcomers in the short-wave game are scratching their heads and saying "there must be something in these Doerle sets."

The desk of our catalog editor has actually been swamped by letters of praise from our customers trying out their Doerle receivers for the first time. So excited are they at receiving their first foreign broadcasts that they go into sixteen ecstasies of joy and then pass some of it onto us by penning letters to us. Several of these letters are reprinted on these pages.

Mr. Doerle described his first receiver, the now famous TWO-TUBE 12,500 MILE RECEIVER in the December-January issue of Short Wave Craft. If you are a reader of this magazine you have undoubtedly been amazed at the tremendous number of fan letters published in that magazine. Thousands of experimenters have built their own and have obtained miraculous results. The TWO-TUBE 12,500 MILE DOERLE RECEIVER is a low-priced set, yet pulls in short-wave stations from over the entire world, in PRACTICALLY ANY LOCATION, NOT ONLY IN THIS COUNTRY, BUT ANYWHERE AND EVERYWHERE. If all commercial receivers were built along the same lines as the Doerle, a good deal of the skepticism on the part of the fans would undoubtedly be eradicated. THESE DOERLE SETS WORK BECAUSE THEY ARE SIMPLE. They work because there is absolutely nothing that can possibly go wrong. People who have been skeptical of short-wave reception, can now buy these Doerle receivers without the slightest doubt in their minds but what they will perform 100%. All the usual "bugs" have been thoroughly ironed out by us in such a way that you may order any receiver with full confidence that in practically ANY LOCATION, anywhere, "they will do their stuff."

Only First Class Parts Used

It may be possible to buy the parts or the completed set elsewhere at a lower price. We admit this at once. But we also say advisedly that a short wave receiver is no better than the cheapest component part contained therein. Only first-class material is used in our Doerle receivers. We have done away with all "losses." There is no hand capacity. All component parts are neatly assembled on a beautifully-finished black crackle chassis—a chassis which will enhance the appearance of any room in which it is placed. This receiver may be had either completely wired or in kit form.

The kit consists of the following parts: 1-black, crackle-finished panel, drilled; 1-black, crackle-finished base completely drilled and punched; 2-genuine Hammarlund .00014 mf. condensers; 1-filament rheostat with switch; 2-Kurz Kasch vernier dials; 1-bakelite knob; 1-audio transformer; 1-special r.f. choke; 1-.0001 mf. fixed condenser; 1-5 meg. grid leak; 2-sets of double binding posts; 1-color-coded battery cable; 1-coil socket; 2-type 230 tube sockets; 1-antenna equalizer condenser; 1-set of 4 plug-in coils, 15 to 200 meters; and assorted hardware and hook-up wire. Shipping weight 5 lbs.

SPECIFICATIONS

- No. S2140 Two Tube 12,500 Mile Doerle Short-Wave Receiver, completely wired and tested as per specifications. Shipping weight, 5 lbs. **\$9.90**
YOUR PRICE
- No. S2141 Two Tube 12,500 Mile Doerle Short-Wave Receiver Kit, with all parts as specified above, but not wired, with blueprint connections and instructions for operation. Shipping weight, 5 lbs. **\$8.70**
YOUR PRICE
- No. S2142 Complete set of accessories, including the following: 2 six months guaranteed Neontron type No. 230 tubes; one set of No. 1678 Matched Impedance, Matched Headphones; 2 No. 6 standard dry cells; 2 standard 45-volt "B" batteries. Shipping weight, 22 lbs. **\$5.45**
YOUR PRICE



FOUR FULL PAGES OF INSTRUCTIONS and DIAGRAMS FREE

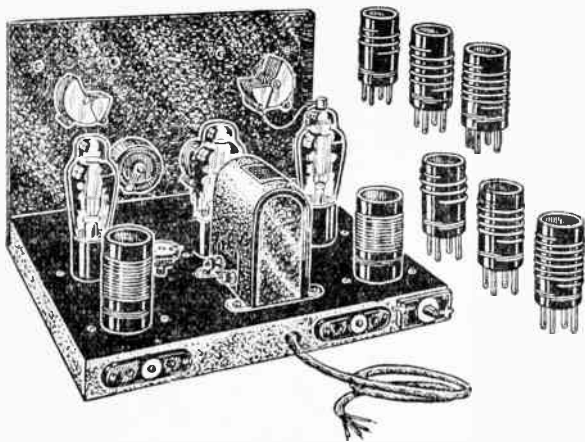
Every Doerle receiver is accompanied by a complete set of instructions and diagrams. These instructions are not only an aid to building the set but also give detailed instructions on how to operate it as well as enlightening information concerning successful short-wave reception. The diagrams are both schematic and pictorial. People who have never followed a radio diagram before will be able to assemble the kit from our instructions and diagrams.

THRILLED BY DOERLE PERFORMANCE

I am very much pleased with the DOERLE S.W. radio I received; the local amateur stations come in loud and clear. The first foreign station I received was DJA, Zessen, Germany. I certainly received this station with a thrill. Yours for success, Randolph Gray, Quincy, Mass.



Front View of all 2-Tube Doerles



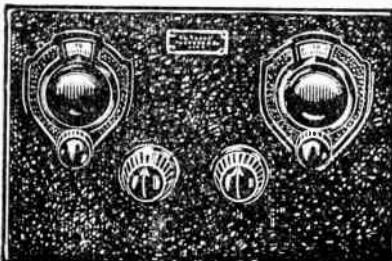
Improved 3-Tube Doerle Signal Gripper

THE IMPROVED 3-TUBE SIGNAL GRIPPER differs from the 2-TUBE 12,500 MILE DOERLE SET only in that it has a stage of radio frequency amplification before the detector. In less technical language, this means that the 3-tube receiver is able to "reach out" further for more stations; that it is more sensitive and a bit more selective. It means that a good many more of the local stations will come in with so much more power that a loudspeaker can be operated. Two sets of coils must be used with this set, one for the r.f. stage and one for the detector stage. As is the case with the 2-tube receiver this 3 tube set is in the low-price class, yet withal, it pulls in short-wave stations from all over the world with singular regularity and in practically any location, not only in this country, but anywhere. All fancy gadgets and embellishments, which are usually found on more expensive receivers, have been done away with, so that now none but the very fundamental parts which are required for successful short-wave reception are utilized. This means that it is difficult for the set to get itself out of order—that's how simple it is.

The Improved 3-Tube Signal Gripper employs a type 34 screen grid r.f. amplifier followed by a type 30 regenerative detector and finally, a type 30 A.F. amplifier. It requires 2-No. 6 dry cells to light the filaments and 3-45 volt "B" batteries for the plate supply. A good magnetic loud speaker should be used on strong signals. Tuning is exceedingly simple and oscillation is always under the full control of the operator. The vernier dials are so accurate that stations can actually be logged and found in their allotted positions each time the set is turned on. All Doerle receivers without exception are tested in our laboratory under actual operating conditions. They are available either fully assembled ready to use, or in kit form.

The kit consists of: 1-black, crackle-finish panel, drilled; 1-black, crackle-finished base completely drilled and punched; 3-Hammarlund 00M4 mf. condensers; 1-filament rheostat with switch; 2-Kurz Kasch vernier dials; 2-Bakelite knobs; 1-audio transformer; 1-special r.f. choke; 1-0001 mf. fixed condenser; 1-5 meg. grid leak; 2-sets of double binding posts; 1-color-coded battery cable; 2-coil sockets; 2-type 30 tube sockets; 1-type 34 tube socket; 1-screen-grid clip; 1-antenna equalizer condenser; 2-sets of plug-in coils (4 per set) 15 to 200 meters, and assorted hardware and hook-up wire. Shipping weight 9 lbs.

Free Instructions
and Plans with
Each Kit



Front View of all
3-tube Doerle Receiver

Testimonials — Our Poor Catalog Editor



ASK THESE FANS— THEY OWN DOERLES

WELL SATISFIED

Gentlemen:
I bought a three tube Doerle receiver from you a few months ago at \$11.85 and I got good results from it and the set is still in good working order just as the day I got it.

But I am thinking about getting a larger set and would give you my first preference as I got the results from your three tube receiver. I got England, Spain and Germany very clear as well as Canada and U. S. stations.

JAMES GILLESPIE,
131 Beckwith Ave.,
Paterson, N. J.

FOREIGN STATIONS GALORE

Gentlemen:
It may interest you to know that at 12:15 P.S.T., I heard CFH at Rio de Janeiro. They came in at 10220 Kcs. and the announcing voice was as clear and strong as on an ordinary telephone.

I am using just 45 volts for both detector and audio stage on the plate. What it would do on 90 volts on the audio I do not venture to say.

At the moment 10:35 P.S.T., I am listening to phone from Japan to Hawaii. No station identification however. Around 16,030 K.C.S., KKD—Kauai, Hawaii just identified his station.

HARRY V. DAVIS,
Penticton, B.C., Canada.

DELIGHTED!

Gentlemen:
I set the set to working just as soon as received and I am more than delighted with it. I have heard stations in England, Germany, Spain, Italy and Canada and the set works fine.

I have a friend who told me if my set worked all right, he thought he would order one just like it. You will probably hear from him in a few days as he is coming over to hear my set and I am sure he will order one just like it.

HOWARD A. PAGE,
Buckroe Beach, Va.

SPECIFICATIONS

No. S2143 Improved THREE TUBE DOERLE SET, completely wired, ready to use. **YOUR PRICE \$12.85**

No. S2144 Improved THREE TUBE DOERLE SET IN KIT FORM with all parts as specified above, but not wired—with blueprint connections and instructions for operation. Shipping weight, 7 lbs. **YOUR PRICE \$11.50**

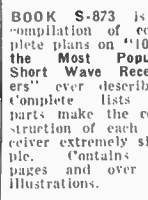
No. S2145 Complete set of accessories, including the following: 2 six months guaranteed Neontron type 230 tubes; one type 34; one set of Brandes Matched Headphones; 2 No. 6 standard dry cells; 3 standard 45-volt "B" batteries, 1 B.B.L. 9 inch Cone Magnetic loudspeaker. Shipping weight, 32 lbs. **YOUR PRICE \$11.50**

ABSOLUTELY FREE! Your Choice

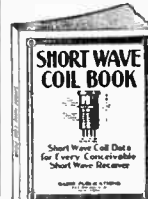
Of Any One Of The Short-Wave Books Listed In This Column—ABSOLUTELY FREE OF CHARGE—with the purchase of any short-wave receiver listed in this catalog. Please understand that only the short-wave book will be given with any one set purchased. If you buy two sets you are entitled to two books. All the books listed here are very timely and will bring your radio library more up to date. If you desire to purchase them separately, you will find them listed elsewhere in this catalog.



BOOK S-872 compiled especially for beginners. Contains everything in connection with short waves, starting with simplest fundamentals to the present stage of the art. Excellent reference book for old timers. Contains 40 pages, and over 75 illustrations.



BOOK S-873 is a compilation of complete plans on "10 of the Most Popular Short Wave Receivers" ever described. Complete lists of parts make the construction of each receiver extremely simple. Contains 40 pages and over 75 illustrations.



BOOK S-874 is a complete and comprehensive compilation of all available data on winding procedures for short-wave coils. Only the most modern information on the subject is included. No radio library complete without this book. Contains 16 pages and more than 32 illustrations.

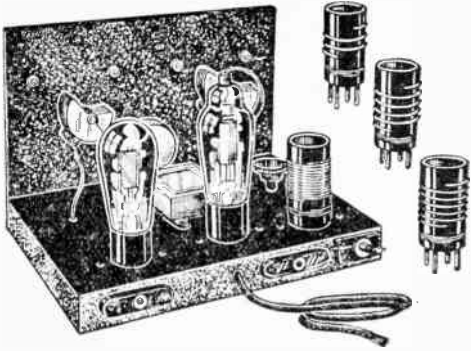


BOOK S-830 contains a wealth of material on the building and operation of many short-wave receivers and converters. A complete compilation of the best receivers over a long period of time. Contains 72 pages and more than 150 illustrations.



BOOK S-866 is indispensable to the short-wave fan who plans eventually to become a transmitting amateur. Theory of radio circuits, Federal regulations, learning the code and many other subjects clearly explained. Contains 72 pages and more than 150 illustrations.

You'll Stay Awake Nights —



Listening To These Electrified Official Doerle Receivers WILL OPERATE ON A.C. OR BATTERIES

Electrified Two Tube 12,500 Mile Doerle Receiver

BE CONVINCED BY THESE SHORT-WAVE DOERLE FANS

FOREIGN STATIONS GALORE!

Gentlemen:
I built the Doerle 2 tube A.C. set and here is what I logged so far: EAQ, NDA, 2AE, 2XK, IEL, 3NL, KAHFT, KIOXAL, VE9JR, W: XAL and plenty of 20 and 30 meter amateurs.

ROBERT SCHMITZ,
West Allis, Wis.

A GOOD START!

Gentlemen:
Received set O.K. this morning. First phone station received was E.A.Q., Madrid, Spain.
PAUL PARKER (D), JR.
Barnton Bays, N. Y.

THERE'LL BE MANY MORE!

Gentlemen:
I picked up California, Canada, England, Spain, Colombia, and Germany on your 3 tube Doerle.

W. L. KING,
184 12th St., N.W.
Washington, D. C.

"SWEETEST" LITTLE SET

Gentlemen:
I have built the Doerle 2-Tube A. C. set and it is the "sweetest" little set I have ever heard! With the results I have obtained so far there is nothing that so can't get! I want to add another audio stage to it using a 57 tube. I strongly recommend this set to anyone.

EDWARD McGRATH,
121 E. 139 St.,
Brooklyn, N. Y.

GERMANY ON LOUD-SPEAKER!

Gentlemen:
I received the three tube electric set together with the power pack in perfect condition. I am well pleased with the set although it is my first short wave. Last Saturday I got London and held it for one and one-half hours. I get Germany very good on the loud speaker, also South America and Canadian stations, but I only used one set of plug-in coils so far. I had an expert get it up for me and he gave me the lesson at the same time. I have a very poor aerial so far.

JOHN C. CONNELLY,
11 Hill St.,
Watertown, Mass.

"AM SURE PROUD OF IT"

Gentlemen:
I must say that the 3 tube Doerle receiver electrified, will bring in stations that my 2 tube all-wave Scout will bring in. I am sure proud of it. Stations on speaker are VK2ME, EAQ, IAB, VV3BW, GSP, BI, Prador, NDA, 0A1B, X1B, VK2ME, W3XAL, W9NE, W3XAL, W2NE, RV1BC, WEA, WEF, VE9GW, W3XAL, W3XL, W2XAF, W2XAD, W3XK, VE9JR, XETE, HJ1ABE, HC2RL, TU9RH, 13RO, DHD, PSH, and ham stations in 23 states.

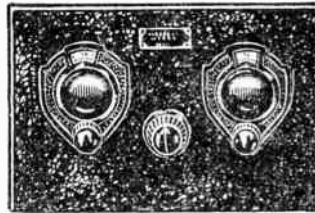
JAMES BROWN,
Box 265,
Lubbock, Texas.

YES—once you buy these electrified Official Doerle receivers, you will not sleep any more. You will stay awake nights traveling from country to country and from continent to continent listening to programs which you never even dreamt existed. This is no mere statement as you will note by the letters from short-wave Doerle fans some of which are reprinted on these pages. If you think your present set is good,—wait until you listen to a Doerle! Perhaps your friend already has one; listen to his!—that will convince you.

The original Doerle receivers were battery sets designed for 2-volt operation. Subsequently we developed an A.C. model designed to take advantage of the latest type tubes. This, of course, means that these new electrified receivers are infinitely more sensitive and selective; it means that they will reach out further and bring in stations which you never even knew existed. Expensive receivers can do no more than what these simply-constructed Doerles will do. All fancy gadgets and embellishments have been eliminated for they are not necessary for successful reception of short-wave programs. Latest type triple-grid high-gain tubes are employed. The screen grid detector and resistance-coupled audio stages are features which all dyed-in-the-wool experimenters will appreciate.

AND ARE THEY POWERFUL!

This 2-tube receiver brings in distant stations REGULARLY and, on local signals, loud enough to operate a loud speaker. Practically all local stations and many favorably located foreign stations are thus received. Uses 1-57 tube as screen grid detector and 1-56 as the audio amplifier. The circuit is so designed that the receiver may be used either with an A.C. power pack or with batteries. When used with a power pack the 57 and 56 tubes are



utilized. When used with batteries the 56 is replaced with a 37 and the 57 with a 77. Batteries required are 4 No. 6 dry cells (in series-parallel arrangement, or any other 6-volt source such as a storage battery) for the "A" supply and 2-45 volt "B" batteries for the "B" supply. If a power pack is used it must be one designed especially for short-wave receivers or else considerable difficulty will be encountered due to noise which is usually inherent in an ordinary power pack. The power pack listed on this page has been designed especially for use with the electrified Official Doerle Receivers. Only first-class parts are used. We fully appreciate that it is possible for you to buy the parts or the complete sets elsewhere, but unless you too wish to join the ranks of skeptical short-wave fans, you will insist upon receiving only the best of parts. FOR YOU MUST NOT FORGET that in short waves, it takes as little as a poorly-made socket or improper layout of wiring to render the set inoperative. In these receivers only the best tuning condensers—and that means Hammarlund, of course—are used. We too could have used cheaper parts but refrained from doing so because THEN we could not guarantee results.

SPECIFICATIONS

No. S2174 Electrified 2 Tube 12,500 Mile Doerle Receiver, completely wired and tested, less tubes. Shipping weight, 7 lbs. **YOUR PRICE \$10.45**

No. S2175 Electrified 2 Tube 12,500 Mile Doerle Receiver in kit form, less tubes, but including blueprints and instructions. Ship. wt., 7 lbs. **YOUR PRICE \$9.25**

No. S2176 Complete set of tubes for above; either one—57 and one—56 for A.C. operation, or one—77 and one—37 for battery operation. **YOUR PRICE \$1.80**

Special Hum-Free A.C. Power Pack

Designed Especially For The Doerle Receivers

Every one knows that an A.C. short-wave receiver is no better than the power pack which supplies its power. A power supply for short wave work must be constructed with extreme care. It must be absolutely free from hum or other disturbances caused by insufficient filtering, poor wiring or faulty equipment.

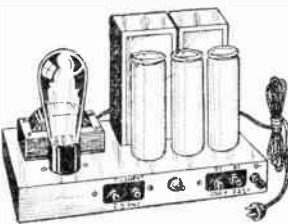
This unit has a two-section filter circuit, employing 2-30 henry chokes and a tremendous amount of capacity on all sides. This assures PURE D.C. with practically no ripple at all.

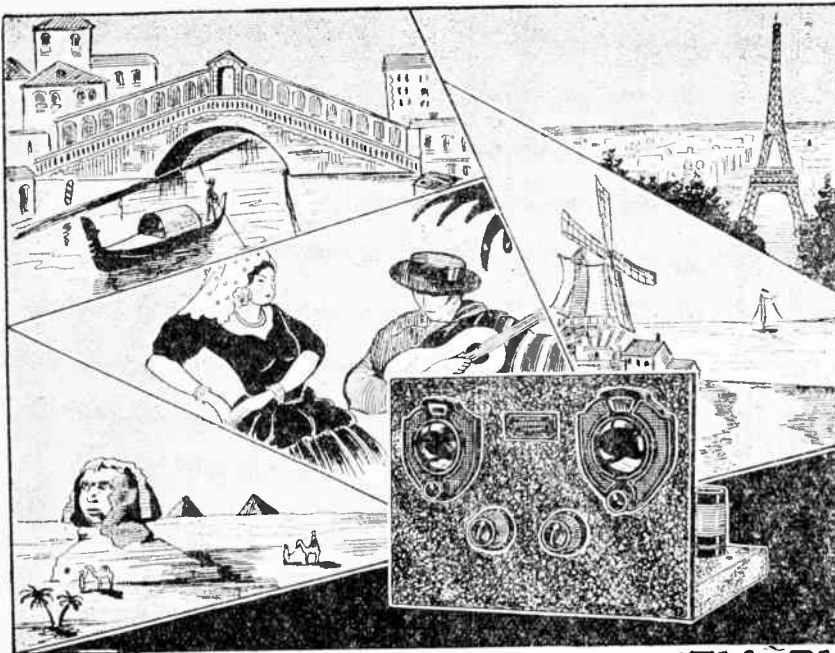
The power pack supplies 250 volts at 50 mils for the plates of the tubes, 22½ volts for the screen and 2½ volts at 5 amperes for the filaments. These various voltages are obtained from convenient binding posts on the side of the pack. All component parts are built into a sturdy metal base presenting a neat, professional appearance.

The pack employs a type 280 full wave rectifier. A convenient on-off toggle switch is mounted on the side. The pack is sold with line cord and plug and the 280 rectifier tube. Measures 10" x 5½" x 6½" overall.

Not only can this power pack be used with the Doerle receivers, but with many other short-wave sets requiring similar voltages. The voltage divider used in the pack is of the variable type so that intermediate voltages may be obtained by adjusting the sliders. Shipping weight, 10 lbs.

No. S2149 Special Hum Free A.C. Power Pack including 280 Tube. **YOUR PRICE \$7.25**





—and what's more
**YOU'LL TOUR THE
 WHOLE WORLD**
 via these

**Short-Wave
 Doerle Sets**
15 TO 200 METERS
**Will Operate Both
 on A.C. or Batteries**

**Electrified 3-Tube Doerle
 Signal Gripper**

This receiver is of course the "top notch" of the entire Doerle line. It naturally would be, since it employs an extra radio frequency stage which makes it considerably more selective. A type 58 super-control r.f. amplifier is employed in that extra stage. This is followed by a type 57 screen-grid detector and finally a resistance-coupled 56 audio amplifier and output tube.

The results obtained with this 3 Tube Electrified Signal Gripper surpass even your wildest imagination. We do not ask that you take our word for it—merely read the letters written by short-wave Doerle fans on this page. They are only a few of the hundreds which we receive regularly. In fact the illustration above was inspired by these many testimonials—testimonials which praise this receiver beyond description. Many of our Doerle fans wax so enthusiastic that they cannot wait long enough to fully exploit the power of these Doerle receivers. They hastily write "have had your Doerle set but one day and have already received so and so, etc.—more later." And why shouldn't they be enthusiastic? After all, their greatest expectations in short-wave reception are being realized.

The electrified 3-tube Doerle receiver is so designed that it can be operated in conjunction with either an A.C. power pack or batteries. When used with batteries the 58 tube is replaced with a 78, the 57 with a 77 and the 56 with a 37. The necessary batteries are four No. 6 dry cells (arranged in series parallel, or any other 6 volt source such as a storage battery) as the "A" supply, and three 45 volt "D" batteries as "B" supply. When used with the power pack the 58, 57 and 56 are of course used. The power pack must be of special construction so that all the usual noise inherent in ordinary power packs are eliminated. The power pack illustrated on the opposite page has been especially designed to be used in conjunction with the electrified Doerle sets.

A special feature of this particular set is that the antenna trimming condenser has been eliminated through the use of induction coupling. This does away with the necessity of continually adjusting the antenna condenser for the different wave lengths. Two sets of plug-in coils are employed. One being of the 3-winding 6-prong type and the other the standard four-prong type. All local short wave stations and a considerable number of foreign ones come in on the loud speaker—**REGULARLY—NIGHT AFTER NIGHT—WHENEVER THEY ARE ON THE AIR.** In other words no matter how weak a signal may be if it has sufficient power to reach your antenna it will be intercepted. Set measures 8 1/4" deep x 10 1/4" wide x 7" high. All parts mounted on a beautiful black, crackle-finished chassis.

SPECIFICATIONS

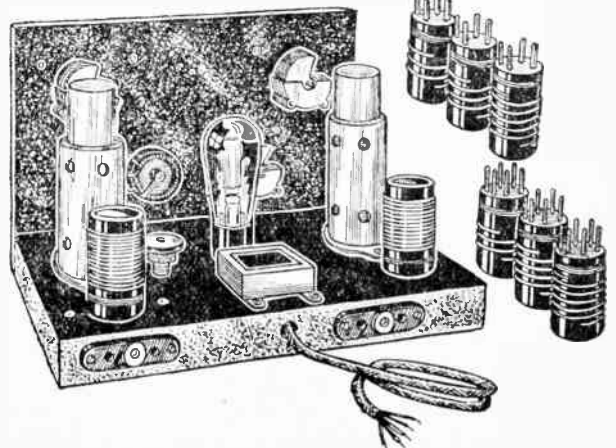
- No. S2177 Electrified 3 Tube Doerle Signal Gripper, completely wired and tested; less tubes. Shipping weight, 9 lbs. **YOUR PRICE \$15.20**
- No. S2178 Electrified 3 Tube Doerle Signal Gripper in kit form, including blueprints and instructions; less tubes. Ship. wt., 9 lbs. **YOUR PRICE \$13.75**
- No. S2179 Complete set of tubes; either one—58, one—57 and one—56 for A.C. operation or one—78, one—77 and one—37 for battery operation. **YOUR PRICE \$2.55**

This Plate—



appears on the front panel of every Official Doerle Short-Wave Receiver. We do this to protect the interests of our customers against the purchase of so called "Doerle" receivers or receivers which are merely designated as "12,500 Mile Short-Wave Set," "3 Tube Signal Gripper" or any other name which was originally associated with the official Doerle circuit. Such sets are sold at lower prices because they contain inferior parts. Therefore do not forget: It is not a Doerle receiver if it does not have the official name plate bolted to the front panel.

**4 FULL PAGES OF
 INSTRUCTIONS—FREE**



FREE—BOOKS

See Page 27

MORE LETTERS

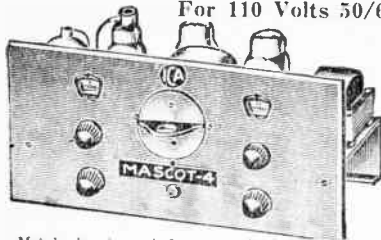
**HATS OFF AGAIN TO THE
 "DOERLE"!**

What a break for me that I heard about the world famous "Doerle" receiver. I constructed it, after reading of the wonderful results obtained by others—and it worked right off the bat!

The first station received was WINAZ and since I made it all kinds of stations have been "logged." Here are some of them: KKZ, KWL, KEZ, VEGW, WXP, WSK, WINAZ, WIXAL, VEGH, WOO, WML, WMA, WEF, WEXAT, WZE, GBC, GSH, GSB, EAQ, WIXB, XPE, HIC, PSH, PCV, and others too numerous to mention. I have pulled in "hams" from Canada, Mexico, Venezuela and hear by every station in the Union. My aerial at the present time is a single wire running north and south 175 feet long and the lead-in is on the northern end. Gerald E. Nearhood, Cedar Rapids, Neb.

