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RADIO SERVICE NEWS

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DECEMBER 20, 1934 CAMDEN, NEW JERSEY Vol. I, No. 6

New RCA Antenna Reduces Noise on All Bands

MAKES OWN SOUND PICTURES

Rudy is more familiar with the other end of the camera, but with the new RCA 16-mm Sound Camera, anyone can make sound movies. He is shown with the "studio type" RCA Sound Camera, which records the actors' voices. It is available also in the "news reel" type, in which the operator's voice only is recorded on the film.

NO SWITCH ON TRANSFORMERS OF DE LUXE KIT

Scientific Length of Antenna and Lead-In Assure Highest Efficiency

Man-made static is completely routed on both short-wave and standard broadcast reception by the latest addition to the famous RCA World-Wide Antenna Systems family, the De Luxe RCA World-Wide Antenna which lists at $7.75.

Thus, for only $1.75 more than he would pay for the standard RCA Antenna System for all-wave sets, the radio listener can now get a proven antenna system that, properly installed, will bring him noise-free reception of all programs, domestic and foreign.

No Transformer Switch

In addition to performing the noise-reduction function on *all* programs, the new de luxe antenna has the added feature of having no switch on the receiver-coupling transformer for shifting from short to long wave reception. Elimination of the switch is made possible by two newly-designed transformers. Each contains special windings for the many different frequencies involved in tuning a receiver from 150 K. C. to 36,000 K. C.

(Continued on page 2, col. 4)

CABINET REFINISHING KIT MAKES TOUCHUP JOBS EASY

New Compact Kit, Price $2.90, Contains All Touchup Materials Specified by RCA Victor Cabinet Craftsmen

The never-ending bugaboo of radio service work—the cabinet that has been scratched in handling—becomes a minor problem in service shops that have invested $2.90 in one of the recently-announced RCA Cabinet Refinishing Kits, states E. J. Kelly, manager of the cabinet department of the RCA Victor plant.

The RCA Cabinet Refinishing Kit—$2.90 worth of pleased-customer insurance.

"We brought out the Cabinet Refinishing Kit as the answer to a problem that every service engineer has to meet frequently. We are constantly receiving inquiries from dealers and servicemen asking whether they can get a certain panel or part of a cabinet to replace one that was marred either when being delivered or when handled in the service shop or on a service call. We have found that in the great majority of cases the damage could be entirely effaced by any mechanic who had a few simple materials and a tool or two.

Retouching Not Difficult

"Of course, retouching cabinets is an art. Speed in this kind of work requires years of practice. We have men here at the factory who have been at it for years—removing any minor blemishes as the cabinets come off the production line. They are the men that have suggested that, judging by some of the inquiries we receive, some servicemen are making mountains out of molehills, that the injuries to cabinets which bother them so much could be easily repaired.

"We have taken the essential materials used by our own cabinet refinishers and neatly packed them in a folding leatherette case along with the spatula and brush that are practically the only special tools required. A

(Continued on page 8, col. 4)

NOVEL DEVICE LINKS SET TO PHONOGRAPH

RCA Phonograph Oscillator Eliminates Internal Chassis Alterations

Sell customers who would like to play phonograph records through their radios a miniature radio transmitter to "broadcast" records to the receiver!

Ridiculous? Not at all. A miniature radio transmitter—that exactly describes the latest product offered by RCA Parts Division to solve the problems frequently encountered when internal chassis changes are required in phonograph modernization work.

Saves Time Making Connections

The new product is called the RCA Victor Phonograph Oscillator and has a list price of $7.75. Since it simplifies and saves time in connecting an electric pickup to a receiver chassis, and assures record reproduction equal to

(Continued on page 2, col. 1)

The Voice of Radio Service

RADIO JIM'S SERVICE ENGINEERS
Providence, R. I. Fall River, Mass.
November 1, 1934

RCA Parts Division,
Camden, N. J.

James A. Iodise

It seems to me—and probably to many others—that it is about time for the RCA Company to stop airing somebody's private grudge in the matter of Free Examination.

It not only is unfair to make such sweeping statements as to the integrity of the Free Examination man—it most certainly is not good business. The RCA company itself is truly in the position of "Caesar's Wife" (as per your editorial of some time back). Many long-established and reliable firms have never charged for examination, feeling confident that their quotations and quality of work will stand anyone's comparison. Many of these same firms are so called "authorized dealers."

* * * * *

It should be a matter of interest to many to learn why the right of furnishing an estimate on repairs should be denied the radio service industry alone. If there is something putrid in Denmark and the element of racketeering has entered the industry, it is

(Continued on page 8, col. 4)

9-Cm. Transmitter Demonstration at I. R. E. Convention

A radio transmitter that operates on the ultra-short-wave length of nine centimeters (about four inches) and which some day may protect ships against collision at sea, guide airplanes through fog, or possibly give a high degree of privacy to radio communication, was demonstrated to interested radio engineers at the recent Rochester Convention of the I. R. E., by Dr. Irving Wolff of the RCA Victor Research Laboratory.

Artificial Heaviside Layer Created

So rapid are the vibrations emanated by the transmitter shown by Dr. Wolff that the extremely small inertia

(Continued on page 4, col. 5)

SAVE
RCA ANTENNA LABELS
SEE STORY
PAGE 8, COLUMN 3

RCA Parts Division Wishes You a Merry Christmas

Simplifies Phonograph Connections

Here is an illustration of the new RCA Phonograph Oscillator. Using either a 2.5 or 6 volt tube, it can be attached in a few minutes to any radio set, eliminating circuit changes when connecting phonograph pickups. Simplicity of installation is shown on page 6.

NOVEL DEVICE CONNECTS RADIO TO PHONOGRAPH

(*Continued from page 1, col. 1*)

the best radio reproduction of which the set is capable, it is a profitable item for service engineers who are cashing in on the increasing public interest in phonograph record music. The Phonograph Oscillator is a featured item in the booklet, "Phonograph Modernization—the 1935 Opportunity for Radio Service Engineers," which the RCA Parts Division sends to service engineers and dealers for the asking.

No Circuit Changes

It usually takes about five minutes to install the Oscillator. No internal circuit changes on the chassis are necessary. Simply connect the leads to the antenna and ground binding posts, slip special adaptors over the prongs of the rectifier tube and over the heater prongs of any other tube and the connections are made. The Oscillator is designed to use either a 2.5 or a 6.3 volt tube so that it can be used with practically all the A. C. sets manufactured during the last five years.

For All Modernization Jobs

Designed originally to simplify the connecting of an RCA Record Player, the RCA Phonograph Oscillator may also be used for attaching any magnetic pickup to any type of receiver with only slight modifications, usually the inclusion of an input transformer.

Lack of sufficient audio gain, the problems involved in avoidance of hum, changing of detector tube bias to operate the tube as an audio amplifier, switching in the radio chassis proper, distortion in the audio system—all these are avoided by the use of the RCA Phonograph Oscillator. It may be seen at RCA Parts Distributors'. Or interested dealers and service engineers are invited to write to the RCA Parts Division, Camden, New Jersey, for the booklet, "Phonograph Modernization."

Technical Features

Circuit. The RK-24 Phonograph Oscillator uses a Hartley oscillator circuit which is very stable in operation. This circuit is modulated by the so-called "suppressor grid" type of modulation which gives good depth of modulation without distortion.

Either 2.5 or 6 Volt Tubes

Radiotron. RK-24 Phonograph Oscillator uses either an RCA 2A7 or an RCA 6A7. As practically all alternating-current receivers have either a 6-volt winding or a 2½-volt winding, these two tubes cover the entire field. Being of a dual-purpose type, they cover the functions of both oscillator and modulator which would normally require two tubes.

Input Pickup Impedance. The RK-24 Phonograph Oscillator is designed for optimum results with the R-93 Record Player. This pickup has an impedance of 2450 ohms at 1000 cycles. It may be used with pickups and transformers of other impedance, but in such case it is desirable to put a potentiometer across the secondary of the transformer. By means of this potentiometer the output voltage may be adjusted for its optimum value. If the pickup has an impedance within the limits of 2000 to 3000 ohms, no transformer is required

For All Receivers

Output Impedance. The output impedance is approximately 30 ohms, which means that there will be very little radiation and that it will be suitable for connection to any of the usual input systems that will be found on the average receiver.

Tuning Range. The trimmer screws are both parallel and give a total tuning range from 1400 kilocycles to 1700 kilocycles. The usual point of adjustment is just above the 1500 kilocycle range of the receiver so that the tuning point will be slightly off dial. Most receivers tune slightly beyond 1500 and, since there are no stations there, this gives a very good point at which to have the Phonograph Oscillator. It is also an easy reference point to remember and tune to when phonograph operation is desired.

Installed in Few Minutes

Connection. Connections are very simple, due mainly to the use of an improved type of connector which may be inserted under any type of tubes without danger of short-circuit or without affecting the operation of the tube in the usual manner. The radio record switch on the RK-24 disconnects the filament to the heater of the tube when in the "radio" position so that an excessive drain on the power transformer does not occur for a tube not in use for radio reception. Plate voltage is obtained from the rectifier filament regardless of the position of the filter system. This is made possible by the fact that sufficient filtering is incorporated in the RK-24 unit to use the raw rectified voltage available at this point, which occurs on some receivers.

Mounting. Holes are available for mounting the unit on the end or on the back as may be required on various type cabinets. The proper position for mounting should be one that enables the tubes to be operated in a vertical manner and also have the switch in a position convenient for operating.

Model Numbers Describe Sets

Numbers Tell Style of Cabinet, Number of Tubes, Sequence of Sets of any Type

Model numbers for RCA Victor receivers not only designate the set but also describe it to those who know the code.

The first digit of a model number indicates whether the set is a table model, console, or radio-phonograph combination. When the first digit is "1," the set is a table model. Consoles all have "2" for a first digit and combinations all have "3" for a first digit.

Second Digit Four Less than Tubes

The second digit is always 4 less than the number of tubes employed in the receiver. For the third digit, numbers are assigned beginning with "1" as new models of a general type are brought out.

Thus the "3" of Model 381 indicates that the set is a radio-phonograph combination. By adding "4" to the second digit, which in this case is "8," we know that Model 381 has twelve tubes. The last digit, "1," tells us that this is the first 12-tube radio-phonograph combination produced since this numbering system was adopted. Similarly, Model 241 is the first 8-tube console produced since this system of assigning numbers was adopted.

I. R. S. M. HAILS A NEW ERA OF CO-OPERATION

Official Says Speech by Cunningham Begins New Order in Industry

Before the recent I. R. S. M. Convention in New York, October 19th was hailed as the "Big Night" of the meeting. Since then, October 19th has been considered by radio service men who were present as the beginning of a new era in radio service in which manufacturers and service engineers will work together with a greater realization of their common interests.

