# PHILCO SERVICEMAN

RADIO : MANUFACTURERS : SERVICE : NEWS

MARCH, 1942


# Philco Introduces Sensational New Kind of Tester

## EDITORIAL

### SERVICEMAN'S DECISION

There has never before been a time when radio servicemen have been so much in demand as they are today. Now is the time for every radio serviceman to decide just which course he is going to take and to make his plans for the immediate future.

#### Army and Navy Service

The Signal Corps needs thousands of radio men both in a military and civilian status. Those who are about to enter the Army, either through enlistment or the draft, can and should be assigned to radio work. In fact there are probably many members of Radio Manufacturers Service who can qualify immediately for commissions in the Signal Corps. There are many others who can qualify later after completing additional training. The Navy and the Air Corps also need trained radio servicemen.

#### Civilian Jobs With Signal Corps

In addition to the work in the Army and Navy, there are also open thousands of well-paid civilian jobs in the Signal Corps. A number of Signal Corps supply depots are maintained in various sections of the country. They need experienced radio men as inspectors on radio parts and equipment being purchased by the Signal Corps. In many cases it will be possible that men may be assigned to such civilian positions in one of the depots in their local territory.

#### More Work Per Man

Considering the fact that thousands of radio men will be going with the Army or Navy and the fact that there will be no more new radio sets, there is obviously going to be more radio service work per available serviceman than there has ever been in the past. This means that those men who remain in civilian life and continue their activities as radio servicemen will have to turn out more jobs in less time in order to keep up with the increased activity. Anything that the serviceman can do either in the way of better education and better understanding of radio or in connection with his equipment for the speedy location of troubles in radio sets must be done at once. Regardless of what you decide to do, decide right now that you are going to do it well. Speed is most important.

### Greatest Time and Labor Saver Ever Produced for Servicemen

In these days when time means everything, Philco has again scored with a new test instrument that gives the serviceman a quick, sure and simple way to locate trouble in a radio. The new Philco model 030 dynamic tester is an instrument which makes it possible to handle many more pay jobs every day.

#### Unlimited Uses

The 030 is used in locating defects in any type of radio with a minimum of time and effort. It operates on the principle of amplifying and reproducing a signal taken from any circuit of a radio in which a signal is normally present regardless of frequency (I.F., R.F., or A.F.). The Philco dynamic tester not only indicates the presence of a signal, but gives a comparative idea of its intensity. The usefulness of this new and exclusive Philco test instrument is unlimited. In addition to indicating the presence and strength of a signal, it can also be used to detect hum and to determine the causes of noise generated within a radio due to faulty parts.

#### Difficult Cases Easy

One of the most impressive features of the new instrument is the fact that it can be used for the location of defects that were formerly the most difficult ones to find. As an example, the tester which is primarily intended to indicate the presence of a signal in a circuit where a signal is normally intended to be can by the same token be used to detect signals in circuits in which they are supposed to be excluded through the action of bypass condensers. Two such points are screen grids of R.F. and I.F. tubes and bias circuit of tubes which are controlled by automatic volume control. Servicemen will all agree that faulty by-passing in these circuits is ordinarily difficult to locate.

#### Simplified Operation

All that is necessary in the operation of the new tester is to plug it in to A.C. power supply, clip the ground wire to the chassis and touch the test prod to the various points at which a signal should be present. This operation does not disturb or detune the circuit under test in any way. When a normal signal at some particular amplifier stage is not obtained, the test prod is touched to adjacent parts of the circuit to find the exact spot of the trouble. No switching is required for the R.F., I.F., A.F., or short wave signal. Likewise, no meters are required, no tuning controls and no headphones. The model 030 does the

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job every time — easily, quickly and accurately. The instrument is portable and no installation is required. It weighs only 5¾ lbs.; the size 8¼" x 5¼" x 3".

There is more radio service work today than there has been for a long while. As the sets begin to fail and there will be no new sets, servicemen will have more work than ever. Now is your golden opportunity to make your time, your skill and your knowledge pay you big dividends. Make every minute count in productive work. Do not miss this opportunity to increase your earnings. See your Philco distributor today for a demonstration of the famous new model 030 dynamic tester.