THE MASCOT A.C. FOUR

For 110 Volts 50/60 Cycle A.C. Operation



- 16 TO 200 METERS
- VERNIER FULL-VISION DIALS
- FRONT PANEL COIL PLUG-IN
- VERNIER BAND-SPREAD
- 4 LATEST TYPE TUBES
- NO HAND CAPACITY
- LOUDSPEAKER OPERATION

Metal chassis and front panel provide effective shielding and the elimination of hand capacity. The front panel coil plug-in arrangement facilitates the changing of coils without removing the chassis from the cabinet or reaching behind the panel.

Vernier Full Vision Dials having a ratio of two to one make for precise and exact tuning of short-wave stations. In addition, a band-spread control is provided which allows the mechanical separation of stations on the bandspread dial over practically 100 divisions.

The receiver employs four of the latest type tubes in a circuit which is equivalent to five-tube performance. One 6B7 dual-pentode-triode tube is used as radio frequency amplifier and regenerative detector. This is resistance-capacity coupled to a type 77 high-gain screen grid pentode acting as a first audio amplifier tube. A type 80 tube is used as the rectifier in the power supply which is an integral part of the receiver. A head-phone jack is provided in the plate circuit of the 77 audio stage.

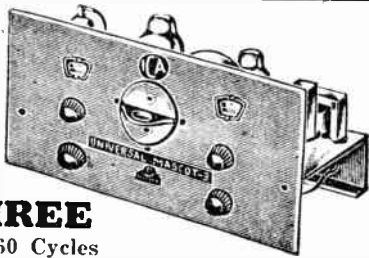
Either a magnetic speaker or a dynamic speaker having a field resistance of 2500 ohms and a pentode 42 output transformer can be used with this receiver.

A complete kit of four coils is supplied covering the short-wave bands as follows: Green 16-38 meters; Brown 35-75 meters; Black 73-137 meters and Red 135-200 meters. Additional coils to cover the special bands of from 9.5 to 21 meters and the broadcast band of from 190 to 550 meters will be found listed on page 40. Complete instructions and blueprints showing you how to build this receiver in a few hours' time are furnished with each kit. Measurements 14" x 7" x 6 3/4".

SOLD ONLY IN KIT FORM. Shipping weight, 20 lbs. **YOUR PRICE \$17.65**

No. S-310 Universal Mascot A.C. Four Tube Receiver Kit. **YOUR PRICE \$3.48**

- FRONT PANEL PLUG-IN COIL
- VERNIER FULL VISION DIALS
- VERNIER BAND-SPREAD
- 3 LATEST TYPE TUBES



Universal MASCOT THREE

105 to 130 Volt A.C. 50/60 Cycles

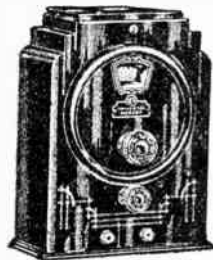
This set uses three of the latest type tubes arranged in such a novel manner as to give actual five-tube performance. One 6B7 dual pentode triode tube is employed as R.F. amplifier and regenerative detector, resistance capacity coupled to a 79 dual triode tube as audio amplifier. An 80 tube is used as a rectifier.

Vernier Full Vision Dials having a ratio of two to one make for precise and exact tuning of short-wave stations. In addition, a bandspread control is provided, which allows the mechanical separation of stations on the bandspread dial over a much greater travel of the dial.

The complete kit of parts is supplied with four coils covering the short-wave bands as follows: Green 16-38 meters; Brown 35-75 meters; Black 73-137 meters; Red 135-200 meters. Additional coils to cover the special bands of from 9.5 to 21 meters and the broadcast band of from 190 to 550 meters will be found listed on page 40. Complete instructions and blueprints showing you how to build this receiver in a few hours' time are furnished with each kit. The set measures 11" x 7" x 6 3/4". **SOLD ONLY IN KIT FORM.** Shipping weight, 15 lbs.

No. S-316 Universal Mascot Three Tube Receiver Kit. **YOUR PRICE \$13.23**

No. S-317 Set of 6 Months Guaranteed Tubes; 1-6F7; 1-79; 1-80. **YOUR PRICE \$3.46**



Mascot 1-Tube Receiver

16 to 200 Meters — Full Vision Dial

Economical 2-Volt Battery Operation

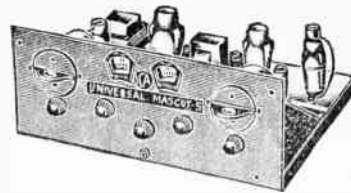
Here is one of the finest little 1-tube short-wave sets you've ever laid eyes on. The entire receiver in its beautiful, black bakelite modernistic cabinet is no larger than the average electric clock and yet in performance it will outdo many of the 2 tube receivers on the market. Small as it is, it has a completely built-in metal chassis which prevents hand capacity and other detrimental effects inherent in unshielded receivers.

A full-vision vernier dial affords precise tuning—so precise in fact that stations may be definitely logged and always found in their respective positions on the dial. Two convenient phone tip jacks are mounted right on the front of the panel.

This receiver is extremely economical to operate. It requires but a single ordinary 80 "dry cell to light the 50 tube and a single 45 volt standard "B" battery. These batteries will last for many months, even with frequent use. The complete kit is supplied with four low-loss bakelite plug-in coils covering the following ranges: Green 16-38 meters; Brown 35-75 meters; Black 73-137 meters; Red 135-200 meters. Additional coils to cover the bands of from 9.5 to 21 meters and the broadcast band of from 190 to 550 meters will be found listed on page 40 of this catalog. A complete set of detailed instructions enabling you to construct this set in a few hours' time is furnished with each kit. The black bakelite case measures 5 3/4" high x 4 3/4" wide x 2 3/4" deep. Shipping weight, 4 lbs.

No. S-318 Universal Mascot 1-tube Kit. **YOUR PRICE \$5.85**

No. S-319 Accessories, 6 Months' Guaranteed 30 Tube; 1 No. 6 Dry Cell; 1 45-volt Standard "B" Battery. **YOUR PRICE \$2.03**



- 16 TO 200 METERS
- VERNIER FULL-VISION DIALS
- FRONT PANEL COIL PLUG-IN
- 5 LATEST TYPE TUBES
- NO HAND CAPACITY
- DYNAMIC SPEAKER OPERATION

MASCOT A.C. FIVE

110 Volts 50/60 Cycle A.C. Operation

This receiver is a De-luxe model short-wave instrument employing one tuned R.F. stage, 1 tuned regenerator detector, 1 high-gain resistance-capacity coupled audio amplifier, 1 pentode power output tube and 1 80 type full-wave rectifier tube. Individual dial control of the R.F. and detector circuits increases the overall selectivity of the receiver. Band-spread tuning is controlled by another individual dial.

Metal chassis and front panel provide for effective shielding and the elimination of hand capacity. The front panel coil plug-in arrangement facilitates the changing of coils without removing the chassis from cabinet or reaching behind the panel.

Vernier Full Vision Dials having a ratio of two to one make for precise and exact tuning of short-wave stations. In addition, a band-spread control is provided which allows the mechanical separation of stations on the bandspread dial over practically 100 divisions of the dial. This aids materially in utilizing the high selectivity of the receiver.

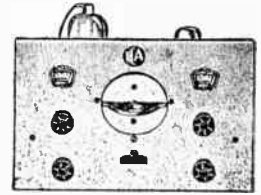
This receiver uses one type 78 variable- μ screen-grid pentode as R.F. amplifier, one type 37 triode as sensitive regenerative detector which is resistance-capacity coupled to a 77 high-gain screen-grid pentode audio amplifier which in turn is type 80 full-wave rectifier is used in the power supply which is an integral part of the receiver. Connections are provided for a phonograph pick-up. A head-phone jack is also provided in the plate circuit of the 77 audio amplifier.

This receiver can be used with either a magnetic speaker or a dynamic speaker having a field resistance of 2500 ohms and a pentode 42 type output transformer. The complete kit of parts includes eight plug-in coils. **SOLD ONLY IN KIT FORM.** Measurements 17" x 7" x 12". Shipping weight, 25 lbs.

No. S-312 Universal Mascot A.C. Five Tube Receiver Kit. **YOUR PRICE \$23.09**

No. S-313 Set of 6 Months Guaranteed Tubes, 1-78; 1-37; 1-77; 1-42; 1-80. **YOUR PRICE \$3.80**

- 16 TO 200 METERS
- FRONT PANEL COIL PLUG-IN
- VERNIER FULL VISION DIALS
- VERNIER BANDSPREAD
- 3-TUBE PERFORMANCE



MASCOT TWO

Economical 2-Volt Operation

Metal chassis and front panel provides effective shielding and the elimination of hand capacity. The front panel plug-in coil arrangement facilitates the changing of coil without removing the chassis from the cabinet or reaching behind the panel. The coils plug into a shield can which thoroughly isolates them from the tube circuits, giving the best possible performance. Commercial type ring handles are provided for convenient removing of coils from chassis.

Vernier Full Vision Dials having a ratio of two to one make for precise and exact tuning of short-wave stations. In addition, a bandspread control is provided which allows the mechanical separation of stations on the bandspread dial over a much greater travel of the dial. This aids materially in utilizing the high selectivity of the receiver. In operation, the main tuning dial is set to the approximate band desired and the various stations in this band are then tuned in with the bandspread dial which distributes them over practically 100 divisions on the band-spread dial.

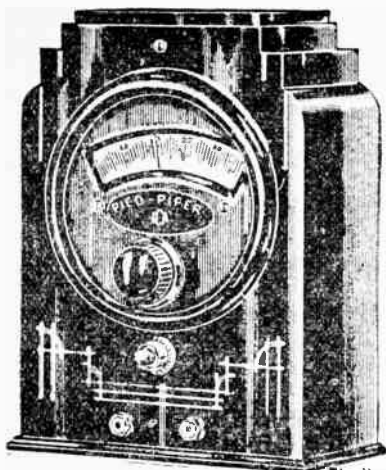
A new circuit arrangement for regeneration control is incorporated in this receiver, which uses a non-inductive resistance in series with a fixed capacity. This gives very smooth and precise control of regeneration so necessary for tuning in weak short-wave signals. Uses one 32 type screen grid detector tube and one 19 type dual triode tube as two-stage, resistance-capacity coupled audio amplifier, thereby giving exceptional volume from the two tube receiver. The dual operation of the 19 tube actually gives three tube operation.

The receiver will operate with an efficient loud speaker on foreign short-wave broadcasts. Another feature of the set is its low total "B" battery drain. The receiver only requires one milliamperes of current from 135 volts of "B" battery—a feature which insures practically shelf life for the "B" batteries, (which under normal conditions will last for more than one year). The filaments of the tubes can be supplied from two No. 6 standard dry cells and will give satisfactory operation over a long period of time without replacement. Where a 2-volt storage cell or air cell is available, even longer operation without recharging the battery is possible.

The complete kit is supplied with four coils covering the short-wave bands as follows: Green 16-38 meters; Brown 35-75 meters; Black 73-137 meters; Red 135-200 meters. Additional coils to cover the special bands of from 9.5 to 21 meters and the broadcast band of from 190 to 550 meters will be found listed on page 40. Complete instructions and blueprints showing you how to build this receiver in a few hours' time are furnished with each kit. Measurement: 7" x 10" x 6". **SOLD IN KIT FORM ONLY.** Shipping weight, 8 lbs.

No. S-314 Mascot 2-Tube Battery Receiver Kit. **YOUR PRICE \$10.29**

No. S-315 Set of 6 Months Guaranteed Tubes; 1-32; 1-19 Twin Tube; 2 No. 6 Dry Cells; 3-45 Volt Standard "B" Batteries. **YOUR PRICE \$5.94**



THE PIED PIPER

AFFORDS
Crystal-Clear Reception
and yet
Costs Nothing To Operate

Range 190 to 550 Meters

- NO BATTERIES
- NO TUBES
- ADJUSTABLE CRYSTAL
- ILLUMINATED TUNING DIAL

Recently there has been a tremendous revival of interest in crystal receivers. And why not?—for the best possible fidelity of tone is obtained only from a crystal receiver. Engineers frankly admit that our most modern multi-tube receivers cannot compare with the tone of a simple crystal set. The Pied Piper is as different from old type crystal sets as our modern receivers from the old type battery sets. It is a beautiful instrument housed in a beautiful black, molded-bakelite case of modernistic design. In fact it looks just like a small midgeet receiver.

The "Pied Piper" measures 6½" high x 4¾" wide x 2¾" deep. It has an adjustable crystal control, operated from the front panel. Furthermore a full-vision dial is automatically illuminated by a pilot light operating from a flashlight cell. This feature is optional. When tuning takes place all one has to do is to hook up the aerial and ground, plug in the head phones and "go to it." The earphone jacks are conveniently located on the front panel. Take it where you wish;—to isolated spots, camps, summer resorts, etc. Requires no batteries or tubes of any kind. The pilot light battery is not essential to the operation of the set. Merely set it up and it works right off the "bat". Shipping weight, 5 lbs.

No. S-5 "Pied Piper" Crystal Receiver. **\$2.65**
YOUR PRICE
No. S-320 Accessories, Comprising Complete Antenna and Ground Kit and Standard Headset. **\$1.60**
YOUR PRICE

Triplet Thermo-Couple Ammeters

For High Frequency Work



These panel instruments are of the movable iron-repulsion type with sapphire jewel bearings. All are air-damped and have extra light moving parts. Accuracy guaranteed at 2%. All meters are in bakelite cases requiring a 2½" hole for mounting. Overall diameter of meter 3½". These meters are operated with external couplings which can withstand a 50% overload. They are connected to the meter with 2 ft. leads. Length of scale 2½". **WHEN ORDERING, PLEASE MENTION CATALOG NUMBER AND AMMETER RANGE.**

Range	Res.	Cat. No. S-441
0-1 Amperes	.15	YOUR PRICE
0-2.5 Amperes	.13	\$6.53
0-5 Amperes	.065	

Universal A.C.-D.C. Meter

Copper-Oxide Type

The A.C. scale has 75 divisions marked 0 to 15 in red. The D.C. is similar but printed in black. The ohm scale reads 0-1500 in black and 0-1.5 megohms in red. With multipliers, scale readings are 0-15-150-750 volts A.C. or D.C. at 1000 ohms per volt resistance. The D.C. milliamperage readings are 15-150. Ship. 1½ lbs.

No. S-Univ. Universal Meter (0-1 M.A.) With Copper Oxide Unit and Switch Only. **\$10.00**
YOUR PRICE

No. S-Kit. Complete Kit of Mounted Resistors and Shunts (to obtain all above-mentioned readings), selector switch, rheostat, jacks, panels, bar knobs, batteries—22.5 and 1.5 volts and hook-up wire, less meter. Shipping weight, 1½ lbs. List Price \$20.00 **\$13.35**
YOUR PRICE

NOTES ON SHORT-WAVE RECEPTION*

The following notes are a summary of extensive data compiled mainly by experimentation and should be found both interesting and helpful, especially to beginners in the field of short-wave reception.

Broadcast transmission at 40 meters is most reliable when received from a distance of 500 miles (800 kilometers) or more, although good reception at distances greater than 1500 miles (2400 kilometers) can be expected only when a large portion of the signal path is in darkness.

Thirty-one (31) meter stations afford greatest reliability of service to receivers situated at a distance exceeding 500 miles (800 kilometers). Good reception from distance stations in this band is possible both day and night.

Reception from stations operating in the 25 meter band is most reliable when a span of 1000 miles (1600 kilometers) or more separates the receiver and trans-

mitter. Such transmission over distances of less than 2000 miles (3200 kilometers) will be received best during daylight hours. The more distant stations however, can still be heard well after nightfall under favorable conditions.

In the 19 meter band stations situated at a distance of 1500 miles (2400 kilometers) or greater will be found most satisfactory. Signals in this band will generally be heard during daylight hours—rarely after nightfall or when any appreciable portion of the transmission path is in darkness. Wavelengths below 19 meters are useful only when transmitted entirely through daylight and over long distances (2000 miles or more); ordinarily they cannot be received after sunset.

Transmitted signals of any wavelength are known to divide into two components—the "ground" wave and the "sky" wave. The former remains close to the earth's surface, providing reliable service only over short distances from the broad-

casting station. The sky wave, however, travels into the higher layers of the atmosphere and is reflected back to the earth's surface at an appreciable distance from the station. With short-wave signals, the sky wave usually does not return within the radius covered by the ground wave, resulting in a so-called dead-spot region within which reception is impossible or extremely unsatisfactory. The length of the region wherein such conditions are effective is known as the "skip distance," varying greatly from day to night and from summer to winter approximately as shown in the Table.

The time standards observed at various longitudes must be considered in the reception of short wave broadcast. At 8:00 P.M. in New York or 7:00 P.M. in Chicago, it is 1:00 A.M. of the next day in London and 2:00 A.M. of the next day in most of Europe. At these hours, obviously, the European broadcasting stations are seldom in operation. Therefore, on the American continents, tuning for stations

in Europe must be done during the afternoon or early evening. Australian stations, on the contrary, will be received in the early morning.

Although reception on the short wavelengths is less affected by atmospheres or static and good results may be had in mid-summer even during a thunder storm, the reverse is true of man-made interference. Electrical machinery such as trolleys, dials, telephones, motors, electric fans, automobiles, airplanes, electrical appliances, flashing signs and oil burners create far more interference to the shorter waves than do frequencies in the standard broadcast band (200 to 555 meters).

While the foregoing statement are valid, many other factors may so influence the transmission of short waves that expectations are probable in certain locations. Experience in the operation of short-wave receivers in a given location is the best guide as to what to expect in reception at various times.

*Courtesy R.C.A. Victor Company, Inc.

EFFECT-OF TIME OF DAY AND SEASON OF YEAR ON SHORT-WAVE TRANSMISSION

Wavelength (Meters)	Ground Wave Range		Sky Wave (Summer) Reliable Range				Sky Wave (Winter) Reliable Range			
	Miles	Kilom.	Noon		Midnight		Noon		Midnight	
			Miles	Kilom.	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.
100	90	145	90	145	600	970	100	160	2500	4000
49	75	120	100-200	160-320	250-5000	400-8000	200-600	320-970	400-∞	640-∞
31	60	97	200-700	320-1125	1000-∞	1600-∞	500-2000	800-3200	1500-∞	2400-∞
25	50	80	300-1000	480-1600	1500-∞	2400-∞	600-3000	970-4800	2000-∞	3200-∞
19	35	56	400-2000	640-3200	2500-∞	4000-∞	900-4000	1450-6400	X	X
15	15	24	700-4000	1125-6400	X	X	1500-∞	2400-∞	X	X

∞—Unlimited distance.

X—Ordinarily cannot be heard.

NOTE—Time and season apply to transmitting station. The above table applies to transmitters of relatively high power and to receivers operating under favorable conditions.

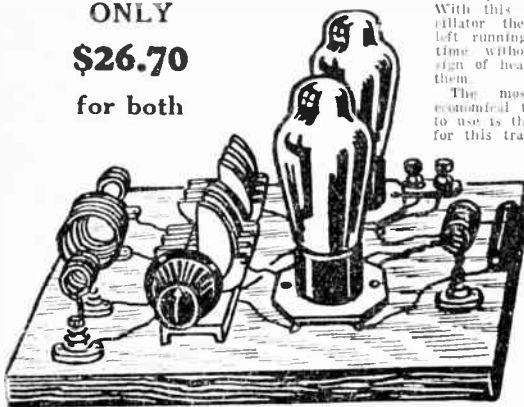
RADIO TRADING COMPANY, 101 HUDSON STREET, NEW YORK, N. Y.

"R.T." 5-METER PHONE TRANSMITTER

This 5 meter transmitter uses 12-A or 71-A oscillator tubes in a push-pull oscillator circuit and is modulated with a class "B" modulator. Uses a 53 twin tube. The modulator unit also supplies the plate voltage for the oscillator. This little 5-meter transmitter is capable of working practically every station that can be heard on the 5-meter band.

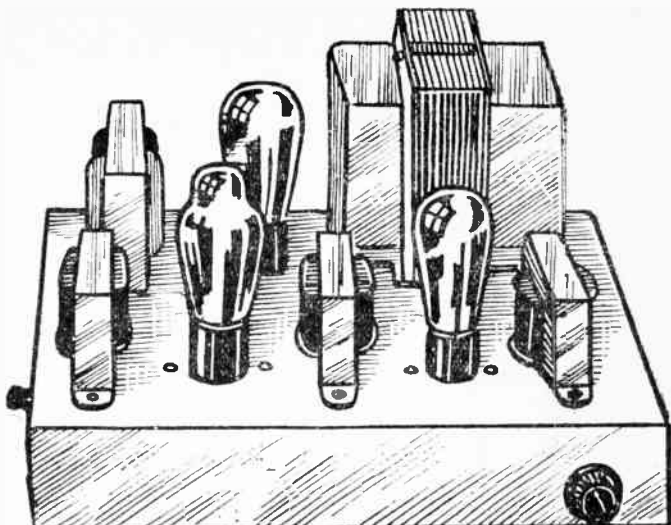
Although the transmitter uses receiving type tubes throughout, it is capable of emitting a surprisingly strong signal. Distances up to 35 miles have been covered in all sorts of weather. The outfit has proven to be entirely satisfactory under all conditions. The tubes used in the push-pull oscillator circuit may be either 12-A's or 71-A's. The 12-A's seem to be the best oscillators and are much steadier in operation. The plate supply furnished is 300 volts at 75 milliamperes or a power of 22½ watts.

**ONLY
\$26.70
for both**



With this input to the oscillator the tubes may be left running for hours at a time without the slightest sign of heating or injury to them.

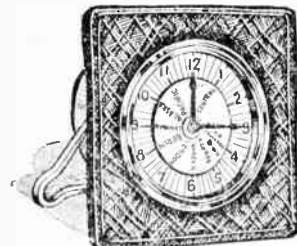
The most efficient and economical type of modulator to use is the class "B" type for this transmitter. It was found, while still under test, that the 53 class "B" twin tube offered the best modulation. With the proper plate voltage and excitation this tube will deliver approximately 10 watts of audio power. This is entirely sufficient to modulate the two 12-A's in push-pull 100 percent, with 300 volts on the plates. The high quality class "B" components on the modulator assures good quality speech and complete modulation of the oscillator. A type 82 rectifier is used in the power supply. The power supply has been especially designed for short-wave operation. It provides 300 volts at over 100 milliamperes for the modulator and 300 volts at 75 milliamperes for the oscillator. The filter is a single section brute-force affair with an 8 mf. electrolytic condenser on each side of a heavy duty filter choke. This choke is capable of passing more than 175 mls and has a very low D.C. resistance. The use of a poor quality choke at this point would render the entire power supply and modulator unsuitable for short-wave work. Only the finest quality parts are used throughout its entire construction. The oscillator itself is neatly laid out and mounted on a wooden breadboard measuring 8½" x 5½" x 3" high overall, while the power supply and modulator are mounted on a single heavy metal chassis measuring 12" x 8" x 6¾" high overall.



No. S305 5-Meter Push-Pull Oscillator, Less Tubes. Shipping weight, 8 lbs.

YOUR PRICE \$7.95
No. S306 Modulator and Power Supply for 5-Meter Transmitter, Less Tubes. Shipping weight, 20 lbs.
YOUR PRICE \$18.75

NEW! — Short-Wave Round-the-World Clock



Here is something entirely new in the short wave field. A CLOCK WHICH INSTANTLY TELLS YOU THE EXACT CORRESPONDING TIME IN ANY OF 12 ZONES IN DIFFERENT PARTS OF THE WORLD. For instance, if you look at the clock at 8:00 P.M. in New York, that very same glance will tell you instantly that it is 1:00 A.M. of the next day in London. This speed-creating convenience is exactly what short wave fans and amateurs have been wanting for a long time.

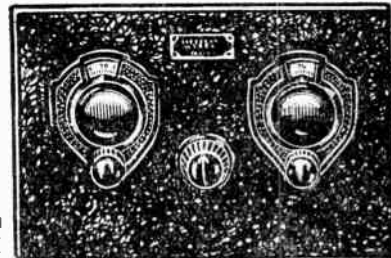
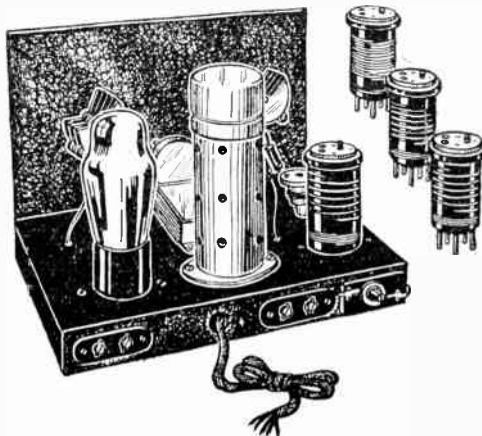
Previously in order to receive a foreign station at a certain time in New York one had to consult either a flat map or a globe in order to find out the corresponding time in that particular country. Now he can have it at a moment's notice. It is just as simple as telling time every day in the year. The clock itself is of the spring-wound type having a 30-hour guaranteed movement and a 2" dial. The 12 zones are etched in brass on a special dial attached to the hour shaft and moves in unison with the hour hand. The clock is mounted in a genuine leather plaque with scratch-brass back and case. Ship. weight, 2 lbs.

No. S112-L Short-Wave Clock. **\$2.05**
YOUR PRICE

HERE IT IS! Amateur Bandspread DOERLE SET

15 to 200 Meters

— — — and out of the confusion and darkness emerged the Official Doerle Amateur Bandspread Receiver. No more maze of shrieking, incoherent stations, one on top of the other! No more ear-splitting, nerve-racking bedlam of noise—like half dozen menageries suddenly turned loose. So, friends, throw away your headache powders and your aspirins; settle back in your easy chair and listen to REALLY pleasant and comfortable short-wave reception. Go to your short-wave receiver as you would to your telephone—with that same sense of security and confidence that that



See Page 12

which you are after, you will receive. **THAT IS THE STORY OF THE DOERLE BANDSPREAD RECEIVER.**

Any particular amateur band may now be spread over practically the entire tuning scale of the dial. If you have already bought one of the original 2-tube electrified models you can very easily modify it for band spread operation by carefully reading the bandspread article in the editorial section of this catalog. Stations which before were closely crowded or passed by entirely, can now be spread over the entire dial and thus be easily intercepted. Not only that but through the use of the powerful 2A5 pentode in the output stage, most of these short-wave stations will now come in on the loud speaker.

