

PHILCO SERVICEMAN

Circulation Over 30,000 Copies Monthly

RADIO • MANUFACTURERS • SERVICE • NEWS

NOVEMBER, 1935



We Can Be Thankful

EDITORIAL

NOVEMBER is the month of Thanksgiving, the month when most everyone takes stock of his possessions and gives thanks for their ownership.

Radio servicemen can be grateful that the so-called "depression" in business is gradually disappearing, and apparently the beginning of a much better period of business is at hand.

A marked improvement in the radio service business has followed closely the improvement both in radio manufacturing and in general business. Better radio programs have stimulated interest in listening and caused many persons to have their radio sets repaired or overhauled.

As a result, there was never a better time than the present for you to step into the picture and put yourself in position to get *all* of this service business in your neighborhood. The way to do this is to use every possible means at your disposal to identify yourself as "the official" radio serviceman in your locality and build a reputation as a dependable, courteous individual who does high-class, guaranteed work at fair prices.

You cannot do this by running just one ad or distributing one set of handbills. To be effective, advertising must be continuous and repeated week in and week out. Its major effect does not begin to show until the plan you decide upon has been in operation for a reasonable length of time.

Plan out an identification campaign for yourself in your territory for the next three months or six months. Use the various types of service business promotions R. M. S. has made and is making available to you for just this purpose. If your campaign is properly planned and conscientiously carried out, you will be well repaid by increased business during the winter and spring months.

SUCCESSFUL STORE DEMONSTRATIONS GREATLY SIMPLIFIED

Multiple Aerial Switch Affords Quality Radio Performance

REMEMBERING that first impressions are usually lasting ones, anything that can be done to improve the performance of all PHILCO radios in dealers' stores will create favorable first impressions upon prospective purchasers and cannot help but increase sales.

The PHILCO Multiple Aerial Switch will eliminate the need for apologies which often accompany store demonstrations and will, therefore, provide a highly profitable investment for any dealer.

Good Installation Essential

Just how much the performance of sets on the sales floor has to do, not only with actual demonstrations, but also with the customer's frame of mind, is illustrated by a recent experience in investigating a complaint from a PHILCO dealer about the performance of one of the new models. This particular dealer complained that the sample Model 650B he had just received did not perform nearly as well as the 630B on his floor. He had what he really believed to be a very satisfactory aerial installation, consisting of a single-wire antenna and an uninsulated lead-in wire placed behind the sets on display and neatly supported by porcelain insulators. A

wire from the antenna terminal of each set was clipped to the lead-in wire behind the radio.

Comparisons Made

The cause for the dealer's unfavorable comparison between the two models was immediately apparent after a casual inspection of the installation. The 630B had been connected to the lead-in wire near the point where the wire was brought into the building, while the 650B had been connected at the opposite end of the store beyond numerous sets on display and in the midst of other receivers having low-impedance antenna circuits.

One Set at a Time

Moving the 650B to the point at which the 630B was connected reversed the comparison at once. Even when thus connected, neither set would bring in the more distant stations in the daytime without considerable background noise due to the connection of so many additional sets to the same aerial, as the connection of an individual antenna to each set quickly proved.

Progressive PHILCO dealers will be quick to realize the economy of connecting the PHILCO Multiple-Aerial Switch to all radio receivers on display.



Parts and Service Department, W. W. Woodruff Hardware Company, PHILCO Distributors in Knoxville, Tenn.

Ground Connection for Less Noise

IT HAS been found in many installations of the PHILCO All-Wave Aerial that better results are obtained when the chassis is grounded.

In the average installation, it is unnecessary to use a ground connection, since an effective ground is obtained through the electric power line. In some cases, however, the power-line ground may be at a considerable distance from the radio set, and in this event less noise and greater signal strength are obtained when a good ground connection from the radio chassis to a water pipe or hot-water radiator system is employed. Whenever an installation is being made, the serviceman should first make a reception test with the ground and then without the ground connected to the chassis. If better results are obtained when using the ground, this should be left on permanently.

In every case, it is essential that a ground connection be employed with a battery-operated receiver.

TIME A BIG FACTOR IN CHECKING INTERMITTENTS

Good Condensers an Investment

THE much-discussed trouble of intermittent operation of radio receivers can be traced in most cases to the by-pass condensers used in various circuits.

Condensers were not intended to pass direct current, but provide a path for alternating current. There are three important factors to take into consideration in by-pass condensers.

Condensers can be grouped under three groups:

First Group

- Coupling condensers.
- By-pass condensers across bias resistors or voltage dividers.
- By-pass in plate screen and grid circuits.

