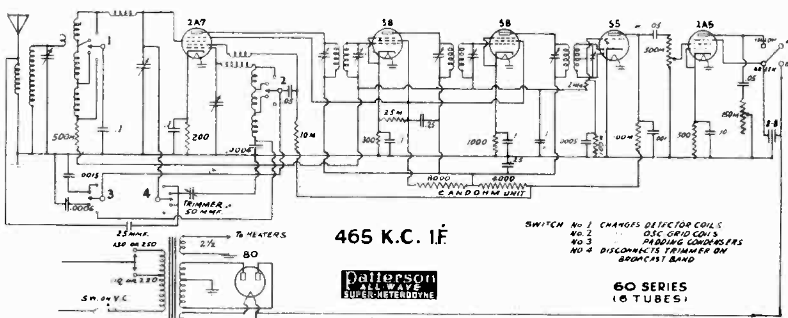
VOLUME V

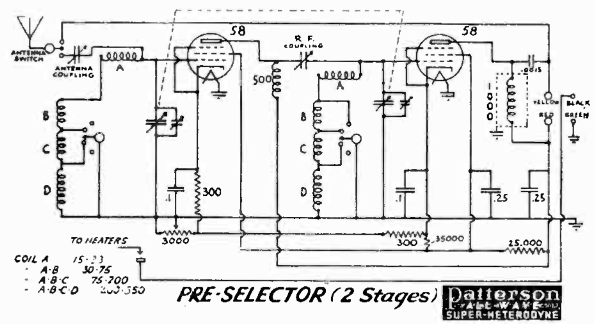
PERPETUAL TROUBLE SHOOTER'S MANUAL

JOHN F. RIDER

MODEL 60 Series
Schematic
MODEL Pre-Selector
Schematic, Data

PATTERSON RADIO CO.



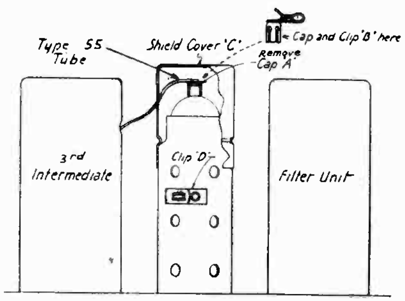


PHONOGRAPH CONNECTION

INSTRUCTIONS FOR CONNECTING ELECTRIC PICKUP TO ALL MODEL RECEIVERS:

The use of jacks and switches for operation of electric phonograph pickups is unsatisfactory with the modern highly perfected radio receivers. The electrical loss in the long leads used to connect the switch and jack into the circuit is enough to unbalance these highly sensitive, long distance receivers and the full capabilities of the set are lost.

For best radio and phonograph operation the rules below should be followed. With the methods graphically shown, full efficiency of the radio and phonograph are utilized and the greatest satisfaction is obtained.

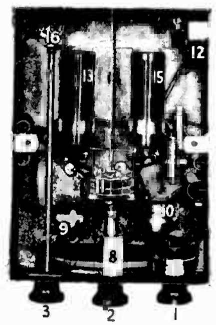


METHOD No. 1

Remove shield cover "C." Remove cap "A."

Place cap "B," with attached clip, on top of 55 tube. Connect one phonograph pickup wire to clip "B." Connect other phonograph wire to clip "D." Phonograph will now play and volume control on radio will control phonograph.

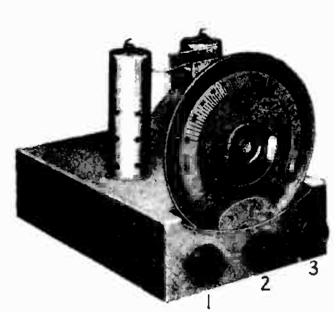
Some pickups work better with a 4½ volt C battery in series with lead that connects to clip "D." (+) to clip. (—) to pickup lead.



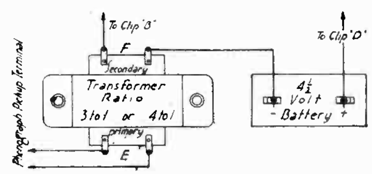
1. Sensitivity Control
2. Push, Band Change, Normal Preselection Dial
3. Antenna Change-over Switch
8. Switch Clutch
9. 15-33 First Stage Coil
10. 15-33 Second Stage Coil
11. Band Change Switch, Silver Plated Contacts
12. Output "B" + Choke
13. 3-Band Coils, First Stage
14. Shield
15. 3-Band Coils, Second Stage
16. Antenna Change-over Switch

Weight Packed, 22 Lbs.

Same type construction as in the PR-10.



1. Sensitivity Control
2. Push Band Change, Normal Preselection Dial
3. Antenna Change-over Switch
4. Two-Gang Condenser, Rubber Mounted
5. First R.F. Stage, No. 58
6. Second R.F. Stage, No. 58
7. Band Indicator



METHOD No. 2

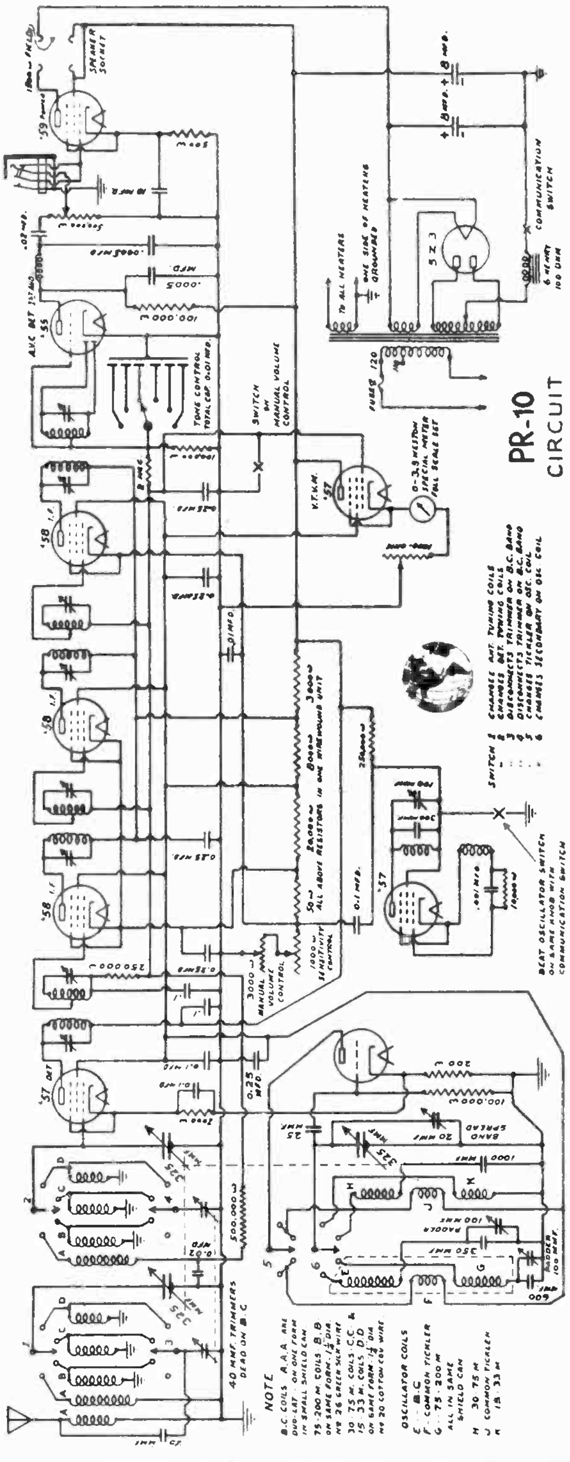
Use Method 2 where extreme volume is required. Remove shield cover "C." Remove cap "A." Place cap "B" (with attached clip), on top of 55 tube. Connect one of transformer (secondary) terminals to negative terminal (—) of 4½ volt battery. Connect positive terminal of battery (+) to clip "D." Connect other (secondary) terminal of transformer to clip "B." Connect phonograph pickup terminal wires to transformer primary terminals. Any good audio transformer may be used as a step up for phonograph use. Phonograph will now operate and volume control on radio set will control phonograph volume.

Cap "A" and cover "C" are not used when phonograph is played. Remove cap "B" and replace cap "A" for radio operation.

MODEL PR-10
Schematic
Socket

PATTERSON RADIO CO.

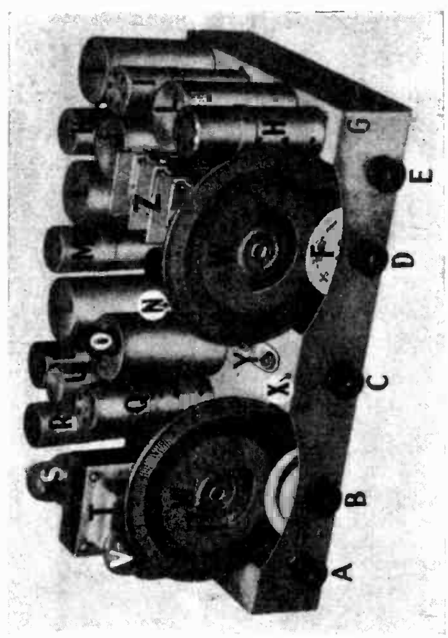
To rebalance the receiver does not require any equipment. The meter will indicate the exact resonance point of the I.F. trimmers and also the condenser gang. Proceed as follows: Set band spread dial at "O," then tune in a station on the high frequency end of the Broadcast band (any station around 1400 K.C. is okay). Next, adjust the trimmer on the condenser section nearest the dial until the station reads exactly on its known K.C. Now, tune in a station in around 600 K.C. and be careful to be on the exact center of the carrier. All of the above operations must be made with the manual control in off position. Next, turn the sensitivity control toward minimum so that the meter reads about R-9. Now, adjust each of the eight I.F. trimmers very carefully until the meter swings the farthest to the right. You probably will not be able to increase the gain more than 1.5-R. It should not be necessary to turn any trimmer more than 1/8 of a turn.



PR-10 CIRCUIT

Everything from A to Z

A—"B" on and off, Beat Oscillator switch.
B—Push, Tone Control. Normal, Band Spread.
C—Volume Control, Power Switch.
D—Push, Band Change. Normal, Main Tuning.
E—Short-Wave Trimmer, two gang.
F—Band Indicator.
G—Heavy 18-gauge Chromium Plated Chassis.
H—First Detector—#57.
I—First I. F. Tube—#58.
J—B. C. and 75 Meter Oscillator.
K—Second I. F. Tube—#58.
L—Three Stages I. F.
M—Third I. F. Tube—#58.
N—High Frequency Oscillator Tube—#56.
O—Beat Oscillator Control.
P—Second Detector and AVC Tube—#55.
Q—Beat Oscillator Tube—#57.
R—Vacuum Tube Volt Meter—#57.
S—Output Tube—#59.
T—Heavy Duty Power Supply.
U—Moisture-proof Filter.
V—Rectifier Tube—5Z3.
W—Patterson Velvet Tuning Dials.
X—Manual Control Mounts Here.
Y—Sensitivity, "R" Meter Adjustments.
Z—Three-gang Condenser, Rubber Mounted.



PR-10 Chassis

MODEL G
Installation Data

PHILCO RADIO & TELEV. CORP.

CHRYSLER • DODGE • PLYMOUTH • CAR RADIO

The Model "CGD" is a custom built radio which is made exclusively for the Chrysler Corporation and its various car divisions and which is sold only through their dealer organizations.

The Receiver and controls are specially designed for installation in the 1934 Chrysler Six Models CA and CB, the Dodge Models DR and DS and the Plymouth Models PE and PF. Many of these cars will be equipped at the car factory with the Philco custom built radio. In many others, the installation will be made by you in your service stations.

Don't file this "Service Broadcast" in your Office. The men in your service station must know how to install and service these radios if you expect to get your share of this profitable installation and service work.

Carefully unpack the cartons and check the contents with the material packing lists. Examine the parts and compare them with illustrations given in these instructions so that you may become familiar with them and thus make the installation easily and quickly.

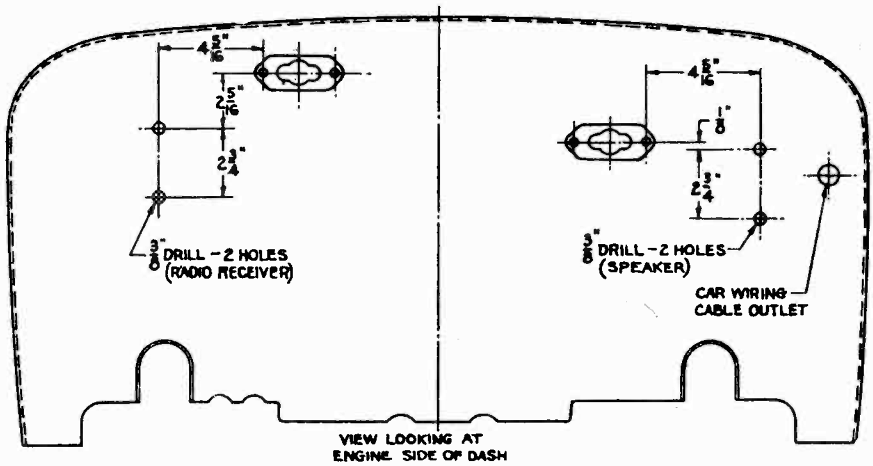


FIGURE 1

Receiver and Speaker Installation

Refer to Figure 1, which gives detailed dimensions for the location and drilling of the holes in the dash. Remove the paint from the dash for ¾" from around the holes to insure good ground contact after drilling. All dimensions are shown from the engine side of the dash. After drilling the holes, bolt the two (2) mounting brackets to the inside of the dash, using both the flat and the lockwashers under the nuts. The left-hand bracket (over the steering column) is for the speaker unit; the right-hand bracket is for the Receiver.

Remove the car wiring cable outlet grommet cap on the left-hand side of the dash, so that the battery cable can be installed. Push the metal fuse housing end of the cable through the grommet from the engine side, leaving just enough slack so that the cable can be connected and fastened in place as shown in Figure 4. Route the cable through the clip that holds the car wiring harness and along under the floor boards to the battery. Replace the grommet and cap, but do not connect the cable terminal to the battery terminal at this time.

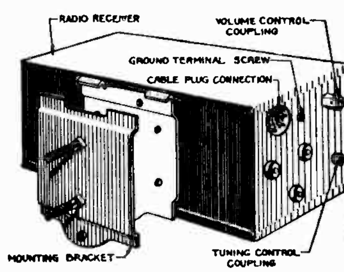


FIGURE 2

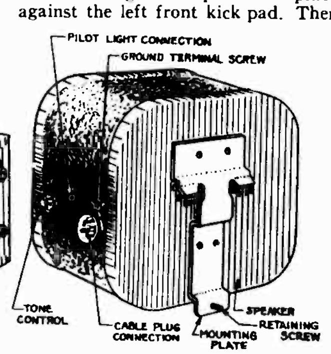


FIGURE 3

The Receiver mounting plate must be fastened to the Receiver housing, using the four (4) self-tapping screws. Four (4) holes are provided for these screws in the side of the housing. To fasten the speaker mounting plate to the speaker, first remove the four (4) hex-head machine screws from the back of the speaker. Use these same four (4) screws to fasten the mounting plate to the back of the speaker. Figures 2 and 3 show the correct positions of the brackets and mounting plates. Hang the Receiver on its bracket and fasten it securely with the hex-head retaining screw at the bottom of the plate.

Before installing the speaker, remove the car wiring fuse on ammeter. To get the speaker in place turn it sideways with the back against the left front kick pad. Then slide it in between the kick pad and the steering column. Push the clutch pedal down to get sufficient clearance and then turn the speaker around over the steering column with its back against the dash. Hang the speaker in place on its bracket and fasten it securely with the hex-head retaining screw at the bottom of the plate. The battery cable must be placed over top of speaker.

Connect the interconnecting cable to both the Receiver and the Speaker, the six (6) hole plug connecting to the Receiver and the four (4) hole plug to the Speaker. The shield terminals at the cable ends must be grounded under their respective ground terminal screws on the Receiver and Speaker housings, shown in Figures 2 and 3. Ground the pigtail in the center of the cable to the dash, using the hole that holds the dash lining retainer and the 8-32 screw.

The antenna lead branches out of the interconnecting cable near the Receiver. Place this lead over the top of the Receiver, splice, and tape it to the antenna lead-in as close as possible to where the lead-in leaves the front right windshield pillar. Cut off excess car

MODEL G
Installation Data
Service Data

PHILCO RADIO & TELEV. CORP.

lead-in. The shielding must be grounded to the cowl panel by drilling a 1/8" hole where the hood overlaps and as close to the A pillar as possible, using the 8-32 bolt and nut supplied for this purpose. (See Figures 4 and 5.) Remove paint from around hole.

Place the fuse and fuse insulator in the metal fuse housing of the battery cable and connect it to the small fuse connector which branches out of the interconnecting cable close to the Speaker. The two (2) shield terminals at the fuse housing must be connected under the same terminal screw that is used to ground the speaker cable shield at the speaker. Figure 4 shows the general layout of the cables and connections.

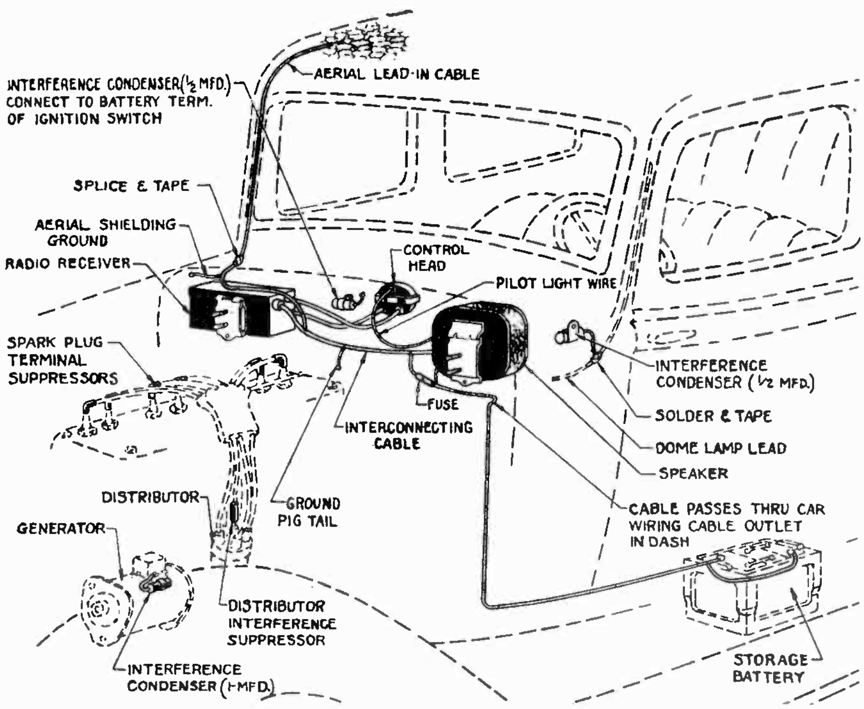


FIGURE 4

Instrument Panel Control

Remove the ash receiver from the panel with an upward pull. Remove the ash receiver bezel from the panel by compressing the retaining tabs at the bottom of the bezel assembly. This can be done best by using a screw-driver and working from in back of the instrument panel. While pushing up on an end tab, pull the bezel forward and it will come out.

Loosen the two (2) screws which secure the instrument board brace to the instrument board flange. The cradle assembly can then be slid forward. Next, loosen the bolts on the brace in back of the instrument panel and remove the toggle spring. Slide the entire assembly forward and remove. Figure 6 gives the details of the ash receiver assembly, while Figure 7 gives an enlarged view of the Section A in Figure 6. Be sure to tighten all bolts and screws that were loosened for this operation. (See Note 1.)

Loosen the car lighting switch to permit more working space. While this operation is not absolutely necessary, it makes the following operation easier.

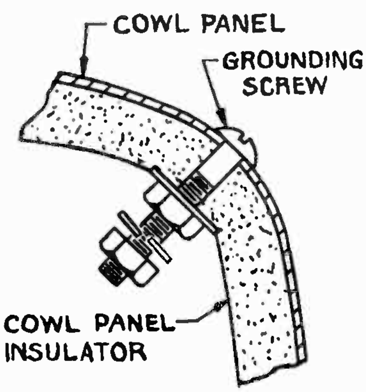


FIGURE 5

Push the flexible shafts of the control through the opening in the panel and install the control unit in this opening.

The "U" retaining clamp must be placed over the studs on the back of the control and the hex-nuts tightened to draw the control bezel flush with the instrument panel. (See Figure 8.) Replace and tighten the car lighting switch.

The flexible shafts must be placed around to the Receiver. The ends of the two (2) shafts are different so that they can only be installed in the proper couplings. The long shaft and housing is on the left of the control unit, while the short one is on the right.

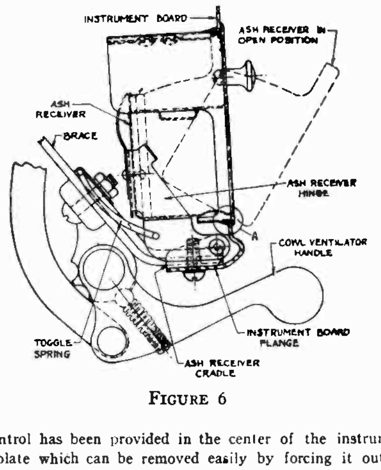


FIGURE 6

The set screws on the coupling bushings must be loosened sufficiently to allow the shaft housings and couplings to be properly seated. After the shafts have been coupled, tighten the set screws again.

Battery Connections

Connect the battery lead to the negative terminal of the storage battery. Be sure this connection is tight. The shield terminal must be connected to positive or ground terminal of the storage battery.

The black lead from the control unit must be connected to the pilot light terminal on the Speaker. (See Figure 3.)

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers.) Pull the knob from the right-hand control shaft and loosen the set screw found there. (See Figure 8.) Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob.

Motor Interference Suppression

Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals. Cut off the end of the distributor center lead cable and screw the straight molded resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay

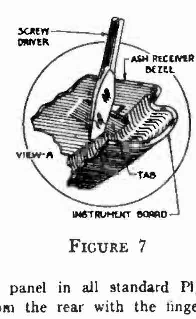


FIGURE 7

NOTE 1.—A hole large enough for the dash control has been provided in the center of the instrument panel in all standard Plymouth Model, Code PF. This hole is covered with a special Plymouth plate which can be removed easily by forcing it out from the rear with the fingers or with a screw-driver.

PHILCO RADIO & TELEV. CORP.

(see Figure 4). Install a ½ microfarad by-pass condenser, splicing and soldering it to the dome light lead as close as possible to the point where it enters the windshield pillar. The condenser must be fastened to the cowl panel in front of the hood line by drilling a ⅛" hole where the hood overlaps and as close to the pillar as possible, using the 8-32 bolt and nut supplied for this purpose. (See Figures 4 and 5.) Remove paint from around hole. Replace the car lighting fuse—test the lights and horn.

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

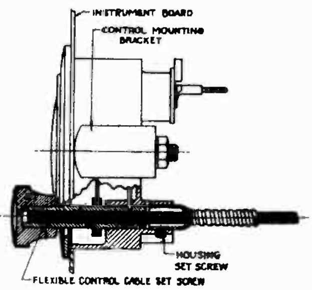


FIGURE 8

The following procedure should be carefully followed: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinists' hammer. Replace the rotor and the cap, then turn the engine over by hand. After a couple of revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

In some stubborn cases, it may be necessary to solder a bond to the control wires and tubes where they enter the dash, grounding them securely under one of the dash grommet cap screws. No. 14 stranded and tinned copper wire can be used for this purpose, a length of which is provided (see Figure 9). Be sure that all the high tension wires are properly seated in their sockets in the distributor cap.

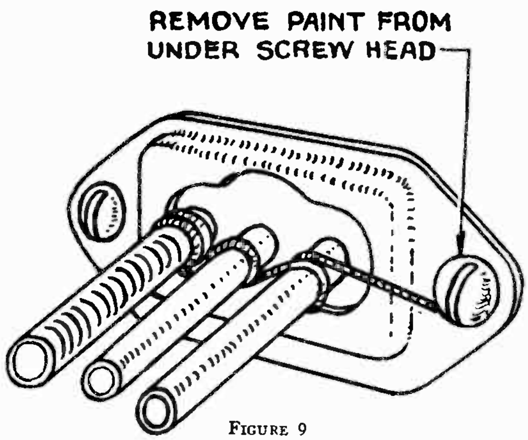


FIGURE 9

An additional ½ microfarad condenser may at times be used to advantage. This condenser should be mounted on the bottom edge of the instrument board and connected to one of the terminals on the ignition switch directly behind the instrument panel.

I. F. Transformer and Padders

The new style I. F. transformer complete with padders is used in the Model G.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figures 10 and 11.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

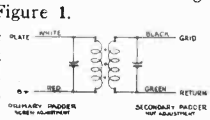


FIGURE 10

Model G Adjustments

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the lid from the Receiver. Remove the grid cap from the 6A7 tube (for location see Figure 11).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Figure 11.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

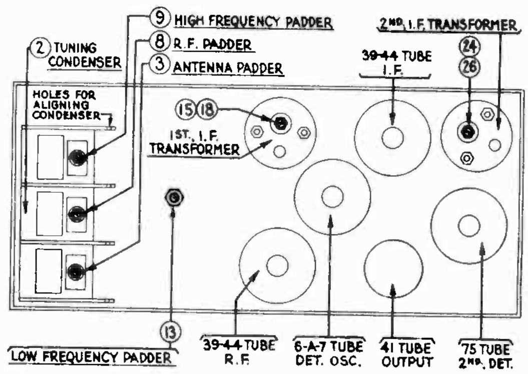


FIGURE 11

The padders (24) and (26) are adjusted first (Figures 11 and 12). Turn the adjusting screw (24) all the way in. A metal screw-driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (26) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (24) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers (15) and (18).

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Figure 11.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (9) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

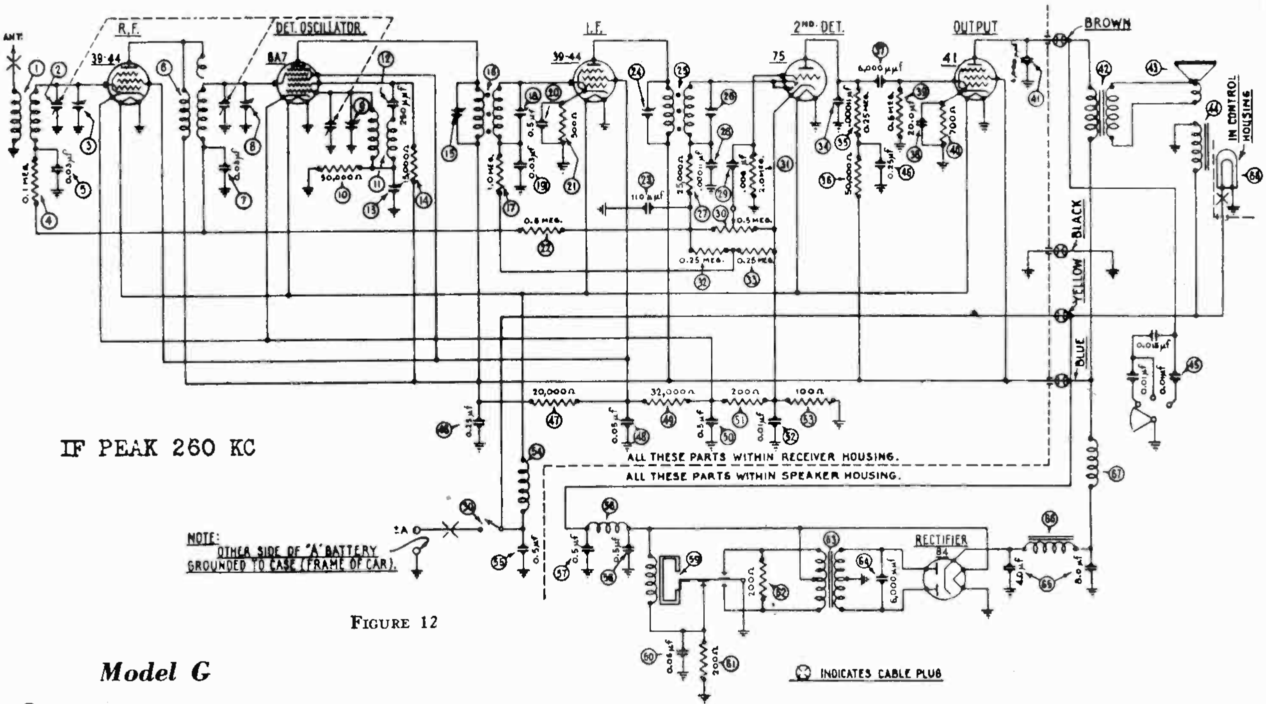
Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (8) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder (13) for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL G
Schematic
Chassis Layout
Parts List

PHILCO RADIO & TELEV. CORP.



IF PEAK 260 KC

FIGURE 12

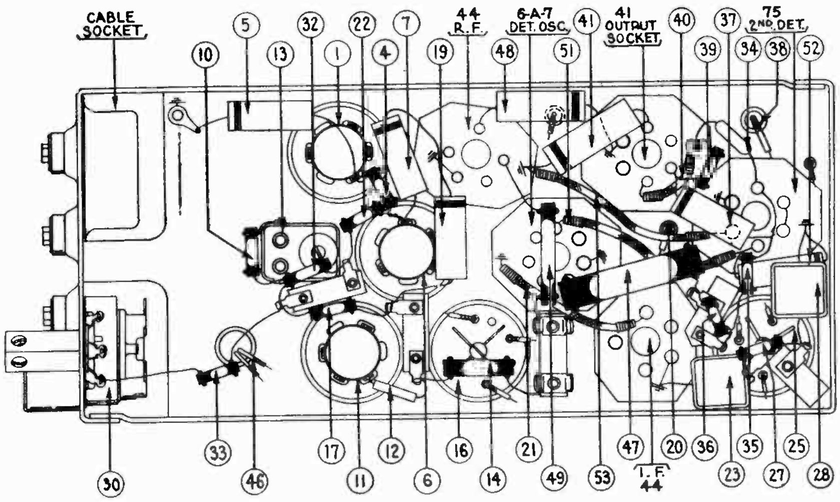


FIGURE 13

Model G

1. Antenna Transformer 32-1220
2. Tuning Condenser 31-1182
3. 1st Padder (on tuning cond.) ....
4. Resistor (99,000 ohms) 6099
5. Condenser (.03 mfd.) 30-4025
6. R. F. Transformer 32-1221
7. Condenser (.03 mfd.) 30-4025
8. 2nd Padder (on tuning cond.) ......
9. 3rd Padder (on tuning cond.) ......
10. Resistor (51,000 ohms) 6098
11. Oscillator Transformer 32-1222
12. Condenser (.00025 mfd.) ... 3082
13. Padder 31-6012
14. Resistor (15,000 ohms) 6208
15. Padder (Prim. 1st I. F.) part of 32-1236 assembly ....
16. I. F. Transformer (1st) ... 32-1236
17. Resistor (1,000,000 ohms) .. 33-1096
18. Padder (Secondary 1st I. F.) part of 32-1236 assembly ....
19. Condenser (.03 mfd.) 30-4025
20. Condenser (.5 mfd.) 30-4018
21. Resistor (500 ohms) 6977
22. Resistor (500,000 ohms) 6097
23. Condenser (.00011 mfd.) ... 30-1006
24. Padder (Prim. 2nd I. F.) part of 32-1237 assembly ....
25. I. F. Transformer (2nd) ... 32-1237
26. Padder (Secondary 2nd I. F.) part of 32-1237 assembly ....
27. Resistor (25,000 ohms) 33-1013
28. Condenser (.00011 mfd.) ... 30-1006
29. Condenser (.006 mfd.) 30-4125
30. Volume Control Assembly . 33-5056
31. Resistor (2,000,000 ohms) .. 33-1025
32. Resistor (250,000 ohms) 33-1097
33. Resistor (250,000 ohms) 33-1097
34. Condenser (.00011 mfd.) ... 30-1006
35. Resistor (250,000 ohms) 33-1097
36. Resistor (51,000 ohms) 6098
37. Condenser (.006 mfd.) 30-4123
38. Condenser (20 mfd.) 30-2063
39. Resistor (500,000 ohms) 6097
40. Resistor (700 ohms) 6443
41. Condenser (.006 mfd.) 30-4024
42. Output Transformer 2598
43. Cone and Voice Coil 36-3159
44. Field Coil Assembly 36-3140
45. Tone Control 30-4127
46. Condenser (.25, .25 mfd.) .. 30-4126
47. Resistor (20,000 ohms) 5649
48. Condenser (.05 mfd.) 30-4020
49. Resistor (32,000 ohms) 3525
50. Condenser (.5 mfd.) 30-4018
51. Resistor (200 ohms) 7217
52. Condenser (.01 mfd.) 30-4124
53. Resistor (100 ohms) 33-3023
54. "A" Choke 32-1312
55. Condenser (.5 mfd.) 30-4015
56. Vibrator Choke 32-1260
57. Condenser (.5 mfd.) 30-4015
58. Condenser (.5 mfd.) 30-4015
59. Vibrator Unit 38-5036
60. Condenser (.05 mfd.) 30-4039
61. Resistor (200 ohms) 7217
62. Resistor (200 ohms) 7217
63. Power Transformer 32-7110
64. Condenser (.006 mfd.) 30-4024
65. Filter Condenser (4 mfd., 8 mfd.) 30-2030
66. "B" Chokes 32-7118
67. R. F. Choke 32-1260
68. Pilot Lamp 34-2031

Spark Plug Resistor 33-1015
Distributor Resistor 33-1113
1 mfd. Condenser 4522-S
½ mfd. Condenser 30-4007
Glass for Control 27-7325
Bezel Assembly 42-5115
Dial (Plymouth) 42-5123
Dial (Dodge & Chrysler 6) . 42-5122
Pointer (Dodge) 28-1764
Pointer (Plymouth) 28-1763
Pointer (Chrysler 6) 28-1825
Control Assembly (Plymouth) 42-5113
Control Assembly (Dodge) . 42-5112
Control Assembly (Chrysler 6) 42-5134
Knobs (Plym.—tuning) 27-4083
Knobs (Plym.—volume) ... 27-4084
Knobs (Dodge—tuning) ... 27-4079
Knobs (Dodge—volume) .. 27-4080
Knobs (Chry. 6—tuning) . 27-4071
Knobs (Chry. 6—volume) . 27-4072
Knobs Springs 28-1738
Interconnecting cable 41-3065
Battery Cable 41-3073
Flexible Shaft—tuning 28-8188
Flexible Shaft—volume 28-8198
Speaker Mounting Plate ... 28-1790
Speaker Mounting Bracket . 28-1791
Receiver Mounting Plate ... 28-1792
Receiver Mounting Bracket . 28-1848
Fuse 7227
Fuse Insulator 27-7131
"U" Control Bracket 29-1705
5-Prong Socket 27-6014
6-Prong Socket 7547
7-Prong Socket 27-6005

MARCH, 1934

PHILCO RADIO & TELEV. CORP.

MODEL 10 (Code 122) RECEIVER

THE MODEL 10 (Code 122) represents the latest developments in single-unit automobile radio. Compact and easy to install, its performance is amazing.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a tremendous power output and is equipped with a full-size electro-dynamic speaker, the same type used in high-priced home radio Receivers.

Bass compensation gives full rounded tone at any volume. Four point tone control is provided to satisfy the individual preference. Greater sensitivity, a three-section tuning condenser giving improved selectivity and fidelity, inherently quiet circuits and all the other improvements, make this model the outstanding automobile radio.

The new interference filters and improvement in shielding,cut installation time to just a fraction of what it would be without these improvements. The ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) makes it the most desirable one to sell, install or own.

I. F. TRANSFORMER AND PADDERS

A new style I. F. transformer complete with padders is used in the Model 10. (Code 122.)

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. Stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

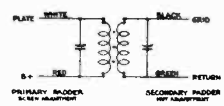


FIG. 1

A new type first I. F. transformer is used, but retains the same part no. 32-1236.

This transformer can be distinguished from the old type, since the bottom fibre spacer is painted green.

MODEL 10 (Code 122) ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (25) and (27) must be adjusted first. These padders should be adjusted to peak. (Figs. 2 and 3.) First adjust the screw, then the nut.

The padders (17) and (21) must be adjusted next. (Figs. 2 and 3.) Turn the adjusting screw (17) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (21) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (17) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid cap to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (12) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (10) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder (15) for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

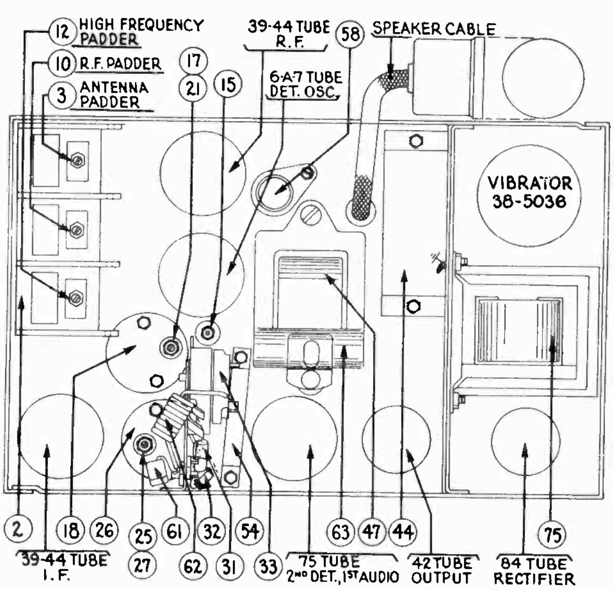


FIG. 2

MODEL 10 (Code 122)
Schematic
Chassis, Parts List

PHILCO RADIO & TELEV. CORP.

