

# PHILCO

REG. U.S. PAT. OFF

## Service Bulletin No. 120C

THIS BULLETIN SUPERSEDES SERVICE BULLETINS NOS. 120 AND 120B

### Adjusting Philco Superheterodynes

The compensating condensers in every Philco Receiver are carefully adjusted before the set leaves the factory. Under ordinary circumstances they should never have to be re-adjusted in the field. Extremely rough handling during shipment, or a slight change in some of the electrical characteristics of the radio circuit may in some cases make re-adjustment necessary.

The indications that the set may require re-adjustment are poor sensitivity, poor selectivity and dial readings in kilocycles off more than 20 K.C. In some cases, an unstable condition of the set with a tendency to squeal or howl on certain sections of the dial may also be an indication of improper adjustment.

Under no circumstances should a re-adjustment be attempted unless the necessary equipment is available and unless the proper instruction has been received. Your distributor will gladly assist you in both of these matters.

The general method of adjusting the compensating condensers in all Philco superheterodyne receivers is the same. Once this procedure is understood for one model, it can be applied with but little change to the various other Philco models. By means of the instructions below and by reference to the different illustrations, the complete adjustments can be made on all Philco superheterodynes.

**EQUIPMENT.** The following equipment is needed:

1. Philco Model 095 Intermediate Frequency Oscillator accurately calibrated at 175 K. C. and 260 K. C., equipped with self contained output meter and batteries.
2. Philco fibre wrench, part 3164.

**INTERMEDIATE FREQUENCY OR I. F. ADJUSTMENTS.** The adjustment of the I. F. compensating condensers should be done in the following manner:

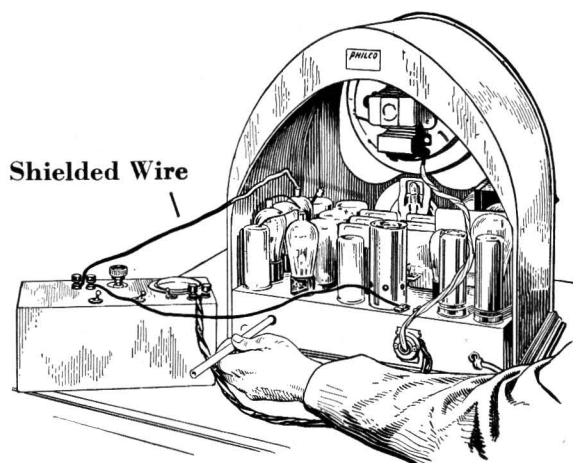


Fig. 1

1. Make the necessary connections between the oscillator and the receiver as shown in the illustration, Fig. 1. The connections consist of (a) the ground wire to the GND. terminal of the radio set and to the G terminal of the oscillator; (b) the A terminal of the oscillator through the necessary length of shielded lead, (shielding grounded) to the grid of the first detector tube (tube shield in place and first detector grid clip removed), (c) output meter terminals to the primary of the output transformer (this connection is obtained at the speaker plug and socket through the Philco plug-in adapter, part 6095); in the Philco models without a speaker plug, this connection is made to the primary of the output transformer, (d) power cord of receiver to the electric power outlet after all other connections have been completed.

2. Turn on the radio set and the oscillator. Place the oscillator switch in the 260 K. C. or 175 K. C. position, depending upon the Philco model being adjusted. See pages 3 and 4 for the intermediate frequency setting. When adjusting sets with a NORMAL-MAXIMUM switch, the switch should be placed in the NORMAL position. Turn the radio volume control to Maximum. Set the dial between 60 and 65 on the Philco scale. Adjust the oscillator control (attenuator) until a reading is obtained on the output meter of approximately  $\frac{1}{2}$  the scale deflection.
3. By means of the Philco fibre wrench, part 3164, adjust the various intermediate frequency condensers, one at a time, to obtain maximum reading in the output meter. Locations of all compensating condensers are shown in the illustrations on pages 3 and 4. It is desirable to start with the last I. F. compensating condenser in the circuit (3rd I. F. secondary in the case of the 11 tube models and progress in the adjustments toward the first. It may be necessary while the adjustments are being made, to lower the setting of the oscillator control from time to time so as to keep the output meter reading within the scale range.

