

# PHILCO SERVICEMAN

Copyright 1936 By Philco Radio & Television Corporation

RADIO • MANUFACTURERS • SERVICE • NEWS

OCTOBER, 1936



## EDITORIAL

### A Fair Deal for All Concerned

UNTIL a few years ago, the Radio Servicing business faced much the same conditions as existed in the automobile service business in the early days of popularity of automobiling. Lack of organization and lack of stabilized standard prices for various servicing operations encouraged all sorts of price tampering. Unscrupulous servicemen greatly overcharged customers; others going to the other extreme offered work at cut prices and used inferior parts. Result: the public became distrustful of radio servicemen in general and were loath to have repair work done unless absolutely necessary. The better class of servicemen became disgusted with the business, and radio dealers would not maintain service departments on the ground that they did not pay.

#### Constructive Action Necessary

PHILCO, having sold several million receivers by June, 1933, concluded that definite constructive steps must be taken to overcome the unstable conditions surrounding radio service, so that (1) radio owners could have a definite, dependable source of radio service, at standard, reasonable prices; (2) that servicemen would have a definite, printed schedule of standard charges for the majority of common servicing jobs; the rate of charge being determined as a result of the experience of many men over a period of time and being ample to provide a reasonable profit for the serviceman.

The result of this was the establishment of Radio Manufacturers Service—an organization to help the serviceman and protect his interests as well as to make adequate service conveniently available to all radio owners.

#### A Financial Aid to the Serviceman

The STANDARD SERVICE CHARGE schedule, a printed folder supplied to every member of R. M. S. at the time of his acceptance, is one of the fundamental features of this plan. It is intended for use by the serviceman IN THE PRESENCE OF HIS CUSTOMER, and its use in this way immediately dispels any doubt in the mind of the customer as to the fairness or legitimacy of his charges. In addition to containing a complete schedule of charges for both home and auto radio jobs, it is designed to sell the customer who reads it the value of the standard R. M. S. "tune up" as a preventive of major troubles.

(Continued on Page 7)

## Foreign Station Demonstrator Aerial Sells Thousands of New Sets

### Amazing Performance Reports Received from All Sections

THOUSANDS of PHILCO dealers and servicemen are acclaiming the PHILCO Foreign Station Demonstrator as one of the greatest aids in radio set sales that they have ever experienced. This demonstration aerial, which was introduced by PHILCO at the beginning of the summer, has proven itself from every standpoint.

#### Amazing Performance

During the past few months, emphasis has been placed on the ease of installation and the portability of the demonstration aerial for the benefit of the salesmen. Little has been said about performance. Reports are coming in from all sections of the country—from Chicago, San Francisco, New Orleans, New York, everywhere—that the PHILCO Foreign Station Demonstrator is bringing in foreign reception with amazing volume and clarity. Wherever dealers have used the demonstrator in conjunction with radio sales in the home, they find that the performance is up to all expectations and that the customer is invariably highly pleased with the results obtained on the new PHILCO.

#### A Research Product

The PHILCO Foreign Station Demonstrator was designed and perfected by

the PHILCO Research Department to enable dealers and dealers' salesmen to give a convincing demonstration of the new PHILCO radio sets in the home. It has always been a problem in the past to get quality reception on installations of this kind, because of the aerial requirements. Good reception was possible on local broadcast stations, but foreign reception was almost out of the question. The result was, in the past, that the customer was not particularly impressed with the foreign tuning feature of the new set because he was unable to obtain foreign reception to any extent. Now, it is possible to get all of the local broadcasting stations that were heard previously on the "radiator" aerial, and it is also possible to get reception from foreign short wave broadcasting stations as well.

#### Five Minutes' Installation

Simply attach the PHILCO Foreign Station Demonstrator to the window near the radio set in five minutes' time, and then you are ready to put on one of the best demonstrations to a prospect you have ever experienced. Home selling is becoming more and more essential, because it is only in the home that the customer can fully appreciate the marvelous tone and the tremendous advancements in tuning ease that have been made in the new sets. Thousands of PHILCO owners who purchased PHILCO sets only last year will be in the market for one of the new PHILCOS if they are given a good demonstration in the home. We urge every PHILCO dealer to start at once cashing in on the tremendous sales possibilities for the new PHILCO sets and to demonstrate in the home with this new, convenient method, using the PHILCO Foreign Station Demonstrator for ease and performance.

