

## Model 37-610 Codes, 121-122

### General Description

Model 37-610 is a 5 tube superheterodyne receiver for operation on alternating current, having three tuning ranges, covering standard broadcast and short-wave frequencies and using the New Philco High-Efficiency self-centering glass tubes.

The circuit includes the Philco Foreign Tuning System—controlled by the range switch—providing maximum sensitivity and noise reduction when used with the Philco High Efficiency Aerial, supplied with the receiver.

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided at the rear of the chassis. Connect the jumper of the terminal panel across terminal 3 and 4.

If a temporary aerial is used, the jumper should be across terminal 2 and 3. The aerial connects to terminal 1 and the ground to terminal 3.

A good ground connection is desirable in all installations—with the Philco High-Efficiency Aerial, a ground lead and ground clamp are provided. Make the ground connection from the nearest water or radiator pipe to terminal 3 on the terminal panel.

### CONSTRUCTION

The chassis is constructed in three basic assembly units.

The Radio Frequency unit contains a 6A8G tube which functions as a Detector-Oscillator, tuning condenser, antenna and oscillator coils for each tuning range, selector switch—compensating condensers for all coils and other parts necessary for the associated circuits. The unit is separately mounted on rubber grommets, cushioning it from the main chassis.

The Intermediate Frequency unit, mounted on the right-hand side of the chassis, facing front, consists of the Intermediate

Frequency coils, compensating condensers, a 6K7G tube for I. F. Amplifier stage, and a 6Q7G tube as the second detector-automatic volume control and first audio stage.

All voltages supplied to the I. F. and R. F. units are furnished from a terminal strip mounted in this unit.

The Power Pack and audio output circuits, together with the required Voltage dividers and filter condensers are mounted in the power unit.

Although unit construction has changed the appearance of this model, the service bulletin will be of great assistance in checking through all stages of the receiver. The Wiring Diagram, as usual, is numbered, indicating all important parts. These numbers correspond with the parts layout shown in Fig. (6). In addition, the range switch wafers are shown on the schematic diagram. The contacts on each wafer are lettered and numbered to indicate their connection points in the schematic diagram, which are also lettered and numbered. The physical drawings of each coil used in the receiver are also shown on schematic diagram Fig. (5). The connections of these coils are numbered on the coil itself and on the schematic diagram.

Fig. 1 shows the Voltage measurements taken from the bottom of the sockets at each contact. In Fig. 2, the correct position of the dial indicator, for proper adjustment of the compensators is shown. Fig. 3, and 4, are the location of the I. F. and R. F. compensators respectively.

The Model 37-610 code 121 receiver is used in cabinets type B and J. In code 122 receiver, Type T cabinet is used. This receiver differs from code 121, only in the rectifier socket mounting and power transformer. The socket is placed adjacent to the 6F6G output tube and power transformer (Part No. 32-7626) is used. Location of rectifier socket is shown in Figs. 1 and 6.

### Electrical Specifications

**Voltage Rating:** 115 Volts. A. C.

**Frequency Rating:** 50-60 and

For 25 to 40 cycle operation, use Power Transformer marked with asterisk in parts list.

**Power Consumption:** 60 Watts.

**Type and Number of Tubes:** 1 type 6A8G, Detector-Oscillator; 1 type 6K7G, I. F.; 1 type 6Q7G; 2nd Detector, A. V. C. and 1st audio; 1 type 6F6G, Output; and 1 type 5Y4G Rectifier.

**Undistorted Output:** 3 Watts.

**Type Circuit:** Superheterodyne with Pentode Output.

**Intermediate Frequency:** 470 K. C.

**Tuning Ranges:** 3. Range 1; 530 to 1720 Kilocycles.

Range 2; 2.3 to 7.4 Megacycles.

Range 3; 7.35 to 22 Megacycles.

**Speaker Code:** 121.—HS.

**Speaker Code:** 122.—S7.

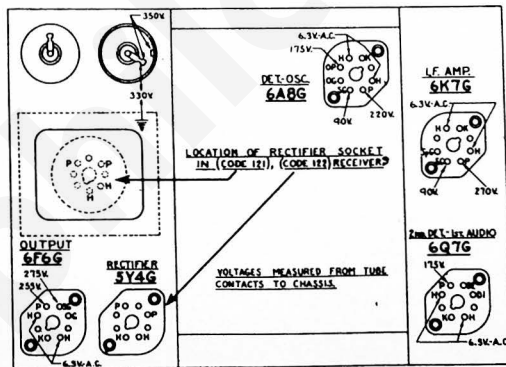


Fig 1—Tube Socket Voltages  
Viewed from Underside of Chassis

The Voltages Indicated by Arrows were Measured with a PHILCO 025 CIRCUIT TESTER which contains a 1000 ohm per volt Voltmeter. Range Switch in Broadcast Position. 115 volt line.