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4. After these adjustments have been completed, remove the oscillator connection from the grid terminal of the first detector tube and restore the grid clip connection to this terminal.
5. The adjustment of the first I. F. primary (coupling) condenser may have a slight effect on the adjustment of the low frequency compensating condenser in the Philco models which have a combined oscillator and first detector tube--such as the 51 and 52 series, the latest 70 and 90 series, and the 71, 91, 15 and 47 series. After making the adjustment of the I. F. condensers on these models, be sure to make the low frequency adjustment as described below.

**HIGH FREQUENCY ADJUSTMENTS.** Improper adjustment of the high frequency compensating condenser is characterized by weak reception and poor selectivity at the high frequency end of the dial and by dial readings being off by more than 20 K. C. at this end of the dial. Proceed in the following manner:

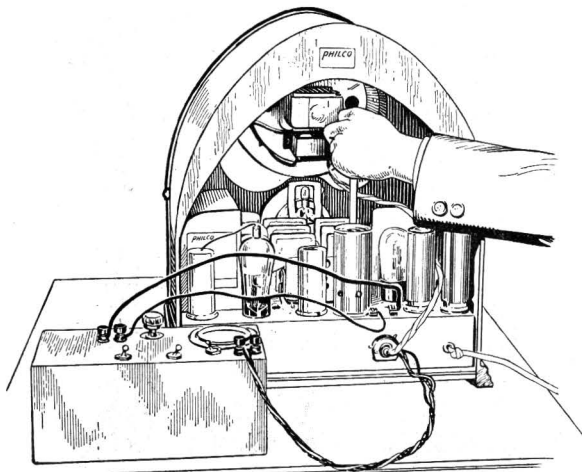


Fig. 2

1. Connect from the A terminal of the oscillator to the ANT terminal of the broadcast receiver. All other connections remain the same as for adjustment of the I. F. compensating condensers. See Fig. 2 for complete connections.
2. Set the switch on the oscillator to 175 K. C. Set the dial of the receiver to exactly 140 (1400 K. C.). The eighth harmonic of 175 K. C. will be received at this point. Turn the volume control to maximum. Turn on the oscillator and adjust the control until a  $\frac{1}{2}$  scale reading is obtained on the output meter. If the receiver is badly out of adjustment, it may not be possible to obtain such a reading, in which case the meter reading must be disregarded temporarily and the adjustments made by ear.
3. Carefully adjust the high frequency compensating condenser for maximum reading in

- the output meter or for maximum volume if the output is not great enough to be read on the meter.
4. When making this adjustment, it may be found that a given position of the adjusting nut can be obtained at which maximum reading is noted, but that the meter reading decreases when the fibre wrench is lifted from the nut. Allow for this condition by turning slightly beyond the point of maximum reading, then when the wrench is removed the reading will go up instead of down.
  5. After making the adjustment, turn the station selector slightly to note if any increase in volume is obtained as the set is being re-tuned. If such an increase is obtained, then the antenna, detector and r. f. condensers should be adjusted as described below. After this adjustment, the high frequency condenser can again be re-adjusted at 1400 K. C.
  6. In some cases, when first starting to make the 1400 K. C. adjustment, it may be found that the signal from the oscillator cannot be heard at 140 because the set is so far out of adjustment. In this case, tune the set to the signal, and then adjust the Antenna Detector and R. F. condenser first. Re-adjust the high frequency condenser at 140 on the dial.

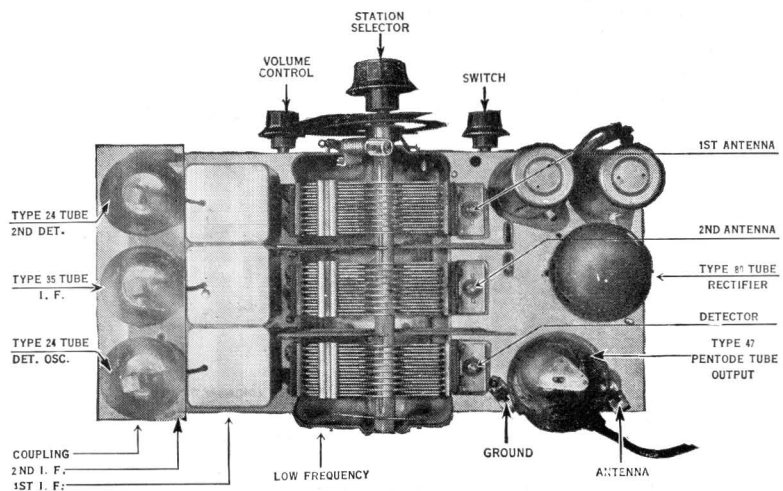
### ANTENNA, DETECTOR, AND R. F. ADJUSTMENTS:

The adjustment of the antenna, detector, and R. F. compensating condensers is done at 140 on the dial in the same manner and with the same connections as for the high frequency adjustments.

