

# PHILCO SERVICEMAN



RADIO · MANUFACTURERS · SERVICE · NEWS



AUGUST, 1934

## Getting the Most From the 200-X

THE latest and finest in modern radio tone—the new high fidelity PHILCO 200-X—must be given every chance to perform *always* at its best. This means that the installation must receive particular attention; the location of the instrument in the room must be chosen to afford the best acoustic results; and most important of all, a good aerial, for noise elimination, must be used.

There is a very definite reason for care in the installation of this model, and this is because of the increased number of high notes reproduced by this new radio set. These high notes have a definite significance in relation to noise, since the amount of noise is nearly equal throughout the upper audio frequencies.

The illustrations on this page, shown as Figures A, B and C, will explain just what takes place in the reproduction of the Model 200-X, as compared with other radio sets. Figure A represents the audio frequency covered by most present-day receivers. In the particular case chosen, the illustration shows the noise level to be thirty per cent and the signal level seventy per cent of the total input to the set. Referring to Figure B, we see the relationship of noise level to the signal level on the Model 200-X, using an ordinary aerial. By increasing the musical range in order to reproduce higher and lower frequencies we also pick up the noise on these added frequencies. In Figure B, the 200-X

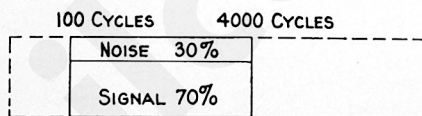


FIG. A

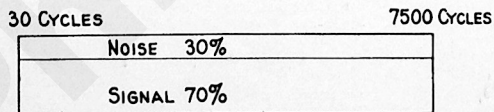


FIG. B

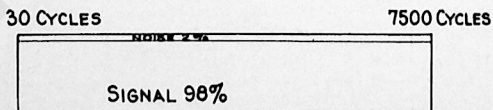
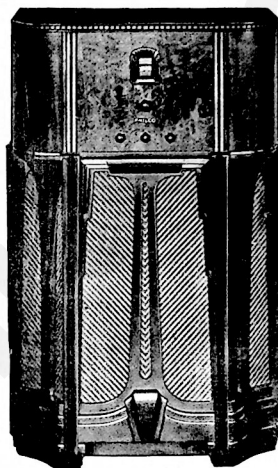


FIG. C



PHILCO High Fidelity RADIO  
*The Musical Instrument  
of Tomorrow*

has increased the musical range 3,570 cycles. This noise is more noticeable on high frequencies because man-made static frequencies are more pronounced at this end. This means that the 200-X, whose response covers from 30 to 7,500 cycles, will require the best noise-reducing antenna system available. Since most noise is purely local, and is not part of the carrier signal, it can be reduced or eliminated. The amount of noise reduction by the use of the Three Purpose Antenna System will be equal over the entire audio frequency range. The result, using a Three Purpose Antenna, is represented in Figure C. In the first place, the noise has been reduced; second, the signal has been favored by an increase in ratio of signal strength to noise level. Instead of there being seventy per cent signal and thirty per cent noise coming into the radio set, there is now a total of ninety-eight per cent signal and two per cent noise being received.

High fidelity is consistent with high quality throughout, and in every installation the Three Purpose Antenna System should be employed to bring about this high quality of reception. The 200-X will bring about the high quality of reproduction.

## R. M. S. Lesson No. 4 Now Ready

ONE of the most important and most interesting R.M.S. lessons to be issued is now available through your PHILCO distributor. The subject of this lesson is "Increasing the Serviceman's Income." The experience of PHILCO and of various distributors, dealers and servicemen in the service business is all combined in this lesson to give the serviceman practical and usable information on how to make more profit. Suggestions are given as to how the serviceman can make a real business out of his ability to service radio sets. The serviceman is a salesman, and he has plenty to sell if he is willing to put forth the necessary sales effort. R.M.S. Lesson No. 4 gives the man the necessary information to go about merchandising his services as well as making money in various other ways through the sale of radio equipment and accessories.

You will want your copy of R.M.S. Lesson No. 4 immediately, because it contains a number of ideas on how you can make more money right now during the summer months. Be sure to stop in at your PHILCO distributor's parts store without delay to obtain your copy now.

RADIO MANUFACTURERS SERVICE  
Lesson Number Four

### Increasing the Serviceman's Income



"Finding a Service Customer is More  
Difficult than Finding the Trouble"

Prepared by

Philco Service Department

Especially for Members of

Radio Manufacturers Service

## Correcting I. F. Interference in Superheterodynes

IN SOME territories, interference from commercial radio code stations is occasionally experienced on superheterodyne receivers. This condition is particularly true with sets having an intermediate frequency of 460 K.C. Customers sometimes complain of receiving interference from amateur stations, but when it comes to actual tracing of these interfering stations it is found that the trouble is caused by the pick-up of a commercial code station in the I.F. amplifier portion of the superheterodyne receiver. In some cases, code interference is heard around the low frequency end of the broadcast dial but is not heard at any other point. Many commercial stations use a 500 K.C. call frequency, and when contact is established with the desired station, the actual messages are then transmitted on another assigned frequency which may be anywhere between 500 K.C. and 400 K.C. If there is a station near a receiving set with a 450 K.C. or a 460 K.C. I.F., interference may be experienced.