The circuit incorporates the new Alden 5 prong bandspread plug in coils. These coils are specially designed for this particular work, each having a padding condenser mounted to the top. This condenser is shunted across the entire secondary winding, whereas the main tuning condenser is across only part of this winding.

The same standard of high quality parts used in other Doerle receivers is maintained here. All component parts are mounted on a beautiful black, crackle-finished chassis with the Official Doerle nameplate bolted to the front panel. Although this receiver may be used with batteries it is recommended for A.C. operation. A good, well-filtered power supply such as the one we recommend for our other Doerle receivers should be used. The set uses 1-58 and 1-2A5. A set of 4 bandspread plug-in coils are furnished with the receiver. Shipping weight, 8 lbs.

No. S307 Official Doerle Amateur Bandspread Receiver, Less Tubes But Including Coils. **\$11.75**
YOUR PRICE

"R.T." AMATEUR C.W. PUSH-PULL TRANSMITTER

Featured In Short Wave Craft
Magazine October, 1933.

- 15 to 30 Watts
- All Amateur Bands
- A Real Globe Girder
- It Is Fool-proof — Because It Is Simple

POWER SUPPLY

The power supply to operate this transmitter delivers 400 volts at 150 milliamperes for the plate of the tubes and 2.5 volts for the filaments. A type 83 mercury vapor rectifier is used because of its low voltage drop which permits excellent regulation. The filter consists of a 30 Henry iron-core choke with two 2 mfd. 1000 volt condensers on either side. A suitable size bleeder resistor is connected across the output filter to further aid in regulation by suppressing the high voltage peaks when there is no load on the power pack as is the case when the key is in the "off" position. Ship. wt., 8 lbs., for transmitter and 18 lbs. for power pack.

No. S2121 "R.T." Push-Pull Transmitter, complete with 80 meter coils, but less tubes. **\$5.95**

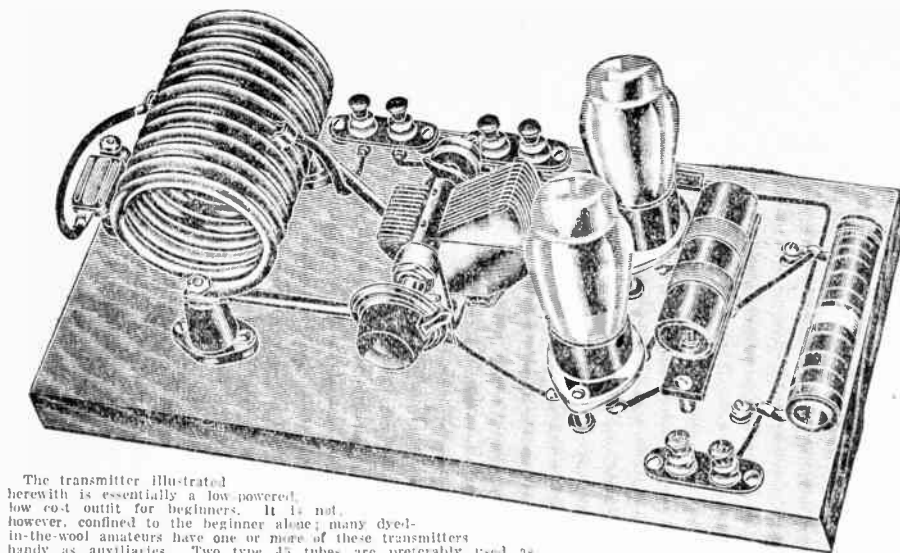
YOUR PRICE
No. S2122 Power Pack for "R.T." Transmitter, less tubes. **\$7.95**

YOUR PRICE
No. S2123-A Plug-In Coils for 20 Meter Band. **\$1.75**

YOUR PRICE
No. S2123-B Plug-In Coils for 40 Meter Band. **\$1.95**

YOUR PRICE
No. S2123-C Plug-In Coils for 60 Meter Band. **\$2.25**

YOUR PRICE



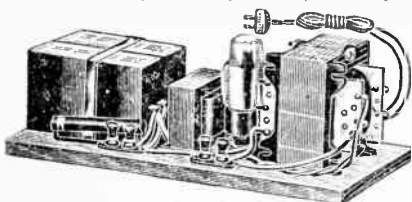
The transmitter illustrated herewith is essentially a low-powered, low cost outfit for beginners. It is not, however, confined to the beginner alone; many dyed-in-the-wool amateurs have one or more of these transmitters handy as auxiliaries. Two type 45 tubes are preferably used as oscillators. These tubes are most popular because of their low cost and because, in actual operation, they have practically the same output as the type 210 tubes, yet at 1/3rd the cost.

The circuit is of the type using fixed-tuned grid, tuned plate. The construction of this transmitter is, as you will notice, extremely simple. No grid or filament by-pass condensers are used and the usual R.F. choke has been omitted from the plate circuit. No benefit was derived from their employment. The method of coupling the antenna to the output circuit is unique and a desirable feature. The antenna suggested is a single-wire-fed Hertz. The transmitter is supplied with a set of 80-meter coils. Coil sets to cover the other amateur bands may be had at the additional prices shown at the right.

This transmitter, with a power output of anywhere

from 10 to 30 watts (depending upon the type of tubes employed) is a REAL globe girder. Some short-wave fans (particularly the newcomers) have the impression that a transmitter, with a power output of, let us say, 10 watts, will transmit only several miles and no further. This, for their guidance, is not the case, for location and weather conditions constitute important factors. The "R.T." Transmitter has actually "worked" amateurs in the far corners of the earth. It is a well known fact that a LOW POWER TRANSMITTER IN A GOOD LOCATION IS, PRACTICALLY SPEAKING, MORE "POWERFUL" THAN A HIGH POWER TRANSMITTER IN A POOR LOCATION.

All parts are neatly laid out in bread-board fashion so that all parts of the circuit are easily accessible.



Heavy-Duty Power Pack

Versatile One Tube "Push-Pull" Ten Meter Transmitter USES NEW 53 CLASS "B" TWIN TUBE EXCELLENT FOR PHONE WORK

Paradoxical as it may seem this 10 meter transmitter EMPLOYS A SINGLE TUBE IN "PUSH-PULL" ARRANGEMENT. Heretofore "push pull" automatically implied the use of 2 tubes—yet here we are with a 1-tube push-pull transmitter.

It is the advent of the new type 53 tube which makes this fact possible. This tube is actually "TWO" in one glass envelope. It was designed as a class "B" twin amplifier. So versatile however, is this tube that not only can it be used for power amplification but for detection and amplification as well. In fact we list in this very catalog, a so-called one tube Twinplex receiver which is "A ONE TUBE TWO-TUBE SHORT-WAVE RECEIVER." This single 53 tube is made to detect as well as amplify short-wave signals.

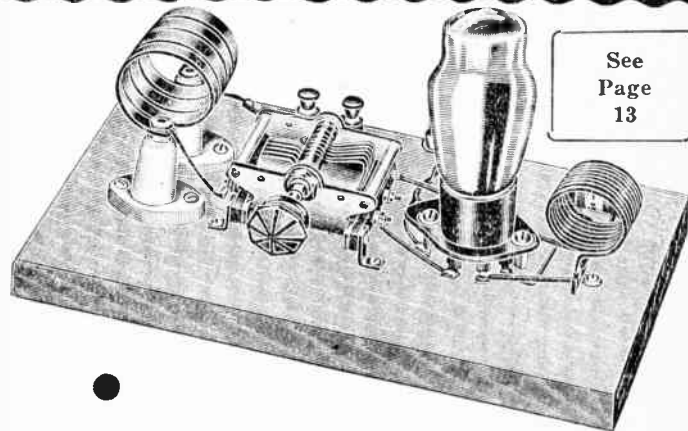
This 10-meter transmitter is not a high-power job but when properly coupled to a suitable antenna system, such as a single-wire-fed Hertz or the familiar zepelin antenna it will, under favorable conditions, transmit over a long distance. The circuit is of the fixed-tuned grid, tuned plate type and utilizes a solenoid of solid copper ribbon as the plate coil. All component parts are of the highest possible quality since r.f. loss in ultra short-wave work is fatal.

There are any number of uses to which a compact unit of this type may be placed. For instance, it can be used as a master oscillator for multi-stage, high frequency transmitters OR 2 such units may be connected together to produce a complete master oscillator—r.f. amplifier transmitter. Neutralizing condensers must be used when used as an R.F. amplifier. The transmitter requires 2½ volts, either A.C. or D.C., for the filament of the 53 tube and anywhere from 180 to 350 volts "B" supply. The keying is done in the cathode lead.

THIS UNIT IS EXCELLENTLY SUITED FOR PHONE WORK. A single-button microphone can be inserted in series with grid return lead (using no microphone transformer) thereby obtaining from 80 to 80% modulation. The transmitter, on its neat bread-board measures 11" long x 6¼" wide x 6" high overall. Furnished complete with a set of 10-meter coils. Shipping weight, 10 lbs. No. S10-M Versatile 10-Meter Transmitter, Less Tube. **\$4.50**

YOUR PRICE

\$4.50

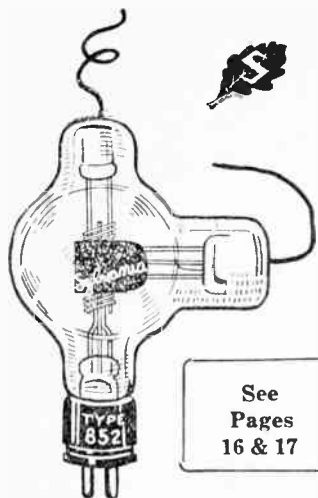


Special Short-Wave Power Pack

This power pack has been especially built for use with short-wave equipment. It was originally designed especially for the official Doerle receivers listed elsewhere in this catalog. Furnishes 250 volts at 50 mls. 22½ volts (not required on this transmitter) and 2½ volts at 5 amperes for the filament. A two section filter circuit with a tremendous amount of filtering capacity, assures pure D.C. output. Sold complete with a 280 rectifier tube. Ship. wt., 10 lbs.

No. S2149 Special Short-Wave Hum-Free A.C. Power Pack including 280 Tube. **\$7.25**

YOUR PRICE



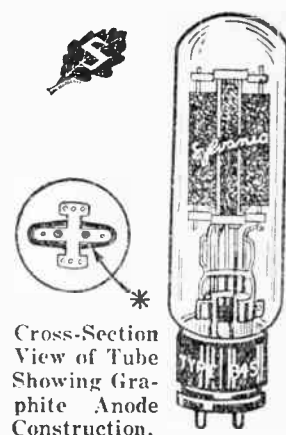
See
Pages
16 & 17

Sylvania

REG. U.S. PAT. OFF.

TRANSMITTING TUBES PHOTOTUBES INDUSTRIAL POWER TUBES

**Precision — Performance
Endurance**



*
Cross-Section
View of Tube
Showing Gra-
phite Anode
Construction.

AIR COOLED VACUUM TUBES

Cat. No.		YOUR PRICE
S-203A*	Oscillator and radio frequency amplifier	17.50
S-204A*	Triode oscillator and R.F. amplifier	97.50
S-205D*	Oscillator, Modulator, R.F. & A.F. amplifier	7.00
S-210*	Triode oscillator and amplifier	5.75
S-211*	Oscillator, Modulator, R.F. & A.F. amplifier	17.50
S-211B*	Special 211 for high frequency applications	19.00
S-211C*	Low interelectrode-capacity type 211	17.50
S-242A*	Modulator and A.F. amplifier	17.50
S-264A	Non-microphonic A.F. amplifier	2.50
S-264B	Non-Microphonic A.F. amplifier	2.50
S-276A*	Oscillator, Modulator, R.F. & A.F. amplifier	17.50
S-282A*	Screen grid oscillator and R.F. amplifier	31.00
S-825*	High frequency oscillator and amplifier	10.00
S-830*	Oscillator, Modulator, R.F. & A.F. amplifier	8.75
S-830A*	Class A audio frequency amplifier	10.00
S-830B*	Class B audio frequency amplifier	10.00
S-841*	Oscillator and voltage amplifier	5.75
S-842*	Audio frequency power amplifier	7.50
S-845*	Audio frequency amplifier and modulator	20.00
S-850*	Screen grid oscillator and R.F. amplifier	37.50
S-852*	High frequency oscillator and R.F. amplifier	23.80
S-860*	Screen grid oscillator and R.F. amplifier	35.00
S-865*	Screen grid oscillator and amplifier	12.75

WATER COOLED VACUUM TUBES

Cat. No.		YOUR PRICE
S-207	Water-cooled oscillator and R.F. amplifier	\$350.00
S-820B	Water-cooled oscillator and R.F. amplifier	187.00
S-846	High frequency water cooled oscillator	300.00
S-858	Water-cooled oscillator and R.F. amplifier	500.00
S-863	Water-cooled oscillator and R.F. amplifier	350.00

RECTIFIERS

S-217A*	Half-wave, high vacuum thermionic rectifier	20.00
S-217C*	Half-wave, high vacuum thermionic rectifier	20.00
S-866*	Half-wave mercury vapor rectifier	5.00
S-866A*	Shielded filament, high voltage type 866	5.00
S-872*	Half-wave mercury vapor rectifier	16.50
S-872A*	Shielded filament, high voltage type 872	18.50
S-869*	Half-wave mercury vapor rectifier	168.00
S-869A*	Shielded filament, mercury vapor rectifier	168.00

GRID CONTROLLED RECTIFIERS

S-867*	Grid controlled mercury vapor rectifier	14.00
S-873*	Grid controlled mercury vapor rectifier	25.00

PHOTOTUBES

S-803A	Theater and industrial type Phototube	10.00
S-814A	General purpose and theater type Phototube	7.50
S-868	General purpose and theater type Phototube	5.65

*THESE TUBES EMPLOY THE EXCLUSIVE SYLVANIA GRAPHITE ANODE CONSTRUCTION

A graphite anode is now used in all Sylvania intermediate and high power air-cooled transmitting tubes. To the many inherent good features of the Sylvania line the graphite anode adds the following major advantages over tubes employing the ordinary type of metallic plate:

1. High plate dissipation without overheating. This is a direct result of the high thermal emissivity of graphite.
2. Lower operating temperature at the anode. This results in a lower operating temperature of the other electrodes, preventing primary and secondary emission from the grid.
3. Uniformity of characteristics. The physical properties of graphite permit exact processing. Graphite does not warp under high temperatures and the mechanical

dimensions of the anode remain constant. Proper relation between the tube elements retained in this manner preserve the normal electrical characteristics of the tube. One-piece construction of the anode eliminates high contact resistance found in other methods of construction.

4. Long life. Comparative freedom from gas is another important result of the use of the graphite anode and the high vacuum obtainable results in longer tube life.

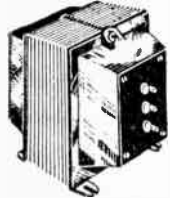
These new Sylvania tubes are not to be confused with ordinary "carbon plate" tubes. A process developed in the Sylvania laboratories produces a one-piece anode of pure graphite, with all amorphous carbon and other impurities removed. This treatment insures freedom from harmful carbon deposits on filament, insulators and presses.

.... Franklin Amateur Transmitting Equipment

Plate Transformers Filament Transformers Swinging Chokes

Filter Reactors Audio Chokes Speech Amplifier Transformers

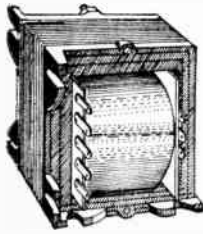
ALL TYPES — CLASS A and B



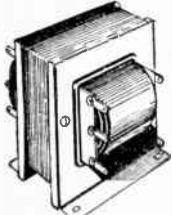
Type A



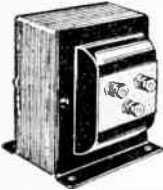
Type F



Type D



Type C



Type G

Plate Transformers									
Cat. No.	Illus.	Secondary Voltages	Sec. M. A.	V. A.	L.	W.	H.	YOUR PRICE	
S-FTP7	D	500-0-500	150	75	3 3/4"	5 1/2"	4 1/2"		\$5.63
S-FTP51	H	500-0-500	300	150	3 3/4"	5 3/4"	4 3/4"		6.00
S-FTP8	H	750-0-750	200	150	3 3/4"	5 3/4"	4 3/4"		6.57
S-FTP4	H	1000-750-0-750-1000	300	300	5 3/4"	6 1/2"	6 1/2"		8.91
S-FTP1	H	1500-1000-0-1000-1500	175	262	5 3/4"	6 1/2"	6 1/2"		11.25
S-FTP52	H	1500-1000-0-1000-1500	600	900	5 3/4"	9 1/2"	6 1/2"		18.00
S-FTP2	H	2000-1500-0-1500-2000	250	500	5 3/4"	7 1/2"	6 1/2"		15.95
S-FTP5	H	2500-1500-0-1500-2500	250	625	5 3/4"	8 1/2"	6 1/2"		17.82
S-FTP53	H	3000-2000-0-2000-3000	200	600	5 3/4"	9"	6 1/2"		21.00
S-FTP54	H	3000-2000-0-2000-3000	350	1000	5 3/4"	10"	6 1/2"		25.00

Combination Plate and Filament Transformers									
FOR CLASS B AUDIO, LOW POWER TRANSMITTERS AND MODULATORS.									
1500 VOLT INSULATION									
Cat. No.	Illus.	Plate Supply	Filament Supplies	No. and Type of Tubes	L.	Size W.	H.	YOUR PRICE	
S-FT182	D	350 0 350	5V. 3A.	1-83, 5Z3					
		200 M. A.	2 1/2 V. 3A.	2-46, 47	3 3/4"	3"	4 1/2"		\$4.95
S-FT6	H	100-0-100	2 1/2 V. 7A.	4 24, 27, 47					
		100 M. A.	7 1/2 V. 3A.	2-10, 65, 81	3 3/4"	5 1/2"	4 1/2"		4.40
		150 0 450	5 V. 3A.	1-800, etc.					
S-FT282	D	200 M. A.	2 1/2 V. 3A.	1-83, 5Z3					
		600 0 600	2 1/2 V. 9A.	2-47, 46, etc.	3 3/4"	5 1/2"	4 1/2"		5.54
S-FT284	H	150 M. A.	2 1/2 V. 3A.	5-24, 27, 47, or 1-59's					
		600 0 600	7 1/2 V. 3A.	2-10, 1-800	3 3/4"	5 3/4"	4 1/2"		5.90
S-FT283	H	150 M. A.	5 V. 3A.	1-83, 80, 5Z3	3 3/4"	5 3/4"	4 1/2"		5.90
		750 0 750	7 1/2 V. 3A.	2-10, 1-800					
S-FT3	H	300 M. A.	7 1/2 V. 3A.	2-10, 1-800	5 3/4"	6"	6 1/2"		7.32
		600 0 600	5 V. 3A.	1-83, 5Z3, 80					
S-FT11	H	250 M. A.	2 1/2 V. 1 1/2 A.	3-47, 2-50, etc.	5 3/4"	6"	6 1/2"		6.50
			5 V. 3A.	1-83, 5Z3, 80					

Filament Transformers									
Cat. No.	Illus.	SECONDARY Volts	Amps.	Insulation	SIZE L.	W.	H.	Type Tubes	YOUR PRICE
S-FTF40	C	2.5	10 C. T.	7500	3 3/4"	4 1/2"	4 1/2"	866, 82	\$5.25
S-FTF50	H	5.0	20 C. T.	7500	3 3/4"	5 1/2"	4 1/2"	872, 83	5.60
S-FTF10	C	7.5	3 C. T.	7500	3 3/4"	4 1/2"	4 1/2"	800, 210, 841, 812	5.23
		7.5	3 C. T.	7500				865, 250, 281, etc.	
S-FTF20	H	10.0	10 C. T.	7500	3 3/4"	3 3/4"	4 1/2"	03A, 111, 523, 160	5.60
S-FTF25	H	11.0	10 C. T.	7500	3 3/4"	3 3/4"	4 1/2"	01A, 849, 861	5.60
								Also 10v tubes & pri. rheo.	
S-FTF30	H	12.0	8 C. T.	7500	3 3/4"	3 3/4"	4 1/2"	11v tubes w/ pri. rheo.	5.60
S-FTF41	C	2.5	12 C. T.	1000	3"	2 1/2"	3 3/4"	47, 49, 46, 59	1.45
		5.0	3 C. T.	1000				83, 523, 80	
S-FTF42	C	2.5	12 C. T.	1000	3"	2 1/2"	3 3/4"	47, 49, 46, 59	1.65
		5.0	3 C. T.	1000				For C. T. Keying	
		5.0	3 C. T.	1000				83, 523, 80	
S-FTF43	C	7.5	3 C. T.	1000	3"	2 1/2"	3 3/4"	800, 10, 50, 65	1.45
		5.0	3 C. T.	1000				83, 523, 80	
S-FTF44	F	2.5	5 C. T.	1000	2 3/4"	1 3/4"	2 1/4"	45, 46, 47, 59	1.15
S-FTF45	F	7.5	3 C. T.	1000	2 3/4"	1 3/4"	2 1/4"	800, 10, 65	1.15
S-FTF46	D	5.0	6 C. T.	1500	3 3/4"	3 1/4"	4"	Bridge Rectifier, 1-83's, giving 1000 v.	2.60
		5.0	3 C. T.	1500				500 ma. (QST, July '33)	

Speech Amplifier and Receiver Audio Transformers

S-F6102	Plate (27's, etc.) to Grid.	3:1 Ratio	\$2.40
S-F6103	Grid, but to two Grids		2.55
S-F575	2A3 Plates to 500 Ohms		2.55
S-F563	Class B 40's to 500 ohms		2.40
S-F525	500 ohm line to grid		3.00
S-F525B	Grid, but Type F uncased		1.59
S-F520	Microphone, 200 ohm button to Grid		2.34
S-F521B	Grid, but double button and Type F uncased		1.32
S-F522	Grid, but to 500 ohm line. Cased		2.70
S-F522B	Grid, but Type F uncased		1.13
S-F6131	Double button microphone, 200 ohms per button, to Grid		3.10
	(Special balanced windings for low hum pickup.)		
S-F451	Push-pull Interstage, 4 separate windings, 1 1/2 to 1 Ratio		3.86
S-F527	500 ohm line to 2500, 5000 or 10,000 ohm load		3.30

Type numbers followed by "B" are uncased with push-back leads.
 Size 2 3/4 x 1 3/4 x 2. Weight 7 1/2 lbs.
 Illustration F.
 Others are fully cased. Illustration G
 Weight 3 lbs.
 Size 2 3/4 x 2 3/4 x 3 3/4.

Low Voltage Class B Power Transformers

S-182	350—350	5 V. 3 A.	\$4.95
	200 M.A.	2 1/2 V. 7 A.	
		2 1/2 V. 7 A.	
S-282	450—450	5 V. 3 A.	5.53
	200 M.A.	2 1/2 V. 9 A.	
		2 1/2 V. 9 A.	
S-290	375—375	5 V. 3 A.	5.25
	120 M.A.	2 1/2 V. 10 A. C.T.	
		6.3 V. 9 A. C.T.	
S-291	125—125	5 V. 3 A.	5.44
	100 M.A.	2 1/2 V. 2 A. C.T.	
		2 1/2 V. 7 A. C.T.	

Cat. No.	Henries	M. A.	Ohms	Insula-	Illus.	L.	SIZE W.	H.	YOUR PRICE
S-F981	750	5	3500	400	F	2 3/4"	1 3/4"	2"	\$1.40
S-F850	50	80	400	1000	G	2 3/4"	2 3/4"	3 3/4"	2.00
S-F700	30	100	200	1500	G	2 3/4"	2 3/4"	3 3/4"	1.80
S-F7C2	30	150	200	5000	H	3 3/4"	3 3/4"	4 1/2"	4.50
S-F991	30	200	90	1500	G	3 3/4"	3 3/4"	4"	3.30
S-F7C1	30	300	150	7500	H	5 3/4"	6 1/4"	6 3/4"	8.85
S-F7C4	30	500	100	7500	H	5 3/4"	6 1/4"	6 3/4"	10.50
S-F990	20	30	450	1000	F	2 3/4"	1 1/4"	1 1/2"	.75
S-F875	20	60	500	1000	F	2 3/4"	1 3/4"	2"	.95
S-F993	20	80	250	1000	F	2 3/4"	1 3/4"	2 1/4"	1.13
S-F994	20	150	200	1500	G	2 3/4"	2 3/4"	3 3/4"	2.10
S-F995	20	200	50	2500	G	2 3/4"	3 3/4"	4"	3.30
S-F986	10	60	300	2500	F	2 3/4"	1 3/4"	2 1/4"	.95
S-F7C7	10	150	100	1000	G	2 3/4"	2 3/4"	3 3/4"	2.00
S-F7C8	10	150	100	5000	G	3 3/4"	3 3/4"	4"	3.60
S-F7C3	10	500	70	5000	H	5 3/4"	6 1/4"	6 3/4"	8.00
S-F7C5	25/5	150	135	1000	G	2 3/4"	2 3/4"	3 3/4"	2.00
S-F7C9	25/5	150	100	5000	G	3 3/4"	3 3/4"	4"	3.60
S-F7C10	25/5	500	70	5000	H	5 3/4"	6 1/4"	6 3/4"	8.00

Filter Reactors, Chokes, Etc.

Our Regular Catalog contains Page after Page of other Audio and Power Transformers. Get your copy today if you do not already have one. See Page 51 for details.

Special Filament Transformers

DESIGNED TO FIT THE NEEDS OF THE AVERAGE AMATEUR STATION

Either of the two types below permit the use of primary keying of a separate plate supply transformer which avoids key clicks and high no-load filter voltages. With separate plate and filament transformers, it is convenient to delay the high voltage until all filaments are correctly heated, as recommended by tube manufacturers especially in the case of mercury vapor types. Transmitter filaments may be left lit while receiving but ready for instantaneous "come-back" or "breaks" and steadier filament voltages result from the use of separate transformers.

The normal 110 volt primary in either type below is tapped at about 103 volts so a primary rheostat may be used to accurately adjust the filament voltages for wide line voltage changes.

FOR LOW AND MEDIUM POWER
 For 47, 46, 59, (Xtal & Doublers)
 For 800, 10, 65, etc.
 For Rectifiers, 2 1/2 or 5 V.
 82, 83, 5Z3, 80, etc.