### Testing Signal Circuits With the 030

1. **Antenna Circuit Test**
   a. Place test prod at point "A"; with the attenuator on full, the signal should be heard weakly. The band switch should be tested in broadcast and S.W. positions, with a signal tuned in for each position.
2. **R. F. Circuit Test**
   a. Apply test prod at point "B" (plate of R.F. Tube); an increase in signal strength should be noted. When testing the S.W. band a signal should be tuned in above the middle of the tuning range (tuning condenser at least half meshed).
3. **Converter Circuit (1st Detector Stage)**
   a. Connect test prod to point "D" (grid signal should have same signal strength as point "B").
   b. Attach prod to point "E" (plate). The signal should increase greatly over point "D" (grid).
4. **Oscillator Circuit**
   a. Touch test prod to oscillator grid or plate "G". Momentarily short circuit the plate of oscillator section of gang with metallic instrument or wire. A click should be heard in the speaker of the tester when the short is applied and also when it is removed.
5. **I. F. Circuit**
   a. Connect prod to point "H" (grid I.F.). Signal should be approximately the same as at point "E".
   b. Apply prod to point "J", (plate of I.F. tube). Signal should increase in strength over point "H" grid.
6. **2nd Detector — A.V.C.**
   a. Attach prod to diode plate, point "L". Signal should be heard.
   b. Apply test prod to points "M" and "U". A signal should NOT be heard at either of these points. If signal is heard there is a possibility of the A.V.C. bypass condenser being open.
7. **First Audio Stage**
   a. Apply test prod to high end of volume control point "N" — push switch on test prod to "LOW" position. A weak audio signal should be heard.
   b. Apply test prod to point "O" (volume control). Volume control of radio in maximum position, signal should be heard with equal strength of point "N".
   c. Attach test prod to point "P" (plate of audio tube). Signal will greatly increase in strength if tube and associated circuit preceding are normal.
   d. While the illustrative diagram shows the 2nd detector A.V.C. and 1st audio stages in one tube, the same test as given above is used when these circuits are in separate tubes.
   In some sets an intermediate audio stage will be found. In these radios the test prod should be attached to the grid and plate of the 2nd audio stage and the signal strength noted. The signal should have greater gain than when tested at the 1st audio stage.
8. **Audio Ouput Circuits**
   a. Connect test prod to point "Q" (grid). Signal should have same gain as was noted at point "P".
   b. Attach prod to point "R". Signal should have tremendous gain over the input point "Q".
   c. Apply test prod to point "S". Signal should be lower in volume than at point "R", depending upon ratio of transformer.

## *Here's What The 030 Does For You!*

**Instantly Amplifies and Reproduces, Through Its Own Loud Speaker, Any Kind of Signal From Any Part of a Circuit — R.F., I.F., or A.F. — Even Short Wave!** No tuning or switching required; no meters; no headphones. You don't even have to know the Intermediate Frequency of the set to check the I.F. stages.

**Traces the Course of a Signal Through a Radio and Shows You Where the Signal is Obstructed in a Dead or Weak Set.**

**Quickly Indicates Gain in Any Stage or Any Amplifier Tube — R.F., I.F., or A.F.!** Gain is immediately evident in increased volume from loud speaker in the tester. *No high capacity test cables to produce misleading gain indications.* No dummy antennas or other attachments required.

**Enables You to Become Familiar Quickly With Any Radio Circuit.** When service information is not available, tester shows you the path the signal takes through R.F., I.F., and A.F. stages.

**Checks Tracking of R.F. Tuning With Respect to Dial Calibration.**

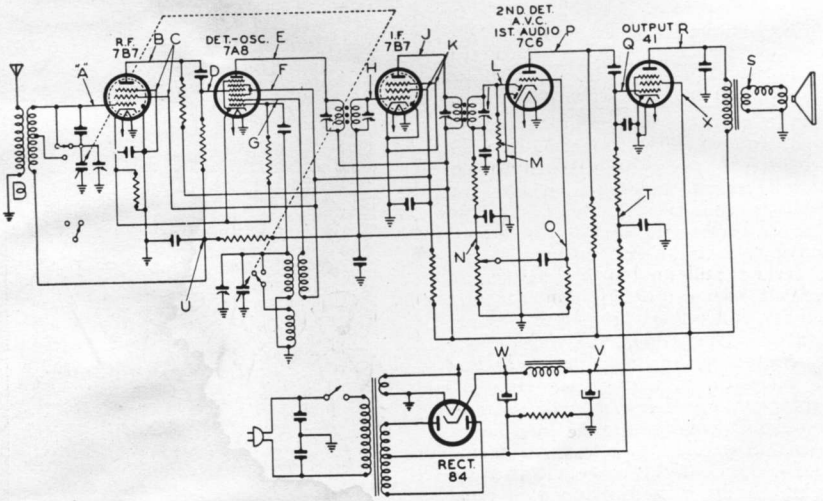
**Tests Phase Inverter Stage for Equality of Audio Input to Push-Pull Output Tubes** . . . a positive test for proper operation of phase inversion.