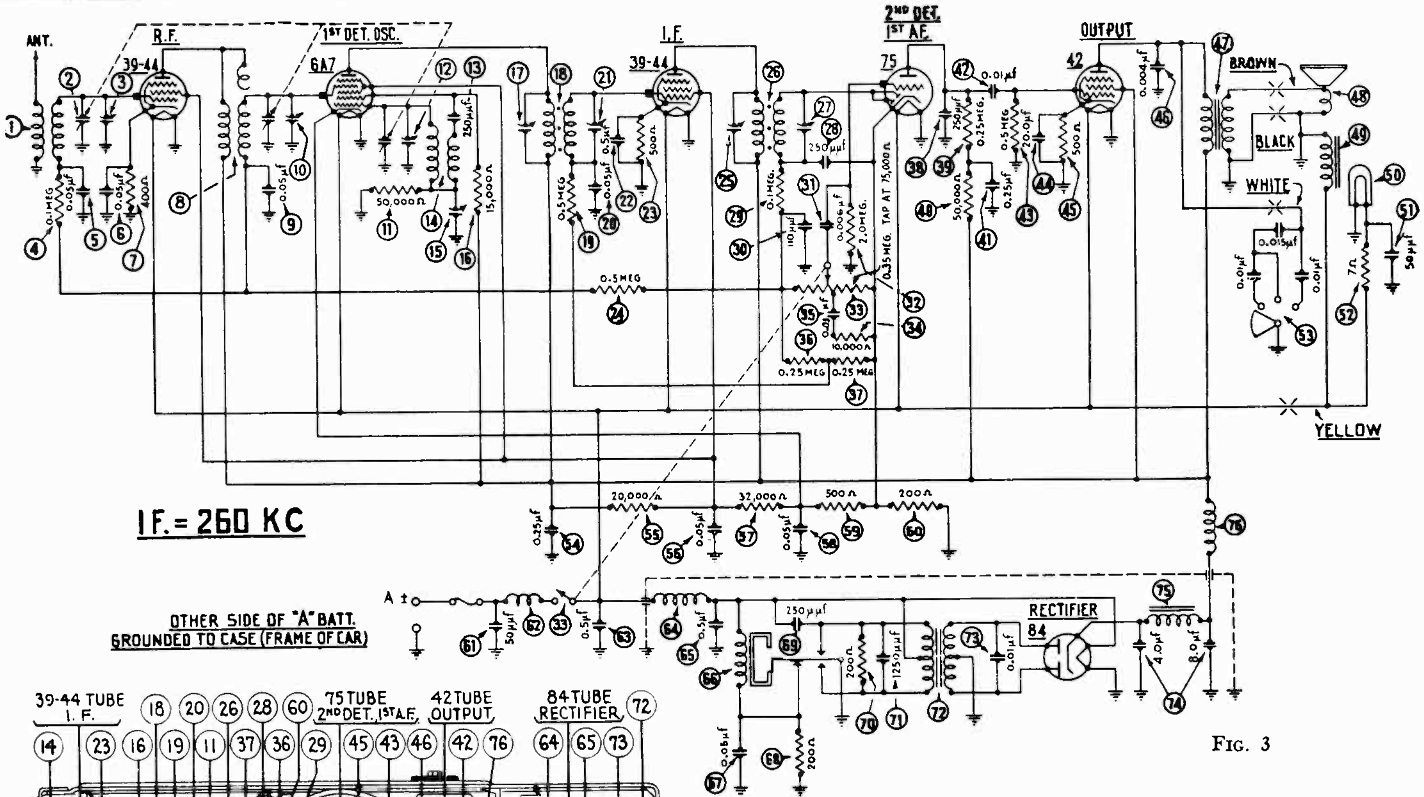


FIG. 3

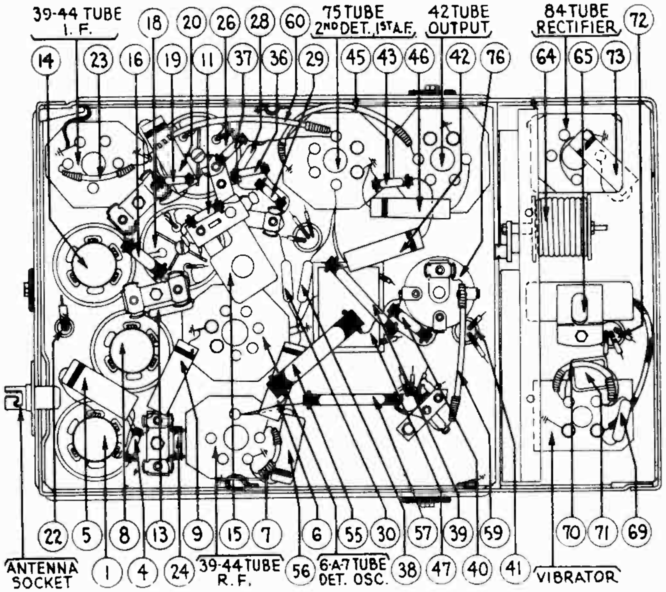


FIG. 4

(1)	Antenna Transformer	32-1220
(2)	Tuning Condenser	31-1202
(3)	First Padder (in tun. cond.)	
(4)	Resistor (100,000 ohms)	6099
(5)	Condenser (.05 mfd.)	30-4020
(6)	Condenser (.05 mfd.)	30-4020
(7)	Resistor (400 ohms)	33-3016
(8)	R. F. Transformer	32-1221
(9)	Condenser (.05 mfd.)	30-4020
(10)	Second Padder (in tun. cond.)	
(11)	Resistor (50,000 ohms)	6098
(12)	Third Padder (in tun. cond.)	
(13)	Condenser (.00025 mfd.)	30-1032
(14)	Oscillator Transformer	32-1222
(15)	Padder	04000S
(16)	Resistor (15,000 ohms)	6208
(17)	Padder (Pri. 1st I.F. Trans.)	
(18)	First I. F. Transformer	32-1236
(19)	Resistor (500,000 ohms)	6097
(20)	Condenser (.05 mfd.)	30-4020
(21)	Padder (Sec. 1st I. F. Trans.)	
(22)	Condenser (.5 mfd.)	30-4058
(23)	Resistor (500 ohms)	6977
(24)	Resistor (500,000 ohms)	6097
(25)	Padder (Pri. 2nd I. F. Trans.)	
(26)	Second I. F. Transformer	32-1237
(27)	Padder (Sec. 2nd I. F. Trans.)	
(28)	Condener (.00025 mfd.)	30-1032
(29)	Resistor (100,000 ohms)	6099
(30)	Condenser (.00011 mfd.)	30-1031
(31)	Condenser (.006 mfd.)	30-4125
(32)	Resistor (2,000,000 ohms)	33-1025
(33)	Vol. Control Sw. Assembly	38-5851
(34)	Resistor (10,000 ohms)	33-1000
(35)	Condenser (.03 mfd.)	30-4025
(36)	Resistor (250,000 ohms)	33-1097
(37)	Resistor (250,000 ohms)	33-1097
(38)	Condenser (.00025 mfd.)	30-1032
(39)	Resistor (250,000 ohms)	3768
(40)	Resistor (50,000 ohms)	4237
(41)	Condenser (.25 mfd.)	30-4065
(42)	Condenser (.01 mfd.)	30-4169
(43)	Resistor (500,000 ohms)	6097
(44)	Condenser (20 mfd.)	30-4065
(45)	Resistor (500 ohms)	6977
(46)	Condenser (.004 mfd.)	30-4185
(47)	Output Transformer	32-7102
(48)	Cone and Voice Coil	36-3159
(49)	Field Coil Assembly	36-3130
(50)	Pilot Lamp	34-2039
(51)	Condenser (.00005 mfd.)	30-1029
(52)	Resistor (7 ohms)	33-3035
(53)	Tone Control	30-4056
(54)	Condenser (.25 mfd.)	04360
(55)	Resistor (20,000 ohms)	6649
(56)	Condenser (.05 mfd.)	30-4020
(57)	Resistor (32,000 ohms)	3525
(58)	Condenser (.05 mfd.)	30-4020
(59)	Resistor (500 ohms)	6977
(60)	Resistor (200 ohms)	7217
(61)	Condenser (.00005 mfd.)	30-1029
(62)	Choke	32-1374
(63)	Condenser (.5 mfd.)	30-4061
(64)	Vibrator Choke	32-1259
(65)	Condenser (.5 mfd.)	30-4061
(66)	Vibrator	38-5036
(67)	Condenser (.05 mfd.)	30-4039
(68)	Resistor (200 ohms)	7217
(69)	Condenser (.00025 mfd.)	5858
(70)	Resistor (200 ohms)	7217
(71)	Condenser (.00125 mfd.)	5886
(72)	Power Transformer	32-7098
(73)	Condenser (.01 mfd.)	30-4051
(74)	Filter Condenser (4-8 mfd.)	30-2015
(75)	Filter Choke	32-7104
(76)	R. F. Choke	32-1281
	Spark Plug Resistors	33-1015
	Distributor Resistor	33-1113E
	Interference Condenser	30-4007
	Studs	28-6036
	Nuts (mounting)	W55A
	Battery Cable	38-5296
	Antenna Lead	38-5131

Acorn Nut	W821
Bracket	6035
Strap	04344
Strap Pad	6206
Knob	27-4058
Glass	27-7325
Glass Gasket	27-7509
Pointer	28-1957
Shaft	28-8206
Face Assembly	42-5173
Control Assembly	42-5171

MODEL 10 (Code 122)

JULY, 1934

PHILCO RADIO & TELEVISION CORP.

MODEL 11 RECEIVER

THE PHILCO auto radio Model 11 is a new Philco development in single-unit automobile radio. It is compact, easy to install and will give exceptional performance.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a genuine Philco electrodynamic speaker, the same type that is used in many of the larger home radio Receivers. A three-section tuning condenser giving improved selectivity, remarkable sensitivity and tone, inherently quiet circuits and other improvements make this model one of the outstanding and most popular automobile radios.

Added to this, the ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) and the handy, attractive steering-column control which makes this model universal in its use are additional features which make the Model 11 a very desirable one for the dealer and for the owner.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 11.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

1st I. F. Transformer 32-1329

2nd I. F. Transformer 32-1237

FIG. 1

MODEL 11 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (22) and (24) are adjusted first (Figs. 2 and 3). Turn the adjusting screw (22) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (24) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (22) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

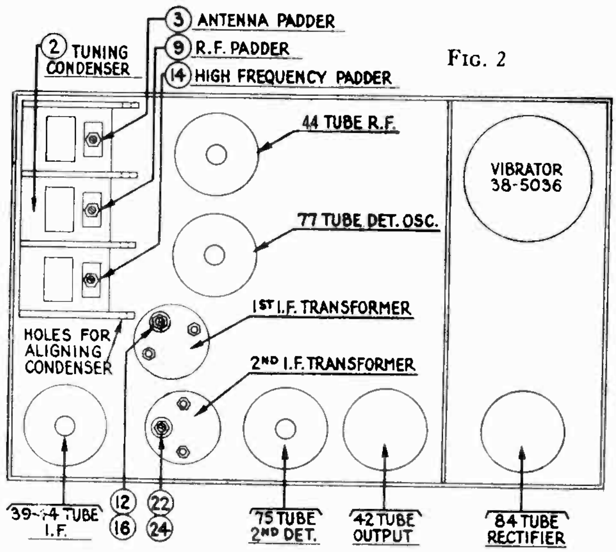


FIG. 2

Repeat the above procedure with the condensers (12) and (16).

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

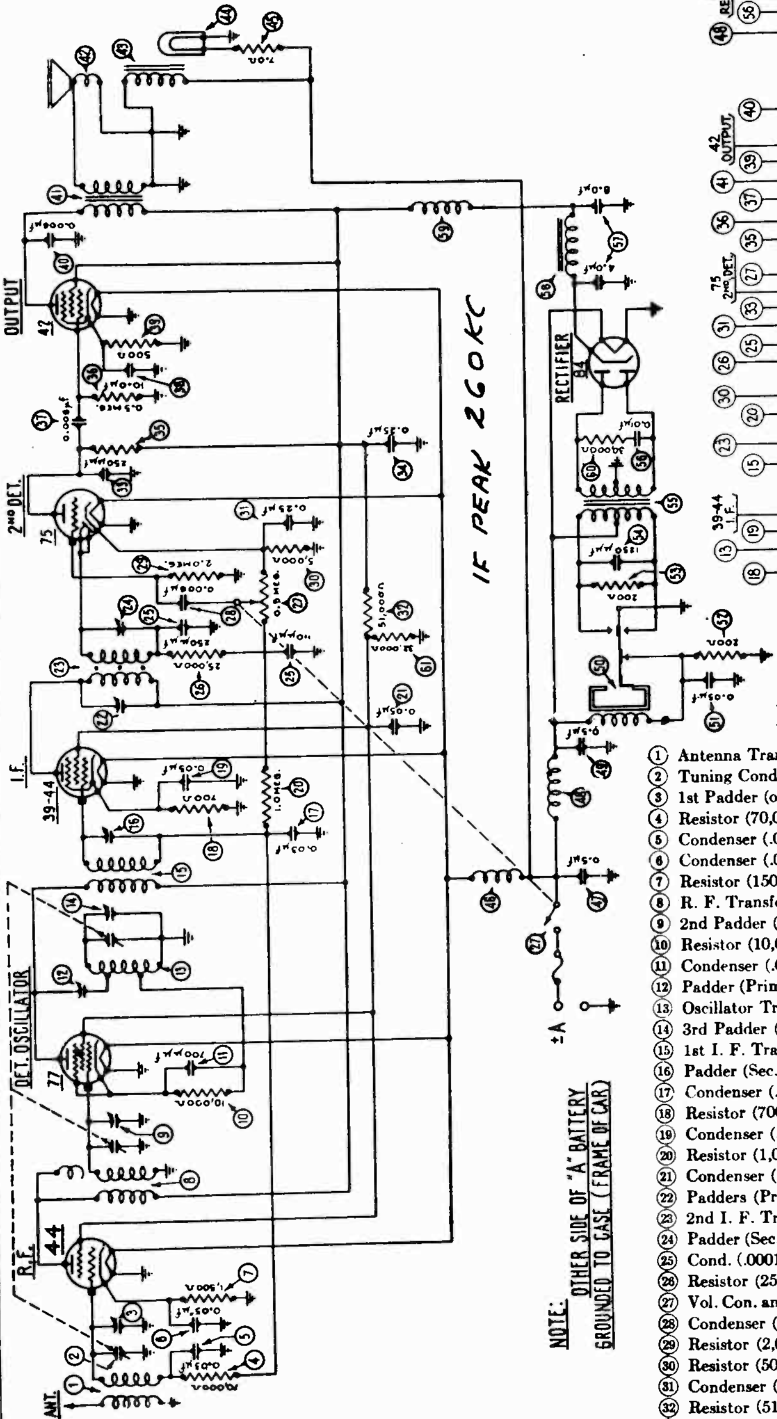
With the tuning condenser in this position adjust the high-frequency padder (14) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (9) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL 11
Schematic
Chassis Layout
Parts List

PHILCO RADIO & TELEVISION CORP.



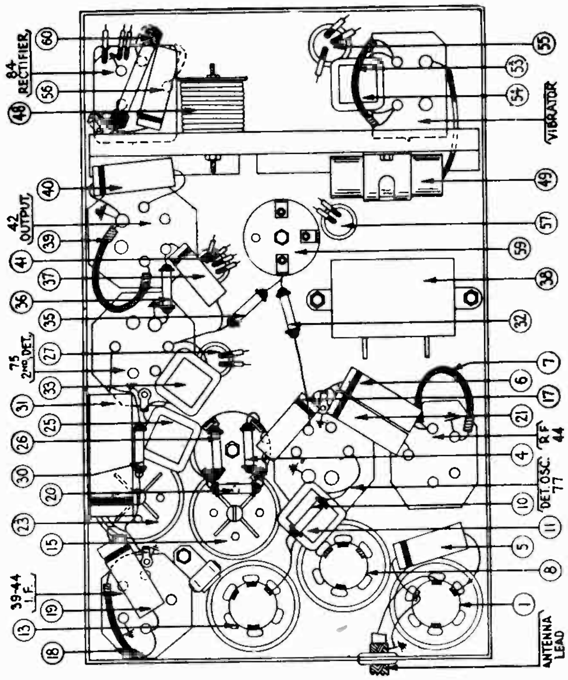


FIG. 4

MODEL 11 PARTS LIST

1	Antenna Transformer	32-1331
2	Tuning Condenser	31-1149
3	1st Padder (on tun. cond.)	
4	Resistor (70,000 ohms)	33-1115
5	Condenser (.03 mfd.)	30-4025
6	Condenser (.05 mfd.)	30-4020
7	Resistor (1500 ohms)	33-3047
8	R. F. Transformer	32-1332
9	2nd Padder (on tun. cond.)	
10	Resistor (10,000 ohms)	33-1000
11	Condenser (.0007 mfd.)	5863
12	Padder (Prim. 1st I. F. Tran.)	
13	Oscillator Transformer	32-1333
14	3rd Padder (on tun. cond.)	
15	1st I. F. Transformer	32-1329
16	Padder (Sec. 1st I. F. Tran.)	
17	Condenser (.03 mfd.)	30-4025
18	Resistor (700 ohms)	6443
19	Condenser (.05 mfd.)	30-4020
20	Resistor (1,000,000 ohms)	33-1096
21	Condenser (.05 mfd.)	30-4020
22	Padders (Prim. 2nd I. F.)	
23	2nd I. F. Transformer	32-1237
24	Padder (Sec. 2nd I. F. Tran.)	
25	Cond. (.00011-.00025 mfd.)	30-1020
26	Resistor (25,000 ohms)	33-1013
27	Vol. Con. and Switch Assm.	33-5058
28	Condenser (.006 mfd.)	30-4125
29	Resistor (2,000,000 ohms)	33-1025
30	Resistor (5000 ohms)	33-1001
31	Condenser (.25 mfd.)	30-4146
32	Resistor (51,000 ohms)	5868
33	Condenser (.00025 mfd.)	3082
34	Condenser (.25 mfd.)	04360
35	Resistor (100,000 ohms)	6099
36	Resistor (500,000 ohms)	6097
37	Condenser (.006 mfd.)	30-4125
38	Condenser (10 mfd.)	7440
39	Resistor (500 ohms)	33-3031
40	Condenser (.006 mfd.)	30-4024
41	Output Transformer	32-7214
42	Cone and Voice Coil	02861
43	Field Coil Assembly	36-3097
44	Pilot Light	6608
45	Resistor (7 ohms)	33-3035
46	"A" Choke	32-1268
47	Condenser (.5 mfd.)	30-4047
48	Vibrator Choke	32-1235
49	Condenser (.5 mfd.)	30-4147
50	Vibrator Unit	38-5036
51	Condenser (.05 mfd.)	30-4039
52	Resistor (200 ohms)	7217
53	Resistor (200 ohms)	7217
54	Condenser (.00125 mfd.)	5886
55	Power Transformer	32-7216
56	Condenser (.01 mfd.)	30-4051
57	Condenser (4.-8. mfd.)	30-2072
58	"B" Choke	32-7215
59	R. F. Choke	32-1281
60	Resistor (30,000 ohms)	7836
61	Resistor (32,000 ohms)	3525
	Spark Plug Resistor	33-1015
	Distributor Resistor	4546
	Screw Type Resistor	4851
	Interference Condenser	30-4007
	Dial	27-5038
	Studs	28-6036
	Nuts (mounting)	W55A
	Knobs (tuning)	03334
	Knobs (volume)	06886
	Battery Cable	38-5296
	Acorn Nut	W821
	Key	6091
	Fuse	7227
	Fuse Insulator	27-7131
	4-Prong Socket	27-6006
	5-Prong Socket	27-6014
	6-Prong Socket	6417
	Cont. Unit Assm. (Dir. Dr.)	42-5150
	Shafts—Tuning	28-8139
	Volume	28-8141
	Cont. Unit Assm. (Gr. Dr.)	42-5157
	Shafts—Tuning	28-8217
	Volume	28-8217

APRIL, 1934

MODEL 18 (Code 124)
Alignment, Voltage
Parts List

PHILCO RADIO & TELEV. CORP.

Model 18 (Code 124)

Model 18 (code 124) is an eight-tube superheterodyne receiver, for operation on alternating current (A.C.) The range of receivable frequencies is from 530 to 1720 kilocycles which includes standard broadcasts and police stations on the first (lowest) police band. The tubes used are: Type 78 R.F.; type 6A7 detector-oscillator; type 78 I.F.; type 75 2d detector, 1st A.F.; type 42 driver; two type 42 output tubes, and type 80 rectifier. The intermediate frequency is 260 kilocycles.

Adjusting Compensating Condensers

The adjustment of the compensating or padding condensers in Model 18 (124) requires an accurate signal generator, such as the Philco Model 024, an output meter, and a special insulated hex wrench. The adjustments are made as follows:

1. I. F. (Intermediate Frequency). Remove the grid clip from the cap on the 6A7 tube and attach the shielded antenna lead from the signal generator to the grid cap of the 6A7. Set the switch of the signal generator at 260 K. C. (the I. F. of Model 18) and the dial of the set at 550. Turn on the set and signal generator. Adjust each of the three I. F. compensating condensers in turn to give maximum reading in the output meter (connected to primary of output transformer). If the needle on the meter goes off scale, turn down the attenuator adjustment on the signal generator. See Fig. 4 for locations of the I. F. compensating condensers. The first and 2d I. F. primary condensers (21) and (25) are accessible through the two holes in the chassis sub-base directly over them. The 1st I. F. secondary (24) is accessible from the rear.

2. ANT. H. F., DET., and OSC. H. F. CONDENSERS ((5), (10), and (12).) These are located on top of the tuning condenser assembly and adjusted from above. (5) is mounted on the section nearest front of set. Replace the grid cap clip on the 6A7 and connect the antenna lead of signal generator direct to antenna post of set for these adjustments. Set signal generator at 1500 and dial of set at 1500.

3. OSC., L. F.—This adjustment (15) is made from rear of chassis (see Fig. 4). Set Signal Generator and dial of set at 600. The tuning condenser assembly should be "rocked" while this adjustment is being made.

Replacement Parts for Model 18 (Code 124)

No. on Figs.	Description	Part No.	List Price
(1)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	$0.25
(2)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(3)	Antenna Transformer	32-1396	.60
(4)	Tuning Condenser Assembly	31-1196	6.00
(5)	Compensating Condenser (Ant.)	Part of (4)	....
(6)	Condenser (.05 Twin—Bakelite Block)	3615AM	.40
(7)	Resistor (200 ohms Flexible Wire-wound)	7217	.20
(8)	Condenser (.09 Twin-Bakelite Block)	4989AC	.40
(9)	Detector Transformer	32-1397	.50
(10)	Compensating Condenser (Det.)	Part of (4)	....
(11)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(12)	Compensating Condenser (Osc. H. F.)	Part of (4)	....
(13)	Oscillator Transformer	32-1398	.45
(14)	Condenser (.00011 Mfd. Mica)	4519	.35
(15)	Compensating Condenser (Osc. L. F.)	04000R	.45
(16)	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
(17)	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
(18)	Condenser (Double: .05—.15 Bakelite Block)	6287M	.40
(19)	Resistor (2 Meg.) (Red-Black-Green)	5872	.25
(20)	Condenser (.05 Mfd. Bakelite Block)	3615AA	.35
(21)	Compensating Condenser (1st I. F. Pri.)	04000M	.20
(22)	Resistor (2500 ohms) (Red-Green-Red)	7775	.25
(23)	1st I. F. Transformer	32-1288	.55
(24)	Compensating Condenser (1st I. F. Secondary)	04000X	.20
(25)	Compensating Condenser (2d I. F. Primary)	04000A	.15
(26)	2d I. F. Transformer	32-1258	.55
(27)	Condenser (.00011 Mfd. Twin-Bakelite Block)	8035-K	$0.25
(28)	Resistor (.1 Meg. White-White-Orange)	4411	.25
(29)	Condenser (.05 Mfd. Tubular Paper)	30-4020	.35
(30)	Volume Control (350,000 ohms Tapped at 75,000)	33-5069	1.00
(31)	Resistor (.25 Meg.) (Red-Yellow-Yellow)	4410	.25
(32)	Condenser (.01 Mfd. Bakelite Block)	3903-Z	.25
(33)	Resistor (1. Meg.) (Brown-Black-Green)	4409	.25
(34)	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
(35)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(36)	Shadowmeter	45-2028	2.50
(37)	Condenser (.00011 Mica)	4519	.35
(38)	Condenser (.09 Mfd.) (Bakelite Block)	4989-N	.35
(39)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(40)	Condenser (Electrolytic—1, 1, 2 Mfd.)	30-2029	1.20
(41)	Resistor (.1 Meg.) (White-White-Orange)	4411	.25
(42)	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
(43)	Condenser (.015 Mfd. Bakelite)	3793AB	.35
(44)	Condenser (.006 Mfd. Tubular Paper)	30-4024	.40
(45)	Input (Audio) Transformer	32-7114	2.00
(46)	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.25
(47)	Condenser (.01 Mfd. Bakelite Block)	3903-P	.25
(48)	Output Transformer	32-7078	1.40
(49)	Voice Coil and Cone Assembly H-13	02625	.80
	Voice Coil and Cone Assembly K-17	36-3159	.50
(50)	Field Coil and Pot. Assembly	36-3104	2.70
(51)	Resistor (B) (6500 ohms Wire-wound)	33-3033	.30
(52)	Resistor (Voltage Divider—9.5, 112, 84 ohms Wire-wound)	33-3034	$0.20
(53)	Tone Control	30-4073	.75
(54)	Condensers (in Tone Control)	Inside (53)	....
(55)	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
(56)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(57)	Condenser (Twin .015 Mfd. Bakelite Block)	3793-R	.40
(58)	Power Transformer	32-7111	5.75
(59)	Condenser (Electrolytic 8 and 10 Mfd.)	30-2045	1.95
(60)	Condenser (Electrolytic 8 Mfd.)	30-2025	2.00
(61)	Condenser (.25 Mfd. Bakelite Block)	6287-N	.40
(62)	Filter Choke	32-7115	1.80
(63)	On-Off Switch	42-1064	.40
(64)	Pilot Lamp (Station Selector)	6608	.11
(65)	Pilot Lamp (Shadowmeter)	Part of (36)	....
(66)	Resistor (2900 ohms) (Red-White-Red)	5309	.25
	A. C. Cord and Plug Assembly	L-943A	.60
	Tube Shield	28-1107	.10
	4 Prong Socket	7544	.10
	6 Prong Socket	7547	.11
	7 Prong Socket	27-6005	.11
	Speaker Socket	4957	.10
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Chassis Mfg. Screw	W-1345-A	2.75C
	Chassis Mfg. Washer	29-2089	.35C
	Chassis Mfg. Foot (Rubber)	27-4116	.05
	Chassis Mfg. Foot Plate	27-7497	.35C
	Dial Assembly	31-1207	.50
	Dial Scale	27-5049	.25

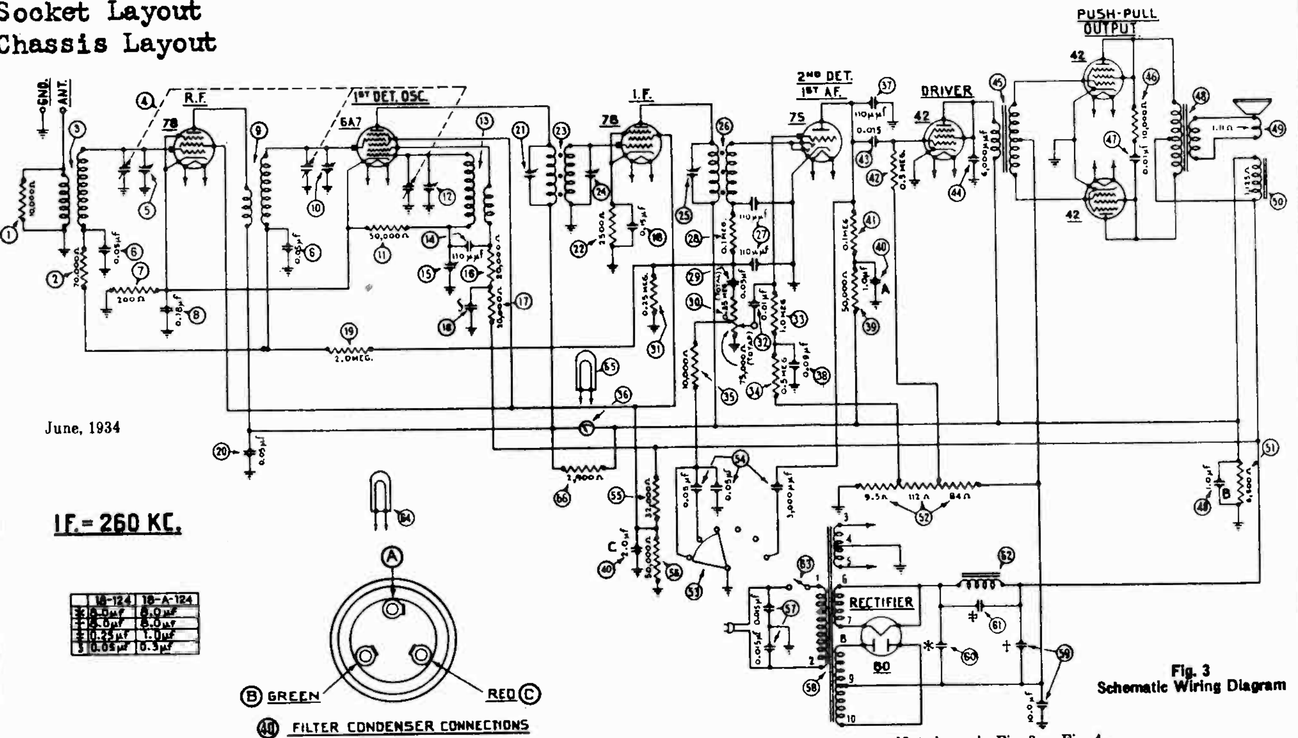
Tube Socket Voltages

Circuit	R. F.	Det. Osc.	I. F.	1st A. F.	Driver	Output (Class "A")		Recti-fier
Type Tube	78	6A7	78	75	42	42	42	80
Filament (F-F)	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	210	210	210	120	205	280	280	350
Screen Grid (SG-K) (6A7)	80	..	80	..	200	300	300	..
G1-K	..	35	..	..	..	..	..	..
G2-K	..	130	..	..	..	..	..	..
Cathode (K-F)	2.8	2.8	5.3	0	0	0	0	..

All the above values were obtained from the underside of the chassis, using test prods and leads with an A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The **Philco Model 048 All-Purpose Set Tester** is highly recommended for this use. Volume control at maximum and station selector at 520 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

MODEL 18 (Code 124)
Schematic
Socket Layout
Chassis Layout

PHILCO RADIO & TELEV. CORP.



	18-124	18-A-124
[illegible]	6.0µf	8.0µf
[illegible]	[illegible]	8.0µf
[illegible]	0.25µf	1.0µf
[illegible]	0.05µf	0.3µf

Fig. 3
Schematic Wiring Diagram

NOTE: A resistor No. 5309 (2900 ohms) (red-white-red) is used, shunted across the shadowmeter. Not shown in Fig. 3 or Fig. 4.

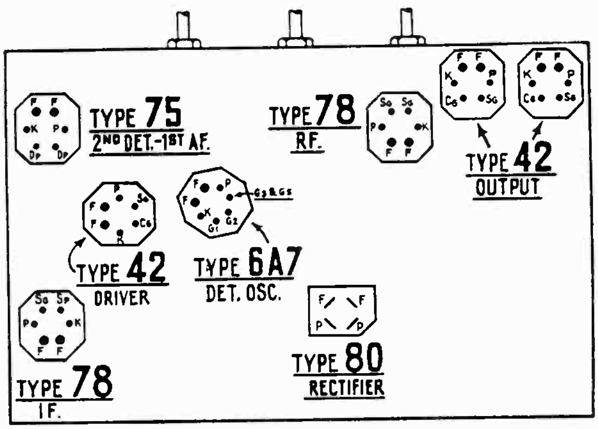


Fig. 1—Socket Layout (Underneath)

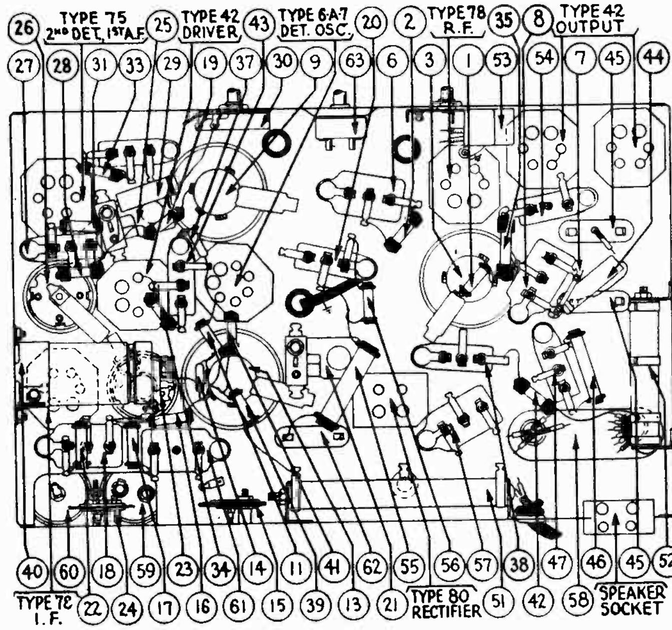


Fig. 4—Bottom View of Chassis Showing Parts

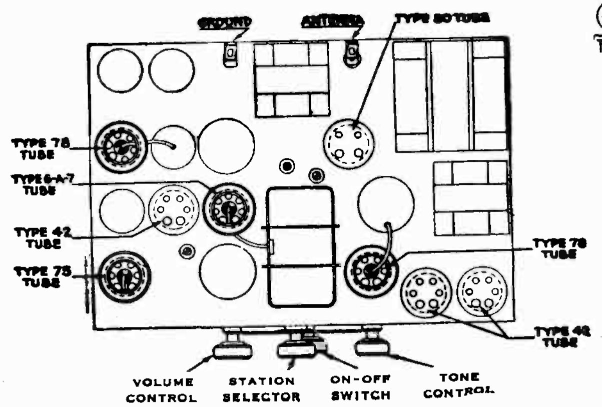


Fig. 2—Top View of Chassis

Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1-2	105-125	Primary	White
3-5	6.3	Filament	Black
6-7	5.0	Filament of 80	Blue
8-10	760	Plates of 80	Yellow
4	....	Center Tap of 3-5	Black—Yellow Tracer
9	....	Center Tap of 8-10	Yellow—Green Tracer

MODEL 28
Alignment
Parts List

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in Model 28, an accurately calibrated signal generator, an output meter, and a special insulated padding wrench and screwdriver are needed. We suggest the Philco Model 024 Signal Generator, which is accurately calibrated and easy to handle. Philco No. 3164 fibre wrench and No. 27-1159 fibre-handled screwdriver are also recommended. For the output meter either Philco Model 025 complete tester or Philco Model 012 shadow output meter is suggested.

The chassis must be removed from cabinet in order to make all adjustments.

Adjustments are made in the following order—

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter adapter leads to the plate and cathode prongs of the type 43 tube. Set the signal generator at 460 K.C. (the intermediate frequency of Model 28) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600 K.C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6-A-7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left-hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ② is located at rear and underneath the chassis, and is shown in Figure 1. It is reached from the rear of the chassis by inserting the fibre wrench through the hole near left-hand rear corner of chassis.

ANTENNA AND OSCILLATOR "HIGH" AND "LOW" FREQUENCY ADJUSTMENTS—The "antenna" and "oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set and adjust the antenna compensator ⑧ (nearest tuning control) to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser ⑭ (located on the other section of tuning condenser) to maximum reading.

Finally, set the signal generator at 600, tune in this signal and adjust the "oscillator L. F." condenser, located underneath chassis (⑱ in Fig. 1) to maximum reading. This adjustment is reached through the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).

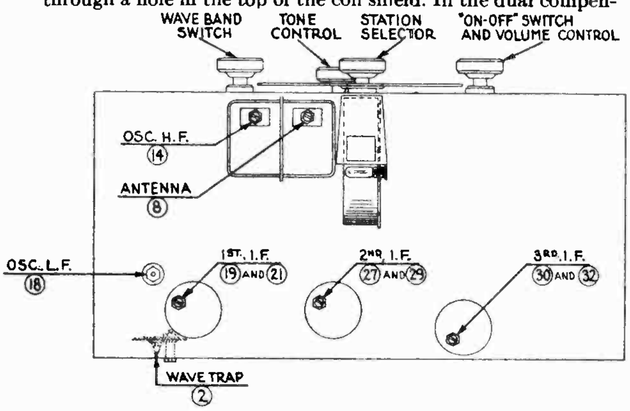


Fig. 1—Top View Showing Location of Compensating Condensers.

No. on Figs.	Description	Part No.	List Price Each
①	Condenser (.00125 mfd.—Mica)	5886	$0.35
②	Wave Trap	38-6050	.50
③	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
④	Antenna Transformer	32-1360	.60
⑤	Wave Band Switch	42-1062	1.10
⑥	Condenser (.25 mfd.—Tubular)	30-4146	.40
⑦	Tuning Condenser Assembly	31-1366	5.70
⑧	Compensating Condenser (Antenna)	Part of ⑦	....
⑨	Condenser (.1 mfd.—Tubular)	30-4122	.35
⑩	Resistor (400 ohms—Flex.) (Yellow-Black-Brown)	33-3016	.20
⑪	Condenser (.1 mfd.—Tubular)	30-4122	.35
⑫	Resistor (120,000 ohms) (Brown-Red-Yellow)	33-1128	....
⑬	Condenser (.003 mfd.—Mica)	30-1028	.60
⑭	Compensating Condenser (Osc. H. F.)	Part of ⑦	.65
⑮	Oscillator Transformer	32-1361	.65
⑯	Condenser (.0008 mfd.—Mica)	5878	.35
⑰	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.25
⑱	Compensating Condenser (Osc. L. F.)	04000S	.35
⑲	Compensating Condenser (1st I. F. Primary)	Part of ⑳	....
⑳	First I. F. Transformer	32-1362	1.50
㉑	Compensating Condenser (1st I. F Secondary)	Part of ⑳	....
㉒	Resistor (200 ohms—Flex.) (Red-Black-Black)	7217	.20
㉓	Condenser (.1 mfd.—Tubular)	30-4122	.35
㉔	Condenser (.09 mfd.—Twin Bakelite Block)	4989M	.40
㉕	Resistor (15,000 ohms) (Brown-Green-Orange)	6208	.25
㉖	Resistor (.1 meg.) (White-White-Orange)	4411	.25
㉗	Compensating Condenser (2d I. F. Primary)	Part of ㉘	....
㉘	2d I. F. Transformer	32-1363	1.50
㉙	Compensating Condenser (2d I. F. Secondary)	Part of ㉘	....
㉚	Compensating Condenser (3d I. F. Primary)	Part of ㉛	....
㉛	3d I. F. Transformer	32-1364	1.55
㉜	Compensating Condenser (3d I. F. Secondary)	Part of ㉛	....
㉝	Condenser (.05 mfd.—Tubular)	30-4020	.35
㉞	Resistor (1000 ohms) (Brown-Black-Red)	5837	.25
㉟	Resistor (2 megs.) (Red-Black-Green)	5872	.25
㊱	Condenser (.0001 mfd.—Twin-Bakelite Block)	8035E	.25
㊲	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
㊳	Volume Control and On-Off Switch (350,000 ohms, tapped at 75,000)	33-5066	1.45
㊴	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
㊵	Condenser (.05 mfd.—Bakelite Block)	3615-BU	.35
㊶	Condenser (.01 mfd.—Tubular)	30-4124	.25
㊷	Condenser (.00025 mfd.—Mica)	5858	.35
㊸	Resistor (1 meg.) (Brown-Black-Green)	4409	.25
㊹	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
㊺	Condenser (.1 mfd.—Tubular)	30-4122	.35
㊻	Condenser (.25 mfd.—Tubular)	30-4146	.40
㊼	Condenser (.00011 mfd.—Mica)	30-1031	.35
㊽	Condenser (.02 mfd.—Mica)	30-4113	.30
㊾	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410	.25
㊿	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
51	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	$0.25
52	Condenser (.09 mfd.—Twin-Bakelite Block)	4989M	.40
53	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
54	Tone Control (3-point)	30-4211	.75
55	Condensers (In tone control)	Inside 54	....
56	Output Transformer (28C)	32-7243	1.10
57	Condenser (.25 mfd.—Tubular)	30-4146	.40
58	Voice Coil and Cone Assembly P-21	02861	.65
	Voice Coil and Cone Assembly K-27	36-3159	.80
59	Field Coil and Pot Assembly P-21	36-3357	3.50
	Field Coil and Pot Assembly K-27	36-3352	4.00
60	Pilot Lamp	4567	....
61	Resistor (Wire Wound, New Type) (37, 63, 29 ohms)	33-3159	.35
62	Filter Choke	6658	1.50
63	Filter Choke	32-7018	1.50
64	Condenser (.05 mfd.—Tubular)	30-4123	.35
65	Condenser (Electrolytic 6 and 12 mfd., 150 volts)	30-2083	1.70
66	Resistor (Wire Wound, New Type) (10, 137 ohms)	33-3158	.45
67	Condenser (.09 mfd.—Tubular)	30-4122	.35
68	Condenser (Electrolytic 6 and 12 mfd., 150 volts)	30-2083	1.70

August, 1934

MODEL 28
Schematic
Layouts, Voltage

PHILCO RADIO & TELEV. CORP.

