

PHILCO SERVICEMAN

• RADIO • MANUFACTURERS • SERVICE • NEWS •

JULY, 1934

Buying Parts for Quick Turnover

IT is the desire of every serviceman to have, at minimum cost, a representative stock of all the small radio parts commonly used for service work. Such a group of parts, if selected by radio servicemen of many years' experience and by engineers and manufacturers, would be of the greatest possible help to every serviceman in enabling him to have available for immediate use those parts which are necessary for quick service.

PHILCO has anticipated this requirement of the serviceman and has prepared a group of twelve new parts kits which afford a quick-moving parts stock at minimum investment. In the May issue of the PHILCO SERVICEMAN we printed an article on the subject of buying quality parts from a reliable supplier. It is possible today for every radio serviceman to buy the best quality of commercial radio parts from the largest and most reliable organization of wholesale radio distributors in the world. Every serviceman can buy PHILCO general replacement parts for use on any make of radio set from the PHILCO distributor who is today doing the largest business of any radio distributor in his territory.

The serviceman will profit by having the new parts kits. In the first place, they contain only popular parts which are used on many makes and models of radio receivers. They are parts you will need in your regular work and are not items with which you may find yourself overstocked at any time. The electri-

cal values of the assorted parts contained in these kits were selected after consulting radio servicemen, engineers and radio set manufacturers. Because of the completeness and utility of the kits, you will have on hand the correct part for practically any service job. It will be unnecessary to lose time, and possibly lose the job, in sending away for the parts. All of the parts are mounted in the most convenient form for instant selection and immediate use. The value and part number of each part is printed plainly under the part, so that there is no possibility of making a mistake and getting the wrong item.

The advertising value of a set of these parts display cards is tremendous and is something which will impress every one of your service customers who sees the cards. They will show him that you are in a position to render real service and that you use only the best of materials in your replacements. You obtain a representative, usable stock to meet all service requirements. The investment is a very minimum one, and you are assured of quick turnover.

See your PHILCO distributor now and place your order for the new PHILCO General Replacement Parts Kits. Do not wait until you have a call for a certain item and then send or drive to your distributor's place of business for the part. Save this delay and expense and make more profit for yourself by having these parts available for immediate use.



Have You Obtained Your Copy of This Descriptive Folder on the New Philco Parts Kits?

Foreign Reception Easy If Your Aerial Is Right

THE successful operation of any short-wave receiver and the success in keeping the set sold are dependent upon correct installation.

A recent survey taken among twenty owners of Philco Model 16 disclosed some rather interesting facts. Of the twenty customers interviewed only four had been able to obtain foreign reception.

Investigation showed that in each of the four cases where foreign reception had been obtained, a good aerial installation had been made. All of the sixteen customers who had been unable to obtain foreign reception had not been given any special instructions in the operation, nor had they been given a good aerial installation. Only two out of the twenty had been sold by the same dealer, which fact indicated that the average installation of the short-wave receiver in these cases was poor.

A modern short-wave receiver, when operating correctly, will positively give foreign reception, providing the receiver is given a chance with a good aerial. It will not perform consistently if it is dependent upon a poor aerial. In the December issue of the PHILCO SERVICEMAN we gave a number of installation hints for the short-wave models. This was followed in the January issue with further information on the subject. We are not going to repeat these pointers here; but get out your past issues of the SERVICEMAN and see for yourself now.

Remember that the Philco Three-Purpose Antenna System is intended for broadcast reception only and it will not be satisfactory for use with all-wave receivers except on the broadcast band. In every case where an all-wave set is in use, we recommend the Philco Short-Wave Antenna Kit in place of the Philco Three-Purpose Antenna System. A good installation of the Short-Wave Antenna Kit will enable your customers to obtain foreign reception on any of the new Philco short-wave models.

When you sell a short-wave model, don't cheat your customer by giving

him a poor installation. If you are a dealer, you owe your customer good reception, because he has paid you good money for his radio. You cannot give him value received if you use the ground as an aerial, or the electric wire, or an inside aerial or the bed springs. True enough, the set is powerful and it may bring in stations several hundred miles away with such an aerial. So is a Pierce-Arrow or a Lincoln automobile powerful, even though it is using cheap gas and oil. The fact remains that it performs like a Pierce or a Lincoln when it has good oil and gas, and like an ordinary car when it has poor-quality gas and oil.

