

# PHILCO SERVICEMAN

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RADIO · MANUFACTURERS · SERVICE · NEWS



APRIL, 1936

## EDITORIAL

### Make Every Customer a Permanent Customer and Friend

RADIO SERVICEMEN, like other aggressive business men, are always anxious to get new customers, because each new job increases the total amount of business done. But it is a mistake to treat a new service-call job as a single "job," to be done as well as possible, after which the customer and job are completely forgotten unless a complaint arises.

We have repeatedly emphasized the importance of courtesy to the customer and leaving a good impression, both by your own manner and the quality of work done. But here is something still more important: Every radio owner needs—more or less—service from time to time. Why not get all of his service work by keeping in touch with him and reminding him regularly of your readiness to serve and your ability to do any job he may give you?

Drop him a postcard or letter every month or so or give him a call on the phone. Suggest he let you install a new set of tubes this spring or a new aerial if his was damaged by the winter storms. Sometimes just a few such inexpensive suggestions will bring in many dollars' profit to you.

### Electrolytic Condenser Substituted

IN the PHILCO Model 116X of the early production, an 8-mfd. electrolytic condenser, Part No. 30-2011, was employed. This is an excellent wet-type electrolytic condenser. However, there was some difficulty experienced from leakage as a result of too tight clamping during the mounting. For this reason the factory decided to substitute Part No. 30-2069, a dry-type electrolytic condenser of the same working voltage and capacity. This has proved entirely satisfactory and is now being used as replacement in all cases of this kind.

## R. M. S. Business-Getting Helps in Big Demand by Members

THE fact that ambitious servicemen realize the value of advertising their business is indicated by the continual flow of orders received at R. M. S. headquarters for the various handbills, stationery, envelope inserts, etc., which have been provided for their benefit. Especially popular have been the handbills entitled "Radio Repairs" and "Radio Service."

Since the announcement of the attractive R. M. S. book matches a short time ago, orders have been coming in so fast that the initial supply was quickly exhausted. The new, colorful R. M. S. tube sticker is running the book matches a close race for popularity.

these cards to stimulate many old customers into having their sets overhauled and ready for these big events, as well as the big-league ball games, regattas and other summer sporting events.

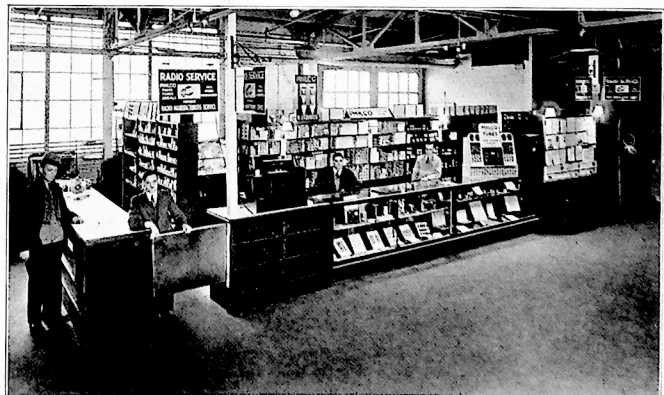
R. M. S. headquarters will continue to provide members (at actual cost of printing) with new and powerful business stimulants—all that is required of the member is to use them!

### R. M. S. Members Receive Questionnaire

IN ORDER to obtain first-hand information and suggestions from every member of R. M. S. direct as to what he prefers in the way of service information and service-selling helps, R. M. S. headquarters included in the recent spring mailing to members a questionnaire to be filled out and returned. It is important that all members return this questionnaire promptly so that the answers can be tabulated and all suggestions given careful consideration. Through this means it is hoped that R. M. S. will be able this season to concentrate even more than in the past for the benefit of the serviceman, both in his work and his finances.

If you are a member and have not yet returned your questionnaire, please do so at your earliest convenience.

Herewith is shown a reproduction of the interesting new R. M. S. mailing card mentioned in last month's SERVICEMAN. The reference in this card to the National Conventions (to be held in June) is a timely one, and the serviceman should be able by using



Parts Department, PHILCO Radio and Television Corporation of New York, PHILCO Distributors in Syracuse, N. Y.