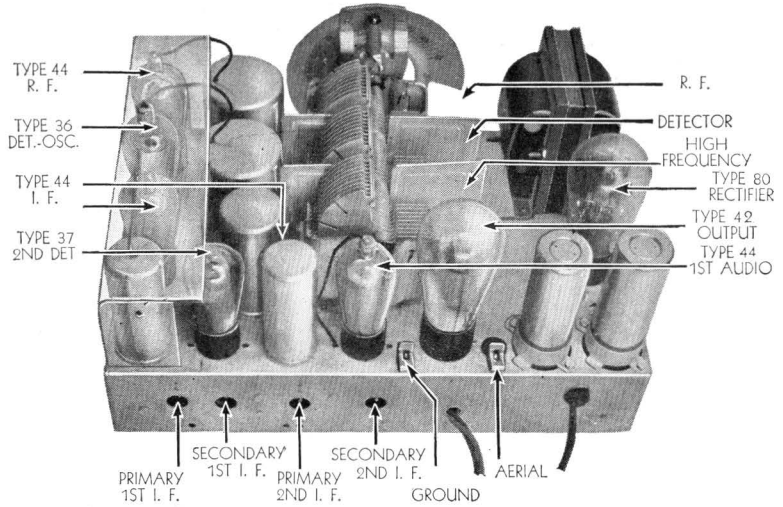
**LOW FREQUENCY ADJUSTMENT.** The characteristics of improper adjustment of the low frequency condensers are weak reception, poor selectivity and dial calibrations off more than 20 K. C. at the low end of the dial. The low frequency adjustment is made with the same connections as for the high frequency and Antenna condenser adjustments. Proceed in the following manner:

1. With the receiver and the oscillator in operation, the latter at 175 K. C., set the Philco dial at exactly 70 on the scale.
2. With the volume control at maximum, adjust the oscillator output until the output meter reads approximately  $\frac{1}{2}$  scale deflection. Adjust the low frequency compensating condenser for maximum reading in the output meter.
3. If the signal comes in stronger at a position off 70 on the Philco scale, adjust for maximum output on the meter at this "Off K. C." position of the dial. Now re-tune the set slightly to obtain any further possible increase, adjusting the compensating condenser and re-tuning the dial each time so as to bring the point of maximum output as near 70 as possible.
4. Re-set the dial to exactly 140, and re-adjust the high frequency condenser. It is possible that the adjustment of the low frequency condenser has affected the high setting of the dial slightly.