### POWER TRANSFORMER DATA

| Lead No. Shown on Schematic | A C Volts | Currents | Circuit           | Color  | Resistance           |
|-----------------------------|-----------|----------|-------------------|--------|----------------------|
| 1-2                         | 120       | —        | Pri.              | White  | 5 ohms               |
| 3-4                         | 5.0       | 2.0A     | Fil. Rectifier    | Blue   | .1 ohms              |
| 5-7                         | 670       | 70 M.A.  | High Voltage Sec. | Yellow | 145 ohms<br>155 ohms |
| 6                           | —         | —        | Center Tap of 5-7 | —      | —                    |
| 8-9                         | 6.7       | 2.1A     | Fil.              | Black  | .1 ohms              |

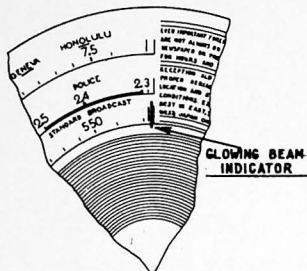


Fig. 2—Dial Calibration

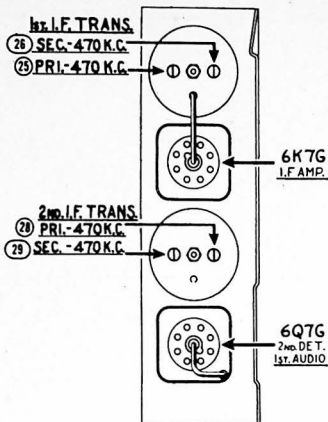


Fig. 3—Locations of I.F. Compensators Top of Chassis

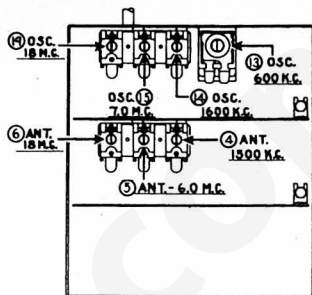


Fig. 4—Locations of R.F. Compensators Underside of Chassis

### Alignment of Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit, four in the Oscillator Circuit, and three in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the PHILCO MODEL 088 SIGNAL GENERATOR, covering from 110 to 20000 K. C. is recommended to adjust the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators. PHILCO MODEL 025 CIRCUIT TESTER contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Wrench No. 3164 and Fibre Handle Screw-driver No. 27-7059 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 3 and 4.

The following procedure must be observed in adjusting the compensators:—

**DIAL ADJUSTMENT**—In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of dial hub, then turn dial until the glowing indicator is centered between the index lines of dial scale (see Fig. 2). Now tighten the dial hub set screw in this position.

**OUTPUT METER**—The 025 Output Meter is connected to the plate and cathode terminals of the (6F6G) tube. Adjust the meter to use the (0-30) volt scale.

Before adjusting the compensators of each circuit, the signal generator attenuator should be set to give approximately ¼ scale reading on output meter.

#### INTERMEDIATE FREQUENCY CIRCUIT

##### Frequency 470 K. C.

- 1 Connect the 088 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8G and the ground connection of output lead to the chassis.
- 2 The tuning range switch is set in position No. 1 (Broadcast). Rotate the tuning condenser of receiver to the maximum capacity position (counter-clockwise), and adjust the signal generator for 470 K. C.
- 3 Adjust compensators ② 2nd I. F. Sec., ③ 2nd I. F. Pri., ④ 1st I. F. Sec. and ⑤ 1st I. F. Pri. for maximum reading on output meter.

#### RADIO FREQUENCY CIRCUIT

##### Tuning Range—7.3 to 22.0 M. C.

- 1 Remove the signal generator output lead from grid of 6A8G tube and connect it through a 0.1 mf. condenser to terminal No. 1 on aerial input panel, rear of chassis. Connect generator ground lead to chassis. Terminals 2 and 3 of aerial input panel must be connected with connector link provided on the panel.