Cunningham Speaks

As the "Big Night," October 19th lived up to its name. More than 1,000 eager radio service engineers, by far the largest night's attendance, heard prominent men in the industry speak on the problems of the business. Noteworthy was the fact that E. T. Cunningham, President of RCA Victor Company, Inc., and RCA Radiotron Company, Inc., was present and expressed the wish of his companies to co-operate with service engineers and their organizations in all constructive activities. Harking back to the days when he was in the radio parts and service business in San Francisco in the early days of radio, Mr. Cunningham showed a keen appreciation of the problems of the service industry.

Goldsmith and Joyce

Following Cunningham, T. F. Joyce, RCA Victor Advertising Manager, talked straight from the shoulder about the need for better business methods in service work, pointing out especially that the public will not place any higher value on service work than service engineers themselves place on it.

Dr. A. N. Goldsmith, noted consulting engineer, pointed out the steps that service engineers and manufacturers each can take to work more effectively with each other.

Diehl on Cathode Rays

The high point of the technical side of the convention came at the close of the first night's program when W. F. Diehl, of the RCA Victor laboratory, explained and demonstrated the Cathode Ray Oscillograph which is now being perfected in the RCA laboratory.

The New Era

In a letter to E. T. Cunningham following the Convention, Paul J. McGee, President of the Institute of Radio Service Men, commented on the beginning of the "new era" as follows: "On behalf of the Institute of Radio Service Men, please accept our sincere thanks for your wonderful message of encouragement to the radio service men who filled the Roof Garden of the Pennsylvania Hotel in New York at our Second Convention. Your appearance at the meeting constituted a turning point in the history of the radio service profession. It marked the overthrow of the antiquated and destructive policy of belittling the service men . . . and the formal establishment of a new order of co-operation between service men and manufacturers . . . we take this opportunity to openly thank you for volunteering to appear before our convention to tell those assembled that you, personally and as the executive representative of your company, stand four-square behind the service men."

New Antenna Reduces Noise on All Wave Bands

System Has No Switch; Unique Transformer Circuits Give High Efficiency Automatically

(*Continued from page 1, col. 3*)

These windings are interconnected to maintain good matching and effective noise-reduction at frequencies below as well as within the range of the doublets.

Matched Impedances Important

To maintain the high degree of matching of impedances between line and antenna and receiver, an exclusive feature that has contributed much to the success of RCA World-Wide Antenna Systems, a fixed length (80 feet) transmission line is used. By using either one or two full 80-foot lengths of transmission line and coiling any excess behind the receiver (beyond 160 feet the length of line is not critical and may be increased to any desired point up to 500 feet), the service engineer can quickly make the installation without worrying about mismatched impedances such as necessarily occur when varying lengths of transmission line or antenna are used.

From the dealer's or service engineer's sales viewpoint, the new De Luxe RCA World-Wide Antenna System (Stock No. 9555) provides a double-barreled selling weapon, with the new feature of noise-reduction on standard broadcast serving to break down the last line of sales resistance on the part of some customers who may not care to spend money to eliminate noise on short-wave reception only. In the future, the dealer's attack on such customers may be expected to be about as follows:

SERVICE ENGINEER (*just starting to install a new all-wave radio set*): Mrs. Jones, you have chosen a mighty fine radio set. Now, in order to enjoy all that this fine set is capable of bringing you, I suggest that you let me install a scientific antenna, the RCA World-Wide Antenna System. You have probably heard from your friends of the big difference they make in short-wave reception.

All-Wave Set Needs Antenna

CUSTOMER: Why, the old set was four years old and yet it did pretty well with the old aerial. I don't see why a good new set like this should need a fancy aerial. How much are these RCA Antenna Systems?

SERVICE ENGINEER: The old-style standard broadcast receivers could get along without a special antenna, but it's a different matter with all-wave sets. You see, the short waves travel thousands of miles before they reach you and they are affected by noises of electrical appliances far more. The RCA Antenna System will eliminate all those man-made noises and bring in more stations, too. The Kit of materials costs only $6; if you want me to look over your location I can quickly tell you how much it will cost you to install it. Then you will have given this new set a chance to perform at its best.

Scientific design enables the De Luxe RCA World-Wide Antenna System to reduce noise on both short-wave and standard broadcast reception without a transformer switch.

The Solution

CUSTOMER: No, not today. We shall probably listen to domestic programs more than short-wave programs anyway. I wish we could get some of my old favorites without the noise.

SERVICE ENGINEER: RCA makes an Antenna System that is just what you want. It is designed to eliminate man-made static on both short-wave and standard broadcasts. It is the De Luxe RCA World-Wide Antenna and it is only $7.75.

CUSTOMER: Fine. Just what we want. Please install one while you are here. Programs without the noise are what we want.

An Outstanding Booth at I. R. S. M. Show

Shown above is the RCA Parts Division booth which attracted so much favorable attention at the Convention of the Institute of Radio Service Men, held October 19th, in New York. The four indirectly lighted and recessed circular pictures of testing activities in the RCA Victor plant formed a fitting background for the center panel, which outlined the mutual interests of service engineers and RCA.

Twin Speaker P.A. System In Two Compact Cases Has Velocity Mike

New RCA Portable Sound Equipment Assures Maximum of Convenience and Tone Quality

With the introduction of the new Model PG-62D portable public address system, RCA Victor again sets the standard for P. A. equipment, and makes available to one of the most rapidly growing fields for service men a system of matched units combining exceptional fidelity of tone, utter simplicity of operation with rugged portability.

The new equipment, offering 20 watts undistorted output, follows the general design of previous models of the famous "62" series. The amplifier is self-contained in a rugged carrying case and accommodates the reels of conductor and the mike. The unique triangular shape of the two loudspeakers permits them to be locked together to form a single compact carrying case.

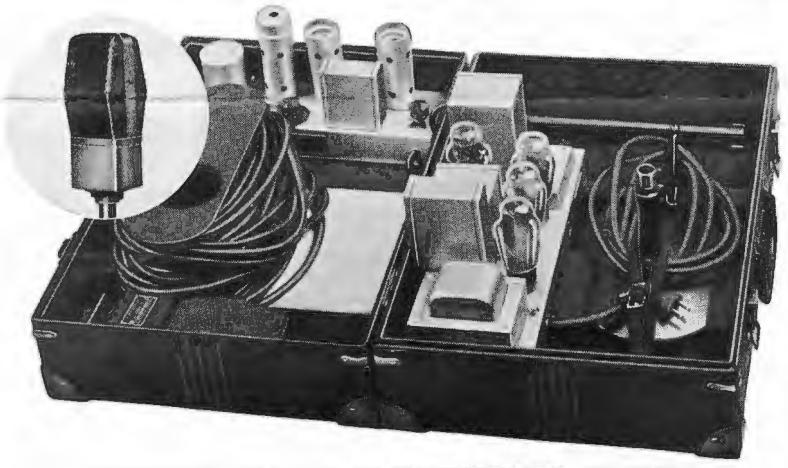
Unique design of the twin speakers of this portable RCA Victor P. A. System permits carrying them as one compact unit. Baffle boards of richly finished woods give any installation a handsome appearance.

Higher Fidelity Characteristics

Through the use of the velocity microphone, well-known exclusive RCA Victor development, in conjunction with a five-stage, 108-decibel amplifier, and dynamic speakers, RCA Victor engineers have achieved a standard of tone quality at high and low output levels that has literally astounded those who have attended test demonstrations.

Wide Latitude of Use

It is the claim of experts that the PG-62D will find a ready market in practically every conceivable case where high-quality reproduction is required. Twenty watts undistorted output, it is claimed, is sufficient to amply accommodate a hall of 2500 capacity. Yet due to its complete portability, positive control and simplicity of operation, it will find enthusiastic reception in night clubs, beer gardens, restaurants and the like, as well as in schools for indoor auditorium and outdoor drill work, and in churches for use in accommodating overflow meetings, "wiring" church music or sermons into the Sunday school and at special occasions.



TWENTY WATTS UNDISTORTED OUTPUT

Compactness and high efficiency distinguish the amplifier of the RCA Victor Model PG-62D P. A. System. Cable is carried neatly on a reel. Inset shows the Velocity Microphone, which has great advantages for public address work. In right hand compartment is an extension stand for the "mike".

Velocity Mike Praised

In discussing the new equipment officials here placed exceptional emphasis on the many advantages of the velocity microphone. Attention was drawn to the fact that ordinary P. A. Systems require a definite microphone technique; that is, the speaker is obliged to pay more attention to the mike than to the audience. Prime advantage of the velocity microphone is its extreme sensitiveness, allowing the speaker to stand as far as six feet away and really be himself before his audience.

Full Information Available

Fully detailed information about the new equipment is now available, and may be had by writing to Centralized Sound Section, RCA Victor Company, Camden, N. J.

Many New Features in 1934 Service Books

Latest Volume Gives Service Instructions and Parts List for All 1934 RCA Victor Models

The Bound Volume of RCA Victor 1934 Service Notes is just off the press. It is the fifth book in the series that covers all RCA and Victor radio receivers from 1923 to 1935.

Many New Features

This 1934 book is a distinct advance. A few of the features of the new book are complete Service Notes and Replacement Parts Lists for 42 RCA Victor 1934 receivers; illustrations of all models; complete literature and technical studies of RCA Laboratory equipment; a description of a complete line of service engineers' equipment; and a complete cross index to all RCA, G. E., Westinghouse and Graybar receivers. The last item has been the missing link to service engineers for years. It's but one example of the manner in which RCA is helping to solve the service engineer's problem.

The new book is printed on coated paper; it weighs almost four pounds, has 436 pages and is bound in a durable maroon cloth cover stamped in gold. It's the biggest dollar's worth (f. o. b., Camden, New Jersey) ever offered in the radio business. See it at RCA Parts Distributors'.

GALE CREATES NEW PROSPECTS SAYS JOBBER

Sees Destruction of Old Antennae as Opportunity to Sell All-Wave Sets

While radio dealers and service engineers all over the country are confining their lists of all-wave antenna prospects to those who have bought all-wave sets, a far-seeing merchandiser on the Pacific Coast has developed a sales attack that should be effective on the owner of *any* type of radio set. And he sees a gale that blew down thousands of old antenna installations in the community as a real opportunity for sales of RCA World-Wide Antenna Systems regardless of whether the prospects have all-wave sets! Let him tell his own story as he does it in *Hi-Mu*, the house organ of Harper-Meggee, RCA Parts Distributor of Seattle:

It's an Ill Wind

"It's an ill wind that blows no good. I think a chap named Bill Shakespeare pulled that well-known crack, and he knew what he was talking about—no foolin'.

"Last week's big gale blew down hundreds—yea, many hundreds of the antennas throughout the Northwest, and was that a break for World-Wide antenna installations! How, you ask? Well, suppose we dramatize it a bit.

The Scene—A radio dealer's store.

(Mrs. Jones enters)

Mrs. Jones: 'My antenna blew off the roof. Would you send a man out to put up a new one?'

Mr. Dealer: 'At once, Mrs. Jones, but before I do, may I show you the RCA World-Wide Antenna System? It is the very latest thing in all-wave reception. It is really two antennas in one. It is designed to work equally well on short-wave and standard-wave.'