If you are a serviceman working for a dealer, you owe your employer a good installation for his customer. The success of his business and of your job is dependent upon your doing the job right. If you are an independent serviceman, you are interested in making money for yourself, in building up your reputation as a capable radio technician and in giving your customer the satisfaction to which he is entitled. When working on a short-wave installation you will insist upon installing a good aerial, for it is only in this way that your customer can be satisfied with his radio and with the services which you have rendered.

We repeat—the short-wave receivers are altogether different from standard broadcast sets, and must be installed differently if true performance standards are to be expected. Read the customer's

instructions carefully, because this sheet contains much valuable information on the proper method of installing the set. Read the installation hints in the December and January issues of PHILCO SERVICEMAN. If you are ever in doubt about the installation or if you run into any technical difficulties, call upon your Philco distributor's service department for help. It is only through quality performance that you can expect to sell the short-wave models successfully, and it is only through care in the installation that such quality can be obtained.

PROFIT INSURANCE

Before Delivery

1. Check chassis.
 - a. Tubes and tube shields.
 - b. Pilot lamp.
 - c. Performance.
2. Inspect and polish cabinet.

Installation

1. Insist on good aerial and ground.
2. Loosen chassis hold-down bolts. (Remove them entirely in some 1935 models.)
3. Check shadow tuning.
4. Check performance.
5. Instruct owner by demonstrating correct tuning, volume control and general operation.

PHILCO

REG. U.S. PAT. OFF.

Radio Service

TEST EQUIPMENT

**SIGNAL GENERATORS AND METERS
FOR EVERY SERVICE REQUIREMENT**

Philco has designed a complete line of quality test equipment. All of the equipment illustrated and described in this folder is built in the Philco factories and is subject to the rigid engineering inspection standards of Philco. The prices are extremely low because Philco is able to build in quantity at the highest quality standards. Philco has gone to the servicemen through Radio Manufacturers Service to determine the exact type of equipment needed for high quality and speedy service tests. The test units presented in this folder are the result of years of service experience and contact between Philco and the serviceman on the job.

Prices Effective June 15, 1934. Subject to change.

PHILCO

REG. U.S. PAT. OFF.

TORONTO

PHILADELPHIA

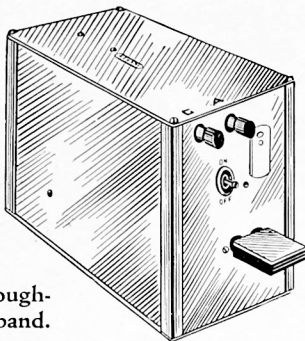
LONDON

PHILCO TESTING EQUIPMENT AND TOOLS

Philco Short-Wave Signal Generator Model 091

Modern radio means short wave and standard broadcast combined—be prepared to service these sets.

Crystal controlled signal generator for the adjustment of short wave converters and receivers. Furnishes a constant and accurate 3600 KC modulated signal, the harmonics of which can be used for adjusting throughout the short-wave band. Uses a 4½-volt "C" battery and a 45-volt "B" battery, both contained in the case.

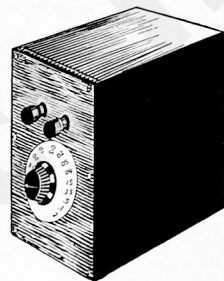


Serviceman's Net Price, complete with 3600 KC crystal, batteries and two Type 30 tubes \$36.00

Philco Condenser Test Box Model 093

Test condensers quickly by substitution method.

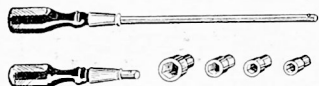
A convenient switch box designed for use in testing by-pass condensers in all receivers by the substitution method. Contains 15 different fixed condensers, which can quickly be connected through a multipolar switch to obtain desired capacities from .00025 mfd. to 2 mfd. Two binding posts on the box provide the necessary connections for external test leads.



Serviceman's Net Price \$8.64

Philco Socket Wrench Kit

Will handle all commonly used sizes of nuts, bolts, screws used in radio work.



A kit of four sockets and two handles, long and short, for hex head nuts, screws and bolts. Specially hardened steel of the highest grade. Kit contains the following parts: 1 handle (long); 1 handle (short); one socket, ¼"; one socket, 5/16"; one socket, 3/8"; one socket, 7/16".