No. S-FTF70. YOUR PRICE \$4.50

FOR LOW AND HIGH POWER STAGES
 For Xtal & Doublers
 For 800, 10, 65, etc.
 For Rectifiers up to 3-83's;
 1-860 with 2-832; 3-03A,
 3-11; 3-845's; 3-860's;
 L. V. Stages H. V. Stages

2.5 Volts, 6 Amps. C. T., 1000 V. Insulation 82
 7.5 Volts, 6 1/2 Amps. C. T., 1000 V. Insulation 2-866's
 10.0 Volts, 10 Amps. C. T., 2500 V. Insulation 83, 5Z3, 80 2-872's

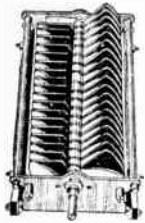
No. S-FTF71. YOUR PRICE \$9.00

Note: Either of the last two windings above may be used for the filaments of the high power rectifier and the other winding may be used for a low voltage rectifier for Crystal, Buffer, Doubler or Bias supply.

CARDWELL CONDENSERS

Receiving — Transmitting — Neutralizing

TRANSMITTING CONDENSERS



Cardwell transmitting condensers have for years been most favored by professional designers and engineers and are most popular with the amateurs. The manufacturers, having been in this business for a good many years, fully appreciate the shortcomings of ordinary transmitting condensers. Accordingly, these units have been designed to overcome these difficulties.

Those condensers intended for the higher voltages (such as T 100, T 143, etc.) have plates, the edges of which are well rounded and brought to a high degree of polish. As a result of this construction the condensers will withstand at least 50% more voltage above their ratings before flashing over. This is not the case with condensers using ordinary plates. A special feature is the self-cleaning brush contacts which are used. Cardwell condensers may well be bought with that sense of security and faithful performance which amateurs desire to have in their apparatus. Shipping weights, 3 to 8 lbs., according to type.

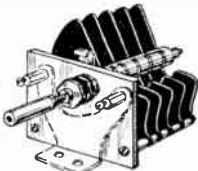
FOR LOW AND MEDIUM POWERED INSTALLATIONS

PAY PARTICULAR ATTENTION TO SYMBOLS REFERRING TO FOOTNOTES

Cat. No.	Max. Cap. Mmfd.	Min. Cap. Mmfd.	Air Gap	No. of Plates	Depth (back of Panel)	List Price	YOUR PRICE
*S-141B	250	15	.020"	11	2 1/2"	\$3.00	\$1.76
*S-123B	480	21	.030"	21	3"	1.00	2.35
*S-137B	950	33	.030"	41	4"	5.00	2.94
*S-164B	220	23	.020"	21	4"	4.00	2.35
*S-147B	410	42	.070"	43	5 1/2"	7.00	4.12
†S-T199	330	41	.084"	37	6 1/2"	10.00	5.88
†S-DT199	650	68	.084"	73	11 1/2"	22.00	12.94
†S-320B	242	32	.100"	33	6 1/2"	10.00	5.88
†S-521B	525	65	.100"	67	11 1/2"	21.00	12.25
†S-T183	110	31	.171"	23	6 1/2"	9.00	5.29
†S-DT183	228	50	.171"	45	11 1/2"	18.00	10.58

NEW "TRIM-AIR" MIDGET CONDENSERS

You will agree with us, when you buy these condensers, that they are the most ingenious ever devised. Not only can they be arranged in tandem but their rotors can be securely locked and the extension shaft removed for screw driver control. They are quality midget condensers using isolantite insulation. Furthermore, not only can they be mounted through the medium of single hole but a special bracket which may be had at an extra charge permits bread-board mounting. This special bracket attaches to the isolantite block so that neither rotor nor stator need touch the metal chassis if such is not desired. Panel space dimensions 1-7/16" x 1 1/4". Shipping weight, 3/4 lb.



Receiving Condensers

Cat. No.	Max. Cap.	Min. Cap.	Airgap	Depth Behind Panel	No. of Plates	List Price	YOUR PRICE
S-RT15	15	1.5	.031"	1-5/16"	5	\$1.15	\$0.68
S-RT25	25	2.5	.031"	1-1/32"	7	1.25	.73
S-RT35	35	3.5	.031"	1-5/16"	11	1.35	.79
S-RT50	50	5.0	.031"	1-5/16"	13	1.45	.85
S-RT75	75	7.5	.029"	1-5/16"	15	1.55	.91
S-RT100	100	10.0	.029"	1-13/32"	19	1.60	.94
S-RT140	140	14.0	.029"	1-7/8"	27	2.85	1.68

(S-RT140 is double ended, 2 bearings)

Transmitting Condensers

Cat. No.	Max. Cap.	Min. Cap.	Airgap	Depth Behind Panel	No. of Plates	List Price	YOUR PRICE
S-XT30	30	3.0	.070"	2-1/8"	17	1.70	1.00

Bracket with 2 screws and nuts—6c extra; mounting posts, per pair—6c extra; extension shaft for ranging—4c extra.

NEUTRALIZING CONDENSERS

Cat. No.	Max. Cap. Mmfd.	Min. Cap. Mmfd.	Air Gap	No. of Plates	Depth (back of Panel)	List Price	YOUR PRICE
†S-511B	23	10	.171"	5	3"	3.00	1.76
†S-513B	50	17	.171"	11	4"	6.00	3.53
†S-515B	56	20	.230"	15	5 1/2"	10.00	5.88
†S-415B	34	11	.171"	15	4 1/2"	5.50	3.23

(This condenser, Type 415B, built into our Midway "Featherweight" f-frame)

SPLIT STATOR CONDENSERS

Cat. No.	Max. Capacity, Mmfd.		Air Gap	Rotor and Stator Plates	Num. of Plates (ea. Sec.)	Depth (back of panel)	YOUR PRICE
	Sections in Mult.	Per Section					
*S-156B	1000	250	500	21	21	4"	\$3.53
*S-197B	160	40	80	11	9	4"	2.94
*S-157B	420	100	210	18	21	5 1/2"	4.70
†S-512B	140	25	50	16	11	6 1/2"	5.88

(Any other condensers listed on this page can be supplied split at \$1.50 extra.)
*Standard receiving condenser spacing. — Suitable for low powered transmitters, filter and stator plates have rounded edges and are highly polished overall.

ALSO MADE TO SPECIAL REQUIREMENTS — SEND PARTICULARS.

MIDWAY RECEIVING CONDENSERS

(Also suitable for low power transmitters using '10-type tube)
(.031" Airgap)

Cat. No.	No. Plates	Depth Behind Panel	Max. Cap. Mmfd.	Min. Cap. Mmfd.	YOUR PRICE	2-GANG	
						Cat. No.	YOUR PRICE
S-401B	3	2-9/16"	26	7	\$1.23	S-401BG	\$2.12
S-402B	5	2-9/16"	50	8	1.29	S-402BG	2.23
S-403B	7	2-9/16"	70	9	1.35	S-403BG	2.35
S-404B	11	2-9/16"	105	10	1.41	S-404BG	2.47
S-405B	15	2-9/16"	150	11	1.47	S-405BG	2.59
S-406B	25	3-9/16"	260	13	1.62	---	---
S-407B	35	3-9/16"	365	14	1.76	---	---

SPLIT STATOR Cat. No.	YOUR PRICE
S-404BS	2.23
S-405BS	2.35
S-406BS	2.59
S-407BS	2.82

MIDWAY TRANSMITTING CONDENSERS

(Rotor and Stator plates of Transmitting Condensers have edges well rounded and are highly polished overall, thus eliminating corona losses and increasing breakdown voltage.)

(Suitable for transmitters using up to 75-watt tube)
(.070" Airgap)

Cat. No.	No. Plates	Depth Behind Panel	Max. Cap. Mmfd.	Min. Cap. Mmfd.	YOUR PRICE	2-GANG	
						Cat. No.	YOUR PRICE
S-408B	5	2-9/16"	22	6	\$1.53	S-408BG	\$2.70
S-409B	7	2-9/16"	35	9	1.65	S-409BG	2.94
S-410B	11	2-9/16"	50	11	1.88	S-410BG	3.41
S-411B	15	3-9/16"	70	13	2.12	---	---
S-412B	21	3-9/16"	100	15	2.35	---	---
S-413B	31	4-1/2"	150	18	2.94	---	---

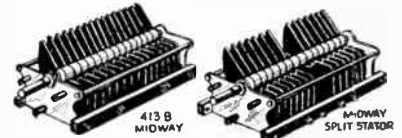
Cat. No.	No. Plates	Depth Behind Panel	Max. Cap. Mmfd.	Min. Cap. Mmfd.	YOUR PRICE
S-415B	15	4-1/2"	34	11	3.23

For neutralizing 50 watt modulated stages .171" airgap — mycalex insulation.



For Years the Criterion of the Trade

The Midway Condenser is constructed almost entirely of aluminum. It is a small and compact variable air condenser which, without doubt should find considerable applications for many purposes, where extremely light weight and reduction of bulk are desirable in oscillator-amplifier outfits. A panel surface of only 3" x 2 1/2" is required. Net weight of condenser vary from 4 to 7 ounces—extremely light. These condensers are particularly suitable for portable use. Both rotor and stator plates of the transmitting condensers have edges well rounded and are highly polished overall, thus eliminating corona losses and increasing breakdown voltage. They are suitable for transmitters using tubes up to 75 watts of power. Shipping weight, 2 lbs.



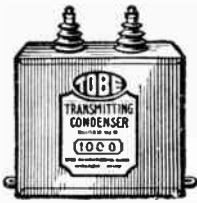
*TWO GANG CONDENSERS—Prices shown are for condensers having in each section a capacity equal to that of the single condenser listed on the same line to the left.

SPLIT STATOR CONDENSERS—Prices shown are for condensers having in each section approximately one half of the capacity shown on the same line to the left.



HIGH VOLTAGE TRANSMITTING CONDENSERS

OIL TYPE



For use in all transmitting and power supply circuits. Ideally suited for use in power units employing the new mercury vapor rectifier tubes. TOBE High Voltage Transmitting condensers are constructed of the finest materials, under careful supervision, and to rigid test specifications. They are all impregnated, and wax sealed. This method of construction assures long life and high safety factor. Each condenser is contained in a rugged, metal container and is provided with porcelain insulators. You do not need to calculate safety factors when you use TOBE oil type transmitting condensers. Just measure the D.C. voltage in the circuit and use the condenser having the rating nearest this voltage. Ship. wt., 4 to 11 lbs.

Cat. No.	Volts	Mfd.	Size	YOUR PRICE
S-0-1001	1000	1	5 3/4" x 4 1/2" x 2"	\$2.70
S-0-1002	1000	2	5 3/4" x 4 1/2" x 3"	4.70
S-0-1004	1000	4	5 3/4" x 7 7/8" x 4 1/2"	7.06
S-0-2001	2000	1	5 3/4" x 4 1/2" x 3"	5.29
S-0-2002	2000	2	5 3/4" x 7 7/8" x 4 1/2"	8.82
S-0-2004	2000	4	6 3/8" x 7 7/8" x 5 3/8"	15.29
S-0-3501	3500	1	5 3/4" x 7 7/8" x 4 1/2"	14.11
S-0-3502	3500	2	6 5/8" x 7 7/8" x 5 3/8"	23.52
S-0-3504	3500	4	6 1/8" x 18 5/8" x 5 1/2"	42.34
S-0-5001	5000	1	6 1/8" x 18 5/8" x 5 1/2"	24.70

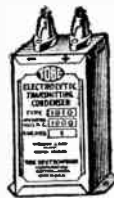
DRY ELECTROLYTIC TRANSMITTING CONDENSERS



This new line of electrolytic transmitting condensers is especially designed for filtering the output of motor generators or Type 281 thermionic rectifiers. These condensers are especially suitable for use in power amplifier systems. If economy of space is of major importance in the construction of your equipment, TOBE Electrolytic Transmitting Condensers will be found ideal for your use. They are contained in rugged metal cases and are provided with screw terminals on substantial porcelain insulators.

IMPORTANT:

Electrolytic transmitting condensers should be used only in filter circuits in which the output of the rectifier is fed into a choke coil. They should NEVER be used directly across a high voltage rectifier. If it is desired to use condenser input in the filter, the input condenser should be a TOBE Oil Type transmitting condenser (listed above). Ship. wts., 2 to 8 lbs.



Cat. No.	Volts	Mfd.	Size	YOUR PRICE
S-E1010	1000	1	1 1/2" x 2 1/2" x 4 1/2"	\$2.12
S-E1020	1000	2	1 1/2" x 3 1/4" x 4 1/2"	2.65
S-E1040	1000	4	2" x 4 3/4" x 4 1/2"	3.38
S-E1510	1500	1	1 1/2" x 3 3/4" x 4 1/2"	3.53
S-E1520	1500	2	1 1/2" x 4 1/4" x 4 1/2"	4.12
S-E1540	1500	4	3" x 5 1/2" x 4 1/2"	8.23
S-E2010	2000	1	3" x 3 3/4" x 4 1/2"	5.00
S-E2020	2000	2	3" x 5 1/2" x 4 1/2"	5.59
S-E2040	2000	4	4 1/4" x 5 1/2" x 4 1/2"	10.58
S-E2510	2500	1	3" x 3 1/4" x 4 1/2"	6.47
S-E2520	2500	2	3" x 5 1/2" x 4 1/2"	11.76
S-E2540	2500	4	5" x 5 1/2" x 4 1/2"	21.17

HIGH-VOLTAGE MICA CONDENSERS

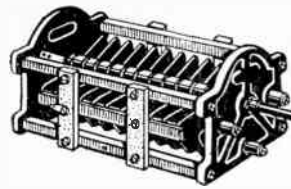


These condensers are made of selected mica, designed to reduce leakage to a minimum. They are conservatively rated and will stand temporary overloads of several hundred percent. The elements are firmly imbedded in a molded bakelite case hermetically sealed. May be thoroughly relied upon to give dependable service. **ORDER BY TYPE NUMBER AND SIZE.** Shipping weight, 4 ounces.

Capacity Mf.	Type A-10 1000 V. D.C. YOUR PRICE	Type A-25 2500 V. D.C. YOUR PRICE	Type A-50 5000 V. D.C. YOUR PRICE
.015	\$0.73	—	—
.012	.71	—	—
.01	.68	\$1.65	—
.008	.59	1.32	—
.006	.50	1.03	—
.005	.41	1.03	—
.004	.35	.91	—
.003	.35	.91	—
.002	.29	.79	\$1.32
.0015	.29	.68	1.15
.001	.29	.53	.88
.0005	.24	.41	.73
.00025	.24	.41	.62
.0002	.24	.41	.62
.00015	.24	.41	.59
.0001	.24	.41	.53
.00005	.24	.41	.53

NEW HAMMARLUND TRANSMITTING CONDENSERS

For Reliable and Continuous Service



Incorporating features usually associated only with high-power transmitters, these condensers represent a marked advance in design and construction for medium and low-power installations. Wider spacing and rounded plate edges (except on the last 3 condensers listed below) permit greatly increased voltages. The use of insulative insulation assures highest efficiency. The TC-350 C and TC-500-C types are over-rated receiving condensers designed for 210 tube transmitters and for laboratory use. The TC-225-X type is a special low-cost condenser intended for medium-power work.

GENERAL SPECIFICATIONS. Overall width 4-11/16", overall height 3-3/16". Shafts are 1/2" diameter and extend 1 1/2" beyond the panel mounting bushings. Rotor contact by means of a phosphor bronze self-cleaning brush. Condensers fully guaranteed and for protection are packed individually in strong, corrugated cartons. Shipping weight, 5 lbs.

Regular Stock Sizes

Cat. No.	Capacity Mmf.	Number Plates	*Plate Spacing	Voltage Rating	Overall Rating	YOUR PRICE
S-TC30A	30	7	1.02"	6500 V.	3 3/8"	\$2.94
S-TC50A	50	11	1.02"	6500 V.	4-5/16"	3.82
S-TC100A	100	21	1.02"	6500 V.	6 5/8"	5.58
S-TC150A	150	31	1.02"	6500 V.	8 15/16"	7.35
S-TC225A	225	47	1.02"	6500 V.	12 21/32"	9.41
S-TC100B	100	11	.080"	3000 V.	3-3/16"	3.23
S-TC150B	150	17	.080"	3000 V.	3 3/4"	3.82
S-TC225B	225	23	.080"	3000 V.	4 5/8"	4.70
S-TC335B X	335	43	.100"	3500 V.	7 3/8"	7.06
S-TC450B	450	47	.080"	3000 V.	7 1/4"	7.06
S-TC225 X	225	23	.080"	2000 V.	4-9/32"	3.53
S-TC350C	350	19	.038"	1000 V.	3-3/32"	2.94
S-TC500C	500	27	.038"	1000 V.	3 3/4"	3.23

* Actual Air Gap between adjacent rotor and stator plates.

LEICHERN GLASS-DIELECTRIC HIGH-VOLTAGE CAPACITORS



Leichner condensers constitute a radical departure from conventional design, in that a high quality of Flint Glass is used for the dielectric. This means that only a small fraction (about .00291% of the total) of the power flowing through the condenser is lost. By way of comparison some of the ordinary condensers lose 100% more power than the Leichner. The use of these units will increase the overall efficiency of any circuit. Flint Glass dielectric has a very low coefficient of expansion which prevents "wave shifting" or "creeping".

Two classes of condensers are available, namely, the "A" class which employs two terminals and the "E" class which employs only one terminal, having their frame or mounting bracket act as the second terminal. This latter class is used especially for by-pass work where the mounting frame or case makes contact with the metal case or chassis. Shipping weight vary from 1/4 lb. to 9 lbs.

Order by Type Number and Capacity.



Type F

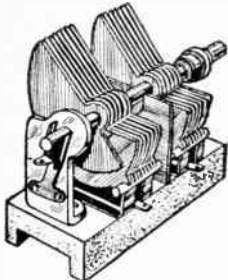


Type C

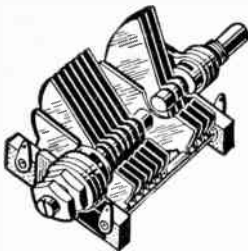
Capacity Mf.	Type A-1 & EA-1 8000 Volts Size 2 1/2" x 4 1/4" x 4 1/2"	Type A-2 8000 Volts Size 1 3/4" x 3 1/4" x 4"	Type C-3 10,000 Volts Size 3/4" x 1 3/8" x 2 1/2"	Type D-3 5,000 Volts Size 1 1/4" x 1 3/8" x 2 1/2"	Type B-2 5,000 Volts Size 1 3/8" x 2 1/4" x 2 1/2"	Type EB-2 5,000 Volts Size 1 1/4" x 2 1/4" x 2 5/8"	Type F-2 3,500 Volts Size 1 3/8" x 2 1/4" x 2 1/2"	Type EF-2 3,500 Volts Size 1 3/8" x 2 1/8" x 2 3/8"	Type B-3 5,000 Volts Size 1 1/4" x 1 3/8" x 2 1/4"	Type EB-3 5,000 Volts Size 1 3/8" x 1 3/8" x 2 1/4"
.003	\$2.79	—	—	—	—	—	—	—	—	—
.0025	2.79	—	—	—	—	—	—	—	—	—
.002	2.79	—	—	—	—	—	—	—	—	—
.00175	2.79	—	—	—	—	—	—	—	—	—
.0015	2.79	—	—	—	—	—	—	—	—	—
.00125	—	\$2.20	—	—	—	—	—	—	—	—
.001	—	2.20	—	—	—	—	—	—	—	—
.00075	—	2.20	—	—	—	—	—	—	—	—
.0005	—	2.20	—	\$0.73	—	—	—	—	—	—
.00015	—	2.20	—	.73	—	—	—	—	—	—
.0004	—	2.20	—	.73	—	—	—	—	—	—
.00025	—	2.20	—	.73	—	—	—	—	—	\$0.82
.0003	—	2.20	—	.73	—	—	—	—	—	.82
.00025	—	2.20	\$1.76	.73	—	—	—	—	—	.82
.0002	—	2.20	1.76	.59	—	—	—	—	—	.82
.00015	—	2.20	1.76	.59	—	—	—	—	—	.82
.0001	—	2.20	1.76	.59	—	—	—	—	—	.82
.000075	—	2.20	1.76	.59	—	—	—	—	—	.82
.00005	—	—	1.76	.59	—	—	—	—	—	.82



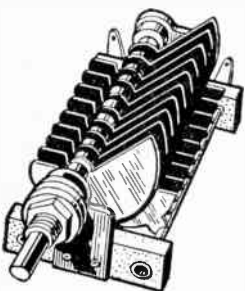
Midget Type



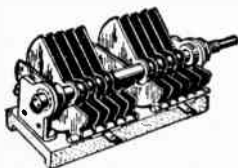
Dual Midget Type



Bandspread Type



Double-Spaced Type



Dual Double-Spaced Type

For Better Radio Hammarlund PRECISION PRODUCTS

Improved Midget Condensers "Midline" and Straight Line Capacity Types

The marked efficiency of Hammarlund Condensers at ultra high frequencies is attested by their dominant position in amateur and experimental fields and their use by the more prominent manufacturers of short wave receivers, television equipment and high frequency apparatus in general.

In such work, with frequencies running up to 50 and 60 megacycles, unusual electrical efficiency is demanded. Every feature of Hammarlund Condensers is designed to meet these strict demands.

General Specifications: — Plates are .0225" brass with .0215" airgap between plates. Shafts are 1/8" diameter and extend 5/16" beyond the rear frame to facilitate ganging. Standard condensers include stops and are made to increase capacity by clockwise rotation. Individually tested for breakdown on 500 volts A.C. and packed with 1 1/2" bakelite knob. Quality fully guaranteed. Ship. wt., 3/4 lb.

REGULAR STOCK SIZES

Cat. No.	No. of Plates	Min. Cap. Mmf.	Max. Cap. Mmf.	Back of Panel Size	YOUR PRICE
S-MC325M	43	12	320	2 33/32"	\$2.06
S-MC250M	34	10	250	2 3/8"	1.76
S-MC200M	27	10	200	2 1/8"	1.52
S-MC140M	19	7	140	1 19/32"	1.47
S-MC100M	11	6	100	1 13/32"	1.32
S-MC100S	14	6	100	1 13/32"	1.32
S-MC75M	11	6	80	1 7/32"	1.18
S-MC75S	11	6	80	1 7/32"	1.18
S-MC50S	7	5	50	1 7/32"	.94
S-MC35S	7	4	35	1 7/32"	.88
S-MC20S	3	3	20	1 7/32"	.82

"M" = Midline Plates.
"S" = Semi-Circular Plates.

Dual Midget Condensers

Like Hammarlund Single Midget Condensers, these new duals incorporate in their design every requirement of a high quality small size two-gang condenser. Their rigidity, low losses and careful construction provide for greatest electrical and mechanical efficiency in all types of short wave receivers employing two-gang tuning condensers.

The entire condenser is BUILT ON A STRONG ISOLANTITE BASE, including a shield plate between the stators. Other specifications are the same as for the single midget condensers described above on this page. Made for single hole panel mounting. Overall length behind panel is 3 1/4". Stock sizes are listed below. Ship. wt., 2 lbs.

No.	CAPACITY	YOUR PRICE
S-MCD 140M (140 mmf. capacity per section)	\$2.35	
S-MCD 100M (100 mmf. capacity per section)	\$2.05	

Padding Condenser

Used for trimming, aligning, compensating, and padding purposes wherever a high-quality, compact, adjustable condenser is required.

Mounted on special low-loss Isolantite base and adjusted by means of convenient machine screw. Two solder-dipped terminals provide for easy connections. Range 600 to 1,000 mmf. Ship. wt., 6 oz.

No.	YOUR PRICE
No. S-7023 Hammarlund Adjustable, Padding Condenser.	\$0.30



Band-Spread Condensers

These condensers are designed for use as "band spread" tuning condensers for short wave receivers and for use in amateur band frequency meters. The "tank" section can be set and looked at any desired capacity permitting the tuning section to spread narrow frequency ranges over the entire dial, regardless of the range of the band or the coils used. Ship. wt., 2 lbs.

Cat. No.	Tank Cap. Mmf.	Tuning Cap. Mmf.	YOUR PRICE
S-MC120B	100	20	\$1.76
S-MC150B	100	50	\$1.90
S-MC175B	100	75	\$2.06

Double-Spaced Midget Condensers

Wide spacing, special bearings and Isolantite make these condensers particularly SUITABLE FOR ULTRA SHORT WAVE RECEIVERS AND TRANSMITTERS. Air gap between plates is .0715".

Their small size adapts them to the compact types of transmitters now so much in vogue. For tuning amplifier stages in crystal controlled transmitters and for neutralizing up to 210's and 50 watters. Ship. wt., 2 lbs.

Cat. No.	Maximum	Minimum	YOUR PRICE
S-MC35X	35 mmf.	6 mmf.	\$1.32
S-MC50X	50 mmf.	7 mmf.	\$1.62

Double-Spaced Dual Midget

This condenser is specially designed for efficiency at ultra high frequencies and may be used for either receiving or transmitting. The wide spacing between plates materially aids frequency stability and the use of Isolantite for insulation assures the low loss factor so necessary in 5 meter work. AN IDEAL CONDENSER FOR COMPACT 5 METER TRANSMITTERS USING TUBES UP TO 245'S OR 210'S IN PUSH-PULL.

Actual air-gap between adjacent rotor and stator plates is .0715". Capacity per section, 23 mmf. max., 6 mmf. min. Ship. wt., 1 1/2 lbs.

No.	YOUR PRICE
S-MCD35X Double-spaced Dual Midget Condenser.	\$2.10

Compensating Condenser

These are the standard Hammarlund compensating or trimmer condensers for use in ganging circuits or neutralizing. An item for which a thousand uses may be found. Variable from 2 to 35 mmf. and from 20 to 100 mmf. Shipping weight, 1 oz. Overall size, 1/4 x 1 1/4 in.



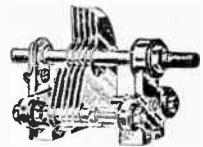
AN IDEAL ANTENNA-COUPLING CONDENSER FOR SHORT-WAVE RECEPTION

Makes the receiver highly selective and sensitive, bringing in DX STATIONS never before received. Adjustment of center screw provides smooth noise-free variation of capacity. May be attached directly to binding post of socket or condenser.