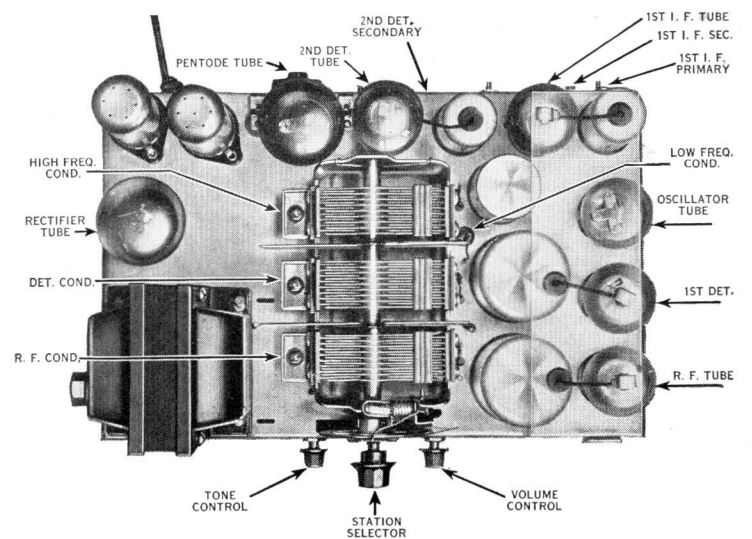
# LOCATIONS OF COMPENSATING CONDENSERS



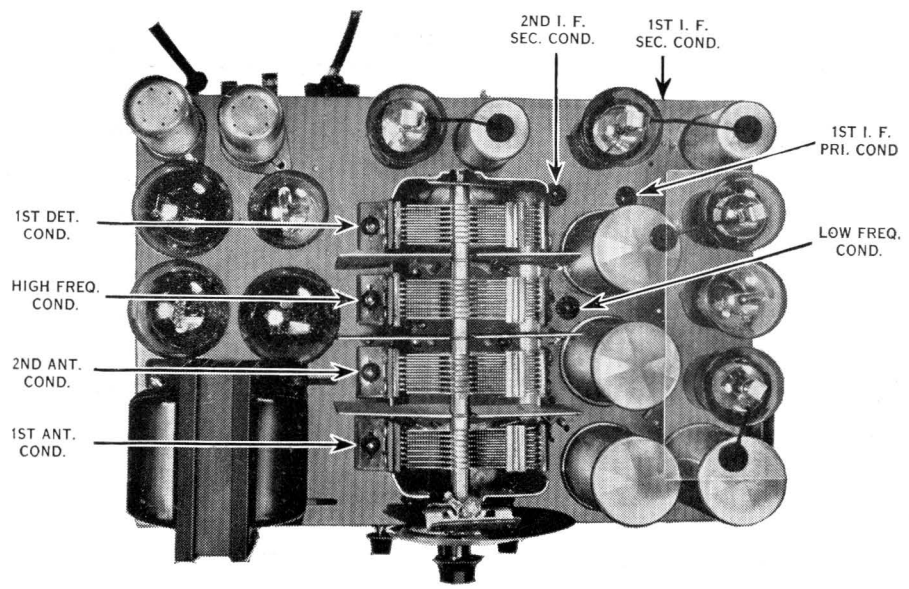
MODELS 51 and 52  
Adjust I. F. at 175 K. C.



MODEL 71  
MODEL 70 with Automatic Volume Control---Same Compensating Condenser Locations.  
Adjust I. F. at 260 K. C.

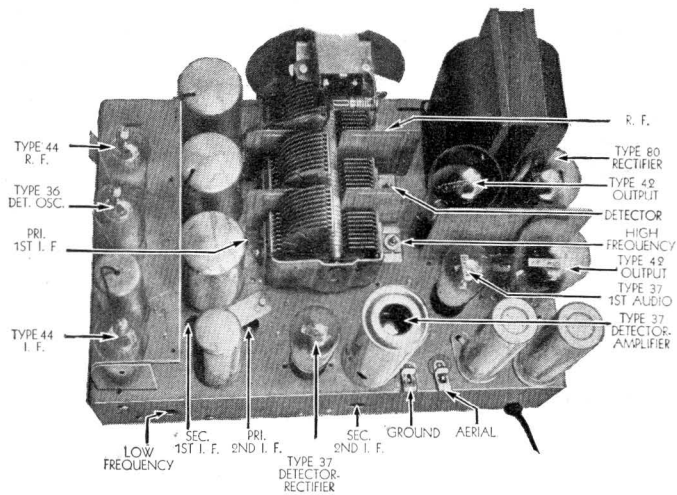


MODEL 70 without Automatic Volume Control.  
Adjust I. F. at 260 K. C.



MODEL 90 with Single Pentode Output  
MODEL 90 with Push-Pull 45's Output  
Adjust I. F. at 175 K. C.