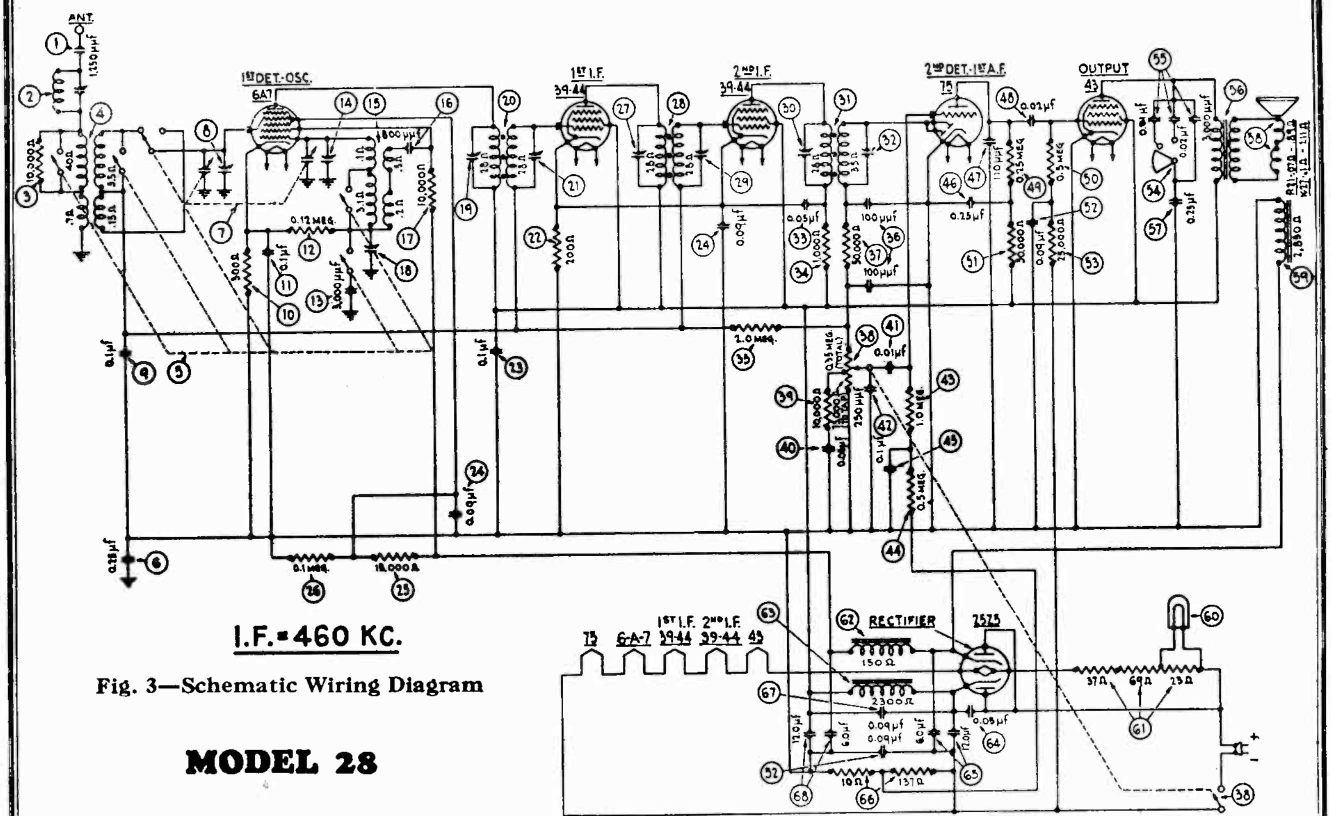


Fig. 3—Schematic Wiring Diagram

MODEL 28

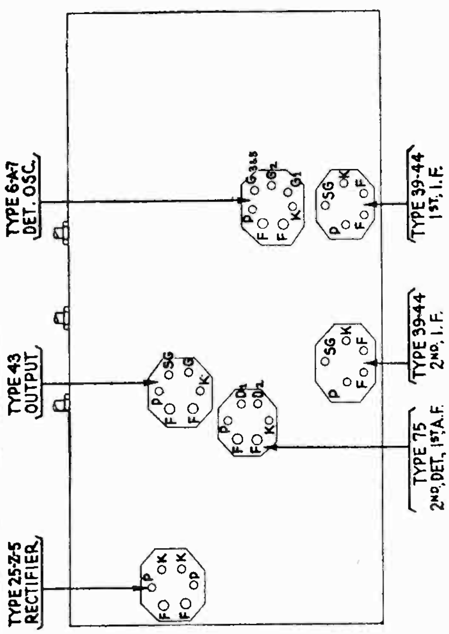


Fig. 2—Bottom View of Sockets for Testing Voltages.

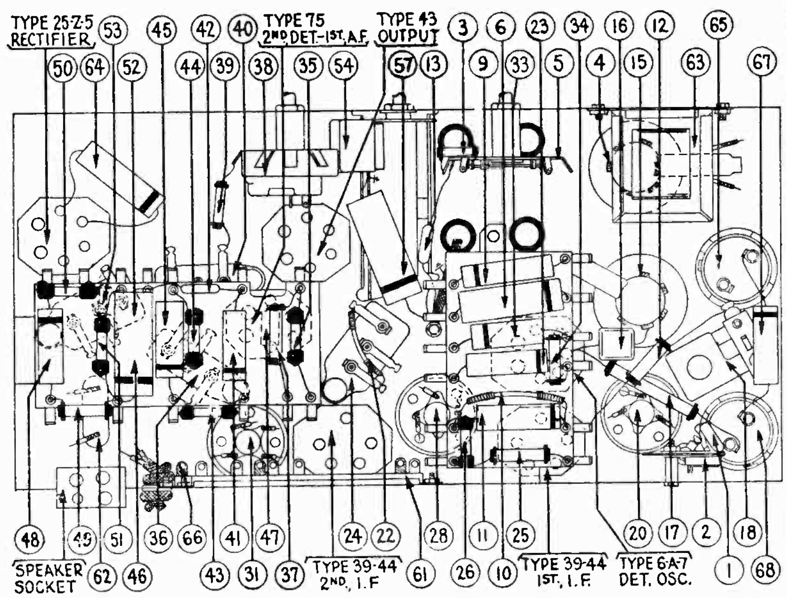


Fig. 4—Bottom View of Chassis Showing Parts.

TUBE SOCKET VOLTAGES

On Line Voltage 120 A.C. (first six tube columns) — **On Line Voltage 120 D.C.** (last six tube columns)

Type Tube	6-A-7	39-44	39-44	75	43	25-Z-5	6-A-7	39-44	39-44	75	43	25-Z-5
Plate (P to K).......	100	100	98	45	95	120	95	95	85	40	90	..
Screen Grid (SG to K)	G1=-8 G2=80 G3&5=60	100	100	..	100	..	G1=-10 G2=80 G3&5=60	95	95	..	95	..

Total Filament Voltage—75 | **Total Filament Voltage—83**

High resistance D.C. voltmeter used for above tests. Volume control at maximum; dial at 55; wave band switch at left. Refer to Fig. 2 (Socket View).
Philco Model 025 Circuit Tester is recommended for making the above voltage tests.

PHILCO RADIO & TELEV. CORP.

Philco Model 29 is a superheterodyne receiver operating on alternating current and capable of receiving either standard and police broadcasts between 540 and 1720 kilocycles, or short-wave stations between 4.2 and 13 megacycles. The left hand side of the dial is calibrated in kilocycles and the right in megacycles. A two-position switch changes reception from standard to short-waves. This model is equipped with shadow tuning, three point tone control with fixed bass compensation, and automatic volume control. The output is 5 watts.

Model 29 uses a type 6-A-7 detector-oscillator, two type 39-44 I. F. tubes, type 75 2d detector, type 42 output tube, and type 80 rectifier. The power consumption is 70 watts. The intermediate frequency is 460 K.C.

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in Model 29, an accurately calibrated signal generator and a special insulated padding wrench and screwdriver are needed. We suggest the Philco Model 024 Signal Generator or the 048 Tester which includes a similar instrument. Philco No. 3164 wrench and 27-1159 screwdriver are recommended in addition.

Adjustments are made in the following order:—

ADJUSTMENT OF INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal on the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 29) turn wave-band switch of receiver to left and dial to 600 K.C. Turn receiver and Signal Generator "ON". Adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located, one pair at the top of each of the three I. F. transformer shields. These are the metal "Cans" near the rear of chassis. Each of these transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6-A-7). Connect the output leads from the Signal Generator directly to the antenna and ground terminals of the receiver. Set the wave-band switch of the receiver to the standard broadcast band (left hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. Signal from signal generator. The Wave Trap (1) is located at rear and underneath the chassis, and is shown in Figure 4. It is reached from the rear of the chassis, thru hole at right hand end of set base.

DETECTOR; AND OSCILLATOR — "HIGH" AND "LOW FREQUENCY" ADJUSTMENTS—The "Antenna" and "Oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set, and adjust the antenna compensator (7) (nearest tuning control), to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser (11), located on the other section of tuning condenser, to maximum reading. Finally set the signal generator at 600, tune in this signal and adjust the oscillator L. F. condenser, located underneath chassis ((15) in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).

Tube Socket Voltages—(Line Voltage 115)

Function	Det. Osc.	1st I. F.	2nd I. F.	2nd Det.	Output	Rectifier
Type	6A7	39/44	39/44	75	42	80
Filament (F to F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)	210	200	200	200	300	310
Screen (SG to K)	80	80	80	...	315	...
Cathode (K to GND)	4.8	4.8	4.8	0	0	...
6-A-7 Grid G1 to K	35	...	...	...	...	...
6-A-7 Grid G2 to K	170	...	...	...	...	...

Power Transformer Voltages

Terminals	A. C. Volts	Circuit	Color of Leads
1-2	120	Primary	White
3-4	5.0	Fil. of 80	Blue
5-7	746	Plates of 80	Yellow
8-10	6.3	Filaments	Black
6	...	Center of 5-7	Black—Yellow Tracer
9	...	Center of 8-10	Yellow—Green Tracer

The above tests were made with an A. C. voltmeter for filament voltages and a high-resistance D. C. voltmeter for all others. Dial at 550 K.C., wave-band switch to left, volume control at maximum. Tests made with test prods applied to sockets underneath chassis.

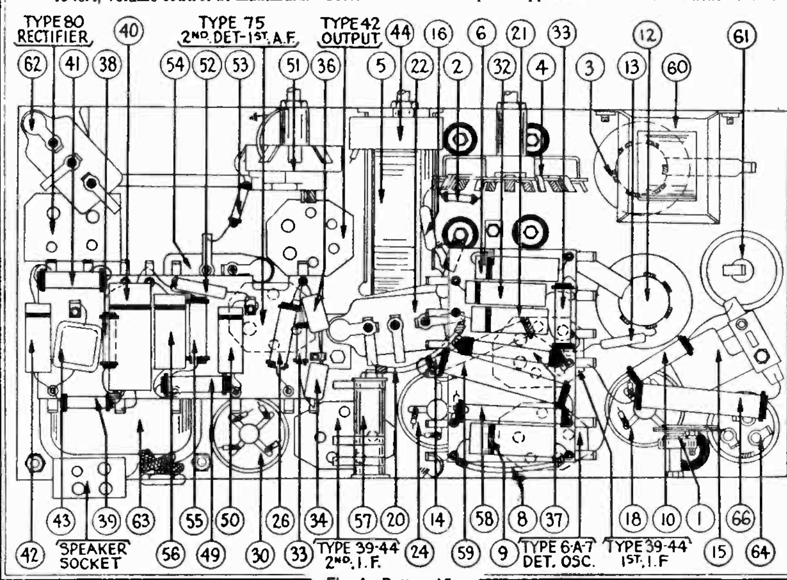


Fig. 4—Bottom View

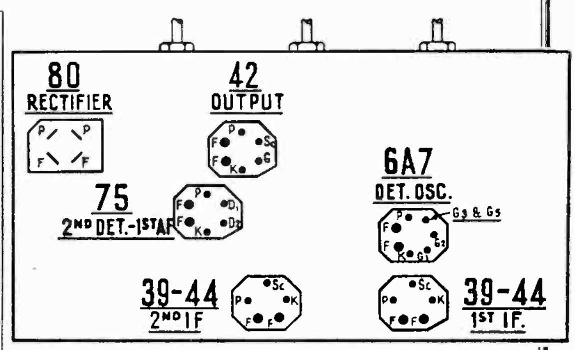


Fig. 1—Tube Socket Layout

MODEL 29
Schematic
Layout, Parts List

PHILCO RADIO & TELEV. CORP.

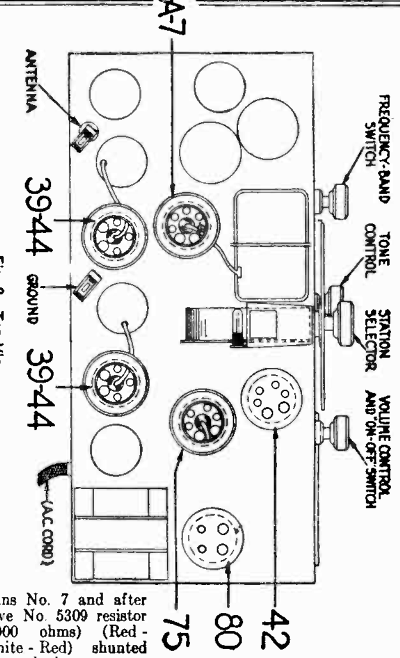


Fig. 2—Top View

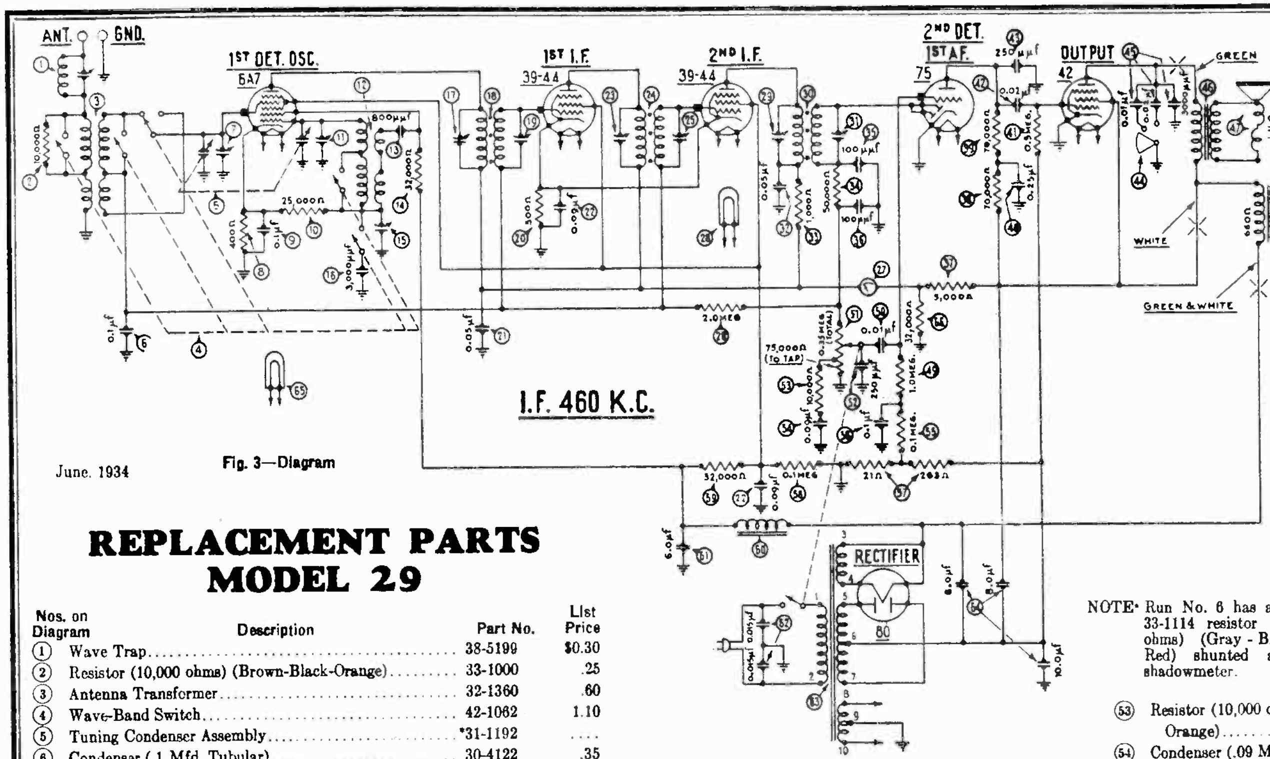


Fig. 3—Diagram

June, 1934

REPLACEMENT PARTS MODEL 29

Nos. on Diagram	Description	Part No.	List Price
1	Wave Trap	38-5199	$0.30
2	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
3	Antenna Transformer	32-1360	.60
4	Wave-Band Switch	42-1062	1.10
5	Tuning Condenser Assembly	*31-1192	....
6	Condenser (.1 Mfd. Tubular)	30-4122	.35
7	Compensating Condenser (Det.)	Part of (5)	....
8	Resistor (400 ohms Flexible Wire-Wound)	33-3016	.20
9	Condenser (.1 Mfd. Tubular)	30-4122	.35
10	Resistor (25,000 ohms) (Red-Green-Orange)	4516	.25
11	Compensating Condenser (Osc. H. F.)	Part of (5)	....
12	Oscillator Transformer	32-1361	.65
13	Condenser (.0008 Mfd. Mica)	5878	.35
14	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
15	Compensating Condenser (Osc. L. F.)	04000S	.35
16	Condenser (.003 Mfd. Mica)	7301	.45
17	Compensating Condenser (1st I. F. Primary)	Part of (18)	....
18	First I. F. Transformer	32-1362	1.50
19	Compensating Condenser (1st I. F. Sec.)	Part of (18)	....
20	Resistor (500 ohms Flexible Wire-Wound)	6977	.20
21	Condenser (.05 Mfd. Tubular)	30-4123	.35
22	Condenser (.09 Mfd. Twin) (Bakelite Block)	4989-Z	.40
23	Compensating Condenser (2d I. F. Pri.)	Part of (24)	....
24	2d I. F. Transformer	32-1363	1.50
25	Compensating Condenser (2d I. F. Sec.)	Part of (24)	....
26	Resistor (2 Megohms) (Red-Black-Green)	5872	.25
27	Shadowmeter	6497	2.50
28	Pilot Lamp (Shadowmeter)	Part of (27)	....
29	Compensating Condenser (3d I. F. Pri.)	Part of (30)	....
30	3d I. F. Transformer	32-1364	1.55
31	Compensating Condenser (3d I. F. Sec.)	Part of (30)	....
32	Condenser (.05 Mfd. Tubular)	30-4123	.35
33	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.25
34	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
35	Condenser (.0001 Mfd. Mica)	30-1031	....
36	Condenser (.0001 Mfd. Mica)	30-1031	....
37	Resistor (5,000 ohms) (Green-Black-Red)	3526	.25
38	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
39	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
40	Condenser (.25 Mfd. Tubular)	30-4134	.45
41	Resistor (500,000 ohms) (Yellow-White-Yellow)	4517	.25
42	Condenser (.02 Mfd. Tubular)	30-4113	.30
43	Condenser (.00025 Mfd. Mica)	5858	.35
44	Tone Control	30-4178	.75
45	Condensers (Inside 44)	Part of (44)	....
46	Output Transformer	32-7178	1.60
47	Voice Coil and Cone Assembly (H-16)	02625	.80
48	Field Coil and Pot Assembly (H-16)	36-3218	3.50
49	Resistor (1 Meg.) (Brown-Black-Green)	4409	.25
50	Condenser (.01 Mfd. Tubular)	30-4124	.35
51	Volume Control and On-Off Switch	33-5066	1.45
52	Condenser (.00025 Mfd. Mica)	5858	.35

NOTE: Run No. 6 has a No. 33-1114 resistor (8000 ohms) (Gray-Black-Red) shunted across shadowmeter. Runs No. 7 and after have No. 5309 resistor (2900 ohms) (Red-White-Red) shunted across shadowmeter.

Nos. on Diagram	Description	Part No.	List Price
53	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
54	Condenser (.09 Mfd.) (Bakelite Block)	4989-AM	.35
56	Resistor (100,000 ohms) (White-White-Orange)	4411	$0.25
56	Condenser (.1 Mfd. Tubular)	30-4122	.35
57	B. C. Resistor (263 ohms; 23 ohms; Wire-Wound)	33-3069	.25
58	Resistor (.1 Meg.) (White-White-Orange)	3767	.25
59	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
60	Filter Choke	32-7018	1.50
61	Condenser (Electrolytic—6 Mfd.)	30-2020	1.40
62	Condenser (.015 Mfd. Twin—Bakelite Case)	3793-E	.40
63	Power Transformer	32-7229	5.25
64	Condenser (Electrolytic—8 Mfd., 8 Mfd., 10 Mfd.)	30-2073	3.45
65	Pilot Lamp (Dial)	6608	.11
66	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
	A. C. Cord and Plug Assembly	L-943-A	.60
	Tube Shield	28-1107	.10
	Four-Prong Socket	7544	.10
	Five-Prong Socket	7547	.11
	Six-Prong Socket	7546	.11
	Seven-Prong Socket	27-6005	.11
	Speaker Socket	4957	.10
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Dial Assembly	*31-1208	.45
	Dial Scale	27-5042	.25
	Chassis Mounting Screw	W-1345A	2.75 C.
	Chassis Mounting Foot (Steel)	29-1983	.03
	Chassis Mounting Foot (Rubber)	27-4116	.05
	Chassis Mounting Foot Plate	27-7497	.35 C.
	Screw (Foot mtg.)	W-644A	1.50 C.

*Note: Some Model 29 sets use tuning condenser assembly No. 31-1250, which has dial assembly 31-1245. This is not interchangeable with 31-1192 and 31-1208.

PHILCO RADIO & TELEV. CORP.

Changes

Model 16

Starting with run No. 14, all type Model 16 will use a different type tone control. This will be Part No. 30-4168 which replaces 30-4069 formerly used. Condenser 7653-C (⑩ on wiring diagram in Bulletin 165-B) is replaced by 3615-L.

The new tone control has fixed bass compensation, effective on all four positions, which helps subdue background noise and thus favorably affects short-wave reception.

Starting with Run No. 15, a No. 30-4125 tubular condenser, .006 mfd, will be added, connected between the plate of the 77 tube and the tone control. This gives a smoother variation in control and prevents too great a change in tone from one step to another.

Starting with Run No. 16, the tone control used on Model 16 will be part No. 30-4204, which replaces 30-4168. (See June 1st change notices.) At the same time, condenser 3615-L replaces 3615-J, and external tone control condenser 30-4125 is removed. This latter condenser is now built in as part of the new tone control, thus simplifying assembly of the set.

Model 18-124

Starting with Run No. 4, Resistor ㉘ on wiring diagram of Model 18-124 will be Part No. 5837 (1000 ohms) instead of No. 7775 (2500 ohms). There is a slight change in the antenna and oscillator transformers, the new ones being identified by a red paint mark on the bracket. No change in part number. Change to increase sensitivity.

Model 29 (Code 123-TX)

The differences between regular Model 29 and the TX type are that the latter has the following parts added:

Output transformer	32-7256
Speaker switch (toggle)	3116
Speaker	Type P-22

Model 29-TX also includes a furniture-type speaker, HR-2, which is connected to the receiver by a 25-foot cable and plug assembly, part No. 36-3327, attached to the speaker cabinet.

The A. C. cord on 29-TX is a flat cable and contains an extra wire, which is for use as an antenna lead by connecting the antenna to the binding post mounted on the side of the special flat A. C. plug used. However, the antenna *may* be connected to the regular antenna clip terminal on the receiver chassis if desired and more convenient.

The part number of this special cable and plug assembly is 41-3104.

Model 29

Effective July 1st, condenser ㊹ in wiring diagram of Model 29 is changed from 4989 AM, (.09 mfd.) to 3615 AW (.05 mfd.). This improves the fixed bass compensation used in this model.

Starting with Run No. 8, the cathode resistor (㉚ in wiring diagram of Model 29) will be changed from Part No. 6977 (500 ohms) to 33-3016 (400 ohms). This will prevent variation in performance of sets due to considerable variation in 6A7 tubes.

Starting with Run No. 9, electrolytic condenser ㊶ (on wiring diagram) will be a Part No. 30-2026 instead of 30-2020. The new type is of a higher working voltage.

Models 29 & 45

Effective July 1st, a new wave-trap will be used in this model. Part ① on wiring diagram of Model 29 is changed from Part No. 38-5199 to 38-5995. The new wave trap uses an improved construction which facilitates production.

Effective July 1st, mica condenser ⑯ on wiring diagram of Model 29 was changed from Part No. 7301 to 30-1028. No change in capacity; change to facilitate wiring only.

MODELS 19,38,89
Notes

PHILCO RADIO & TELEV. CORP.

Correcting Intermittent Operation

On some of the earlier models of the 89, 19 and 38, difficulty may occasionally be experienced with intermittent operation. This condition usually occurs during periods of humid weather, and is caused by stopping of the oscillator. In some cases, the radio may be completely dead and at other times this in-operative condition may exist over a portion of the dial only.

There are a number of possible causes for the difficulty and the necessary steps have been taken in later production to correct the condition. On a few of the earlier sets, however, it may be necessary to make one or more of the changes outlined below:

1. OSCILLATOR TUBE: In most cases, partial or complete failure of the oscillator circuit can be corrected by replacing the oscillator tube.
2. BATTERY VOLTAGE: In the Model 38, low voltage of the "A" or "B" battery may cause failure in oscillation.
3. CATHODE RESISTOR: In the Models 89 and 19, correct performance can usually be restored by changing the cathode resistor ⑩ in the wiring diagrams of service bulletins 146 and 146A from 15,000 ohms to 10,000 ohms (Philco Part No. 4412). In the Model 38, the cathode resistor ⑫ in the wiring diagram of service bulletin 106 is changed from 6,000 ohms to 4,000 ohms (Philco Part No. 33-1040).
4. COMPENSATING CONDENSERS: The first I. F. compensating condensers in Models 89 and 19 ⑮ in service bulletin 146, ⑬ in service bulletin 146-A and ⑩ in service bulletin 166 have been changed from Part No. 04000-M to Part No. 31-6016. The new condenser has a larger insulating surface between the plates of the condenser and the mounting holes. The possibility of moisture absorption is thus eliminated. It is necessary to re-drill a hole in the chassis so that the condenser can be mounted correctly with respect to the opening in the chassis for the compensating condenser wrench.
5. BAKELITE WASHERS: In order to prevent moisture absorption with resulting drifting in the compensating condenser adjustment, a bakelite washer and a metal washer are now being used on top of the compensating condenser, in place of the fibre washers previously used. The part number of the bakelite washer is 27-4109 and the metal washer (placed on top of the bakelite) is W-1331. These two replace the old fibre washer Part No. 3500.
6. MICA INSULATION: It was found on some sets that the mica which separates the leaves of the high frequency oscillator compensating condensers was extremely thin and would crack easily. Moisture absorption in the cracks was sufficient to stop oscillation. This condition was corrected by replacing the mica.
7. WIRE INSULATION: The wire which connects from the oscillator tuning condenser to the oscillator coil should be rubber-covered. Possible moisture absorption in the insulation of the cotton-covered wire may be sufficient to produce leakage to ground.
8. OSCILLATOR COIL IMPREGNATION: In some cases, it may be desirable to re-impregnate the oscillator coils in accordance with the present methods of production. The coil is dipped in hot paraffine for twenty seconds. The entire coil, including the terminals, is submerged; the only part which is out of the paraffine is a portion of the mounting lug, thus assuring a good ground connection. The coil and the paraffine both are allowed to cool until the paraffine becomes a considerably heavier consistency, at which time the coil is again dipped, thus allowing a fairly heavy covering over the entire coil. The coil is now entirely sealed and will not be affected by any moisture changes.
9. TUNING CONDENSER: A few tuning condensers of the 89 and 38 Models went out of the factory with a sanded surface on the bakelite between the stator and rotor plates. Moisture absorption at this point was sufficient to stop oscillation. Changing the tuning condenser to the type with smooth bakelite insulation will correct the trouble. In present production, these bakelite pieces are dipped in insulating varnish to seal all possible openings which might absorb moisture.
10. OSCILLATOR SOCKETS: In extreme cases it may be necessary to change the detector-oscillator tube socket. Moisture absorption occasionally takes place around the rough edges of the socket.

PHILCO RADIO & TELEV. CORP.

ELIMINATION OF NOISE INTERFERENCE CAUSED BY THE FARM LIGHTING SYSTEM

The operation of a radio receiver directly from a 32 volt farm lighting system is sometimes interfered with by noises in reception, caused by the operation of the lighting system's charging equipment. These noises are radiated from the service lines and picked up by the antenna and lead-in. A certain amount of the noise also comes directly thru the lines. A whirring or crackling noise may be caused by sparking at the brushes of the generator; and a "clicking" by the sparks at the spark plug of the gasoline motor used to drive the generator, and by the operation of the "breaker" in the spark coil primary.

Installation of the proper type of antenna system is of considerable importance in eliminating these troublesome noises. For maximum freedom from noise the antenna should be the special Philco "Three-Purpose" aerial system, which was designed to prevent pick-up of noise by the antenna lead-in.

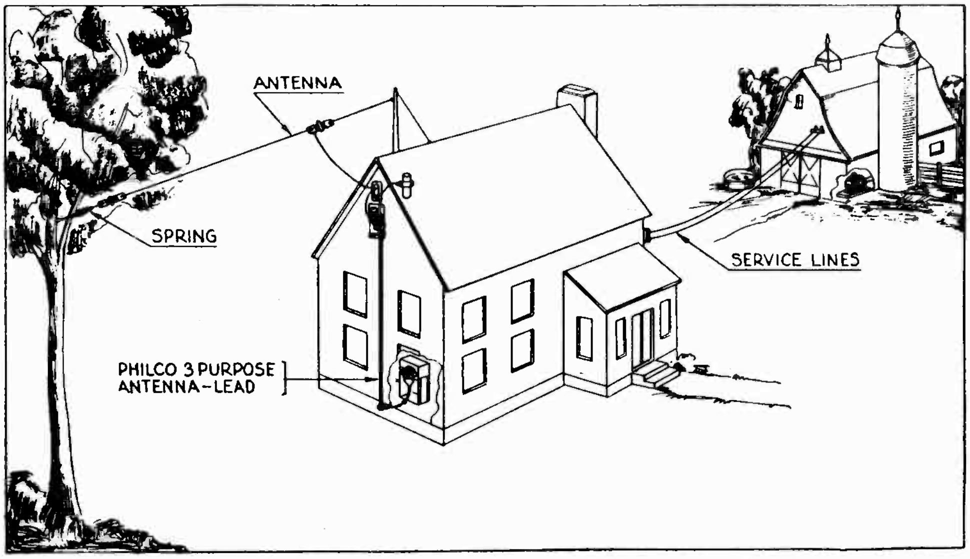


Fig. 8—Best Method of Antenna Installation for Model 32

The antenna wire should in all cases be run in a direction from the house opposite to that of the service leads from the lighting system, as indicated in Fig. 8. Where the Three-Purpose System is used, the instructions furnished with it should be very carefully followed. Note that this system employs a special "transmission line" lead-in, at each end of which a special transformer is installed. The transformers must be installed as per instructions, and if this is done the transmission line (lead-in) will be completely noise-proof. All other necessary parts for the antenna installation such as ground clamps, lighting arrester, etc. are included with the Three-Purpose Antenna System.

Philco has designed a special interference-suppression and filter for 32 volt systems which will eliminate most if not all of the interference encountered in the majority of installations. This unit consists of filter chokes and condensers, and is connected directly in the output lines of the generator as per instructions supplied with this special unit. The unit may be obtained from your Philco Distributor.

It is generally advisable also to connect a ½ mfd. fixed condenser (Philco Part No. 30-4015) from each set of generator brushes to the frame of the generator (which should be grounded). The method of locating these condensers is indicated in Fig. 9 which shows a cut-away view of one end of a generator. These condensers help eliminate the whirring or crackling caused by the generator brushes.

To reduce the clicking noise caused by the ignition at the spark plug, a suppressor (Philco Part No. 4531) should be inserted in series between the terminal of the plug and the cable leading to it. See Fig. 10.

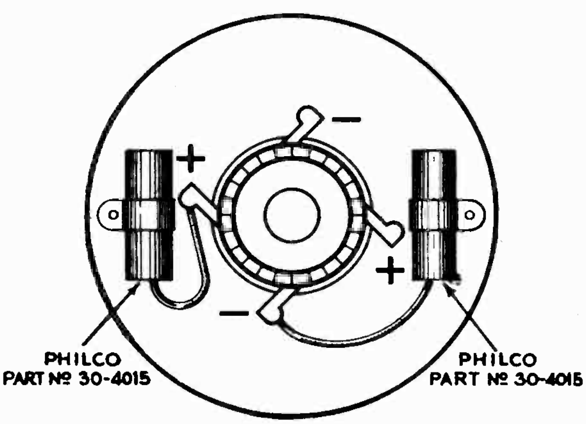


Fig. 9—Condensers Attached to Generator for Suppressing Interference

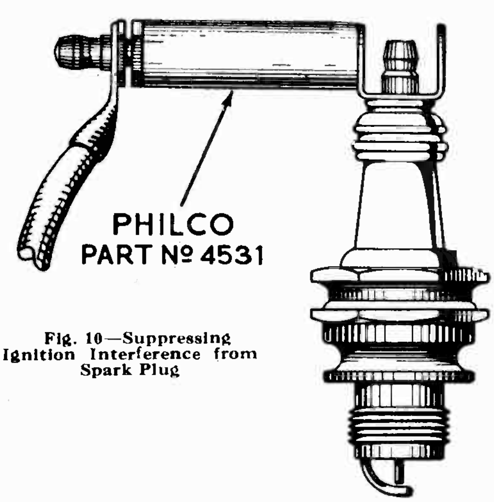


Fig. 10—Suppressing Ignition Interference from Spark Plug

MODEL 32
Alignment Data
Layouts

PHILCO RADIO & TELEV. CORP.

Model 32

Philco Model 32 is a superheterodyne radio receiver designed to operate directly from a 32 volt D. C. (direct current) electric system, such as used on many farms for lighting purposes. In this model the filaments of the tubes (except the rectifier) are connected in series, while the necessary plate and grid voltages are secured from a special vibrator-and-rectifier unit, contained in a separate metal box mounted on a shelf of the radio cabinet. The rectifier tube is inside the vibrator-and-rectifier unit box. It obtains its filament voltage from a secondary winding of the transformer which is also located in the vibrator-and-rectifier unit box.

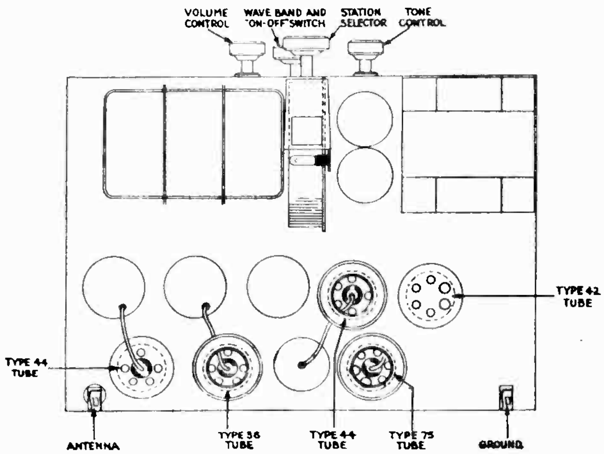


Fig. 1—Top View of Model 32

NOTE: In 32-volt systems where the batteries are old, the voltage is high (40 volts) when generator is running (due to the higher internal resistance of the batteries). In such cases it will help conserve life of the tubes in the set if battery charging is done at periods of the day when the radio is not in use.

Model 32 uses the following tubes: R. F., type 39-44; Detector-Oscillator, type 36; I. F., type 39-44; 2d detector, type 75; Output type 42; Rectifier, type 84.

The frequency range of the model 32 is 520 to 3260 kilocycles. The intermediate frequency (I. F.) is 260 K. C. The power consumption is 50 watts when the line voltage is 32, and approximately 70 watts when the line voltage reaches 38.

With a line voltage of 35 volts to the vibrator and an effective voltage of 28 at primary of power transformer (voltage from white lead to white-black-tracer), the A. C. voltage across secondary should be about 300 volts at 65 milliamperes. Secondary voltage measured from yellow lead to yellow-green-tracer. Voltage across 84 filament approximately 7 volts at .5 amperes. (Filament leads have blue insulation.)