Second Group

- Tone controls.
- Resistance-capacity filters.

Third Group

- Filters for inductances.
- Tuned-circuit capacitors.
- Tone-compensating networks.

A high percentage of intermittents can be traced to the first group. The causes are intermittent shorts and opens. Every serviceman knows the process that is necessary to locate the offending condensers. This may take considerable time (see July issue, Page 2). The most logical thing is to replace all by-pass condensers and save time and worry.

Condensers are like radio tubes or any other piece of working apparatus—they wear out. This wearing takes place at the edges of the plates. A corona action is ever present on the plates when a receiver is in operation. This action decomposes the paper particles, which finally turn to carbon, making a conducting path causing intermittent shorts or dead shorts. The corona action causes heating, also the heat generated in the chassis from other component parts expands the condensers. This expansion and contraction tends to loosen the wires soldered to the plates and causes opens. This continued expansion oftentimes causes small openings, and under humid conditions dampness will creep in between the plates and the paper insulators. When the receiver is turned off and cools, the condenser contracts, forcing this humidity deeper in the insulator, oftentimes causing leakage or shorts.

The low cost of PHILCO Black Bakelite and Tubular Condensers will save considerable money if all are replaced at one time.

Consider for a moment another reason for replacing these condensers. You may locate the one condenser causing the trouble and replace it. The receiver is returned to the customer, and in a few days the same trouble appears again. The first thought in the customer's mind is that the set was not repaired correctly in the first place, and he promptly calls in another serviceman.

These condensers may have tested O.K. when the offending condenser was replaced, but may have been near the worn-out stage. Always do everything necessary to assure the best possible service job and thus assure your reputation as a good serviceman.

WEIGHTS AND DIMENSIONS OF CURRENT PHILCO MODELS

Model	Net Wt. (Lbs.)	Ship. Wt. (Lbs.)	Cabinet Dimensions (Inches)			Model	Net Wt. (Lbs.)	Ship. Wt. (Lbs.)	Cabinet Dimensions (Inches)		
			Ht.	Width	Depth				Ht.	Width	Depth
32-B	43	54	18½	12¾	9	630-B	26	31	19¾	14¾	9½
32-F	54	71	38	23¾	11	630-CSX	53	65	22½	23	14¾
38-B	16	22	16¼	12¾	8¾	630-X	56	64	39¾	24¾	11
38-F	32	49	37½	22¾	10¾	640-B	36	42	20¼	15¾	10½
38-AF	31	48	37½	22¾	10¾	640-X	56	70	39¾	24¾	11
54-C	10	13	8¾	11¼	5¾	641-B	31	38	20¼	15¾	10½
54-S	11½	14	8¾	12¾	5¾	641-X	53	72	39¾	24¾	11
59-C	12	14	8¾	11¼	5¾	642-B	20	26	18¾	12¾	9
59-S	13	14	8¾	12¾	5¾	642-F	36	49	38	23¾	11
60-B	19	22	16¼	12¾	8¾	643-B	28	35	20¼	15¾	10½
60-F	47	61	37½	22¾	10¾	643-X	51	70	40	24¾	11½
84-B	13	15	14¾	11¾	8	650-B	36	44	20¼	15¾	10½
89-B	21	29	16¼	13¾	9¾	650-H	61½	80	36¾	28¾	15¾
89-F	54	62	38	23¾	11	650-X	69	78	40	24¾	11½
116-B	43	52	23½	16¾	12¾	650-PX	104½	155	41¾	26	17
116-X	96	135	42¼	26¼	13¾	650-RX +	55½	72	21	24	13
610-B	18	23	16¾	12¾	8¾	650-RX*	31	48	30¾	24	11½
610-F	33¾	48	37¾	22¾	10¾	650-MX	75	89	35¾	24¾	14¾
611-B	17½	23	16¾	12¾	8¾	660-L	68½	105	31¾	37¾	16¾
611-F	33	49	38	23¾	11	660-X	86	117	40¾	25¾	13½
620-B	20	25	18¾	12¾	9	680-X	126	171	41¾	28¾	17½
620-F	36	51	38	23¾	11						
623-B	19	24	18¾	12¾	9						
623-F	35	52	38	23¾	11						