## Battery Set Remedies Summarized

THESE are many service problems in connection with battery-operated receivers that may not be encountered on the ordinary A.C.-operated set. The PHILCO battery receivers have, in general, given excellent performance this year. There are a few problems, however, which have been encountered by servicemen, and we are listing these below for general information.

A few cases have been reported of complete burn-outs of a set of tubes. Investigation has shown that in some cases a short has developed between the screen and the filament of the 1A4 or 34 tube. This throws the full screen voltage of 67½ volts across the tube filaments and will burn them out immediately.

The B/C battery block has been reported in a few cases as having extremely short life. Investigation has shown that the C section was internally defective. This produced low C bias, which in turn increased the B drain and thus produced short life in the battery. There have also been reported a few cases of leakage in the switch between the B section and ground. Replacement of the switch corrects this trouble.

Noisy volume controls in the Model 38 should be replaced with Part No. 33-5154. When making this substitution for the earlier control, Part No. 33-5094, it is necessary to connect the 13,000-ohm resistor, indicated as No. 39 in the wiring diagram of Serv-

ice Bulletin No. 166A, to the top of the volume control instead of to the bottom of the antenna-coil primary. No other wiring changes are necessary in order to use the new control.

On some of the earlier models of the 623, employing a type 34 tube in the I.F. circuit, a change can be made to improve sensitivity by replacing the 32-1793 I.F. transformer with a later type, Part No. 32-1671. The 34 tube should also be replaced with a 1A4 tube when the I.F. transformer change is made.

The Model 38, which is designed for operation with the PHILCO dry A battery, employs a type 1A1 ballast lamp. If the type 6 ballast lamp is used by mistake, weak reception will result within a short period of time. Replacement of the B/C battery corrects this trouble immediately. The natural assumption is that the B/C battery is defective. Actually what happens is that the initial voltage peak on the new B/C battery is sufficient to offset the effects of the lower filament voltage on the tubes, and thus afford normal operation for a short period of time. After a week or so, this initial peak is exhausted, and the battery settles down to its normal voltage. The use of the correct ballast lamp will give proper operation in all cases and will eliminate any faults in performance such as that just described.

## Philco Adopts New Resistor Numbering System

MANY servicemen and dealers have noted in the recent Service Bulletins sent to all R. M. S. members an eight-digit number for the various resistors. This numbering system is a new method devised for convenience in the PHILCO factory and, when understood by servicemen, will prove to be most helpful in identifying resistors.

Part numbers for fixed resistors consist of a prefix of two figures and a body of six figures. The prefix in all cases is "33." The first three figures of the body refer to the value of the resistor in ohms and correspond to the R. M. A. Color Code.

The first figure indicates the dot of the color code or the number of zeros after the first two figures of the resistance value.

The second figure indicates the body of the color code or the first figure of the resistance value.

The third figure indicates the tip of the color code or the second figure of the resistance value.

The fourth figure represents the wattage of the resistor as follows:

1 equals ¼ watt	4 equals 1 watt
2 equals 1/3 watt	5 equals 2 watts
3 equals ½ watt	6 equals 3 watts

The fifth figure denotes the manufacturing code of tolerance.

(Continued on Page 4)

## Many Advantages Discovered in Philco Part Numbering System

FOR the benefit of many dealers and servicemen who are not familiar with the PHILCO part-numbering system, we are giving the details which explain the six-digit part numbers employed.

Two-digit prefix numbers are assigned to various classes of parts, sub-assemblies and assemblies which are encountered in radio manufacturing. Each part number under this system consists of the two-digit prefix plus a four-digit part number. In writing the numbers a hyphen is placed between the two-digit prefix and the four-digit suffix. This part numbering system was started approximately January 1, 1933, and all new PHILCO part numbers have been assigned in accordance with the new system. Wherever part numbers have previously been assigned, however, the older numbers are still employed.

