

PHILCO SERVICEMAN

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RADIO • MANUFACTURERS • SERVICE • NEWS

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RADIO MANUFACTURERS SERVICE OVERWHELMING SUCCESS BRINGS MORE BUSINESS TO SERVICE INDUSTRY THAN EVER BEFORE IN HISTORY

EDITORIAL

DURING the past few months we have investigated a number of complaints that have been turned in to us regarding the quality of repair work done by radio servicemen.

In a few cases the complaint was justified because the man did not do his work correctly, either because of insufficient knowledge or else because he did not have the proper kind of testing equipment.

In the majority of cases, however, the cause of the customer's dissatisfaction could not be blamed on the kind of work done by the man, but was due entirely to the kind of replacement parts used.

At the PHILCO factory a tremendous amount of money is spent every day developing higher-quality radio parts—radio parts that will stand up month after month under every possible kind of operating condition. In order to carry on this program of continuous development work on radio parts, large groups of radio engineers, electrical engineers, mechanical engineers and chemists are employed in a constant search for better materials and better methods of construction.

The world-wide recognition of PHILCO quality and PHILCO dependability has been earned only because of the extreme care taken in the design and manufacture of each individual part going into PHILCO radios.

The benefit of all of this vast reservoir of radio parts experience is available to every serviceman. PHILCO parts that are sold for replacement purposes are identical for the original parts used in PHILCO radios, and by their use the possibility of a part's failure on any repair job you do is reduced to a minimum.

The customer will pay you for high-quality PHILCO parts on any repair work you do. This problem is simplified by the PHILCO list price parts catalog. The prices of the parts you sell can be shown to the customer, which will answer any questions he might have.

To build up a reputation for doing dependable service work, it is essential that you use high-quality parts.

PHILCO—the world's largest radio manufacturer, with the advantages of the largest radio engineering department—has helped remove the risk of parts trouble.

Business and Technical Aid Acclaimed by All

NEVER before in the history of the radio service industry has there been so much sustained enthusiasm shown for any movement as that which is now being accorded Radio Manufacturers Service. The biggest thing in radio service has become the outstanding friend of the serviceman. Membership is increasing rapidly, because those servicemen who do not belong to R. M. S. at present are realizing the many benefits that they are losing. During the last three months, over 2000 new members have been taken into R. M. S.

Individual servicemen, radio servicemen's associations, radio dealers, the trade journals and the radio schools are most enthusiastic in their praises of this great movement undertaken by PHILCO to help the individual serviceman to make more money and become a better technician.

Five Million Service Jobs

It has been estimated that there are between twenty and twenty-five million radio sets in operation throughout the United States, and it is also estimated that approximately 25 per cent of these sets are either operating at a very low efficiency or are temporarily out of operation. This means that there are five million radio service jobs which should be handled by the service industry within the next few months.

The effect of Radio Manufacturers Service activities has been to increase the possible number of jobs of this kind by bringing to the public's attention the fact that any radio must require a renewal of tubes and a general tune-up from time to time. Hundreds of people brag about the fact that they have a radio three or four years old and have never replaced a tube. Radio Manufacturers Service tells the customer how he can have much greater enjoyment from his radio, get more stations and receive them with far better tone quality than ever before by renewing some of the tubes and by having the standard



Universally Endorsed by Radio Men

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Acoustic Clarifiers Eliminate "Boom"

FROM the standpoint of acoustics, placing a radio against the wall is the worst possible position in the room, but the great majority of sets are located in this manner. The acoustic clarifiers which are used in the new PHILCO Model 116X and Model 680 have been designed to overcome this condition which normally exists when the set is placed against the wall.

The sound issues equally from the front and the back of the speaker, and at loud volumes the sound from the back hits the wall behind the radio and rebounds into the cabinet, causing it to vibrate noticeably and produce a barrel-like "boom." This "boom" could be greatly reduced by standing the radio a few feet from the wall, but this is not practical. Most everyone dislikes seeing a set standing out in the room, for radios are regarded as furniture as well as musical instruments.

To overcome this condition, PHILCO engineers have developed the acoustic clarifiers. This new PHILCO feature admits of full bass reproduction, which formerly was objectionable because the more bass, the more tendency to "boom."

The acoustic clarifiers are cone-like in shape, and there are three of them in number. They are so constructed that they are tuned to respond to the natural periods of vibration of the individual cabinet when placed against the wall. The sound which is reflected from the wall behind the radio and which would normally resonate in the cabinet is absorbed by the acoustic clarifiers. The acoustic clarifiers actually vibrate at these

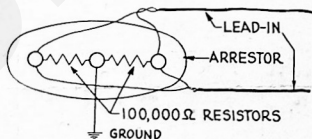
low frequencies, but they do not produce sound. The vibration which would ordinarily produce a "boom" is dissipated in the flexible material at the apex of the clarifier cone.