+ Tuning Unit
* Speaker Unit

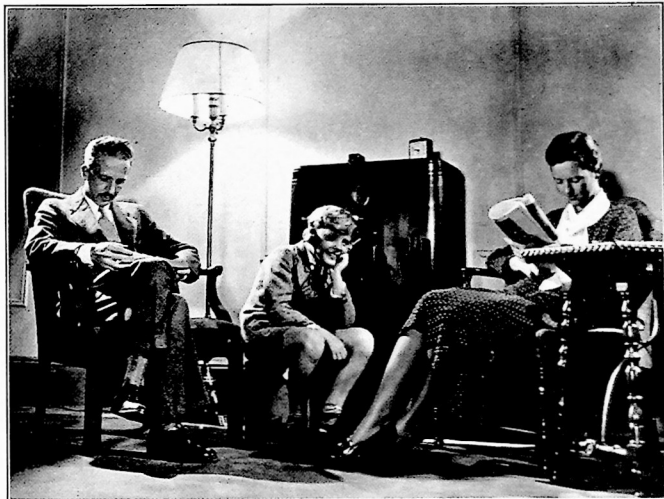
BIGGEST MARKET FOR HEADPHONE KITS IN HOMES WITH CHILDREN

THE PHILCO Headphone Kit provides dealers and servicemen with one of the best possible opportunities to make extra sales. After a set has been successfully installed and is in operation in a home, the serviceman can suggest to the customer some of the many advantages of the headphone kit. Here are just a few:

1. For silent operation late at night.
2. For silent operation while tuning.
3. For DX and foreign reception.
4. For children's programs not desired by the older members of the family.
5. For the sickroom and the hospital room.

Perhaps the greatest market for the headphone kit is in the homes with children. Many times the parents may not care to listen to the children's programs, and yet they do not want to deny the children this pleasure. If a second radio set cannot be provided, then the PHILCO Headphone Kit is the solution to this problem.

People who want to listen to the radio late at night without disturbing other members of the family will find the headphone kit indispensable. The kit can be sold readily in apartment houses where people very often want to listen to the radio late at night without disturbing other tenants in the building.



"Gee, Mom, these kids' programs are good!"

The DX fan is also one of the biggest prospects for the headphone kit. When weather conditions are bad, making excessive static and noise, the headphone kit will serve to eliminate the biggest

objection to such tuning from other members of the family.

Every serviceman can use the headphone kit to advantage in his own service work in the home. It often happens that he wants to make certain tests on the radio set, but he hesitates to do so because of the noise which might result. Headphones will solve this problem, and their use will also serve as an entering wedge to sell the kit to the customer.

Headphones can be employed to advantage by dealers in making store demonstrations of foreign reception. In many cases, the dealer is in a noisy location, and while tuning for various foreign stations excessive noise will be brought in. This noise is naturally upsetting to the prospective customer, because he immediately imagines such noise in his own home. A wise dealer will have the headphone kit connected to the radio set for the sake of displaying the kit and will make use of the headphones for tuning in a foreign station to demonstrate to the customer.

Wherever radio sets are used, the PHILCO Headphone Kit can be employed, and it is one of the best sideline items as an extra profit-maker, both for the dealer and the independent serviceman.

The PHILCO Headphone Kit sells complete at \$7.50 list and is subject to usual parts discount.



A Typical Display to Sell Headphone Kits

SPECIAL ADJUSTMENTS PROVIDE GREATLY IMPROVED SET PERFORMANCE

Practical Service Helps Explained

SOME of the lesser known facts concerning the adjustments of compensating condensers can be employed by the serviceman to provide superior radio performance. Described in the following paragraphs are a number of such helps which will enable the serviceman to turn out a better and more accurate adjustment job.

Short-wave R. F. Compensating Condensers

Adjusting the R.F. and antenna compensators on the high-frequency bands of all-wave models has the effect of slightly detuning the oscillator, which prevents an accurate adjustment from being made. This is particularly true of the various models having no R.F. stage ahead of the detector, such as PHILCO Models 16 (5 band), 44, 610, etc. Such a condition can be overcome by having the second harmonic of the oscillator in the set produce the intermediate frequency when adjusting the R.F. and antenna compensators. This can be done very easily by adding external capacity to the oscillator circuit until the oscillator operates at half its normal frequency. Assuming that the high frequency adjustment is being made at 18 M.C., a preliminary adjustment of the oscillator compensating condenser should first be made so that the signal appears at the correct dial setting and the image frequency is also produced at the proper point. (approximately 17.1 M.C.). A variable condenser is then connected across the oscillator section of the condenser gang and slowly turned in from its minimum capacity setting until the signal is again heard in the speaker. The R.F. and antenna compensating condensers can now be adjusted without affecting the

oscillator circuit. For the variable shunt condenser, a section of any PHILCO condenser gang can be used or any other variable condenser having a maximum capacity of 350 mmf. (.00035 mfd.).