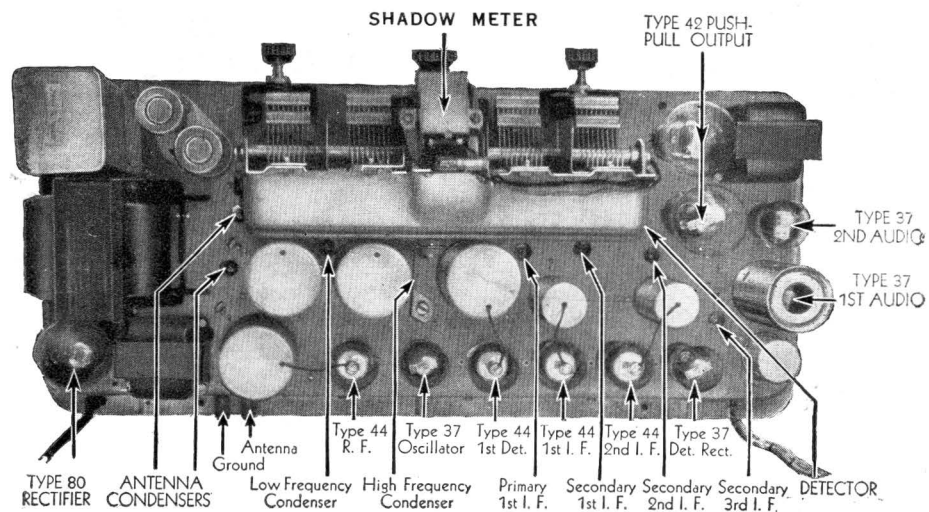
## LOCATIONS OF COMPENSATING CONDENSERS



**MODEL 91**

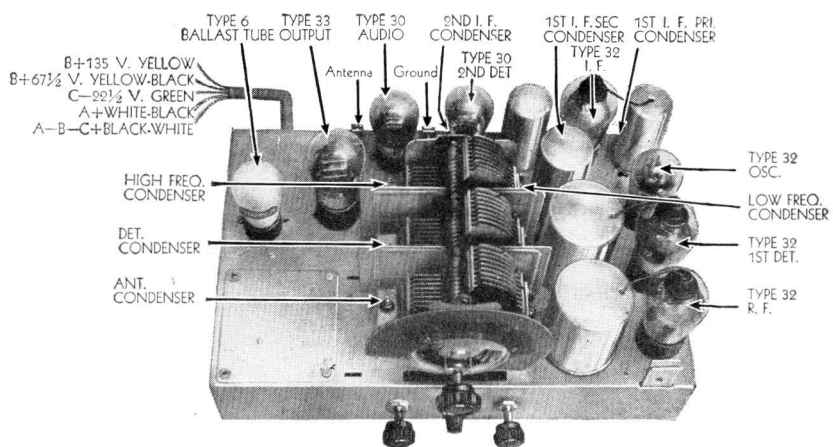
MODEL 90 with Push-Pull 47's Output--Same Compensating Condenser Locations.

Adjust I. F. at 260 K. C.



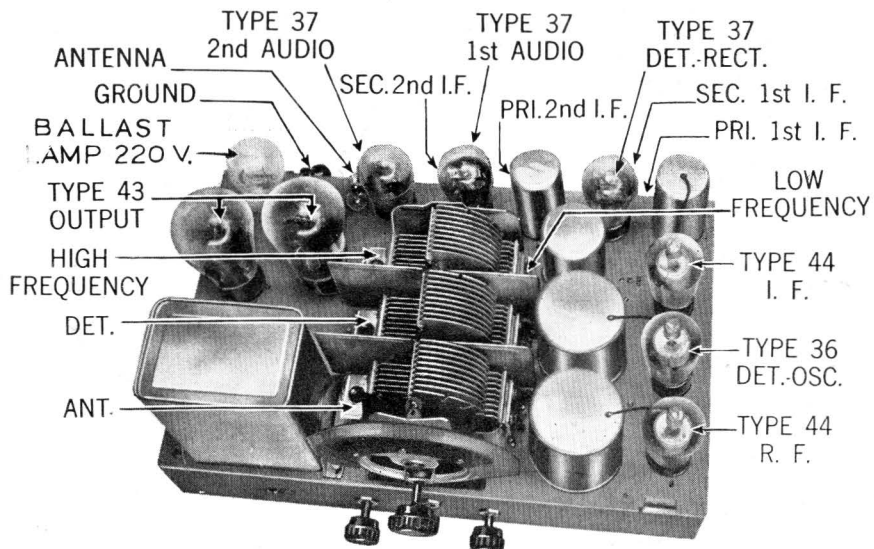
**MODEL 15**

MODELS 111 and 112--Same Compensating Condenser Locations. Adjust I. F. at 175 K. C.



MODELS 35 and 36 (Battery Operated)

Adjust I. F. at 260 K. C.



**MODEL 47 (D. C.)**

Adjust I. F. at 260 K. C.