- 2 Set tuning range switch in position No. 3. Turn signal generator and receiver dial to 18.0 M. C. and adjust compensators ⑥ osc., and ⑦ ant. for maximum output.

The adjustment of the antenna compensator on the high frequency range causes a slight detuning of the oscillator circuit. In order to overcome this detuning effect, connect a variable condenser of approximately 350 mmf., having a good vernier drive, across the oscillator section of the tuning condenser. Leaving the signal generator and receiver dials at 18.0 M.C., tune the added condenser so that the second harmonic of the receiver oscillator will beat against the signal from the 088 signal generator. The antenna compensator ⑦ should then be adjusted to give maximum output. Now remove the external condenser and turn compensator ⑧ to maximum capacity (clockwise) then without moving signal generator or receiver tuning condenser, back off compensator ⑧ (counter-clockwise) until a second peak is reached on the output meter. Note:—The first peak is caused by tuning to the image signal and must be neglected.

##### Tuning Range: 2.3 to 7.4 Megacycles.

- 1 Turn range switch to position No. 2 (Police). Rotate signal generator and receiver dials to 7.0 M.C. Then adjust compensator ⑨ for maximum output. Now turn signal generator and receiver dials to 6.0 M.C. and adjust compensator ⑩ for maximum reading on output meter.

##### Tuning Range: 530 to 1720 Kilocycles.

- 1 Set range switch in position No. 1 (standard broadcast). The 088 signal indicator is set at 800 K. C. and the receiver dial at 1600 K. C.

(a) In adjusting the receiver at 1600 K. C., the second harmonic of 800 K. C., to which the signal generator is tuned, is used.

Now adjust compensator ⑪ osc., ⑫ ant. for maximum output.

- 2 The low frequency end of the band is now tuned by turning signal generator and receiver dials to 600 K. C. and adjust compensator ⑬ for maximum output. When compensator ⑬ osc. series is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows: First tune compensator ⑬ for maximum output. Then vary the tuning condenser for maximum output about 600 K. C. Now retune compensator ⑬, and again vary the tuning condenser back and forth at 600 K. C. for maximum output. This operation of first tuning the compensator, then the tuning condenser is continued until maximum output is obtained at the 600 K. C. frequency.
- 3 After the low frequency (600 K. C.) end of range 1 is adjusted, the 1600 K. C. end is re-adjusted, as given in Paragraph 1 above, to correct any variation that the low frequency series compensator may have caused in the alignment of the high frequency end.
- 4 Now turn signal generator and receiver dial to 1500 K. C. and re-adjust compensator ⑭ for maximum output.

I.F. = 470 K.C.