No.	YOUR PRICE
No. S-1742 Compensating Condenser 2 to 32 mmf.	\$0.12
No. S-1743 Compensating Condenser 20 to 100 mmf.	\$0.30

S.L.W. Midget Variable Condensers

For Ultra Short Wave Work



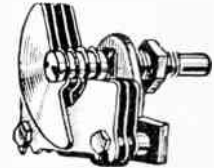
These condensers were designed to meet the difficult requirements of Ultra High Frequency Service. They embody a number of unusual refinements—such as—Insulux Insulation properly placed to reduce dielectric losses to an absolute minimum constant impedance, dual pig-tail rotor connections, and thick non-resonant brass plates to prevent microphone feed-back caused by acoustic vibration. Both rotor and stator plates are completely insulated from the frame, thus entirely eliminating the possibility of shorted turn effect or changes in reactance due to loose contact of shaft when the rotor plates are turned. All models are furnished with the shaft extending through the rear bearing for ganging purposes.

The frame of the condenser is constructed with a slotted keyway, which facilitates mounting two or more condensers as a unit, through the use of a bar of any length which can be slipped and fastened in the keyway. Therefore, the sections may be spaced at any distance, and at all times maintain perfect alignment. Ship. wt., 1 lb.

Cat. No.	Cap. Mmf.	Plates	List Price	YOUR PRICE
S-100	20	5	\$1.25	\$0.73
S-101	50	11	1.50	.89
S-102	75	15	1.75	1.03
S-103	100	20	2.00	1.18
S-104	150	29	2.25	1.33
S-105	200	27	2.50	1.47
S-106	250	32	2.75	1.62

Standard Shaft Length 1 1/4"

Midget Variable Condensers



These variable condensers are used extensively for vernier tuning, compensating, building test oscillators, laboratory equipment and for a host of other purposes. THEY ARE EXCELLENTLY SUITED FOR SHORT-WAVE WORK, where they are usually employed in the antenna circuit making the short-wave receiver highly selective and sensitive and bringing in DX STATIONS never before received. When used for controlling regeneration in short-wave receivers, they afford a smooth unflinching control—a highly desirable feature.

Cat. No.	No. of Plates	Capacities	YOUR PRICE
S-2192	3	15 3	\$0.36
S-2193	5	30 4	\$0.38
S-2194	7	40 5	\$0.42
S-2195	11	60 6	\$0.45
S-2196	15	100 7	\$0.47

Sponge Rubber Earphone Cushions



Listen fans, don't get callow lower ears listening to the radio all night with phones clamped tightly against your ears. These cushions will eliminate fatigue and permit you to really enjoy your short-wave reception from the minute you apply them. Fits easily over any headset, including the so-called "featherweight" type. Sold only in pairs. Ship. wt., 1/4 lb.

No.	YOUR PRICE
No. S-331 Sponge Rubber Earphone Cushions.	\$0.22

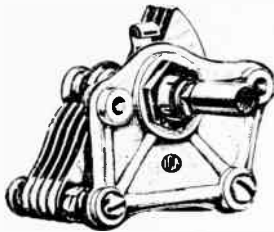


LATEST SHORT-WAVE ACCESSORIES



"UNIVERSAL" MIDGET CONDENSERS

Insulex Insulation



These unique condensers can be applied in almost any conceivable manner to the many forms of mounting and ganging required in experimental and permanent hookups.

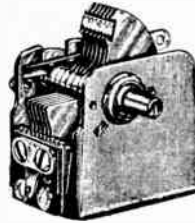
They meet all electrical requirements. Insulation is one solid end plate of Insulex, a non-hygroscopic low dielectric constant, low absorption loss material. Both rotor and stator are insulated from mounting bosses. Shortest path through dielectric between rotor and stator is one inch. Contact to rotor is made through a specially designed cupped spring washer having large contact area with rotor and bearing insuring noiseless rotating contact at all frequencies.

Mechanically these condensers can be adapted to practically any position of mounting and ganging by means of the removable front and rear drive shafts. Insulated bosses to guide extension bolts for mounting additional condensers so that they can be rotated from the same shaft are also provided. Additional condensers coupled to the main shaft can be insulated through the use of I.C.A. Insulex Flexible shaft couplers which can be directly coupled by use of suitable lengths of threaded metal shaft. Each condenser is provided with a locking nut so that the rotor can be definitely locked into any position relative to the stator. A screw driver slot is also provided for semi permanent rotation adjustment.

Plates can readily be removed, respaced or added to both rotor and stator and direction of rotation changed through the use of simple tools, usually available in the experimental shop. For constant and reliable operation there is no better variable short-wave condenser. Ship. wt. 1/2 lb.

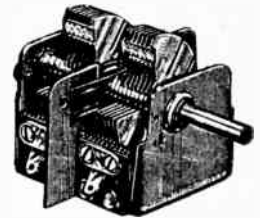
No.	Cap. Mfms.	Spacing	List Price	YOUR PRICE
S-111	15	.024	\$0.85	\$0.50
S-112	25	.026	.95	.56
S-113	50	.026	1.05	.62
S-114	120	.026	1.15	.68
S-115	140	.026	1.50	.99

COMPACT PRECISION VARIABLE CONDENSERS



These condensers, although of standard capacities, were designed particularly for the ultra in-detect receivers. Despite their size, however, they constitute extremely precise units; in fact constancy of calibration and uniformity between the different sections of the ganged models is considerably higher than those of the old type large size. This, of course is due to the advanced mechanical design of these later type condensers. Ball-bearing shafts insure long life without wear or side play. The rotors are contacted by means of brass springs which make for smooth, noise-free operation. The single units measure 2 1/4" wide x 1 1/2" high x 1 1/2" deep, back of panel. Shaft measures 1/4" diameter x 3/8" long. Dual units measure 3" wide, including shield between stators, 3/4" high x 2 1/2" deep, back-panel. Shaft 1/2" diameter x 1 1/4" long. Shipping weight, single units, 1 lb. Dual units, 1 1/2 lb.

Cat. No.	SINGLE UNITS		YOUR PRICE
	Cap. Mfms.	List Price	
S-540	50	\$1.25	\$0.74
S-541	100	1.25	.74
S-533	140	1.25	.74
S-542	350	1.50	.88
DUAL UNITS			
S-538	140	2.25	1.32
S-534	350	2.25	1.32
TRIPLE UNITS			
S-531	350	3.25	1.91



"MYCALEX"

Latest Insulating Material Panels and Rods



Here is an insulating material which approaches isolantite in R.F. resistance and low-loss characteristics but which is machineable with ordinary tools; in other words it can easily be drilled and sawed.

The electrical and mechanical characteristics of Mycalex make it the most perfect insulation on the market today. Mycalex is unaffected by temperature rise up to 1000° F. It is an inorganic compound and hence precludes any possibility of carbonization or burning. This insulating material is available either in panels of the standard sizes listed below or in rods of various diameters.

STANDARD SIZES—1/8" Thick			
Cat. No.	Size	List Price	YOUR PRICE
S-326	3 3/4" x 3/4"	\$1.50	\$2.65
S-327	6" x 8 7/8"	8.00	4.70
S-328	12 3/4" x 17 3/4"	15.00	8.82
STANDARD SIZES—3/16" Thick			
S-329	3 3/4" x 4 3/8"	6.50	3.82
S-330	6" x 8 7/8"	12.00	7.06
S-300	13 7/8" x 17 3/4"	23.00	13.52
RODS			
Cat. No.	Dia.	Length	List Price
S-301	1/4"	14"	\$2.00
S-302	3/8"	18"	5.00
S-303	7/8"	18"	6.50
S-304	1"	18"	8.75

Short-Wave Superhet. Coil Assembly

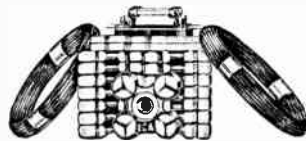
A compact unit of the necessary coils and low capacity-selector switch. Eliminates the inconvenience of plug-in coils. Designed to switch the necessary millitor and detector coils to cover the ranges of 14-28, 27-45, 43-80, 75-200 meters. Unit may be easily wired into a short-wave converter circuit for use with TRF or Super-heterodyne receivers. Complete wiring diagram and instructions packed with each assembly.



List Price \$7.50
No. S-1425 Short-Wave Superhet. Coil Assembly.
YOUR PRICE \$4.41

I.C.A. SHORT-WAVE ANTENNA KIT

Using the Famous Insulex Transposition Blocks



Scientifically designed for securing best results in short-wave broadcast band, amateur channels, etc. Equally well adapted for regular broadcast reception. Three prime factors are instrumental in affording excellent noise-free reception.

1. Use of better, more efficient wire; better insulation, coupling, etc.
2. A decided increase in signal strength because design of antenna is primarily for amateur frequencies.
3. Elimination of noise picked up by the lead-in wire. This improves the overall signal to noise ratio.

I.C.A. Short-Wave Antenna Kit contains the following units:

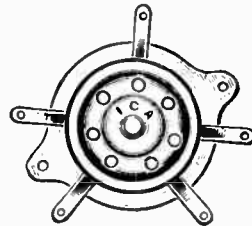
- 15 I.C.A. Transposition Blocks, made of Insulex, a non-hygroscopic, ceramic compound, absolutely impervious to climatic conditions.
- 8 Insulex insulators, the finest, most efficient available.
- 1 I.C.A. Coupler for matching and equalizing transmission line impedance.
- 200 ft. Enamel-1 Antenna Wire especially treated for short wave work.
- Packed in an attractive di-play carton (Ship. wt., 6 lbs. List Price \$4.75)

No. S-659 Short-Wave Antenna Kit.	\$2.79
YOUR PRICE	List Price \$5.25
No. S-660 All-Wave Kit for all frequencies.	\$3.14
YOUR PRICE	

I.C.A. INSULEX SOCKETS

For Base Mounting

No.	Prong	YOUR PRICE
S-290	4 prong	\$0.29
S-291	5 prong	.29
S-292	6 prong	.32
S-293	7 prong large	.32
S-294	7 prong small	.32



For Sub-Panel Mounting

S-295	4 prong	\$0.29
S-296	5 prong	.29
S-297	6 prong	.32
S-298	7 prong large	.32
S-299	7 prong small	.32

Made of Insulex—a non-hygroscopic ceramic compound—superior to porcelain, unaffected by weather conditions in the slightest degree. These efficient sockets cut losses to an absolute minimum. The latest, most modern construction. Especially adapted for ultra short-wave work.

Shielded R.F. Choke



2.5 Millihenries Radio Frequency Choke. Can be used in most circuits where R.F. Chokes are specified. Very handy for the service man in circuits up to 500 meters. Handsomely finished in I.C.A. aluminum shield, size 1" O.D. x 3/4" long. Ship. wt., 4 oz.

No. S-275 Shielded R.F. Choke.
YOUR PRICE \$0.44

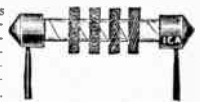
Unmounted R.F. Chokes



Cat. No.	M. H.	YOUR PRICE
S-1771	80	\$0.44
S-1772	30	.44
S-1773	60	.44
S-1774	10	.38
S-1775	5 1/2	.38
S-1776	3 1/2	.38
S-1777	2 1/2	.38

Low Distributed Capacity

R. F. CHOKE COIL HIGH FREQUENCY



This choke has been designed especially for high-frequency receivers and has extremely low distributed capacity. It consists of four narrow sections, each universally wound. Spaced on an Insulex form. Supplied with several leads, for mounting. May be mounted in grid leak clips if desired.

Approximate Characteristics:
D. C. receivers—50 ohms. Distributed capacity—1 mmf. Inductance—2 1/2 M.H. Will carry—125 milliamperes, without heating. List Price \$0.75
No. S-277 R.F. Choke Coil. **\$0.44**
YOUR PRICE

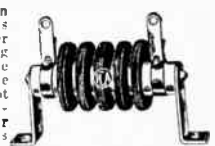
INSULEX R. F. CHOKES



This low-loss choke, particularly designed for short-wave receivers and transmitters but operates equally well above regular broadcast band. Specially recommended as grid choke for Multi-stage transmitters.

Insulex spool holds four moisture-proof, cellophane-covered windings. Removable brackets and flexible leads permit any style of mounting. Absolutely low loss. Inductance 8 M.H.—14 c. resistance 70 ohms. Current carrying capacity—125 milliamperes. List Price \$1.00
No. S-275 Shielded R.F. Choke. **\$0.59**
YOUR PRICE

HEAVY DUTY TRANSMITTING CHOKE



For use in plate circuits of high power transmitting tubes, where continuous plate current does not exceed 500 milliamperes or 50% duty when intermittently operated. Distributed capacity held to low value of 1.5 mmf., inductance is 5.3 millihenries. Suitable for short-wave transmitter use. Five uniformly-wound coils are mounted on an Insulex core with tapped hole in each end. D.C. resistance 12 ohms. Ship. wt., 1/2 lb. List Price \$1.75
No. S-278 Heavy Duty Transmitting Choke. **\$1.03**
YOUR PRICE



I.C.A. SHORT-WAVE PLUG-IN COILS



There are still quite a number of short-wave fans and experimenters who do not appreciate the full importance of short-wave plug-in coils in connection with their receivers. These people will spend all sorts of money building up their short-wave receivers in a most elaborate style and then spoil it all by buying poorly constructed, inefficient short-wave coils. Plug-in coils constitute the HEART of any short-wave receiver. They are part of the tuned circuit and, therefore, unless properly constructed, will introduce unnecessarily high R.F. losses which will decrease the overall efficiency and performance of the receiver. I.C.A. offers on this page a complete line of plug-in coils which have been engineered to the pinnacle of perfection. All windings are made of the proper sized wire and properly

spaced, thereby decreasing the distributed capacity and increasing the effective inductance. The broadcast coils are sold in pairs. It has been found that one broadcast coil was not sufficient to give full band coverage over the entire broadcast band from 200 to 550 meters with .00011 mf. tuning condensers (usually used in short-wave receivers). Consequently TWO coils are provided, assuring full band coverage. The ultra short-wave coils are accurately calibrated and will cover the bands specified for them below. All coils are wound on ribbed forms which further tend to reduce R.F. loss inasmuch as the wire comes in actual contact with the form only at the "ribs."

GENUINE BAKELITE RIBBED COILS

16-217 METERS

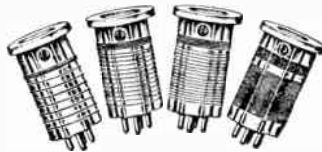


Unquestionably the finest, most rugged and most efficient short-wave coils ever designed. Actual size is 3 5/8" high and 1 5/8" in diameter. Will engage any standard four-prong socket. Forms are made of the finest grade, octagonal-shaped bakelite, in four different colors representing four different bands. Each coil functions separately and independently—one each from 16 to 36 meters; 27 to 65 meters; 57 to 115 meters and 108 to 217 meters. Complete set of diagrams and instructions furnished with each set of coils. For use with .00011 mf. tuning condenser. Shipping weight, 1 1/2 lbs. List Price, \$3.00

No. S-1426 Genuine Bakelite Ribbed Coils. **\$1.76**
 YOUR PRICE
 No. S-1051 Coil Form Only, Four Prongs. **\$0.21**
 YOUR PRICE

INSULEX RIBBED PLUG-IN COILS

16-217 METERS



For very sensitive short-wave receivers where even the slightest amount of R.F. loss spells the difference between success and failure, we recommend these Insulex four-prong short wave plug-in coils. Insulex is a special non-hygroscopic ceramic compound with extremely high R.F. resistance. Not only that, but to further keep down R.F. losses, these coils are ribbed so that the windings touch the forms only at the six corners. Each coil functions separately and independently. One each from 16 to 36 meters; 33 to 65 meters; 57 to 115 and 108 to 217 meters. Complete set of wiring diagrams and instructions supplied with each set of coils. Coils measure 1-9/16" in diameter x 3" high and engage standard four-prong sockets. For use with .00011 mf. tuning condenser. Shipping weight, 2 1/2 lbs. List Price \$4.50

No. S-951 Insulex Ribbed Plug-In Coils. **\$2.65**
 YOUR PRICE
 No. S-952 Coil Form Only, Four-Prong. **\$0.29**
 YOUR PRICE

Ultra Short-Wave Plug-In Coil—Ribbed

9.5 to 21 Meters

This coil has been designed to be used in conjunction with the No. S-1126 coil set listed above. Consists of an orange colored ribbed coil form specially wound to cover the low wave range of from 9.5 to 21 meters. Shipping weight 3/4 lb. UX-1 prongs.

No. S-1441 Ultra Short-Wave Plug-In Coil. **\$0.59**
 YOUR PRICE
 No. S-1443 Six-Prong Ultra Short-Wave Plug-In Coil. **\$0.74**
 YOUR PRICE

Broadcast Plug-In Coils—Ribbed

Comprises TWO coils designed to cover the regular broadcast band from 200 to 550 meters. These coils will go down to as far as 130 meters. They should be used in conjunction with the No. S-1126 plug-in coils listed above. Wound on four-prong forms of the octagonal-shaped type.

No. S-1431 Broadcast Plug-In Coils. **\$1.09**
 YOUR PRICE
 No. S-1429 Six-Prong Broadcast Plug-In Coil. **\$1.32**
 YOUR PRICE

Insulex Ultra Short-Wave Plug-In Coil

This coil works in conjunction with the No. S-951 set listed above. It will tune short wave receivers having .00011 mf. tuning condenser down to the 10 meter band since it has a range of from 9.5 to 21 meters. UX-1 prongs.

No. S-947 Insulex Ultra Short-Wave Plug-In Coil. **\$0.79**
 YOUR PRICE
 No. S-948 Insulex Six-Prong Ultra Short-Wave Coil. **\$0.88**
 YOUR PRICE

Insulex Broadcast Plug-In Coils

Comprises TWO coils designed to cover the regular broadcast band of from 200 to 550 meters. Will even go down to 130 meters. Each coil is wound on Insulex octagonal-shaped forms UX-1 prongs. Shipping weight, 1 lb.

No. S-962 Insulex Broadcast Plug-In Coil. **\$1.47**
 YOUR PRICE
 No. S-966 Insulex Six-Prong Broadcast Coil. **\$1.76**
 YOUR PRICE

SIX-PRONG THREE-WINDING COILS RIBBED BAKELITE FORMS

The use of six-prong coils in short wave receivers presents certain advantages which are preferred by a good many short wave fans. The use of these coils in the antenna circuit introduces inductive coupling between the antenna and receiver, thereby eliminating the usual antenna trimming condenser with the attendant inconvenience of constant adjustment each time another coil is plugged in. The set consists of four color-coded octagonal-shaped coils, each coil being wound with three separate windings, namely, primary, secondary and tickler. These coils cover a range of from 16 to 217 meters when used with a .00011 mf. condenser. Shipping weight, 2 lbs.

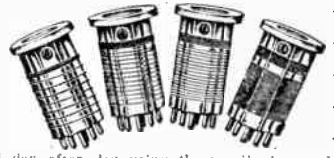


No. S-1428 Six-Prong Three-Winding Coils. **\$2.36**
 YOUR PRICE
 No. S-1053 Coil Forms Only, Six Prong. **\$0.24**
 YOUR PRICE

INSULEX 6-PRONG RIBBED COILS

16 TO 200 METERS

These six-prong three-winding coils are becoming more and more popular each day. Numerous circuit in short-wave magazines are incorporating them. Their use in the antenna circuit of the receiver definitely does away with the trimming condenser and its attendant inconvenience of constant adjustment. Furthermore the use of three separate windings on each coil permits experimentation of a very flexible nature. Many new circuits are being discovered day after day using these coils in novel hook-ups. Each coil functions separately and independently—one each from 16 to 38 meters; 35 to 75 meters; 73 to 137 meters; 135 to 200 meter. A complete set of wiring diagrams and instructions furnished with each coil set. For use with .00011 mf. condenser. Shipping weight 2 1/2 lbs.

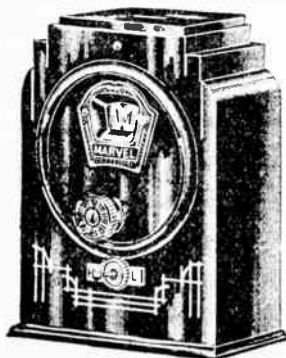


No. S-965 Insulex Six-Prong Ribbed Coils. **\$2.94**
 YOUR PRICE
 No. S-954 Coil Form Only, Six Prong. **\$0.35**
 YOUR PRICE

I.C.A. MARVEL SHORT-WAVE CONVERTER

20 TO 200 METERS

Works With All A.C. Receivers
 Receives Foreign Speech and Music



A brand new converter which makes any electric set into a modern short-wave receiver. Easily connected in a few minutes without any wiring or tools. Complete instructions and diagrams showing you how to attach this efficient superheterodyne converter to your particular receiver furnished with each unit. Can be used with any A.C. electric receiver regardless of type or number of tubes. This converter automatically "converts" any A.C. receiver into a full-fledged superheterodyne short wave set capable of receiving police calls, airplane reports, foreign reception and many other interesting programs which cannot ordinarily be received by a regular broadcast set.

This converter need not be detached from the regular broadcast receiver; a switch on the front panel of the unit takes care of this, automatically switching from short wave to broadcast reception. The converter utilizes the entire receiving circuit of the set to which it is attached—not only the audio tube but the entire circuit from the antenna post to speaker. The unit is housed in a beautiful bakelite cabinet 6 1/2" high x 4 3/4" wide x 2 1/4" deep. Requires but one tube, either a 56, 37, or 76 depending upon the type of receiver with which it is to be used. Shipping weight, 6 lbs. List Price \$9.50

No. S-9 I.C.A. Short-Wave Converter. **\$5.59**
 YOUR PRICE, less tube, but including coils

I.C.A. CRYSTAL HOLDER



This crystal holder is ideally suited for amateur and broadcast transmitters. It is for use with crystals ranging from one-fifth to six millimeters in thickness (20 to 500 mc. crystals). It is rigidly constructed and will fit a standard I.C.A. base receptacle.

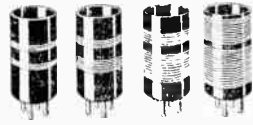
List Price \$2.50
 No. S-404 I.C.A. Crystal Holder. **\$1.47**
 YOUR PRICE
 No. S-405 Base Receptacle For Crystal Holder. **\$0.47**
 YOUR PRICE

FOR OSCILLATING QUARTZ CRYSTALS, CRYSTAL OVENS AND CRYSTAL HOLDERS SEE PAGE 46.

Short Wave Plug-In Coils and Coil Forms

Gen-Win Litz-Wound Coils

Tuning Range 16 to 225 Meters

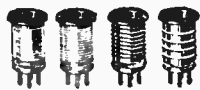


Gen-Win Short Wave Plug-In Coils are adaptable to any short wave receiver or converter. Wound on genuine molded bakelite plug-in coil forms to insure mechanical strength, good insulation and minimum dielectric loss. **EACH COIL IS WOUND ON A DIFFERENT COLORED FORM FOR QUICK IDENTIFICATION OF THE DIFFERENT WAVELENGTH RANGES.** The design of the secondary winding is such that are easily achieved. The tickler windings are properly related to the secondaries thus affording smooth regeneration over the entire range. **RECEIVERS AND CONVERTERS EMPLOYING THESE COILS WILL NOT "PLOP" IN AND OUT OF OSCILLATION** or produce any other disturbing effects. Designed to tune with either a .00011 or .00015 mf. variable condenser. **LITZ WIRE USED THROUGHOUT.** Blueprints of Short Wave Receivers using these coils included. Shipping weight, 1 1/2 lbs. **List Price \$3.75**
 No. S-404 Gen-Win Short Wave Plug-In Coils Employing Litz Wire. **\$2.25**
 YOUR PRICE

maximum clarity and selectivity. **RECEIVERS AND CONVERTERS EMPLOYING THESE COILS WILL NOT "PLOP" IN AND OUT OF OSCILLATION** or produce any other disturbing effects. Designed to tune with either a .00011 or .00015 mf. variable condenser. **LITZ WIRE USED THROUGHOUT.** Blueprints of Short Wave Receivers using these coils included. Shipping weight, 1 1/2 lbs. **List Price \$3.75**
 No. S-404 Gen-Win Short Wave Plug-In Coils Employing Litz Wire. **\$2.25**
 YOUR PRICE

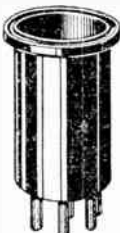
YOUR PRICE

Short-Wave Plug-In Coils



We recommend these coils in all short-wave circuits which are critical to so-called "R.F. losses". These coils will cover the wave range of from 20 to 200 meters with a .00011 mf. condenser. Each coil has a special rim on top which serves the dual purpose of easy gripping and color coding. The color of each rim, on each coil is different so that at a glance, you can tell the wave range which each particular coil will cover. They are precision wound on low-loss Bakelite forms. Ship. wt. 1/2 lb. **List Price \$2.00**
 No. S-704SWS Aa-Ald Short-Wave Plug-In Coils. **\$1.18**
 YOUR PRICE, per set of 4

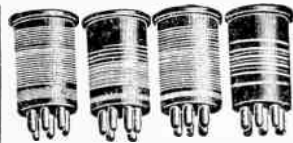
Color Coded Plug-In Coil Forms



Genuine molded Bakelite with phosphor bronze contact prongs. Overall length, 2-11/16 ins., 3/4 in. outside diameter. Top rim colored for identification of different wave-lengths. Specify either blue, green, yellow or red rims when ordering. Specify 1X or 1Y. No. S-1864 Coil Forms. **YOUR PRICE, ea. \$0.16**

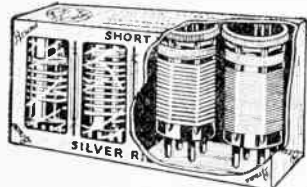
SIX PRONG PLUG-IN SHORT-WAVE COILS

Range 15-200 Meters



The set consists of four plug-in coils, each having **THREE** separate windings. Each winding is connected to a separate pair of base prongs thereby allowing great flexibility of application. The secondary winding is intended for tuning with a short wave tuning condenser, preferably of .00014 mf. (110 nmf.). The primary is wound between turns of the secondary for efficient close coupling. The complete isolation of all windings permits the use of these coils in circuits requiring only a primary and secondary, or a tickler and secondary such as the Doerle Short-Wave sets and many others. All secondary windings are space-wound and all forms are of low loss construction. When used with a .00011 mf. condenser, coils will tune over short wave bands as follows:—Blue rim coils, 15 to 25 meter; Red rim, 25 to 50 meters; Yellow rim, 50 to 100 meters; Green rim, 100 to 200 meters. Ship. wt., 1 lb. **List Price \$3.50**
 No. S-706SWS Six Prong Plug-In S.W. Coils. **\$2.06**
 YOUR PRICE—per set