Part No. 7016—Wrench Kit Complete—Net Dealer Price \$1.65
Part No. 7019—¼" socket only—Net Dealer Price12
Part No. 7020—5/16" socket only—Net Dealer Price12
Part No. 7021—3/8" socket only—Net Dealer Price12
Part No. 7022—7/16 socket only—Net Dealer Price12

Philco Special Adjusting Tools

For Adjusting Padding Condensers



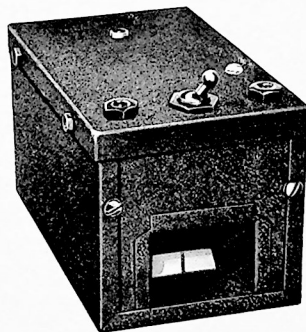
Part No. 3164. Fibre Wrench for hex head adjusting screws. 8" long. Net Dealer Price \$0.12



Part No. 27-7059. Insulated Screw-driver, Fibre shank, 7" long, 1/8" steel blade. Serviceman's Net Price \$0.36

Philco Shadow Output Meter Model 012

An essential output indicator for adjusting receivers.



Something new for the serviceman—An inexpensive output meter with the accuracy and convenience of PHILCO shadow tuning. Connects to the output tube of any radio set. Affords an accurate indication of output volume when adjusting compensating condensers. Maximum shadow width indicates maximum signal—strong signal produces a wide shadow and weak signal a narrow shadow. Width of shadow is directly proportional to signal strength, thus permitting accurate adjustment of radio by means of shadow indication. Can be connected to plate and cathode prongs of output tube or across two plates of push-pull output using clips and leads provided. Makes an ideal output meter for use with the PHILCO 024 or other signal generator.

Serviceman's Net Price \$7.50

PHILCO CIRCUIT TESTER

• MODEL 025 •

A.C. VOLTS—D.C. VOLTS—MILLIAMPERES—
AMPERES—OHMS—OUTPUT METER—
CAPACITY METER

The latest addition to PHILCO'S line of testing equipment—an accurate, compact tester for all types of radio sets. Affords simple and quick tests by means of resistance, voltage and current methods.

Modern radio test methods require a unit of this kind for speed, simplicity and accuracy. The many different applications of the meter and the convenient rotary control switch make this instrument unusually valuable to the serviceman, both for outside and shop service work.

Serviceman's Net Price \$36.60



Philco Model 025

5 A. C. Voltage Ranges: 0-10 volts; 0-30 volts; 0-100 volts; 0-300 volts; 0-1000 volts. 5 D. C. Voltage Ranges: Same as A. C. Ranges listed above. 5 Output Meter Voltage Ranges: Same as A. C. Ranges listed above. 3 Millammeter Ranges: 0-1 Mil.; 0-10 mils.; 0-100 mils. Special 10 ampere shunt available for automobile radio current tests. 3 Ohmmeter Ranges: 0-1½ megohms; 0-15000 ohms; 0-150 ohms. Meter adaptable for capacity tests. Rotary Switch controls all meter ranges and connections. All necessary Leads, Adaptors and Batteries furnished complete.



Philco 024 Signal Generator

A compact, smoothly operating and beautifully finished instrument. Frequency-range scales and designations of controls are etched in brass lettering on black panel. Top, sides and back have special black "crackle" finish. Brass handle provides easy portability. Ball-bearing tuning condenser provides extremely fine adjustment. Shielded antenna lead with Universal clip, included for connection to receiver. The "A" battery is held in place by a special spring cap, removable without tools. Entire instrument mounted on special felt feet. At price quoted, no serviceman can afford to be without one.

PHILCO SIGNAL GENERATOR

• MODEL 024 •

INTERMEDIATE AND BROADCAST FREQUENCIES

The Model 024 Philco Signal Generator is a complete, self-contained, accurately calibrated instrument, designed to cover all frequencies from 105 K. C. to 2000 K. C. All necessary batteries and tubes are included within the container. No external connections of any kind required.

Modern Superheterodynes cannot be adjusted properly without a high-grade signal generator, but many servicemen have been unable to pay the high prices previously asked for quality equipment. The PHILCO MODEL 024 now makes it possible for every serviceman to own a high quality Signal Generator at a figure about equivalent to the sum collected on his first six RADIO MANUFACTURERS SERVICE jobs.

MODEL 024 SIGNAL GENERATOR

Complete with Batteries and Tube

Serviceman's Net Price \$13.50

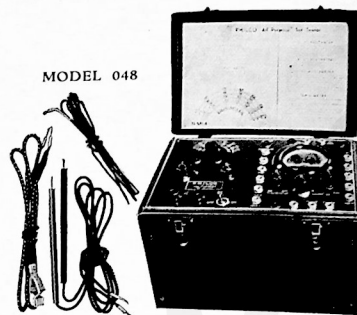
PHILCO ALL-PURPOSE SET TESTER

• MODEL 048 •

PORTABLE! . . . COMPACT! . . . ACCURATE!