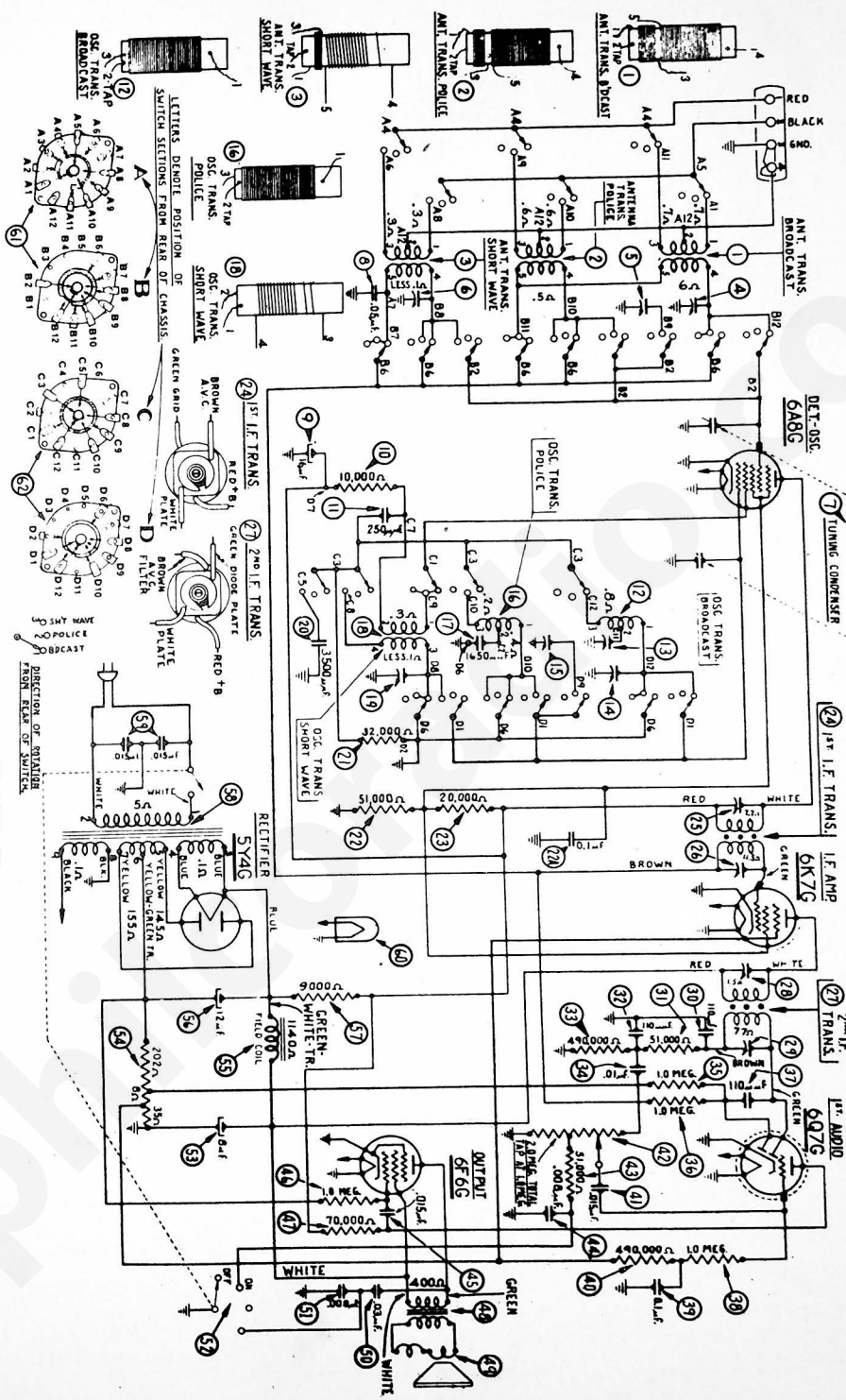


Fig. 5—Schematic Diagram—Model 37-610

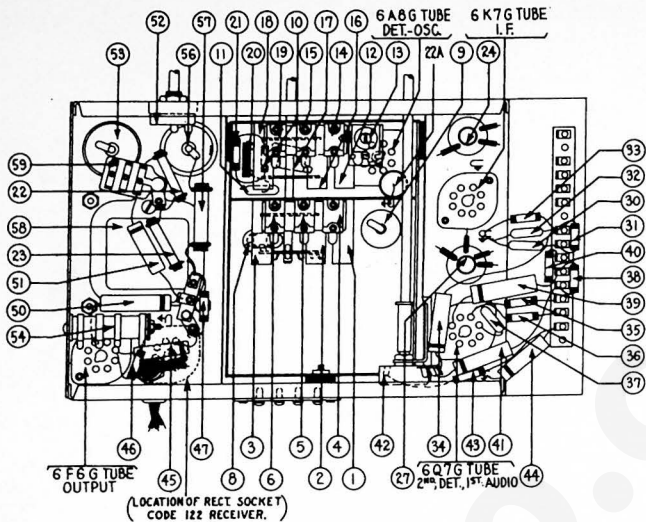


Fig. 6—Base View of Chassis

### Replacement Parts—Model 37-610

| Schem. No. | Description                        | Part No.  | Price List | Schem. No. | Description                                      | Part No.      | Price List |
|------------|------------------------------------|-----------|------------|------------|--|---------------|------------|
| ①          | Antenna Transformer (Broadcast)    | 32-2108   | \$0.80     | ⑤          | Power Transformer 50-60 cycle 115 volts          | 32-7683       | \$4.25     |
| ②          | Antenna Transformer (Police)       | 32-2110   | .65        | ⑥          | Power Transformer 25-40 cycle 115 volts          | 32-7584       |            |
| ③          | Antenna Transformer (Short-Wave)   | 32-2109   | .75        | ⑦          | Power Transformer 50-60 cycle 115 volts Code 122 | 32-7628       |            |
| ④          | Compensator (Broadcast)            | 31-6092   | .60        | ⑧          | Power Transformer 25-40 cycle 115 volts Code 122 | 32-7627       |            |
| ⑤          | Compensator Ant. (Police)          | Part of ④ |            | ⑨          | Condenser (Twin Bakelite, .015-.015 mfd.)        | 3793 DG       | .40        |
| ⑥          | Compensator Ant. (Short-Wave)      | Part of ④ |            | ⑩          | Pilot Lamp                                       | 34-9339       | .15        |
| ⑦          | Tuning Condenser                   | 31-1821   | 3.50       | ⑪          | Wave Switch Antenna Section                      | 42-1170       | 1.10       |
| ⑧          | Condenser (.05 mfd. Tubular)       | 30-4020   | .20        | ⑫          | Wave Switch Osc. Section                         | 42-1172       | 1.10       |
| ⑨          | Electrolytic Condenser 16 mfd.     | 30-2118   | 1.65       | ⑬          | I. F. Wiring Panel                               | 38-7703       | .25        |
| ⑩          | Resistor (10000 ohm 1/4 watt)      | 33-310339 | .20        | ⑭          | I. F. Wiring Panel Spacer                        | 28-4001       | Per C .25  |
| ⑪          | Condenser (250 mmfd. Mica)         | 30-1032   | .25        | ⑮          | Ant. Panel                                       | 27-6057       | .11        |
| ⑫          | Oscillator Transformer (Broadcast) | 32-2120   | .65        | ⑯          | Tube Socket 7 prong                              | 27-6058       | .11        |
| ⑬          | Compensator Osc. Series 600 K.C.   | 31-6056   | .55        | ⑰          | Tube Socket Rectifier, Code 122                  | 27-6083       | .11        |
| ⑭          | Compensator Osc. 1600 K.C.         | 31-6092   | .60        | ⑱          | Tube Shield                                      | 28-2729       | .10        |
| ⑮          | Compensator Osc. 7.0 Mez.          | Part of ⑬ |            | ⑲          | I. F. Transformer Shield                         | 38-7763       | .20        |
| ⑯          | Oscillator Transformer (Police)    | 32-2121   | .40        | ⑳          | AC Cable   | L-2183        | .40        |