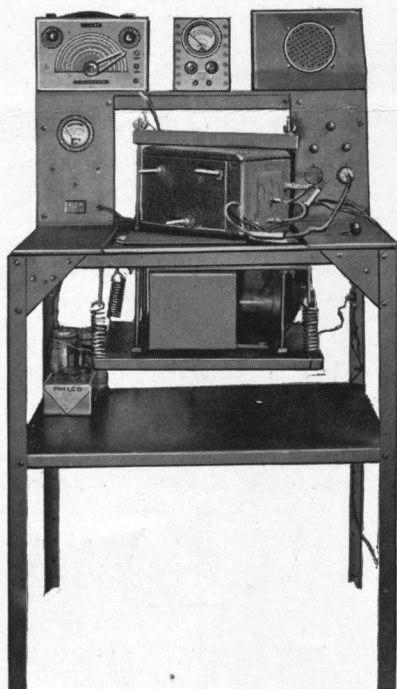


Temporary Aerial for Home Demonstration

# Special Test Bench Locates Intermittents Quickly

## Vibrating Table Loosens Poor Contacts

THE serviceman who repairs a radio set only to have the customer come back the next day with the story that the set is just the same as before is branded, usually through no fault of his. Intermittents are often difficult to



Showing Auto Radio Under Test

locate by ordinary test methods, and in many cases the serviceman may not even be aware of the presence of such intermittents, but the customer always blames the serviceman. Usually, the set is again returned to the shop, and the serviceman finds that it plays perfectly. The above problem is particularly true of automobile receivers.

All such complaints can be satisfied if enough time is taken, but since time is one of the most important factors in radio servicing, it is imperative that some device be used to duplicate the actual operating conditions under which the receiver is to be used.

Such a device was developed by PHILCO, and is being used in production testing and in the Service Department. The use of this device discloses defects that would otherwise go unnoticed.

A detailed drawing of the test table is shown on this page. A square sec-

tion is cut out of the middle of the table to accommodate two heavy pieces of board bolted together with carriage bolts. Enough space is provided between these boards for the mounting of a  $\frac{1}{4}$  H. P. motor. The whole assembly is then suspended from the table by heavy springs. The upright bolts with wing nuts are used to clamp a chassis to the shaker assembly.

A balanced flywheel is mounted on the motor shaft and an elongated piece of metal fastened on the side of the flywheel. By making this piece of metal adjustable, any degree of vibration may be obtained. The most satisfactory adjustment is such that the shaker assembly moves approximately  $\frac{1}{8}$  inch each side of a given line or center.

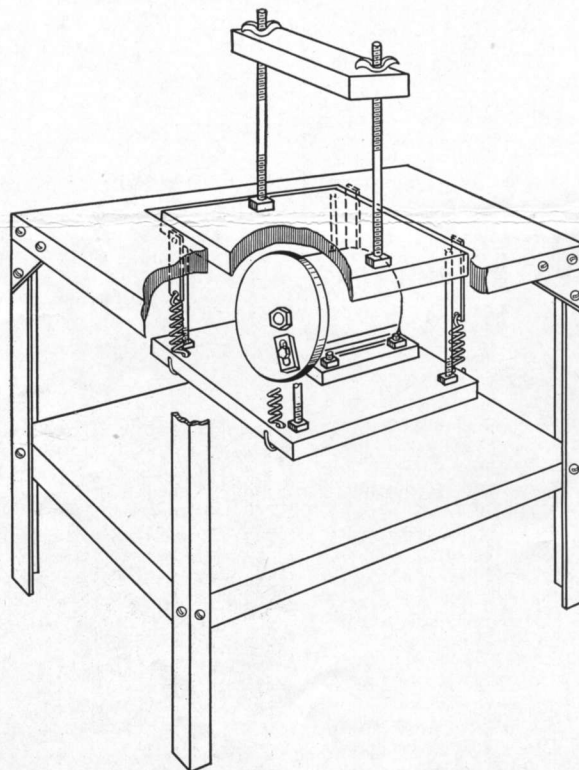
The photograph shows the complete assembly. The 088 signal generator and the 025 tester mounted at the top are for general testing. The 088 may be used for a constant signal supply and the 025 to check the output of the receiver. This type of test indicates visually the consistency of the receiver in maintaining a constant volume. The

speaker on the right may be used on any auto radio receiver, since it is equipped with the necessary cable and plug adapters. For home sets, the speaker with the receiver should be employed.

The meter on the left indicates the amount of current being consumed when testing automobile receivers. Toggle switches are mounted under the meter to control the shaker motor, the "A" supply for automobile receivers, and the 110-volt outlet for home receivers. The switches on the right control the speaker voice coil, the output meter, and the field supply.

This tester may be constructed from odds and ends found around the shop. If a more elaborate job is desired, the necessary parts may be obtained from a local machine shop.

The construction and use of this type of tester will eliminate the necessity of installing automobile receivers in cars for test, and will assure the serviceman that no loose or shorted connections remain in either the home type or automobile receivers.