Tube Socket Data Line Voltage 34 Volts

Circuit	RF	Det.-Osc.	IF	AF	Out-put	Rect.
Type Tube	39-44	36	39-44	75	42	84
Filament Volts	6.8	6.8	6.8	6.8	6.8	6.8
Plate Volts	205	200	235	155	220	300
Screen Grid Volts (SG to K)	85	83	85	......	240	......
Cathode Volts (K to Gnd)	4	8.5	4	0	0	......

The above voltage values were obtained with a high-resistance, multi-range D. C. voltmeter. The readings were taken from the underside of the chassis, with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER is an ideal instrument for taking these readings, and is highly recommended for this purpose. When the above values were obtained, the Station Selector was set at the low frequency (550 K. C.) end of the scale; the Volume Control was at maximum

Fig. 2—Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis

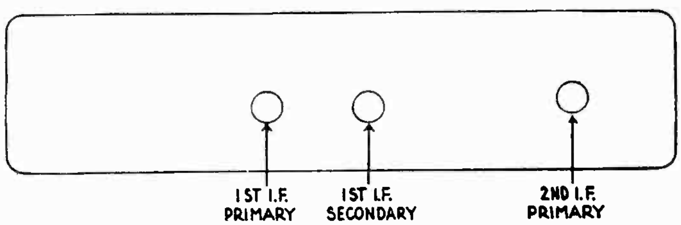


Fig. 3—Rear of Model 32 Chassis, showing location of I.F. Compensating Condensers. I.F. of Model 32 is 260 K. C.

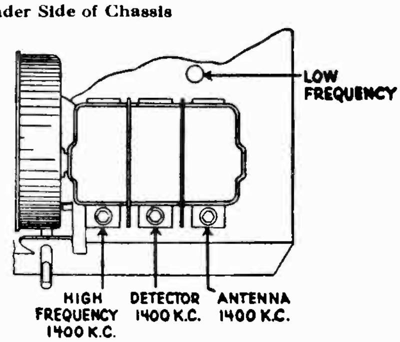


Fig. 4—Top View of Chassis Showing Compensating Condensers Mounted on Tuning Condenser, also Low Frequency Compensating Condenser.

ADJUSTMENT OF MODEL 32

COMPENSATING CONDENSERS

These receivers are adjusted accurately before they are shipped from the Factory. If re-adjustment is required, it is usually necessary to re-align only the intermediate frequency compensating condensers. Fig. 3 shows the location of these compensating condensers. The intermediate frequency is 260 kilocycles.

An accurately calibrated signal generator is required for these adjustments. The PHILCO MODEL 024 is a precision signal generator supplying frequencies from 105 kilocycles to 2000 kilocycles and is recommended for this work.

To adjust the I. F. condensers, remove the grid cap clip from the type 36 tube and connect the shielded antenna lead from the signal generator to the grid cap. Connect the ground lead from signal generator to ground post of set.

Connect the primary terminals of the output transformer to an output meter. Set the signal generator frequency switch at 260 K. C., turn it and the receiver "on" and adjust the attenuator of the signal generator so as to get a half scale deflection on the meter. Now with the fibre hex wrench, adjust each of the I. F. condensers in turn so as to obtain maximum reading in the meter.

If re-adjustment of the intermediate frequency circuits is not sufficient to restore sensitivity, the high frequency and low frequency compensating condensers are re-aligned as described in the following paragraphs. Figure 4 shows the location of these compensating condensers.

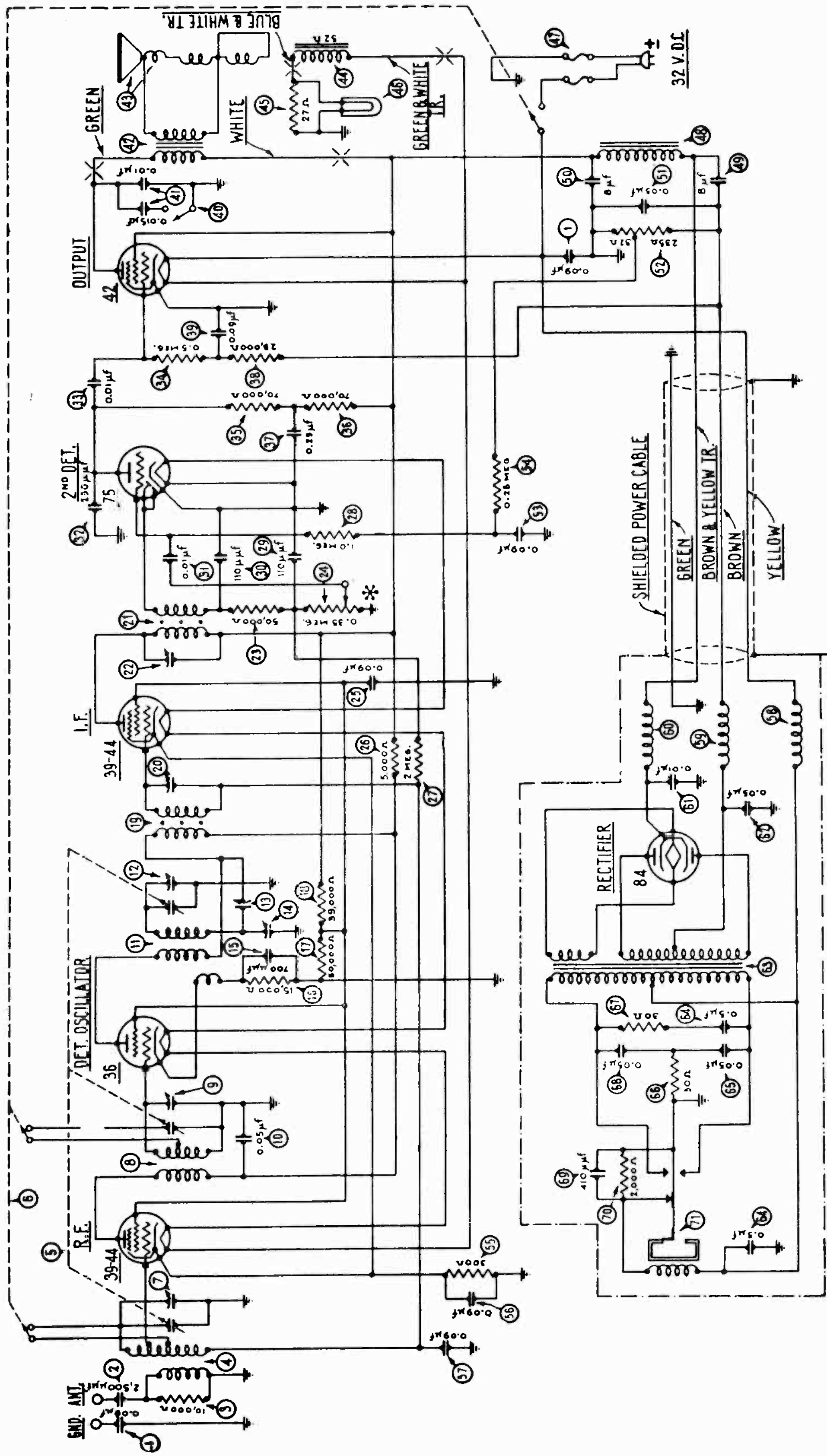
When making these adjustments replace the grid clip on the 36 tube, and connect the antenna and ground leads from the signal generator direct to the antenna and ground posts of set.

The High Frequency compensating condenser is first adjusted. This adjustment is made with the signal generator set at 1400 kilocycles. Next the Detector and Antenna Condensers, located on the tuning condenser assembly, should be adjusted, with the signal generator still operating at 1400. It may be necessary to readjust the attenuator on the signal generator for these adjustments.

The last adjustment is that of the low frequency (LF) compensating condenser which is accessible from above through the hole in chassis alongside the tuning condenser assembly. This adjustment is made with the signal generator set to give a 700 K. C. signal.

MODEL 32
Schematic

PHILCO RADIO & TELEV. CORP.



IF PEAK 260 KC

Fig. 5—Wiring Diagram—Model 32

* MUST BE GROUNDED AT 75 CATHODE

April, 1934

MODEL 32
Layouts
Parts List

PHILCO RADIO & TELEV. CORP.

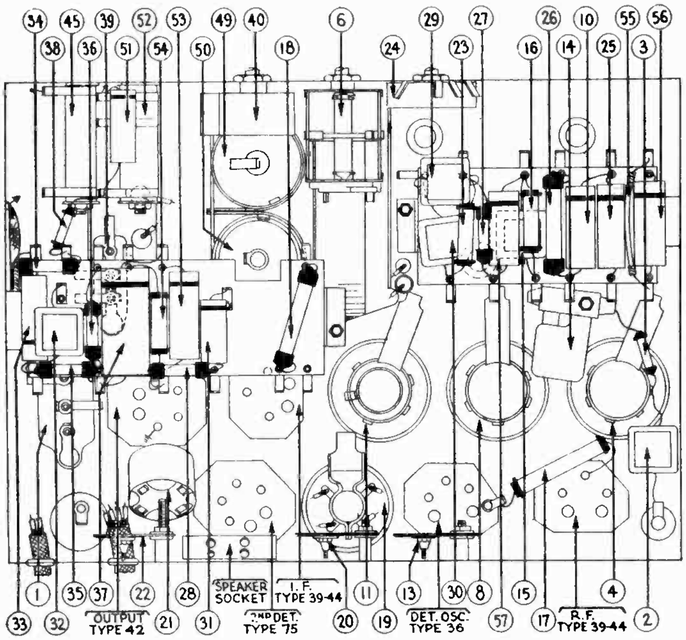


Fig. 6—Bottom View of Chassis

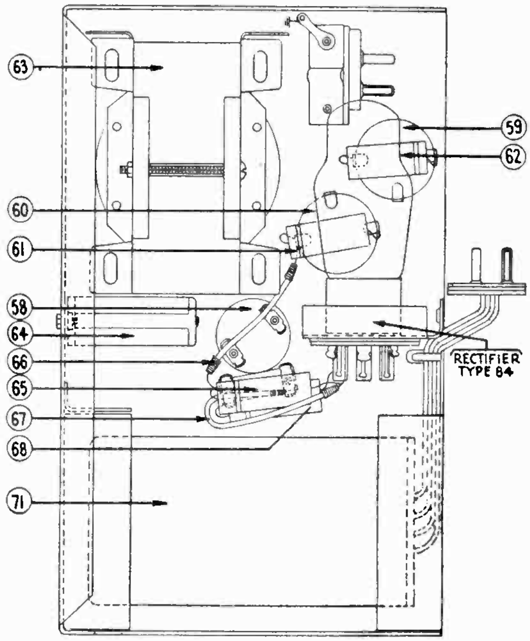


Fig. 7—Bottom of Vibrator and Rectifier Unit

REPLACEMENT PARTS FOR MODEL 32

No. on Figs. 6 and 7	Description	Part No.	List Price
1	Condenser (.09 mfd.—.09 mfd.)	4989-G	$0.40
2	Condenser (.0025 mfd.) (mica)	7006	.40
3	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25
4	Antenna Transformer	32-1062	.70
5	Tuning Condenser Assembly	31-1059	5.00
6	Wave-band & On-off Switch	42-1017	1.00
7	Compensating Condenser (ant.)	Part of 5	....
8	Detector Transformer	32-1063	.50
9	Compensating Condenser (det.)	Part of 5	....
10	Condenser (.05 mfd. tubular)	30-4123	.35
11	Oscillator Transformer	06620	.90
12	Compensating Condenser (osc. H. F.)	Part of 5	....
13	Compensating Condenser (1st I. F. pri.)	04000-M	.20
14	Compensating Condenser (osc. L. F.)	04000-S	.35
15	Condenser (.0007 mfd.—mica)	5863	.35
16	Resistor (15,000 ohms) (Brown-Green-Orange)	6208	.25
17	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
18	Resistor (39,000 ohms) (Orange-White-Orange)	33-1027	.25
19	First I. F. Transformer	32-1289	.60
20	Compensating Condenser (1st I. F. secondary)	04000-M	.20
21	Second I. F. Transformer	06622	1.20
22	Compensating Condenser (2d I. F. primary)	04000-A	.15
23	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
24	Volume Control (350,000 ohms)	33-5065	1.00
25	Condenser (.09 mfd. tubular)	30-4122	.35
26	Resistor (5,000 ohms) (Green-Black-Red)	3526	.25
27	Resistor (2 meg. Red-Black-Green)	5872	.25
28	Resistor (1 meg. Brown-Black-Green)	4409	.25
29	Condenser (.00011 mfd.—mica)	30-1006	.35
30	Condenser (.00011 mfd.—mica)	30-1006	.35
31	Condenser (.01 mfd. tubular)	30-4124	.25
32	Condenser (.00025 mfd.—mica)	3082	.35
33	Condenser (.01 mfd. tubular)	30-4145	.25
34	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
35	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25

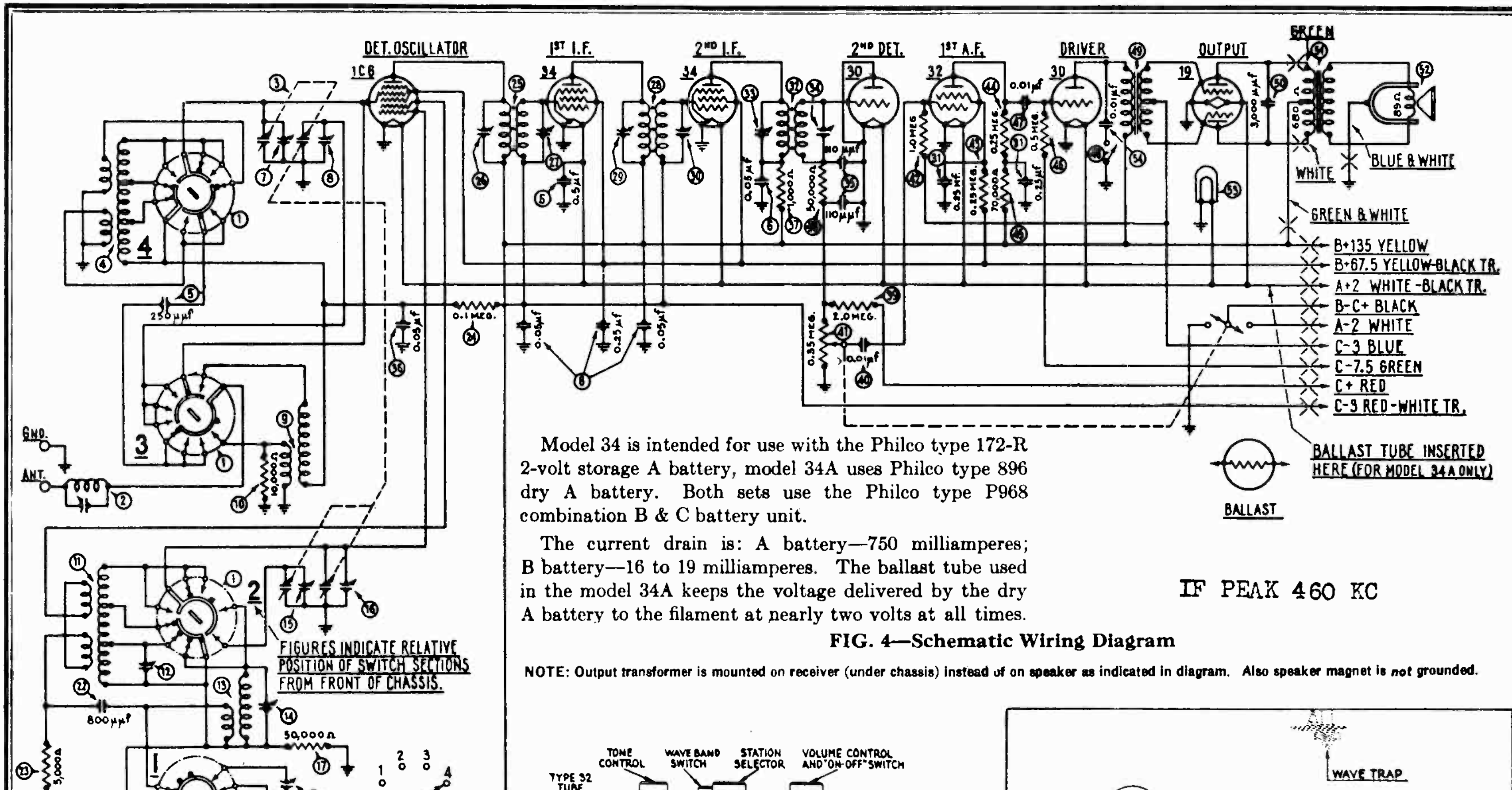
No. on Figs. 6 and 7	Description	Part No.	List Price
36	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	$0.25
37	Condenser (.25 mfd. tubular)	30-4134	.45
38	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
39	Condenser (.09 mfd.) (Bakelite block type)	4989-AL	.35
40	Tone Control	06764	.50
41	Condensers	Part of 40	....
42	Output Transformer (For K-26 spkr.)	32-7042	.95
43	Voice Coil and Cone (For K-26 spkr.)	36-3174	.40
44	Field Coil and Pot Assembly (K-26)	36-3306	2.85
45	Resistor (Pilot light) (27 ohms)	33-3132	.20
46	Pilot Lamp	4567	.12
47	Line Fuses (Located in line plug) (3 amp.)	45-2046	ea. .06
48	Filter Choke	32-7213	1.60
49	Condenser (Electrolytic—8 mfd. wet)	30-2026	1.50
50	Condenser (Electrolytic—8 mfd. dry)	30-2014	1.70
51	Condenser (.05 mfd. tubular)	30-4020	.35
52	B. C. Resistor (235—32 ohms)	7998	.20
53	Condenser (.09 mfd. tubular)	30-4122	.35
54	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410	.25
55	Resistor (Flexible—300 ohms)	33-3010	.20
56	Condenser (.09 mfd. tubular)	30-4122	.35
57	Condenser (.09 mfd. tubular)	30-4122	.35
	Speaker Plug Socket	4957	.10
	Line Plug Assembly with Cord (Less fuses)	L-1738	.85

VIBRATOR AND RECTIFIER UNIT

No. on Figs. 6 and 7	Description	Part No.	List Price
58	R. F. Choke (Low voltage)	32-1375	$0.40
59	R. F. Choke (High voltage)	32-1348	.30
60	R. F. Choke (High voltage)	32-1348	.30
61	Condenser (.01 mfd. tubular)	30-4145	.25
62	Condenser (.05 mfd. tubular)	30-4020	.35
63	Power Transformer	32-7218	4.95
64	Condenser (.5 mfd.—.5 mfd.—metal case)	30-4155	.85
65	Condenser (.05 mfd. tubular)	30-4020	.35
66	Resistor (30 ohms flexible wire wound)	33-3119	.25
67	Resistor (30 ohms flexible wire wound)	33-3119	.25
68	Condenser (.05 mfd. tubular)	30-4020	.35
69	Condenser (.00041 mfd.—mica)	Inside 71	....
70	Resistor (2,000 ohms)	Inside 71	....
71	Vibrator Unit	38-5640	6.00

MODEL 34, 34-A
Schematic
Layouts

PHILCO RADIO & TELEVISION CORP.



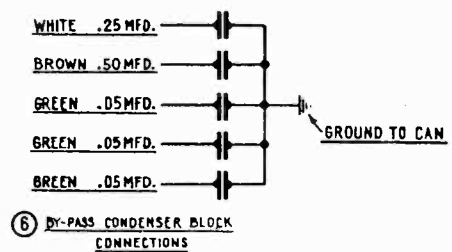
Model 34 is intended for use with the Philco type 172-R 2-volt storage A battery, model 34A uses Philco type 896 dry A battery. Both sets use the Philco type P968 combination B & C battery unit.

The current drain is: A battery—750 milliamperes; B battery—16 to 19 milliamperes. The ballast tube used in the model 34A keeps the voltage delivered by the dry A battery to the filament at nearly two volts at all times.

IF PEAK 460 KC

FIG. 4—Schematic Wiring Diagram

NOTE: Output transformer is mounted on receiver (under chassis) instead of on speaker as indicated in diagram. Also speaker magnet is *not* grounded.



(6) BY-PASS CONDENSER BLOCK CONNECTIONS

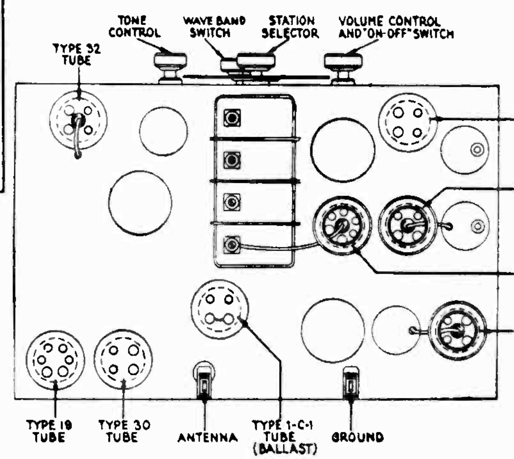


FIG. 1—Top View of Chassis

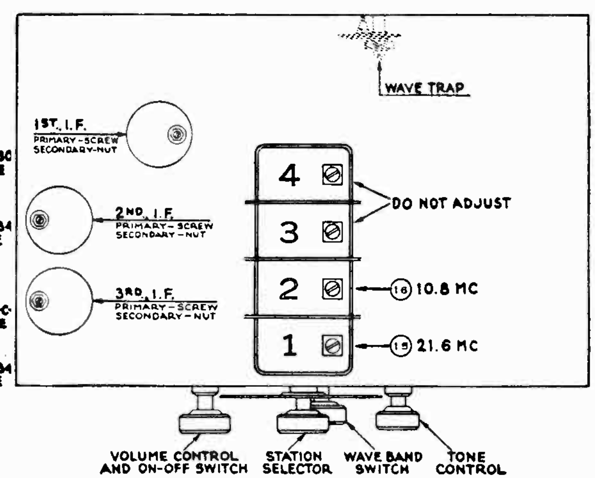


FIG. 2—Position of Compensating Condensers Reached from *Above* Chassis

March, 1934

MODEL 34,34-A
Alignment Data
Voltage,Socket

PHILCO RADIO & TELEVISION CORP.

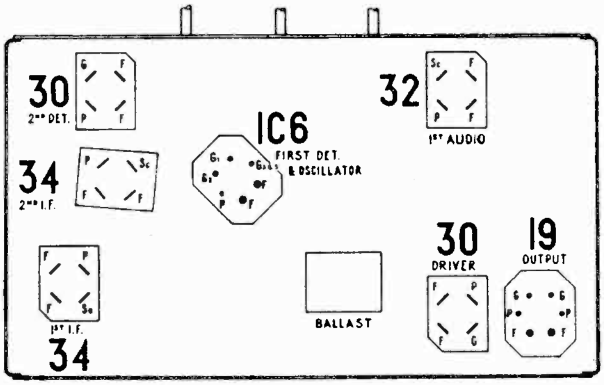


FIG. 3—Tube Socket Layout (View of Underside)

Table 1—Tube Socket Data*

CIRCUIT	Det.-Osc.	1st I. F.	2nd I. F.	2nd Det.	1st A. F.	Driver	Output
TYPE TUBES	1C6	34	34	30	32	30	19
Filament Volts	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Plate Volts	P-135 G2-120	135	135	..	40	135	135
Screen Grid Volts	67½	67½	67½	..	35	..	..

*The above values were obtained from the underside of the chassis, using test prods and leads, with a high-resistance multi-range D. C. voltmeter. The Philco Model 048 All Purpose Set Tester is highly recommended for all tests of this character. Receiver volume control at maximum; station selector at 520 kilocycles. Readings taken with a plug-in adapter will not be satisfactory.

ADJUSTING MODEL 34

The compensating condensers of Model 34 have been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should NOT be undertaken unless the receiver is seriously out of alignment.

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly. These have been adjusted, and sealed, at the factory.

Philco Model 048 All-Purpose Set Tester, which incorporates a signal generator covering broadcast and police band frequencies, is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies for adjusting the compensating condensers in the high frequency circuits.

1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 1C6 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 34) and adjust each of the I.F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I.F. compensating condensers is shown in Figure 2. Each of these transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 1C6). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (Range 1) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ② condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ② is located at rear and underneath the chassis, and is shown in Figures 2 and 5. It is reached from the rear of the chassis.

3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 34 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

Range 1............520 K.C.—1500 K.C.
Range 2............1.5 M.C.—4.0 M.C.
Range 3............4.0 M.C.—11.0 M.C.
Range 4............11.0 M.C.—23.0 M.C.

Connect the output terminals of the Model 091 or equivalent Signal Generator, to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. Set the Wave-Band Switch to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser ⑮ on Section 1 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be heard. Adjust the compensating condenser ⑯ on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment, otherwise the output of the Signal Generator will be too great. Adjust the compensating condenser ⑫ to give maximum response in the output circuit. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 5.

This concludes adjustments requiring the Model 091 (or equivalent) high frequency signal generator.

The Model 048 or its equivalent is now used again. Turn the Wave-Band Switch of the set to Range 2 and the Station Selector to 1.5 M.C. Set the Signal Generator at 1500 K.C. Make sure the "Antenna" connection between the Signal Generator and the Chassis has been restored. Adjust compensating condenser ⑲ located underneath the chassis, (Figure 5). Adjustment is made from the underside of the chassis.

Tune the Wave-Band Switch to Range 1 and the Station Selector to 1400 K.C. Set the Signal Generator at 1400 K.C. Adjust compensating condenser ⑭, which is located underneath the chassis. (See Figure 5). This adjustment is made from the underside of chassis.

Finally, with Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator at 520 K.C. and adjust compensating condenser ⑱ (Figure 5). This compensating condenser is also mounted underneath the chassis, and reached from below.

For proper and accurate adjustment of Model 34, the procedure must be followed exactly in the order given. The adjustment should not be undertaken without proper equipment as mentioned above.

MODEL 34, 34-A
Chassis Layout
Parts List

PHILCO RADIO & TELEVISION CORP.

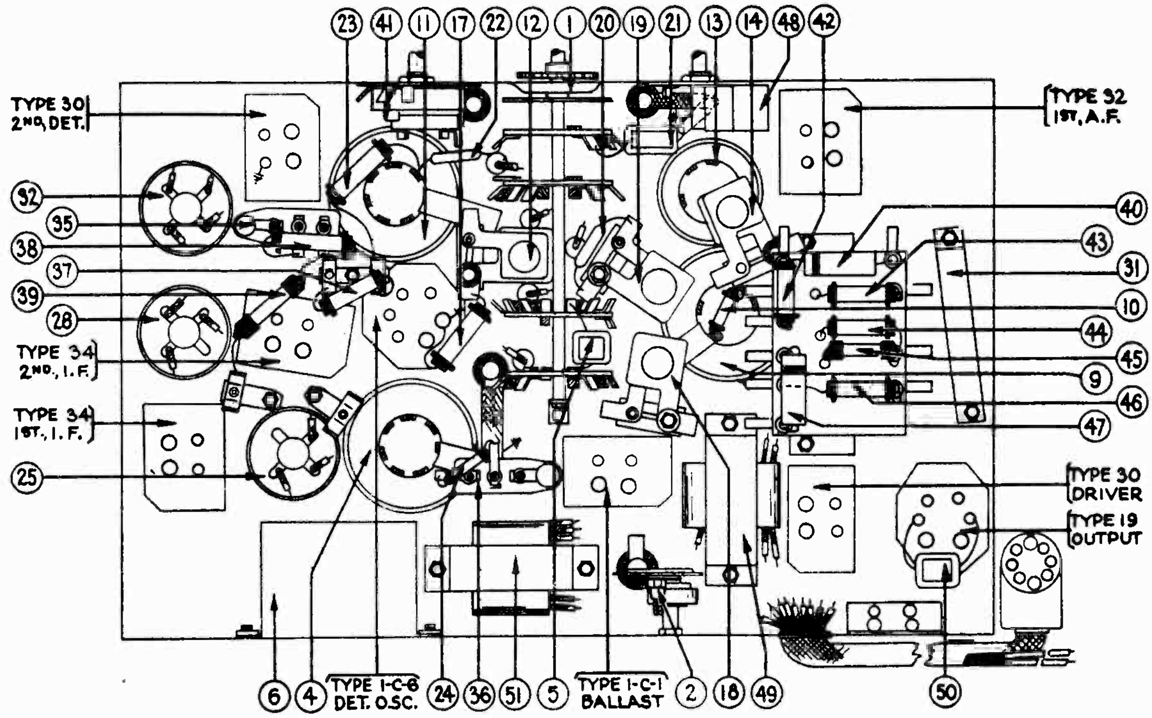


FIG. 5—Bottom View of Chassis, Showing Parts, and Position of Compensating Condensers Reached from Below Chassis

MODEL 34 PARTS

No. on Figs.	Description	Part No.	List Price Each
1	Wave-Band Switch	42-1045	$3.60
2	Wave Trap	38-5199	.30
3	Tuning Condenser Assembly	31-1153	6.25
4	Antenna Transformer (H. F. Bands)	32-1271	.70
5	Condenser (.00025 mfd.)	3082	.35
6	By-pass Condenser Block (.25-.5-.05-.05-.05 mfd.)	30-4151	1.00
7	Compensating Condenser (Ant. H. F.)	Part of (3)	....
8	Compensating Condenser (Ant. B'cst)	Part of (3)	....
9	Antenna Transformer (Broadcast)	32-1270	.55
10	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25
11	Oscillator Transformer (H. F. Bands)	32-1273	.35
12	Compensating Condenser (Range 2)	04000-C	.15
13	Oscillator Transformer (Broadcast)	32-1272	.70
14	Compensating Condenser (Osc. Range 1)	04000-A	.15
15	Compensating Condenser (Osc. Range 4)	Part of (3)	....
16	Compensating Condenser (Osc. Range 3)	Part of (3)	....
17	Resistor (50,000 ohms—Green-Brown-Orange)	4518	.25
18	Compensating Condenser (Broadcast; Series)	04000-S	.35
19	Compensating Condenser (Range 2; Series)	04000-R	.45
20	Condenser (.0007 mfd.)	5863	.35
21	Condenser (.003 mfd.)	6009	.60
22	Condenser (.0008 mfd.)	6021	.35
23	Resistor (5,000 ohms—Green-Black-Red)	5310	.25
24	Resistor (100,000 ohms—White-White-Orange)	6099	.25
25	First I. F. Transformer	32-1341	1.35
26	Compensating Condenser (1st I. F. Pri.)	31-6007, Inc. as part of (25)	....
27	Compensating Condenser (1st I. F. Sec.)		....
28	Second I. F. Transformer	32-1341	1.35
29	Compensating Condenser (2nd I. F. Pri.)	31-6007, Inc. as part of (28)	....
30	Compensating Condenser (2nd I. F. Sec.)		....
31	Condenser (.25-.25 mfd.) (By-pass)	30-4150	.70
32	3rd I. F. Transformer	32-1342	1.35
33	Compensating Condenser (3rd I. F. Pri.)	31-6007, Inc. as part of (32)	....
34	Compensating Condenser (3rd I. F. Sec.)		....
35	Condenser (.00011 mfd. twin)	8035-C	$0.25
36	Condenser (.05 mfd.)	3615-J	.35
37	Resistor (1,000 ohms—Brown-Black-Red)	5837	.25
38	Resistor (50,000 ohms—Green-Brown-Orange)	4518	.25
39	Resistor (2 meg.—Red-Black-Green)	5872	.25
40	Condenser (.01 mfd.)	30-4124	.25
41	Volume Control and On-Off Switch	33-5064	1.45
42	Resistor (1.0 meg.—Brown-Black-Green)	4409	.25
43	Resistor (330,000 ohms—Orange-Orange-Yellow)	4410	.25
44	Resistor (.25 meg.—Red-Yellow-Yellow)	6046	.25
45	Resistor (70,000 ohms—Violet-Black-Orange)	5385	.25
46	Resistor (.5 meg.—Yellow-White-Yellow)	4517	.25
47	Condenser (.01 mfd.)	30-4124	.25
48	Tone Control	30-4152	.50
49	Audio (Input) Transformer	7233	1.80
50	Condenser (.003 mfd.)	7301	.45
51	Output Transformer	32-7223	1.50
52	Voice Coil & Cone Assembly (KR-6)	36-3157	.50
53	Pilot Lamp	5316	.35
54	Condenser (.01 mfd.)	Part of (48)	....
	Pilot Lamp Bracket	38-5633	.55
	Battery Cable	41-3083	2.00
	Tube Shield (1)	28-1107	.10
	Tube Shield (2)	8005	.06 ea.
	Six Prong Socket	7547	.11
	Four Prong Socket	7544	.10
	Speaker Socket	4957	.10
	Knob (Medium)	03063	.10
	Knob (Small)	03064	.10
	Knob (Large)	27-4025	.10
	Dial Assembly	31-1162	1.25
	Dial Scale	27-5039	.60
	Idler Shaft Assembly	31-1056	.25
	Gear (Wave-Band Switch)	28-7012	.20
	Mounting Bolt	W-567	3.00 per C.
	Mounting Washer (Rubber)	5189	.04
	Mounting Washer (Steel)	5058	.85 per C.

MODELS 32,34,38-122
45
Changes

PHILCO RADIO & TELEV. CORP.

Model 32

Starting with Run No. 4, the antenna and ground Fahnestock clip terminals will be replaced with insulated wire leads. This is done to better meet Underwriters' requirements.

Starting with Run No. 5, Model 32 will use a type 77 detector-oscillator tube instead of a type 36. This change gives more stable performance of the oscillator.

This change involves using a six-hole tube socket instead of the original five-hole socket used for type 36. It also requires making the following substitutions:

Part 16, No. 6208 resistor (15,000 ohms) is replaced by 33-1114 (8000 ohms)

Part 15, No. 5863 condenser (700 Mmfd) is replaced by 7007 (1400 Mmfd.)

On page 3, correct Part No. of 24 Volume Control is 30-5063, instead of 30-5055.
(List price given ($1.00) is correct.)

Model 34

Correct *list price* of Part 62, 36-3157 voice-coil and cone-assembly, KR-6 speaker, to read 0.75

Starting with Run No. 3, Model 34 will be equipped with a 4-point tone control instead of a 2-point. The part No. of the new control is 30-4168 which replaces 30-4152.

Model 38-122

This model will use a new output transformer, Part No. 32-7286. This replaces No. 2565 formerly used.

Referring to change notice of July 1st regarding ballast tube shunt resistor on Model 38-122, the correct part number of the 20 ohm resistor used will be 33-3043 instead of 33-3160.

A new ballast tube shunt resistor will be used in production effective this date. This will be part No. 33-3160, 20 ohms, instead of part No. 7155, 30 ohms. This gives a slight (desirable) increase in filament voltage.

Model 45

Starting with Run No. 5, the cathode resistor on 6A7 tube, Part No. 23 on diagram will be changed from Part No. 6977 (500 ohms) to 33-3016 (400 ohms). This is to prevent variation in output of sets due to variation in 6A7 tubes.

Starting with Run No. 6, electrolytic condenser 62 and 63 (Part No. 30-2028) is replaced by No. 30-2079, same capacity but higher voltage rating.

Starting with Run No. 8, electrolytic condenser 68 (see Service Bulletin 191) will be changed from part No. 30-2020 to 30-2026. Same capacity (6 mfd.), higher voltage rating.

Both Codes 121 and 122 on this model will now use bypass condenser 3615-W for part 84. This change was made to simplify assembly on this model and does not affect performance.

Models 45 & 29

Effective July 1st, mica condenser 10 on wiring diagram of Model 29 was changed from Part No. 7301 to 30-1028. No change in capacity; change to facilitate wiring only.

Effective July 1st, a new wave-trap will be used in this model. Part 1 on wiring diagram of Model 29 is changed from Part No. 38-5199 to 38-5995. The new wave trap uses an improved construction which facilitates production.

MODEL 45
Alignment Data
Voltage, Layouts

PHILCO RADIO & TELEV. CORP.

Model 45

Philco Model 45 is a six tube receiver operating on alternating current and capable of receiving either standard and police broadcasts between 540 and 1720 kilocycles, or short-wave stations between 4.2 and 13 megacycles. The left hand side of the dial is calibrated in kilocycles for standard reception and the right in megacycles for short-wave stations. A two-position switch changes reception from standard to short-waves.

Model 45 uses a type 6-A-7 detector-oscillator, two type 39-44 I. F. Tubes, type 75 2d detector, type 42 output tube, and type 80 rectifier. The power consumption is 65 watts. The intermediate frequency is 460 K.C.

Power Transformer Voltages

Terminals	Volts	Circuit	Color Leads
1-2	120	Primary	White
3-4	5.0	Fil. of 80	Blue
5-7	680	Plates of 80	Yellow
8-10	6.3	Filaments	Black
6	...	Center of 5-7	Yellow—Green tr.
9	...	Center of 8-10	Black—Yellow tr.

Tube Socket Voltages

CIRCUIT	Det. Osc.	1st IF	2d IF	2d Det.	Out-put	Rect.
Type Tube	6A7	39-44	39-44	75	42	80
Filament (F to F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)	260	255	255	175	250	335
Screen Grid (SG to K)	G1-35 G2-135 G3&5-85	75	75	...	260	...
Cathode (K to F)	4.2	3.8	3.8	0	0	...

The above tests were made with an AC voltmeter for filament voltages and a high resistance DC voltmeter for all others. Dial at 550 KC, volume control at maximum. Test made with test prods applied to socket terminals underneath chassis. Line voltage 115.

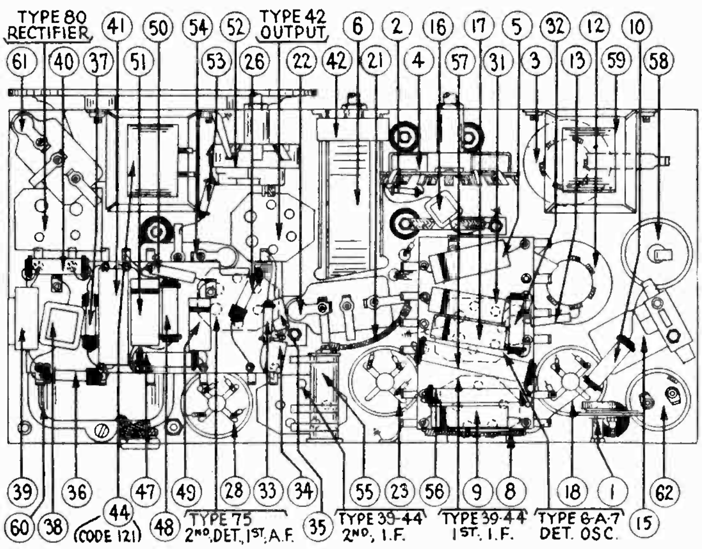


Fig. 4—Bottom View Showing Parts

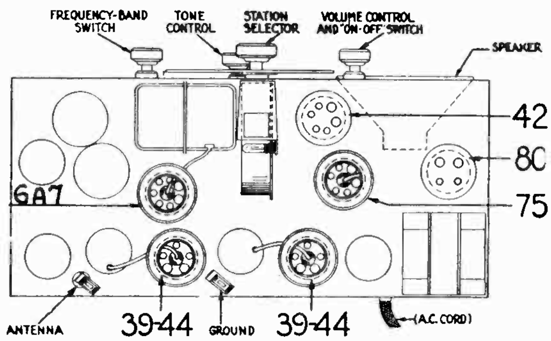


Fig. 2—Chassis Top View

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in model 45, an accurately calibrated signal generator and a special insulated padding wrench are needed. We suggest the Philco Model 024 Signal Generator or the 048 Tester which includes a similar instrument.