CIRCUIT TESTER + SIGNAL GENERATOR

Handles every Service Job and meets all Testing Requirements from the Crystal Set up to the latest Super with duo-diode-triode tubes. Will not become obsolete with future radio developments.



READ THESE SPECIFICATIONS!

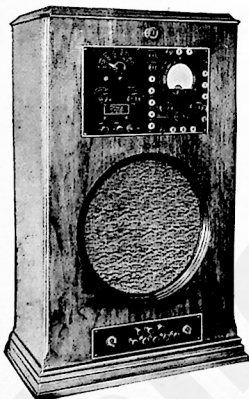
Twenty-two meter ranges and signal generator at a price made possible by Philco laboratory design and construction. Rugged instrument—easy to read, quick change of scales, no danger of taking false readings. Accurate signal generator, calibrated in K. C. on the instrument panel (no graphs to consult). Finest type precision movement meter. All test leads designed to simplify your service job. Real universal clip for connections of screen grid tubes or antenna post, sturdy test prods designed for long service. New exclusive Philco output circuit adapters, will fit 4-, 5-, 6-, 7 and 8-prong sockets, connect output meter to any type output circuit without removing tubes from chassis. All leads plug into tester panel.

5 A. C. Voltage Ranges	Complete Tube Test
5 D. C. Voltage Ranges	Variable Frequency I. F. and R. F.
3 D. C. Milliammeter Ranges	Signal Generator from 105 K. C. to 2000 K. C.
3 Ohmmeter Ranges	All Test Prods, Leads, Batteries, Tube, etc. included—
5 A. C. Output Meter Ranges	
Capacity Meter	
Serviceman's Net Price Complete	\$48.60

PHILCO UNIVERSAL TEST CABINET

• MODEL 059 •

BUILT-IN POWER SPEAKER WITH EXCITER
ELIMINATES BRINGING IN THE CUSTOMER'S SPEAKER
ABSOLUTELY UNIVERSAL—TESTS ANY RADIO



SPECIFICATIONS OF MODEL 059

Auditorium speaker capable of handling up to 15 watts, or the full output from the most powerful modern receivers. Speaker may be operated from sets having either single or push-pull output tubes. Field exciter, including type 80 tube, built into the tester. Four dummy fields built in for connecting in place of speaker on set being tested. Output meter on panel can be immediately connected to set by turning the switch at the top of the cabinet. Complete facilities for every necessary test to a receiver are provided in the "All-Purpose" tester, which is built into the Universal Test Cabinet.

Dimensions: Height, 27 3/4 in.; width, 18 in.; depth, 9 in. Weight (with batteries), 62 lbs.

Designed especially for members of Radio Manufacturers Service, this De Luxe Complete Testing Cabinet presents an unusually rich appearance, commanding immediate interest and respect by the customer and public. In addition to being in the most convenient and economical form for high-speed testing, its appearance alone will add prestige to your place of business. Precision-built, and housed in an artistic cabinet, it is bound to return ample dividends on your investment.

Everything a Well-Equipped Service Department Needs:

Built-in 15-watt Speaker, for radio chassis test.	3 D. C. Milliammeter Ranges.
Universal Speaker Plug and Socket, with necessary Cables.	3 Ohmmeter Ranges.
Signal Generator, variable 105 to 2000 K. C.	5 A. C. Output Meter Ranges.
Visual and Audible Output Indicators.	Capacity Meter.
5 A. C. Voltage Ranges.	Tube Tester.
5 D. C. Voltage Ranges.	Necessary Tubes and Batteries included.
	All Necessary Connecting Leads, Test Prods and Adapters included.

No longer necessary to have many types of extra speakers available to test chassis. The built-in speaker in the Model 059 automatically eliminates this expense and bother. Strictly Universal Speaker Plug and Socket.

Cuts your trouble in half. Now you can remove only the chassis on service calls.

TESTS A. C. SETS, BATTERY SETS, AUTO SETS.

Complete . . . Convenient . . . Attractive . . . Efficient

Serviceman's Net Price Complete \$90.00

There Is a Philco Tester for Every Radio Need

THERE are many reasons why a serviceman should have good test equipment, but perhaps one of the most important of these reasons is the fact that quality test apparatus will enable the man to do a better service job in the shortest possible time.