Constructional Details of Shaker Table



# ATWATER KENT VOLUME CONTROLS

## PHILCO REPLACEMENTS FOR ALL MODELS

(A. C. Home Radios)

*Arranged According to Date of Manufacture*

Year	A. K. Model	A. K. Part No.	Philco Replacement Part No.	List Price	Year	A. K. Model	A. K. Part No.	Philco Replacement Part No.	List Price
1929	55	14250	33-5050	\$1.00	1934	427	24079	33-5029	\$1.45
	60	14250	33-5050	1.00		667	24079	33-5029	1.45
1931	84	19040	33-5029	1.45	310	25798	33-5029	1.45	
	80	20840	33-5050	1.00	510	25798	33-5029	1.45	
	85	19040	33-5029	1.45	445	24079	33-5029	1.45	
	83	22330	33-5050	1.00	665	24079	33-5029	1.45	
	89	23228	33-5029	1.45	711	25798	33-5029	1.45	
1932	90	20840	33-5050	1.00	788	25798	33-5029	1.45	
	92	23228	33-5029	1.45	808A	24079	33-5029	1.45	
	94	22650	33-5050	1.00	145	27425	33-5029	1.45	
	96	23228	33-5029	1.45	206	27425	33-5029	1.45	
	99	23228	33-5029	1.45	325	27425	33-5029	1.45	
	567	20840	33-5050	1.00	1934	376	27425	33-5029	1.45
	627	23228	33-5029	1.45		559	27321	33-5029	1.45
	188	23228	33-5029	1.45		944	27567	33-5032	1.45
	228	23228	33-5029	1.45		318	27321	33-5029	1.45
	260	23228	33-5029	1.45		447	27321	33-5029	1.45
	469	23228	33-5029	1.45	854	27567	33-5032	1.45	
	558	23228	33-5029	1.45	112	27674	33-5039	1.45	
	480	23228	33-5029	1.45	511	27732	33-5029	1.45	
	612	23228	33-5029	1.45	1935	545	29482	33-5029	1.45
	812	23228	33-5029	1.45		286	28961	33-5029	1.45
246	24079	33-5029	1.45	356		28961	33-5029	1.45	
1933	155	24293	33-5029	1.45		475	28961	33-5029	1.45
	555	24293	33-5029	1.45		735	28961	33-5029	1.45
	266	24079	33-5029	1.45		184	27507	33-5032	1.45
	448	23228	33-5029	1.45		225	29482	33-5029	1.45
	165	24293	33-5029	1.45		317	28961	33-5029	1.45
708	24079	33-5029	1.45	328		29618	33-5029	1.45	
808	24079	33-5029	1.45	337		28961	33-5029	1.45	
1934	275	25798	33-5029	1.45		435	29842	33-5029	1.45
	425	24079	33-5029	1.45		649	27321	33-5029	1.45
	525	26564	33-5029	1.45		810	31608	33-5029	1.45
	185	24293	33-5029	1.45		856	28961	33-5029	1.45
	217	24079	33-5029	1.45		976	28961	33-5029	1.45

**These controls obtainable from your PHILCO distributor**

### Car Radio Installations Simplified Using 055 Speaker Tester

PRACTICALLY everyone who has had any experience with car radio installations knows how hard it is to locate and eliminate the metallic rattles which are often set up from various loose or vibrating parts in or near the dash after a radio set has been installed. In some cases, the speedometer cable, the glass or a heater grille will set up a sympathetic vibration that is most annoying when certain musical notes are heard in the radio. The PHILCO 055 Audio Oscillator makes it possible to locate these rattles easily and quickly.

After the radio installation has been completed, the set and the 055 are both placed in operation, the set being tuned to pick up the signal from the

055. Simply turn the control of the 055 from low to high, and in this way all of the audio frequencies between approximately 50 and 8,000 cycles will be produced. By going over