Mrs. Jones: 'But I haven't an all-wave receiver.'

Mr. Dealer: 'Maybe not at present, Mrs. Jones, but your next radio will be all-wave, I'm sure. All up-to-date radios are all-wave and when you do get your new radio you will be saving the expense of putting up a new antenna.'

Mrs. Jones: 'I'm sure we'll buy a new radio soon, so I may as well save myself the expense of changing aerials, by having you put the correct one up now. You may put a world-wide antenna on my house, Mr. Dealer.'

Mr. Dealer: 'Thank you, Mrs. Jones, we'll have it done at once.'

Dealer (*to himself*): 'Well, that's not only a job, but a hot prospect for an all-wave radio as well."

HUGE ADVERTISING SCHEDULE BOOSTS RCA ANTENNA SALES

Twenty Million Magazine Messages Each Month Supplement Word-of-Mouth Advertising By Public and Amateurs

More than 20,000,000 magazine messages each month as a *supplementary* advertising campaign in addition to the main advertising on the RCA World-Wide Antenna System! This was the astounding statement made by T. F. Joyce, advertising manager for RCA Victor Company, to a group of leading metropolitan dealers who recently visited "Radio Headquarters" to see the manufacture of "Magic Brain" radio sets.

In explanation of the term "supplementary" as applied to a magazine advertising schedule of such proportions, Joyce said that the most valuable advertising the RCA World-Wide Antenna has or could have has been the enthusiastic reports of users. "Word-of-mouth advertising is the kind that a product must *earn;* it cannot be bought. Since the early days of radio few products have been advertised as thoroughly by the users as has the RCA World-Wide Antenna."

Advertisements like the above, now running in national magazines, are making RCA World-Wide Antennae even easier to sell.

"Even the amateur radio operators, talking back and forth on the air, have boosted the World-Wide Antenna. Those fellows are cranks for performance and an antenna has to be good for one amateur to recommend it to another as the solution of his reception problems. Tune in on the amateur bands almost any night and you can hear these pioneers into new radio fields discussing the RCA World-Wide Antenna.

20,000,000 Advertisements

"We are not, however, depending entirely on word-of-mouth advertising by any means. Dealers and service engineers selling the RCA World-Wide Antenna are reaping the benefit of over 20,000,000 magazine messages that go into American homes every month during our present schedule. This includes RCA Victor 'Magic Brain' receiver advertising, which mentions the RCA World-Wide Antenna as a help to *any* all-wave set, as well as the ads that concentrate all their message on the Antenna."

In addition to the coverage obtained through the mention of the Antenna System in RCA Victor instrument advertisements, special ads featuring the antenna are running in magazines with circulations totaling almost two million. These magazines are *Time, Popular Mechanics, Popular Science, Radio Guide, Radio Index,* and *Short-wave Craft.*

This huge advertising campaign is rapidly educating the public to the fact that a makeshift antenna, so commonly used with standard broadcast receivers, must be replaced by a scientific antenna for best short-wave reception—and that the RCA World-Wide Antenna is the antenna to buy. Dealers and service engineers benefit by having part of the sales work already done for them.

Engineers Admire RCA Oscillator

Virgil Graham, Chairman of the Standards Section of the Engineering Division of the R. M. A. and Chairman of the Rochester Section of the I. R. E., and Mr. W. R. G. Baker, Vice-President and General Manager of the RCA Victor Company, examining the popular RCA Test Oscillator, TMV-97-B, at the I. R. E. Convention, held in Rochester, on November 12th, 13th and 14th.

Although this oscillator was designed primarily to provide radio service engineers with an accurate test instrument at a moderate price, it is widely used also in radio factories and laboratories. RCA Parts Distributors offer it at $29.50, or slightly higher on the Pacific Coast, or those who require extreme accuracy (guaranteed within ± ½ of 1%) can get this instrument individually calibrated for an additional $5.00.

WELL-DESIGNED PARTS ESSENTIAL IN MODERN SETS

Excess Length of Condenser Lead May Affect Performance

Dealers and Service Men who built their own receivers in the days of the 199's and 201A's learned from experience that the position of a grid lead was important. Modern receivers with ten and twelve tubes have a maze of wires. The leads have not been important lately.

Short waves again make leads important. All Service Men know that condensers are made by winding foil between waxed paper. A small strip of foil is used to bring out the lead to the terminal. The length of the lead inside a condenser may mean the success or failure of a short-wave receiver.

Little Things Important

Few service men who have not had amateur experience realize the importance of the length of a lead. Great care has to be used in designing circuits so that there will be no leads which resonate at or near the frequencies which are used in short waves.

On short waves, one inch of lead assumes the importance of one hundred inches at standard wave lengths. This fact is so important that the capacitors used in RCA Victor receivers are now soldered at the point where the foil lead is joined to the roll of foil.

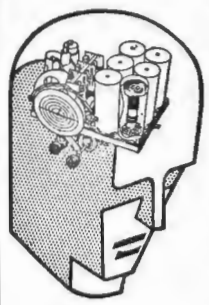
Improved Methods

Formerly this soldering was done at the end of the lead, inside the roll of foil. The frequency response of even this short length of unsoldered foil assumes such great importance that it is eliminated by the new soldering operation.

This example is but one instance of the many hidden quality features in the construction of RCA Victor Factory Tested Parts. Because they are designed for the jobs they have to do, they do them well.

Appearances are misleading. It is not safe to use a part in the carefully designed 1935 RCA Victor models unless it is FACTORY TESTED to do the job.

MAGIC BRAIN SYMBOL BECOMES FAMOUS IN FEW SHORT MONTHS



This is the Magic Brain symbol with which RCA Victor has advertised its famous R. F unit. Hardly three months have elapsed since its premier public appearance, but both the advertising theme and the instrument behind it have made an indelible impression on the public consciousness. RCA Victor it was that made "Superheterodyne" a byword and a "buy-word" of radio; now radio's greatest value is that famous circuit plus the unit that has revolutionized short-wave reception, the RCA Victor Magic Brain!

NBC-NBC Offer Long Program

Three Hours of Dance Music Sets New Record

National Biscuit Company's debut on the air December 1st and continuing for at least fifty-one Saturday nights thereafter began a new epoch in radio entertainment.

Three hours of dance music without a turn of the dial is quite an innovation, and that's just what this "Let's Dance" program of "Uneeda Music" will give, through fifty-seven NBC stations, using three bands, three directors and a master of ceremonies.

To those with dancing pep or at least young ideas, this three hours of "Let's Dance," "Uneeda Music" will be a new Utopia.

Months before this year's RCA Victor models were announced to the trade, a number of each model had been made and shipped to all parts of the country for operation tests under local conditions. The models which you will have to work upon have been tested and approved in your territory. They stand up under the conditions of all neighborhoods.

INTERFERENCE DISCUSSED AT RMA MEETING

Hold Conference at Rochester to Co-ordinate Activities to Reduce Interference

ROCHESTER, N. Y.—Pointing out that interference from man-made static must be materially lessened to clear the way for such new public services as television and fac-simile picture transmissions by radio, W. R. G. Baker, Chairman of the Engineering Division of the Radio Manufacturers Association, today opened the first national conference for the reduction of electrical interference in radio reception, at the Sagamore Hotel here.

With the growing popularity and usefulness of the shorter wavelengths on which man-made electrical interference is particularly troublesome, the problem of interference reduction from power and telephone lines, automobile ignition systems, and electrical appliances becomes of major importance. The purpose of the conference is to devise ways and means of promoting active co-ordination of scattered efforts for the reduction of radio interference into a single effective program under the guidance of the Radio Manufacturers Association, not only in the interests of improving broadcast reception but of accelerating progress in the use of short waves for new services now being developed in the laboratories. To this end representatives of the Edison Electric Engineering Institute, the National Electrical Manufacturers' Association, the Institute of Radio Engineers, the Society of Automotive Engineers, the Federal Communications Commission and others have been invited to participate.

Shielding of Equipment Urged

Mr. Baker, who is also Vice President and General Manager of the RCA Victor Company, urged that the various interested groups co-ordinate their efforts in a single active program, under the guidance of the engineering division of the Radio Manufacturers' Association, to enlist the co-operation of automotive, electrical and public utility companies in properly shielding their equipment so that they will not transmit interfering noises, as a matter of public interest and good-will.

Interference Affects Television

The indications are, he said, that when television and radio picture transmission become publicly available they will use the shorter waves where man-made static is particularly prevalent. Mr. Baker called attention to the fact that when interference is present on standard wavelength sound broadcasting, the program is usually intelligible, although imperfect, because the ear is able to compensate for deficiencies. In visual broadcasting, however, as in a television or radio picture service, interference is translated in terms of visual distortion for which the eye is incapable of compensating properly. More immediately, a reduction of interference would materially aid the progress of short-wave reception of foreign programs which is lately gaining wide popularity.

Two Methods of Elimination

There are two ways of coping with electrical interference in radio reception, according to Mr. Baker. The first and most important is to eliminate the interference at its source by proper shielding and suppression methods; and the second is to use a scientifically designed noise-reducing antenna system. But this last method is not always practicable in congested city areas. Automobile manufacturers and makers of electrical appliances have already shown a willingness to co-operate in this public service. It is now necessary, Mr. Baker said, to intensify this co-operation to clear the air waves for the new short-wave entertainment and communications services. Among the chief sources of interference are automobile ignition systems, dial telephones, and home electrical appliances which when inadequately shielded generate electrical interference that is carried into the home via the power lines.

Many Prominent Speakers

The opening sessions of the interference conference included a symposium of prominent speakers presenting the viewpoints of the consumer, the radio manufacturer, the retail dealer, the Federal Communications Commission, and the Public Utilities. The speakers included Dr. O. H. Caldwell, former Federal Radio Commissioner and now editor of *Electronics Magazine;* J. O'R. Coleman, Edison Electric Institute; L. F. Muter, President, Radio Manufacturers' Association; Benjamin Gross, Gross Sales, Inc.; Dr. C. B. Jolliffe, Chief Engineer, Federal Communications Commission, and Dr. Alfred N. Golsmith, consulting engineer. Other prominent speakers include H. O. Merriman, Department of Marine, Radio Branch, Canada, who described the work for the investigation and suppression of inductive interference which is being successfully carried on in Canada; and Dr. J. H. Dellinger, Federal Communications Commission, who will report the phases of the problem which were covered at the recent International Communications Conference at Lisbon, Portugal. Among other organizations whose representatives are participating in the first conference on noise reduction are the Institute of Radio Engineers, the National Electrical Manufacturers' Association, The Society of Automotive Engineers, and others.

Neon Modulated Transmitter

Dr. Irving Wolff, RCA Victor Research Laboratory, demonstrates a new ultra-short-wave directional transmitter of 9 cm., modulated by means of gas-filled tubes. The varying illumination of the tube corresponds to voice or music frequencies.