A person can actually feel the acoustic clarifiers operate. A simple test is to turn the volume up and place one hand on the acoustic clarifiers and the other hand on the cabinet. The clarifiers vibrate vigorously, but the cabinet remains quiet. Thus, the distortion which would normally take place is absorbed and superior tone results.

It will be noted in the 1936 "X" model PHILCOS that the inclined sounding board has less degree of inclination than that in previous "X" models. When the speaker is placed high up on the baffle, as it is in the 1936 PHILCO models, the present degree of inclination of the sounding board is sufficient to raise the high notes to the ear level, and thus maintain the fundamental principle of superior tone from the inclined sounding-board models. The acoustic clarifiers permit the use of a cabinet of this design.

High-Voltage Static

WE RAN across a serviceman's comment the other day. Although it was rather old, we are passing it along for its general interest to servicemen.



Bleeder circuit for taking off high-voltage accumulations

Remember the dust storms in the Middle West last spring? R. B. Cherry, Service Manager of Spurrier's, Inc., PHILCO distributors in Oklahoma City, wrote as follows:

"Had to fix a pair of bleeder resistors across the all-wave antenna we use on the bench to keep the thing discharged during the dust storms. It would almost knock your head off when it had been idle a few minutes (not connected to the set). Of course, on a permanent installation, it would not bother, but on a bench where it is used on so many different sets, it's different."

Oil-Burner Interference Suppression Timely Problem

NOISE suppression in oil burners is comparatively simple, but do not forget that you are experimenting with an ignition system having an approximate potential of 12,000 volts and a current capacity of 5 milliamperes. This is enough to give you a terrific shock, so be sure that the current is turned off before attempting any changes.

.5 Mfd. Condensers Employed

The strongest radiating circuit of the system is the firing chamber, the transformer secondary and the connecting leads. Additional radiation comes from the transformer primary and the power leads. The latter can be silenced easily by connecting two .5 mfd. condensers in series across the line as near the transformer as possible and grounding the center. Be sure the AC voltage rating of the condensers exceeds the line voltage.

The radiation firing circuit is not so easily remedied and may require some experimentation. However, by placing a 10,000-ohm resistor (non-inductive 10 watts minimum) in each high-potential lead as near the firing chamber as possible, this will reduce the interference from 60 to 80 per cent. The remainder can be eliminated by shielding.

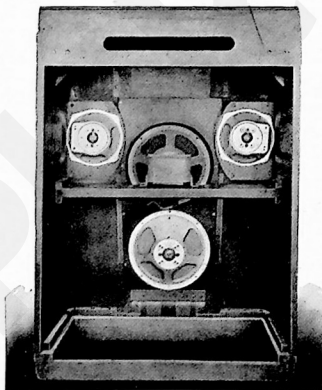
Shielded Wire Effective

Regular auto ignition shielding will be satisfactory for the leads. The important step now is to properly shield the firing plug porcelain and the resistor. This can be done with copper screen, making a cylinder with a minimum diameter of three inches and long enough to cover both resistor and plug porcelain, connecting one end to the furnace and the other to the shield.

The furnace and hot-air pipes will radiate interference in some cases. Usually such radiation will be heard only on certain frequencies and not over the entire dial. This condition can be corrected by individually grounding the frame of the furnace and the various pipes.

Noise-Reducing Aerial Important

The installation of the PHILCO All-Wave or Three-Purpose Aerial System will greatly simplify the problem of oil-burner interference in every case.



Back view of PHILCO Model 680 cabinet, showing acoustic clarifiers installed

Radio Manufacturers Service Overwhelming Success

(Continued from Page 1)

R. M. S. tune-up on his set. This statement, coming to the public from the world's largest radio manufacturer, carries far more weight and is more convincing than if it came from any individual serviceman.

R. M. S.-Western Union Gets New Customers

The R. M. S.-Western Union plan has been one of the greatest things that ever happened in the service industry to bring more business. Boake Carter, on the air, has told millions of listeners about the plan and about the ability of the R. M. S. member to do quality service work. One of the biggest advantages of the plan lies in the fact that almost every call received by the individual member from the PHILCO distributor creates a new service customer.

A customer calls Western Union because he does not know where to get a reliable serviceman in his neighborhood. When the R. M. S. member takes care of the job, he makes it a point to tell the customer that it will be unnecessary to call Western Union the next time, because the customer can call the R. M. S. member direct.

One comment which was recently received by an R. M. S. member sums up briefly all of the feeling and appreciation for the direct factory mailings which were started in May of this year. This man says, "It is great to have technical information on sets before it is needed instead of after." These direct factory mailings are just one thing more which PHILCO is doing to help the R. M. S. member do a better job and make more money. By giving him the necessary information in advance of the time when it will be needed, he is in a far better position to service the sets than he would be under any other circumstances.