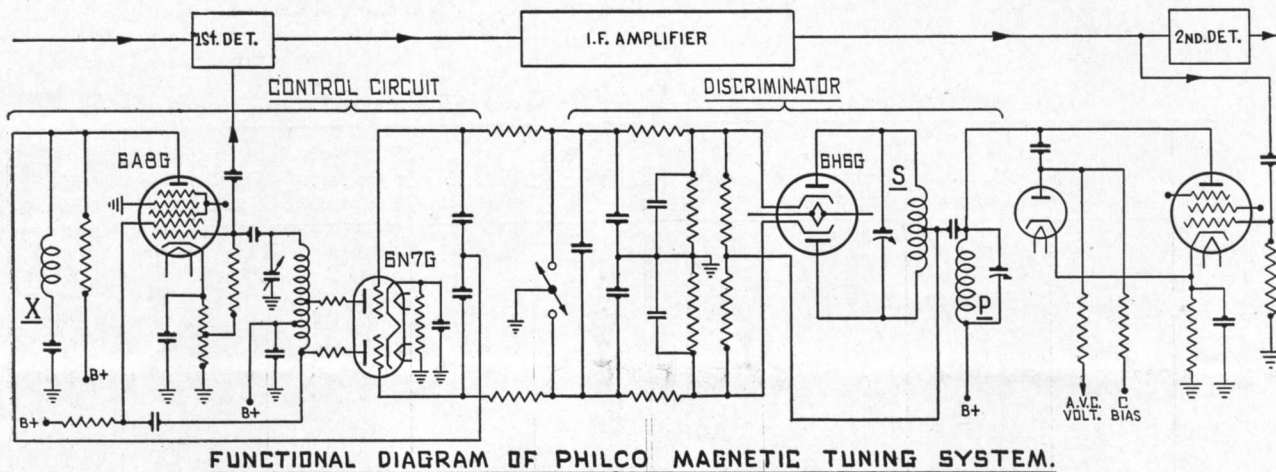
the range two or three times in this manner, there will be some frequency found to which the rattle will respond. Leave the audio oscillator in operation at that frequency, and then go immediately to the offending part on the car.

Many hours' time will be saved by employing this method, and all of your customers will be much more pleased with their auto radio installation when the car is entirely free from these vibrations. You will have the added satisfaction of knowing the job is right. We recommend that the 055 Audio Oscillator be used as a standard test on every auto radio installation immediately at the completion. When the set is first played on broadcast, there may not be the particular musical vibration present to create the annoying rattle that would show up at a later time. When you employ the audio oscillator tester, you can be confident that the installation job will be turned out in a satisfactory manner.



Model 055

# THE PHILCO MAGNETIC TUNING SYSTEM



FUNCTIONAL DIAGRAM OF PHILCO MAGNETIC TUNING SYSTEM.

**M**MAGNETIC TUNING, one of the most outstanding features of the larger models of the new PHILCO line, is PHILCO'S latest contribution to the art. By means of it the usual "juggling" with the dial and the distortion due to inaccurate tuning are eliminated. Magnetic Tuning tunes the set more accurately than the most skilled operator. As soon as the set is tuned approximately to any reasonably strong signal, the Magnetic Tuning System comes into play and pulls the local oscillator in step and holds it there, preventing the oscillator frequency from changing or drifting for any reason.

The operation of the Magnetic Tuning system depends upon proper alignment of the complete set, but particularly upon the alignment of the I.F. amplifier and discriminator unit. The proper alignment of the receiver is thus even more important in sets employing Magnetic Tuning than in previous models.

The Magnetic Tuning system is composed of two principal units; (1) the discriminator, which determines if the set is mistuned and which provides control voltages whose magnitude and polarity indicate the direction and extent of the mistuning, and (2) the control circuit, which, in response to the control voltages, changes or shifts the oscillator frequency accordingly.

In a conventional superheterodyne the desired signal is combined in the first detector with a locally generated signal to form a heterodyne signal of the intermediate frequency. The frequency to which the R.F. stages are tuned differs from the oscillator frequency by a constant amount regardless of the position of the tuning condenser. For example, if the intermediate frequency is 470 k.c. and the set is tuned to receive a station at 700 k.c., the oscillator frequency is 1170 k.c. In the first detector the desired 700 k.c. signal combines with the locally generated 1170 k.c. signal to form a heterodyne signal of 470 k.c. This signal with its sidebands is selected and amplified in the I.F. ampli-

fier. If the desired station frequency was 1200 k.c. and the set was tuned to that frequency, the oscillator frequency would be 1670 k.c. and the heterodyne signal still 470 k.c.

Now, if in the first example it was desired to receive the 700 k.c. signal, but the set was mistuned by 5 k.c. on the low side, the oscillator frequency would be only 1165 k.c. and thus the heterodyne signal 465 k.c. Since the I.F. amplifier is adjusted to transmit a signal of 470 k.c. with its sidebands, it will cut the lower sidebands of the 465 k.c. heterodyne signal and cause such serious distortion that the signal would be generally useless.

If, however, the set in the above example were equipped with Magnetic Tuning, the discriminator, which is energized by a signal from the output of the I.F. amplifier, compares the heterodyne signal of 465 k.c. with the proper tuned I.F. frequency (470 k.c.) and determines that the heterodyne signal frequency is 5 k.c. low. Control voltages are formed in its output which cause the control tube to increase the oscillator frequency to nearly 1170 k.c. in spite of the fact that the oscillator tuning circuit is tuned by the tuning condenser to 1165 k.c., and thus increase the heterodyne signal frequency to very nearly 470 k.c., improving the quality and eliminating the distortion.