| ⑰          | Condenser (Semi-fixed 1550 mfd.)   | 31-4096   | .40        | ㉑          | Speaker Cable                                    | L-2181        | .25        |
| ⑱          | Oscillator Transformer (S.W.)      | 32-2110   | .75        | ㉒          | Grommet Mtg. Tuning Condenser                    | 27-4325       | .02        |
| ⑲          | Compensator (Osc. 18.0 megacycles) | Part of ⑱ |            | ㉓          | Grommet Mtg. R. F. Unit                          | 27-4317       | .04        |
| ⑳          | Condenser (Semi-fixed 3500 mfd.)   | 31-6097   | .50        | ㉔          | Mtg. Screw R. F. Unit                            | 28-2257 FA-3  | .01        |
| ㉑          | Resistor (32000, 1/2 watt)         | 33-332339 | .20        | ㉕          | Mtg. Screw R. F. Unit                            | W-729 FA-3    | Per C .45  |
| ㉒          | Resistor (51000, 1/2 watt)         | 33-351339 | .20        | ㉖          | Mtg. Washer R. F. Unit                           | 28-3927       | .01        |
| ㉓          | Condenser (.1 mfd. Tubular)        | 30-4170   | .25        | ㉗          | Pilot Lamp Assembly                              | 38-7700       | .35        |
| ㉔          | Resistor (20000 ohm, 1/4 watt)     | 33-320439 | .20        | ㉘          | Bracket Electrolytic Condenser                   | W-1446 FA-3   | Per C .40  |
| ㉕          | 1st I. F. Transformer              | 32-2100   | 1.50       | ㉙          | Bracket Screw Electrolytic Condenser             | W-95 FA-3     | Per C .30  |
| ㉖          | Compensator 1st I. F. Transformer  | Part of ㉕ |            | ㉚          | Bracket Nut Electrolytic Condenser               | W-1358A       | Per C 2.50 |
| ㉗          | Compensator 1st I. F. Transformer  | Part of ㉕ |            | ㉛          | Chassis Mtg. Screw                               | 42-1173 Rev-E | .50        |
| ㉘          | 2nd I. F. Transformer              | 32-2102   | 1.50       | ㉜          | Wave Switch Indexing Plate & Shaft               | 27-5203       | .50        |
| ㉙          | Compensator 2nd I. F. Transformer  | Part of ㉘ |            | ㉝          | Dial   | 28-7187 FA-3  | .12        |
| ㉚          | Compensator 2nd I. F. Transformer  | Part of ㉘ |            | ㉞          | Dial Hub   | W-1641        | .02        |
| ㉛          | Condenser (110 mmfd. Mica)         | 30-1031   | .20        | ㉟          | Dial Set Screw                                   | 28-2837 FA-3  | .10        |
| ㉜          | Resistor (51000 ohm, 1/4 watt)     | 33-351339 | .20        | ㊱          | Dial Clamp                                       | 38-7912       | .10        |
| ㉝          | Condenser (110 mmfd. Mica)         | 30-1031   | .20        | ㊲          | Dial Screen Assembly                             | 28-7912       | .10        |
| ㉞          | Resistor (490000 ohm 1/4 watt)     | 33-449339 | .20        | ㊳          | Dial Gear  | 28-7185       | .10        |
| ㉟          | Condenser (.01 mfd. Tubular)       | 30-4124   | .25        | ㊴          | Drive Gear                                       | 31-1884       | .25        |
| ㊱          | Resistor (1 megohm 1/2 watt)       | 33-510339 | .20        | ㊵          | Scale Guard                                      | 27-8324       | .02        |