The following are the various classifications under the later system:

27—Fiber, Bakelite and Moulded Parts.  
1000-1999—Sheets and strips.  
2000-2999—Tubes and coil forms.

3000-3999—Housings.  
4000-4999—Knobs and bezels.  
5000-5999—Celluloid parts.  
6000-6999—Sockets.  
7000-7999—Finished fiber parts.

### 28—Metal Parts.

1000-5999—Stampings.  
6000-6999—Screw machine parts.  
7000-7999—Castings.

### 30—Fixed Condensers.

1000-1999—Mica condensers.  
2000-2999—Electrolytic condensers.  
3000-9999—Paper condensers.

### 31—Variable Condensers.

1000-5999—Tuning condensers.  
6000-9999—Padding condensers.

### 32—Transformers.

1000-6999—R.F. and I.F. transformers.  
7000-8999—Power and audio transformers.  
9000-9999—Field coils (speaker and transformer).

### 33—Resistances.

1000-2999—Carbon (fixed).  
3000-4999—Wire wound (fixed).  
5000 —Variable (carbon and wire wound).

### 34—Tubes and Lamps.

1000-1999—Tubes, cell packed.  
2000-2999—Same tubes, individually packed.  
3000 —Tube kits.  
9000-9999—Lamps.

### 35—Phonograph Parts.

1000-1999—Motors, phonograph.  
2000-2999—Tone arms and pick-ups.  
3000 —Turntables, needle cups and miscellaneous phonograph parts.

### 36—Speakers and Speaker Sub-Assemblies.

1000-2999—Complete speakers.  
3000 —Speaker sub-assemblies.

### 37—Chassis and Chassis Sub-Assemblies.

1000-4999—Chassis complete with tubes and tube shield.  
5000-9999—Chassis wiring assembly.

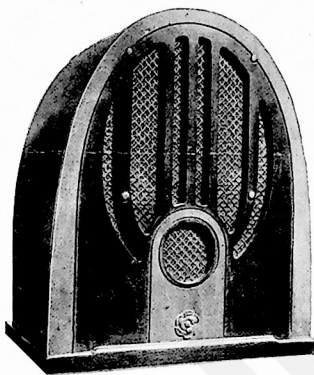
(Continued on Page 3)

## Philco Extension Speaker Another Profitable Item for Dealers and Servicemen

*A Real Sales-Service Moneymaker for the Spring and Summer Months*

THE demand on the part of thousands of PHILCO dealers and servicemen for a standard PHILCO extension speaker has been met by PHILCO in making available the new permanent-magnet dynamic speaker housed in an attractive baby-grand type cabinet. This speaker is the standard K size and is the same speaker as that employed in the PHILCO Model 38 battery receiver. The output transformer of the extension speaker has an impedance of 20,000 ohms, which is suitable for use in connection with the average radio receiver.

There are thousands of homes in which an extension speaker can be sold if you will tell the radio set owners about it—the invalid's sickroom, the den, the basement game room, the sun porch, the garden are but a few of the many possibilities.



Philco Extension Speaker  
Part No. 45-1224

In order to standardize and to keep the basic price down as much as possible, there is no cable, switch or volume control supplied, since these items will vary with practically every installation. In case a switch or volume control is desired, however, the small plaque on the front of the cabinet can be removed and the desired control easily installed.

The usual method of connection of the extension speaker to the radio set is across the plates of the output tubes in the case of push-pull circuits, or from plate to cathode in the case of single output tubes, a 5-mfd. condenser, such as PHILCO 30-4174, being inserted in series in one lead.

The PHILCO extension speaker is an attractive item which will be readily accepted by any customer desiring equipment of this kind. The part number is 45-1224, and the list price is \$15, subject to your regular parts discount.