In the functional diagram outlined above, the first detector, I.F. amplifier and second detector are shown in block diagram, while the discriminator and control circuits are shown in their essential details. These will, of course, vary to some extent as between different chassis and different wave bands. The one given above is a composite example.

### The Discriminator

As outlined above, the function of the discriminator unit is to form two balanced control voltages which by their amplitude and polarity indicate the amount and direction of the mistuning of the oscillator. The unit con-

sists of an amplifier energized by a signal from the output of the I.F. amplifier, a device resembling an I.F. transformer, two rectifiers and two filters. In addition an A.V.C. tube is usually energized by the output of the amplifier. The circuit functions in this way: The heterodyne signal is amplified and builds up a voltage across the primary P, which is tuned to the rated I.F. frequency. The secondary S is magnetically coupled to P and its center tap is connected through a condenser to the hot end of P. The anodes of the two rectifiers are connected to the two ends of S, while their cathodes are grounded through blocking condensers. Both rectifiers are included in one tube—a 6H6G. The secondary must likewise be adjusted to the rated I.F. frequency, and it is the frequency-determining unit of the discriminator. It is the purpose of the Magnetic Tuning system to correct the heterodyne frequency until it is the same as the frequency to which the secondary S is resonant.

The two rectifiers rectify the signals across the secondary and form across their associated resistors two differential voltages, which are used to bias the two grids of the control tube (6N7G). When the heterodyne signal has the same frequency as that to which the discriminator is tuned the unidirectional voltages produced by the rectifiers are the same and the differential control voltage is zero. If the heterodyne signal frequency is greater, the two balanced control voltages produced by the rectifiers differ, and one control voltage becomes positive, while the other becomes negative. But if the heterodyne signal frequency were lower, the first control signal would become negative, while the second would become positive. The amplitude of the signals is proportional to the mistuning.

### The Control Circuit

Having formed the control voltages in the discriminator, it is necessary to  
(Continued on Page 5)



## Headphone Kit Offers New Sales Possibilities to the Hard of Hearing

ONE of the biggest outlets for headphones and headphone kits will be found among the deaf. There are thousands of people who have never been able to hear radio and who could hear satisfactorily by using the PHILCO Headphone Kit. Letters are in file in the PHILCO factory offices in Philadelphia from deaf people who have found, for the first time, the great pleasure which is derived from modern radio.

The new Universal Headphone Kit, Part No. 45-2225, is particularly desirable for this application, since it takes advantage of the full output from the radio set with separate regulated volume for the phones. This means that the output for the hard-of-hearing person can be regulated to any desired level. A particular advantage of this type kit lies in the fact that the headphones can be used with separate volume regulation at the same time the speaker in the radio set is being played at standard volume for the benefit of other members of the family.

The standard PHILCO Headphone Kit, Part No. 45-1167, is recommended for sets employing a driver tube ahead of push-pull output tubes. The Octal Base Headphone Kit, Part No.

45-2227, is suggested for use in conjunction with the various new PHILCO models employing octal base tubes. All



three kits are priced the same at \$7.50 list, subject to regular parts discount.

We suggest that PHILCO dealers contact the local hard-of-hearing societies and arrange to put on a demonstration of the PHILCO Headphone Kit at one of the society meetings. After this demonstration has been made, every member of the society immediately becomes a prospect, not only for the Headphone Kit, but for a new PHILCO radio set as well.

## The Philco Magnetic Tuning System

(Continued from Page 4)

use them to control the oscillator frequency, and this is done by the control circuit, which includes an oscillator and control tube (6N7G). In the diagram the grid  $G_1$  of the oscillator is connected to the tuning circuit and the usual feedback obtained from the oscillator anode-grid  $G_2$ . This provides the feedback system which supplies energy to the tuning circuit. Two additional circuits are provided by the connection from the electron-coupled output of the output anode, through the two triodes (both in the same tube, 6N7G) back to the tuning circuit.

The signal thus returned has its phase changed by the control impedance  $X$  in the electron-coupled oscillator anode circuit. By change in phase is meant that the signal returned to the tuned circuit leads or lags the signal developed across the tuned circuit. One triode is connected so that the signal it supplies to the tuned circuit is ahead of the signal in that circuit in point of time, while the other triode is

connected backwards so that its signal lags behind the latter signal. The leading signal tries to make the oscillator go faster; that is, oscillate with a higher frequency, while the lagging signal tries to slow it down.