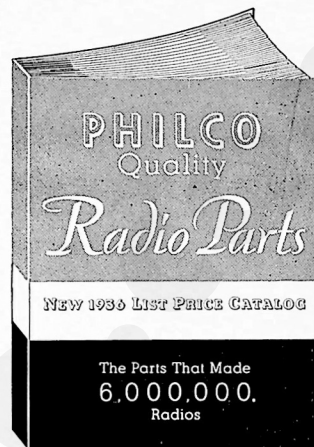
460 K. C. Wave Traps

When adjusting the wave traps in the 1936 all-wave models, it will be difficult to obtain a definite peak with the signal generator connected to the antenna and ground terminals in the usual manner. In making this adjustment, it is important to connect a 200 mmf. condenser (.0002 mfd.) between the signal generator antenna lead and the antenna terminal on the chassis.

Changing Frequency of I. F. Stages

A sharply tuned I.F. amplifier cannot be shifted in frequency by simply applying another frequency to the first detector and adjusting the compensating condensers in the usual way. If the frequency of the signal generator differs considerably from the frequency to which the I.F. amplifier was previously tuned, the adjustment of any single compensating condenser will tend to follow the adjustment of the other compensating condensers rather than the signal from the signal generator. When changing the intermediate frequency of a receiver to some other value to avoid long-wave interference or for any other reason, it is, therefore, advisable to shift the tuning of one I.F. transformer at a time. This can be done by first connecting the signal generator antenna lead to the control grid of the last I.F. tube and adjusting the compensators of the I.F. transformer preceding the second detector and by following the same

New Philco Parts Catalogues Now Available



THE new PHILCO Parts Catalogue, larger and more complete than ever, is now ready for distribution to dealers and servicemen. Thirty-six pages are filled with the most complete line of radio parts for the serviceman, experimenter and amateur of any manufacturer. Every item in the PHILCO parts line is listed and fully described. The new catalogues are ready now and can be obtained from your PHILCO distributor. Be sure to get your copy at once.

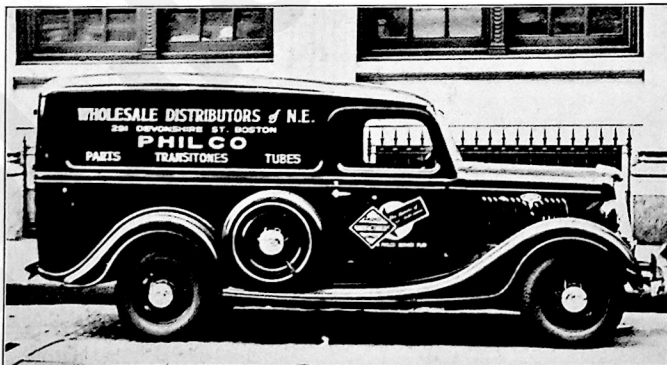
procedure one stage at a time back to the first detector.

Another occasion to use this procedure will be presented when the I.F. stages in a receiver are found to be adjusted to the wrong frequency. In all cases, before adjusting the I.F. compensating condensers in any receiver, it is advisable to first find the frequency to which the I.F. stages are already tuned. This is accomplished simply by adjusting an accurately calibrated signal generator for maximum output-meter reading. If, at this point, the setting of the signal generator dial does not correspond to the correct intermediate frequency for the receiver, and if the difference is more than 5 K.C., the above procedure should be used to make the necessary change.

All-Wave Aerial Equally Important for Broadcast Receivers

(Continued from Page 5)

broadcast reception, both on the new sets they are buying and on the broadcast receivers they bought from you during the past few years, sell them a PHILCO All-Wave Aerial with a set transformer. This transformer, Part No. 42-1095, sells at a list price of \$1.75, subject to regular parts discount,



Ford Truck Used by Wholesale Distributors of New England, PHILCO Distributors in Boston, to Obtain Parts, Transistone and Tube Distribution in the Outlying Sections of New England

USES OF THE SIGNAL GENERATOR EXPLAINED

A Necessary Part of Service Equipment

THE signal generator is one of the most important and most useful instruments in the serviceman's equipment. At the time of its introduction, the service oscillator, as it was then called, was a rather crude piece of equipment and was used only for the purpose of balancing radio receivers. It has since been developed until it bears close resemblance to the laboratory signal generator in refinement and precision, and its increased usefulness has made it indispensable to the serviceman, not only for making the numerous critical adjustments to the sensitive receivers of today, but for purposes of testing parts and locating trouble as well.