Ribbon-Wound Short-Wave Plug-In Coils



The latest development in the radio field. In place of the ordinary magnet wire used on other types of coils, these units are wound with a special, uncovered ribbon wire which reduces the distributed capacity and thereby increases the effective inductance in the tuned circuits. The flat ribbon wire is silver plated and is wound on octagonal-shaped, ribbed forms which assure low-loss performance. The forms are of a special bakelite composition designed especially for these particular coils. We recommend the use of these coils in short-wave receivers which are very critical to circuit constants. Designed to tune with a .00014 mf. condenser. Ship. wt., 3 lbs. No. S-B-SWC Ribbon Wound Short-Wave Plug-In Coils. **\$2.94**
 YOUR PRICE

Hammarlund Ultra Short-Wave Coil Forms



Designed for maximum efficiency at ultra high frequencies or within the 28 to 56 megacycle band. Made of isonitrite having maximum high-frequency resistance which assures absolute stability. The number and location of holes facilitates securing the exact inductance desired and permits every conceivable type of experimental winding. Measures 1 3/8" in diameter and 2 1/2" long. Made only in 5 prong type to fit standard sockets. No. S-CF-5-M Hammarlund Ultra Short Wave Coil Forms. **\$0.44**
 YOUR PRICE



Hammarlund Isolantite Forms
 Form measures 1 1/2" in diameter by 2 1/2" long exclusive of knob and prongs.
 No. S-CF-4 Four Prong
 No. S-CF-5 Five Prong
 No. S-CF-6 Six Prong
YOUR PRICE \$0.58

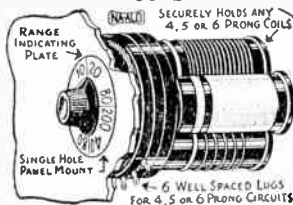
NA-ALD AMATEUR BAND-SPREAD COILS



If you are an old-timer you will probably appreciate the advantage of hand-spread coils "right off the bat". Hand-spread means that you can take the whole array of strikers which formerly elongated 2 or 3 points on the main tuning dial of your short-wave receiver and spread them over the entire scale of your hand-spread dial. Each coil consists of two windings on a 5-prong form, the 5th prong going to the center tap of the secondary winding. The principle of hand-spread is to have the tank section of the tuning condenser across half of the secondary winding and the hand-spread vernier condenser across the entire secondary winding. Ship. wt., 1 lb. No. S-705-SWB Amateur Bandspread. **\$2.35**
 YOUR PRICE
 No. S-705-SWCB Short-Wave Broadcast Bandspread Coil. **\$2.35**
 YOUR PRICE

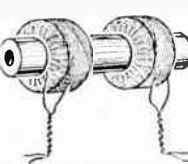
NEW SHORT-WAVE COIL-SELECTOR UNIT

Does Away With Plug-In Coils



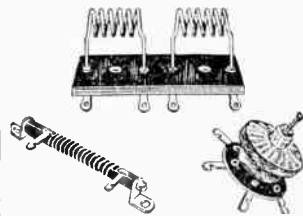
Many new devices have appeared on the market for eliminating short-wave plug-in coils; yet most of them have passed away due to their inefficiency. This new unit, however, has been tried and found to be thoroughly successful. It is essentially a coil selector unit which instantly swings any coil into the circuit by turning the knob on the front panel. It is so ingeniously designed that any 4, 5, or 6 prong coil may be slipped into any given socket on the back of the unit and held there rigidly. The sockets are of the composite type. The knob and wave-length indicator on the face of the panel show what coil is in the circuit at any given time. It is a simple device easily mounted. Experienced short-wave fans will readily appreciate the many advantages offered by this little device. Countless numbers of experimental circuits can easily be constructed around it. Don't fail to use it in sets which you are now building. Shipping weight, 1 1/2 lbs. **List Price \$3.50**
 No. S-700 Coil Selector Unit Without Coils. **\$2.06**
 YOUR PRICE

175 KC I. F. Transformer



Employed in all Majestic superheterodyne receivers. The Isolantite core prevents high frequency losses thereby improving sensitivity and selectivity considerably. May be used for I.F. choke or for I.F. coupling weight, 8 oz. No. S-1675 175 KC I.F. Transformer. **\$0.20**
 YOUR PRICE

Gen-Win 5-Meter Super-Regenerative Coil Kit



Here's your chance to build a REAL 5-meter super-regenerative receiver. A detailed blueprint for constructing such a receiver is furnished FREE with each kit. These coils are specially designed for the 5-meter band and will therefore, produce surprisingly good results. A large percentage of amateur and practically all television transmissions are now being broadcast over the extremely high frequency (low wave length) ranges. High frequency transmission channels will in our opinion be the ultimate wave length band over which all regular television transmissions will take place. Already there are quite a number of television stations and thousands of amateur stations broadcasting regularly in these ultra-low waves. The Gen-Win 5 meter coil kit consists of double tuning coil, special radio frequency choke coil, and special oscillator coil. Shipping weight, 1 lb. **List Price \$4.50**
 No. S-555 Gen-Win 5 Meter Coil Kit. **\$2.70**
 YOUR PRICE

All-Wave Coil Kit

Range 25 to 550 Meters



A newly developed all-wave coil kit comprising a 3 circuit tuner and an R.F. coil, both having tapped secondaries, which permits you to enjoy **SHORT WAVE AND BROADCAST PROGRAMS.** By means of a simple shorting-switch arrangement, a portion of the secondary coils may be cut out of the circuit thereby making it resonant to the higher frequencies i.e. lower wave lengths. Wound on sturdy Bakelite forms provided with suitable soldering lugs. The tickler coil of the tuner revolves smoothly on its own Bakelite form, at a predetermined distance from the secondary, thereby permitting very fine regeneration control. Kit may be had for use with either .00035 or .0005 mf. condenser. Specify which when ordering. Our No. 1970 Best Sectional Rotary Switch is excellently suited for use with this kit. Either of these units may be bought separately. Blueprint furnished free. Ship. wt., 2 lbs. No. S-2075 All-Wave Coil Kit. **\$1.50**
 YOUR PRICE
 No. S-2076 All-Wave 3 Circuit Tuner. **\$0.90**
 YOUR PRICE
 No. S-2077 All-Wave R.F. Coil. **\$0.75**
 YOUR PRICE

Copper Tubing

Available in two of the most popular sizes for amateur work namely 3/16" (16 feet per pound) and 1/4" (12 feet per pound). Sold in 2 1/2 Hammarlund coils. No. S-256 3/16" Copper Tubing. **\$0.06**
 YOUR PRICE, Per Turn
 No. S-257 1/4" Copper Tubing. **\$0.07**
 YOUR PRICE, Per Turn

TELEGRAPH KEYS AND PRACTICE SETS

Junior Key

A low-power sounding key constructed on a heavy black enamel base. Has coin silver contacts and nickel plated lever. Keys is of cast aluminum alloy base provided with two brass binding posts. Shipping weight, 2 lbs. No. S-112K Junior Key. **YOUR PRICE \$1.35**

Legless Key

Polished and lacquered brass base, nickel plated lever, coin silver contacts. Has also make and break switch. This type of key is used exclusively by Western Union. List Price \$2.75. No. S-M100 Legless Key. **YOUR PRICE \$1.80**

Standard Wireless Keys



The most popular key for radio amateur transmitting stations. Designed for larger capacity radio work. The arm, base, and supporting posts are constructed of heavy cast lacquered brass. Contact points are of coin silver and will not arc. Are available in three different sizes of contact points. Shipping weight, 1 1/2 lbs.

Cat. No.	Size of Contacts	List Price	YOUR PRICE
S-R62	3/16"	\$3.50	\$1.98
S-R63	1/4"	3.70	\$2.18
S-R64	3/8"	3.90	\$2.30

Speed-X Automatic Telegraph Key

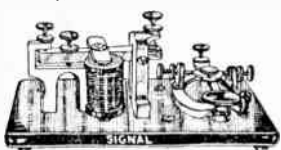
Saves Time, Labor and Fatigue — Unconditionally Guaranteed

If you are one of the finest automatic key operators in the world, you will appreciate the balance, ease of operation, and the "pep" and "life" of the Speed-X automatic key. Experienced amateurs throughout the world are using these new keys, saving themselves time and labor energy. It is absolutely the simplest thing in the world to operate once you become accustomed to it. A slight pressure of the key to one side produces a series of dots until released. Repeating the operation in the other direction produces dashes.

NOTE THESE EXCEPTIONAL FEATURES: Fully adjustable—can be slowed down to 5 words per minute or geared to as high a rate of speed as desired; standard construction throughout; precision adjustments at all pivot points; contacts 1/2" diameter—made of coin silver; heavy sturdy construction throughout—will hold adjustment at all speeds; base of bright bakelite enamel—all nickel parts highly polished. **EVERY SPEED-X KEY IS MANUFACTURED TO THE HIGHEST STANDARD OF QUALITY AND IS UNCONDITIONALLY GUARANTEED.** List Price \$12.50.

No. S-100 "HI-SPEED" Speed-X Telegraph Key. **YOUR PRICE \$7.50**

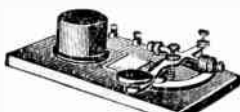
Signal Learner Set



On city, private and short lines learners will find this instrument easy to handle and having a clear, distinct tone. Bar frame and key base are black enamel, the bridge is brass and sounding bar is aluminum. Key and switch levers are nickel plated. Sounder and key are mounted on a mahogany finished wood base.

List Price \$4.50
No. S-M110 4 Ohm Learner Set. **YOUR PRICE \$3.00**
No. S-M111 20 Ohm Learner Set. **YOUR PRICE \$3.30**

CODE PRACTICE SET



FOR BEGINNERS

A simple wireless code practice set for beginners. Just the instrument to get started with. Has a high frequency buzzer which emits a note exactly similar to real wireless signals. Requires only a 3 volt battery for operation. The code is printed on a little brass plate fastened to the base. Key is made of solid brass and is mounted on a beautifully finished base board together with the buzzer and three brass binding posts for battery and ear phone connections. Shipping weight, 2 lb.

No. S-R68 Signal Practice Set. **YOUR PRICE \$2.03**

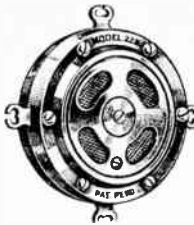
Na-Ald Simple Code Practice Set

This set is the most inexpensive code instrument on the market. Has an adjustable pitch buzzer and will operate from the smallest type flashlight batteries. All metal parts are nickel plated and are mounted on a beautifully molded Bakelite base. The Morse Continental Code is molded on each side of the key. Clips can be placed in the binding post to hold fountain-pen flashlight battery. It is an excellent set for practicing code with someone else—each party having an individual code set. Will work efficiently up to 1,000 feet.

May be connected to the antenna post of your radio receiver to produce clear, loud, signals from the loudspeaker. The box in which each set is packed illustrates with diagrams many interesting ways of using this code set. Ship. wt. 1/2 lb. List Price \$0.75. No. "Shear" Na-Ald Simple Code Practice Set. **YOUR PRICE \$0.44**

Shure Two-Button Microphone

A large sized high quality two button microphone for public address systems and amateur broadcasting. Incorporates many high quality features not available in cheaper models. New glazed carbon button units, adjustable buttons, gold-plated diaphragm tuned and clamped by a special process. Each unit is individually assembled and tested by experts in the laboratory. Has all the new Shure features including the new "Quackway" hooks (for easy attachment of microphone springs), a screen across the face of the microphone to eliminate the need of covers. Designed along modernistic lines with bevelled edge and many other features which have made these microphones so well known for quality and performance.

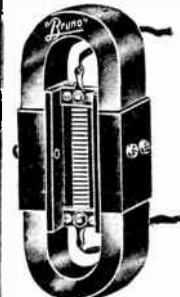


Operates best at 6 to 8 mils per button. Any greater current than 12 mils will ruin the microphone. Total internal resistance 200 ohms, per button. Diameter over all 3 1/16", diameter of frame 3", thickness over all 1 1/4". Individually packed and including wiring diagram. Guaranteed if not abused. Shipping wt., 2 1/2 lbs.

No. S-12N Shure Two Button Microphone. Chromium Finish. **YOUR PRICE \$13.95**

Bruno Ribbon-Type Velocity Microphone

Available in Kit Form Or Assembled



Here indeed is the ULTIMATE in microphones. It may be subjected to all extremes of weather or submerged in water and still it will perform perfectly. Responds uniformly to a frequency range of from 30 to 14,000 cycles. IT IS FREE FROM RESONANT PEAKS. It will not pick up extraneous noise or cause feed back due to its highly directional quality. In other words it is the "PERFECT MICROPHONE."

This microphone GENERATES ITS OWN CURRENT and is therefore absolutely quiet in operation; no hiss, no carbon r-r-r-ring noise. Can be used at a distance from preamplifier. OPERATES WITH FULL EFFICIENCY IN FRIGID NORTH OR TORRID SOUTH. Not affected by altitude or humidity. Its construction is so rugged that if handled roughly or even if dropped there is no danger of major injury. This fine instrument is available either in kit form or completely wired ready to use. All component parts are finely machined and accurately matched so that they can be assembled in less than one hour's time. Complete instructions and amplifier diagram furnished FREE with each instrument.

IT IS IMPORTANT TO NOTE that the usual microphone transformer will not match this ribbon microphone. Therefore we are listing below a number of specially constructed transformers designed to be used with this fine precision instrument:

Cat. No.	Description	YOUR PRICE
S-AR1	Bruno Ribbon Microphone Kit	\$5.88
S-AR2	Bruno Ribbon Microphone, assembled ready to use	11.76
S-RL	Transformer, Mike Ribbon to line	3.53
S-LG	Transformer, Line to Grid	3.53
S-RG	Transformer, Mike Ribbon to Grid	3.53

Shure Two-Button Hand Microphone

This particular microphone has been designed especially for transmission of voice. It is not recommended for music. The case of the microphone is provided with covers and screen and is highly nickel plated. The handle is finished in black rubberized Japan and is designed along modernistic lines. A hook is provided on the top for suspending the microphone. The unit is especially useful for industrial and home talking picture machines, home recording, public address outfit, etc. Operates best at 6 to 8 mils per button. Limit of guarantee, 12 mils per button. Total internal resistance 400 ohms or 200 ohms, per button. Thickness overall 1 1/4", diameter overall 3 1/4", diameter of frame 2 1/2". Each microphone packed individually with wiring diagram and instructions. Finished in nickel. Shipping weight, 1 1/4 lb.



No. S-11N Shure Two Button Hand Microphone. **YOUR PRICE \$8.50**

Faraday Double Button Microphone



Here is the largest value ever offered in commercial type microphones! An extremely large, two-button microphone, ruggedly constructed and designed especially for broadcast purposes. It has the remarkable frequency coverage of from 30 to over 5,000 cycles—adequate for all speech and music reproduction. This highly desired frequency response characteristic is due to the use of a new design, of stretched cushion diaphragm, made of special heat-treated duralium. Has pure gold center contacts on buttons and diaphragm. Available in standard 200 ohms resistance per button. The microphone is finished in beautiful polished chrome and compares excellently with professional and more expensive microphones. Net weight, 1 1/4 lbs. Ship. wt., 2 1/4 lbs.

No. S-11F Faraday Double Button Microphone. **YOUR PRICE \$4.50**

Acme "Feather-Weight" Headphones



An exceptional efficient, small, low priced head-set for amateurs, experimenters and for all other uses where a high grade, light weight, comfortable head set is required. The complete head set weighs but 5 ozs.

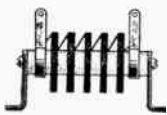
Magnets made of high-grade chrome steel. Standard 2,000 ohm per phone. Excellent for use on short waves. Shipping weight, 1 1/2 lb. No. S-1679 Acme "Feather-Weight" Headphones. **YOUR PRICE \$0.99**

New Bakelite Tube Cap



This cap was designed especially for transmitting tubes having large caps on top, such as the 866 etc. Made of genuine moulded bakelite shaft with phosphor bronze spring contact inside. A 12" lead (turn-head) comes through top of cap. Shipping weight, 4 oz. List Price \$0.35. No. S-92 New Bakelite Tube Cap. **YOUR PRICE \$0.18**

Hammarlund Heavy Duty Transmitting R.F. Choke



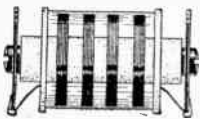
This choke is ideal for use in the plate circuits of high power transmitting tubes where the continuous plate current does not exceed 500 milliamperes. For intermittent operation this value may be exceeded by at least 50%. Although the self-inductance of this choke is 5.3 millihenries, its distributed capacity has been held to the extremely low value of 1.5 micro-microfarads. Thus it is **SUITABLE FOR USE IN TRANSMITTERS OPERATING IN ANY OF THE SHORT WAVE BANDS.**

Mounting brackets are secured to the isolantite core with short machine screws and are insulated from the choke terminals. The mounting brackets may be removed and the choke mounted on a metal base or panel by means of a single machine screw. Overall size (with mounting brackets) 1 5/16" diameter by 2 3/4" long. D.C. resistance, 12 ohms. No. S-CH500 Heavy Duty R.F. Choke.

YOUR PRICE \$1.03

Hammarlund Isolantite R.F. Chokes

This low loss radio frequency choke is designed particularly for short wave and ultra short wave receivers and transmitters, but its efficiency actually extends well above the regular broadcast band. Its compactness permits mounting in isolated positions well removed from stray R.F. fields. Its lead characteristics make it specially suited as a grid choke for multi-stage transmitters.



Both standard leads and terminals are provided to permit the choke being either base mounted or suspended in the circuit wiring. No metal screw passes through the choke to increase losses and disturbed capacity. The choke measures 1 3/8" x 3/8", has an inductance of 8 millihenries, a D.C. resistance of 70 ohms, a distributed capacity of 3 mmf. and a current carrying capacity of 125 milliamperes. No. S-SHR Ship. wt., 4 oz.

YOUR PRICE \$0.65

Hammarlund High Impedance R.F. Choke Coils

85 and 250 Millihenries—60 ma. Standard in the Industry for Years



A special process of helical winding and impregnating, enable the forming of a very large inductance with very low distributed capacity. Have no natural resonance period within broadcast band. Their unusually low distributed capacity makes them exceptionally effective in short-wave work.

Ideally suited for detector plate circuits, B+ and grid return lead and for R.F. filtering in general. Current carrying capacity of both sizes is 60 milliamperes. Shipping weight, 1 oz.

List Price \$2.00
No. S-RFC85 Inductance 85 millihenries, capacity 3 mmf., D.C. resistance 215 ohms. **YOUR PRICE \$1.18**
No. S-RFC250 Inductance 250 millihenries, capacity 2 mmf., D.C. resistance 420 ohms. **YOUR PRICE \$1.32**

New Hammarlund R.F. "Pigtail" Chokes

Five universal wound pies are mounted on a 3/4" Isolantite core. Length across ends is 1 1/2". Diameter 3/4". 125 milliamperes. Inductance 2.1 mh. No. S-CH-X New Hammarlund R.F. "Pigtail" Chokes. **YOUR PRICE \$0.44**



Gen-Win Shielded R.F. Chokes



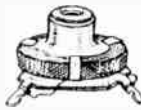
These R.F. choke coils are indeed the ultimate in radio frequency choke construction. Because of the peculiar arrangement of the windings, known as three pie windings, there is an absolute minimum amount of distributed capacity per unit of inductance. The illustration here, clearly shows the unique manner in which this choke is wound. It is being adapted very rapidly by manufacturers and research laboratories as standard choke equipment.

The entire unit is housed and shielded in a small aluminum can with terminals protruding conveniently from the sides. Suitable provisions are made for mounting the choke. These chokes are made in a variety of sizes for all circuit requirements. Shipping weight, 5 oz.

Cat. No.	Description	YOUR PRICE
S-610	1 Milliheny (for short wave sets)	\$0.80
S-611	1.25 Milliheny (gen. purpose short wave choke)	.85
S-612	8.8 Milliheny (screen-grid tube circuits)	.90
S-613	18 Milliheny (for plate circuit of second detector in 175 KC super-het circuit)	.95
S-614	27.5 Milliheny (for detector plate in T.R.F. circuit)	1.05
S-615	50 Milliheny (for special purposes)	1.15
S-616	85 Milliheny (general purpose broadcast receiver choke)	1.25

Gen-Win Precision Lattice Wound R.F. Choke Coils

Gen-Win choke coils are undoubtedly among the finest in the industry. They are precision wound with the best grade of material thoroughly impregnated by the new electrical-oven heat process. Ship. wt., 4 oz.



Cat. No.	Description	YOUR PRICE
S-600	1 Milliheny (for short wave sets)	\$0.40
S-601	1.25 Millihenries (general purpose short wave)	.48
S-602	8.8 Millihenries (for screen grid tube circuits)	.55
S-603	18 Millihenries (for plate circuits of second detectors in 175 K.C. superhet. circuits)	.60
S-604	27.5 Millihenries (for detector plate in T.R.F. circuit)	.70
S-605	85 Millihenries (general purpose broadcast receiver choke)	.80

Gen-Win R.F. Filter Chokes

For Type 82 Mercury-Vapor Rectifiers
These heavy duty filter chokes are positively essential in circuits employing the mercury-vapor rectifier tube type 82. The choke consists of 2 coils, each of which should be connected in series with each plate of the tube. When the mercury in the rectifier tube is vaporized it becomes ionized and creates miniature radio frequency discharges, which cause disturbances in the receiver. These chokes will entirely eliminate such disturbances by smothering them out. The coils are approximately 2 millihenries each and will stand at least 250 Mil. No. S-625 R.F. Filter Chokes for 82 Rectifiers. **YOUR PRICE \$0.95**

85 Milliheny Choke Coil

This choke coil is recommended for short-wave work inasmuch as its distributed capacity is extremely low. Consists of 1900 turn of helically wound enameled wire. Measures 1 1/2" in diameter x 3/8" thick. Ship. wt., 4 oz. No. S-1681 85 Milliheny Choke Coil. **YOUR PRICE \$0.12**



Globes for Short-Wave Fans



This remarkable globe, which measures 12" in diameter total height with pedestal 16", and printed in fourteen different colors, is waterproof and easily washed by using a damp cloth.

There is a graduated "Meridian" scale of black enameled metal. An additional feature is the metric hour scale found at the north pole—this facilitates determining the hour in any part of the world. Only on a globe of this size is it possible to get an accurate picture of countries and their relative position to each other. You will actually be amazed when you compare distances—from New York to Moscow; from Cape Town to Tokyo; from Los Angeles to Rio de Janeiro, etc. A flat map is deceptive for measuring, but take a small string and stretch it across the globe, from city to city, and you have the correct distance.

Here is the globe that adds dignity to home, office, studio or laboratory. It's a globe that everyone would be proud to possess.

The World Short-Wave Globe, printed early in 1931, contains over 7,500 names and cities. All spellings conform to standard rulings of U. S. Department of Commerce and Royal Geographic Society of London, England.

All globes are packed in cartons assuring safe delivery. Shipping weight, 8 lbs. No. S-215 Large Short Wave Globe. **YOUR PRICE \$3.75**
No. S-216 Small Short Wave Globe measuring 6" diameter. **YOUR PRICE \$1.25**

New Airplane Tuning Dials High Ratio Verniers For Short-Wave Tuning

These double geared dials have special spring take ups which do away entirely with backlash. Extremely high ratio of 12 to 1. Convex glass covered and illuminated pyralin scale. Two models available. Ship. wt., 1 lb. List Price \$5.00

No. S-120 With 3 1/2" Scale. Pointer Moves 270 In Same Direction As Condenser Knob. **YOUR PRICE \$2.94**

No. S-121 With 4" Scale. Pointer Travels 270 In Same Direction As Knob Shaft But Opposite To Condenser Travel. **YOUR PRICE \$2.94**

A 6 to 1 ratio wedge-drive Airplane Dial 2 1/2" diameter scale with pointer moving 270° in same direction with knob and condenser. Measure 3 1/2" in diameter by 1 1/2" high overall. Ship. wt., 1 lb. List Price \$3.00

No. S-123 Dial. **YOUR PRICE \$1.76**

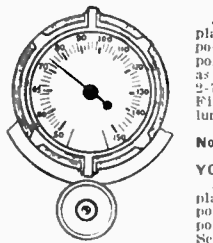
A 6 to 1 ratio, wedge-drive Airplane Dial. Knob travels in opposite direction to condenser but pointer travels in same direction as condenser. Dial measures 2 7/16" wide by 3 1/2" high. Fitted with convex lens and illuminated dial. Ship. wt., 1 lb. List Price \$2.60

No. S-124 Airplane Dial. **YOUR PRICE \$1.56**

A high ratio friction-drive Airplane Dial. Knob travels in opposite direction to condenser but pointer travels with the condenser. Scale diameter 2 1/2", overall length 2 5/8" overall height 1 1/2". Fitted with convex lens Airplane dial illuminated. Ship. wt., 1 lb. No. S-125 Dial. **YOUR PRICE \$1.18**



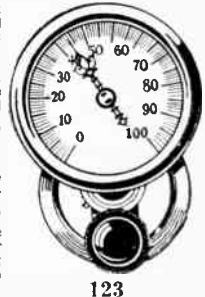
120 and 121



123



125



123



124

Kurz Kasch Vernier Dials

For Short-Wave Work

Here is an excellent low-priced vernier dial which is very popular on short-wave receivers. If you will glance through the pages of this catalog you will find that the large majority of short-wave sets listed therein employ these Kurz Kasch dials. The dial attaches to the shaft on the condenser by the famous Kurz Kasch split bushing method. Friction drive employed—with a strong spring ever ready to compensate for wear. Physical ratio is 1 to 1. Available in 3" size. The out-side of the dial is hand-enameled in a very decorative effect. Shipping weight, 1 lb. List Price \$2.00
No. S-1580 Kurz Kasch Vernier Dial. **YOUR PRICE \$0.39**

LYNCH SHORT-WAVE ANTENNA SYSTEMS

The diagram (right) illustrates one of the most effective short-wave antennas—the doublet antenna—with transposed feeders for noise-free reception. While these antenna systems were designed primarily for short-wave reception, their noise-reducing properties are conventional on the broadcast frequencies and will provide "R-9" reception (highest possible intensity) where ordinarily the signal would be lost in a barrage of man-made static. The Lynch Short-Wave Antenna system is the only commercially available noise-reduction type of aerial combining high noise reduction and pick-up efficiency on waves shorter than 200 meters. The fact that these properties are also effective from 10 to 550 meters recommends the system as the best possible antenna for use with "all wave" receivers.