| ㊲          | Resistor (1 megohm 1/2 watt)       | 33-510339 | .20        | ㊶          | Dial Gear Thrust Spring                          | 28-3904       | .01        |
| ㊳          | Condenser (110 mfd. Mica)          | 30-1031   | .20        | ㊷          | Dial Gear C. Washer                              | 28-3976       | .30        |
| ㊴          | Resistor (1 megohm 1/2 watt)       | 33-510339 | .20        | ㊸          | Dial Gear Thrust Washer                          | 27-5198       | .30        |
| ㊵          | Condenser (.015 mfd. Tubular)      | 30-4353   | .20        | ㊹          | Mask   | 27-8318       | Per C .50  |
| ㊶          | Volume Control                     | 33-5168   | 1.00       | ㊺          | Mask Washer                                      | 37-8566       | .35        |
| ㊷          | Resistor (51000, 1/2 watt)         | 33-510339 | .20        | ㊻          | Mask Arm and Link Assembly                       | 38-7844       | Per C .50  |
| ㊸          | Condenser (.008 mfd. Tubular)      | 30-4112   | .20        | ㊼          | Mask Guide                                       | 28-8624       | Per C .50  |
| ㊹          | Condenser (.015 mfd. Tubular)      | 30-4226   | .20        | ㊽          | Spring   | 27-8310       | .02        |
| ㊺          | Resistor (1 megohm 1/2 watt)       | 33-510339 | .20        | ㊾          | Knob Tuning Control                              | 27-4330       | .10        |
| ㊻          | Resistor (70000 ohm 1/2 watt)      | 33-510339 | .20        | ㊿          | Knob Vernier                                     | 27-4332       | .10        |
| ㊼          | Output Transformer                 | 32-2019   | .85        | ①          | Knob—Tone & Volume                               | 27-4326       | .10        |
| ㊽          | Voice Coil and Cone                | 28-5157   | .80        | ②          | Knob—Wave Switch                                 | 28-6499       | .10        |
| ㊾          | Condenser (.03 mfd. Tubular)       | 30-4380   | .20        | ③          | Volume Control Shaft                             | 28-6499       | Per C .40  |
| ㊿          | Condenser (.008 mfd. Tubular)      | 30-4112   | .20        | ④          | Volume Control Spring                            | 28-8610       | Per C .03  |
| ①          | Tone Control and AC Switch         | 42-1182   | .75        | ⑤          | Retaining Clip                                   | 28-4186       | Per C .75  |
| ②          | Electrolytic Condenser (.8 mfd.)   | 30-5024   | 1.10       | ⑥          | Washer   | 4430          | Per C 1.50 |
| ③          | Resistor C-Bias                    | 33-3277   | .20        | ⑦          | Washer   | W-484 FA-3    | Per C 1.25 |
| ④          | Field Coil Assembly                | 38-3039   | 2.75       | ⑧          | Nut Tone Volume Controls                         | 38-1009       |            |
| ⑤          | Electrolytic Condenser (12 mfd.)   | 30-2117   | 1.20       | ⑨          | Speaker 57                                       | 38-1220       |            |
| ⑥          | Resistor (9000 ohm 2 watt)         | 33-290539 | .30        | ⑩          | Speaker HS.                                      |               |            |

\*Code 122, \*\*Code 122, 25 cycle operation.