World's Outstanding Advertising

The R. M. S. sales promotion material, such as handbills, letters, stationery, ads, etc., have enabled thousands of servicemen to build up their business to such a point where they are now making some real money out of radio service work. This advertising material is prepared by some of the most outstanding advertising copywriters of the world. It is the type of advertising which is positively bringing results where properly used. This material, which is available at all PHILCO distributors, can help every R. M. S. member to tie in to a greater extent with the national activities of R. M. S., and thus bring to the attention of the people in his neighborhood the fact that he is the local representative. This means plus-business and more profits.

\$ \$ MONEY \$ \$

More service calls mean
more money for you!!

R. M. S. gets
you more
calls

Helps you
make more
money

Service Advertising Most Profitable Now

AT THIS time of the year, people are thinking more about radio perhaps than at any other season. This is the height of the radio-buying season and should also be the height of the radio-service season. Radio set owners who have not been particularly interested in radio during the summer now want to get their sets conditioned for the good programs on the air. Many people have radio sets that are operating after a fashion, and the owners need only be reminded by a handbill or letter from you that their set may require new tubes or a general tune-up.

This is certainly the time of the year when you can do some active promotional work and get the biggest possible returns from your effective but low-cost advertising. By tying in with Radio Manufacturers Service, which today has become known as the biggest thing in the radio service industry, you will immediately identify yourself as a member and a competent serviceman. If you have not already seen the many advertising helps and promotional literature now available at your PHILCO distributor, make it a point to see the R. M. S. Sales Promotion Book in your distributor's Service Department without further delay.

Servicemen Can Eliminate the Fraudulent "Eliminators"

THE Philadelphia Radio Servicemen's Association, working with the Better Business Bureau and the Police Department, recently brought up a test case against a gyp who was marketing one of the many so-called static and aerial eliminating devices. Court action was obtained against the dealer on the basis of tests made by the servicemen, to prove to and convince the court of the fraudulent claims.

Members of Radio Manufacturers Service can eliminate this type of business in their sections just as readily as the Philadelphia Servicemen's Association was able to curtail such activities in Philadelphia. It is important to the individual serviceman that such action be taken, because every aerial eliminator sold is depriving the serviceman of legitimate aerial business, and it is also giving him more trouble from customers. You know the type of salesman and his methods, and this job of removing this pest is a serviceman's job. Who else can be called on but the technician who knows the construction and appreciates the fraudulent claims of the so-called eliminator?

There are several agencies through which action can be taken:

- Better Business Bureau
- Chamber of Commerce
- Federal Trade Commission
- Postal authorities (if mail is used)
- Local police
- Local merchants protesting in unison.

Good aerial installations of a noise-reducing type will net you profit and will put the fake static eliminators off the market.



Parts Department, PHILCO Radio and Television Corp. of Illinois, Chicago.

New Short-Wave Listings Help Servicemen

"GOOD work on your short-wave data! It—or they—round out the bulletins."

That is what the radio editor of one of New York City's leading newspapers wrote to The Radio Institute of the Audible Arts the other day. It is one of many similar unsolicited expressions of enthusiastic approval of the short-wave listing which PHILCO'S Institute is now including in its monthly program bulletins.

R. M. S. servicemen are now in a position to offer their customers and prospects additional welcome radio information, an extension of the splendid service which the Radio Institute is rendering listeners everywhere.

Dial Twisters

As the previously quoted radio editor also said in his letter, "Most short-wave listeners are dial twisters and want to know whether or not a station is on the air at the time they are twisting." The Institute's program bulletins now give them this information. The principal foreign short-wave stations most easily tuned in at this time of year are listed together with their locations, frequencies and the hours during which they broadcast.

Foreign and Domestic Listings

This information is supplemented by brief analyses of various "American hours" broadcast by foreign short-wave stations and designed especially for American listeners. In the August program bulletin, the Institute lists short-wave programs of this type currently offered by stations in England, Canada, U. S. S. R., Italy, Japan, Spain and Germany. The Institute has established contacts with both the foreign embassies in this country and the directors of foreign radio stations, and as additional short-wave program information of interest to American listeners becomes available, it will be included in future program bulletins.

The Institute also lists domestic short-wave stations operated by the various network stations, in order that listeners in rural districts and remote sections of the country can tune in on popular network programs which they may have some difficulty in receiving through the regular medium-wave stations.

Such information makes it possible for listeners to plan their short-wave listening for any hour of the day, just as the Institute's regular program recommendations provide guidance in the selection of worthwhile medium-wave programs to be heard at all hours of the day and night.

Means Increased Service Business

The increased interest in and use of radio in general, and short-wave sets in particular, that the Institute's efforts are inducing, tend to make the installation

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MULTIPLE-AERIAL SWITCH SOLVES DEMONSTRATION PROBLEM

PHILCO has at last solved the problem of multiple-set operation on the all-wave aerial. Up to this time, many dealers have found it difficult to provide a good store demonstration, because it was impossible to use the all-wave aerial on more than one radio set at a time. Noise from local interference sources thus prevented many demonstrations and caused the loss of sales.