The chassis must be removed from cabinet in order to make all adjustments.

Adjustments are made in the following order—

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 45) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600 K.C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap (1) is located at rear and underneath the chassis, and is shown in Figure 4. It is reached from the rear of the chassis, by inserting the fibre wrench thru the hole near right-hand rear corner of chassis.

DETECTOR, AND OSCILLATOR "HIGH" AND "LOW" FREQUENCY ADJUSTMENTS—The "antenna" and "oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set and adjust the antenna compensator (7) (nearest tuning control) to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser (11) (located on the other section of tuning condenser) to maximum reading.

Finally set the signal generator at 600, tune in this signal and adjust the oscillator "L. F. condenser", located underneath chassis ((18) in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left hand end of chassis when facing rear).

MODEL 45
Schematic
Parts List
Socket Layout

PHILCO RADIO & TELEV. CORP.

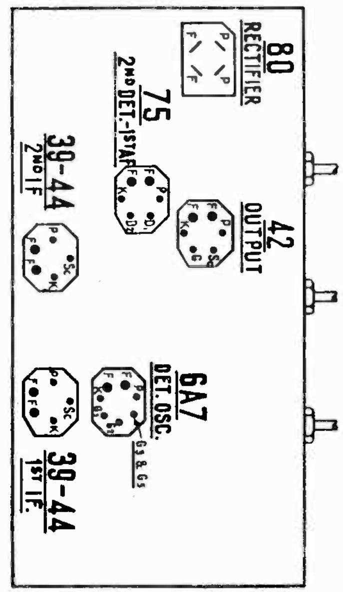
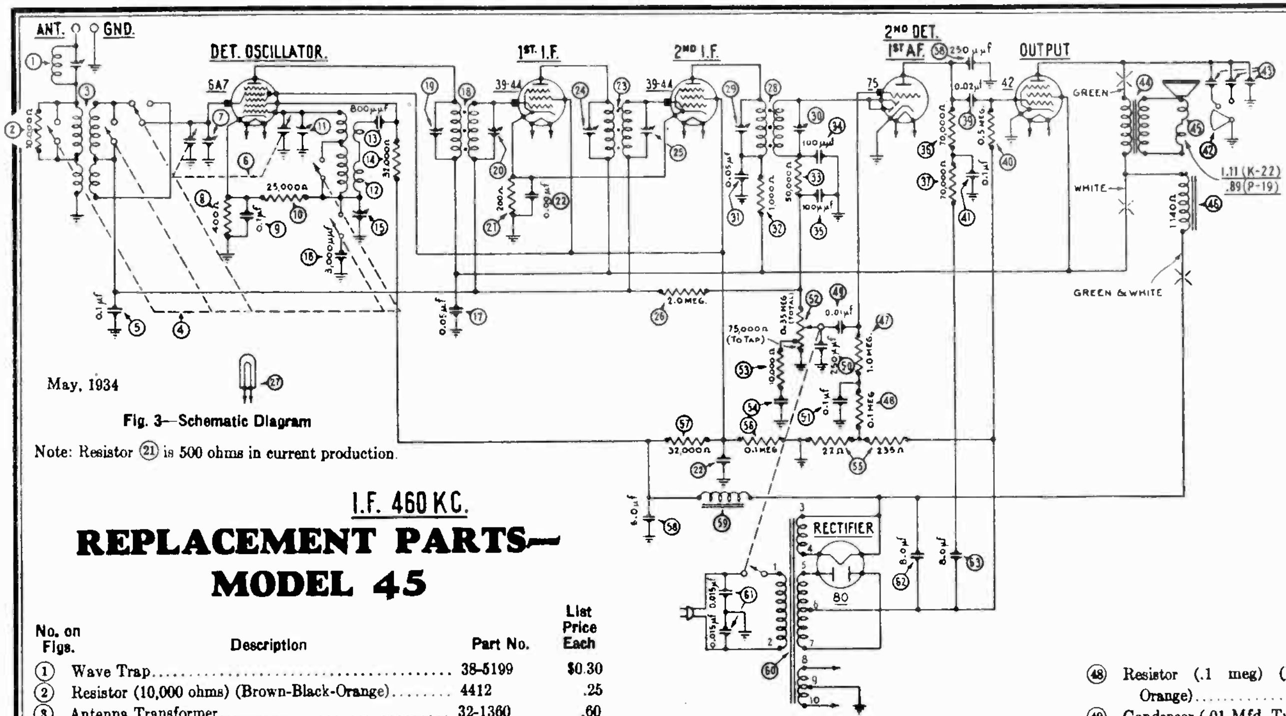


Fig. 1—Tube Socket Layout (underside)



May, 1934

Fig. 3—Schematic Diagram

Note: Resistor (21) is 500 ohms in current production.

I.F. 460 KC.

REPLACEMENT PARTS— MODEL 45

No. on Figs.	Description	Part No.	List Price Each
(1)	Wave Trap	38-5199	$0.30
(2)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(3)	Antenna Transformer	32-1360	.60
(4)	Wave Band Switch	42-1062	1.10
(5)	Condenser (.1 Mfd.) (Tubular)	30-4122	.35
(6)	Tuning Condenser Assembly	31-1169	4.40
(7)	Compensating Condenser (Det.)	Part of (6)	....
(8)	Resistor (400 ohms—Flexible wire wound)	33-3016	.20
(9)	Condenser (.1 Mfd.) (Tubular)	30-4122	.35
(10)	Resistor (25,000 ohms) (Red-Green-Orange)	4516	.25
(11)	Compensating Condenser (Osc. H. F.)	Part of (6)	....
(12)	Oscillator Transformer	32-1361	.65
(13)	Condenser (.0008 Mfd.—Mica)	5878	.35
(14)*	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
(15)	Compensating Condenser (Osc. L. F.)	04000-S	.35
(16)	Condenser (.003 Mfd.—Mica)	7301	.45
(17)	Condenser (.05 Mfd.—Tubular)	30-4123	.35
(18)	1st I. F. Transformer	32-1362	1.50
(19)	Compensating Condenser (1st I. F. Primary)	Part of (18)	....
(20)	Compensating Condenser (1st I. F. Secondary)	Part of (18)	....
(21)	Resistor (500 ohms—Flexible wire wound)	6977	.20
(22)	Condenser (.09 Mfd. twin) (Bakelite block)	4989-Z	.40
(23)	2d I. F. Transformer	32-1363	1.50
(24)	Compensating Condenser (2d I. F. Primary)	Part of (23)	....
(25)	Compensating Condenser (2d I. F. Secondary)	Part of (23)	....
(26)	Resistor (2 megs.) (Red-Black-Green)	5872	.25
(27)	Pilot Lamp	6608	.11
(28)	3d I. F. Transformer	32-1364	1.55
(29)	Compensating Condenser—3d I. F. Primary	Part of (28)	....
(30)	Compensating Condenser—3d I. F. Secondary	Part of (28)	....
(31)	Condenser (.05 Mfd. Tubular)	30-4123	.35
(32)	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.25
(33)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(34)	Condenser (.0001 Mfd. Mica)	30-1031	....
(35)	Condenser (.0001 Mfd. Mica)	30-1031	....
(36)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(37)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(38)	Condenser (.00025 Mfd. Mica)	5858	.35
(39)	Condenser (.02 Mfd. Tubular)	30-4113	.30
(40)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
(41)	Condenser (.1 Mfd.) (Tubular)	30-4170	.35
(42)	Tone Control	30-4178	.75
(43)	Condensers	Inside 42	....
(44)	Output Transformer (Code 121)	32-7041	.95
•	Output Transformer (Code 122)	2580	1.25
(45)•	Voice Coil & Cone Assembly		
	P-19 (Compact)	36-3027	.50
	K-22 (Lowboy)	36-3174	.40
(46)*	Field Coil and Pot Assembly		
	P-19 (Compact)	36-3298	3.00
	K-22 (Lowboy)	02767	2.70
(47)	Resistor (1 meg.) (Brown-Black-Green)	4409	.25
(48)	Resistor (.1 meg) (White-White-Orange)	4411	.25
(49)	Condenser (.01 Mfd. Tubular)	30-4124	.25
	*Does not appear in Fig. 4.		
(50)	Condenser (.00025 Mfd. Mica)	5858	$0.35
(51)	Condenser (.1 Mfd. Tubular)	30-4122	.35
(52)	Volume Control and On-Off Switch	33-5066	1.45
(53)	Resistor 10,000 ohms (Brown-Black-Orange)	33-1000	.25
(54)	Condenser (Code 121) (.05 Mfd.) (Bakelite Block)	3615-W	.35
	Condenser (Code 122) (.09 Mfd.) (Bakelite Block)	4989-AM	.35
(55)	Voltage Divider (BC Resistor 22—235 ohms) (Wire wound)	33-3037	.20
(56)	Resistor .1 meg (White-White-Orange)	3767	.25
(57)	Resistor 32,000 ohms (Orange-Red-Orange)	33-1026	.25
(58)	Condenser (Electrolytic—6 Mfd.)	30-2020	1.40
(59)	Filter Choke	32-7018	1.50
(60)	Power Transformer	32-7226	4.25
(61)	Condenser (.015 Mfd. twin—Bakelite block)	3793-E	.40
(62) (63)	Condenser (Electrolytic 8—8 Mfd. 450 Volts)	30-3028	2.40
	A. C. Cord and Plug Assembly	L-943-A	.60
	Tube Shield	28-1107	.10
	Four Prong Socket	4955	.10
	Five Prong Socket	4956	.11
	Six Prong Socket	6417	.11
	Seven Prong Socket	27-6005	.11
	Speaker Socket (Lowboy set—code 122)	4957	.10
	Knob	27-4052	.10
	Knob (Large) (Lowboy only)	27-4051	.10
	Dial Assembly	31-1208	.45
	Dial Scale	27-5042	.17
	Mounting screw (Compact set)	W-1345	2.75 C.
	Mounting Washer (Compact set)	5058	.85 C.
	Foot (Rubber)	27-4116	.05

MODEL 49
Alignment Data
Parts List

PHILCO RADIO & TELEV. CORP.

Model 49 is a superheterodyne radio receiver designed for operation on 115 volts direct current (D. C.) only. Model 49 covers two bands of frequencies—from 530 to 1720 KC and from 4.2 to 12.0 megacycles. This gives either standard or short wave reception by turning the wave-band switch on the panel. The intermediate frequency (I. F.) of the set is 260 kilocycles. The power consumption of Model 49 is 50 watts. The receiver uses the following tubes: Type 6A7 detector-oscillator; type 78, R. F.; type 78, I. F.; type 85 2nd detector—1st A. F.; type 76 driver; two (2) type 43 output tubes.

Adjusting Compensating Condensers

For adjusting compensating or padding condensers in Model 49, an accurately calibrated signal generator covering the broadcast range of frequencies is required and also a crystal controlled signal generator for the high frequency adjustments. For the former we suggest the Philco Model 024 Signal Generator and for the latter the Model 091, Crystal Controlled high frequency signal generator. The actual adjusting calls for a special insulated hex wrench and insulated screwdriver. Philco Part No. 3164 Fibre Wrench and No. 27-1159 Screwdriver are recommended. An output meter is also required, for connection to the receiver. Figs. 1 and 2 show the locations of the various compensating condensers.

I. F. ADJUSTMENT—The I. F. (intermediate frequency) of Model 49 is 260 K. C.

Remove the grid clip from the top of the 6A7 tube and connect the shielded antenna lead from the Signal Generator to the cap of this tube. Connect the ground lead of the Signal Generator to the ground post of receiver. Connect the output meter adapter leads to the plates of the output tubes (type 43) in the receiver. Set the wave-band switch at the left position (standard broadcast).

Set the wave switch of the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. (21) and (23) in Fig. 2) and the 2d I. F. primary and secondary condensers ((26) and (28)) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

NOW REMOVE Antenna lead of signal generator from grid cap of 6A7 tube and reconnect it to antenna post of receiver. Replace cap on 6A7 tube.

ANTENNA, DETECTOR AND OSCILLATOR H. F. (Broadcast)—These condensers Nos. (8), (12), and (14), are located on top of the tuning condenser gang (See Fig. 2) adjustment made by means of the fibre wrench. Set the signal generator at 1500 K. C., tune in the signal at 1500 on dial and adjust these condensers in the order given, to give maximum output reading. (8) is located on the section nearest the front and (12) on the center section.

OSCILLATOR—LOW FREQUENCY—This is condenser (17) (see Fig. 1) located underneath chassis and accessible from underneath. Use the fibre wrench. Set signal generator switch at 600, tune in the signal at 600 on the dial and adjust condenser to maximum.

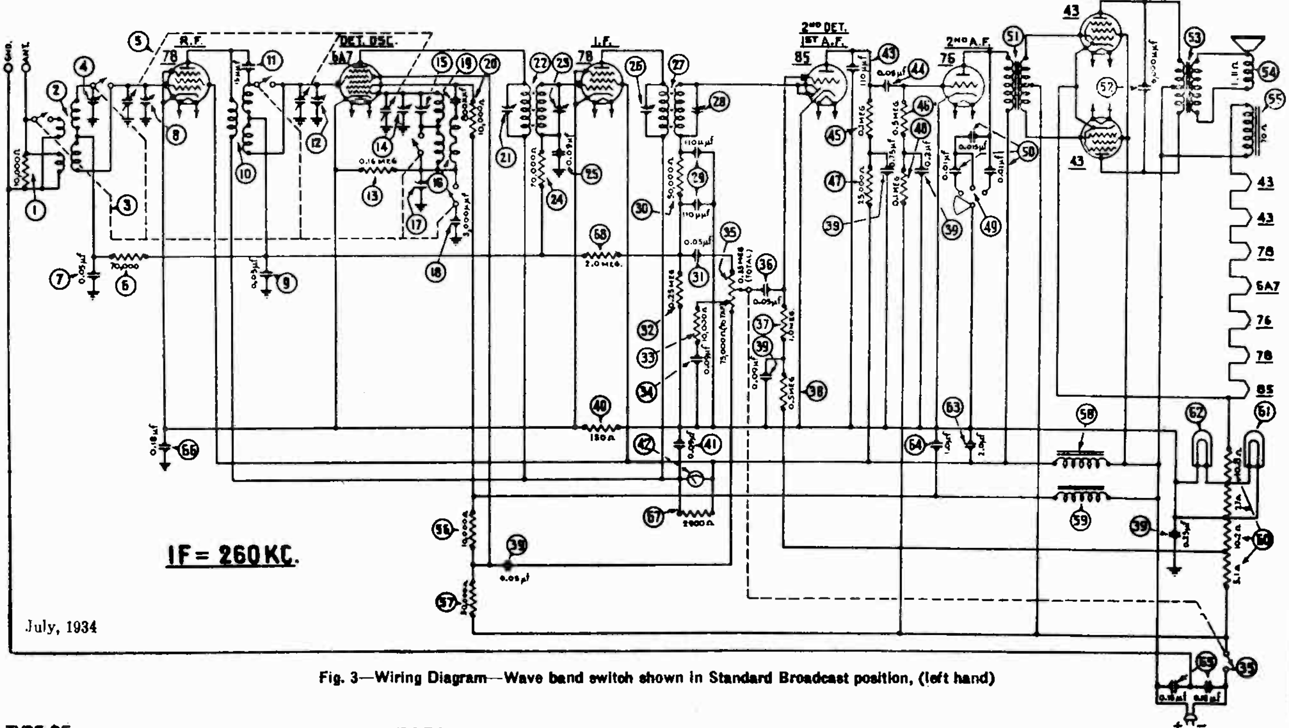
ANT. AND OSC. H. F.—SHORTWAVE—The crystal controlled signal generator is used for these adjustments. These are condensers (4) (Ant.) and (15) (Osc. H. F.) located underneath chassis. (4) is adjusted from underneath, and (15) from above, thru hole in sub-base directly behind tuning condenser assembly. The fundamental frequency of the Philco Model 091 crystal controlled signal generator is 3600 K. C. or 3.6 megacycles. The third harmonic of this is 10.8 M. C. Turn the wave-band switch of the set to the right and the dial to just below 11 M. C. The 10.8 harmonic should be picked up here and the two condensers should be adjusted to give maximum reading on the output meter, on this signal.

REPLACEMENT PARTS

Nos. on Diagram	Description	Part No.	List Price
(1)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	$0.25
(2)	Antenna (R. F.) Transformer	32-1379	.70
(3)	Wave-band Switch	42-1046	.80
(4)	Compensating Condenser (Ant. S. W.)	04000D	.15
(5)	Tuning Condenser Assembly	31-1334	6.85
(6)	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115	.25
(7)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(8)	Compensating Condenser (Ant.)	Part of (5)	....
(9)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(10)	Detector Transformer	32-1427	.90
(11)	Condenser (.000015 Mica)	30-1030	.35
(12)	Compensating Condenser (Det.)	Part of (5)	....
(13)	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331	.25
(14)	Compensating Condenser (Osc. H. F.)	Part of (5)	....
(15)	Compensating Condenser (Osc. S. W.)	31-6016	.15
(16)	Oscillator Transformer	32-1428	.70
(17)	Compensating Condenser (Osc. L. F.)	04000R	.45
(18)	Condenser (.003 Mfd. Mica)	30-1028	.60
(19)	Condenser (.0008 Mfd. Mica)	6021	.35
(20)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(21)	Compensating Condenser (1st I. F. Primary)	Part of (22)	....
(22)	First I. F. Transformer	32-1381	1.50
(23)	Compensating Condenser (1st I. F. Secondary)	Part of (22)	....
(24)	Resistor 70,000 ohms (Violet-Black-Orange)	33-1115	.25
(25)	Condenser (.09 Mfd. Bakelite Block)	4989N	.35
(26)	Compensating Condenser (2d I. F. Primary)	Part of (27)	....
(27)	2d I. F. Transformer	32-1424	1.60
(28)	Compensating Condenser (2d I. F. Secondary)	Part of (27)	....
(29)	Condenser (.00011 Twin Bakelite Block)	8035E	.25
(30)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
(31)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(32)	Resistor (250,000 ohms) (Red-Yellow-Yellow)	33-1097	.25
(33)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(34)	Condenser (.09 Mfd. Bakelite Block)	4989-P	.35
(35)	Volume Control and On-Off Switch	33-5024	1.45
(36)	Condenser (.05 Mfd. Bakelite Block)	3615-H	.35
(37)	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.25
(38)	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.25
(39)	Condenser (Metal Case Block) (.2-.75-.25-.05-.09)	30-4144	1.30
(40)	Resistor (200 ohms Flexible Wire-Wound)	7217	.20
(41)	Condenser (.09 Mfd. Bakelite Block)	4989P	.35
(42)	Shadowmeter	45-2042	2.50
(43)	Condenser (.00011 Mfd. Mica)	30-1006	.35
(44)	Condenser (.05 Mfd. Bakelite Block)	3615AX	.35
(45)	Resistor (.1 Meg.) (White-White-Orange)	6099	.25
(46)	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.25
(47)	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
(48)	Resistor (.1 Meg.) (Yellow-White-Yellow)	6099	.25
(49)	Tone Control	30-4043	.75
(50)	Condensers in Tone Control	Part of (49)	....
(51)	Audio Transformer	32-7211	5.75
(52)	Condenser (.006 Mfd. Bakelite Block)	7625-E	.25
(53)	Output Transformer	2550	1.75
(54)	Voice Coil and Cone Assembly H-10	02625	.80
	K-13	36-3159	.50
(55)	Field Coil and Pot Assembly	02745	$4.25
(56)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(57)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(58)	Filter Choke	32-7213	1.60
(59)	Filter Choke	32-7018	1.50
(60)	B. C. Resistor (Wirewound; 5.1-10.2-27.0-10.8 ohms)	33-3128	.25
(61)	Pilot Lamp (Dial)	4567	.09
(62)	Pilot Lamp (Shadowmeter)	Part of (42)	....
(63)	Condenser (2.0 Mfd. Metal Case)	30-4140	.80
(64)	Condenser (1.0 Mfd. Metal Case)	04357	.75
(65)	Condenser (.15 Mfd. Twin Bakelite Block)	6287-T	.40
(66)	Condenser (.09 Mfd. Twin Bakelite Block)	4989AP	.35
(67)	Resistor (2900 ohms) (Red-White-Red)	5309	.25
(68)	Resistor (2 Meg.) (Red-Black-Green)	33-1025	.25
	Dial Assembly	31-1205	.50
	Dial Scale	27-5046	.25
	Knob (large)	27-4051	.10
	Knob (small)	27-4052	.10
	Five Prong Socket	7546	.10
	Six Prong Socket	7547	.10
	Seven Prong Socket	27-6005	.11
	Chassis Mtg. Screw	W-1358A	2.60 C.
	Chassis Mtg. Foot (Rubber)	27-4116	.05
	Chassis Mtg. Foot Plate	27-7497	.35 C.
	Chassis Mtg. Washer	29-2089	.35 C.
	Speaker Socket	4957	.10
	Cord & Plug Assembly	L-943A	.60

MODEL 49
Schematic
Voltage, Layouts

PHILCO RADIO & TELEV. CORP.



July, 1934

Fig. 3—Wiring Diagram—Wave band switch shown in Standard Broadcast position, (left hand)

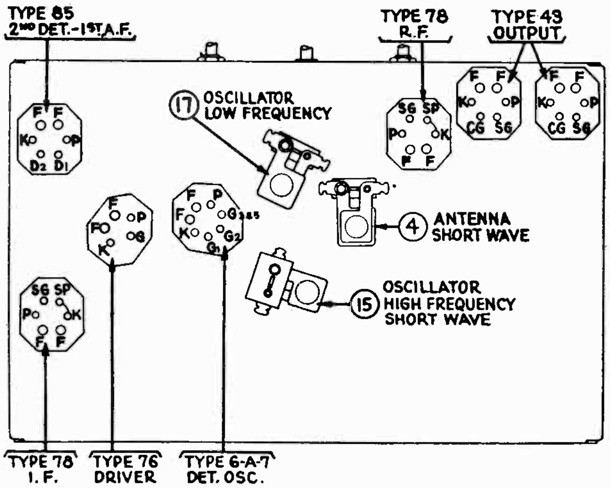


Fig. 1—Tube Sockets

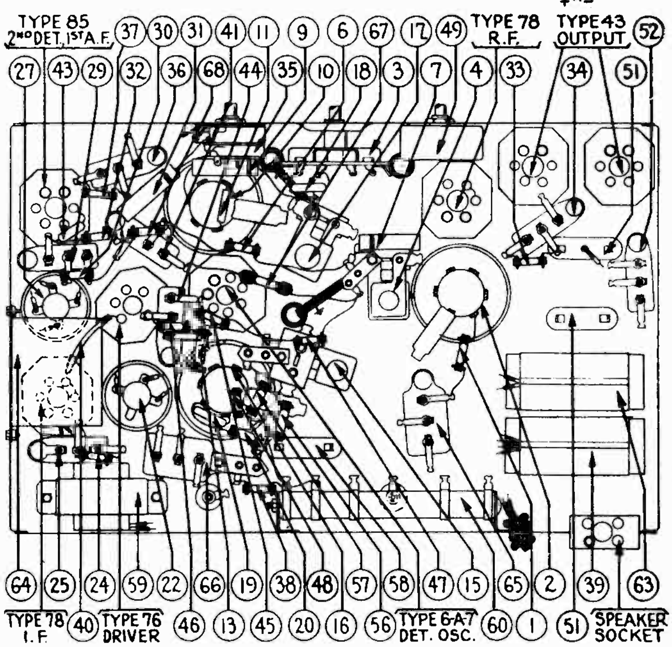


Fig. 4—Bottom View

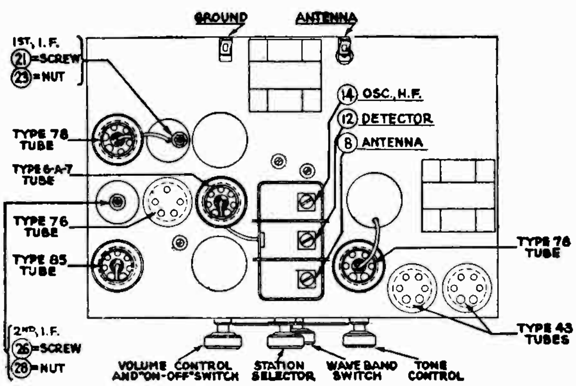


Fig. 2—Top View

All readings above made with a high resistance multirange D. C. voltmeter using test prods applied to tube sockets underneath chassis (See Fig. 1). Volume control at maximum, wave-band switch at left (standard broadcast) and dial at 550 K.C.

Philco Model 025 Circuit Tester or 048 All-Purpose Tester are highly recommended for making the above tests.

Tube Socket Voltages—Line Voltage 120 D.C.

TUBE		Filament F to F	Plate P to K	Screen Grid SG to K	Cathode K to F
Type	Circuit				
78	R. F.	5.8	85	100	30
6A7	Det.-Osc.	5.7	90	G3&5-K:65 G2 -K:80 G1 -K:12	22
78	I. F.	6.3	90	100	15
85	2d Det.—1st A. F.	6.3	40	. . .	15
76	Driver	6.3	100	. . .	20
43 43	Output	2.6 2.6	100 100	105 105	60 60

PHILCO RADIO & TELEV. CORP.

Model 59

Philco Model 59 is a four-tube superheterodyne receiver operating on alternating current, capable of receiving standard broadcasts, and police calls on the first (lowest) police range. The tubes are as follows: Type 77 detector-oscillator, type 77 second detector, type 42 output and type 80 rectifier. The intermediate frequency is 460 K.C. The power consumption of model 59 is 52 watts.

Tube Socket Data—Line 115 Volts

Circuit	Det. Osc.	2nd Det.	Out-put	Recti-fier
Type Tube	77	77	42	80
Filament Volts—F to F	6.3	6.3	6.3	4.8
Plate Volts—P to K	235	45	235	300
Screen Grid Volts—SG to K	110	35	250	....
Control Grid Volts—CG to K	10.5	.25	.25	....
Cathode Volts—K to F	25	15	15	....

Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1- 2	105–125	Primary	White
3- 5	6.3	Filament	Black
6- 7	5.0	Filament of 80	Blue
8-10	580	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black-Yellow Tracer
9	...	Center Tap of 8-10	Yellow-Green Tracer

*All of the above readings were taken from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high resistance multirange D. C. voltmeter for all other readings. Volume control at maximum and station selector turned to low frequency end. Readings taken with a plug-in adapter will NOT be satisfactory. The Philco Model 048 All-Purpose Set Tester is recommended for all tests of Model 59.

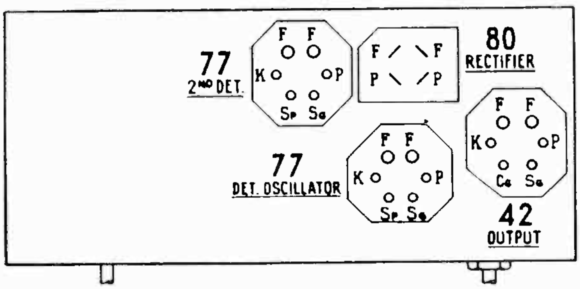


Fig. 1—Tube Socket Layout (Viewed from Bottom)

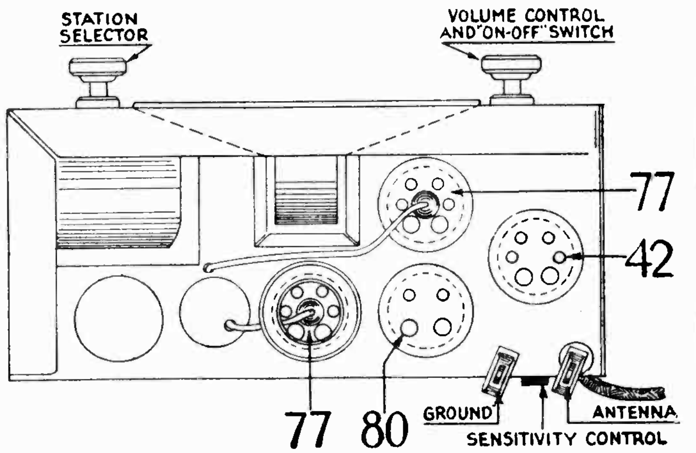


Fig. 2—Top View of Chassis

Adjusting Compensating Condensers

In Model 59 the I. F. primary and secondary condensers and the "regeneration" compensating condenser are located at the rear of chassis and accessible from the rear; the "ANT" and "OSC H. F." are located on the side of the tuning condenser gang.

Referring to Fig. 3, the I. F. primary and secondary condensers (8) and (15) should be adjusted first. Use an accurate signal generator such as the Philco Model 024. Remove the grid cap clip from the detector-oscillator tube and connect the antenna lead from the signal generator to the cap of this tube. Connect the ground lead from the signal generator to the ground terminal of the set. Connect the primary terminals of the output transformer to an output meter. Set the frequency switch of the signal generator at 460 K.C. (the I. F. of model 59), and turn the switches of the set and signal generator on. Turn volume control full on. Turn the dial pointer on the set to 600, and then adjust the I. F. compensating condensers (8) and (15) by means of a fibre wrench so that maximum reading is obtained in the output meter. If the needle goes off scale, adjust the attenuator on the signal generator so that a lower reading is obtained.

Next adjust the ANT. and OSC. H. F. (high frequency) condensers (4) and (9) located on the tuning condenser gang. To adjust these condensers it is necessary to remove the chassis from the cabinet, necessitating removing back plate, base screws, knobs and pointers. Replace the grid clip on the 77 tube and connect the antenna and ground leads of the signal generator direct to the antenna and ground terminals of the set. Set the signal generator switch at 1400, turn the tuning condenser shaft until the rotary plates barely start to mesh with the stationary ones. Tune in the 1400 K.C. signal here and adjust condensers (4) and (9) for maximum output meter reading. When replacing the dial pointer, be sure it is mounted exactly as it was removed.

Finally adjust the regeneration condenser (16). With the set connected to an antenna, turn the station selector to receive a station at about 130 on the dial. With a screw driver turn the small fibre hex-head screw (which operates the regeneration condenser) located at rear of chassis below antenna and ground terminals, clockwise until the set squeals or oscillates. Then turn the hex-screw ¼ of a turn back until the squealing stops. Tune in other stations on different points on the scale to make sure that the squealing is eliminated. It will be necessary to readjust this condenser if a different type 77 tube is used for second detector.

MODEL 59
Schematic
Chassis, Parts List

PHILCO RADIO & TELEV. CORP.

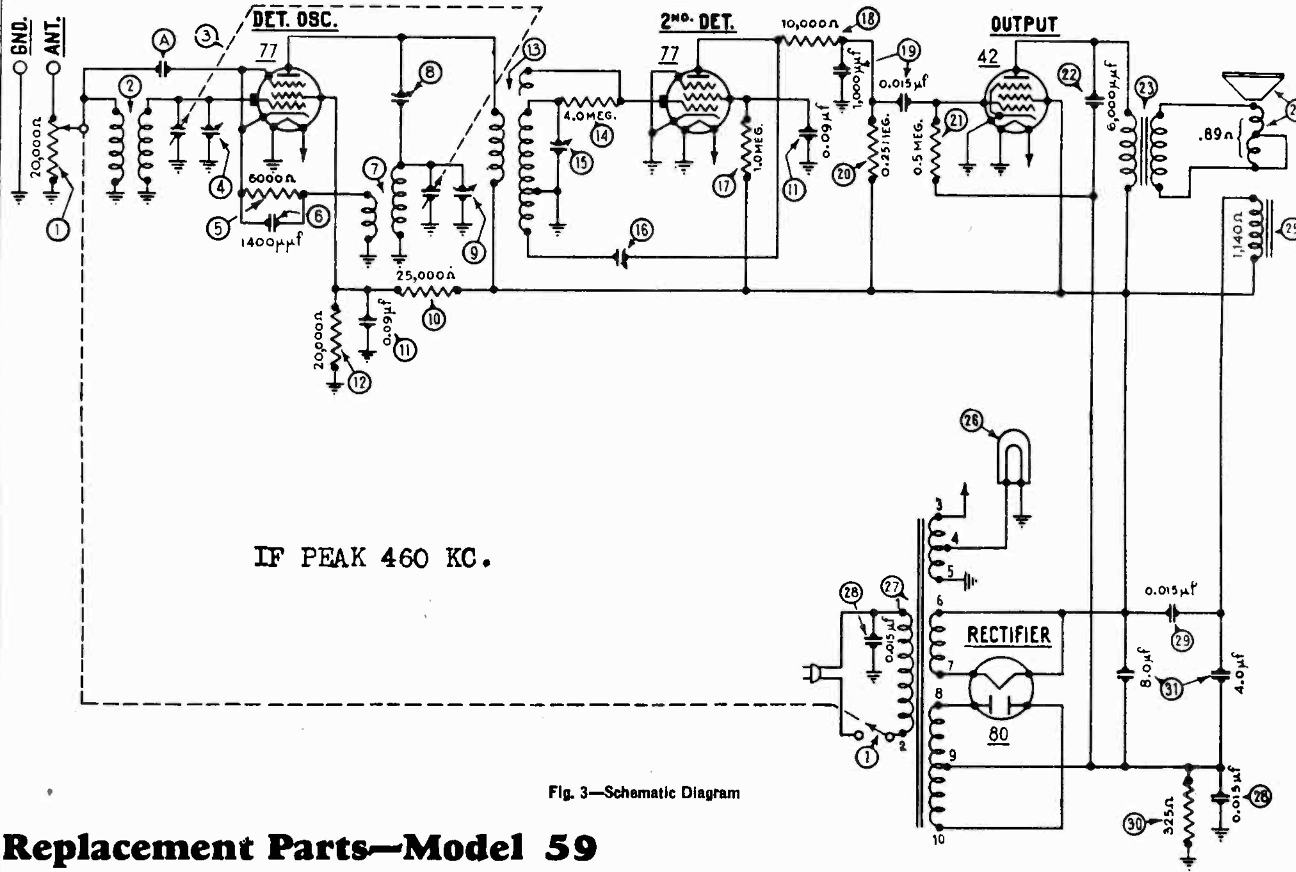


Fig. 3—Schematic Diagram

Replacement Parts—Model 59

No. on Diagram	Item	Part No.	List Price
1	Volume Control and On-Off Switch	33-5057	$1.40
2	Antenna Transformer	32-1388	.45
3*	Tuning Condenser Assembly	31-1190	2.75
4*	Compensating Condenser—Ant.	Part of 3	....
5	Resistor (6,000 ohms—Blue-Black-Red)	7352	.25
6	Condenser (.0014 Mfd.—Mica)	7007	.35
7	Oscillator Transformer	32-1389	.40
8	Compensating Condenser (I. F. Primary)	04000-A	.15
9*	Compensating Condenser (Osc. H. F.)	Part of 3	....
10	Resistor (25,000 ohms—Red-Green-Orange)	3656	.25
11*	Condenser (.09 twin—Black Bakelite)	4989-C	.40
12	Resistor (20,000 ohms—Red-Black-Orange)	6650	.25
13	I. F. Transformer	32-1155	1.20
14*	Resistor (4 Megohms—Yellow-Black-Green)	6010	.25
15	Compensating Condenser (I. F. Secondary)	04000-D	.15
16	Compensating Condenser (Regeneration)	04000	.20
17	Resistor (1 Megohm—Brown-Black-Green)	33-1096	.25
18	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25
19	Condenser (.015-.0001 Mfd. Block type)	7762-B	.30
20	Resistor (250,000 ohms—Red-Yellow-Yellow)	33-1097	.25
21	Resistor (500,000 ohms—Yellow-White-Yellow)	6097	.25
22*	Condenser (.006 Mfd. Block type)	7625-E	.25
23*	Output Transformer	32-7041	.95
24*	Voice Coil and Cone Assembly	36-3029	.75
25*	Field Coil and Pot Assembly	36-3081	1.75
26*	Pilot Lamp	6608	.11
27	Power Transformer	32-7064	3.15
28	Condenser (.015 Mfd. Twin)	3793-R	.40
29	Condenser (.015 Mfd.)	See Note A below	
30	Resistor (Wire wound 325 ohms)	7465	.15
31	Condenser (Electrolytic 8.0—4.0 Mfd.)	30-2013	1.95
	Tube Shield	28-1107	.10
	Four Prong Tube Socket	7544	.10
	Six Prong Tube Socket	7547	.11
	A. C. Cord and Plug	L-943A	.60
	Dial Scale	27-5023	.15

*Does not show in Fig. 4.
Note A: Condenser 29 not used in production.

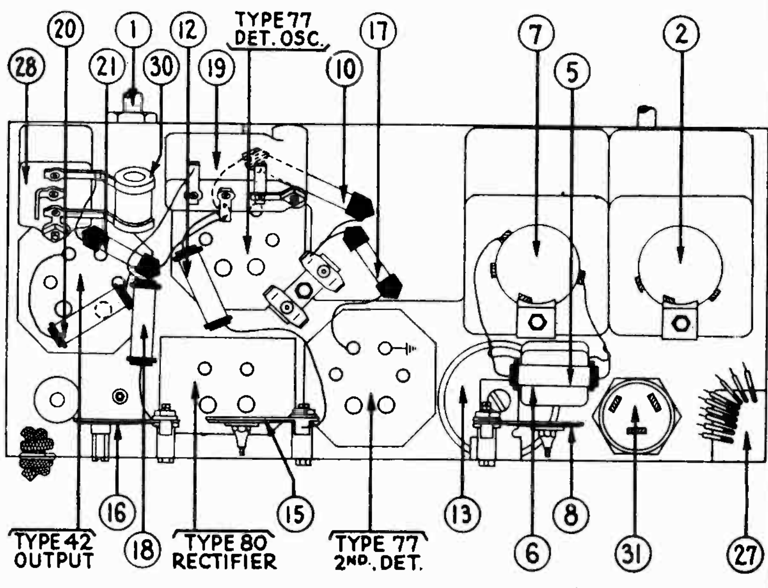


Fig. 4—Base View

May, 1934

MODEL 66
Alignment Data
Voltage
Parts List

PHILCO RADIO & TELEV. CORP.