**Locates Hum in Condenser-Resistor Filter Circuits.**

**Locates Open Screen Grid and AVC Bypass Condensers** by showing a signal to be present in those circuits.

**Locates Defective Parts Which Cause Noisy Operation,** such as Audio Transformers, Coupling Condensers, Bias Resistors, etc.

**Tests Phonograph Pick-Ups, Crystal Microphones or Any Device Which Generates a Signal or Noise of Any Kind.**




Typical Receiver Circuit

# PHILCO HOME RECORDING OFFERS OPPORTUNITY FOR SELLING UP


Showing Home Recorder Installed

Philco home recording offers the dealer a grand opportunity for selling up on his remaining stock of Philco radio phonograph combinations. The installation has been so much simplified and the performance is so dependable that every dealer can sell this *plus* equipment with the greatest of confidence.

### Easy Installation

Most Philco distributors are in a position to supply a record changer with home recording already installed. It is only necessary for the dealer's serviceman to make an exchange with the record changer already in the cabinet and to plug in the home recording connections to the radio chassis in accordance with the simplified instructions. The distributor's service department is in a position to do the necessary preliminary adjustment work on the record changer at the time the home recording kit is installed so that the complete changer with home recording will then operate perfectly when it is placed in the customer's cabinet.

### Repeat Business

In addition to selling home recording with those radio phonographs still remaining in stock, there are hundreds of prospects in practically every dealer's territory for the 1942 home recording kit to go along with phonographs already installed in customers' homes. People will buy home recording if they are asked to buy it. The repeat business in home recording record blanks and needles is likewise an attractive profit item for every Philco dealer. Home recording kits are available now and we suggest that every Philco dealer contact the distributor to work out a plan whereby home recording can be sold in quantity at an attractive profit.

## Care Preserves Jewel Assemblies in Photo-Electric Pickup

Examination of some recent returns of defective jewel assemblies from photo-electric pickups has shown that almost one hundred per cent of those checked had been damaged and were not actually defective.

Because of the retractable feature of the jewel in the Philco photo-electric pickup, it is possible to move this needle across the grooves of a record without causing damage either to the jewel itself or to the record surface. Many retail salesmen have used this feature as a demonstration when selling the photo-electric type phonograph. In doing so, however, it is a very easy matter to touch the jewel against the edge of the record instead of the surface grooves and thus cause damage. As a general thing, such a demonstration is not recommended because of the possibility of this damage occurring, although with care it can be demonstrated to the customer very readily.

In the case of those jewels which had been returned to Philco for replacement, the jewel point had been chipped either through carelessness in handling the pickup in the manual playing position or in allowing the needle to strike the top of the record changer base plate. If the tone arm lift adjustment is set too low, it will be possible for the needle to strike the base plate. Likewise a very slight downward pressure from the hand when the tone arm is off the rest and not on the record surface will allow the jewel to strike the base plate of the changer. Although this jewel assembly is comparatively strong, we must not forget that it is a delicate mechanical assembly and must be treated as such. Salesmen making demonstrations and customers receiving operating instruction should always be cautioned on these points.

## FARM RADIO IMPROVED ON L.F. BROADCAST PERFORMANCE

In Models 42-124, 125 and 126, service may be necessary when the sets will not operate on the low end of the broadcast band when the "A" battery voltage goes below 1.2 volts.

In some cases the condition can be corrected simply by replacing the oscillator tube. In other cases, however, it will be necessary to change the oscillator coil, using a new coil, Part No. 32-3879. In addition, the grid resistor No. 10 in the wiring diagram of Service Bulletin No. 390 should be shunted with a 220,000 ohm resistor, such as Philco Part No. 33-422339.

After the oscillator coil has been replaced, it is necessary to repad the receiver according to service instructions. Should any difficulty be experienced in padding the high frequency end of the broadcast band, the lead from the high frequency broadcast padder to the wave switch should be dressed away from the sub-base.