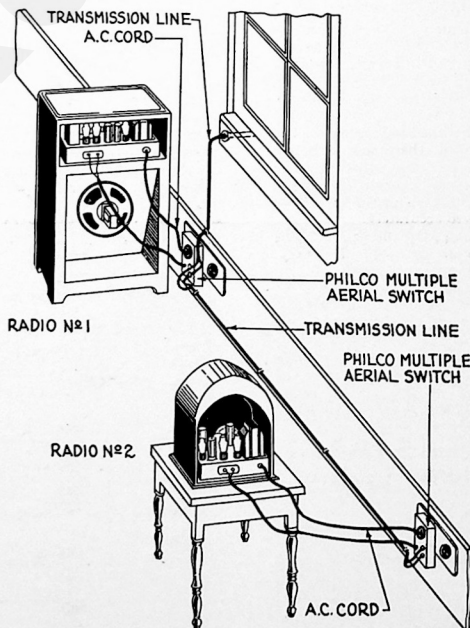
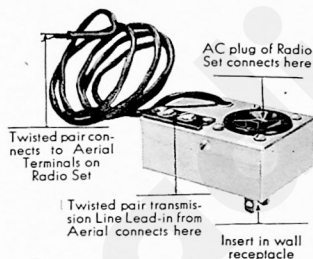
The new PHILCO multiple-aerial switch is the answer to this problem, and it also answers the problem of multiple-set operation in the home, as well as in the dealer's store. This latest device is an automatic switch which connects the transmission line of the all-wave antenna to the transmission line terminals on the new PHILCO sets when the power switch of the set is turned on. The connections are extremely

simple, and the convenience of operation very quickly justifies the small cost of the switches.

The power plug is simply removed from the baseboard outlet and the multiple switch plug inserted in place of the power plug. The power plug is then inserted in the socket of the multiple switch, and it is then ready to operate just as soon as the set is turned on. When this is done, the transmission line coming from the outside is automatically connected to the transmission line coming out of the switch box and going to the radio set. For the second set, the incoming transmission line is paralleled over to the second switch box, and the transmission line coming out of the second box is connected to the transmission line terminals on the back of the second chassis. Additional sets are connected in exactly the same manner.

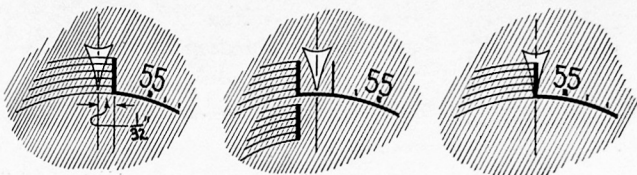
Every set is disconnected from the transmission line, except when the power for the individual set is turned on. In practically no case would it be necessary to operate two radio sets simultaneously, and in this way it is possible to get the full benefit of all-wave performance on each set without having to bother about reconnecting the transmission line to the various sets that are being demonstrated. In the home, where multiple-set operation is desired from a single

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Showing method of connecting multiple-aerial switches to radio sets

CORRECT DIAL SCALE SETTINGS EASILY MADE ON NEW 1936 PHILCOS



Showing index relation to glowing arrow

AMONG the many engineering considerations which were given to the design of the 600 Series 1936 PHILCOS to make them more serviceable is the simplicity with which the dial scale settings can be made.

The index line, the first vertical line on the dial at the extreme left, is the first calibration and is used when replacing the dial in its original position on the condenser gang shaft. If the dial is not placed in this original position, the calibration will be off in the center of the dial.

Replacing and adjusting a new dial on a radio should be done with the rotor plates of the condenser gang all the way in, or maximum capacity, and the index line on the dial set in exact relation with the glowing arrow, as shown on the chart below, for that particular model. Doing this will save lots of time in aligning sets and making them "track" or follow calibration.

This is extremely important on all-wave receivers. A fraction of an inch error in setting the dial on the condenser gang would throw the calibration off several megacycles on the high-frequency band.

Assuming that the condenser gang has not been damaged, there should be no reason for the dial not following calibration if it is "set" correctly and the aligning procedure furnished in service bulletins followed accurately.

All dial settings are made with the gang condenser all the way in (maximum capacity) on broadcast band. In the case of the adjustments under "A" in the diagram, set index line of dial 1/32 inch to right of glowing arrow. In the case of "B," set dial so that glowing arrow is half way between index line and the additional index line to the right. In "C," set dial so that index line and glowing arrow exactly coincide.

Multiple-Aerial Switch Solves Demonstration Problem

(Continued from Page 4)

aerial, as well as in the dealer's store, additional lightning protection is afforded by keeping the aerial disconnected when not in use.

The new PHILCO multiple-aerial switch is now available from your PHILCO distributor at a list price of \$4.85, subject to your regular parts discount.