Now the amount of signal returned through each of these tubes is controlled by their respective grid biases which are provided by the two control voltages. Thus, when the set is mistuned the discriminator supplies control voltages which make the grid of one triode more positive, while the other becomes more negative. For zero control voltage, the effects of the two signals returned cancel each other. When the receiver is properly tuned the grid bias and thus the gain in each tube is the same, and since the one signal tries to increase the oscillator frequency just as much as the other tries to slow it down, the net change is zero.

However, if the set is mistuned, the bias goes up in one tube and down in the other. Thus one signal will predominate and change the oscillator frequency in such a direction as to correct that mistuning. Mathematically speaking, the effects of the two triodes may be explained in terms of positive

and negative inductances shunted across the tuning circuit. On this basis, the effects of the positive and negative inductances cancel each other for zero control voltage, but one or the other becomes greater when the receiver is mistuned and changes the oscillator frequency accordingly.

It is important to note that this balance obtains whenever the bias in each of the two control grids of the 6N7G is the same, regardless of the actual value of this common bias. Thus the Magnetic Tuning may be cut out by either grounding or shorting the two control voltage leads. When this is done, the oscillator frequency is the same as it would be in the absence of the Magnetic Tuning. In the operation of the Automatic Tuning dial, the control voltage leads are shorted momentarily just as the tuning condenser is brought to the proper position. The filter circuit in the discriminator delays the building up of control voltages momentarily, while the tuning condenser comes to rest and thus the Magnetic Tuning system locks the receiver on the desired station rather than on one which might be near it.

### The Control Impedance

The control impedance  $X$  serves the purpose of modifying the phase of the signals returned and controls their amplitude so that proper selectivity is obtained. This impedance may be a condenser or a tuned circuit. On the broadcast band in the more expensive sets a series circuit tuned to 2650 k.c. is used. This circuit is permanently adjusted at the factory and should not be changed in the field. On the highest-frequency bands the inherent capacity of the tube and its associated circuits is sufficient and no additional condenser is needed.

In some sets an electron-coupled oscillator is used to combine the functions of first detector and oscillator. In this case the control impedance is a resistance in the tuning circuit. Its function, however, is substantially the same.

There are, of course, limits over which this system will correct mistuning of the oscillator. These limits are reasonably wide, however, and if the several circuits are properly aligned, the Magnetic Tuning System will hold the oscillator on the proper frequency, even though the receiver is badly mistuned, and will completely prevent the oscillator frequency from "drifting" for any reason. A switch is provided for shorting out the Magnetic Tuning System, and this should be done when the R.F., oscillator, I.F., circuits and discriminator primary circuit are being aligned. It may also be necessary to turn off the Magnetic Tuning System when tuning a weak station adjacent to a powerful local station, as the Magnetic Tuning may tend to bring in the more powerful station.

## Questions and Answers

1. Q. What is the cause of dial slipping in some of the new PHILCO models?

A. One possible cause is weak spring tension in the coil spring of the split gears. Increasing the spring tension eliminates the slipping. Another cause is incorrect action between the ball bearings and the ball race. This condition may be caused by a sharp blow against the end of the drive shaft. Replacing the ball race corrects this trouble. Slipping or jerky action in the automatic-tuning models may be caused by binding at the flexible rubber coupling between the drive and the tuning-condenser shaft. This condition can be corrected by loosening the automatic tuning mechanism slightly from the chassis and readjusting until the binding action is eliminated. A common cause of slipping in the vernier drive is contact of the drive knob against the cabinet opening, caused by failure to loosen the shipping bolts. Inside the tuning drive assembly a small coil spring bears against the end of the vernier shaft. If this spring is weak, particularly on Model 116X De Luxe, vernier slipping will result.

2. Q. In the new models with automatic tuning, what is a convenient way, aside from placing more pressure on the slots, to prevent the small tabs bearing station call letters from slipping out?

A. A narrow strip,  $7/16" \times 10\frac{1}{2}"$ , can be cut from the same material as the call letters are cut originally and of the proper length that it can be inserted inside the circle formed by the ends of the call-letter tabs. This is easily accomplished simply by removing the cover plate over the station-setting screws.

3. Q. What is a convenient method of making soldered connections in some of the restricted locations in the new 1937 PHILCO models?



A. The illustration shows a section of an ordinary soldering iron from which the regular tip has been removed. In its place is substituted six or seven turns of No. 14 bare copper wire with one end brought out to form a long, fine tip for delicate soldering in comparatively inaccessible places.