9-Cm. Transmitter Demonstration at I. R. E. Convention

(*Continued from page 1, column 4*)

of the electron, which is only 1/1800 as massive as the smallest known atom, that of hydrogen, must be taken into account in building a radio tube to produce them.

A new method, which involves what might be called an artificial Heaviside layer, is used for varying the magnitude of the oscillations. The artificial Heaviside layer is produced in a luminous gas discharge tube, similar to a neon tube. This tube is placed in the path of the beam of nine centimeter radio waves, and causes its magnitude to vary in accordance with the electric current through the gas in the tube.

Waves May Be Reflected

The nine-centimeter waves have many interesting properties which distinguish them from the longer ones used in broadcasting. The most important is the similarity to light. Using a small antenna in the focus of a metal reflector resembling a huge automobile headlight, a beam of nine-centimeter radio waves may be transmitted much as a beam of light. The reflector may be trained on any desired position just as a searchlight is pointed at an object. At the receiving end the intensity of signal may be multiplied many times by using another parabolic reflector. The waves can be reflected from a sheet of metal, and an object placed in their path can be made to throw a "shadow."

Neon Tube Governs Waves

The experiment in which the artificial Heaviside layer is used is quite striking. The transmitter is pointed toward the receiver with the luminous glass tube between them. No sound issues from the receiver until the luminous tube, in which the light is made to vary in accordance with the sound waves in the studio, is lighted. Just as soon as the light is extinguished the sound stops. This effect is not caused by the change of light intensity, but is due to the variations in the electrified layer. The light is an additional effect which indicates the density of electrified particles in the gas.

Amateur Uses Double-Doublets

EQUIPMENT INCLUDES CATHODE RAY OSCILLOGRAPH

The photograph shows Ted Ostman, well-known New Jersey amateur, seated at the equipment in his station, which has done outstanding work in the amateur field. In 1922 this station was awarded the Department of Commerce "Hoover Cup" for the "Best All-Around Amateur Station in the United States."

His station handled the first 500-word press dispatch from the first McMillan Arctic expedition to carry radio to the North Pole—holds many "DX" transmitting and receiving records—and is probably the first amateur station to employ a cathode-ray oscillograph as an integral part of the equipment to check the carrier and modulated telephone signal.

Practically every amateur station today employs a modern type of transmitter antenna, but many have neglected to keep pace with antenna design in the receiving field. This station employs doublet antennas exclusively for transmitting on both the amateur 20 and 75 meter telephone bands and RCA World-Wide Doublet Antennas for receiving.

In the insert can be seen the special twisted transmission lines connecting the RCA World-Wide receiving antenna to the receivers through special coupling transformers furnished with the RCA World-Wide Antenna Kits. These transformers have an efficient electrostatic shield which eliminates the normal capacity coupling between primary and secondary of the transformers, thereby reducing to a negligible quantity interfering noises normally picked up by the lead-in. Ostman says a gain in signal-to-noise ratio of 5–1 is normally obtained with the RCA World-Wide Antenna doublet over the conventional single-wire aerial, permitting greater "DX" and more accuracy in reception.

SERVICE TIPS

Win a handsome pigskin wallet. Until further notice, these popular wallets will be given to all whose tips on any phase of radio service are published in this column. Send your favorite idea to RCA RADIO SERVICE NEWS, Camden, N. J.

Service Tips are our readers' ideas, not ours. While RCA RADIO SERVICE NEWS believes they are worth while, we can not be responsible in any way for results obtained.

High Line Voltage

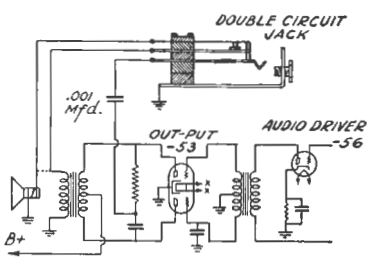
For all cases of excessively high line voltage on radios that have no taps on the primary of the power transformer, we have found 32-volt tungsten lamps very satisfactory as resistors to be placed in series with the line. They cost but a fraction of the price of the special ballast lamps made for this service and we have found them to last much longer. The 50-watt and 25-watt sizes take care of most conditions that are encountered and the screw-in-and-try method, together with a voltmeter on the filament circuit, will tell you which to use. In our territory we have up to 125 volts on the house circuits and even the Majestic's Model 90, etc., with their special ballast resistor run 2.9 volts on the tube filaments and require a 50-watt, 32-volt lamp in series with one side of the line to bring them down to 2.5 volts.

Mt. Tabor Radio Shop,
Walter P. Schuck, Manager,
4731 S. E. Hawthorne Blvd.,
Portland, Oregon.

Earphone Connection

I am sending herewith a service tip for earphone connection on RCA Model 141-E.

Many short-wave fans cannot take utmost advantage of the set like the 141-E, due to the fear of disturbing



other members of the family late at night and they would appreciate an earphone connection on their sets.

Certainly there is ample power in the 56 driver tube to work on earphone, but as the connections are not easily accessible, it can be put in the 53 output tube, as shown in the diagram. The 0.001 mfd. capacity of the condenser by-passes low-frequency hum which many a time is objectionable on earphone and as well cuts off the volume appreciably, which otherwise would be too much for it. The double circuit jack cuts off loudspeaker automatically when the earphone plug is inserted.

S. G. Gidh,
Indira Lodge,
Santa-Cruz,
Bombay, India.

Mershon Wet Condensers

Mershon wet electrolytic condensers found in Crosley and many other older sets have a tendency to boil over, emitting a liquid substance through a rubber vent found on the top of the condenser. This liquid will in time turn to a crystal form and short from binding post of the condenser to the can which is ground. This will make a noise as if a transformer in the A. F. end of the set were going out. No A. C. hum is detected. Clean the top of the condenser off and take her home.

Wood's Electric
Appliance Repair Shop,
208 East Fourth Street,
Santa Ana, California.

Motor Ignition Noises in Auto Radios

Several different makes and types of auto radios which developed motor ignition noise after some time, were found and corrected, after having been worked on and given up by other service organizations. On cars using the Electrolock Ignition, a steel conduit, flexible of course, leads from the ignition switch to the breaker box, carrying the ignition leads to protect them from tampering. This cable is clamped to a sleeve at the breaker box, and usually works loose in the sleeve, so that a poor ground at this point develops. Grounding the shield at the dash does not help, but soldering a piece of shielding from the steel conduit to the loose sleeve and then to the breaker box takes away every vestige of motor interference. This idea worked on several different cars and radios, and is passed on for its worth.

Noel L. Havermale,
711 South 16th Street,
Quincy, Illinois.

RCA TMV-121-A

The new inexpensive RCA TMV-121-A output indicator which takes care of output indications on sets using separately excited field coils, may be also used as an output indicator on equipment using permanent magnet dynamic speakers and magnetic speakers. To use the indicator in this manner remove back cover plate and connect leads from receiver speaker to secondary of output indicator transformer or to red wires in case. An ohmmeter is useful in determining resistance of speaker to be used and then adjusting output resistor on indicator for same resistance. The sensitivity might be improved by disconnecting output transformer from neon lamp, but it seems to work very satisfactorily as originally intended. A neater and more useful job may be made by mounting two additional posts on panel or top of case, which would eliminate bother of taking cover plate off each time a measurement is to be made.

Sidney Z. Bear,
CRM. USNR.
262 Canner Street,
New Haven, Conn.

Midget Receivers

A tunable hum which is very bad in midget receivers, particularly of the gyp make and of the Crosley 120 series, can easily be stopped by adding a 0.01 condenser from the A.C. plate of the rectifier to the ground. Precaution must be observed to use a condenser of high voltage rating, otherwise it will break down. It may also be connected from the A. C. plate of the rectifier to one side of the filament to stop this annoying hum, which in some cases modulates the signal so badly that it entirely ruins reception.

Lovell B. Crawford,
Radio Service,
Genoa, Illinois.

G. E. C-41 and Montgomery-Ward "Airline"

On the C-41 a short between the open end of the first I. F. trimmer and the adjoining primary soldering lug will ruin a 6B7 tube. This usually occurs when the set has warmed up enough to cause the trimmer plate to warp over if there happens to be a sliver of solder run down the lug on the trimmer side. This trouble won't show up on the bench UNLESS the set is run long enough to be really warmed up.

On the Airline 1933 model mentioned there will be oscillation over the dial from 750 K.C. to 1500 K.C., if:
—the 6D6 is the least bit off in internal capacity;
—either the primary or secondary of the antenna coil is open.

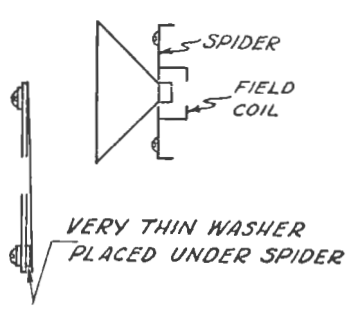
If the shield on the 6D6 isn't making GOOD contact with the chassis, I suggest soldering to the ground lug at side of socket that makes mechanical contact.

Earl Gibbs, Assoc. I. R. E.,
Radio Engineering,
720 Fifth Street,
Las Vegas, N. M.

Shimming Spider of Voice Coil

I am sending in a tip I have used on A.C.–D.C. models.

Customers claim sour tone. After checking tubes, etc. I hit on this



method of shimming spider to change position of voice coil.

As this type of set is handled frequently and subjected to all weather, the spider becomes warped.

H. Dieball,
12821 Wilfred Ave.,
Detroit, Mich.

PLAN 1935 SERVICE MEETS; PAST SERIES WAS BIG SUCCESS

Over 42,000 Attendance at 1934 Meetings in Over 200 Towns. All Service Engineers Welcomed

The 1934 program of RCA Victor Service Meetings for Service Engineers is drawing to a close. Service Engineers from Maine to California have enjoyed them so much that at their requests a new series of meetings for 1935, to start early in February, has already been scheduled.

New Attendance Records

New attendance records were set during the 1934 meetings, which were held in the 43 cities and 130 smaller towns. Total attendance was well over 42,000.

Officials of the RCA Parts and Service Division, who conducted the meetings, attributed the tremendous popularity to the fact that they were "service" meetings in the truest sense of the word. The carefully prepared talks were confined to technical subjects. The usual sales "ballyhoo" was conspicuous by its absence.

Local Associations Co-operate

At the meetings in larger cities, stereopticon slide projectors were used to illustrate the technical talk. In the smaller cities, small film projectors were used. All programs were carefully planned to avoid exhausting length and monotony. Technical talks were interspersed with comedy movies projected from a 16 mm. portable RCA Photophone equipment. In some cities local distributors provided refreshments, additional entertainment, and door prizes.

Same Plan for 1935

The 1935 series of meetings will follow the same plan. The first meeting will cover "Theory and Practice of Antenna Systems"—from the early days of radio to the present time. Practical solutions of today's antenna problems will be explained. The dates and places of these meetings can be obtained from RCA Parts Distributors after the middle of January.