Adjustments Require Constant Signal

Even in the simplest form of circuit, such as the tuned radio frequency type, maximum performance can be obtained only when adjustments are made by means of a sharp and constantly modulated signal such as can only be obtained from a high-grade signal generator. If an attempt were made to substitute a broadcast signal for this purpose, it would be impossible to obtain an accurate indication of maximum volume due to the variation in frequency and amplitude of the speech or music being reproduced. Furthermore, these same wide variations would render the use of an output meter impractical, since the ear cannot be depended upon to register minute changes in volume of sound. The primary purpose of alignment is to adjust all tuned circuits for the greatest possible response to a minimum amount of signal, and it is only after all adjustments have been completed that the maximum selectivity is also obtained.

In the course of making these adjustments, variations in selectivity will cause erroneous impressions of volume on a broadcast signal due to the variations in side-band cutting produced at the same time. It is this effect that causes the volume from a broadly tuned set to appear greater than that from a highly selective one. This means that nothing but a signal being constantly modulated by a relatively low audio frequency can be used to obtain accurate adjustments of even the simplest of radios.

Weak Signal for A. V. C.

In sets employing automatic volume control, attenuation of the signal being used for adjustment becomes of greater necessity, especially on the standard broadcast band where the sensitivity of an all-wave receiver is usually greatest. The signal used in adjusting a set of this type must be weak enough to produce an output indication which is fairly proportional to the sensitivity being developed. Substitution of a broad-

cast signal in adjusting such a set would be attended with extreme difficulty, as a strong signal would prevent an accurate adjustment from being obtained, while a sufficiently weak signal would, of course, be accompanied by a certain amount of background noise.

In adjusting the intermediate frequency stages of a superheterodyne, it is necessary to use an extremely sharp signal, which can be obtained only from a signal generator. Theoretically, the intermediate frequency is developed by the combination of a broadcast signal and the frequency at which the oscillator in the set is operating, but this signal would be entirely too broad for the adjustment of the I.F. stages. By far the greater part of the high selectivity and sensitivity characteristic of the superheterodyne is developed in the intermediate frequency amplifier. Without the use of an accurately calibrated signal generator, there would be no way of having the intermediate frequency stages respond only to the correct frequency. It is often desirable to adjust the tuned circuits in one particular I.F. stage independently of the others, and without the signal generator there is no way of feeding the correct frequency into that particular stage. Only with the signal generator is it possible to check the amplification of each individual stage by applying the signal to various points in the circuit.

To Be Continued Next Month

SPECIAL INSTRUCTIONS FOR MODEL 088

High-Frequency (Short-Wave) Adjusting Points for 1933-1935 PHILCOS (All Frequencies Given in Megacycles)

Philco Model	Adjusting Frequencies			
4, 470, 490	18.0	7.0	3.5	1.5
16 (121-122)	20.0	11.0	5.0	3.5 1.5
34, 44, 144	20.0	11.0	3.5	
49, 118, 201	11.0			
16 (125-6)	20.0	18.0	7.0	3.5 1.5
39	14.5	7.0		
97	18.0	3.5	1.75	

NOTE: This table gives you the correct adjusting frequencies, all of which appear on the 088 scale, to use instead of the adjusting frequencies recommended in the PHILCO SERVICE BULLETINS covering these models or the R. M. S. Service Lessons. The bulletins and lessons were written before the 088 was designed, consequently some of the frequencies suggested in them do not appear on the 088 scale, being frequencies obtainable on other units, such as the PHILCO Model 091 crystal-controlled short-wave signal generator.



Parts Department, Radio Electric Service Company, PHILCO Parts Distributors in Philadelphia, Pa.

Now!

A Professional Type

All-Wave SIGNAL GENERATOR

... at a price within reach of every Radio Serviceman!

PHILCO
Model 088
All-Wave
SIGNAL
GENERATOR

(Fundamental Frequency)



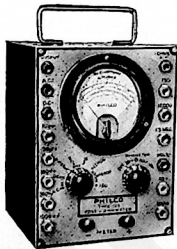
In these days of all-wave receivers, an accurate, dependable all-wave signal generator is a necessary part of every serviceman's equipment. Here is the instrument that perfectly meets this need—and at a price you can afford to pay. In the Model 088, PHILCO has produced a "precision" instrument. Possessing the highest quality of appearance, construction and performance, it can be depended on to do an accurate alignment job on any type radio receiver.