## Philco Battery Equipment Listing

THE use of correct battery equipment for the various new battery-operated PHILCO receivers is an important factor from a performance

standpoint. We are listing on the chart below the various model numbers together with complete A battery and B/C battery information:

Model	Wet "A" Battery	Dry "A" Battery	"B-C" Battery	"A" Current	"B" Current	Ballast Lamp*
37-33	92R	P8096	P9062	600 Milliamps	13.5 Milliamps	1Y1
37-34	76W	.....	.....	1.16 Amperes	.....	.....
37-38	92R	P8096	P9062	720 Milliamps	20.0 Milliamps	1F1
37-623	172R	P8096	P9068	720 Milliamps	23.0 Milliamps	1F1
37-624	116R	.....	.....	1.44 Amperes	.....	.....
37-643	172R	P9086	P9068	780 Milliamps	23.0 Milliamps	1Z1

\* Ballast Lamps are used only with the Dry A Battery.

## Good Ground Connection Reduces Hum

THE use of a ground wire is recommended for the new PHILCO High Efficiency Aerial.

In many cases dealers and customers who have complained about excessive hum or a general unstable condition in the receiver have been employing the aerial without a good ground connection. In almost every case of this kind, the hum is reduced and general operation is noticeably improved when a ground connection is made to the chas-

sis. This ground can be to a water pipe or to a hot water radiator pipe. It can also be made to a driven ground in moist soil.

In addition to the grounding of the chassis, there are many installations in which the noise pick-up between the aerial and the radio set will be further reduced by grounding the aerial transformer on the roof. There is a small grounding lug which is brought out of the bottom of the aerial transformer for this purpose. The wire can be run from this connection to an overflow or drain pipe at some point on the roof.



Parts and Service Department of Strevell Paterson Hardware Co., Philco Distributors in Salt Lake City, Utah.



# ENGINEERING TESTS SHOW BIG ADVANCE IN NEW AERIAL PERFORMANCE

RADIO moves fast and big improvements from year to year are inevitable. We feel that it is only fair to PHILCO dealers that they be given the latest information and the true facts of current performance as compared with last year's performance.

The PHILCO Research Department has made a number of comparative tests of the new PHILCO High Efficiency Aerial against the PHILCO All-Wave Aerial of last year. The results which are given below are amazing and deserve careful study.

The performance of last year's all-wave aerial on last year's PHILCO sets is well known and will be accepted during this report as the basis of comparison. Thus, the overall performance of the old aerial on the old set on the various wave bands will be referred to as "100".

The table below shows approximately the relative sensitivity performance of the old aerial on the old and new sets.

Relative Signal Pick-up, Old Aerial		
K.C.	1936 Set	1937 Set
550	100	60
1400	100	100
M.C.		
2.3	100	100
6	100	250
12	100	150
18	100	100

## EDITORIAL

(Continued from Page 1)

### Universally Approved

As is the case with any original and constructive plan, when first proposed and put into use, the Standard Service Charge Plan met with severe criticism from various sources—many said it would not work, would not be practical, etc. But time has proven the contrary, and has in fact shown that this plan has been one of the greatest contributions made to the general good of the radio service industry. Highest praise of its merits and value has been received not only from servicemen the world over, but from manufacturers, dealers, jobbers and consumers. In a recent questionnaire sent to 16,000 servicemen, the answers contained unanimous praise of the plan and many statements as to how it had helped them collect their charge and obtain the confidence of their customer.

It should be understood that the prices in the "Standard Service Charge Sheet" are not compulsory or absolute, but are merely suggested—however, long experience has shown the figures to be as nearly accurate and fair to all concerned as can possibly be arrived at. To R. M. S. members it is the key to a fair deal for both the customer and themselves.

The following table shows the relative sensitivity performance of the new PHILCO high-efficiency aerial on the old and new sets.

Relative Signal Pick-up, New Aerial		
K.C.	1936 Set	1937 Set
550	110	200
1400	100	125
M.C.		
2.3	80	100
6	200	500
12	300	400
18	100	100

The above story pertains only to the sensitivity and efficiency of pick-up without reference to noise rejection. For a proper comparison of the new and old aerials on the new and old sets, the question of noise pick-up should also be considered.

### Noise Pick-up Reduced

The following table shows the amount of relative noise pick-up of the new and old aerial on the new and old sets, assuming the noise pick-up of the old aerial on the old set as "100".

Relative Noise Pick-up, Old Aerial		
K.C.	1936 Set	1937 Set
550	100	80
1400	100	80
M.C.		
2.3	100	80
6	100	80
12	100	80
18	100	80

The following table shows the relative noise pick-up of the new PHILCO high-efficiency aerial on the old and the new sets.