Perhaps none of the four meetings already held has been more fascinating to Service Engineers than the fourth series, which was devoted entirely to the cathode-ray oscillograph, with a demonstration of the instrument recently perfected in RCA Victor Laboratories but not as yet placed on the market. The practical application of this revolutionary radio service equipment was demonstrated, accompanied by stereopticon slides which explained every point.

Previous Subjects

Subjects of previous meetings have been:

Meeting No. 1—Automatic AVC; Servicing the New RCA Victor Receivers.

Meeting No. 2—Alignment of Superheterodynes; 16mm. Sound Camera.

Meeting No. 3—Police and Other Transmitters; Servicing Radio-Phonograph Combination Instruments.

All Service Engineers and Dealers are welcomed at the meetings and are urged to keep in touch with their RCA Parts Distributors to get the dates of meetings. Many of the fourth series meetings, on the cathode-ray oscillograph, will be held, especially those meetings in smaller towns, well up into January

RCA RADIO SERVICE NEWS CUT-OUT SERVICE

TEAR ON THIS LINE

EXPERIMENTS WITH DIVERSITY RECEPTION TO ELIMINATE FADING

By V. D. Landon, RCA Victor Laboratory

One of the most annoying defects of radio reception is the distortion and variable volume which occur when receiving fading signals. The phenomenon is encountered at all frequency ranges in which entertainment broadcasting is allowed. In the standard broadcast band fading is only troublesome for certain critical distances from the transmitter, and then only at certain times of the day. Even so it constitutes a problem well worth solving as the critical distance is such as to be an important portion of the useful area covered. Also, the critical time (near sunset) is during the most valuable portion of the broadcasting schedule.

Nevertheless, it is the sudden popularity of short waves which brings the problem into the limelight at the present time, as a majority of the signals receivable on short waves are fading badly a good share of the time.

Of course automatic volume control is a big help in reducing the objectionable effects of fading. Were it not for an effect known as carrier cancellation, this would constitute a sufficient solution of the problem.

Two Types of Fading

There are two general types of fading which produce somewhat different effects. In the first type there is but a single path through the transmission medium for the signal arriving at the receiver. Fading is due to a variation of the efficiency of transmission of this single path. This variation in efficiency is caused by movements of the reflecting ionized layer of the upper atmosphere. This type of fading can be received very well with the help of automatic volume control as distortion is not ordinarily produced. However, the amplitude variations sometimes become too rapid or too great for the AVC to follow. A more serious and equally common type of fading is caused by the presence of two or more paths for the signal through the transmission medium.

In this case only a slight change in the length of one of the paths is necessary to reverse the relative phases. When the antenna voltages from the two paths are nearly equal and opposite, the result is nearly complete cancellation and a bad fade. The lengths of the two paths are seldom equal, and hence the two subtracting portions of the signal were not radiated at the same time. As a result the modulation frequencies (*i. e.*, side bands) are not cancelled. The result is equivalent to an increase in the effective percentage of modulation, often to values far over 100 per cent. The result is the familiar blasting of fading signals. The sound is much the same as that produced by bad over-modulation at transmitter except that in general low frequencies are missing, these being partly cancelled out with the carrier, if the difference in lengths of path is not great

Use of Diversity Reception

When this type of fading signal is being received with a set employing automatic volume control, the sound output is often greater than normal during a fade due to the higher effective modulation percentage and higher set sensitivity when the carrier amplitude is reduced. The output is greatly distorted at such times.

The only practical method of reducing the distortion due to this type of fading is by the use of diversity reception. Diversity makes use of the fact that the times of worst fading may be different in different antennas. Two, three or more antennas may be used, the circuit being so arranged that reception at any instant takes place only from the antenna supplying the greatest signal. In order that the antennas may have different fading characteristics, it is necessary that they differ widely from each other in location, directional effect or polarization. A difference in antenna location is the most effective method of obtaining different fading characteristics, but differences of the magnitude desired are often impractical and it becomes necessary to employ differences in directional or polarization.

Extra Antenna Improves Results

While results are theoretically better the greater the number of antennas, it is seldom that more than three are used because of the complication. Also, three is sufficient to produce a very steady signal if the antennas are properly diversified. In fact two antennas are enough to produce considerable improvement.

It is necessary to supply a complete receiver for each antenna used except that only one speaker and audio amplifier are required. In general the experi-

(Continued on next page)

Radio Rambles

EVOLUTION OF OSCILLATOR A LONG PROCESS

Many Problems Were Solved in Designing Phonograph Oscillator

The RCA Phonograph Oscillator was born as a direct result of a study of the problems encountered by service engineers in their phonograph modernization work. While connecting an electrical pickup to a radio set in many cases is no great problem to a competent service engineer, there are other cases where considerable experimenting and study of circuit requirements is necessary. It was to avoid these problems that RCA engineers devised the RCA Phonograph Oscillator, and the story behind it is an interesting one.

A Difficult Problem

With the advent of the RCA Victor Record Player the Phonograph Section of the Engineering Department was vitally concerned with issuing information as to its proper connection to receivers of all types and manufacture. That this was a question and an assignment of large magnitude is evidenced by the fact that several weeks of work were necessary just to cover the last few years of RCA Victor receivers. This, of course, to say nothing of hundreds of other receivers of both old and new types as well as certain types of RCA Victor receivers.

The more the problem was gone into the more hopeless it seemed. Days were spent looking over Rider's Manual, and even then when instructions were written up they were written with misgivings, as one can never be entirely sure how any particular circuit will work out until it has been tried, regardless of the proficiency of the engineers involved. As a last resort it was decided to stop tackling the problem from an individual receiver point of view and tackle it from a broader view of classification of sets which might show some simple uniform method.

Tackling from this viewpoint brought forth the information that the cathode type of connection was suitable in a large majority of cases. However, there were some cases it was not and it still was one of those unknown factors which cannot be definitely determined in advance just how the final results will be.

Radio Signal for Phonograph Input

Going back to the original thought it was decided to view the problem from still a broader viewpoint, which gave rise to the idea of the phonograph input similar to a radio input. As these were all radio sets they were all capable of receiving radio signals, so the thought naturally occurred, why not provide a radio signal for the phonograph input rather than just an audio signal?

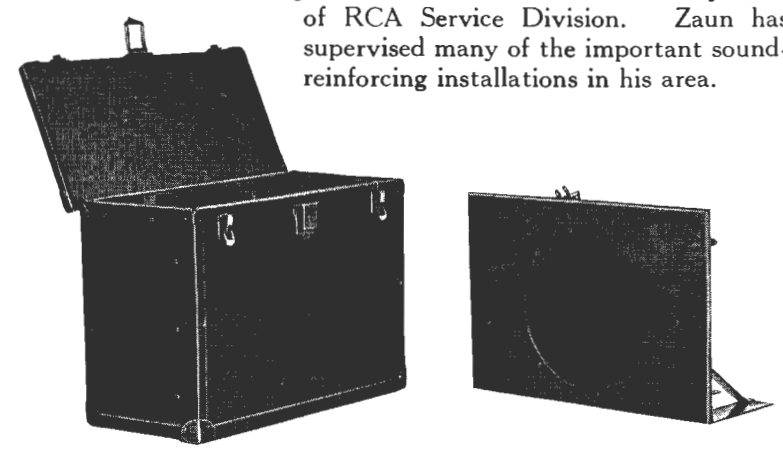
Dual Purpose Tube Used

The Phonograph Oscillator was the result. It was necessary to build several forms first, using several different types of tubes before the final dual-purpose tubes with two filament voltages were decided upon. This tube gives the very best possible results and also was more universally adaptable than any other tube that could be used. The question of connection was simplified for they are the same in all sets. The problem of radiation was eliminated by having a very low impedance output which radiated considerably less than the average local oscillator in a superheterodyne receiver. A frequency adjustment screw was provided so that a point could be selected on the receiver that was free from interference from other stations.

Cased Speakers Have Many Advantages for P. A. Jobs

High-Quality Speaker Which is Fully Protected When Not in Use is Good Buy

While the supply lasts, operators of public address systems can get an unusually good buy in the speaker known as RCA Cased Speaker, Stock No. 9530, according to Bill Zaun, of the New York City office of RCA Service Division. Zaun has supervised many of the important sound-reinforcing installations in his area.



All danger of damage from dirt or accidents when not in use is eliminated by the sturdy carrying case in which the portable P. A. speaker shown above is housed. It has an 18" x 15½" baffle and a convenient supporting bracket so that it stands anywhere.

"One of the chief difficulties encountered in temporary public-address systems is the damage to equipment while moving it from place to place," stated Zaun.

"Design is one of the things most frequently overlooked by service engineers who assemble their own equipment. An important reason for the inferior performance of these units in comparison with a complete system purchased from a company which specializes in sound equipment is the lack of care they give to it while it is not in service.

"Too often," continued Zaun, "any old speaker is mounted on a board for a baffle. After the job is over, the board is thrown in the car, taken to the shop, and placed in a corner until needed again. Something rests on the cone, warping it out of shape, or dirt and dust get in the voice coil slot. As a result, the reproduction is distorted and fuzzy when the speaker is again used.

"Here is a portable speaker that is protected whether in use or in transit to the job," Zaun pointed out as he turned to one of the Stock No. 9530 Cased Speakers supplied by the RCA Parts Division for portable work. "This unit has a trunk-type case with hinged top, clasp, lock and suitcase handle. Its size—19" long, 9½" wide and 14" high—makes it easily portable. It is sturdy enough to prevent damage to the speaker regardless of what gets piled on top of it."

Speaker Stands Anywhere

Zaun opened the lid and lifted out the 18" by 15½" by ½" baffle with an 8" dynamic speaker mounted on it. "Notice how the brackets at the edge and the flat plate permit you to place it on a small surface and help you to make a quick installation instead of having to take time to figure out a way of supporting it. This construction lets you move the speaker from point to point until you find the best spot.

"Then, the cable is neatly coiled within the case. All that is required is to insert the plug in the amplifier and the equipment is ready for use. The field has a d. c. resistance of 1300 ohms and draws 85 mils at 110 volts. If it is desired to use it as a separate speaker, the field supply can be obtained from two Rectox units, RCA Stock No. 5898.

"It is unfortunate that the stock of these units is so limited," said Zaun. "The service engineers who are lucky enough to get one from their RCA Parts Distributor before they are all sold will be able to add a professional appearance to his equipment."

DIVERSITY RECEPTION

(*Continued from previous page*)

menter will find it simpler and cheaper to use complete standard receivers rather than to build up special equipment.