Correct Dial Settings for All 1936 Philco Models

A	B	C
611	116	623
620	640	610
630	641	
642	643	
	650	
	660	
	680	

New Short-Wave Listings Help Servicemen

(Continued from Page 4)

of an All-Wave PHILCO Aerial absolutely essential. R. M. S. servicemen can further this work and thus stimulate their own business by calling the public's attention to the Institute's listings of recommended programs and short-wave information. As more people listen to more good programs, both medium and short wave, they will learn to demand better performance of their radio sets. That, of course, means more business for R. M. S. servicemen.

Secure your supply of Recommended Radio Program Guides from your PHILCO distributor. Stamp your name, address and telephone number on them and use the Guides to contact new and old customers.

Power Supply for 32-Volt Tests Easily Constructed

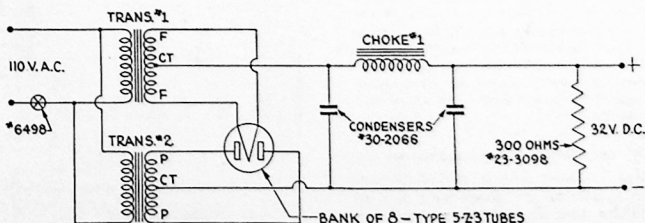
IN THE August issue of the PHILCO SERVICEMAN, we mentioned the use of a bank of 5Z3 tubes to supply 32-volt operating power for testing 32-volt receivers. We have received so many requests for circuit details of this arrangement that we are publishing the information for the benefit of all servicemen.

The diagram below shows that the power-supply device consists of two transformers, a bank of eight type 5Z3 tubes connected in parallel, two 8 mfd. electrolytic condensers, a filter choke and a 300-ohm 10-watt load resistor.

Both transformers must be specially wound by the serviceman. In the case of transformer No. 1, which supplies the filament, it is necessary to have a secondary capable of furnishing 24 amperes. This transformer can be constructed from a burned-out transformer, such as an old PHILCO Part No. 3752 or No. 6672. If the original primary of the burned-out transformer is still good, all of the secondary windings should be removed. Then proceed to wind four secondaries of twenty turns each of No. 14 enameled copper wire. Connect all of these in parallel, and in the case of the fourth secondary, bring out a center tap. If the old transformer is burned out on both primary and secondary, or on the primary only, it is then necessary to wind a primary consisting of 420 turns of No. 20 enameled wire in addition to the secondary winding described above.

Transformer No. 2 can be constructed from a burned-out transformer, such as an old PHILCO Part No. 3752 or No. 6672. The primary is the same as transformer No. 1. The secondary should consist of 880 turns of No. 24 enameled wire, center tap.

The tubes are arranged in a parallel bank of eight. They should be spaced apart sufficiently so as to allow adequate ventilation. The electrolytic condensers and the choke are connected in the usual manner to afford a filtered DC supply. The 300-ohm resistor across the output is used to hold down the voltage on open circuit. The part number of Choke No. 1 is 02795.



Circuit of 32-volt test power supply

Questions and Answers

1. Q. What is the cause of the vernier tuning shaft coming out in the new models?

A. Examination will show that the rounded end of the vernier shaft is welded to the shaft. Occasionally a severe blow against the end of the shaft during transit will cause a break at this welded joint. As soon as this break occurs, the shaft is entirely loose within the drive assembly and is free to fall out. The only correction in a case of this kind is to replace the vernier shaft, Part No. 31-1643 for Model 610 and Part No. 31-1631 for Models 620 and 630.

2. Q. Is there a different electrolytic condenser now being used in the PHILCO Model 116X in place of the Part No. 30-2011?

A. Yes. The No. 30-2011 condenser has now been replaced with No. 30-2069. The latter condenser is a higher-voltage dry electrolytic type.

3. Q. What is the cause of consistent loss of sensitivity in some older models after each adjustment?

A. It has been found upon examination of some receivers, particularly models where there is a relatively higher operating temperature due to cabinet construction, that the I.F. adjustments have a tendency to drift. In such models as the "RX" and compact receivers, a condition of this kind might be more prominent than in some of the other types of sets where the natural ventilation is greater.

The condition can be corrected in some sets by using a smaller capacity compensating condenser in the I.F. circuits and bridging this condenser with a fixed condenser so as to make the total capacity equal to that of the original capacity in the compensating condenser. By making this change, the only variable factor, so far as drift is concerned, would be in the smaller compensating condenser. Since the capacity of this condenser is less than that of the original compensating condenser, there is less possibility of variation.

4. Q. What are the possible causes of low sensitivity in the Model 623?

A. The PHILCO Model 623 battery set was designed to afford superior performance to that of the Models 38 and 39. The Model 623, when correctly adjusted, will outperform both of these other models. In case of difficulty, correct readjustment will usually overcome entirely any trouble with low sensitivity. This is particularly true with regard to the 1400 K.C. adjustment.

It is also highly essential that a good ground connection be employed with any battery set. This is true whether the set is used on the standard aerial or on the PHILCO all-wave noise-eliminating aerial. In all instances, the best possible ground should be provided.