Relative Noise Pick-up, New Aerial		
K.C.	1936 Set	1937 Set
550	80	25
1400	80	50
M.C.		
2.3	80	75
6	80	50
12	60	25
18	75	50

### New Philco Aerial on Competitive Sets

The new PHILCO high-efficiency aerial is designed to operate into a low resistance line. All competitive sets using twisted pair transmission line are similarly designed, and the new PHILCO high-efficiency aerial gives similar increased sensitivity to that experienced on the new PHILCO receivers. However, the noise-reducing effectiveness is governed entirely on the design of the terminating circuits in the competitive receivers. From this standpoint, no more noise reduction should be effected than when the new aerial is used on the old PHILCO set.

In case the competitive receiver is not equipped to operate on any type of transmission line, then the PHILCO high-efficiency aerial should be furnished with the special matching and noise-reducing

terminal transformer—the same as mentioned here, part 42-1095.

### Whistles, Birdies and Images

The new PHILCO high-efficiency aerial is quite distinctive in that the design has taken into account the question of selectivity, in addition to the improved sensitivity and noise reduction. This factor has been entirely overlooked by certain companies. Without the precaution which the PHILCO Engineering Department has inserted in the new aerial design, the aerial largely destroys the selectivity of the first tuned circuit—particularly in the broadcast band; so that birdies and whistles are very apparent on two-gang receivers and noticeable on three-gang receivers, if the old type aerial or those of competitors are installed. The new PHILCO high-efficiency aerial avoids this loss of selectivity, resulting in a remarkable degree of freedom from birdies and images on both the old and new sets, and should show the same improvement in this regard when employed on competitive sets.

### Note of Caution

In interpreting the approximate figures of merit in the sensitivity tables, it should be appreciated that improved pick-up may not be noticed by the dealer or customer if the strength of signal is above the level where automatic volume control starts to function. The improved aerial efficiency will be noted in the increased number of stations picked up and in the relative freedom from noise of the weaker stations as compared with stations operating on less efficient aerials.

## Philco Dealers—

1. Do you know that in addition to being the world's largest radio supplier, PHILCO is the world's largest parts supplier?
2. Do you know that the quality of PHILCO radio sets is dependent upon the quality of PHILCO parts which go to make up those sets?
3. Do you know that PHILCO's mammoth Engineering and Research Department is constantly analyzing field reports, testing new items and developing improved quality on PHILCO parts?
4. Do you know that the price of PHILCO parts is no higher than the price of inferior parts of comparatively unknown manufacture?
5. Do you exercise the same judgment in your purchase of parts that you do in your purchase of radio sets?

*Standard of the Radio Service Industry*

# PHILCO MODEL 099 RADIOTESTER

*Designed and Specified by PHILCO, to Be the Only Instrument  
for Precision Testing With Maximum Speed and Efficiency*

MAKES  
EVERY  
NECESSARY  
TEST

COMPACT  
RUGGED  
DEPENDABLE

•  
Cannot  
Become Obsolete



PRECISION  
CONSTRUCTION

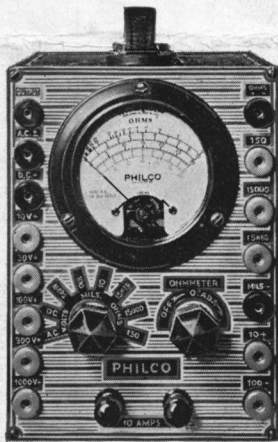
•  
RICH,  
DIGNIFIED  
APPEARANCE

List—  
**\$100<sup>00</sup>**

*Special R. M. S. Discount*

**SEE IT AT YOUR  
DISTRIBUTOR'S**

## THE TWO FAMOUS UNITS Incorporated in the 099

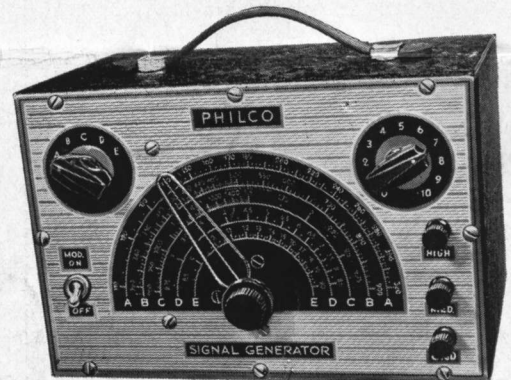


### MODEL 025 Circuit Tester

The accepted standard test unit for measuring voltage, current, resistance, capacity or output and checking continuity . . . New model improved in appearance, performance and economy.

### MODEL 088 Signal Generator

Finest precision all-wave instrument designed by Philco engineers for aligning sets with laboratory accuracy. Combines beautiful appearance with rugged construction and extremely easy operation.



**BUY an 099 NOW—BE PREPARED FOR ANY JOB**

**DAYTON RADIO COMPANY**

427 East Third Street

Dayton, Ohio