SPECIFICATIONS OF 088:

- **Variable Condenser:** Extremely low-loss, low-capacity, rugged condenser designed especially for service use.
- **Wave Bands:** Five, giving continuous frequency range from 110 to 20,000 kilocycles. All frequencies appear on the scales on panel in large readable numerals. No charts, graphs or curves to bother with.
- **Compensation:** Individual compensating for each wave band, not affecting any of the others.
- **Moisture-proof and unaffected by temperature change.**
- **Coils:** Specially designed solenoid-type coils, giving permanent stability of calibration.
- **Waveband Switch:** Combined with on-off switch.
- **Signal Attenuation:** 20,000 to 1 in broadcast band; more than sufficient range for realigning sets which are completely "out," yet signal can be reduced to minimum for "hairline" adjustment of sensitive circuits.
- **Panel:** Satin finish, chromium plated; special design of extremely attractive appearance.
- **Case:** All metal, black crackle finish.
- **All Fundamental Frequencies**
- **Ball-bearing Tuning**
- **Direct Reading Scales**
- **New PHILCO Tube, Designed for High-Frequency Use**
- **Precision Calibration**
- **Vibration Proof**
- **Non-drift Padders**
- **Extremely Economical**
- **All Necessary Clips and Leads Furnished**

ONLY
\$3250
LIST

MODEL 088 SIGNAL GENERATOR



Model 025
CIRCUIT TESTER

The
Universal
Radio
Tester

LIST PRICE
\$6100
Complete

A.C.VOLTS · D.C.VOLTS · MILLIAMPS.
AMPS. · OHMS · OUTPUT · MFDS.

● **Companion Unit to Model 088 Signal Generator**

Designed to enable the serviceman to perform any type of test on a radio set with absolute accuracy and in minimum of time, Model 025 has for over a year been constantly proving its success and winning admirers among the entire radio service industry. Thousands of these have been sold, and the demand continues daily.

The many uses of this instrument and the accuracy and convenience it affords will pay for its cost in a short period of time. Portable for outside use; handy and compact for use around the shop.

ALL EQUIPMENT ON THIS PAGE SUBJECT TO REGULAR PARTS DISCOUNT

The World's Finest, Complete Portable
RADIO TEST INSTRUMENT

PHILCO
Model 099
Combination
All-Wave Signal
Generator and
Circuit Tester



EVERYTHING THE SERVICEMAN NEEDS

In Model 099, PHILCO offers the serviceman the highest type complete radio servicing unit. Combining the accurate and beautiful 088 All-Wave Signal Generator with the efficient 025 Circuit Tester, it covers every possible need of the serviceman and guarantees him 100 per cent accuracy in all testing and adjusting operations.

The two units are fitted into a beautiful polished walnut case with removable lid and leather carrying handle. All necessary connecting leads and adaptors required for making the various operations and tests are included. A quality instrument throughout—in both appearance and performance.

LIST PRICE (in walnut case with removable lid) **\$1000**

The Ideal
SIGNAL GENERATOR

for Standard
Broadcast Use

PHILCO "024"



A neat, compact and sturdy signal generator particularly designed for adjusting standard broadcast and auto radio sets, Model 024 represents the outstanding "buy" on the market in this type unit. Completely self-contained and requiring no outside current supply. Covers a range of 105 to 2000 K.C. Extremely simple to operate; polished brass panel and carrying handle.

List Price
\$2250
Complete

IDEAL
for
ADJUSTING
AUTO RADIO
SETS

Ball-Bearing Tuning
Condenser.
"A" battery remov-
able without tools.
Felt feet prevent
marring woodwork.

- **Accurate**
- **Attractive**
- **Economical**
- **Labor Saving**

• SUPPLIED with TUBE, BATTERIES and LEADS •

Neat, Compact **PHILCO OUTPUT METER**
using the SHADOW-TUNING PRINCIPLE



Here is an efficient, inexpensive output meter with the accuracy and convenience of PHILCO shadow tuning. Connects to the output tube (or tubes) of any radio set, affording an accurate indication of output volume when adjusting compensating condensers. Width of shadow is directly proportional to signal strength. Necessary clips and leads provided. Makes an ideal output meter for use with the PHILCO 024 or 088 Signal Generator.

Rugged, yet Extremely Sensitive

PHILCO MODEL 012 . . . List Price \$1250

DEVLIN-DREW COMPANY

1302 Van Ness

Fresno, California

SERVICE DEPARTMENT