## Servicemen — Let's Be Honest With Ourselves

DO YOU know that running an aerial from the end of a roof on a house out to a pole or tree in the yard gives better results than running the aerial between poles or peaks from one end of the roof to the other?—*Effective height above ground.*

Do you know that radiated noise interference varies inversely as the square of the distance from the source?—*Scientific theory of wave propagation.*

Do you never make a ground connection to the chassis on a PHILCO All-Wave Aerial installation, because the instructions say that in some cases less noise and hum may be obtained with a ground?—*A good chassis ground connection never harmed any radio performance.*

Do you allow the salesman to tell a prospect that the modern radio set is so good it doesn't require any aerial to get good reception?—*He is giving the customer \$25 radio performance on a \$100 set if he gets away with it.*

Do you ever have occasion to install a new aerial parallel with a previously installed aerial?—*They hate each other; get them separated as far as possible and insist upon an absolute minimum of six feet.*

Do you ever try to take the easy way out by placing part of the horizontal section of the PHILCO All-Wave Aerial at an angle to some other part instead of all in a straight line?—*No aerial will operate correctly in that manner, and remember, in the case of the PHILCO All-Wave Aerial, you can cut, if necessary, from the forty-three-foot section, but never from the seventeen-foot section, because if you do you ruin short-wave reception.*

Do you know that, in general, short waves are more subject to interference from man-made static than standard broadcast waves?—*Interference is general and broad, but the larger percentage is radiated at the higher frequencies.*

Do you know in those cases where you sell an all-wave receiver without a PHILCO All-Wave Aerial that greater signal strength losses are experienced in the ordinary lead-in circuit with short waves than with standard broadcast waves?—*Remember that an aerial is a capacity device and operates on the same principle as a condenser, ground being one side. The higher the frequency, the greater the energy transfer (loss to ground). Use stand-off insulators.*

## Many Advantages Discovered in Philco Part Numbering System

*(Continued from Page 2)*

- 38—Sub-Base and Sub-Base Assemblies.
  - 1000-4999—Sub-base assemblies.
  - 5000-9999—Miscellaneous chassis sub-assemblies.
- 39—Printed Matter.
  - 1000-2999—Battery.
  - 3000 —Radio.
- 40—Accessory Kit — Knock-Down Chassis.
  - 1000-4999—Knock-down chassis.
  - 5000 —Accessory kits.
- 41—Dynamotor and Chargers.
  - 1000-1999—Complete dynamotors (packed).
  - 2000-2999—Complete dynamotors (unpacked)
  - 3000-3999—Dynamotor sub-assemblies.
  - 4000-4999—Motors.
  - 5000-5999—Charger (packed)
  - 6000-6999—Charger (unpacked)
  - 7000-7999—Charger sub-assemblies.
- 42—Controls and Switches.
  - 1000-4999—Switches.
  - 5000-9999—Control units.
- 43—Major Radio Sub-Assemblies.
  - 1000
- 44—Silks and Cloths.
  - 1000 —Grille silks.
- 45—Service Items.

The Price of the Model 055 Beat Frequency Oscillator Kit is \$25.00, List Subject to Special Parts Discount

## Philco Adopts New Resistor Numbering System

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The sixth figure denotes the manufacturing code of resistor type.

The R. M. A. Color Code is as follows:

Brown	— 1	Blue	— 6
Red	— 2	Violet	— 7
Orange	— 3	Gray	— 8
Yellow	— 4	White	— 9
Green	— 5	Black	— 0

Examples: A 1500-ohm, ½-watt, insulated resistor is numbered: 33-215343. A 490,000-ohm, 1-watt, lead-end resistor is numbered: 33-449431.

In connection with PHILCO resistor color coding, servicemen have often asked the question of why PHILCO uses odd values in resistance instead of the more common values employed by other manufacturers. For example, it will be noted that the standard 50,000-ohm resistor employed in PHILCO chassis is color coded 51,000 ohms. A resistor of 100,000 ohms is color coded 99,000, etc.

The reason why PHILCO has these odd values is because of greater convenience in manufacturing under the Cooper-Hewitt lamps, which are used for illumination throughout the assembly plant. Under this type of light it is extremely difficult to tell the color coding of a 50,000-ohm resistor, but a 51,000-ohm resistor shows up very clearly. The same applies with respect to other values which seem rather odd to servicemen. Circuits are designed to take these special values.