Model 66

Model 66 is a five-tube superheterodyne radio receiver, capable of receiving either standard broadcasts (and police calls up to 1720 K.C.), or short-wave stations within a frequency range of 5.5 to 16.0 megacycles. The frequency range on standard broadcast is 540-1720 kilocycles.

The tubes used are: Type 6A7 detector-oscillator, type 78 intermediate frequency, type 75 2d detector, type 42 output and type 80 rectifier. The intermediate frequency of the Model 66 is 460 K.C. and the power consumption is 60 watts.

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 66 Receiver requires the use of an accurate signal generator such as Philco Model 024, an efficient output meter (Philco Model 012 or Model 025 are recommended), and a suitable fibre hex wrench. Connect the output meter to the plate and cathode prongs of the 42 output tube.

Adjustments are made in the following order:

(1)—I. F. (Intermediate Frequency)—Remove grid clip from cap on 6A7 tube and connect antenna lead from signal generator to cap of tube. Connect ground lead to ground post on set. Turn on set and signal generator; set wave switch of latter to 460 K. C. (the I. F. of Model 66) and dial of set at 540, wave band switch to left. Adjust each of the four I. F. compensating condensers (17), (19), (22) and (24) in turn so that maximum reading is obtained in the output meter. If the meter reading goes off scale, adjust the attenuator on the signal generator so as to get a lower reading. These I. F. condensers (visible in Fig. 4) are adjusted by inserting the hex wrench thru the holes in rear of chassis sub-base (except one to extreme left when facing rear of set). Two of the holes are covered by small metal buttons which can be removed temporarily by hand.

(2)—WAVE TRAP—Replace grid clip on cap of 6A7 tube and connect antenna lead from signal generator to antenna post on set. Set signal generator at 460 K. C. and adjust wave trap (1) so as to get MINIMUM reading in output meter.

(3)—ANT. and OSC. H. F.—These adjustments (7) and (11) are located on top of the tuning condenser assembly at right (facing front of set) and adjusted from above. The "ANT" (7) is nearest front of set. Set signal generator at 1700 and dial of set at 1700 and adjust these two condensers to get maximum output meter reading.

(4)—OSC. L. F.—This condenser (13) is located underneath chassis (see Fig. 4) and is reached from underneath. Set dial of set and signal generator switch at 600, and adjust for maximum reading.

Replacement Parts for Model 66

No. on Figs.	Description	Part No.	List Price
(1)	Wave Trap	38-5199	$0.30
(2)	Wave-band Switch	42-1066	.90
(3)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(4)	Antenna Transformer	32-1412	.85
(5)	Condenser (.000015 Mfd.)	30-1030	.35
(6)	Tuning Condenser Assembly	31-1231	3.65
(7)	Compensating Condenser (ANT)	Part of (6)	....
(8)	Resistor (200 ohms Flexible) (Red-Black-Brown)	7217	.20
(9)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(10)	Resistor (50,000 ohms) (Green-Green-Orange)	6098	.25
(11)	Compensating Condenser (OSC. HF)	Part of (6)	....
(12)	Condenser (.003 Mfd. Mica)	30-1028	.60
(13)	Compensating Condenser (Osc. I. F.)	04000-S	.35
(14)	Condenser (.0008 Mfd. Mica)	5878	35
(15)	Resistor (32,000 ohms) (Orange-Red-Orange)	5279	.25
(16)	Oscillator Transformer	32-1413	.60
(17)	Compensating Condenser (1st I. F. Pri.)	04000M	.20
(18)	1st I. F. Transformer	32-1414	1.00
(19)	Compensating Condenser (1st I. F. Secondary)	04000M	.20
(20)	Resistor (400 ohms Flexible)	33-3016	.20
(21)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(22)	Compensating Condenser (2d I. F. Primary)	04000M	.20
(23)	2d I. F Transformer	32-1415	$1.00
(24)	Compensating Condenser (2d I. F. Secondary)	04000J	.20
(25)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
(26)	Condenser (.0001 Mfd. Twin Bakelite Block)	8035-B	.25
(27)	Condenser (.1 Mfd. Tubular)	30-4170	.35
(28)	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115	.25
(29)	Resistor (70 000 ohms) (Violet-Black-Orange)	33-1115	.25
(30)	Condenser (.00011 Mfd. Mica)	30-1006	.35
(31)	Condenser (.02 Mfd. Tubular)	30-4113	.30
(32)	Resistor (500,000 ohms) (Yellow-White-Yellow)	6097	.25
(33)	Tone Control	30-4192	.50
(34)	Condensers in Tone Control	Inside (33)	....
(35)	Output Transformer	32-7019	1.25
(36)	Voice Coil & Cone Assembly (S-12)	36-3014	.60
(37)	Field Coil and Pot. Assembly (S-12)	36-3341	2.75
(38)	Resistor (2 Megohms) (Red-Black-Green)	33-1025	.25
(39)	Volume Control and On-Off Switch	33-5006	1.45
(40)	Condenser (.01 Mfd.) (Bakelite Block)	3903-AB	.25
(41)	Resistor (1 Megohm) (Brown-Black-Green)	33-1096	.25
(42)	Condenser (.1 Mfd.)	30-4122	.35
(43)	Resistor (.1 Meg.) (White-White-Orange)	6099	.25
(44)	Resistor (B C. Wire-wound) (22-235 ohms)	33-3037	.20
(45)	Resistor (.1 Meg.) (White-White-Orange)	6099	$0.25
(46)	Condenser (.05 Mfd. Tubular)	30-4123	.35
(47)	Resistor (37,000 ohms) (Orange-Violet-Orange)	33-1098	.35
(48)	Filter Choke	32-7018	1.50
(49)	Condenser (Electrolytic—6 Mfd.)	30-2021	1.55
(50)	Condenser (Electrolytic—8-8 Mfd.)	30-2028	2.40
(51)	Condenser (.09 Mfd. Bakelite Block)	4989-D	.35
(52)	Power Transformer	8046	3.45
(53)	Condenser (.015 Mfd. Bakelite Block)	3793-W	.35
(54)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(55)	Dial Light	6608	.11
	Four Prong Socket	7544	.10
	Six Prong Socket	7547	.11
	Seven Prong Socket	27-6005	.11
	Tube Shield	28-1107	.10
	Chassis Mounting Screw	W-567	3.00C
	Chassis Mounting Washer (Metal)	W-315	.50C
	Chassis Mounting Washer (Rubber)	5189	.04
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Dial Assembly	31-1234	.30
	Dial Scale	27-5057	.10
	A. C. Cord and Plug Assembly	'3A	.60

Tube Socket Voltages—Line Voltage 115

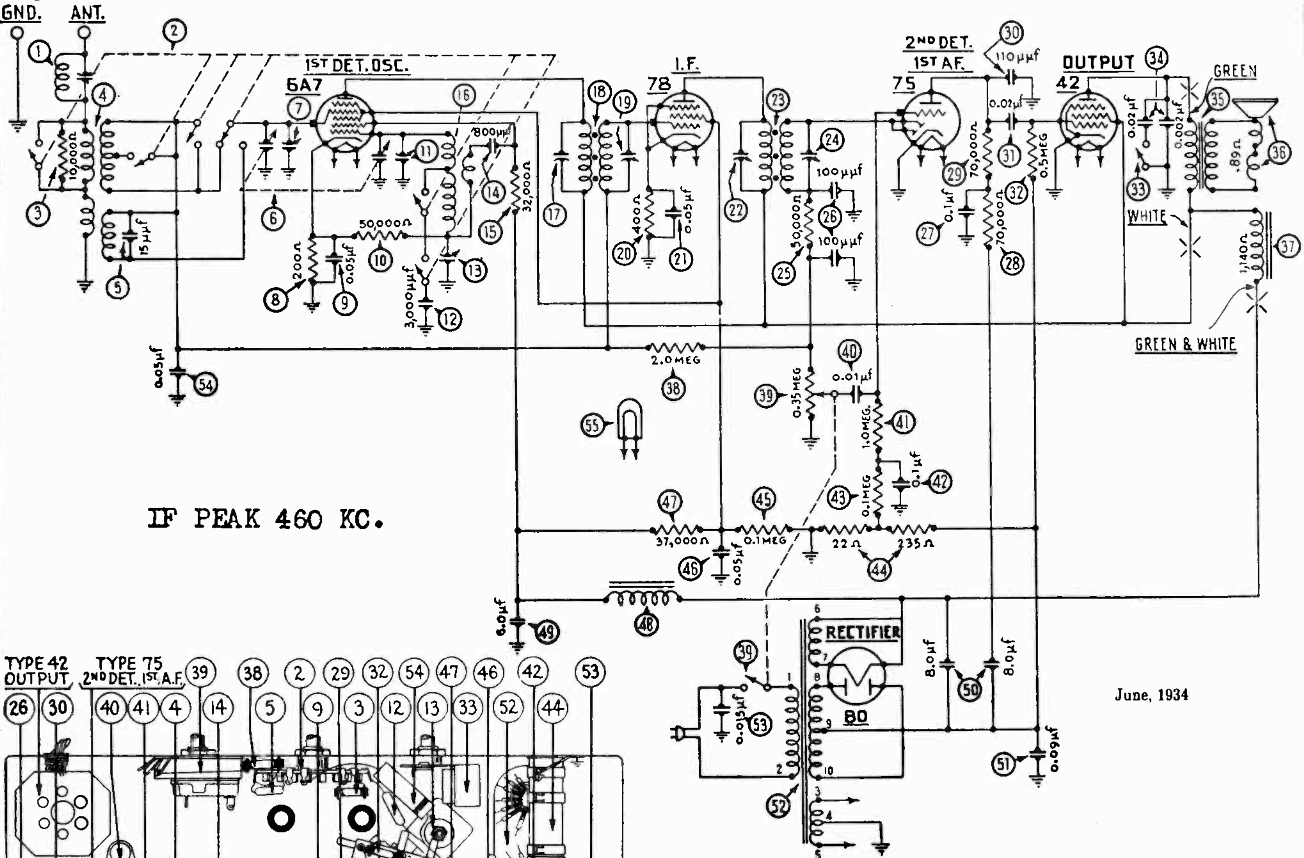
Tube	6A7	78	75	42	80
Circuit	Det. Osc.	I. F.	2d Det.	Output	Rect.
Filament (F-F)	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	260	260	160	250	340
Screen (SG-K)	85	85	...	260	
Cathode (K-F)	2.1	2.2	0	0	...

6A7–G1-K: 20; 6A7–G2-K: 130.

The above voltages were obtained by using a high resistance multi-range DC voltmeter, and an AC voltmeter for filaments. Tests made with test prods applied to tube sockets at underside of chassis (see Fig. 1). Volume control at maximum, dial at low frequency end of scale.

MODEL 66
Schematic
Layouts

PHILCO RADIO & TELEV. CORP.



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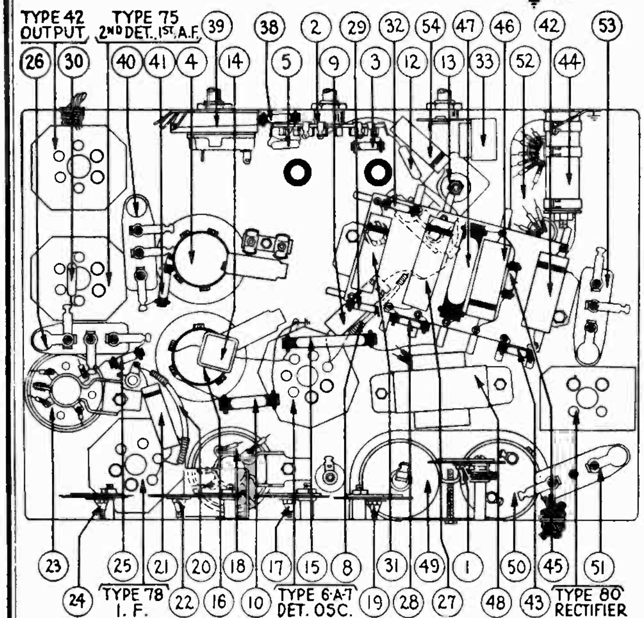


Fig. 4—Base View

Power Transformer Data

Terminals	Volts	Circuit	Color of Leads
1-2	105-125	Primary	White
3-5	6.3	Filaments	Black
6-7	5.0	Filament of 80	Blue
8-10	680	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black—Yellow Tracer
9	...	Center Tap of 8-10	Yellow—Green Tracer

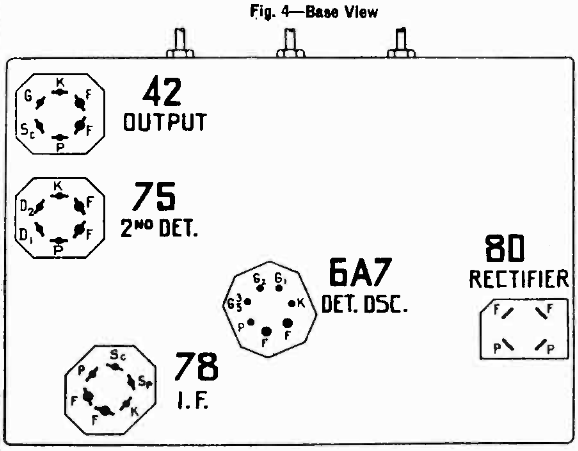


Fig. 1—Tube Sockets (Underside)

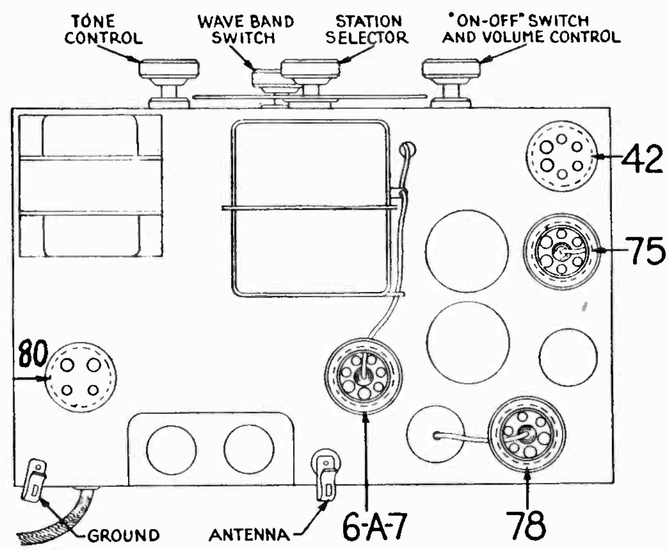


Fig. 2—Top View of Chassis

PHILCO RADIO & TELEV. CORP.

Model 49

A change in the Shadowmeter Circuit on this model becomes effective with Run No. 4. This is in order to reduce the current thru the shadowmeter.

Referring to Figure 3 of Service Bulletin No. 199, the lead from the primary of 27 (2nd I. F. transformer) is removed from one side of the Shadowmeter 42 and connected to the other side. Resistor 67, Part No. 5309 is omitted.

In list of tubes for Model 49 (DC), correct to read 2 type 78 instead of 3.

Starting with Run No. 3, Part 40, 3615AX By-Pass Condenser will be replaced with 3615BB. This change facilitates wiring in the factory.

Model 66

Starting with Run No. 9 the following changes in compensating condensers will be made, which will make padding adjustments less critical.

Replace condenser 17, 04000M with an 04000J, and condenser 19 04000M with an 04000A.

Connect a mica condenser, Part No. 30-1029 (.00005 mfd.) across 19.

Effective July 1st, a new wave trap will be used. Part 1 in diagram will be Part No. 38-5994 instead of 38-5199 previously used. The new wave trap uses an improved construction which facilitates mounting.

Starting July 10th, a 70-ohm wire wound resistor Part No. 33-1129 will be added. Connected in series with condenser 14 on the oscillator coil side. This will prevent oscillation at extreme high frequency end of the short wave band.

The part number of the Tone Control on Model 66 will be 30-4212 instead of 30-4192 previously used. No change in wiring needed. The new Tone Control gives a slight desirable increase in response to high notes.

Effective August 1st, a 50 Mmfd. Mica Condenser, Part No. 30-1029 was added across the secondary of the 2nd I. F. Transformer. This makes adjustment of the 2nd I. F. Padder smoother and easier.

At the same time a 20,000 Ohm Resistor, Part No. 6650 was added, connected between the arm of the wave-band switch and the grounded junction of 8 and 9 This corrects any tendency toward oscillation on the high end of the short-wave band.

A 70-Ohm flexible wire-wound resistor is also added, Part No. 33-3027, connected in series between condenser 14 and the upper end (on diagram) of the oscillator transformer plate winding.

CURRENT MODELS—IMPROVEMENT IN COMPENSATING CONDENSER

To prevent any tendency to "Frequency Drifting" in current models, a bakelite washer and a metal washer are now being used on top of the Compensating Condenser, in place of the fibre washer previously used.

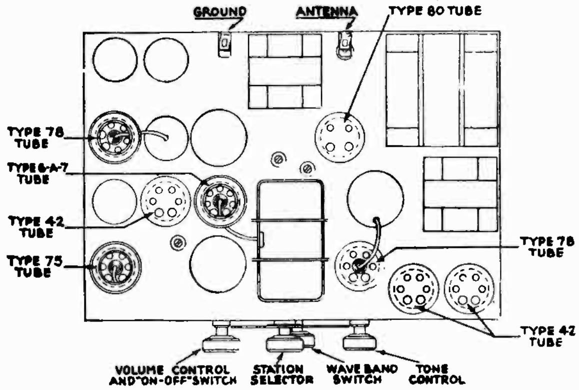
Part No. of bakelite washer is 27-4109, and of the metal washer (placed on top of bakelite) is W-1331. These two replace the old fibre washer Part No. 3500.

MODEL 118
Layout Change
MODEL 118 (Code 121)
MODEL 118 (Code 123-RX)
Changes

PHILCO RADIO & TELEV. CORP.

Model 118

Incorrect cut was used by printer for Fig. 2 of this Bulletin. Correct cut is reproduced herewith and is same as Fig. 1 of Instruction Book on Model 118.



Correct price of dial scale, Part No. 27-5046 is $0.25

Effective with Run No. 8 on Code 121 and Run No. 2 on Code 123 (RX), the following parts on Model 118 will be changed. These changes are made to facilitate wiring. Note that resistors are not changed in value, but in current rating only. New resistors are 1/3 watt rating.

No. on Bulletin 194	*Old Part No.*	*New Part No.*	*No. on Bulletin 194*	*Old Part No.*	*New Part No.*
9	3615-BK	3615-AU	48	4517	6097
16	3615-D	3615-AP (twin)	42	4409	33-1096
43	4517	6097	64	4410	33-1097
65	4412	33-1000	40	4411	6099
10	5385	33-1115	50	4519	30-1031
20	4518	6098	19	30-4020	Included in 16
15	5872	33-1025			

In the Model 118A (25 Cycle Model) the part numbers of parts which differ from the 60 Cycle Model are

70 Power Transformer 32-7112 $8.00 list price
72 Condenser 30-4093 (1.0 Mfd.) 0.60 list price

Also add a condenser, .1 Mfd. Tubular, Part No. 30-4122 connected across field coil of Speaker.

Model 118 (Code 123-RX)

Replacement parts on Model 118-RX which differ from other 118 models are as follows:

No. on Bulletin 194	*Model 118*	*118-RX*
74 Electrolytic condenser	30-2025	30-2014
6 Tuning condenser	31-1173	31-1242
Dial assembly	31-1205	31-1241
Dial scale	27-5046	27-5058

Model 118-RX uses a type HR-2 speaker, which is equipped with a 25′ cable-and-plug assembly, part No. 36-3327.

The A. C. cord on Model 118-RX is a flat cable and contains an extra wire, which is for use as an antenna lead by connecting the antenna to the binding post mounted on the side of the special flat A. C. plug used. However, the antenna *may* be connected to the regular antenna clip terminal on the receiver chassis if desired and more convenient.

The part number of this special cable and plug assembly is 41-3104.

PHILCO RADIO & TELEV. CORP.

Model 118

Philco Model 118 is an eight tube superheterodyne radio receiver operating on alternating current (A. C.) and designed for reception on either the standard broadcast band (including police bands up to 1720 K. C.), or a major section of the short wave band. A two-position switch changes reception from broadcast to short-wave. The frequency ranges are 540 to 1720 K. C. and 4.2 to 12 megacycles.

Model 118 is equipped with shadow-tuning, four point tone control with fixed bass compensation, and automatic volume control. The power consumption is 110 watts and the undistorted output of the Super Class "A" Amplifier is 10 watts. The intermediate frequency (I. F.) is 260 K. C.

Model 118 is equipped with the following tubes:

R. F.	Type 78
Detector-Oscillator	Type 6A7
I. F.	Type 78
2d Det. 1st A. F.	Type 75
Driver	Type 42
Output tubes (2) (Connected as triodes)	Type 42
Rectifier	Type 80

Replacement Parts for Model 118

No. on Diagram	Description	Part No.	List Price
1	Wave Trap	38-5740	.45
2	Compensating Condenser (Ant.-H. F.)	04000D	$0.15
3	Resister (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
4	Antenna Transformer	32-1378	1.00
5	Wave Band Switch	42-1046	80
6	Tuning Condenser Assembly	31-1173	6.25
7	Compensating Condenser (Ant.-Broadcast)	Part of 6	....
8	Resistor (400 ohms Flexible Wire-Wound)	33-3016	.20
9	Condenser (.05 Mfd.) (Bakelite Block)	3615BK	.35
10	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
11	Condenser (.05 Mfd.) (Tubular)	30-4020	.35
12	Detector Transformer	32-1379	.70
13	Condenser (.000015 Mfd.) (Mica)	30-1030	.35
14	Compensating Condenser (Det.)	Part of 6	....
15	Resistor (2 Meg.) (Red-Black-Green)	5872	.25
16	Condenser (.05 Mfd.) (Bakelite Block)	3615D	.35
17	Condenser (.05 Mfd.) (Tubular)	30-4020	.35
18	Resistor (300 ohms Flexible Wire-Wound)	33-3010	.20
19	Condenser (.05 Mfd.) (Tubular)	30-4020	.35
20	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
21	Compensating Condenser (Osc. H. F. Bdcst.)	Part of 6	....
22	Compensating Condenser (Osc. H. F. Shortwave)	31-6016	.30
23	Oscillator Transformer	32-1380	.70
24	Condenser (.0008 Mfd. Mica)	5878	.35
25	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
26	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
27	Pilot Lamp (Station Selector)	6608	.11
28	Compensating Condenser (Osc. L. F.)	04000R	.45
29	Condenser (.003 Mfd. Mica)	7301	.45
30	Compensating Condenser (1st I. F. Pri.)	Part of 31	....
31	1st I. F. Transformer	32-1381	1.50
32	Compensating Condenser (1st I. F. Sec.)	Part of 31	....
33	Resistor (500 ohms Flexible Wire-Wound)	6977	.20
34	Condenser (.05 Mfd.) (Bakelite Block)	3615AU	.35
35	Shadowmeter	6497	2.50
36	Shadowmeter Pilot Lamp	Part of 35	....
37	Compensating Condenser (2d I. F. Pri.)	*04000A	.15
38	2d I. F. Transformer (Early Prod. 32-1258)	32-1424	....
39	Condenser (.0001 Mfd. Twin) (Bakelite Block)	8035-K	.25
40	Resistor (.1 Meg.) (White-White-Orange)	4411	.25
41	Condenser (.01 Mfd. Bakelite Block)	3903Z	.25
42	Resistor (1 Meg.) (Brown-Black-Green)	4409	.25
43	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
44	Condenser (.09 Mfd. Bakelite Block)	4989D	.35
45	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	$0.25
46	Condenser (Electrolytic 1, 1, 1, and 2 Mfd.)	30-2078	2.45
47	Resistor (.1 Meg.) (White-White-Orange)	4411	.25
48	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
49	Condenser (.015 Mfd. Bakelite Block)	3793F	.35
50	Condenser (.0001 Mfd. Mica)	4519	.35
51	Tone Control	30-4186	.75
52	Condensers (In Tone Control)	Part of 51	....
53	Condenser (.006 Mfd. Tubular)	30-4024	.40
54	Input Transformer	32-7114	2.00
55	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.25
56	Condenser (.01 Mfd. Bakelite Block)	3903P	.25
57	Output Transformer	32-7078	1.40
58	Voice Coil and Cone Assembly	H-13-02625	.80
		K-17-36-3020	.60
59	Field Coil and Pot Assembly	36-3104	2.70
60	Resistor (Wire-Wound) (6500 ohms)	33-3033	.30
61	Resistor (Wire-Wound) (9.5, 112, 84 ohms)	33-3034	.20
62	Volume Control and On-Off Switch	33-5024	1.45
63	Condenser (.05 Mfd. Tubular)	30-4020	.35
64	Resistor (240,000 ohms) (Red-Yellow-Yellow)	4410	.25
55	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
66	Condenser (.025 Mfd. Bakelite Block)	7653D	.35
67	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
68	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
69	Condenser (.015 Mfd. Twin) (Bakelite Block)	3793R	.40
70	Power Transformer	32-7111	5.75
71	Filter Choke	32-7115	1.80
72	Condenser (.25 Mfd.)	6287-R	.40
73	Condenser (Elec. 8 Mfd. 10 Mfd.)	30-2045	1.95
74	Condenser (Elec. 8 Mfd.)	30-2025	2.00
75	Compensating Condenser (2d I. F. Secondary)	Part of 38	....
76	Resistor (2900 ohms) (Red-White-Red)	5309	.25
	Chassis Mtg. Screw	W-1345A	2.25C.
	Chassis Mtg. Washer	29-2089	.35C.
	Chassis Mtg. Foot (Rubber)	27-4116	.05
	Chassis Mtg. Foot Plate	27-7497	.35C.
	Knob Assembly (Large)	27-4051	.10
	Knob Assembly (Small)	27-4052	.10
	Dial Assembly	31-1205	.50
	Dial Scale	27-5046	.35 C.
	Tube Shield	28-1107	.10
	4 Prong Socket	7544	.10
	6 Prong Socket	7547	.11
	7 Prong Socket	27-6005	.11
	Speaker Socket	4957	.10
	A. C. Cord and Plug	L-943A	.60

*See Note below Fig. 4.

Note: Part 37, is as shown above only in early production. In later production this part is incorporated as part of 38, not visible from below.

MODEL 118
Schematic
Socket Layout

PHILCO RADIO & TELEV. CORP.

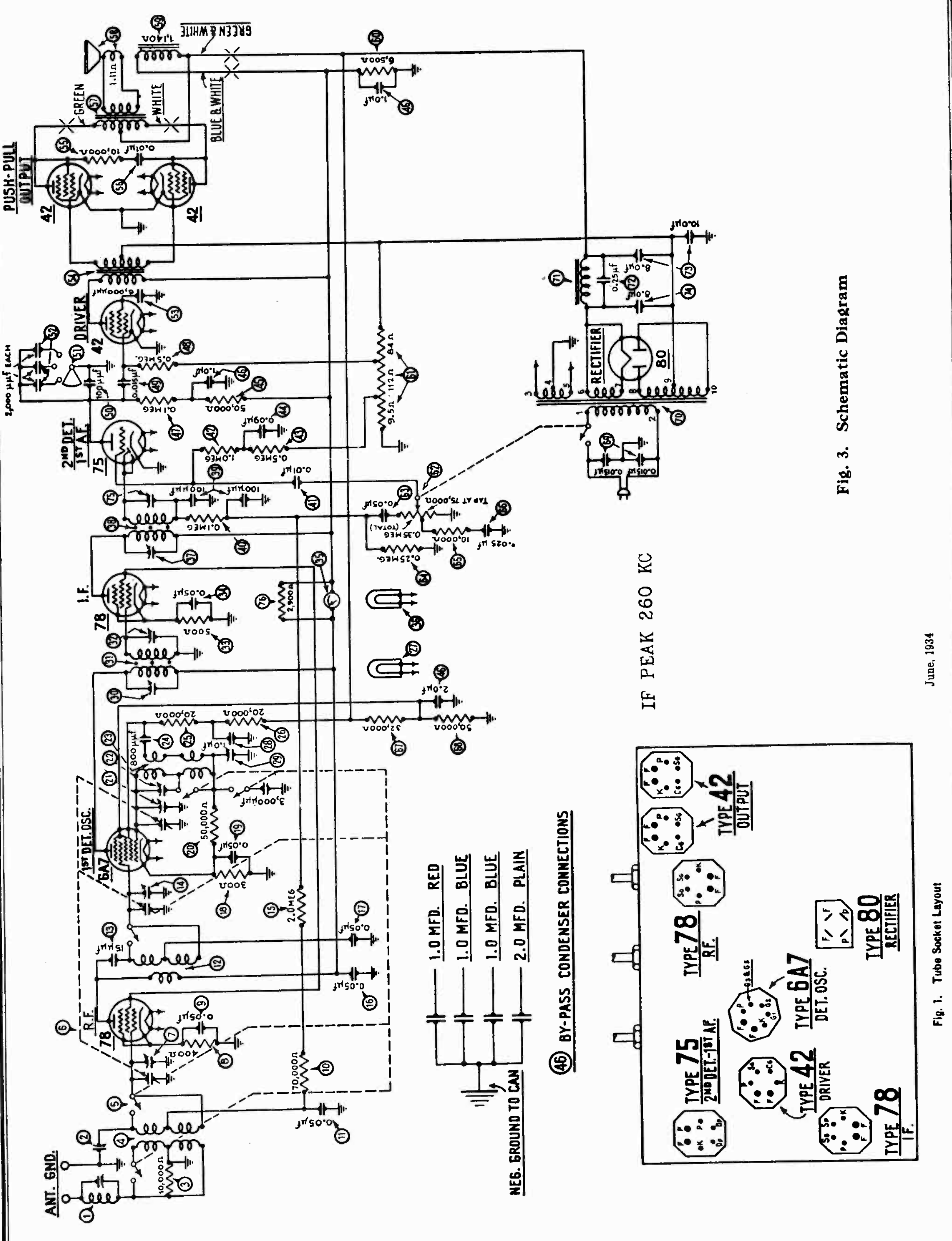


Fig. 3. Schematic Diagram

Fig. 1. Tube Socket Layout

MODEL 118
Chassis Layout
Trimmer Locations

PHILCO RADIO & TELEV. CORP.

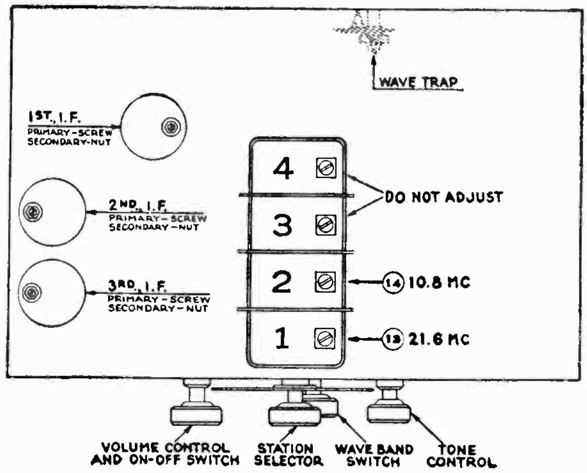


Fig. 2. Top View

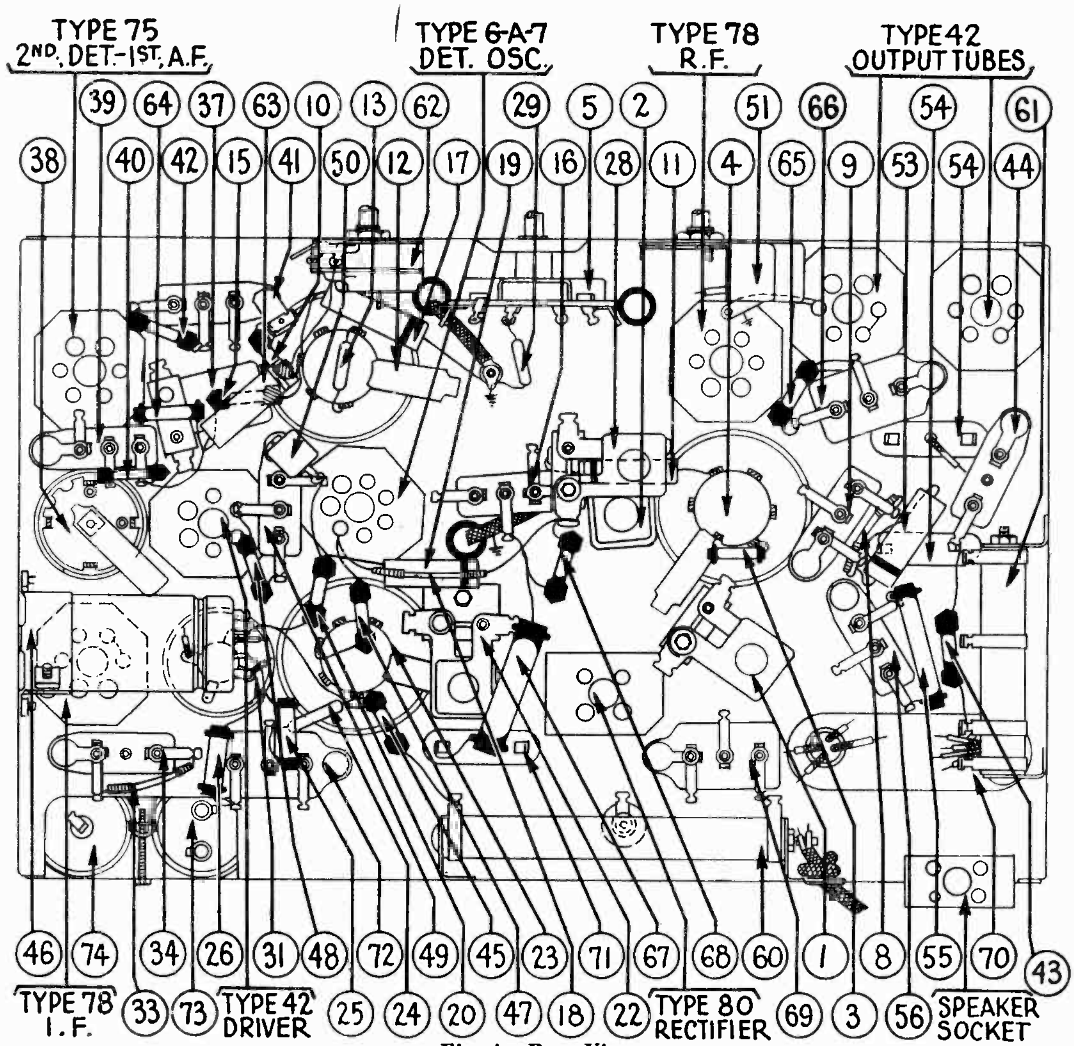


Fig. 4. Base View

MODEL 118
Alignment Data
Voltage

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

For adjusting compensating or padding condensers in Model 118, an accurately calibrated signal generator covering the broadcast range of frequencies is required and also a crystal controlled signal generator for the high frequency adjustments. For the former we suggest the Philco Model 024 Signal Generator and for the latter the Model 091, Crystal Controlled high frequency signal generator. The actual adjusting calls for a special insulated hex wrench and insulated screwdriver. Philco Part No. 3164 Fibre Wrench and No. 27-1159 Screwdriver are recommended. An output meter is also required, for connection to the receiver.

I. F. ADJUSTMENT—The I. F. (intermediate frequency) of Model 118 is 260 K. C.

Remove the grid clip from the top of the 6A7 tube and connect the shielded antenna lead from the Signal Generator to the cap of this tube. Connect the ground lead of the Signal Generator to the ground post of receiver. Connect the output meter to the primary terminals of the output transformer of receiver. Set the waveband switch at the left position (standard broadcast).

Set the wave switch on the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. (30) and (32) in Fig. 3) and the 2d I. F. primary and secondary condensers ((37) and (75)) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

Note: In early production the 1st I. F. compensating condensers only are adjusted as described above. Part (75) is not used. The 2d I. F. primary (37) is an 04000A condenser reached and adjusted through hole in top of chassis near the 42 driver tube.

WAVE TRAP—Remove antenna lead from grid cap of 6A7 tube and attach it to antenna post on set. Replace cap on 6A7 tube. With Signal Generator still operating at 260 K. C., adjust wave-trap condenser ((1) in Figs. 3 & 4) so as to get MINIMUM reading in output meter. This adjustment is made from underneath the chassis.

ANTENNA, DETECTOR AND OSCILLATOR H. F. (Broadcast)—These condensers Nos. (7), (14), and (21), are located on top of the tuning condenser gang, adjustment made by means of the fibre wrench. Set the signal generator at 1500 K. C., tune in the signal at 1500 on dial and adjust these condensers in the order given, to give maximum output reading. (7) is located on the section nearest the front and (14) on the center section.

OSCILLATOR—LOW FREQUENCY—This is condenser (28) (see Figs. 3 and 4) located underneath chassis and accessible from underneath. Use the fibre wrench. Set signal generator switch at 600, tune in the signal at 600 on the dial and adjust condenser to maximum.

ANT. AND OSC. H. F.—SHORTWAVE—The crystal controlled signal generator is used for these adjustments. These are condensers (2) (Ant. H. F.) and (22) (Osc. H. F.) located underneath chassis, and adjusted from underneath. The fundamental frequency of the Philco Model 091 crystal controlled signal generator is 3600 K. C. or 3.6 megacycles. The third harmonic of this is 10.8 M. C. Turn the waveband switch of the set to the right and the dial to just below 11 M. C. The 10.8 harmonic should be picked up here and the two condensers should be adjusted to give maximum reading on the output meter, on this signal.