5. Q. What are the correct batteries for the Model 088 Signal Generator?

A. The correct batteries for the 088 are three small-size 22½-volt "B" batteries, such as the PHILCO P-155 and two No. 2 flashlight cells.

Boake Carter's R. M. S. Broadcasts



From
Broadcast
of
August 22nd

... and all programs which will sound best if your radio is in perfect shape. And it can be put in that condition only by a Radio Manufacturers Serviceman, who's a trained PHILCO service expert who knows his stuff, makes only standard charges and who can be reached by a call through Western Union. This PHILCO service for radio owners stretches from Pacific to Atlantic—and who hasn't wondered where he could get an honest, good serviceman easily? Well, call Western Union, then ask for an R. M. S. man to hop out to the house and fix your set.

From
Broadcast
of
September 10th



... all programs will come in far better with a NEW All-Wave Aerial, as the former Federal Radio Commissioner, Orestes Caldwell, pointed out so clearly on his program last night. Nowadays, the construction of aerials has become of immense importance. And as usual, PHILCO's engineers pioneered and produced PHILCO's All-Wave Aerial, which reduces man-made static, picks up far distant signals so much easier. For no instrument can be better than its aerial, and you'll find PHILCO's All-Wave Aerial allows one's radio to accomplish all that it's supposed to do.

RTI Urges Grads to Join R. M. S.

THE Radio and Television Institute of Chicago recently sent out a mailing to all qualified graduates outlining the R. M. S.-Western Union plan and urging all graduates to investigate the requirements for membership in Radio Manufacturers Service. This is one more example of the widespread endorsement which R. M. S. is receiving from the radio industry.

\$5.50 PER CALL

IN COMMENTING about the R. M. S.-Western Union plan, one of the PHILCO distributors writes as follows:

"We have received and turned over to R. M. S. members seventy Western Union calls and have to date received reports on sixty-three completed jobs. The charges on these calls range from \$2.50 to \$13.50, averaging about \$5.50 per call.

"We have strictly adhered to the policy of granting calls to the qualified R. M. S. member nearest to the customer requesting service. We find the servicemen that are using the R. M. S. Standard Labor Chart have received the greatest profits for their work."

\$\$\$ CASH \$\$\$

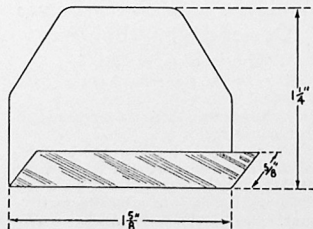
R. M. S. is helping
Servicemen every-
where to cash in.

Handy Shadow-Tuning Indicator Screen

THE shadow-tuning device on the new PHILCO models, such as the 116, 630, 640, 650, 660, etc., is not equipped with an image screen, the frosted glass portion of the dial glass serving this purpose.

W. H. Bamberger, of San Francisco, has made the following suggestion:

"For making adjustments in the service shop with the chassis out of the cabinet, the shadow is often helpful. A handy detachable screen can be made easily from a discarded dial of the larger size and can be slipped under the shadow-tuning meter while making the adjustments. The screen should be cut to the dimensions shown in the sketch and bent by applying heat. When making the bend, however, care should be observed not to get the celluloid directly in the flame or too near the flame, as it is highly inflammable. Only sufficient heat should be applied to permit bending, and this can be done by holding the celluloid a few inches above the flame.



SPEAKER CONES WEAR OUT IN TIME

A Profitable Replacement Item for the Serviceman

SINCE a radio set is a piece of electrical equipment, we are inclined to think of it and its components as something on which there is no wear, because, unlike the washing machine or vacuum cleaner, there is little mechanical movement. And yet there is no piece of equipment in the home which is subjected to more mechanical movement than a speaker cone. It is the vibration of the speaker cone which produces sound and, in the case of a 1200-cycle note, the cone is vibrating 1200 times per second. In spite of the contention that a radio set does not require replacements because of mechanical motion, it is reasonable that a speaker cone which has been in operation for two or three years is going to be worn to a certain extent, and replacement of the cone will show a decided improvement in tone quality.

Extra Money on Service Jobs

Many servicemen are making extra money on their service calls by selling the customer a new speaker cone on a set which has been in operation for several years. The improvement in tone is so great that the customer is more pleased with the job done by the serviceman.

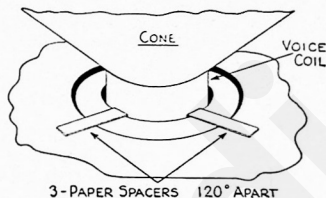
Cone diaphragms, spider mountings on dynamic or magnetic speakers are made either of fabric or specially treated paper. The weather in time will dry out or stiffen the cone and the diaphragm to a point where all resiliency is lost. The many millions of vibrations to which a spider is subjected may also weaken the fiber structure, and any such change in the original balance of the cone will cause a loss in tone quality as well as noticeable rattle in many cases. No cone can be as efficient after two years' operation as it was originally, and in many cases cones lose their efficiency before that time, depending upon varying atmospheric and dust conditions. The changing of the cone shape, because of the fact mentioned above, also causes the voice coil to be thrown out of line, so that in many cases it will rub against the pole piece and produce a noticeable rattle.