It may be safely stated that 9/10ths of all noise picked up by a radio receiver (especially short-wave sets) is picked up by the antenna system. Of all this noise—practically 9/10ths is picked up by the lead-in wire alone. It is logical to understand, therefore, that by insulating the lead-in wires all extraneous noise will be eliminated since the individual electrical fields in each wire, raised by the noise cancel each other out. This is exactly what the Lynch transposed feeder system does.

The Lynch short-wave antenna kit comprises the following parts: 15 Lynch Transposition Blocks, 8 Lynch Commercial type Insulators, 1 Lynch Doublet Coupler (Trans-mission Line Impedance-Matching Device) and 200 feet of enameled short-wave antenna wire.

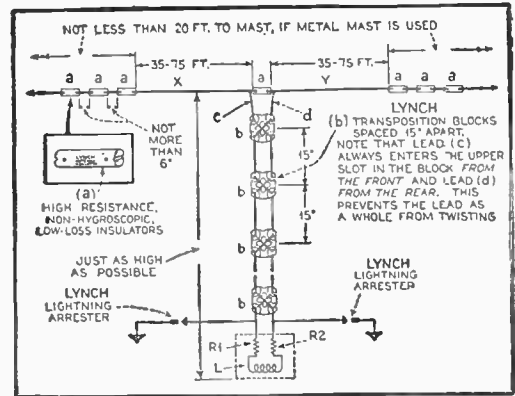
The 15 transposition blocks are sufficient for a transmission line 18 feet long. For longer lines additional blocks may be had in kits of 10 each as listed below. One kit of 10 blocks is sufficient for a lead-in of 11 1/2 feet; 2 kits for 23 1/2 ft. long; 3 kits for 35 1/2 ft. long; 4 kits for 47 1/2 ft. long; 5 kits for 61 1/2 ft. long, etc.

Determining Proper Length

For best results on short-wave reception the size of the Doublet antenna (marked X and Y respectively in diagram) should be 78 feet each. For best results on a definite wave length, the lengths X and Y should be one-quarter of the desired wave length. Thus for 80-meter work the doublet portion of the antenna will have an overall dimension of approximately 19.5 feet. However the 80-meter antenna will provide excellent reception on 40 meters and 20 meters (and the 40 meter antenna at 20 meters) due to the harmonic condition. But the reverse is not true. A doublet antenna tuned to 20 meters will not show peaks at 40 and 80 meters. These antennas will be as effective as the ordinary well-tuned aerial on waves to which they are not tuned, pronounced peaks will occur, as indicated.

The simplest method of coupling the transposed lead-ins to the receiver is to connect them to the antenna and ground posts on the receiver by means of the shortest possible length (not more than 8 feet) of ordinary twisted lamp cord. In this case the receiver must not be grounded. If this method is not satisfactory, any one of the other Lynch couplers listed on this page may be used. Ship. wt., 6 lbs. **List Price \$6.00**

No. S-217 Lynch Short-Wave Antenna Kit. **\$3.53**
YOUR PRICE



SPECIAL ALL-WAVE KIT

This kit is exactly the same as the Lynch Short-Wave Antenna Kit, differing therefrom only in the method of coupling to the receiver. The Short Wave Kit uses the "doublet" coupler which works best from 200 meters down, whereas this "all wave" antenna system employs the new "universal" coupler which can be used for reception on ALL wave lengths. Ship. wt., 6 lbs.

List Price \$6.50
No. S-218 Lynch Special All-Wave Kit. **\$3.82**
YOUR PRICE

ANTENNA ACCESSORIES

"All-Wave" and "Universal" Couplers

While it is possible to secure much more satisfactory results by the application of the transposed lead-in alone over the usual ground and aerial system, the best results are obtained when there is no connection between the receiver itself and the regular ground. The best way to accomplish this result is to have a winding which is connected with the 2 leads of the transposed lead-in system and placed in inductive relation to the first tuned circuit in the receiver. The "All-Wave" coupler is designed to couple the transposed lead-in to short wave receivers, whereas the "Universal" coupler is designed for regular broadcast or all wave receivers using the noise free doublet antenna system. The illustration above shows the "All-Wave" coupler. Ship. wt., 1 lb.

No. S-2169 Lynch "All-Wave" Antenna Coupler. **\$1.03**
YOUR PRICE
No. S-2168 Lynch "Universal" Antenna Coupler. **\$0.88**
YOUR PRICE

Transposition Blocks

These blocks are made of a new ceramic material, called Lynchite. They are non-hygroscopic, affording low capacity and low-loss possible power factor. Sold in kits of 10 blocks. One kit is sufficient for a lead-in of 11 1/2 feet; 2 for 23 1/2 ft.; 3 for 35 1/2 ft.; 4 for 47 1/2 ft.; 5 kits for 61 1/2 ft., etc. Ship. wt., 1 lbs. per kit.

List Price \$2.75
No. S-2165 Kit of Ten Transposition Blocks. **\$1.62**
YOUR PRICE

Cage-Aerial Spreaders

Where the cage-type aerial is to be used in order to take advantage of its great pickup qualities and non-directional properties, the new Lynch cage antenna spreaders are highly desirable. Made of the new low loss insulation material called Lynchite. Sold in kits of 10 spreaders. Ship. wt., 2 lbs.

List Price \$2.75
No. S-2166 Kit of 10 Cage-Aerial Spreaders. **\$1.62**
YOUR PRICE

Lynch Doublet Couplers

This is the unit which is furnished with the Lynch Short-Wave Antenna Kit. The coupler is preferably mounted on the inside of the receiver close to the antenna and ground posts. Complete instructions enclosed with each unit. The unit consists of 2 resistors mounted on a dual mounting. The effectiveness of the antenna, lead-in and mount system can be increased by impedance-matching or changing the values of the resistors for different frequencies. Ship. wt., 1 lb.

List Price \$1.15
No. S-2186 Lynch Doublet Couplers. **\$0.68**
YOUR PRICE

"U.S. Navy" Type Antenna Insulators

Power loss due to electric "leak" is an important factor as man-made static. These Lynch insulators are made of the new Lynchite material which has an extremely high tensile strength and low R.F. leakage loss. Sold in kits of 8. Ship. wt., 2 lbs.

No. S-2167 Kit of 8 Lynch Insulators. **\$1.18**
YOUR PRICE

"Commercial" Antenna Insulators

These insulators do not have the same tensile strength as the U. S. Navy type. Where long antennae or lead-ins are used we recommend the use of the U.S. Navy type insulators. Sold in kits of 8.

List Price \$1.15
No. S-2168 Lynch Commercial Antenna Insulators. **\$0.75**
YOUR PRICE

ANTENNA TENSION SPRING

Designed particularly for keeping antennae taut and prevent them from sagging in the wind. It is a valuable advantage particularly when used with the doublet system as it prevents excessive sag due to the weight of the transposition block. Even should the spring break the antenna itself will not fall. Ship. wt., 1/2 lb.

No. S-765 Antenna Tension Spring. **\$0.29**
YOUR PRICE

Do You Have Our Regular Catalog?

If not you are certainly missing something. Aside from a very large array of interesting and modern radio merchandise, you will find an extremely educational editorial section. Some of the information contained therein is as follows: Fundamental Circuits and Uses of the New Tubes—Revamping 6-Volt Battery Sets For 2-Volt Tubes—Public Address Systems—How to Build Short-Wave Transmitters and Receivers—New Tube Chart and Socket Connections—Fundamental Principles of Radio For the Beginner, Chapter 2, etc., etc.

WRITE TODAY—Send 5c coin or U. S. stamps for postage-treatise by return mail.



FEEDER SPREADERS

Where the conventional type of feeders on the doublet antenna system is employed these spreaders will help keep the 2 leads at a uniform distance. Constructed of genuine bakelite with hole slot for wires and set screws. For use in 2 wire feed lines—available in three sizes. Ship. wt., 1/4 to 1/2 lb.

No. S-406 7" Spreader. **\$0.24**
YOUR PRICE
No. S-407 4" Spreader. **\$0.18**
YOUR PRICE
No. S-408 2" Spreader. **\$0.15**
YOUR PRICE

Solid Copper Enameled Antenna Wire

Available in 100 foot rolls. The sizes listed below are the most popular for short-wave antenna.

Cat. No.	Size	YOUR PRICE
S-490	14	\$0.45
S-492	12	.66
S-499	10	1.14

UNEEDIT DRY-CELL BATTERIES

For All Types of "A"—"B"—"C" Work
Uneedit batteries are made of the highest grade ingredients under careful and scientific supervision. The chemical formula employed in constructing these batteries is such that the operating life imparted to them is far beyond that of most batteries on the market. The standard 45 volt battery is usually employed on receivers using from 1 to 1 tubes. The standard 15 volt heavy duty battery is employed with receivers and amplifiers using more than 1 tubes. The small 2 1/2 volt battery is excellently suited as a "B" supply for portable receivers and amplifiers. It may also be employed as "C" potential for power tubes. We recommend that these batteries be shipped via express collect rather than parcel post due to their weight. The No. 6 dry cell is of course a general purpose unit for radio and all other types of service.



Cat. No.	Description	Standard	Ship. Wt.	YOUR PRICE
S-UV-30D	Standard 15 Volt "B" Battery	15	9 1/4 lbs.	\$0.98
S-UV-30F	Heavy Duty 45 Volt "B" Battery	45	15 3/4 lbs.	1.44
S-UH-3 D	1 1/2 Volt "C" Battery	1 1/2	1 lb.	.40
S-UH-15B	No. 6 Dry Cell 22 1/2 Volt "B" & "C" Battery	6	2 lbs.	.30
			1 lb.	.80

NEW! NEW! NEW! "FEED-THRU" STANDOFF INSULATORS

The novel and ingenious features of these new stand-off insulators make them essential for high quality construction work on all transmitting and receiving apparatus. We speak particularly of the "Feed Thru" insulators which afford maximum ruggedness and highest possible insulating properties. The Feed-Thru insulators are intended for sub-panel mounting, thereby permitting connections to be made on the bottom side of the sub-panel. Each Feed-Thru insulator has an insulated bushing which eliminates all possibilities of leads shorting to the metal chassis as they pass through their respective holes.



NO. S-458 FEED-THRU INSULATOR

This is the smallest of the Feed-Thru insulators, being only $\frac{5}{8}$ " high and furnished with solid brass, nickel-plated hardware with $\frac{6}{32}$ " nuts and screws. Requires $\frac{5}{16}$ " diameter hole for mounting. Diameter of base $\frac{3}{8}$ ". Ship. wt., 4 oz.
YOUR PRICE \$0.08



NO. S-478-J JACK-TYPE INSULATOR

This item is similar to the 478, being $\frac{7}{8}$ " high; but instead of the screw terminal top, it has a jack made to accommodate a G.R. plug (banana-type plug). A $\frac{7}{16}$ " hole is required for mounting. Complete with solid brass, nickel-plated hardware with $\frac{10}{32}$ " nuts and screws. Diameter of base $\frac{5}{8}$ ". Shipping weight, 4 oz.
YOUR PRICE \$0.15

NO. S-478 FEED-THRU STAND-OFF INSULATOR

This is the most popular type. Measures but $\frac{3}{4}$ " high. Complete with solid brass, nickel-plated hardware with $\frac{6}{32}$ " nuts and screws. A $\frac{7}{16}$ " hole is required for mounting. Especially adapted for mounting transmitting R.F. coils. Diameter of base $\frac{3}{4}$ ". Ship. wt., 4 oz.
YOUR PRICE \$0.12



No. S-4125-J JACK-TYPE INSULATOR

This unit is similar to the No. S-1125, being $1\frac{1}{2}$ " high; but instead of the screw terminal top it is provided with a jack to accommodate a G.R. plug (banana type). Requires $\frac{7}{16}$ " hole for mounting. Hardware made of brass, nickel plated with $\frac{10}{32}$ " nuts and screws. Diameter of base $\frac{3}{4}$ ".
YOUR PRICE \$0.18

No. S-4125 Feed-Thru Insulator same as above but measuring $1\frac{1}{2}$ " high. Diameter of base $\frac{3}{4}$ ".
YOUR PRICE \$0.15

"BREADBOARD" STANDOFF INSULATORS



NO. S-866-J JACK-TYPE INSULATOR

This insulator is provided with jack on the top, to engage the G.R. type (banana type) plug. Measures $1\frac{1}{2}$ " high. Base measures $1\frac{1}{4}$ " x $1\frac{1}{2}$ " with two holes $1\frac{1}{8}$ " between centers for No. 6 screws. Soldering lug on top of insulator. Ship. wt., 6 oz.
YOUR PRICE, each \$0.10



NO. S-966 MIDGET INSULATORS

This is a truly small insulator being fashioned after white space is at a premium. Designed especially for use in transmitter. Measures but $1\frac{1}{4}$ " high. Base $\frac{3}{8}$ " x $1\frac{1}{4}$ " with 2 holes $\frac{3}{8}$ " between centers for No. 6 screws. Built with $\frac{8}{32}$ " brass, nickel plated hardware.
YOUR PRICE, each \$0.06

NO. S-866 JUNIOR INSULATOR

This model is a convenient insulator being only $1\frac{1}{8}$ " high. Applicable to the mounting of variable condensers, transmitting coils and other high voltage equipment. Base measurements are $1\frac{1}{2}$ " x $1\frac{1}{2}$ " with 2 holes $1\frac{1}{8}$ " between centers for No. 6 screws. All hardware made of brass, nickel plated.
YOUR PRICE, each \$0.09



NO. S-766 BEE-HIVE INSULATORS

These units are designed for extra heavy-duty work. They are ideal for power supply leads, lead-in and ground wires, heavy tank coils, etc. Base measures $2\frac{1}{2}$ " diameter with 3 tabs on a $1\frac{1}{2}$ " circle for No. 8 screws. Supplied with brass, nickel plated 12/24 screws and nuts. Specify color: blue, brown or white.
YOUR PRICE, each \$0.10



LOW-LOSS, HIGH-STRENGTH GLASS INSULATORS For TRANSMITTING and RECEIVING

Essential properties for satisfactory radio insulation, especially at high frequencies are: low power loss, low surface conductivity, high electrical resistance, a hard, smooth surface, stability against corrosive influences, and a high strength-to-weight ratio. These are the properties which are inherent in Pyrex Glass Insulators—properties which remain permanent and unchanged by age, exposure to elements and continued impact of radio energy. Ship. wt., $\frac{1}{2}$ to 5 lbs.



Strain Insulators

Cat. No.	Length	Strength	Power	YOUR PRICE
S-6706	3 $\frac{1}{2}$ "	450 lbs.	B'deant.	\$0.17
S-67017	7 $\frac{1}{2}$ "	.009 lbs.	250 w.	.68
S-67021	12 $\frac{1}{2}$ "	1000 lbs.	1 $\frac{1}{2}$ kw.	2.06

Entering Insulators

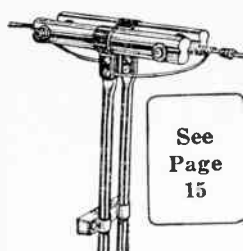
Cat. No. S-67104	15 Ins. Long, 2 $\frac{1}{2}$ Ins. Diam.	\$1.49
Cat. No. S-67105	20 Ins. Long, 2 $\frac{1}{2}$ Ins. Diam.	1.59



JOHNSON TYPE Q ANTENNA MAXIMUM TRANSFER OF POWER

ADVANTAGES

- * 100% more radiation from the same power than obtained with the usual doublet antenna system.
- * Negligible losses in entire system.
- * Matched impedances throughout.
- * Practically zero radiation from transmission line.
- * No standing waves on main transmission line.
- * No distortion of radiation pattern or angle.
- * No exact or critical overall feeder lengths. Line may be several thousand feet long if desired.
- * Permanent, low-loss construction. Glazed porcelain insulation—no deterioration or weathering.
- * Easily installed and adjusted without calculations or experimenting.
- * May be used without modification in reflector and directional "beam" systems.

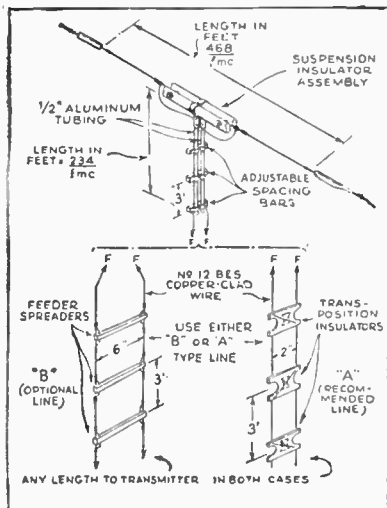


See Page 15

The theory that a thoroughly matched transmitter and antenna system results in absolutely no losses in the transmission system is now materialized in the form of the Johnson Type "Q" Antenna System. The system is designed to amateur broadcast and commercial short-wave transmitters of all types, resulting in increased range, improved efficiency and higher signal-to-noise ratio. It makes possible the amazing condition that the feeders to the antenna proper may be any length at all.

THEORY

For maximum transfer of power without reflection losses or standing waves, the antenna and line must be accurately matched. However, impedance-matching with inductive transformers, tuned circuits or inefficient "twisted pair" lines is wasteful of power; introducing losses which offset the gain obtained by the matching. As contrasted with such methods the Type "Q" system uses a highly efficient impedance matching quarter-wave line section, consisting of one-half inch aluminum tubing which functions as an impedance-matching transformer between antenna and main transmission line with practically no loss at all. This type of antenna has an impedance of approximately 75 ohms. The length of the tubing is 90% of a quarter-wave length at the operating frequency, while the spacing of the tubes depends only on the characteristic impedance of the main transmission line. From the lower ends of the twin aluminum tubing, the feeders may be as long as necessary.



Johnson Type Q Antenna System

COMPLETE ANTENNA SYSTEMS

Complete instructions are included for the adjustment of the various antennas to any operating frequency in their respective bands. Each complete antenna system include the following material: One No. 34 Suspension Insulator Assembly; One length of No. 12 Enamelled Copper-clad Steel Wire (see No. S-320 below) of sufficient length for the Half Wave Doublet; two lengths of light weight $\frac{1}{2}$ " diameter Aluminum Tubing (see No. S-375 below) for the Quarter Wave Line Section; a supply of No. 33 Spacing Bars for clamping the tubing in position; handy spacing template for lining up the tubing with proper spacing and finally complete instructions for operating on any desired frequency in the band. No end insulators for the doublet antenna are included. Shipping weights vary from 5 to 10 lbs.

Cat. No.	Complete Material for	List Price	YOUR PRICE
S-10-Q	Complete Material for 10-meter (28 MC) Antenna	6.25	3.67
S-20-Q	Complete Material for 20-meter (14 MC) Antenna	9.90	5.82
S-40-Q	Complete Material for 40-meter (7 MC) Antenna	17.50	10.29
S-80-Q	Complete Material for 80-meter (3.5 MC) Antenna	32.75	19.26
S-160-Q	Complete Material for 160-meter (1.175 MC) Antenna	63.75	37.48

INDIVIDUAL PARTS

NO. S-34 SUSPENSION INSULATOR ASSEMBLY. Includes two—No. S-107 7 inch glazed porcelain insulators, two—18 gauge nickel plated, hard-brass, tubing suspension clamps, two strain bolt assemblies, solder lugs and cable eyes. Shipping weight, 3 lbs.
List Price \$2.10
YOUR PRICE \$1.23

NO. S-33 SPACING BAR. Made of dense, highly-vitrified glazed porcelain. Used at 3-foot intervals for holding the quarter-wave tubes in position with proper spacing. Slots in bar allow adjustment of spacing from $1\frac{1}{4}$ " to $1\frac{1}{2}$ " center-to-center. Furnished complete with two half-inch nickel plated tubing, clamps and hardware. Ship. wt., $\frac{1}{2}$ lb.
List Price \$0.30 Each
YOUR PRICE \$0.18

NO. S-350 ANTENNA WIRE. Enamelled copper-clad steel wire No. 12 B. & S. gauge. The ideal material for doublets, main transmission line, and any other application where the wire must not elongate or sag. Very low R.F. resistance. Minimum length sold, 25 ft. Ship. wt., 3 oz. per ft.
YOUR PRICE, Per Foot \$0.01 1/2

NO. S-375 ALUMINUM TUBING. Used for the quarter-wave section of the Type "Q" Antenna System. One-half inch outside diameter. No. 21 Stubbs gauge. Affords ample conductivity and yet extremely light in weight (18.3 feet per pound). Furnished rolled in any length up to 100 feet.
YOUR PRICE, Per Foot \$0.09

BLILEY QUARTZ CRYSTALS

Bliley Mounted Crystals

The BC-3 Mounted Crystal is designed primarily for the amateur who wants to buy his crystal complete in a unit, plug it into his transmitter, and forget all about frequency troubles. The

rest of these units is no more than the BC-2 crystal alone. These are the special tanker type crystals mounted in a compact, modern, bakelite holder. Austre single frequency oscillation, more accurate calibration and less frequency drift while warming up. The prongs on the holder are so arranged that they will engage on the 1 inch or 1 1/4 inch prong socket. Your choice of any crystal within the 10, 80 and 160 meter bands supplied to your Exact specified frequency in kilocycles and temperature, if desired. OR may be had with the tolerance of 25 K.C. plus or minus or 5 K.C. plus or minus. All crystals have a precision of 0.03%.

No. BC-3 S-258. Any Crystal in 40, 80 or 160 Meter Bands Supplied To EXACT FREQUENCY. **YOUR PRICE \$6.85**

No. BC-3 S-259. Any Crystal in 40, 80 or 160 Meter Bands Supplied Within 25 K.C. Plus or Minus. **YOUR PRICE \$4.95**

No. BC-3 S-260. Any Crystal in 40, 80 or 160 Meter Bands Supplied Within 5 K.C. Plus or Minus. **YOUR PRICE \$5.75**

Bliley Single Signal Filters

The best single signal receivers employ a Bliley quartz filter. A precision ground, scientifically designed and rigidly tested, it insures maximum selectivity. They are supplied completely mounted for frequency of 150, 500 and 225 K.C. Please specify your particular frequency when ordering. The pins of the holder are so arranged that they will engage the opposite holes in a standard 5 prong socket.

No. SSF S-261 Single Signal Filters. **YOUR PRICE \$5.90**

Bliley Crystal Holder



Crystals mounted in this holder are thoroughly protected from dust or moisture. This is accomplished by having the top threaded down tightly to the base. The holder is made of genuine molded bakelite throughout. The pins of the holder are arranged in such a manner as to engage opposite holes in a standard 5 prong socket. Designed for 1 1/4 square crystals. A spring with variable tension holds the crystal firmly in place. Can be mounted in any position. Available in two sizes, namely for 10 and 80 to 160 meter bands.

No. S-BC-2-40 for 40 meter
No. S-BC-2-8 6 for 80-160 meter.

YOUR PRICE, Each \$1.50

Bliley Square-Cut Unmounted Crystals

These are the standard one inch square X cut power type crystals. A high quality finely ground crystal. Frequency accuracy is within 0.05%. These crystals fit into the Bliley BC-2 Crystal Holder. Your choice of any crystal from 10 to the 10, 80 and 160 meter bands.

No. S-BCX Bliley Square Cut Unmounted Crystals. **YOUR PRICE \$3.90**

Important Before Ordering

Be sure to specify the EXACT desired frequency; the exact operating temperature of room or oven and the allowable frequency variation from given frequency. Please remember that these crystals are all ground to order (except standard frequency crystals) hence sufficient time for shipment should be allowed.

Bliley Constant Temperature Crystal Oven

A scientifically designed constant temperature crystal oven which can be plugged into any 5 prong socket. Has a rating of 7.5 volts at 1/2 of an ampere and will hold its temperature within 1% of the set point. Contains a solid metal plate with 1 1/4 square top electrodes for the 10 meter crystals. The oven is made of molded bakelite presenting a very neat appearance. The heat of the oven can be adjusted by a small protruding set screw which controls a thermostat. Interchangeable plug-in with standard Bliley holders.

No. S-BC-6 Bliley Constant Temperature Crystal Oven. **YOUR PRICE \$7.50**

Bliley Oven Mounted Crystals

Type BC-7—40, 80 and 160 Meter Bands. No. B-C S-262 Oven Mounted Crystal. Any Frequency Within 10, 80 or 160 Meter Band Precisioned 0.03% Supplied With Tolerance Of 25 Kcs.

YOUR PRICE \$11.30

No. BC-7 S-263 Oven Mounted Crystal. Any Frequency Within 10, 80 or 160 Meter Band. Precisioned 0.03% Supplied With Tolerance, 5 Kcs.

YOUR PRICE \$12.50

No. BC-7 S-264 Exact Frequency in 40, 80 or 160 Meter Band Precisioned 0.03% Frequency Held Within Approximately 1 cycle.

YOUR PRICE \$14.00

No. BC-7 STD 100 Kcs. Exact Frequency Precisioned 0.05% (Adjustment By Purchaser Will Greatly Reduce This Frequency Held Within Approximately 1 cycle. **YOUR PRICE \$16.50**

Wafer Tube Sockets

Available for either 4, 5, 6 or 7 prong tubes. Mounting 1-11/16" centers.



No. S-4*4 UX Socket
S-4*5 UY Socket
S-4*6 6 Prong Socket
S-4*7 7 Prong Socket
S-4*7*7 Small
YOUR PRICE \$0.06

Universal Mounting Sockets

Genuine molded bakelite with phosphor bronze spring contacts. For mounting either above or below sub-panel. Equipped with insulated mounting flanges and hole-ideal for building adapters.



Ship. wt., 4 oz. ea.
No. S-424 UX Socket) **YOUR PRICE**
No. S-425 UY Socket) **Each**
No. S-436 6 Prong)
No. S-437 7 Prong) **\$0.15**
No. S-437A 7 Prong Small)

50 WATT TRANSMITTING SOCKETS Insulex Table Type

The most efficient transmitting socket on the market today. Fits all standard 50-watt tube bases. Maximum insulation is obtained by the use of Insulex base.

a non-hygroscopic ceramic compound which is absolutely unaffected by weather conditions. All metal parts are nickel plated and the contacts so arranged that connections can be made either to terminal screws or else soldered directly on to the extended portion of the contact spring. Contact is made to both side and bottom of tube prongs. All connections marked. The tube socket shell can be rotated to any one of four positions for the most convenient lead arrangement. Ship. wt., 1 1/2 lbs.