The RCA 140 is easily adapted to this type of reception. The procedure is to connect a set to each of several antennas and time in the same signal on each. The Number 3 terminals on the back of these receivers have the audio and AVC voltage outputs of the detectors. These Number 3 terminals for all the sets are tied together and the chassis of all receivers connected together. The result is that all sets receive the same audio and AVC voltage. The volume controls may all be turned to zero but one, or they may be all operated together. That receiver which is receiving the strongest signal will bias off the RF amplifiers and the diode detectors of the other receivers. The other receivers do not contribute any audio output until the signal input to one of them exceeds that delivered to the first mentioned set. In this way signals are used only from that antenna supplying the strongest signals. This minimizes fading and noise interference. It is not sufficient to simply operate several receivers simultaneously and independently as the set receiving the weakest signals will produce strong noise interference and distorted signals unless suppressed by the AVC voltage from another receiver.

Best Results from Dipole

The improvement in results obtainable by this system depends on the degree of differentiation between the antennas. The best results are obtained by spacing the antennas 500 to 1000 feet apart, and this should be done if the space is available. For best results it is necessary to use a dipole with a transposed or twisted pair lead-in and a shielded transformer at the receiver. This will result in the pickup coming solely from the antenna. The RCA Double Dipole Short Wave Antenna Kit is eminently suitable for this use, although extra lengths of lead-in will be needed.

Often it will be found impractical to place the antennas a sufficient distance apart for good diversification. In this case two double dipole antennas may be used at right angles to each other, keeping the separation as great as space permits, or a simple antenna about 30 feet long may be used with one double dipole. If a three-channel system is wanted, two double dipoles at right angles and one simple antenna may be used, or three double dipoles mutually at right angles may be used, two being horizontal and one vertical.

It is very interesting to check the improvement in a more accurate way than merely by ear. This can be done by inserting a milliammeter in the circuit to read the plate current of the RF and IF amplifier tubes in each receiver. This is done on the RCA 140 by removing the links between terminals 1 and 2 on the rear of each chassis and connecting milliammeters instead.

Current Change Measures Signal

Each milliammeter will read about 15 miles for no signal. The reading will decrease when a signal is tuned in. The greater the strength of the signal, the greater the decrease in current will be. When the signal fades the current will increase, the amount of current change being a rough measure of the change in signal strength. Usually a one milliampere change indicates a little less than a two to one change in signal strength.

When the meters are used, the fluctuations in current before and after the Number 3 terminals are connected together, will give a good idea of the improvement due to making the connection. Before the connection is made, if the current fluctuations in the various meters do not follow each other then it is certain that making the connection will result in less fading.

On the RCA 140 type receiver the changes outlined above may be easily made. Other types of sets may be used but it is necessary to remove the chassis from the cabinet to make the proper connections.

Set Connections Explained

The milliammeter should be inserted in series with the ground side of the cathode bias resistor of one or more of the amplifier tubes. If the full scale reading of the meter is 10 milliamperes then it should be used in the circuit of only one tube. If a 20 mil meter or greater is to be used, then it should be in the circuit for more than one tube to increase the deflection.

To place the AVC circuits in common, the resistors in the diode returns of the different sets are all placed in parallel.

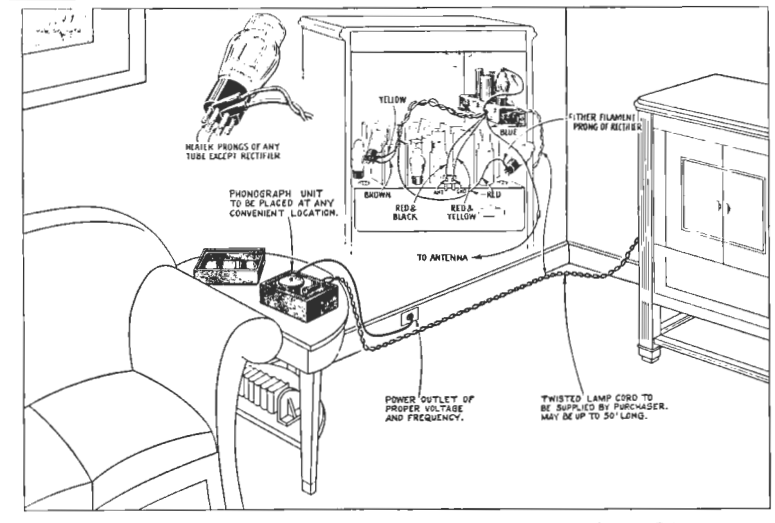
For example, if the new 6-tube set is to be used, the green shielded leads on the volume controls of all the sets used should be connected together and the chassis should all be grounded.

A 10 milliampere meter may be inserted in series with the ground side of the bias resistor of the RF amplifier tube of each set. This is a blue resistor mounted on a terminal board in back of the tone control.

RCA RADIO SERVICE NEWS CUT-OUT SERVICE

TEAR ON THIS LINE

Oscillator Easily Installed



Above diagram shows the simple connections of the RCA Phonograph Oscillator. Tube prong connections are made by means of special adaptors that fit any type tube.

PRINCIPLES OF NOISE-REDUCING ANTENNAE

By W. H. BOHLKE and V. D. LANDON

RCA VICTOR ENGINEERING DEPT.

There has been indicated a demand for a technical discussion of the theory underlying the now famous RCA World-Wide Antenna System by the readers of RCA Radio Service News. The portion of the following article, namely Part I, dealing with the first of the RCA World-Wide Antenna Systems, Stock No. 9500, was published in *Radio News* for September, 1934. Part II will describe the theory behind the development of the new De Luxe RCA World Antenna System, Stock No. 9555. All RCA World-Wide Antenna Systems, of course, are fully covered by U. S. Patents granted and pending.

For details of recommended installation, not outlined in the following discussion, readers are referred to previous issues.

PART I

The RCA World-Wide Antenna System, Stock No. 9500, was developed with two important objects in mind. First, a system was desired which reduced the effects of man-made static. Second, a maximum of signal pick-up over the entire short-wave spectrum was wanted.

Design of the Line

The only principle which has been successfully employed for the reduction of man-made static is to locate the antenna in a comparatively noise-free area and to employ a lead-in of such a type that pick-up on the lead-in is eliminated. To place the antenna in a noise-free location is a unique problem for each installation. However, the type of lead-in is an important design problem. There are two general types — the shielded lead-in and the balanced transposed line. The shielded line is unsuitable for high frequencies, because to be effective, the shielding must be grounded every few feet with short ground wires. This is obviously impossible in most installations.

The balanced line, however, is eminently suitable for many reasons. When used in conjunction with a well-designed transformer at the set pick-up on the line is almost completely eliminated. No grounding is necessary. Losses are lower than in a shielded line and are practically negligible if the design is right.

Line Carefully Chosen

In designing the line the space between the wires and the size of the wires are important. The farther apart they are, and the smaller they are, the higher is the characteristic impedance of the line. If a line is terminated at each end with its characteristic impedance, its transmission is nearly constant at all frequencies. However, when the terminating impedances are widely different from the proper value, the transmission varies greatly with frequency, the curve passing through a series of peaks and valleys corresponding to resonance points in the line.

For the RCA World-Wide Antenna System a line having 180 ohms impedance was chosen because this value is about the average input impedance of most short-wave receivers and because it is about the average impedance of the "Double-Doublet" antenna over the short-wave frequency spectrum.

Line Peaked at S-W Bands

Because the antenna does not represent an impedance exactly equal to the line impedance at all frequencies, the transmission curve does have a series of minor peaks and valleys, varying in efficiency two or three-to-one. The line length was adjusted experimentally by throwing short lengths in and out of the circuit, until a length was found such that a transmission peak occurred at each of the important short-wave broadcasting bands.

Mechanically, the line consists of a rubber-covered twisted pair with stranded, tinned copper wire for each conductor. After exhaustive tests special submarine cable rubber was specified for insulation of the transmission line due to its low losses and high natural rubber content. The life of this transmission line is materially increased by the use of this high-quality rubber insulation and an outer covering of weather-proof braid.

In order to keep the losses low when the line is wet, it is important that no untreated cotton be used as insulation. A cotton wrap must be well-impregnated, to prevent the impregnating material from evaporating away and moisture getting in, thereby increasing the line losses.

The "Double-Doublet" Antenna

It is well known that a half-wave doublet is a most efficient collector of short-wave signals. However, it is at its best only at or near its resonance point. Obviously, if two dissimilar doublets can be connected to the same transmission line without either harming the performance of the other, the overall performance of the combination will be good over a wider range of frequencies than that of a single doublet.

The secret is the much-discussed "cross-connection." That is, the left arm on the longer doublet connects to the same side of the transmission line as the right arm on the short doublet. The connection must be made in this way in order for the output of the short doublet to be additive to the output of the long doublet at a frequency midway between their resonance points.

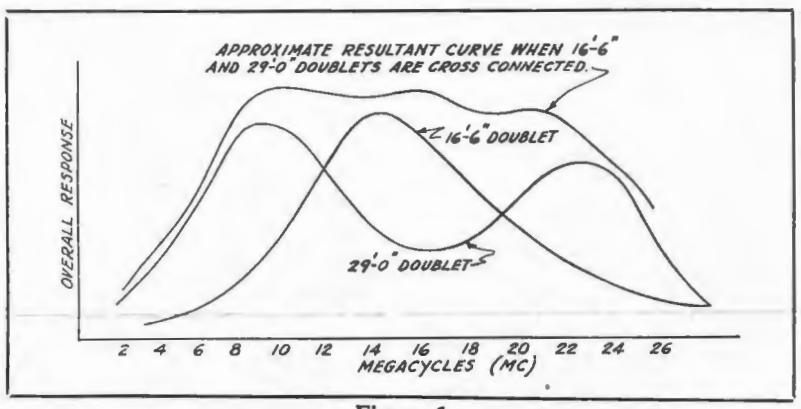


Figure 1

In order to understand this apparent paradox, consider the fact that the long and short arms connected to a given side of the line form a single and nearly straight wire which is resonant in the half-wave mode at the frequency mentioned.

Antenna Impedance Considered

If the two sides of the line were connected near the center of these two straight wires, the antenna would form a low-impedance termination for the line. If the two-line connections were then moved out from the center in opposite directions, the impedance of the antenna would rise progressively, reaching a very high value when the ends of the wires were reached.

At the point actually used, the impedance of the antenna at this frequency is slightly higher than the line impedance.

At the frequency of resonance of either the long or the short doublet, the impedance of the antenna system is somewhat lower than the line impedance. Thus it can be seen that the line impedance chosen is a good compromise value. The performance of the "Double-Doublet" is compared to that of single doublets in the curves of Figure 1.

The long doublet is resonant in the half-wave mode at about 8 MC and in the 3/2 mode at 24 MC. The short doublet is resonant at about 14 MC. The response of the combination is relatively flat over the important part of the short-wave spectrum.

There is a popular misconception that to have a good short-wave antenna, one must use enamel wire. This idea has absolutely no basis. Bare wire has been specified because it is more practical. It has a better appearance and is easier to handle.