Tube Socket Voltages—Line Voltage 115

Function	R.F.	Det.-Osc.	I.F.	A.F.	Driver	Output		Rect.
Type	78	6A7	78	75	42	42	42	80
Filament (F-F)......	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P-K).........	180	180	200	125	195	280	280	315
Screen (SG-K).......	80	175	80	...	195	290	290	...
Cathode (K to F)....	2.5	2.6	3.2	0	0	0	0	...
6A7· G^1 to K........	26							
6A7· G^2 to K........	150							

Power Transformer Voltages

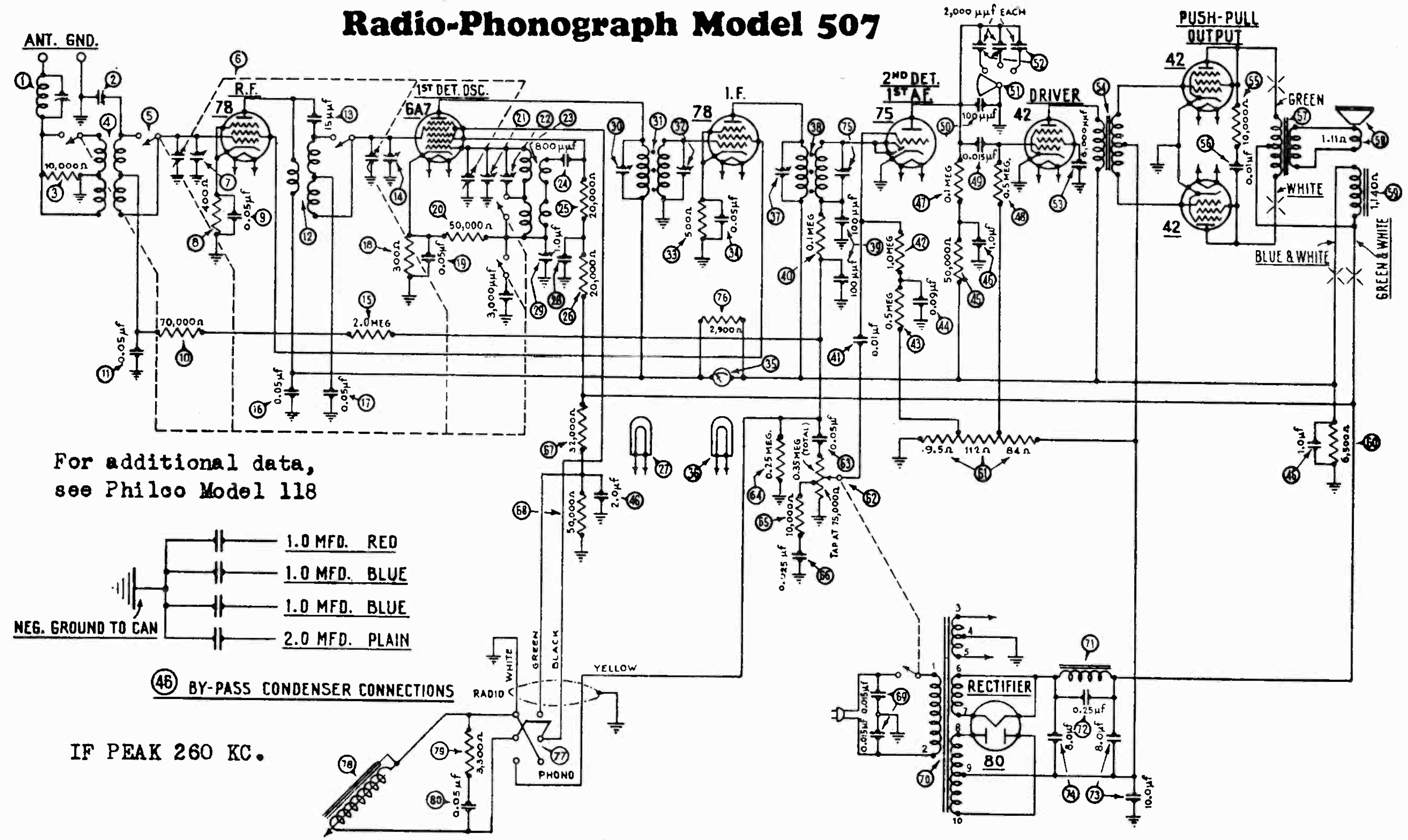
Terminals	A.C. Volts	Circuit	Color of Leads
1–2	120	Primary	White
3–5	6.3	Filaments	Black
6–7	5.0	Filament of 80	Blue
8–10	760	Plates of 80	Yellow
4	...	Center Tap of 3–5	Black—Yellow Tracer
9	...	Center Tap of 8–10	Yellow—Green Tracer

The above tests were made with an A. C. voltmeter for filament voltages and a high resistance D. C. voltmeter for all others. Dial at 550 K. C., wave band switch to left, volume control at maximum. Tests made with test prods applied to sockets underneath chassis. Philco Model 048 All-purpose Tester or Model 025 Circuit Tester are recommended for these tests. Use Fig. 1 in making tests given in left hand table above.

MODEL 507
Schematic
Notes

PHILCO RADIO & TELEV. CORP.

Radio-Phonograph Model 507



I. F. = 260 K. C. Fig. 1—Schematic Wiring Diagram. Note: Phonograph motor not shown in diagram. Numbers on this figure from ① to ⑯, inclusive, are the same as in Fig. 3, Service Bulletin No. 194

Model 507 uses the same radio chassis as Model 118 Superheterodyne.

NOTE: Part ⑭ electrolytic condenser is a 30-2014 in Model 507 instead of the 30-2025 used in Model 118.

The electric motor of Model 507 is of the self-starting, synchronous type, depending on the power line frequency (cycles) for its correct speed. If the motor should develop trouble, do not attempt to repair it. Replace it, and communicate with your Distributor with regard to the faulty one. The motor should be lubricated at least once every six months. To do this, take off the turntable and put a few drops of a good grade of light machine oil in the oil-hole in the motor top-plate.

The pick-up is of the high impedance type. The impedance of the pick-up is approximately 2500 ohms, measured at 1000 cycles. The D. C. resistance is 600 ohms. Adjustment of the pick-up is described in Service Bulletin No. 89, "Adjusting the Electric Pick-up."

The tone arm must be free to rotate upon its axis at all times. Damage to the records will result if it is not.

The speaker unit is Type H-13.

PHILCO RADIO & TELEV. CORP.

Model 60

Effective August 1st, resistors (10) and (28) in wiring diagram of Model 60, Bulletin No. 164 will be changed from Part No. 4518 (1/2 watt) to Part No. 6098 (1/3 watt). These changes are made to facilitate wiring in assembly.

Starting with Run No. 7, the following changes will be made. Note that a Wave Trap is added, necessitating several changes; other changes are to improve sensitivity.

Part No. (Fig. 3)	*Remove*	*Add*	*Location*
	....	38-6073 Wave Trap	In series with antenna post
(8)	4989-Z Condenser	....	....
(9)	7217 Resistor	33-3010 (Bias Resistor, 300 Ohms, flex.)	Refer to Schematic Diagram
	....	33-3016 (Bias Resistor, 400 Ohms)	From 78 Cathode to Ground
	....	30-4020 (Condenser .05 Mfd. Tubular	From 78 Cathode to Ground
(24)	3656 (25,000 Ohms)	33-1027 (39,000 Ohms)	Refer to Schematic Diagram
(22)	4412	....	....
(19)	4518 (5,000 Ohms) 1/2 Watt	6099 (99,000 Ohms) 1/3 Watt	Refer to Schematic Diagram
(35)	4517	6097	Refer to Schematic Diagram
(18)	04000M	04000J	Refer to Schematic Diagram
(20)	30-4063 (.05-.09-.09-.5-.2) (.2 section not used)	30-4217 (.05-.09-.09-.5)	(Filter block)

Model 89

Effective with Run No. 13 compensating condenser (18) on diagram (1st I. F. primary) will be a Part No. 31-6024 instead of 04000M previously used.

The new condenser is of an improved construction which eliminates possibility of "frequency drift" or breakdown.

Starting with Run No. 14, Model 89 will use a type 77 tube as detector-oscillator instead of the type 36 tube previously used. This change results in more stable performance of the oscillator.

In addition to requiring the use of a six-hole socket for the detector oscillator tube instead of the 5-hole previously used, the following changes are required:

Part (10), No. 6208 resistor (15,000 ohms) is replaced by No. 33-1114 (8,000 ohms).

Part (8), No. 8174-B condenser (.09 and .0007 Mfd.) is replaced by No. 8322-B (.09 and .0014).

Model 144

Effective with Run No. 6, electrolytic condenser (71) (see Bulletin No. 193) will be changed from part No. 30-2020 to 30-2026. Same capacity (6 mfd.), higher working voltage.

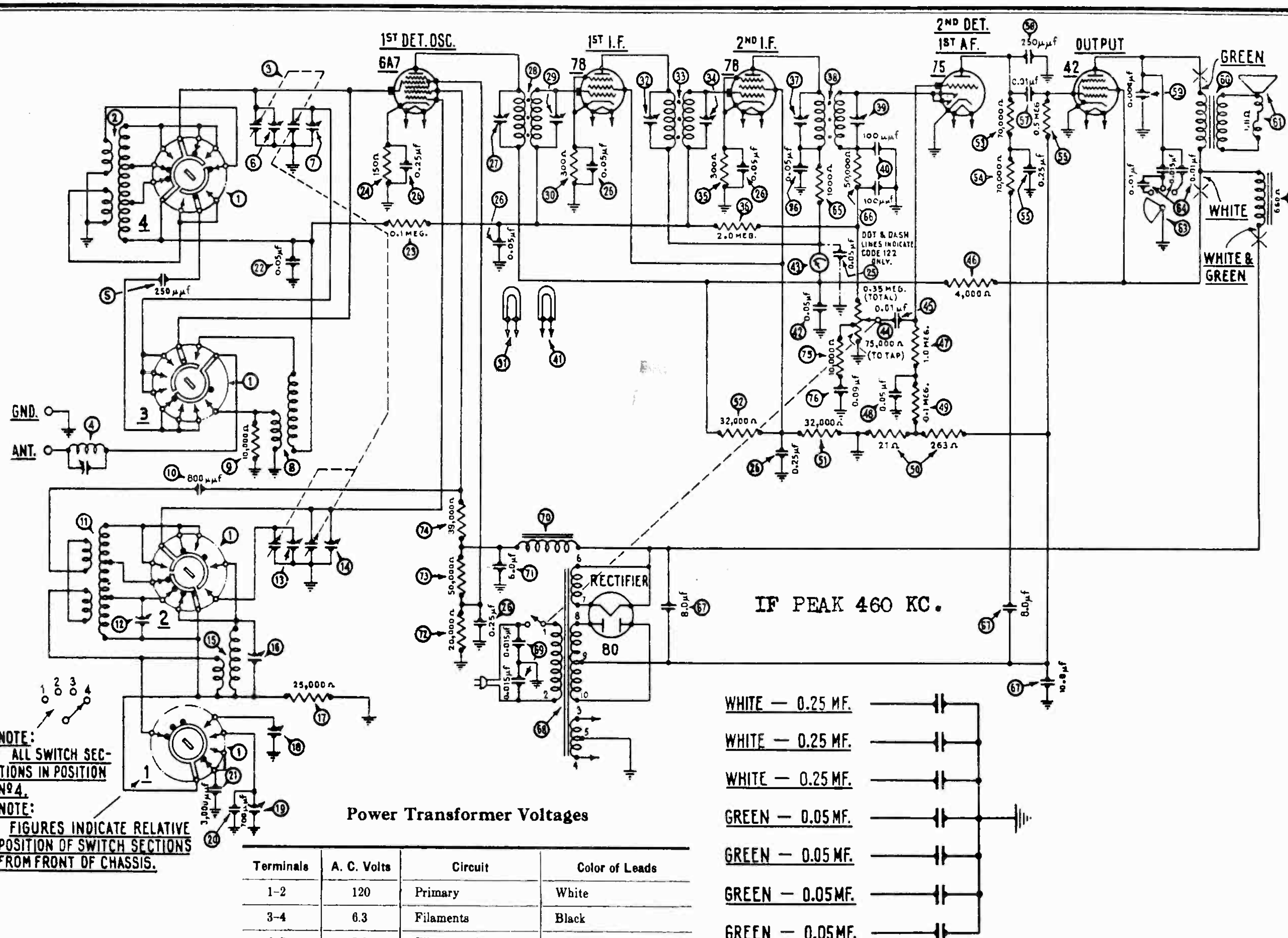
Starting with Run No. 7, Part (70) filter choke in Model 144 will be a 32-7018 instead of No. 5930 which has been used. This change is to adjust factory material lists and does not affect value of choke or performance of set.

The part number of the Shadowmeter to be used on the Model 144 will be 45-1106 instead of 6497 as listed on Bulletin 193. Change to identify in production.

On Fig. 3 (Schematic) fixed condenser (76) used in the bass compensation circuit, should be marked .02 Mfd. (Part No. 30-4113). The list of parts on Page 3 of Service Bulletin 193 gives this part number and value, which is correct.

PHILCO RADIO & TELEV. CORP.

MODEL 144
Schematic
Transformer Voltages



NOTE: ALL SWITCH SECTIONS IN POSITION №4.

NOTE: FIGURES INDICATE RELATIVE POSITION OF SWITCH SECTIONS FROM FRONT OF CHASSIS.

26 BY-PASS CONDENSER BLOCK CONNECTIONS.

Fig. 3—(Schematic Diagram)

Power Transformer Voltages

Terminals	A. C. Volts	Circuit	Color of Leads
1–2	120	Primary	White
3–4	6.3	Filaments	Black
6–7	5.0	Filament of 80	Blue
8–10	746	Plates of 80	Yellow
5	...	Center tap of 3–4	Black—Yellow tracer
9	...	Center tap of 8–10	Yellow—Green tracer

May, 1934

MODEL 144
Alignment Data

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

The compensating condensers of Model 144 have been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should NOT be undertaken unless the receiver is seriously out of alignment.

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly (Fig. 5). These have been adjusted, and sealed, at the factory.

Philco Model 024, an accurately calibrated signal generator covering broadcast and police band frequencies, is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies for adjusting the compensating condensers in the high frequency circuits.

1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect an output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 144) and adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I. F. compensating condensers is shown in Figure 5. Each of the I. F. transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (extreme left) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ④ condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ④ is located at rear and underneath the chassis, and is shown in Figures 4 and 5. It is reached from the rear of the chassis.

3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 144 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

Range 1	520 K.C.—1500 K.C.
Range 2	1.5 M.C.—4.0 M.C.
Range 3	4.0 M.C.—11.0 M.C.
Range 4	11.0 M.C.—23.0 M.C.

Connect the output terminals of the Model 091 or equivalent Signal Generator, to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. Set the Wave-Band Switch to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser ⑬ on Section 1 of Tuning Condenser for maximum response in the output of the receiver. Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be heard. Adjust the compensating condenser ⑭ on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment, otherwise the output of the Signal Generator will be too great. Adjust the compensating condenser ⑫ to give maximum response in the output meter. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 4.

This concludes adjustments requiring the Model 091 (or equivalent) high frequency signal generator.

The Model 024 or its equivalent is now used again. Turn the Wave-Band Switch of the set to Range 2 and the Station Selector to 1.5 M.C. Set the Signal Generator at 1500 K.C. Make sure the "Antenna" connection between the Signal Generator and the Chassis has been restored. Adjust compensating condenser ⑲ located underneath the chassis, (Figure 4). Adjustment is made from the underside of the chassis.

Turn the Wave-Band Switch to Range 1 and the Station Selector to 1400 K.C. Set the Signal Generator at 1400 K.C. Adjust compensating condenser ⑯, which is located underneath the chassis. (See Figure 4). This adjustment is made from the underside of the chassis.

Finally, with Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator at 520 K.C. and adjust compensating condenser ⑱ (Figure 4). This compensating condenser is also mounted underneath the chassis, and reached from below.

For proper and accurate adjustment of Model 144, the procedure must be followed exactly in the order given. The adjustment should not be undertaken without proper equipment as mentioned above.

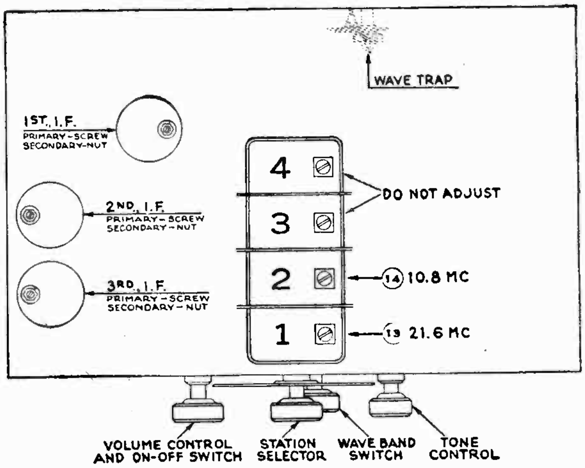


Fig. 5—Position of Compensating Condensers Reached from Above Chassis

PHILCO RADIO & TELEV. CORP.

Model 144

Philco Model 144 is a six-tube superheterodyne receiver operating on alternating current (A. C.) and designed for reception of any frequency from 520 K.C. to 23,000 K.C. (23 megacycles). It is equipped with shadow-tuning, four-point tone-control with fixed bass compensation; Model 144 has 5 watts output. The intermediate frequency (I. F.) is 460 K.C. Tubes used are the following Philco high-efficiency types:—

Detector-Oscillator	Type 6A7
1st I. F.	Type 78
2nd I. F.	Type 78
2nd Detector 1st A. F.	Type 75
Output	Type 42
Rectifier	Type 80

The power consumption of model 144 is 70 watts.

REPLACEMENT PARTS—MODEL 144

Nos. on Diagram	Description	Part No.	List Price
1	Wave-Band Switch	42-1045	$3.60
2	Antenna Transformer (H. F. Bands)	32-1271	.70
3	Tuning Condenser Assembly	31-1175	....
4	Wave Trap	38-5487	.55
5	Condenser (.00025 Mica)	3082	.35
6	Compensating Condenser (Ant. H. F.)	Part of 3	....
7	Compensating Condenser (Ant. Broadcast)	Part of 3	....
8	Antenna Transformer (Broadcast Band)	32-1270	.55
9	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
10	Condenser (.0008 Mfd. Mica)	6021	.35
11	Oscillator Transformer (H. F. Bands)	32-1273	.35
12	Compensating Condenser (Range 2)	04000C	.15
13	Compensating Condenser (Osc. Range 4)	Part of 3	....
14	Compensating Condenser (Osc. Range 3)	Part of 3	....
15	Oscillator Transformer (Broadcast)	32-1272	.70
16	Compensating Condenser (Osc. Broadcast)	04000A	15
17	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
18	Compensating Condenser (Broadcast Series)	04000S	.35
19	Compensating Condenser (Range 2; Series)	04000R	.45
20	Condenser (.0007 Mfd. Mica)	4520	.35
21	Condenser (.003 Mfd. Mica)	7301	.45
22	Condenser (.05 Mfd. Bakelite Block)	3615-L	.35
23	Resistor (100,000 ohms) (White-White-Orange)	4411	.25
24	Resistor (150 ohms Flexible Wire-Wound)	33-3140	.20
25	Condenser (.05 mfd. tubular) (Used in Code 122 only)	30-4123	.35
26	Condenser Block (.25, .25, .25, .05, .05, .05, .05)	30-4167	1.15
27	Compensating Condenser (1st I. F. pri.)	Part of 28	....
28	1st I. F. Transformer	32-1369	1.50
29	Compensating Condenser (1st I. F. Sec.)	Part of 28	....
30	Resistor (300 ohms Flexible Wire-Wound)	33-3010	.20
31	Pilot Lamp	6608	.11
32	Compensating Condenser (2d I. F. Pri.)	Part of 33	....
33	2d I. F. Transformer	32-1306	.90
34	Compensating Condenser (2d I. F. Sec.)	Part of 33	....
35	Resistor (300 ohms Flexible Wire-Wound)	33-3010	.20
36	Resistor (2 Megs.) (Red-Black-Green)	33-1025	.25
37	Compensating Condenser (3d I. F. Pri.)	Part of 38	....
38	3d I. F. Transformer	32-1307	.80
39	Compensating Condenser (3d I. F. Sec.)	Part of 38	....
40	Condenser (.0001 Mfd. Twin—Bakelite Block)	8035-L	.25
41	Pilot Lamp for Shadowmeter	Part of 43	....
42	Condenser (.05 Mfd. Bakelite Block)	3615AB	.35
43	Shadowmeter	6497	2.50
44	Volume Control & On-Off Switch	33-5068	1.45
45	Condenser (.01 Mfd. Bakelite Block)	3903J	.25
46	Resistor (4,000 ohms) (Yellow-Black-Red)	7832	$0.25
47	Resistor (1 Meg.) (Brown-Black-Green)	4409	.25
48	Condenser (.05 Mfd. Bakelite Block)	3615-L	.35
49	Resistor (100,000 ohms) (White-White-Orange)	4411	.25
50	Resistor BC (263 ohms, 21 ohms, Wire-Wound)	33-3069	.25
51	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
52	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
53	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
54	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
55	Condenser (25 Mfd.) (Metal Case)	4264	.60
56	Resistor (500,000 ohms) (Yellow-White-Yellow)	4517	.25
57	Condenser (.01 Mfd. Bakelite Block)	3903AN	.25
58	Condenser (.00025 Mfd. Mica)	30-1032	.35
59	Condenser (.006 Mfd. Tubular)	30-4024	.40
60	Output Transformer	32-7178	1.60
61	Voice Coil & Cone Assembly	(H-16) 02625	.80
		(K-23) 36-3174	.40
62	Field Coil & Pot Assembly	H-16 (36-3218)	3.50
		K-23 (36-3239)	3.75
63	Tone Control	30-4168	.75
64	Condensers (Inside 63)	Part of 63	....
65	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.25
66	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
67	Condenser—Electrolytic (8-8-10 Mfd.)	30-2073	3.45
68	Power Transformer	32-7234	4.75
69	Condenser (.015 Mfd. Twin)	3793-H	.40
70	Filter Choke	5930	1.75
71	Condenser (6 Mfd. Electrolytic)	30-2020	1.40
72	Resistor (20,000 ohms) (Red-Black-Orange)	6649	.25
73	Resistor (50,000 ohms) (Green-Brown-Orange)	5868	.35
74	Resistor (39,000 ohms) (Orange-White-Orange)	33-1027	.25
75	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
76	Condenser (.02 Mfd. Tubular)	30-4113	.30
	A. C. Cord and Plug Assembly	L-943A	.60
	Dial Assembly	31-1206	1.25
	Dial Scale	27-5044	.65
	Chassis Mounting Screw	W-1358A	2.00 C.
	Chassis Mounting Foot (Rubber)	27-4116	.05
	Chassis Mounting Foot (Plate)	27-7497	.35 C.
	Tube Shield	28-1107	.10
	4 Prong Tube Socket	7544	.10
	6 Prong Tube Socket	7547	.11
	7 Prong Tube Socket	27-6005	.11
	Speaker Socket	4957	.10
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Knob (Station Selector)	27-4127	.10

MODEL 144
Voltage
Chassis Layout
Socket Layout

PHILCO RADIO & TELEV. CORP.

Tube Socket Voltages—Line Voltage 115

CIRCUIT	Det.-Osc.	1st I. F.	2nd I. F.	A. F.	Out-put	Recti-fier
TUBE	6A7	78	78	75	42	80
Filament Volts (F-F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts (P-K)	250	230	230	185	300	350
Screen Grid Volts (SG-K)	60	75	75	...	310	...
Cathode Volts (K-Gnd)	1.4	2	2	0	0	...
6A7—G2 to K	160	...	...	...	...	...
6A7—G1 to K	20	...	...	...	...	...

Above values were obtained by means of an A. C. voltmeter for filament voltages and a high resistance D. C. voltmeter for all others. All values obtained from underside of chassis with test prods. Positions of controls were: Volume Control—maximum; Wave-Band Switch—extreme left (counter-clockwise); Dial at 520 K.C.

Philco Model 048 All-Purpose Tester is recommended for making the above tests. Use the illustration below (Fig. 1) as a guide to determine the points to be voltage-tested.

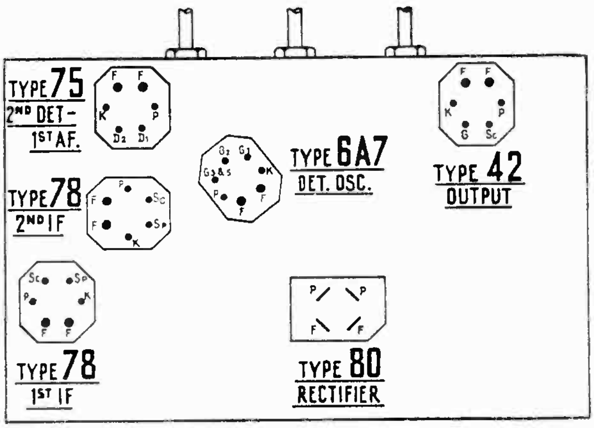


Fig. 1—Tube Sockets (underside)

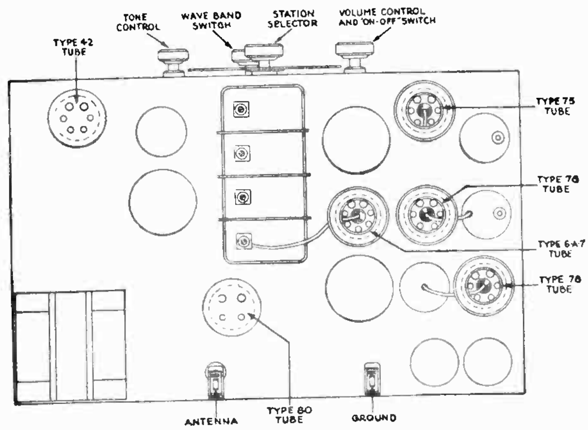


Fig. 2—Chassis—Top View

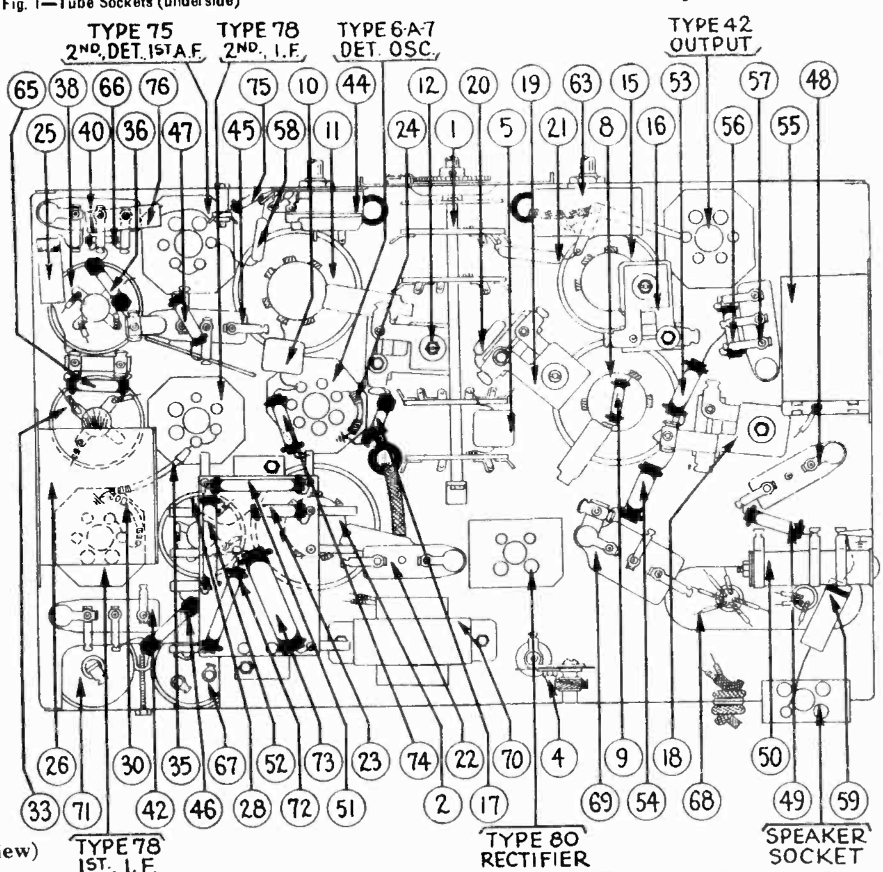
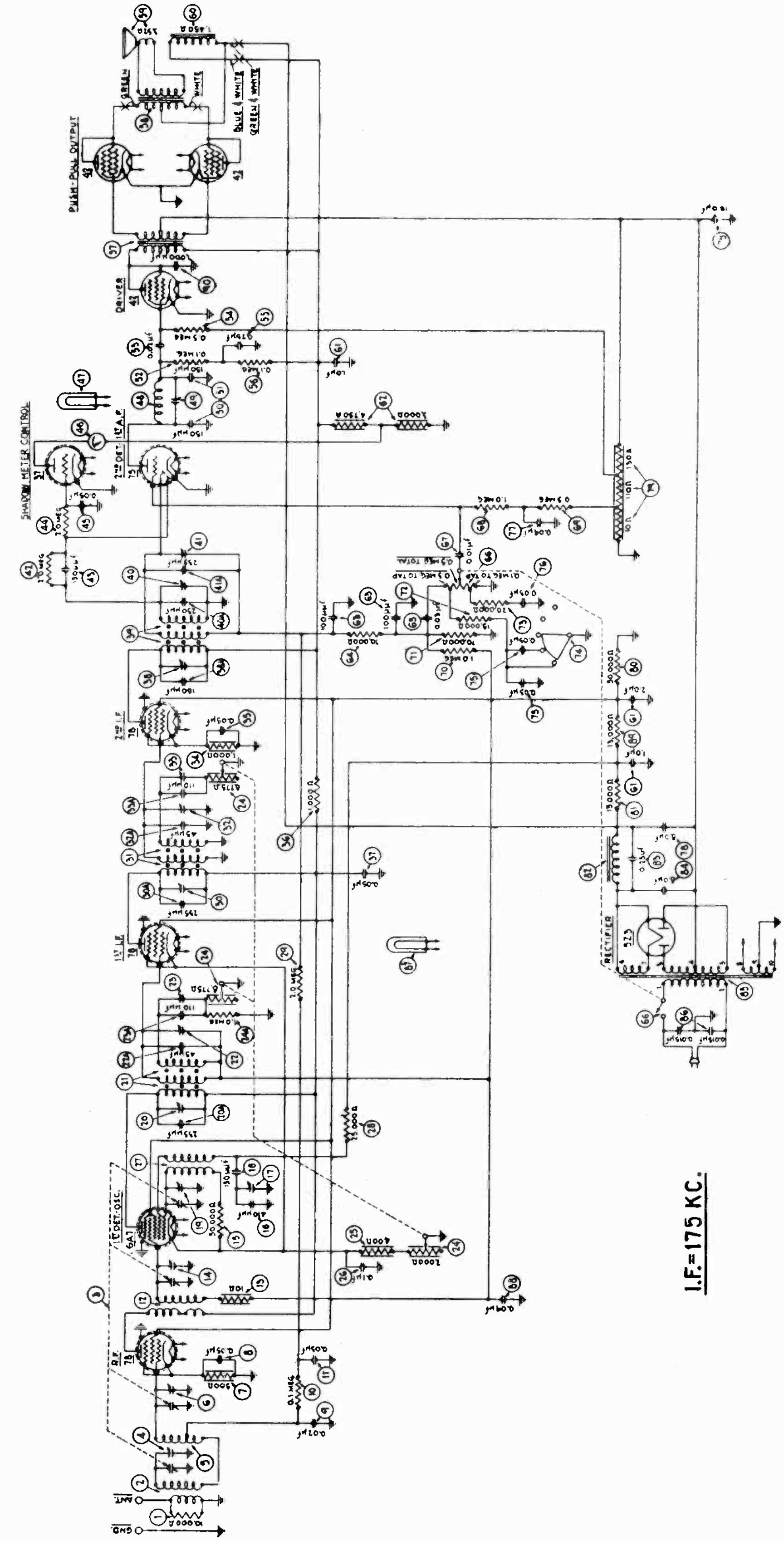


Fig. 4—(Base View)

PHILCO RADIO & TELEV. CORP.

MODEL 200-X
Schematic



Wiring Diagram— Philco Model 200-X

MODEL 200-X
Alignment Data

PHILCO RADIO & TELEV. CORP.

ADJUSTING COMPENSATING CONDENSERS IN MODEL 200-X

The quality performance of this receiver depends to a great extent upon providing a wide channel through the R. F. and I. F. stages to permit the passage of a broadcast signal without cutting of the side bands.

In order to produce this wide tuning band, the set must be carefully and accurately adjusted. These adjustments will be more critical than in the conventional radio, and the padding procedure will be considerably more complicated.

In making the adjustments, it is necessary to use an unmodulated signal generator. The PHILCO Model 048 Set Tester or the Model 024 Signal Generator can be readily adapted for this purpose by the installation of a single-pole double-throw switch, and an additional grid leak resistor, as shown in Figure 9. This switch will adapt the signal generator for either a modulated or an unmodulated signal.

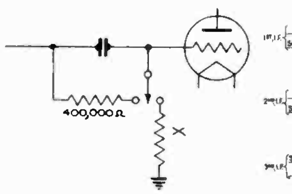


FIGURE 9

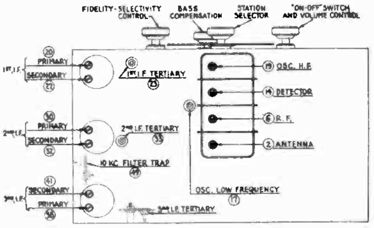


FIGURE 10

With an unmodulated signal, it is not possible to obtain an indication of output by means of the usual form of output meter. An indirect indication can be obtained, however, through the automatic volume control system by connecting a high resistance voltmeter having a scale reading of 0-5 or 0-10 volts across the R. F. cathode resistor , shown in the wiring diagram Fig. 8. This connection can be made conveniently through the use of leads equipped with test clips. With this arrangement, maximum output at the second detector will be indicated by a minimum reading of the meter, and vice versa. In other words, the action will be just the opposite of an output meter used to measure audio frequency voltage at the power output stage. With no signal applied to the receiver, the bias voltage indicated by the voltmeter, will be approximately 3 volts. This voltage will be reduced by the application of a signal to the R. F. or I. F. input circuits.

I. F. ADJUSTMENTS

After preparing the unmodulated signal generator and connecting the voltmeter as directed, proceed as follows:

1. Set the receiver tuning dial at its extreme low frequency position. Remove the grid clip from the cap of the 6-A-7 detector oscillator tube, and connect the signal generator antenna lead in its place. Connect the ground lead from the signal generator to the ground terminal of the chassis. Adjust the signal generator frequency to exactly 175 K. C. Turn the fidelity control of the receiver all the way to the left.

2. Adjust the 6 I. F. padding condensers 20, 22, 30, 32, 41 and 38 (see Fig. 10) in the tops of the 3 I. F. cans, for maximum output (minimum meter reading), starting with the padder at the front of the chassis, and continuing with the adjustments toward the rear of the set. During these adjustments, the output of the signal generator should be regulated to maintain a voltmeter reading of approximately 2 volts.

3. Connect a 250 Mmf. Condenser from the plate of the 2nd I. F. tube to ground. This will increase the voltmeter reading to approximately 2.5 volts.

4. Readjust the 3d I. F. secondary padder 41 for maximum output.

5. Readjust the 3d I. F. primary padder 38 for maximum output. Do not touch the grid padder 41 again.

6. Turn the fidelity selectivity control all the way to the right.

7. Adjust the 1st & 2nd I. F. tertiary padders 23 and 33 for MINIMUM output (maximum voltmeter reading).

8. Leaving the fidelity selectivity control in the right hand position, it will be found, upon varying the frequency of the signal generator, that two definite dips will appear in the voltmeter reading—one at 167 K.C. and another at 182 K.C. These dips in the voltmeter reading indicate peaks in the tuning curve. The amplitude of these peaks should be equal; that is, the same voltmeter reading should be obtained at both 167 K.C. and 182 K.C. Any variations in these two readings can be corrected by a *slight* readjustment of the 3rd I. F. primary padder 38. If the peak at 167 K.C. is higher than the one at 182 K.C., the primary padder will have to be turned out. If the reverse is true, the capacity of this padder must be increased. In any case, the voltmeter readings must be made equal by dividing the differences through readjustment.

R. F. ADJUSTMENTS.

The R. F. portion of the receiver is adjusted as follows:

9. Replace the grid clip on the detector-oscillator tube and connect the antenna terminal of the signal generator to the antenna terminal of the chassis. Turn the fidelity selectivity control all the way to the left and set the receiver dial at 1,500 K. C. The same type of output indication is employed as in the I. F. adjustments.

10. Adjust the signal generator for a frequency of 1,500 K. C. Adjust the "oscillator" padding condenser 19 and the "detector" padding condenser 14 for maximum output and in the order mentioned. Regulate the signal generator output control to maintain a voltmeter reading of 2 volts as before.

11. Turn in padder 6 (R. F.) until the voltmeter reads 2.5 volts and then adjust padder 2 (ANT.) for maximum output.

12. Readjust padder 6 for maximum output. Do not touch padder 2 again.

13. Set the receiver dial and the signal generator at 600 K. C. Adjust the "oscillator low frequency" padder 17 for maximum output. As the R. F. tuning is rather broad, there will be a considerable range on the dial that will give about the same output when the oscillator L. F. padder is adjusted for maximum. The padder must be adjusted at the middle of this range. This point may be determined with accuracy in the following manner: Starting with the usual voltmeter reading of 2 volts, slowly turn the receiver dial toward the low frequency end and, at the same time, readjust the padder 17 for maximum output until a point is reached where the maximum output is indicated by a voltmeter reading of 2.5 volts. Note carefully the exact dial reading at this point. Follow the same procedure while turning the dial in the opposite direction until the output reading decreases to the same value. Set the dial at the exact center of these two points and readjust padder 17, for maximum output.

14. Adjust the 3d I. F. tertiary padder [illegible] to give minimum width in the shadow tuning meter in the receiver. This padder is reached from rear of chassis.

ADJUSTMENT OF 10 K. C. FILTER

The 10 K. C. filter in the audio circuit will rarely require readjustment. As the proper adjustment of this padder ([illegible] on diagram) requires an accurately calibrated audio oscillator, it should be reset only in the event that it has been tampered with or in cases where it has become necessary to replace one of the elements of this filter. An emergency adjustment of this filter can be made in the following manner:

15. Connect the signal generator to the control grid of the type 6-A-7 tube, leaving the grid clip in place.

16. Disconnect the voltmeter from resistor 7 and connect an output meter to the plates of the power output tubes in the usual way.

17. Set the receiver dial at 550 K. C. At this point, the oscillator in the receiver will be tuned to 725 K. C. The adjustment of the signal generator (switch in unmodulated position) to approximately this same frequency will cause an audible beat note to be heard in the speaker. By means of the signal generator tuning control, reduce the frequency of this beat note until zero beat is reached, at which point the output meter reading will decrease to 0. Turning the receiver dial in either direction will gradually increase the frequency of the audible note so that at 540 or 560 K. C. a 10,000 K. C. note will be heard. At either of these points, the padder [illegible] should be adjusted for minimum reading of the output meter.

MODEL 700
Alignment Data
Socket Layout

PHILCO RADIO & TELEV. CORP.

MODEL 700 RECEIVER

THE latest Philco development in single-unit automobile radio is the new Model 700. This Receiver is compact, easier to install than ever before and will give exceptional performance.

It is a six-tube super-heterodyne with a genuine full-size Philco electro-dynamic speaker—the same type that is used in many of the larger home radio Receivers. It has remarkable sensitivity, a three-section tuning condenser, giving improved selectivity—wonderful tone, with a three-point tone control, and inherently quiet circuits. Interference filters in the "A" lead and in the pilot light lead greatly simplify motor interference suppression. In most installations standard suppression is sufficient.