List Price \$2.00
No. S-956 Insulex Transmitting Socket For Table Mounting. **YOUR PRICE \$1.17**

Insulex Wall Type For Panel Mounting With Bracket

For those transmitting enthusiasts who prefer the finest possible socket we offer this product. It is the latest development in transmitting work. The specially designed bracket lends itself to efficient mounting. The other characteristics are the same as described for the table mounting transmitting socket listed above. Ship. wt., 1 1/2 lbs.

List Price \$2.50
No. S-957 Insulex Transmitting Socket For Panel Mounting With Bracket. **YOUR PRICE \$1.47**

50 Watt Bakelite Socket

The base of this socket is made of molded bakelite having a high dielectric strength, extremely high heat resistive qualities and low moisture absorption. The socket shell is made of nickel plated brass securely molded into the base.

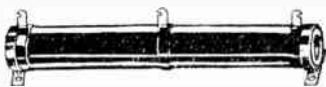
The contacts are of sturdy phosphor bronze, each contact lettered on top of the base to assure proper connection. Ship. wt., 1 lb. Diameter is 3 3/4". Height, 1 1/2".

List Price \$2.50
No. S-401 Bakelite Transmitting Socket. **YOUR PRICE**

TRANSMITTING GRID LEAKS AND BLEEDER RESISTORS

All Wire Wound

These resistors are all conservatively rated; in fact so much so that they will stand as high as a 75% overload for a short time without damage to the resistor. Made of the highest grade resistance wire wound on a non refractory form and baked in vitreous enamel. There is a size below for every need of the amateur.



Cat. No.	Watt	Size	Resistance	YOUR PRICE
1-265	10	2 1/2" x 9/16"	Up to 500 Ohm	\$0.28
1-266	10	2 1/2" x 9/16"	75 to 10M	.34
1-267	10	2 1/2" x 9/16"	1000 to 25M	.38
1-268	10	2 1/2" x 9/16"	2500 to 40M	.41
1-269	10	2 1/2" x 9/16"	1000 to 50M	.49
1-270	20	1 1/2" x 9/16"	Up to 750	.31
1-271	20	1 1/2" x 9/16"	75 to 10M	.38
1-272	20	1 1/2" x 9/16"	1000 to 25M	.41
1-273	20	1 1/2" x 9/16"	2500 to 40M	.46
1-274	20	1 1/2" x 9/16"	1000 to 50M	.53
1-275	35	1 1/2" x 15/16"	Up to 750	.35
1-276	35	1 1/2" x 15/16"	75 to 10M	.43
1-277	35	1 1/2" x 15/16"	1000 to 25M	.47
1-278	35	1 1/2" x 15/16"	2500 to 40M	.50
1-279	35	1 1/2" x 15/16"	1000 to 50M	.58
1-280	50	8 1/2" x 15/16"	Up to 750	.38
1-281	50	8 1/2" x 15/16"	75 to 10M	.47
1-282	50	8 1/2" x 15/16"	1000 to 25M	.50
1-283	50	8 1/2" x 15/16"	2500 to 40M	.55
1-284	50	8 1/2" x 15/16"	1000 to 50M	.63
1-285	75	8 1/2" x 15/16"	Up to 750	.41
1-286	75	8 1/2" x 15/16"	75 to 10M	.50
1-287	75	8 1/2" x 15/16"	1000 to 25M	.55
1-288	75	8 1/2" x 15/16"	2500 to 40M	.58
1-289	75	8 1/2" x 15/16"	1000 to 50M	.65
1-290	100	8 1/2" x 1 1/4"	5000	.84
1-291	100	8 1/2" x 1 1/4"	10000	.94
1-292	100	8 1/2" x 1 1/4"	20000	1.01
1-293	100	8 1/2" x 1 1/4"	50000	1.11
1-294	100	8 1/2" x 1 1/4"	100000	1.49

TUBE SOCKETS

General Purpose Sockets

Provided with knurled nut binding posts for convenient connection. Excellent for regular as well as experimental work. Made of molded bakelite throughout with phosphor bronze contact springs.

Available for either 4, 5, 6 and 7 prong tubes. Ship. wt. 1 oz. ea.
No. S-481 UX Socket) **YOUR PRICE**
No. S-481 UY Socket) **Each**
No. S-486 6 Prong)
No. S-487 7 Prong) **\$0.16**
No. S-487A 7 Prong Small)

Hammarlund Isolantite Sockets

Low-loss sockets are just as important as low-loss coils or low-loss condensers. In these new sockets, Hammarlund has combined low cost with low loss, making improved short-wave reception available to everyone.

Made of isolantite (low permeability material) for lowest losses and highest surface resistivity. Glazed top and side. Rust proof slide gripping contacts. Sub-panel or base mounting. Four, five and six prong types, 2 1/2 ins. long x 1 1/2 ins. wide, standard 1-27/32 ins. mounting centers. Mounting spacers and washers packed with each socket. Hammarlund Isolantite Sockets and Coil Forms provide a short wave combination guaranteeing maximum selectivity. Ship. wt., 4 oz.
No. S-4 (4-prong Sockets) **YOUR PRICE**
No. S-5 (5-prong Sockets)
No. S-6 (6-prong Sockets) **\$0.35**
No. S-7 (7-prong Sockets)



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A Veritable Encyclopedia for the Short Wave Fan



No. S-871 Official Short-Wave Manual

1934 Official Short-Wave Radio Manual
 Volume 1, 1934 Edition Over 200 Pages Flexible, Looseleaf Leatherette Binder
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Edited by HUGO GERNSBACK
BOOK IS SENT COMPLETE—NO SUPPLEMENTS
 We are pleased and proud to announce the greatest and most complete work on SHORT WAVES which has ever appeared in print. There has been a big boom in short waves during the past two years in spite of the depression. Tremendous progress has been made, yet up to now there has not been an adequate book depicting ALL the progress that has been made.

THE OFFICIAL SHORT-WAVE RADIO MANUAL, now fills this need completely. It is a big book in which you will find everything in short waves, no matter what it may be. It is not only a complete manual, but it is a veritable encyclopedia of facts, information, hookups, illustrations. It is impossible to explain the entire volume in a few sentences. Here are the contents of the book.

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4. A complete Short Wave beginner's section.
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11. An important section on Short Wave antennae and noise eliminating procedures.
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13. A section on amateur phone transmitters and how to build them.
14. A Short Wave Physics section on theoretical Short Wave data for the advanced experimenter, as well as a student.

List Price \$2.50
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The Short Wave Beginner's Book

40 Pages Over 75 Illustrations
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Here is a book that will solve your problems if you are new to the short wave game. It contains everything that you wish to know in connection with short waves, leading you in easy stages from the simplest fundamentals to the present stage of the art in short waves as it is known today. It is the only low priced reference book on short waves for the beginner, whether he be a short wave enthusiast, a short wave listener or short wave amateur.

The book is profusely illustrated with all sorts of illustrations, explanations and everything worthwhile knowing about short waves in this interesting and growing field.

Contents in Brief

Getting Started in Short Waves—Short Hand Symbols of Radio—Short Wave Coils and Aerials—Reducing Man-Made Static—Beginner's Short Wave Set—Increasing Volume by Adding Amplifier to One Tube Set—Tuning Short Wave Sets—Regeneration Control—Audio Amplifiers for SW sets—Coupling Speaker to Set—Learning Code—Wave Length and Kilocycle Chart—Wiring Chart—Kinks in Short Wave Construction. List Price 25c.
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10 Most Popular Short-Wave Receivers

40 Pages Over 75 Illustrations
 Size 7 x 10 inches Stiff, Flexible Covers

This new volume is a revelation to all those who wish to build their own short wave receivers. The editors of SHORT WAVE CRAFT have selected ten outstanding short wave receivers and these are described in the volume. Everything worth while about every one of the ten receivers is described in the text. Each receiver is fully illustrated and each receiver has a complete layout, pictorial representation, photographs of the set complete, hookup and all worth while specifications. Everything from the simplest one tube set to a 5-tube TRF receiver is presented. Complete lists of parts are given to make each set as complete as it is humanly possible to do.

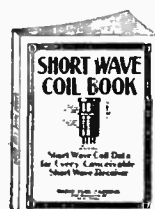
Contents in Brief

2 R.F. Pentode SW receiver having two stages of TRF—2 Tube receiver that reaches 12,500 mile mark—My Deluxe SW receiver—Binneweg 2-tube 12,000 mile DX receiver—"Brief Case" SW receiver—Denton 2-tube All-Wave receiver—Denton "Stand By"—The "Stand By", Electrified—Short Wave Megadyne—Coat Pocket SW receiver—SW Pentode 4—My idea of a good SW receiver—A Good "One-Tuber." List Price 25c.
 No. S-873 Ten Most Popular Short Wave Receivers. How to Make and Work Them. **\$0.25**
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Short Wave Coil Book

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For the first time, it is now possible for the experimenter and short wave enthusiast to obtain the most exhaustive data on short wave coil winding information that has ever appeared in print.

As every experimenter who has ever tried to build a short wave set knows only too well by experience, the difference between a good and a poor receiver is usually found in the short wave coils. Very often you have to hunt through copies of magazines, books, etc., to find the information you require. The present data has been gotten up to obviate all these difficulties.

Between the two covers of this book you now find every possible bit of information on coil winding that has appeared in print during the past two years. Only the most modern "dope" has been published here.

Between the two covers of this book, giving not only full instructions how to wind coils, but dimensions, sizes of wire, curves, how to plot them, by means of which any coil for any particular short wave set can be figured in advance, as to number of turns, size of wire, spacing, etc.
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How to Build and Operate

Short Wave Receiver

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How to Build and Operate Short Wave Receivers in the best and most up-to-date book on the subject. It is edited and prepared by the editors of SHORT WAVE CRAFT, and contains a wealth of material on the building and operation, not only of typical short-wave receivers, but short-wave converters as well. Dozens of short-wave sets are found in this book, which contains hundreds of illustrations; actual photographs of sets built, hook-ups and diagrams galore.

This book is sold only at such a ridiculously low price because it is our aim to put this valuable work into the hands of every short wave enthusiast.
 List Price 50c.

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How to Become An Amateur Operator

72 Pages Over 150 Illustrations
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If you intend to become a licensed code operator, if you wish to take up phone work eventually, if you wish to prepare yourself for this important subject—this is the book you must get.

Partial List of Contents

Ways of learning the code. A system of sending and receiving with necessary drill words is supplied so that you may work with approved methods. Concise, authoritative definitions of radio terms, units and laws, brief descriptions of commonly used pieces of radio equipment. Graphic symbols are used to indicate the various parts of radio circuits.
 Regulations that apply to amateur operators. List Price 50c.

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The only radio magazine that is EXCLUSIVELY Short Wave.

It is recognized by all radio experimenters and amateurs as the outstanding magazine of its kind. It publishes articles only of interest to short wave fans. Every article printed contains "meat"—no theory—no mathematical—but real information. It publishes the most complete short wave list in print, dozens of articles on experimenting, construction of radio short-wave transmitters and receiving sets, etc.

SHORT WAVE CRAFT has the largest circulation of any short-wave magazine published anywhere. It contains dozens of new and outstanding articles by the leaders in short waves, gathered from all four corners of the world. There are also numerous prize contests, where each prize is paid monthly for the best short-wave set gotten up by our readers. Monthly prizes are also paid for the best short-wave kink.

If you are at all interested in short waves, you cannot possibly do without this unique and authoritative magazine.

Such well-known writers as Lee De Forest, F. H. Schnell, John L. Reinartz, Clifford E. Denton, George W. Shuart and many others contribute important articles—four color cover—published every month—25c a copy, Regular yearly subscription \$3.00

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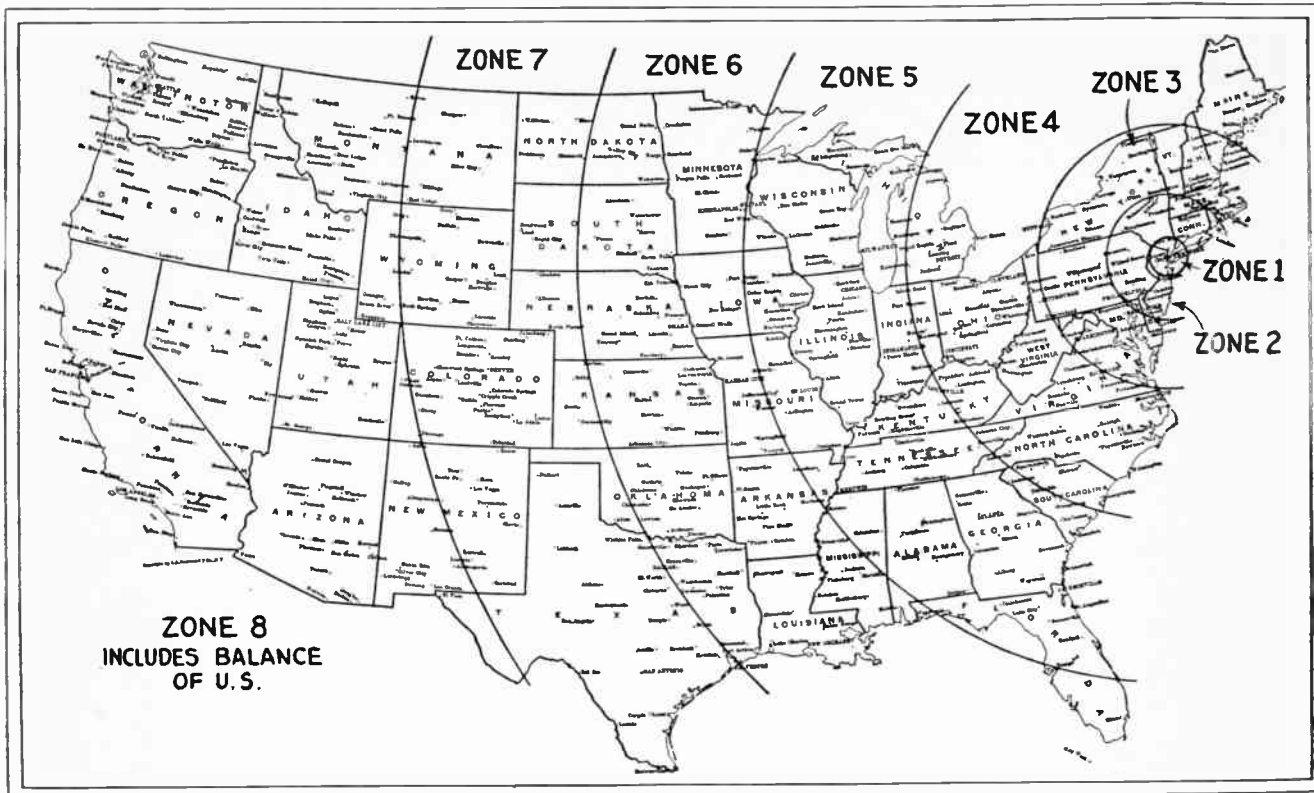


OFFICIAL Short-Wave Log and Call Books

Size 7 x 10 inches Stiff Flexible Covers

Here is a book which contains up-to-the-minute listing of short-wave stations from all over the world. This great book contains other popular features, a chart showing distances between principal cities of the world; list of International Call Letter Assignments; "Around-the-Clock" listing guide; kilocycle meter; Conversion chart; list of international abbreviations used in radio transmission; television stations; airport radio stations. Two large maps are also in the book.
 No. S-875 Official Log and Call Book. **\$0.25**
 YOUR PRICE

SHIPPING INFORMATION—PARCEL POST ZONE MAP AND RATES



IMPORTANT INSTRUCTIONS—READ CAREFULLY

Packages Weighing over 8 ozs. (½ lbs.) to 60 lbs.

WEIGHT IN POUNDS	LOCAL	ZONES							
		1st. up to 50 miles	2nd. 50 to 150 miles	3rd. 150 to 300 miles	4th. 300 to 600 miles	5th. 600 to 1,000 miles	6th. 1,000 to 1,400 miles	7th. 1,400 to 1,800 miles	8th. over 1,800 miles
1	\$0.07	\$0.08	\$0.08	\$0.09	\$0.10	\$0.11	\$0.12	\$0.14	\$0.15
2	.08	.10	.10	.11	.14	.17	.19	.23	.26
3	.08	.11	.11	.13	.17	.22	.26	.32	.37
4	.09	.12	.12	.15	.21	.27	.33	.41	.48
5	.09	.13	.13	.17	.24	.33	.40	.50	.59
6	.10	.14	.14	.19	.28	.38	.47	.59	.70
7	.10	.15	.15	.21	.31	.43	.54	.68	.81
8	.11	.16	.16	.23	.35	.49	.61	.77	.92
9	.11	.17	.17	.25	.38	.54	.68	.86	1.03
10	.12	.18	.18	.27	.42	.59	.75	.95	1.14
11	.12	.19	.19	.29	.45	.64	.82	1.04	1.25
12	.13	.21	.21	.31	.49	.70	.89	1.13	1.36
13	.13	.22	.22	.33	.52	.75	.96	1.22	1.47
14	.14	.23	.23	.35	.56	.80	1.03	1.31	1.58
15	.14	.24	.24	.37	.59	.86	1.10	1.40	1.69
16	.15	.25	.25	.39	.63	.91	1.17	1.49	1.80
17	.15	.26	.26	.41	.66	.96	1.24	1.58	1.91
18	.16	.27	.27	.43	.70	1.02	1.31	1.67	2.02
19	.16	.28	.28	.45	.73	1.07	1.38	1.76	2.13
20	.17	.29	.29	.47	.77	1.12	1.45	1.85	2.24
21	.17	.30	.30	.49	.80	1.17	1.52	1.94	2.35
22	.18	.32	.32	.51	.84	1.23	1.59	2.03	2.46
23	.18	.33	.33	.53	.87	1.28	1.66	2.12	2.57
24	.19	.34	.34	.55	.91	1.33	1.73	2.21	2.68
25	.19	.35	.35	.57	.94	1.39	1.80	2.30	2.79
26	.20	.36	.36	.59	.98	1.44	1.87	2.39	2.90
28	.21	.38	.38	.63	1.05	1.55	2.01	2.57	3.12
30	.22	.40	.40	.67	1.12	1.65	2.15	2.75	3.34
32	.23	.43	.43	.71	1.19	1.76	2.29	2.93	3.56
34	.24	.45	.45	.75	1.26	1.86	2.43	3.11	3.78
36	.25	.47	.47	.79	1.33	1.97	2.57	3.29	4.00
38	.26	.49	.49	.83	1.40	2.08	2.71	3.47	4.22
40	.27	.51	.51	.87	1.47	2.18	2.85	3.65	4.44
44	.29	.56	.56	.95	1.61	2.39	3.13	4.01	4.88
50	.32	.62	.62	1.07	1.82	2.71	3.55	4.55	5.54
55	.34	.68	.68	1.17	1.99	2.99	3.90	5.00	6.09
60	.37	.73	.73	1.27	2.17	3.24	4.25	5.45	6.64

The rate for the first pound in each zone is shown in the table; the rates on additional pounds are: Local zone, 1 cent for each 2 pounds; first and second zones, 1.1 cents each pound; third zone, 2 cents; fourth zone, 3.5 cents; fifth zone, 5.3 cents; sixth zone, 7 cents; seventh zone, 9 cents; eighth zone, 11 cents; a fraction of a cent in the total amount of postage on any parcel being as a full cent.

NOTE: Rate on packages weighing less than 8 ozs. is 1½¢ for each 2 ounces. Packages weighing over ½ lb. (8 ozs.) and not more than 1 lb. take 1 lb. rate. Packages weighing over 1 lb. and less than 2 lbs. take the 2 lb. rate, etc.

* Parcels weighing less than 10 pounds measuring over 81 inches but not more than 100 inches in length and girth combined are subject to a minimum charge equal to that for a 10-pound parcel for the zone to which addressed.

Your remittance must include a sufficient amount to prepay parcel post transportation charges. If you wish us to insure the shipment, kindly include the necessary fee. Parcel Post shipments which are not insured are sent at purchaser's risk. If you do not prepay transportation charges, shipment will be made express collect. All shipments made via express are automatically insured against theft and damage. You are refunded at once any excessive amount you may have sent us for parcel post charges.

Alaska, Hawaiian Islands, Philippine Islands and all other possessions of the United States are considered as being in the 8th Zone. Mexico takes the 8th Zone rates too.

Shipments made by parcel post to Canada and Cuba take the rate of 1½¢ per pound. NO C. O. D. PARCEL POST SHIPMENTS TO CANADA, CUBA OR MEXICO.

Shipments to foreign countries are only made when all transportation and consular charges are included with remittance. Inquiry should be made in your local post office as to parcel post weight and overall size limit. Heavier shipments must then be forwarded via Ocean Freight, which charges must be prepaid.

RETURNED GOODS—We are at all times ready to adjust any just claim of dissatisfaction with our goods on your part, or make an exchange—but we must request you NOT TO RETURN SUCH GOODS WITHOUT OUR WRITTEN AUTHORITY. Such returned goods must be in the original containers, and delivery charges must be prepaid.

OUR LONG DISTANCE TELEPHONE NUMBER IS WALKER 5-9694

Note: All the items listed in this catalog are accompanied by their respective shipping weights. With this information and matter to post fee with the chart above it becomes a simple matter to calculate the exact amount of the parcel required. Merely follow the shipping weights in the left hand column across the right of the chart to the zone in which you reside; there is your fee.

WHY WE MAKE FREE OFFERS!

TO BEGIN with, we frankly state that we are in business to make money. We do not make free offers just to show that our "heart's in the right place," but we do make them to stimulate business in a way which is mutually beneficial. You will readily appreciate that orders (no matter how small or how large) must pass through a certain routine from the time they are received to the time they are shipped. Hence, it costs just as much to handle and ship a small order as it does a large one. However, the "profit-to-handling expense" ratio increases with the size of the order. It is, therefore, to our advantage to receive larger orders. But we would be unfair merely to consider our own advantage and not that of our customer. We, therefore, offer free, useful books and merchandise to those customers who instead of buying one thing today and another perhaps in two weeks, anticipate their needs for a month or two and then order at

one time, in bulk. In this way they not only receive the benefits of these free offers but also a greater saving when the 3% cash discount is deducted.

In one instance one of our customers ordered \$25.00 worth of merchandise on one day and then, a week later, sent in another for \$12 and some odd cents. While the total amount of the two orders was more than \$35.00 and therefore entitled him to an Official 1934 Radio Service Manual, (or some other free offer) we could not see our way clear to giving him this free offer inasmuch as his orders were split into two and had to be handled as two individual orders, each one requiring a separate handling expenditure on our part. Had he anticipated his needs beforehand, we would have been more than pleased to give him this free book since our handling charge for his one order would have been practically halved.

FREE — ABSOLUTELY — FREE

We will send you free of all charges, the famous

1934 OFFICIAL RADIO SERVICE MANUAL 1934

in conjunction with any order for radio merchandise from this catalog providing your order amounts to \$35.00 or over.

There are no strings to this offer. It is simply a gesture of our good will towards you. It is necessary to place the order at one time in order to get this free prize. The order cannot be split over a period of time. We will also give you, absolutely free, the

OFFICIAL SHORT-WAVE MANUAL

with every order for \$20.00 or over, under the same conditions as mentioned above, that is, the order must not be split up over any length of time.

Full description of these books will be found elsewhere.

DO NOT FAIL TO TAKE ADVANTAGE OF THIS IMPORTANT OFFER

FREE MAGAZINES FOR YOU

IN our effort to give our readers the utmost for their money, we have made arrangements with the publishers of RADIO-CRAFT and SHORT WAVE CRAFT to give you these magazines absolutely free under the following arrangement:

As you will note from an announcement of these magazines appearing in one of the last few pages of this and our regular catalog, the two magazines RADIO-CRAFT and SHORT WAVE CRAFT sell under a special offer of \$1.98 per year (Canada and foreign 40c extra).

ABSOLUTELY FREE TO YOU

Your choice of RADIO-CRAFT for one year, or SHORT WAVE CRAFT for one year in connection with any order for radio merchandise from this catalog amounting to \$20.00 or over.

If you live in Canada or any other foreign country, add the following amount in cash for postage required on the two magazines:

RADIO-CRAFT and SHORT WAVE CRAFT 40c.

THERE ARE NO "STRINGS" TO THIS OFFER. It is just simply a gesture of our good will towards you.

You must, however, place your order at one time at the above stated amounts in order to get any of these free prizes. THE ORDER CANNOT BE SPLIT OVER A PERIOD OF TIME.

Be sure to read about these splendid magazines in the back pages of this and our regular catalog.

Do not fail to take advantage of this generous offer.

Concerning Free Catalogs

DUE to the fact that this catalog contains a large editorial section which makes it very expensive to produce, the RADIO TRADING COMPANY has for a number of years, refrained from sending out free "repeat" catalogs to those of our friends inquiring for catalogs originally.

We maintain no so called "mailing lists" whereby a new catalog is sent automatically to those who have requested a catalog in the past.

If you are among those who answered our advertisement in one of the various radio and other publications, you have received this catalog free of charge. You will not, however, receive further free catalogs, if you are not yet a customer. A catalog of every new edition will be sent out free every three months to our customers on record who have sent orders to us in the past.

If, therefore, you value this catalog, as we believe you do on account of its exceptional editorial content, we ask you to be kind enough to avail yourself of our special catalog service which we maintain as a courtesy to those of our friends who are not as yet customers.

We do not expect to be paid for such catalogs, and will be glad to send you every new edition as it comes off the press free as long as you pay for the necessary small charge to cover postage and mailing costs. We realize that this is a very small amount, but where several hundred thousand catalogs are sent out every few months, you will appreciate that we should at least be paid for the postage and handling charges.

Be good enough to fill out the coupon attached, and send us 15c in stamps or coin. This will entitle you to three catalogs per year, and will be sure to get your new edition of every catalog put out by RADIO TRADING COMPANY.

We appreciate that not every one who gets our catalog can be a customer, but if you like this catalog, and if you approve of the editorial contents, then we know that you will be glad to receive each new edition as it comes off the press.

Remember, every new edition has an ENTIRELY NEW EDITORIAL SECTION, and will have the latest and best radio information anywhere. So, if you like the present catalog, we know that you will like all those that will follow.

IMPORTANT: Please inform us immediately of any change in your address.

RADIO TRADING CO.

(Coupon)

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New York City

I enclose herewith 15c in [] stamps [] coin [] money order, which is to cover the postage and handling of the next three editions of your general Radio and Short Wave Treatise.

Each new edition of the catalog is to be sent to me when issued.

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