The Coupling Transformer

It is very important to note that the noise-eliminating feature of the system depends entirely on the design of the transformer which couples the line to the set. The purpose of this transformer is to eliminate "in-phase" signals while transmitting "out-of-phase" signals. The expression "in-phase" means that the voltages of the two sides of the line go positive together and then go negative together. Obviously, this type of signal will produce no current in the primary of the transformer, it simply changes its potential. "Out-of-phase" signals are those which cause one side of the line to go negative when the other goes positive and then the reverse. This type of signal does produce primary current. The mere presence of a transformer does not eliminate the "in-phase" signals (or noise), because if there is capacity coupling, the noise will be transmitted to the set through that capacity.

Static Shield in Transformer

In the transformer under discussion a special and highly efficient static shield (see (a)–Figure 2) is used, completely eliminating capacity coupling. As a result, the "in-phase" signals and noise picked up by the line are eliminated while the "out-of-phase" signals picked up by the antenna are transmitted to the receiver.

The Circuit diagram of the complete antenna system (RCA World-Wide Antenna, Stock No. 9500) is shown in Figure 2.

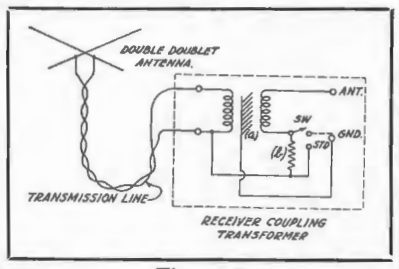


Figure 2

When the switch is on position marked "SW," operation is as described above. When the switch is on "STD" position the antenna and lead-in both act as antenna, that is, both "in-phase" and "out-of-phase" signals are transmitted together.

A Practical Test

A practical test may be made showing that the system does work in this way. When the switch on the transformer is thrown to the position marked "STD," both "in-phase" and "out-of-phase" signals are received. If the two sides of the line are shorted it makes very little difference for this connection. When the switch is thrown to the "SW" position the "in-phase" signals are eliminated, hence if the two sides of the line are shorted the result is almost complete silence.

A resistor (see (b)–Figure 2) is connected from one side of the primary to ground to prevent the antenna system from collecting a high static potential and sparking to ground, which would cause disturbing and periodic clicks in the receiver.

Conclusion

When choosing a noise-free area to locate the "Double-Doublet" antenna, it is well to keep in mind the generally accepted theory that the strength of noise interference varies inversely as the square of the distance from the source of noise. Since the signal strength of the received broadcast signal is usually considered to increase in a direct proportion to the height above ground the reason for the recommendation to install the "Double-Doublet" antenna *as high as possible*, is readily seen. When the RCA World-Wide Antenna System is properly installed the signal-to-noise ratio for short-wave reception should be materially increased to allow for more pleasing reception in the average home than heretofore possible.

Nearby Stations on Ground Wave

On short-wave signals originating at relatively short distances from the receiver it is often found that greater signal strength is obtained with the "SW-STD" switch in the "STD" position. This is to be expected as the signal being received is probably the ground wave (that portion of the transmission vertically polarized) rather than the sky wave. The ground wave does not develop much signal voltage in the "Double-Doublet," but does develop a voltage on the transmission line. Thus since both "in-phase" and "out-of-phase" signals are transmitted with the "SW-STD" switch in the "STD" position, greater signal is received from the local short-wave broadcasting station at this "STD" position.

Ignition Noise Reduced

A puzzling feature of the performance of this system is the marked improvement shown on automobile ignition noise. Since this noise is generated at a distance from the antenna, it would seem reasonable that it should be picked up on the antenna and transmission line equally, in which case no improvement in signal-noise ratio would be expected by eliminating the line pick-up. Nevertheless, a distinct improvement does result. There are two possible explanations of this unexpected fact. First, probably most of the auto-ignition radiation is vertically polarized and cannot be picked up efficiently by a horizontal doublet. Second, probably a good share of the automobile noise does not come in on the antenna at all, but is carried to the set by the power line.

The receiver coupling transformer of the system eliminates noise of this type completely. This can best be explained by the following paragraphs and illustrated by referring to Figure 3.

"S" represents a signal generator such as a source of auto-ignition noise. (a) Represents the capacity coupling from "S" to the transmission line. (b) Represents the capacity coupling from "S" to the power supply line. (h) Represents the capacity coupling from one side of the power supply line to the metal chassis. (f) Represents the capacity coupling from "S" to actual earth ground.

Shield Stops Capacity Coupling

(A) The noise voltage that would be induced by capacity coupling (a) into the transmission line would correspond to an "in-phase" signal and therefore would be coupled or fed through to the secondary of the receiver coupling transformer by the capacity (c) if this capacity (c) were not eliminated by the ground to the chassis through capacity (h). If no receiver coupling transformer was used this voltage would occur across "ANT" and "GND," the input terminals, of the receiver and hence cause noise. When the RCA World-Wide Antenna System is used, including the receiver coupling transformer, this voltage occurs between the primary and the electrostatic shield since capacity (c) has been eliminated. However, this does not produce primary current. Therefore this noise voltage does not induce a voltage in the transformer secondary.

(C) The electrostatic shield (j) provided with most power transformers serves to offset the capacity coupling (g) and thus prevents the introduction of RF noise voltage into the voltage supply of the receiver directly.

No doubt the above reasons (A) and (B) contribute to very real improvement in signal-to-noise ratio to be had with this system on auto-ignition interference.

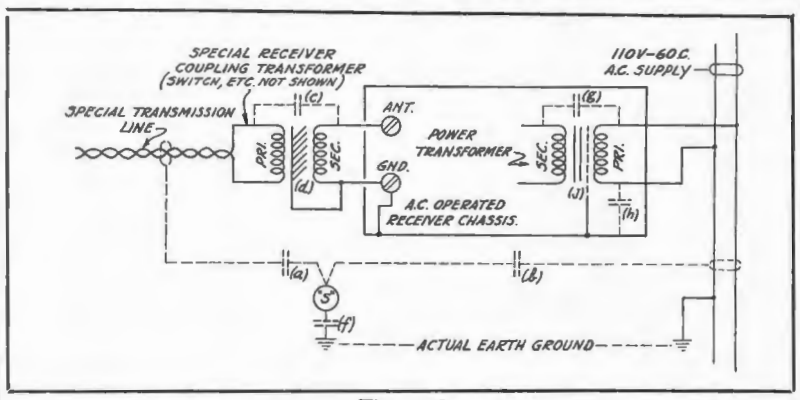


Figure 3

(B) The noise voltage that would be induced by capacity coupling (b) causes current to flow through the power transformer and develop a noise voltage from special and highly efficient electrostatic shield (d). If it were not for shield (d) a noise voltage would be developed across "ANT" and "GND" of the receiver, due to a completed circuit from "GND" to chassis frame through "h" to the power supply line which is usually grounded on one side and thence back to "S" through (f).

(*Part II in next issue*)

Measures Station Coverage

The RCA Victor Field Intensity Meter was an object of interest to Dr. A. N. Goldsmith (left), President of the Society of Motion Picture Engineers, and Mr. C. M. Jansky, Jr. (right), retiring President of the Institute of Radio Engineers, and Mr. W. R. G. Baker (center), Vice-President of the RCA Victor Company, at the Rochester Convention of I. R. E. The RCA Field Intensity Meter measures the strength of broadcast signals at distant locations from the broadcast transmitter.

HIGH QUALITY P.A. EQUIPMENT GAINS FAVOR

Service Men Turning To Dependable Apparatus To Insure Profit

Service men are rapidly becoming convinced that public address sales are right down their alley and offer them an exceptional profit opportunity, states W. L. Rothenberger, Manager, Central-ized Sound Section, RCA Victor Co., Inc.

Public Demands Tone Quality

"It is to the conscientious service man that the PG-62D will certainly appeal," said Mr. Rothenberger. "Too often in the past customers have been sold on cheaply-built and ridiculously low-priced equipment which has ultimately slapped back at the man who sold it. The public is rapidly becoming sound-conscious not only because of high-quality radio in the home but sound equipment of exceptional tone quality in theatres and high-class auditoriums. 'Haywire' P. A. sets, slapped together for price appeal only, have seen their day. High-quality sound, such as the PG-62D offers, is required."

Prospects Everywhere

Reviewing sales opportunities for the new model Mr. Rothenberger said that sales for this equipment are where you find them. Every conceivable activity where groups of people are to be told or sold, means a chance for a P. A. sale.

Greater Profit in Better Apparatus

In conclusion Mr. Rothenberger called attention to the fundamental merchandising principle embodied in the sell-up angle. Small, unsatisfactory equipment not only reflects upon the reputation of the man selling it but gives him in return a very slim margin of profit. By exerting very little extra pressure, many prospects can be sold up to the equipment they really require.

BETTER THAN B BATTERIES IS NEW S.P.U.

Unit Provides Constant Voltage Independent of Load and Line

Of interest to laboratories, service engineers and others now using B batteries is the new RCA Regulated Power Unit, Type TMV-118-B. Pure direct current without AC ripple, voltage regulation better than a set of heavy-duty B batteries and high output are among the features of this useful instrument that is priced at only $39.50 net.

The unit's special regulating circuit, which uses a total of 5 tubes, maintains a constant output voltage independently of the load variations or AC line input variations over a very wide range. Of special interest to service engineers is the ability to use this power unit in servicing receivers in which the power supply is suspected of being the source of trouble. By using the power supply from the TMV-118-B during certain circuit tests, a major cause of trouble may be eliminated in the process of isolating the difficulty.

The extremely good regulation effected by the Unit is accomplished only through the use of the special circuit shown in Figure 1. How and why is an interesting technical story.

Circuit Explained

Before examining the circuit, it is well to understand the action of the voltage regulating tube UX-874. The UX-874 is a gaseous tube of two elements, using either Neon or Argon. The tube functions to maintain a fairly constant voltage (90 volts) across a circuit, independently of load, due to the fact that its resistance varies with the voltage across its terminals. The tube requires 125 volts for starting and maintains an approximately constant D.C. voltage across its terminal for any current from 10 to 50 milliamperes. A link circuit is provided by having two of the tube prongs tied together so that the power circuit may be wired through this link. This prevents power from being applied to the unit without the UX-874 in place. Excessive voltage might otherwise occur if such a condition existed due to absence of the load of the regulator tube.

RCA Regulated Power Unit, Type TMV-118-B

The rectifier and filter circuit of the TMV-118-B functions in the usual manner, a full-wave rectifier and a tapped choke being used. The voltage regulating feature consists of four tubes, each with a special function.

Referring to Figure 2, the general purpose of each tube is as follows:

Five Tubes Employed

UX-874 is a voltage regulator, maintaining a fairly constant voltage across resistors R-5 and R-6 This voltage is known as the reference voltage and a portion of it comprises the grid voltage of the RCA-57.

RCA-57 is a control tube for changing the grid voltage of Radiotron RCA-2A3 in accordance with voltage variations.

RCA-2A3 is a voltage regulating tube which functions as a series resistor in the output line. Its resistance is governed by the value of its grid voltage.

UX-874 (2) is a voltage regulating tube that is used only when the 90-volt tap is used.

The functioning of the circuit may best be explained by considering its action when a variation in line voltage or load occurs.