PHILCO has anticipated the serviceman's requirements and has built the most complete line of radio-test equipment of any manufacturer. This equipment is all of the highest quality, because it is held to the same rigid engineering standards of material and workmanship as PHILCO radios.

PHILCO LINE COMPLETE

There is a PHILCO tester for every requirement. The Model 059 Universal Bench Tester is the largest of the PHILCO test equipment and is complete in every possible detail, enabling the serviceman to make tests of all types of radio sets without the necessity of employing the original speaker. The PHILCO 048 is the well-known All-Purpose Set Tester, which enables a serviceman to make any type of radio service test in his shop or outside on the job. For those who already have part of the equipment which is available in the Model 048, PHILCO has separated the two major portions of this tester and has made available the Model 024 Signal Generator and the Model 025 Circuit Tester. For those men who have purchased the 024 Signal Generator or who have a signal generator of some type, the PHILCO Model 012 Shadow Output Meter has been designed. This is a simple output indicator, which enables the serviceman to make accurate adjustments on radio sets by means of the output indication. For accurate short-wave adjustments, the PHILCO Model 091 Short-wave Signal Generator has been designed. In addition to equipment of this kind, for testing purposes, there is also available the PHILCO 093 Condenser Test Box. This is a compact unit, containing fifteen different condenser values, ranging in capacity from .00025 mfd. to 2 mfd.

The use of plug-in type test equipment is rapidly going out of the picture, in view of the fact that voltage readings,

when taken in this manner, do not give a true indication of the radio set performance. The large capacities which are introduced between the leads of the tube circuits when the plug-in type of test is made produce freak conditions which are entirely misleading. Furthermore, testers of this type very soon become obsolete, due to the fact that tubes are constantly changing, and it is necessary to have different plug-in arrangements in order to accommodate the various types of sockets and tube bases in use. PHILCO test equipment is basic in design and principle and will not become obsolete with any changes in radio circuits or tubes.

PROPER USE IMPORTANT

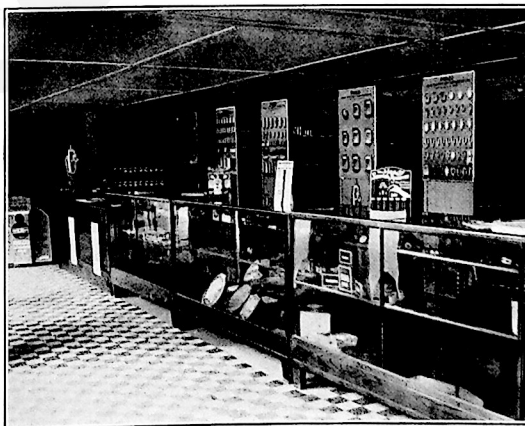
The proper use of test equipment is something which can save the serviceman considerable time and worry when he undertakes to do service work on a chassis. For example, the Signal Generator, Model 024, or the Signal Generator portion of the Model 048 or 059 can be employed to advantage in locating the particular amplifier stage in which trouble exists. Radio Manufacturers Service Lesson Number Two covers, in detail, the method of servicing radio sets by means of this system. After isolating the trouble in a certain stage of the circuit, it then becomes a simple matter to locate the particular defective part by using the Circuit Tester, such as the PHILCO Model 025 or the equivalent portion of the Model 048 or 059. This is just one example of the many uses to which these PHILCO testers can be applied. Radio Manufacturers Service Lesson Number Two is based largely upon the use of the equipment contained in the Model 048, and complete details of testing a radio set are covered in this lesson.

SHORT-WAVE ADJUSTMENTS

The short-wave signal generator is employed when making adjustments of short-wave receivers and adapters at frequencies

(Continued on page 4)

PHILCO distributors in every part of the country have a large and complete stock of PHILCO general replacement parts. Every PHILCO distributor has facilities for the serviceman to purchase parts and tubes with the least possible loss of time.



Parts Department, Crumpacker Distributing Co.
Philco Distributors, Houston, Tex.

The illustration on this page is typical of many of PHILCO distributors' Parts Departments. Make this department in your territory your headquarters for all of your replacement parts purchases.

(Continued from page 3)

above the so-called police band. The Model 091 contains a 3,600 K. C. crystal, which is absolutely reliable and assures precision adjustment of the signal generator at all times. The harmonics of the 3,600 K. C. fundamental signal are used for making adjustments of the various short-wave compensating condensers in the short-wave circuits.