Parts Department, Radio Equipment Co.
Philco Distributors in South Bend, Ind.

## $ QUESTIONS & ANSWERS $

Free technical consultation for servicemen. Address all communications to Editor, Philco Serviceman, Tioga and C Sts., Philadelphia, Pa. Letters will be answered individually and those of interest will be published in this column. A $5.00 thrift stamp will be awarded for each question published.

**From Peter Rice**
**Chicago, Illinois**

"In the Philco model 350T, how is it possible to obtain 890 K.C. range on the high frequency push button when all of the other buttons are set at frequencies below 890?"

**Answer —**

"A 50 mmf silver mica condenser can be connected across the high frequency oscillator trimmer. This increased capacity allows inclusion of 890 K.C. tuning range. In some cases it will not be possible to obtain a peak on the antenna padder for this frequency and in this event it will be necessary to add a small additional capacity across the antenna padder as well as across the oscillator."

**From Frank Rodger**
**Warrenton, Va.**

"On Model 40-610 phonograph, the light beam is not bright. Padding condenser No. 22 is screwed down tight for lowest volume. 1800 K.C. peak is about one and a half turns counter-clockwise from this point. The tone is O.K. Phonograph is about half volume. There is no microphonic feed-back."

**Answer —**

"The trouble may possibly be due to (1) a defective oscillator tube or rectifier tube; (2) defective oscillator grid resistor 47,000 ohms, Part No. 14; (3) low power line voltage delivered at the point at which this receiver is used; (4) the speaker field may have opened up partially increasing its resistance, thus limiting the amount of current flowing to the oscillator tube, and (5) capacitor No. 91 might be low, thus reducing the amount of plate voltage available to the oscillator tube."

## New Resistor Overcomes Trouble in Portables

In the Philco portable Models 42-842, 843, 844, 853 and 854 complaints may be received of a complete set of tubes testing weak. Replacement of the tubes restores normal operation for only a short time after which the same condition re-occurs.

The condition is caused by the overheating of the series filament resistor shown as No. 49 in Service Bulletin No. 391 and as No. 56 in Service Bulletin No. 388. When the overheating takes place, the resistor breaks down, its resistance value decreases, thus allowing an increased filament current to the tubes with resulting damage to the filaments.

An entirely new replacement resistor is available — Part No. 33-3424. This resistor is considerably longer than the one now in the set and is equipped with a protecting cover. The resistor is mounted vertically over one of the original holes in the chassis with a suitable drive screw. The tab on the cover is soldered to the chassis. The longer leads which are required for the installation and which should be fireproof, and not ordinary rubber covered, are brought down through the large hole in the chassis. The other large hole should be plugged up with a spring button, such as Philco Part No. W2232.

Although the Service Bulletin parts listing calls for resistor No. 33-218339, the number of the resistor which has been used is 33-3410. If a replacement is necessary, however, the new resistor No. 33-3424 should be used.

**From H. D. McGarvey**
**Belfield, N. D.**

"In using the short test in Philco model 050 tube tester, if a tube is shorted will it continue to cause indicator tube to glow steady."

**Answer —**

"In checking for shorts, if the switch is thrown up and a flash appears on the short indicator, it does not necessarily indicate a defective tube. This flash may be due to a charge on the element of the tube which, when the switch is thrown, will discharge, giving a flash for short duration."

## Push Button Sensitivity Improved Above 1000 K.C.

In the larger models of the 1942 Philco line there have been cases of low sensitivity between 1000 K.C. and 1600 K.C. on push buttons as compared with the sensitivity over the same tuning range when operating on dial tuning.

This condition can be greatly improved to the extent of increased push button sensitivity over dial sensitivity. The resistor shown as No. 34 in the diagram of service bulletin No. 408 should be opened up at the bottom end (farthest removed from the grid of the first detector) and grounded. The ground connection can be made in the 380, 1010 and 1011 by removing the wire running to the resistor from the outside of the 3 terminal board and re-soldering to the grounded middle terminal. In the other models the wire connects to one of the terminals on the push button switch assembly. It can be unsoldered and re-soldered to a grounded push button switch terminal.

This removes the automatic volume control action from the first tube and thus permits increased sensitivity on push button operation. If a set is being used with an outdoor aerial, this change may not be desirable inasmuch as it would cause overloading on a strong nearby station. In the majority of cases, however, the set will be used on the loop aerial and thus the change will provide more satisfactory performance when operating on push buttons.



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