It is possible to correct interference of this kind by re-adjusting the intermediate frequency to a different value from that of the transmitting station. For example, a Model 60 may pick up interference of this kind from a station operating on a frequency between 450 and 465 K.C. By changing the I.F. of the set to some other frequency at or near which there is no interfering station, it is possible to obtain interference-free reception at all times. This alteration should be accomplished by first changing the adjustment of the I.F. compensating condensers from their present value to some other value within five per cent of the present setting. Assume, for example, that the interfering station is on 454 K.C. Remove the control grid connection of the detector oscillator tube and connect the I.F. signal generator to the control grid. Set the signal generator to 470 K.C. and then readjust all of the I.F. compensating condensers of the radio set until maximum output is obtained with the output meter connected to the output tube. Remove the connection from the control grid and replace the grid clip. Connect the I.F. signal generator directly to the antenna and ground terminals

of the receiver and adjust the signal generator to 1,400 K.C. Adjust the high frequency oscillator compensating condenser and the antenna condenser for maximum output. Now set the signal generator at 600 K.C., and adjust the low frequency oscillator compensating condenser for maximum output. A recheck should now be made of the 1,400 K.C. setting and any necessary minor readjustments can be accomplished.

In selecting the intermediate frequency to which a change will be made, it is necessary to bear in mind the possibility of interference from some other station which may be transmitting on the changed frequency. In other words, it is necessary in most cases to do a certain amount of experimenting until some frequency within plus or minus five per cent of the original I.F. is obtained and no interference is experienced. In all cases, it is more desirable not to depart any more than necessary from the original intermediate frequency of the receiver.

On all PHILCO short wave models having a 460 K.C. I.F. there is a wave trap in the antenna circuit to prevent the reception of 460 K.C. interference. This wave trap can be adjusted to the frequency of the interfering station, and in this way minimum interference will be obtained. In the Models 60 and 16, it may be necessary in extreme cases to install an external wave trap mounted on the back of the chassis. This trap is secured to the chassis by means of a standard PHILCO drive screw. A ground connection is obtained in this way, and a short wire is then run from the other terminal on the wave trap to the antenna terminal of the receiver. The antenna and ground connections to the receiver are not disturbed in any way. The trap is then adjusted for minimum interference from the station. This special wave trap is known as PHILCO Part No. 38-5570, and sells at a list price of forty cents. In extreme cases of interference, it is recommended that you obtain one of these traps from your PHILCO distributor. The installation is extremely simple, and can be completed within five minutes' time.

## More Jobs If You Are Equipped for Short Waves

**T**HERE is always something new in radio that requires additional knowledge and experience on the part of the serviceman, and now it is short waves. This year, more than ever, short waves are a most important factor in radio reception, and the serviceman who is ready with the understanding and equipment for short wave servicing will be the successful man in his service activity.

A knowledge of short wave reception from practical experience is highly recommended. You can talk intelligently to a customer when you are sure of yourself, and when you know the type of reception which should be expected. Many people have been led to believe that it is possible to obtain any kind of foreign reception at any time. They think that they can get freak reception from extremely distant points if they happen to be listening when these distant stations are broadcasting. It is true that exceptional results can be obtained on modern short wave receivers. The receiver design has been greatly improved and broadcasting conditions are far superior to those of a few years ago. The customer must be reasonable in his demands of the short wave receiver, however, and the one person who can assure him of the type of reception to be expected is the serviceman.

### KNOW THE POSSIBILITIES

In most parts of the United States, it is possible to obtain at least one of the major foreign stations at some time during the daylight hours and very often this reception is obtainable up to ten or eleven o'clock at night. On occasions, freak reception from an unusual station may be obtained. The customer, however, should not be led to believe that such reception is a regular occurrence.

There are many locations within a given territory where short wave reception is not entirely satisfactory due to absorption of signal and to high noise level. If possible, the serviceman should make himself fully acquainted with these locations, so that he will be in a position to tell his customers what to expect.

The quality of the aerial is of far greater importance in short wave reception than in broadcast reception. In some parts of the country London or Berlin can occasionally be heard on a PHILCO Model 16 without any aerial except that afforded by placing the finger on the aerial post. For short wave reception in general, however, such an aerial would obviously be out of the question, and it is essential that a high, efficient aerial be employed in order to obtain the greatest possible signal strength for operation of the receiver. *PHILCO'S experience has shown that the most satisfactory results on short waves are obtained with a standard aerial arrangement of the highest quality materials.* The PHILCO Short Wave Antenna Kit is the answer to this requirement, and in every case where unusual foreign reception has been obtained, it was with the PHILCO Short Wave Kit.