Many servicemen are of the opinion that they can use a broadcast or I. F. signal generator on short-wave adjustments. Such, however, is not the case, due to the fact that the harmonics from the lower frequency signal generator fall too closely together for satisfactory adjustment within the short-wave band. On the other hand, the 3,600 K. C.

fundamental produces harmonics in the short-wave band that are sufficiently separated to permit easy distinction between the different harmonics.

RAPID CONDENSER TEST

The Model 093 Condenser Tester is used wherever it is necessary to check for open condensers in a circuit. The continuity test will not show an open condenser, but by means of the 093 it is easily possible to substitute a condenser of the correct capacity when it is suspected that the old condenser is open. As soon as operation is restored, it is then known that the new condenser has corrected the difficulty.

DATA ON NEW PHILCO MODELS

Model	Tuning Range	Tubes Used	Intermediate Frequency K. C.
16	540 K. C.-23 M. C.	1-76; 2-77; 3-78; 1-37; 3-42; 1-80 (B. G. Models) or 1-5-Z-3	460
18	540-1720 K. C.	1-6-A-7; 2-78; 1-75; 3-42; 1-80	260
29	540-1720 K. C.	1-6-A-7; 2-39/44; 1-75; 1-42; 1-80	460
32 (32-Volt)	4.2-12 M. C.	1-36; 2-39/44; 1-75; 1-42; 1-84	260
34 (S.W. Battery)	520-3260 K. C.		460
38 (Battery)	520 K. C.-23 M. C.	1-1-C-6; 2-34; 2-30; 1-32; 1-19	460
45	520-2470 K. C.	1-15; 2-32; 1-30; 1-19	460
49 (D. C.)	540-1720 K. C.	1-6-A-7; 2-39/44; 1-75; 1-42; 1-80	460
54 (A. C.; D. C.)	4.2-12 M. C.	1-6-A-7; 2-78; 1-76; 1-85; 2-43	260
59	540-3200 K. C.	1-6-A-7; 1-78; 1-75; 1-43; 1-25-Z-5	460
60	540-1720 K. C.	2-77; 1-42; 1-80	460
66	540-4000 K. C.	1-6-A-7; 1-78; 1-75; 1-42; 1-80	460
84	540-1720 K. C.	1-6-A-7; 1-78; 1-75; 1-42; 1-80	460
89	5.5-15.5 M. C.	2-77; 1-42; 1-80	460
118	540-1720 K. C.	1-36; 2-44; 1-75; 1-42; 1-80	260
144	4.2-12 M. C.	1-6-A-7; 2-78; 1-75; 3-42; 1-80	260
200	540 K. C.-23 M. C.	1-6-A-7; 2-78; 1-75; 1-42; 1-80	460
	540-1720 K. C.	1-6-A-7; 3-78; 1-37; 1-75; 3-42; 1-5-Z-3	175

Questions and Answers

1 Q. Is the transmission wire for the Three-Purpose Antenna System available in single lengths greater than one hundred feet?

A. Yes. This wire is now available in five-hundred-foot coils. The same price applies as in the case of the one-hundred-foot coils, of 4¢ per foot, list.

2 Q. Can the new PHILCO heavy-duty "B"/"C" battery be used with the PHILCO Model 38?

A. Yes. The new "B"/"C" battery, which is known as type P-968, can be used in conjunction with an adapter to change the eight-prong connection of the battery to a seven-prong connection for the Model 38 battery cable. The adapter is PHILCO Part No. 27-4121, and sells at a list price

of \$2.25. The heavy-duty "B"/"C" battery will give approximately seventy-five per cent greater life than the standard size "B"/"C" battery.

3 Q. How can failure of the oscillator in the Model 38 be corrected?

A. In most cases this condition can be corrected by changing the type 15 oscillator tube. In some cases it is necessary to lower the cathode resistor $\text{\textcircled{R}}$ in the wiring diagram of Service Bulletin No. 166 from 6,000 ohms to 4,000 ohms. In a few cases extremely thin or cracked mica has been found in the high-frequency oscillator compensating condenser $\text{\textcircled{C}}$ in the wiring diagram of Service Bulletin No. 166. The trouble can be readily corrected by replacing the mica and readjusting the high-frequency condenser in the usual manner.

JAS. S. REMICK CO., INC.

909 Twelfth Street

Sacramento, Cal.