Balanced Speaker Design

PHILCO engineers developed a perfectly balanced speaker. The speaker is balanced with regard to field coil resistance, impedance of the voice coil and also the weight of the cone. When the speaker is in the home for any length of time, dust will accumulate on the cone, and this may increase the weight sufficiently to throw the entire speaker off balance.

In every radio factory, speakers are tested by means of beat frequency oscillators, such as that described in the July issue of the PHILCO SERVICEMAN. This is an audio oscillator which will produce an audible note from the lowest to the highest audio frequencies. Any

faults which may exist in the speaker construction are immediately shown when making the beat-frequency oscillator test. In other words, if the speaker has any tendency to rattle or if it is off center in the slightest amount, such a condition will immediately be shown on the beat-frequency oscillator test. We strongly recommend that servicemen build such an oscillator, so that they can have a reliable speaker test. Every job that you service in your shop can be tested, and in this way you will be absolutely sure that there is no distortion present so far as the speaker itself is concerned.



Showing method of using paper spacers for centering speaker cones

Correct Installation Procedure

When making a speaker cone replacement, we suggest that the following procedure be adhered to strictly. In this way you can be sure of the best possible job under all conditions.

First. Unsolder the voice coil leads from output transformer and remove old cone completely.

Second. Carefully examine the spacing in the air gap at the pole piece. This space must be the same at all points. A good way to make a check of the spacing is to use a machinist's twist drill of the proper size as a gauge. Any variations should be corrected or a new assembly should be used.

Third. Clean the pole piece thoroughly, using a small hand air pump to remove all particles which may have accumulated.

Fourth. Place the proper size centering spacers in the air gap in order to center the cone properly. Now insert the new speaker cone.

Note. PHILCO supplies paper spacers of the proper thickness for this purpose. These are obtainable from the PHILCO distributor's service department. The spacers for the "U" type speakers are 6 inches long, $\frac{1}{8}$ inch wide and 0.15 inch thick, Part No. 27-7441. The spacers for the "H" speaker are $4\frac{1}{2}$ inches long, $\frac{1}{4}$ inch wide and .008 inch thick, Part No. 27-7442. The "K," "B" and "P" spacers are 6 inches long, $\frac{1}{4}$ inch wide and .008 inch thick, Part No. 27-7443.

Fifth. Align the screw holes on the rim, making certain that each screw hole has sufficient clearance. If the cone is the type which must be cemented, be sure to coat both cone rim edge and speaker frame with a good speaker cement, such as du Pont's Household Cement, PHILCO Part No. 2827. Be very careful not to drop cement on cone and frame, as this very often causes a rattle.

Sixth. Tighten the spider screw, taking care not to move the cone from the original alignment.

Seventh. Carefully tighten all rim screws and fasten the cemented parts together on the speaker cone rim. Now remove the voice coil spacers and solder the leads to the output transformer.

Eighth. Test the speaker with the beat frequency oscillator to determine if the voice coil is properly centered, and also to determine that all rattles are removed at the various frequencies throughout the audible range of the speaker.

R. M. S. members can cash in on this installation profit if they follow the procedure outlined above. On your next service call, if the speaker has been in operation for a long period of time, explain to your customer how the new and improved PHILCO cones will improve the tone quality. Tell him how the speaker operates and explain why cones wear out just the same as any other piece of equipment. Most customers will welcome such suggestions, and the wide-awake sales-minded serviceman will soon find his efforts along this line are most profitable.

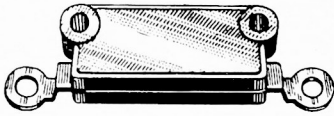
Among the various R. M. S. sales-promotion materials which are available to servicemen through the PHILCO distributor is a form letter which can be imprinted on R. M. S. stationery, with your own name and address, telling prospects of the many advantages of a renewal speaker cone. These form letters are known as PHILCO Form No. PR-233 and can be obtained, completely imprinted, from your PHILCO distributor at \$2.75 for 250, \$3.75 for 500 and \$6.25 for 1000.

\$\$ Increase Business \$\$

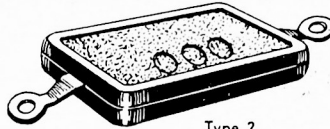
Make use of the many
RMS sales promotion
and advertising helps
available through your
Philco distributor.