How it Works

Assume that the voltage at a particular instant is reduced across the — and + taps, either by reason of high-load current or low A.C. line voltage. This would cause a reduced voltage from ground to the arm of the voltage adjusting potentiometer, which is connected to the grid of RCA-57. Inasmuch as the UX-874 maintains a constant voltage across resistors R-5 and R-6, and this voltage is normally higher than that from the potentiometer arm to ground, reducing this voltage will cause an increased negative voltage to be applied between the cathode and grid of the RCA-57.

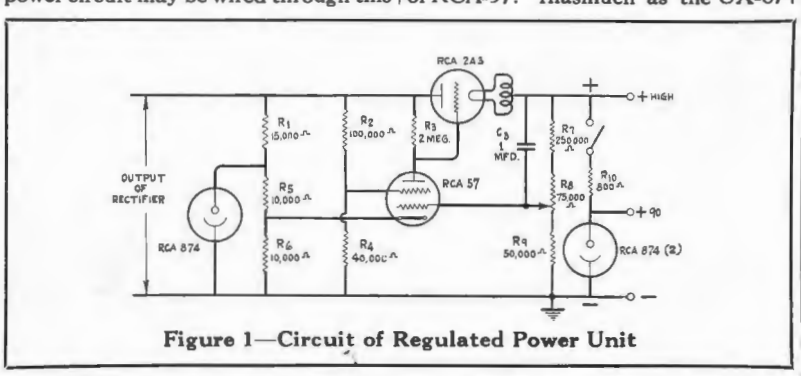


Figure 1—Circuit of Regulated Power Unit

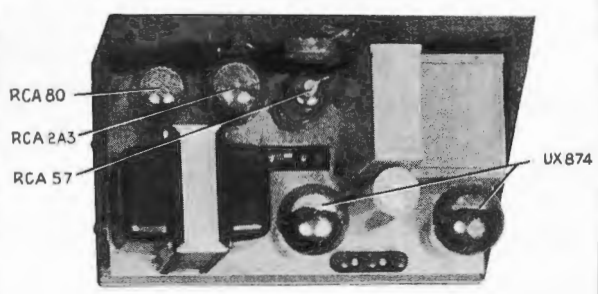


Figure 2—View of Chassis

Increasing the negative potential on the grid of the RCA-57 reduces its plate current and, consequently, the voltage drop across resistor R-3. This causes the grid of the RCA-2A3 to become less negative and its resistance less. This reduces the voltage drop across the RCA-2A3, which gives an increased voltage at the output, thereby compensating for the reduction caused by load or low-line voltage.

D. C. Voltage Without Ripple

As this action occurs very rapidly, the effect is a constant voltage output at all times. While only a portion of the D.C. output is applied to the grid of the RCA-57, the full ripple voltage is applied through capacitor C-3. The regulating action of the circuit also functions on this ripple voltage which further reduces the ripple voltage. The final result is D.C. almost entirely free from ripple voltage.

While the RCA Regulated Power Unit new instrument will be in greatest demand from manufacturers' research and test laboratories where a dependable source of constant voltage is very essential, it will also prove a profitable investment to some radio service shops specializing in battery-operated sets or maintaining very complete equipment.

Help! Help!

Exchange Your Old Service Notes for New Bound Volumes of Service Notes

In the last issue of RCA RADIO SERVICE NEWS any of the five Bound Volumes of RCA Victor Service Notes were offered in exchange for service notes or instruction books on certain old RCA receivers manufactured about 1922 and 1923. Several readers won Bound Volumes of Service Notes, but the opportunity is still open to others who have preserved old instruction sheets.

Look in your files. If you have service instruction sheets on any of the models listed below, send them to J. P. Allen, RCA Parts Division, Camden, N. J., and mention the Bound Volume of Service Notes you wish in exchange: 1923–28, 1929–30, 1931–32, 1933, or the new 1934 Volume, just issued. The first *two* persons to send in instruction sheets for any model listed below will each win a Bound Volume.

SERVICE NOTES WANTED ON FOLLOWING MODELS

Model AR-1375 — Crystal Receiver.

Model RF—Detector and one audio stage.

Model RE—Aeriola, Jr.

Model RF—Aeriola, Sr.

Model RG—RCA Aeriola Grand (this is not the Radiola Grand, but is the model that used ballast tubes).

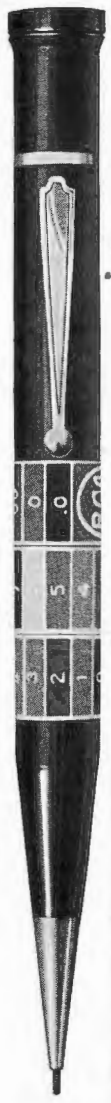
CODE PENCILS POPULAR WITH SERVICE MEN

Resistor Code Pencils are Given For Antenna Kit Labels

"How many labels have you saved?" This question has become the common greeting between radio service engineers since the RCA Service Engineer's Pencil was offered free to all who would send in the labels from ten RCA World-Wide Antenna Kits, states E. M. Hartley, Manager of RCA Parts Division, who has just returned to Camden from a trip to the Pacific Coast.

Almost Like Legal Tender

RCA Antenna labels are regarded as almost as good as legal tender since they became exchangeable for RCA Service Engineers' Pencils. "I have never seen the people in the retail radio business more enthusiastic about a thing than they are about this Pencil, especially the service engineers. It is obvious that the Pencil fills a real need. We have had so many meritorious requests for Pencils that we have had to establish the definite rule that Pencils are not for sale and may be obtained only by sending us the labels from ten RCA World-Wide Antenna Kits.



"There are two labels on each kit; that makes a total of twenty labels required for each Pencil, except that one label from an RCA World-Wide Dealer Demonstration Antenna Kit counts as much as four labels from the regular Kit.

Dealer Responsibility

"I hope we will receive a good many of the labels from Dealer Demonstration Kits, because I think every store should have this antenna. It will not only help dealers to sell all-wave sets, but it is a potent argument to help sell a scientific antenna along with the set. Many dealers hesitate to attempt to sell an antenna after they have sold a set, being afraid to try to add $10 or $15 to the sale. This is a great mistake. Aside from the nice profit from the antenna sale, it is an injustice to the customer not to properly install the set so that it can perform to the best of its capabilities. And furthermore, it is positively harmful to the whole radio industry for dealers to let all-wave sets go into use without a scientific antenna system such as the RCA World-Wide System.

Good Merchandising Judgment

"Many a knocker has told his friends not to buy all-wave sets simply because, as a result of a faulty installation, he was disappointed with the results he obtained from his own set. And so I say, demonstrate sets with the RCA Dealer Demonstration System and sell an RCA World-Wide Antenna with every all-wave set sold. Besides winning an RCA Service Engineer's Pencil, you will have shown good merchandising judgment."

The Pencil referred to by Hartley is a beautiful automatic pencil with black composition barrel and gold-plated tip and clip. The special feature of it is the three colored bands that turn on the barrel and tell the coded value of resistors in a jiffy without consulting charts.

The Voice of Radio Service

(*Continued from page 1, col. 4*)

because we need more real radio men worthy of the name and less part-time or mail-order "technicians." More ability, and less envy. Straightforward, non-ambiguous advertising. Poseurs should return to their paperhanging; and grudge war should be ruled out.

This hue and cry against the Free Examination man comes from the necessity of blaming someone for someone's not getting the cream of the business somewhere. Racketeering is a matter of the individual serviceman and the day may not be far distant when honest servicemen, regardless of whether they charge for examination, are going to band together to make their own "exposures." In the meanwhile, irreparable damage is being done to the multitude of meritorious servicemen who are being libeled by injudicious statements.

* * * * *

I have two ads before me. One says, "Radio Repairing—No Service Charge." The other says, "Examination $1, including minor repairs. Maximum charge $3." The only way to hope to compete with such ambiguous advertising is to call their bluff with *good plain English definitions.*

Racketeering is by no means confined to the free-examination faction. Questionable ethics are a matter of the individual.

* * * * *

The real rogues in the service world are those who seek to capitalize on the customer's cupidity instead of their own abilities; who classify the customer as "poor sucker" at meetings held to wipe out free examination; who openly boast that a semicolon or comma judiciously placed covers the law and a multitude of sins but still makes their newspaper advertising read as though their "maximum charge" were really that and not a charge for the labor alone; the ambiguous advertiser who offers "No Service Charge" without expressly stating of what this "service" consists. The hosts of "$1.00" and "75c" and even "50c" service have blossomed in great number and led the gullible to believe that such nominal sums would put their sets into condition. . . Go farther back—to the real offenders who first featured low price above quality—and you will find the genesis of many a free examination man.

* * * * *

If you are at all interested in a fair appraisal you will note that the man who advertises *Free Examination* as such makes an absolutely honest statement of fact.

You may accept this "protest" at your own valuation. But since we are "authorized" dealers and the oldest established service in our state and pride ourselves on our good standing, it might be advisable to pause to wonder whether you have not and are not running the risk of loss of patronage of many other organizations of equally good standing.

James A. Iodise

THE EDITOR REPLIES

Dear Mr. Iodise:

We are sorry that you have misunderstood us and happy that you have told us about it.

Let us point out that the remarks derogatory to those who offer "free radio inspection" which appeared in our recent editorial (see August 25th issue) were not ours. They appeared in an ad published in a daily newspaper by a Better Business Bureau. We merely quoted them in order to point out the need for action, collectively and individually, on the part of the honest service engineers who form the great majority of the industry.

* * * * *

RCA RADIO SERVICE NEWS has no quarrel with the radio service engineer who honestly offers "free examination" or "free inspection." In many cases it may be good business to do so. In several test activities which we have sponsored, we have found that such offers, honestly made and conscientiously carried out, result in enough legitimate business to return a fair profit.

The point is that the great majority of all radio sets in operation actually need service, and if all of them could be inspected, enough badly-needed work for service engineers would be uncovered to keep the industry rolling in prosperity.

* * * * *

We do believe, however, that ambiguous advertising in general, and specifically the offer of "free service," has been the refuge of the racketeer and the curse of the legitimate service business.

We agree with you, and strongly advocate, that honest service engineers should band together and make their own exposures, that ethics depend on the individual, and that racketeering wherever found must be eliminated.

THE EDITOR

CABINET REFINISHING KIT

(*Continued from page 1, col. 5*)

flame for heating the spatula knife and lacquer for certain jobs are also needed, but these are always available close at hand and have been omitted from this kit to keep it compact and easy to carry.

We have put a sheet of simple instructions with each Kit so that the beginner can have the results of our years of experience in this sort of work.

Retouching Pays Well

"Even though the injury to the cabinet finish was done before the serviceman takes the job, it usually pays well to touch up the nicks. Nothing impresses the customer more, because they can *see* the improved appearance whereas a very difficult chassis repair job usually can not be seen or appreciated by the customer. Touching up the cabinet finish, if only to polish it, is one of those little "extras" that mean so much in building a reputation."