### AERIAL INSTALLATION IMPORTANT

The actual installation of the equipment is highly important, and it is necessary that the precautions outlined in the instruction sheet accompanying the kit be followed carefully. To mention just a few of these precautions: It must be remembered that the aerial should be installed as high above the ground as possible, and at the same time, the lead-in wire should be placed away from the house by means of the six-inch stand-off insulators, and should enter the house through a porcelain insulator and not through a flat lead-in strip. The flat strip supplied with the kit is intended as a ground connection, and not as an aerial lead-in. The lead-in wire should come direct to the radio set, and should not go into the basement where high losses will be obtained because of the proximity of the wire to water pipes and electric wiring. A good ground connection is highly important on the short wave receiver. It is true that in many locations the ground connection is not essential on broadcast, but invariably it will be found that better short wave reception is obtained when a good ground is made to a water pipe or to a metal pipe driven several feet into moist earth.

*(Continued on Page 4)*

### RADIO MANUFACTURERS SERVICE

*Active in Canada*



*R.M.S. Meeting in the King Edward Hotel, Toronto, Sponsored by Cuttén Foster & Sons, Ltd., Philco Distributors of Toronto, Canada.*



## More Jobs If You Are Equipped for Short Waves

(Continued from Page 3)

### GOOD TEST EQUIPMENT ESSENTIAL

In order to do a complete service job on the short wave receiver, it is necessary that the serviceman have a short wave signal generator for adjusting the short wave compensating condensers. An ordinary I.F. or broadcast signal generator will not be suitable for this purpose because the harmonics are too close together to distinguish one from another in the short wave band. The PHILCO Model 091 short wave signal generator has a fundamental frequency of 3,600 K.C. This fundamental is high enough to afford easy distinction between the harmonics in the short wave band. The signal generator is crystal controlled and is, therefore, accurate at all times. In addition to the 091 or its equivalent, it is also necessary that the serviceman have an I.F. oscillator to adjust the intermediate frequency compensating condensers. In practically every short wave set, the largest portion of the gain in the receiver is obtained in the I.F. amplifiers. It is necessary that these circuits be carefully adjusted for maximum efficiency.

### GET FIRST HAND INSTRUCTION

In Radio Manufacturers Service Lesson No. 1, complete instructions are given for adjusting all PHILCO receivers, including the short wave sets. In each of the Service Bulletins

on the various new PHILCO sets with short wave reception, complete adjusting instructions are given. The serviceman should familiarize himself with these adjustments, and if necessary, should go to the PHILCO distributor for personal instruction. Many servicemen hesitate to make adjustments on a short wave receiver simply because they do not understand the principles involved, or the method of making these adjustments. If you will take the time to get first-hand instructions from your PHILCO distributor's Service Manager, you will find that the adjustment of the short wave receivers is no more complicated in theory or practice than adjustments on any other set.

Be sure that you have the equipment, and then obtain the knowledge of how to make the adjustments. You can be assured of complete co-operation from your PHILCO distributor, and you can also be certain that more service work will come your way because of your ability to do short wave servicing.

*The end of the Philco fibre screw driver, Part No. 27-7059, can be ground down to a point and will make an excellent probe for locating loose connections in a chassis.*

## Questions and Answers

1 Q. What type of knobs are intended to be used with the new PHILCO general replacement volume controls of the part number series from 33-5027 to 33-5054?

A. These shafts will fit every size and type of standard knob used by various radio manufacturers. When used with the PHILCO knob, the knob should be placed on the shaft 180° from the position which is ordinarily used for the standard PHILCO shaft.

2 Q. How is it possible to determine when a Dry "A", "B", or "B"/"C" battery has served its normal life?

A. The best indication of normal wear on a dry battery is a uniform voltage in all sections of the battery. If a battery has been shorted externally, all sections will be down uniformly, but there may be present a strong odor of ammonia. When a battery is defective, one section will read low voltage while other sections may read normal, or slightly below normal, voltage. When a battery has served its normal life, there will be no odor of ammonia present, and all sections of the battery will be down in approximately the same proportions.

3 Q. Is it possible to obtain an accurate voltage reading of the filament voltage on the Type 84 rectifier tube used in the Model 32 with an ordinary voltmeter?

A. No. The square wave form and the high frequency (approximately 90 cycles) prevent accurate voltage readings with an ordinary moving vane type A.C. meter, such as that usually employed for 60 cycle A.C. voltage measurements.

4 Q. Is there any difference in the new type 39/44 tubes used in the new PHILCO models from the earlier type 44 tubes which were employed in last year's models?

A. The tubes are interchangeable. There is a slight difference in certain of the electrical characteristics, but this difference is not sufficient to alter reception in any way on those receivers which employ the type 44 tube.

5 Q. Is there available black burn-in wax for use on some of the later PHILCO models?

A. Yes. The wax is known as PHILCO Part. No. 80348.

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