PHILCO *Quality* CONDENSERS: The Accepted Standard

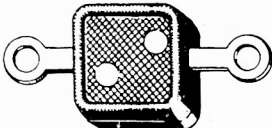
PHILCO MICA CONDENSERS



Type 1



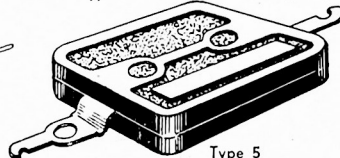
Type 2



Type 3



Type 4



Type 5



Type 6

Philco mica condensers are enclosed in brown moulded bakelite casings and are completely moisture proof. They are available in capacities ranging from 15 Mmf. to .01 Mfd. Each condenser is color coded for capacity and part number identification, or has its capacity stamped directly on the case.

An assortment of these little condensers will be found indispensable by the serviceman or experimenter. A recent reduction in the price of these condensers makes them a remarkable value in a Philco quality product.

Part No.	Capacity (Microfarad)	Type	LIST PRICE	Part No.	Capacity (Microfarad)	Type	LIST PRICE	Part No.	Capacity (Microfarad)	Type	LIST PRICE
30-1030	.000015	6	20c Each	30-1033	.00015	6	25c Each	5215	.001	3	30c Each
6897	.000025	3		30-1041**	.00015	6		30-1007	.001	2	
30-1008	.00003	3		30-1013	.0002	3		5877**	.00125	4	
30-1039**	.00003	6		30-1047**	.0002	6		7007**	.0014	4	
4990	.000035	2 or 3		30-1037**	.000235	6		7139**	.0015	4	
30-1044	.000035	6		3082	.00025	3		5877**	.00185	4	
30-1048	.000035	4		5858	.00025	4		6018	.0018	4	
30-1009	.00004	3		30-1032	.00025	6		6022	.0018	3	
30-1034	.000045	6		30-1038**	.00025	6		4059	.002	2	
3774	.00005	2 or 3		8311	.0003	3		6853***	.002	2	
4587	.00005	3		30-1004**	.000325	4		30-1057	.0022	4	
30-1029	.00005	6		30-1014	.0004	2		30-1055	.00225	2	
30-1045**	.000055	6		5120	.0004	3		7006**	.0025	4	
30-1040**	.00006	6		30-1000**	.00041	4		30-1042**	.002	2	
30-1010	.00007	3		30-1027**	.00041	3		30-1026**	.0025	2	
30-1011	.00008	3	3910	.0005	2	6009	.003	2			
30-1046**	.00009	6	6898	.0006	3	7301**	.003	2			
30-1012	.0001	3	30-1049	.0006	6	30-1028**	.003	4			
30-1035	.0001	6	4520	.0007	3	30-1016	.004	5			
30-1040**	.00011	3	5863	.0007	4	30-1052	.0047	2			
30-1005*	.00011	3	5878	.0008	4	30-1017	.005	5			
30-1006	.00011	4	6021	.0008	3	30-1058	.0052	2			
30-1031	.00011	6	30-1015	.0009	2						
30-1036**	.00013	6									
30-1050**	.00013	6									

NOTES: * Capacity held to within $\pm 3\%$. ** Capacity held to within $\pm 5\%$. *** Condenser tested to withstand 2000 volts. † Condenser tested to withstand 1000 volts.

TUBULAR PAPER CONDENSERS (PAPER HOUSING)



PHILCO tubular paper condensers are of the highest quality construction throughout. They are made complete in the Philco factories, subject to the most rigid inspections, and thoroughly life-tested, voltage-tested and capacity-tested.

Capacity and Voltage Rating Plainly Marked on Condenser

The voltage ratings listed are guaranteed continuous working voltages, and not the "flash" or momentary test voltages by which such condensers are frequently (and misleadingly) listed.

At the new prices, these condensers are an unbeatable value—quantity and low price combined.

200 Volts *Guaranteed* WORKING VOLTAGE

Part No.	Capacity	List Price	Part No.	Capacity	List Price
30-4340	.00011	\$0.25	30-4020	.05	\$0.20
30-4346	.00125	.25	30-4122	.1	.20
30-4215	.02	.20	30-4191	.15	.25
30-4025	.03	.20	30-4146	.25	.25

400 Volts *Guaranteed* WORKING VOLTAGE

Part No.	Capacity	List Price	Part No.	Capacity	List Price
30-4125	.006	\$0.20	30-4114	.06	\$0.25
30-4112	.008	.20	30-4115	.08	.25
30-4169	.01	.20	30-4170	.1	.25
30-4113	.02	.20	30-4134	.25	.35
30-4119	.04	.20	30-4117	.5	.60
30-4123	.05	.20			

600 Volts *Guaranteed* WORKING VOLTAGE

Part No.	Capacity	List Price	Part No.	Capacity	List Price
30-4201	.001	\$0.20	30-4145	.01	\$0.20
30-4042	.003	.20	30-4012	.05	.25

1000 Volts *Guaranteed* WORKING VOLTAGE

Part No.	Capacity	List Price	Part No.	Capacity	List Price
30-4177	.002	\$0.25	30-4024	.006	\$0.25
30-4185	.004	.25	30-4051	.01	.25

PHILCO RADIO & TELEVISION CORP. OF CALIFORNIA

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San Francisco, Cal.