## Questions and Answers

1. Q. What is the cause of hum in the Model 645?

A. An occasional set may be found with the wires reversed to the input transformer primary, indicated as No. 52 in the wiring diagram of Service Bulletin No. 234. Reversing the primary leads in cases of this kind will eliminate the excessive hum.

2. Q. What is the cause of oscillation or motor-boating in some models of the 600 line, particularly the Model 630?

A. This condition is caused by loose eyelets in any part of the shielding of the circuit. The eyelets on the small spade clamps, which are used to fasten the coil shield cans to the sub-base, should be examined first, making certain that the eyelets are tight and that the spades are spread sufficiently to make good contact with the chassis.

3. Q. What is the cause of noise

## More Practical Repair Hints Listed

HERE is another list of practical repair hints on sets that have been serviced in the factory service department. The cause or correction of the condition listed will in all cases be

the same as that listed below, but these are unusual cases, and it will be well to remember the solution found for these particular complaints.

Condition	Model	Cause or Correction
Audio distortion.	16-B	Leaky electrolytic condenser No. 75.
Noisy.	16-X	Defective shadowmeter bracket.
No reception below 15 megacycles	16, Code 122	High-resistance contacts in tuning gang. Replace gang.
No reception on S. W. band.	16, Code 123	High-resistance contacts in wave-band switch. Replace wave-band switch.
Intermittent reception.	16, Code 123	Intermittent connection between coil lead and hook-up wire in third I.F. transformer.
Intermittent reception.	28, 29, 44, 45	Intermittent connection in second I.F. transformer.
Intermittent oscillation.	29-CSX	Intermittently open by-pass condenser No. 6.
Intermittent reception.	39	Intermittent connection in oscillator transformer.
Intermittent reception.	71-B	Intermittent condenser No. 3.
Noisy.	80-B	High-resistance short on primary wire of first I.F.
Cuts off at 750 K.C.	91-B	Lowered value of cathode resistor value to 8000 ohms, Part No. 5838.
Intermittent reception.	95	Intermittent audio coupling condenser No. 32.
Intermittent oscillation.	116	Loose I.F. transformer shield. Spread mounting feet so that good contact is made.
Hum.	116-X	High-resistance ground on pilot-lamp wires.
Noisy.	116-X	Noisy 6A3 tubes.
Intermittent.	118	Defective wave switch.

in the Models 680 and 116X during the first three or four minutes of operation?

A. This noise is traceable to the 6A3 tubes. On a few of these tubes it has been found that the cathode, during the initial heating period, rubs against the supporting spring at the top of the tube, producing a small voltage, which is reproduced in the speaker as noise. Replacement of the 6A3 tubes will correct this condition. In the Model 680 two resistor changes were made to further eliminate the possibility of noise in the audio circuit. The old resistor, Part No. 33-3187 (100 ohms), was changed to a new type 100-ohm resistor, Part No. 33-1219. The old resistor, Part No. 33-3121 (300 ohms) was changed to a new type 300-ohm resistor, Part No. 33-1214. These two resistors are indicated in the schematic wiring diagram of Service Bulletin No. 228 as Nos. 148 and 151.

4. Q. What is the cause of hum in the Model 624?

A. In most cases this hum is caused by the use of an extension cable in the A lead or by using a lighter wire than that furnished in the standard A lead cable of this model. The excessive hum can also be caused by a low A battery. A poor ground to the B power unit will also cause excessive hum. Wooden shipping blocks are used under the B unit housing during transportation from the factory. After removing the blocks, if the mounting screws are not tightened down sufficiently to make good contact with the chassis, a poor ground connection will result and excessive hum will be heard.

5. Q. Should a leaking wet electrolytic condenser be replaced?

A. Yes. A leaking condenser may not test shorted, but for proper filter action it should be replaced. This is due to the fact that the leakage of the electrolyte reduces the capacity of the condenser and thus lowers the filtering action in the circuit.

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