Added to this, the ease of installation characteristic of this model (only one unit to install—one lead to the antenna, one lead to the ammeter) and the convenient, attractive airplane type steering column control, which makes this model universal in its application, are additional features of the Model 700 which appeal to both the dealer and the public.

I. F. TRANSFORMER AND PADDERS

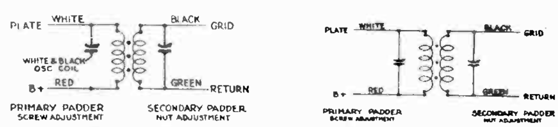
The new style I. F. transformer complete with padders is used in the Model 700.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



1st I. F. Transformer 32-1329 — 2nd I. F. Transformer 32-1237

FIG. 1

MODEL 700 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (22) and (24) are adjusted first (Figs. 2 and 3). Turn the adjusting screw (22) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (24) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (22) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

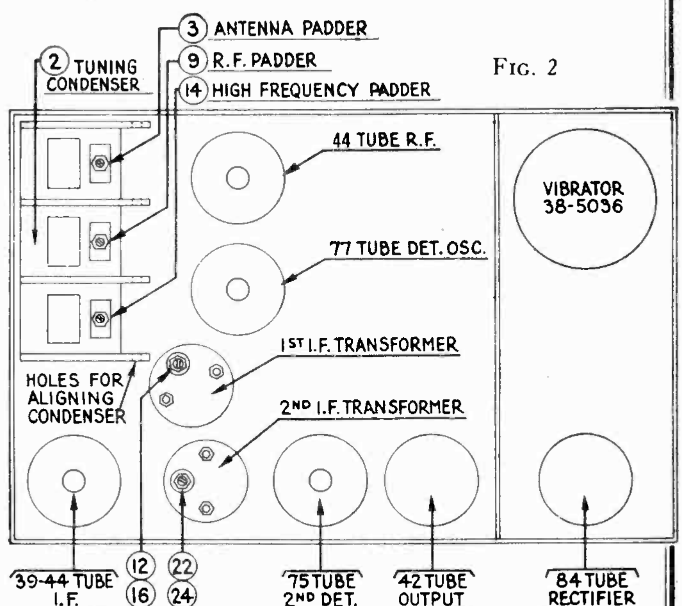


FIG. 2

Repeat the above procedure with the condensers (12) and (16).

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1600 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections

MODEL 700
Schematic
Chassis Layout
Parts List

PHILCO RADIO & TELEV. CORP.

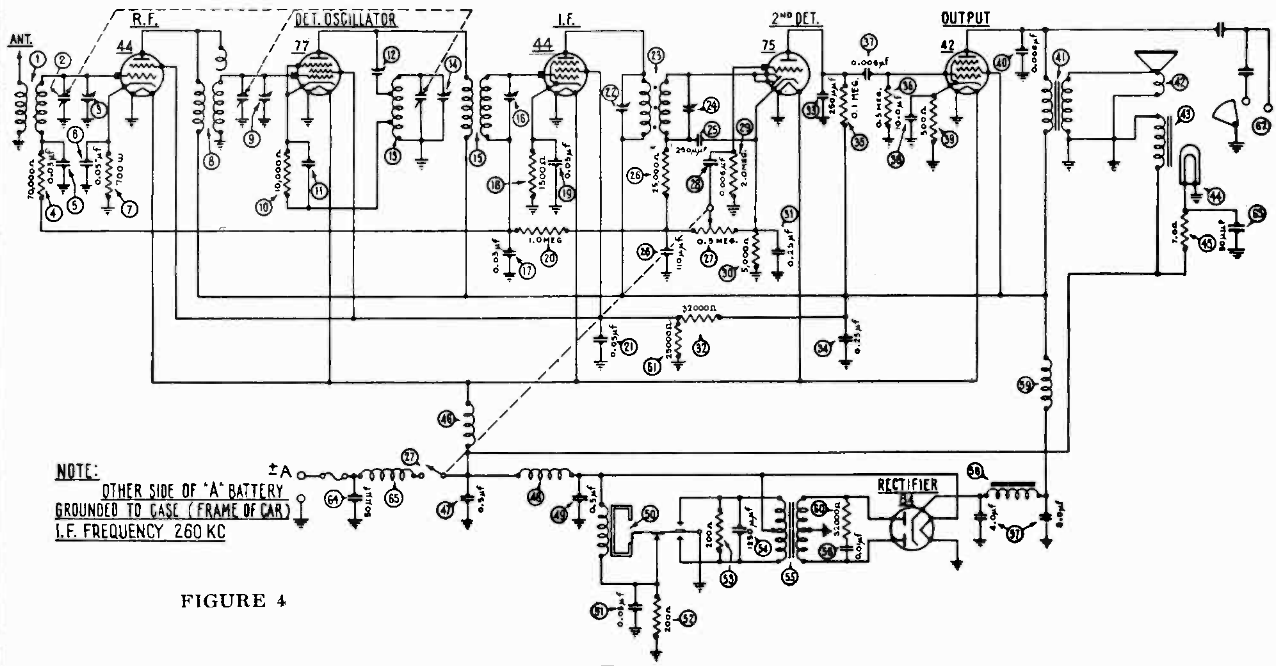


FIG. 3

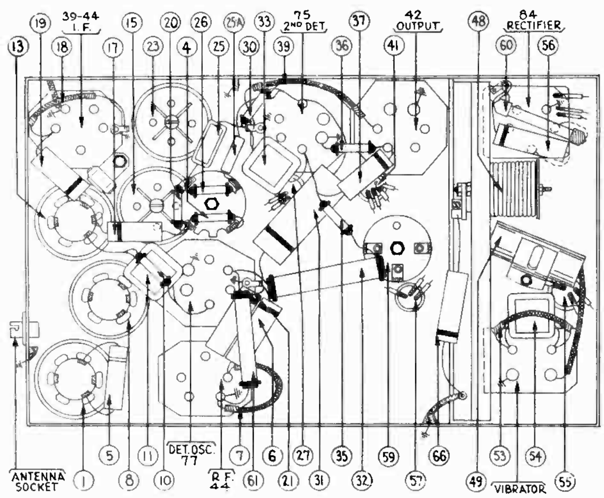


FIG. 4

of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (14) until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (9) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL 700 PARTS LIST

(1)	Antenna Transformer	32-1331	(46)	"A" Choke	32-1268
(2)	Tuning Condenser	31-1199	(47)	Condenser (.5 mfd.)	30-4147
(3)	1st Padder (in tun. cond.)		(48)	Vibrator Choke	32-1235
(4)	Resistor (70,000 ohms)	33-1115	(49)	Condenser (.5 mfd.)	30-4015
(5)	Condenser (.03 mfd.)	30-4025	(50)	Vibrator	38-5036
(6)	Condenser (.05 mfd.)	30-4020	(51)	Condenser (.05 mfd.)	30-4039
(7)	Resistor (700 ohms)	6443	(52)	Resistor (200 ohms)	7217
(8)	R. F. Transformer	32-1332	(53)	Resistor (200 ohms)	7217
(9)	2nd Padder (in tun. cond.)		(54)	Condenser (.00125 mfd.)	5886
(10)	Resistor (10,000 ohms)	33-1000	(55)	Power Transformer	32-7216
(11)	Condenser (.0007 mfd.)	5863	(56)	Condenser (.01 mfd.)	30-4051
(12)	Padder (Pri. 1st I. F. Tran.)		(57)	Condenser (4-8 mfd.)	30-2072
(13)	Oscillator Transformer	32-1333	(58)	"B" Choke	32-7215
(14)	3rd Padder (in tun. cond.)		(59)	R. F. Choke	32-1281
(15)	1st I. F. Transformer	32-1329	(60)	Resistor (32,000 ohms)	3525
(16)	Padder (Sec. 1st I. F. Tran.)		(61)	Resistor (25,000 ohms)	33-1013
(17)	Condenser (.03 mfd.)	30-4025	(62)	Tone Control	30-4180
(18)	Resistor (1500 ohms)	33-3047	(63)	Condenser (.00005 mfd.)	30-1029
(19)	Condenser (.05 mfd.)	30-4020	(64)	Condenser (.00005 mfd.)	30-1029
(20)	Resistor (1,000,000 ohms)	33-1096	(65)	"A" Choke	32-1374
(21)	Condenser (.05 mfd.)	30-4020	(66)	Condenser (1 mfd)	30-4122
(22)	Padder (Pri. 2nd I. F. Tran.)			Spark Plug Resistor	33-1015
(23)	2nd I. F. Transformer	32-1237		Distributor Resistor	33-1113E
(24)	Padder (Sec. 2nd I. F. Tran.)			Interference Condenser	30-4007
(25)	Condenser (.00025 mfd.)	30-1032		Nuts (mounting)	W55A
(25)	Condenser (.00011 mfd.)	30-1031		Battery Cable	38-5296
(26)	Resistor (25,000 ohms)	33-1013		Acorn Nut	W821
(27)	Vol. Con. & Switch Assm.	38-5534		Fuse	7227
(28)	Condenser (.006 mfd.)	30-4125		Fuse Insulator	27-7131
(29)	Resistor (2,000,000 ohms)	33-1025		Studs	28-6036
(30)	Resistor (5000 ohms)	6096		Bracket	6035
(31)	Condenser (.25 mfd.)	30-4146		Strap	04344
(32)	Resistor (32,000 ohms)	3525		Strap Pad	6206
(33)	Condenser (.00025 mfd.)	3082		Knob	27-4058
(34)	Condenser (.25 mfd.)	04360		Glass	27-7325
(35)	Resistor (100,000 ohms)	6099		Gasket (for glass)	27-7509
(36)	Resistor (500,000 ohms)	6097		Pointer	28-1957
(37)	Condenser (.006 mfd.)	30-4125		Face Assembly	42-5189
(38)	Condenser (.10 mfd.)	30-2072		Control Housing Cover	29-7064
(39)	Resistor (500 ohms)	33-3031		Control Unit Assembly	42-5184
(40)	Condenser (.006 mfd.)	30-4024		Shaft	28-8206
(41)	Output Transformer	32-7214		Antenna Lead	38-5771
(42)	Cone & Voice Coil	36-3157		4-Prong Socket	27-6006
(43)	Field Coil Assembly	36-3046		5-Prong Socket	27-6014
(44)	Pilot Lamp	34-2031		6-Prong Socket	6417C
(45)	Resistor (7 ohms)	33-3035			

PHILCO RADIO & TELEV. CORP.

MODEL 800(Code 122)
Schematic
Chassis, Parts List

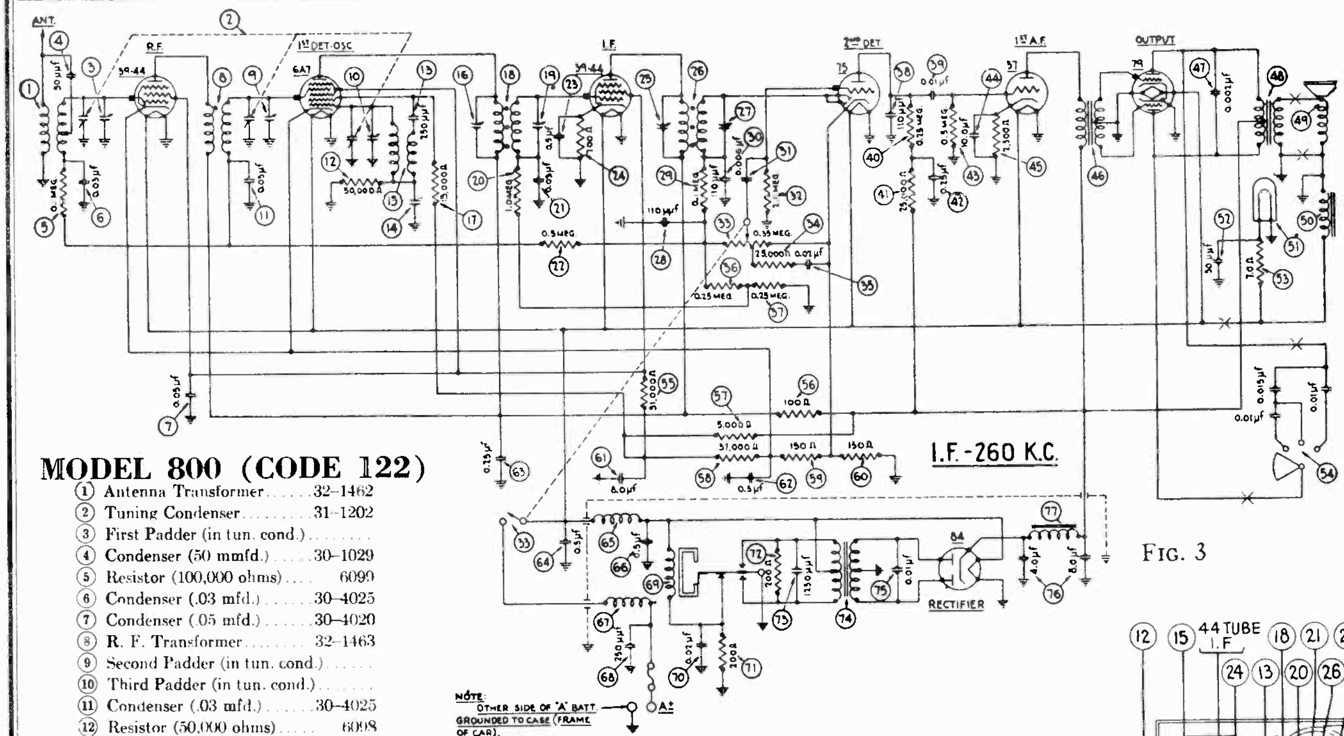


FIG. 3

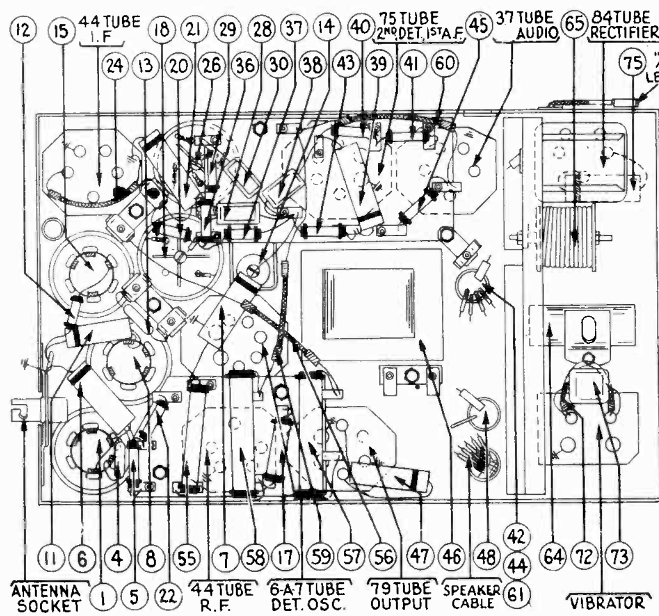


FIG. 4

MODEL 800 (CODE 122)

1	Antenna Transformer	32-1462
2	Tuning Condenser	31-1202
3	First Padder (in tun. cond.)	
4	Condenser (50 mmfd.)	30-1029
5	Resistor (100,000 ohms)	6099
6	Condenser (.03 mfd.)	30-4025
7	Condenser (.05 mfd.)	30-4020
8	R. F. Transformer	32-1463
9	Second Padder (in tun. cond.)	
10	Third Padder (in tun. cond.)	
11	Condenser (.03 mfd.)	30-4025
12	Resistor (50,000 ohms)	6098
13	Condenser (250 mmfd.)	30-1032
14	Padder	30-6012
15	Oscillator Transformer	32-1222
16	Padder (Pri. 1st I. F. trans.)	
17	Resistor (15,000 ohms)	6208
18	First I. F. Transformer	32-1471
19	Padder (Sec. 1st I. F. trans.)	
20	Resistor (1,000,000 ohms)	33-1096
21	Condenser (.03 mfd.)	30-4025
22	Resistor (500,000 ohms)	6097
23	Condenser (.5 mfd.)	30-4058
24	Resistor (700 ohms)	6443
25	Padder (Pri. 2nd I. F. trans.)	
26	Second I. F. Transformer	32-1449
27	Padder (Sec. 2nd I. F. trans.)	
28	Condenser (110 mmfd.)	30-1031
29	Resistor (100,000 ohms)	6099
30	Condenser (110 mmfd.)	30-1031
31	Condenser (.006 mfd.)	30-4125
32	Resistor (2,000,000 ohms)	33-1025
33	Volume control & switch assembly	38-5851
34	Resistor (25,000 ohms)	33-1013
35	Condenser (.02 mfd.)	30-4215
36	Resistor (250,000 ohms)	33-1097
37	Resistor (250,000 ohms)	33-1097
38	Condenser (110 mmfd.)	30-1031
39	Condenser (.01 mfd.)	30-4145
40	Resistor (250,000 ohms)	33-1097
41	Resistor (25,000 ohms)	33-1013
42	Condenser (.25 mfd.)	30-4135
43	Resistor (500,000 ohms)	6097
44	Condenser (10 mfd.)	30-4135
45	Resistor (2500 ohms)	33-1100
46	Input Transformer	32-7206
47	Condenser (.002 mfd.)	30-4177
48	Output Transformer	32-7205
49	Cone & Voice Coil	36-3159
50	Field Coil Assembly	02795
51	Pilot Lamp	34-2039
52	Condenser (50 mmfd.)	30-1029
53	Resistor (7 ohms)	33-3130
54	Tone Control	30-4220
55	Resistor (51,000 ohms)	4237
56	Resistor (100 ohms)	33-3023
57	Resistor (5000 ohms)	33-1070
58	Resistor (37,000 ohms)	33-1098
59	Resistor (150 ohms)	33-3045
60	Resistor (150 ohms)	33-3045
61	Condenser (8 mfd.)	30-4135
62	Condenser (.5 mfd.)	30-4018
63	Condenser (.25 mfd.)	30-4134
64	Condenser (.5 mfd.)	30-4015
65	Vibrator Choke	32-1474
66	Condenser (.5 mfd.)	30-4047
67	"A" Choke	32-1493
68	Condenser (250 mmfd.)	32-1493
69	Vibrator	38-5036
70	Condenser (.02 mfd.)	30-4039
71	Resistor (200 ohms)	7217
72	Resistor (200 ohms)	7217
73	Condenser (1250 mmfd.)	5886
74	Power Transformer	32-7098
75	Condenser (.01 mfd.)	30-4051
76	Filter Condenser (4-8 mfd.)	30-2015
77	"B" Choke	32-7104
	Spark Plug Resistors	33-1015
	Distributor Resistor	33-1113E
	Screw Type Resistor	4851
	Interference Condenser	30-4007
	Studs	28-6036
	Nuts (Mounting)	W55A
	Battery Cable	38-5296
	Antenna Lead	38-5131
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27-7131
	Control Assembly	42-5185
	Bracket	6035
	Strap	04344
	Knob	27-4058
	Knob Spring	28-1738
	Glass	27-7325
	Glass Gasket	27-7509
	Pointer	28-1957
	Shaft	28-8206
	Face Assembly	42-5191
	Cover	29-7064
	4-prong Socket	27-6006
	5-prong Socket	27-6014
	6-prong Socket	27-6020
	7-prong Socket	27-6005
	Auto Radio Lock Switch	42-1076

MODEL 800(Code 122)
Alignment Data
Socket Layout

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 800 (Code 122).

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1471 for the first I. F. stage and 32-1449 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

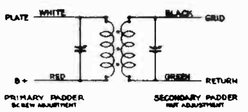


FIG. 1

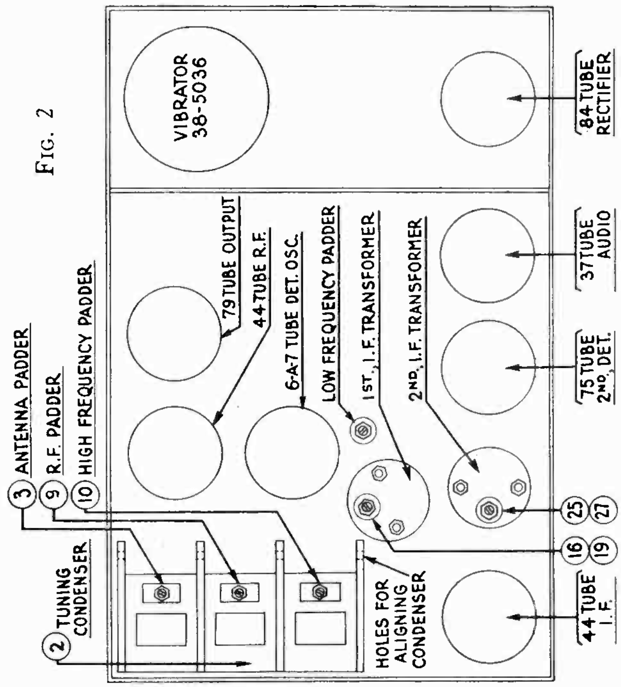


FIG. 2

MODEL 800 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube, grounding the shield. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders 25 and 27 are adjusted first (Figs. 2 and 3). Turn the adjusting screw 25 all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut 27 with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw 25 for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the first I. F. condensers, 16 and 19.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder 10 until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

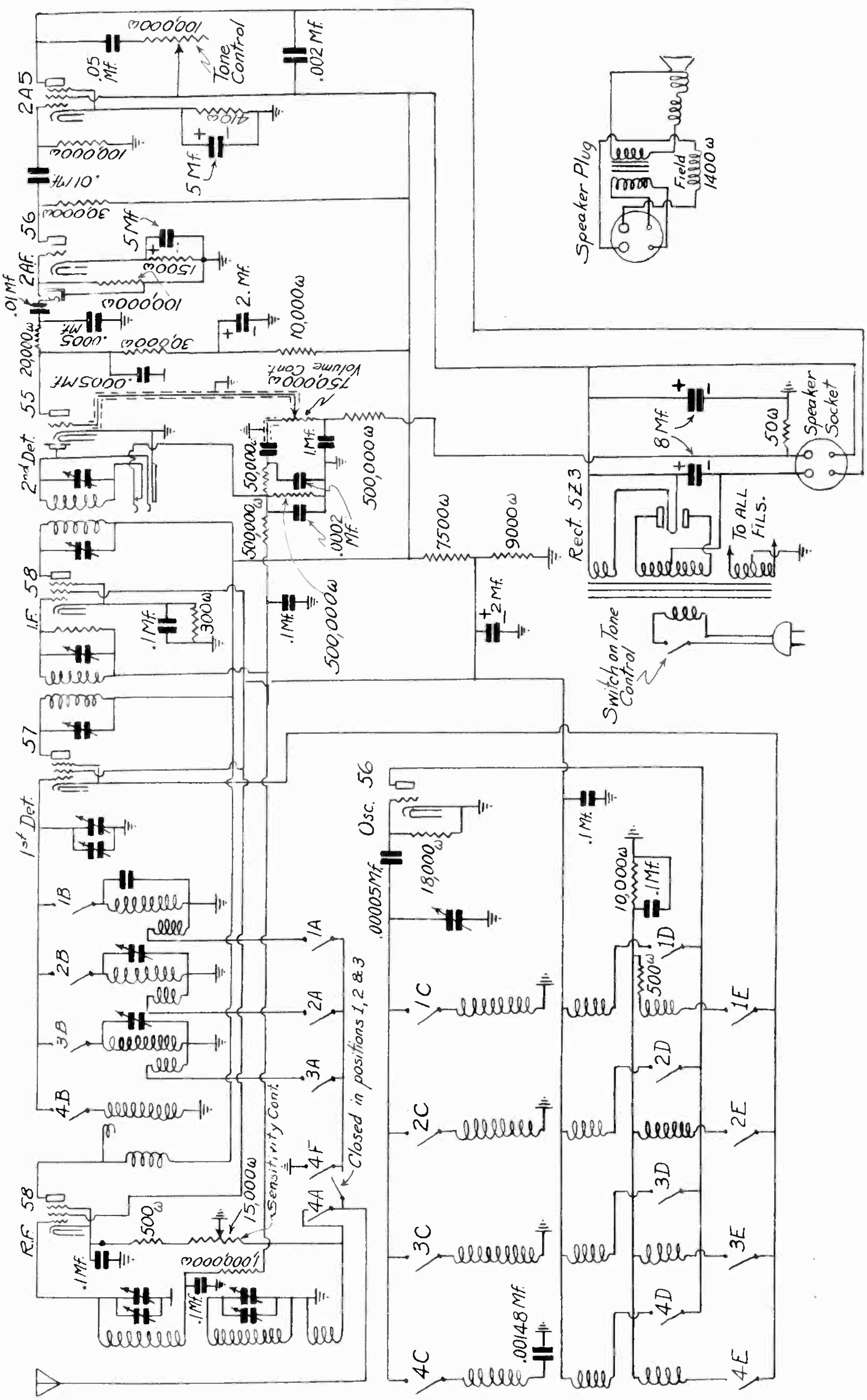
Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder 9 and the antenna padder 3 are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder 14 for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

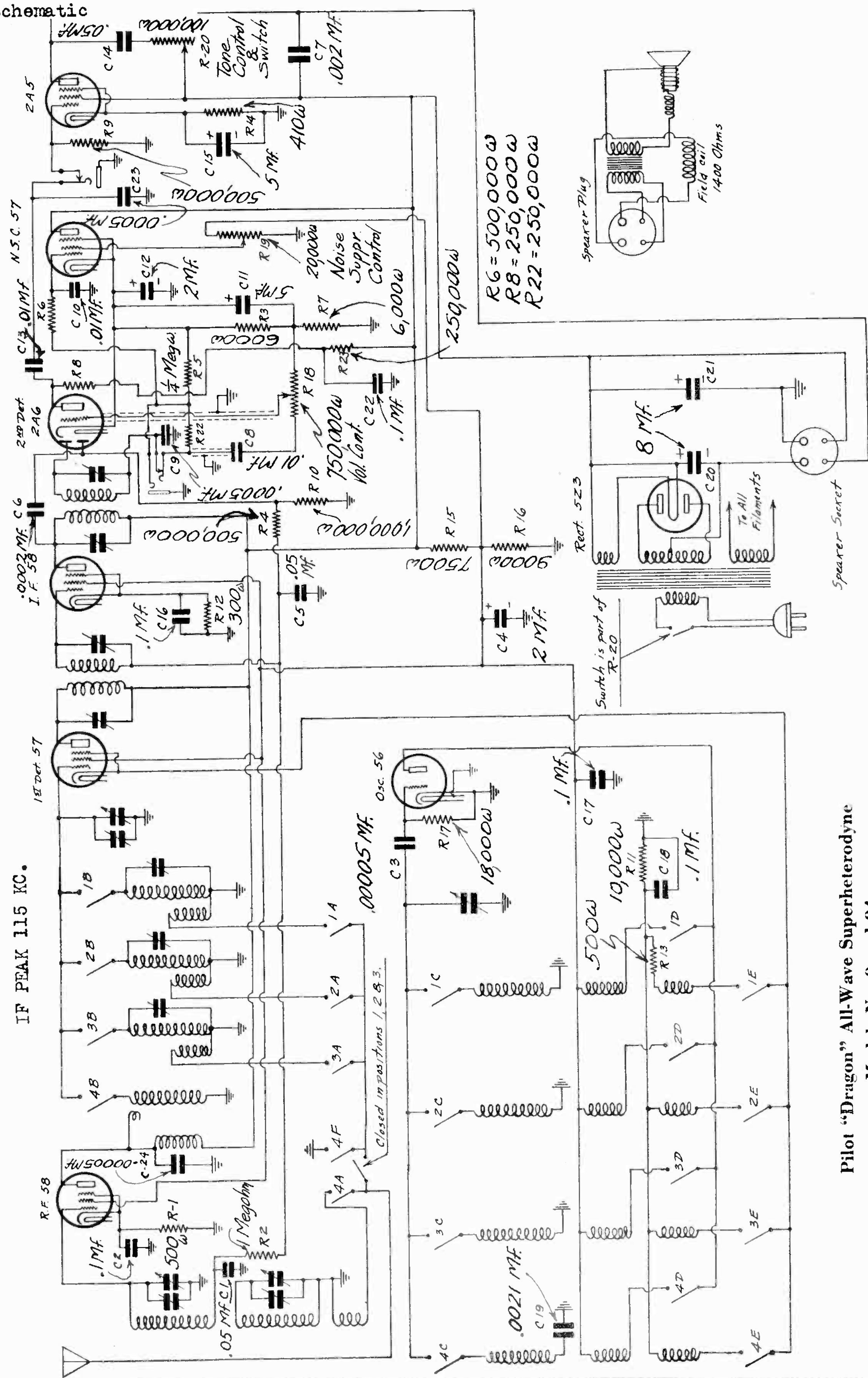
MODEL L-8
(8-Tube Dragon)
Schematic

PILOT RADIO CO. (New Co.)



MODEL 8,84,7,81
(Dragon A-W. Super)
Schematic

PILOT RADIO CO. (New Co.)



IF PEAK 115 KC.

Pilot "Dragon" All-Wave Superheterodyne
Models No. 8 and 84

NOTE: In Models No. 7 and No. 81 the schematic diagram is identical except for the short-wave coil circuit.

Operating voltages .... 115, 125, 150, 220, 240, volts. Alternating Current.
Frequency rating .... 45 to 60 cycles.
Power consumption .... 75 watts.

PILOT RADIO CO. (New Co.)

MODEL 8,84,7,81
(Dragon A-W. Super)
Alignment Data

REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet proceed as follows: Be certain that the line cord is not plugged in the power outlet socket. Dismount the Noise Suppression Control from the side of the cabinet. Remove the "slip-on" knobs and felt washers from the controls located at the front of the receiver.

Unfasten the four 10/32 mounting screws which support the chassis in the cabinet. They are located underneath the cabinet, one at each corner.

Remove the speaker plug from its socket at the rear of the chassis.

ADJUSTMENT OF ALIGNMENT CAPACITORS

At the factory the receiver is carefully adjusted and aligned, and precautions are taken to maintain the accuracy of the adjustment. However, should the receiver ever require realignment the following procedure should be observed. In Fig. 2 the location and description of the various alignment capacitators are clearly illustrated. An External modulated oscillator with a frequency range sufficient to cover the requirements of the receiver should be used for obtaining best results.

Before connecting the chassis to the power line, reconnect the loudspeaker cable in its socket at the rear of the chassis. When aligning the Intermediate Amplifier the external oscillator must be set at 115 kilocycles which is the I.F. frequency of the receiver. The Frequency Range Selector Switch should be in the position marked B.C. when aligning the I.F. amplifier and the Broadcast range. For the various short wave ranges its position should correspond with aligning frequency selected from the external oscillator. Connect the antenna lead from the external oscillator to the control grid of the No. 58 tube in the I.F. amplifier stage. The alignment capacitators for the I.F. are located at top of the shielded I.F. transformers. When adjusting these units it is advisable to insulate the metal blade of the screwdriver so that short circuiting the B plus to the chassis will be avoided. Slowly rotate the adjusting screws of each of the capacitors until maximum output is noted in the loudspeaker output circuit. Use an output meter if one is available as a visual indication is likely to be more accurate than the audible method. With the completion of this operation, remove the external oscillator leads from the No. 58 I.F. amplifier tube and connect them in the same manner to the control grid of the No. 57 1st Detector tube. In a similar manner rotate each adjustor screw for maximum audio response in the speaker circuit.

CAUTION: Do not readjust the I.F. stage employing the No. 58 tube, when the external oscillator leads are connected to the No. 57 1st Detector control grid.

After the I.F. Amplifier has been completely realigned remove the external oscillator leads from control grid of the No. 57 tube and connect them to the Antenna and the Ground leads of the receiver. The BLACK wire at the rear of the chassis is the antenna connection; the YELLOW lead is for the ground. Set the frequency of the external oscillator at 1400 kilocycles. Rotate the "FREQUENCY SELECTOR DIAL" to a position where the "shadow line indicator" of the dial light is in a position coincident with the 1400 kilocycle calibration of the dial scale. Adjust the oscillator trimmer of the broadcast range (See Fig. 2) until resonance is indicated by maximum audio response in the speaker output circuit. Proceed next to the 1st Detector alignment capacitor which is located on the top of the gang condenser section of that circuit. The same procedure is followed in aligning the R.F. amplifier and the Preselector stages, the alignment capacitors of which are located also on top of their respective sections of the gang condenser. The correct positions are clearly illustrated in Fig. 2.

ALIGNMENT OF THE SHORT WAVE RANGES

Each of the Short Wave ranges has a separate aligning capacitor in its heterodyne circuit. The alignment frequencies for the various short wave ranges are:

Range No. 3 .... 3700 kilocycles
Range No. 2 .... 8600 kilocycles
Range No. 1 .... 15,000 kilocycles

The antenna and ground leads of the external oscillator should be connected to the black and yellow wires respectively of the receiver. Adjust the external oscillator to the required frequency for the short wave range being aligned. Rotate the "frequency selector dial" until the signal is noted in the audio output. Turn the tuning condenser slowly from the left to right in the vicinity of the signal, at the same time adjusting the alignment capacitor until the maximum signal response is noted in the loudspeaker output circuit. The signal voltage of the external oscillator should always be held constant while making alignment adjustments. The same alignment procedure should be followed on all of the short wave ranges.

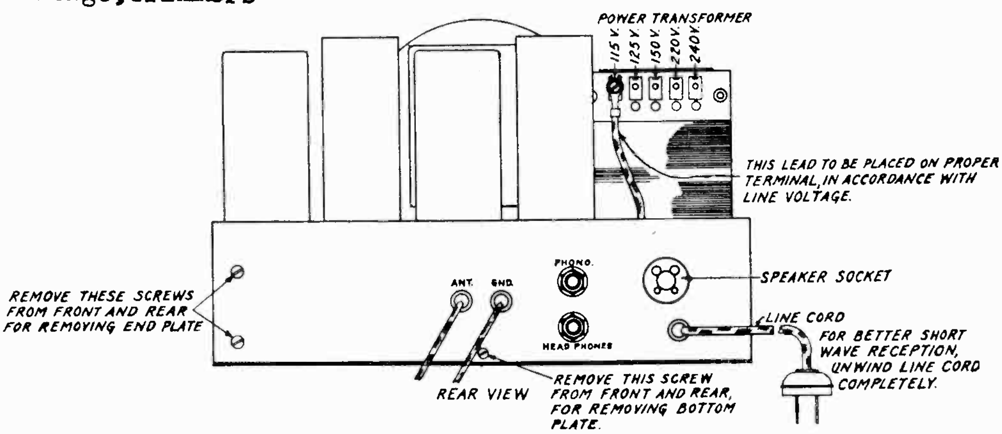
REMOVAL OF FREQUENCY RANGE SELECTOR SWITCH ASSEMBLY

When removing this assembly great care must be exercised by the operator to avoid scratching or marking the coils. Remove the bottom plate and the side plate from the chassis. It is advisable to first unsolder the leads connecting the assembly to the main chassis. Remove the four 8/32 nuts which support the assembly in the chassis. The switch assembly is then ready for removal.

In replacing the switch assembly the same precautions must be observed to avoid damage to the coils. Refasten the assembly firmly in the mounting provided for it. Resolder all connections well. Use only ROSIN CORE SOLDER. DO NOT USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE. Replace the bottom plate and the side plate. It is advisable to realign the receiver after the replacement of the assembly is completed.

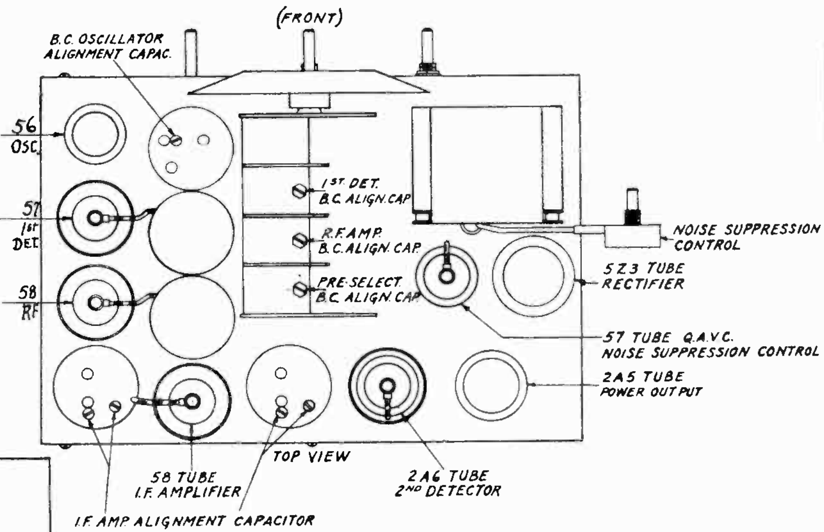
MODEL 8,84,7,81
(Dragon A-W. Super)
Socket Layout
Voltage,Trimmers

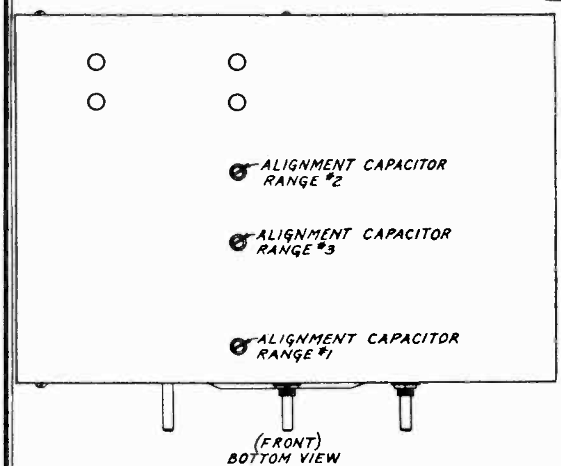
PILOT RADIO CO. (New Co.)



POWER SUPPLY

The operating voltage of the receiver is indicated on the label at the rear of the chassis. In the PILOT "DRAGON" receiver a special type of "universal" power transformer is used. Its design permits the receiver to be used on line voltages of 115, 125, 150, 220, or 240 volts ALTERNATING CURRENT from forty-five to sixty cycles. At the factory the transformer is connected for operation on voltages existing in the location where the receiver is to be used. If doubt exists regarding the voltage of the electric power in your locality consult the power company for advice. When certain that the receiver is connected for the proper operating voltage then plug in the line cord to the nearest outlet.





Frequency coverage of Range Selector Switch positions.

Position BC	540—1500	kilocycles	555—200 metres
3	1500—3900	kilocycles	200—77. metres
2	3900—9000	kilocycles	77.—33.4 metres
1	9000—21,400	kilocycles	33.4—14. metres

Intermediate Frequency 115 kc. The use of this frequency provides a very favorable degree of sensitivity and selectivity.

*The D.C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 Ohms per volt.

Voltages measured at the tube socket

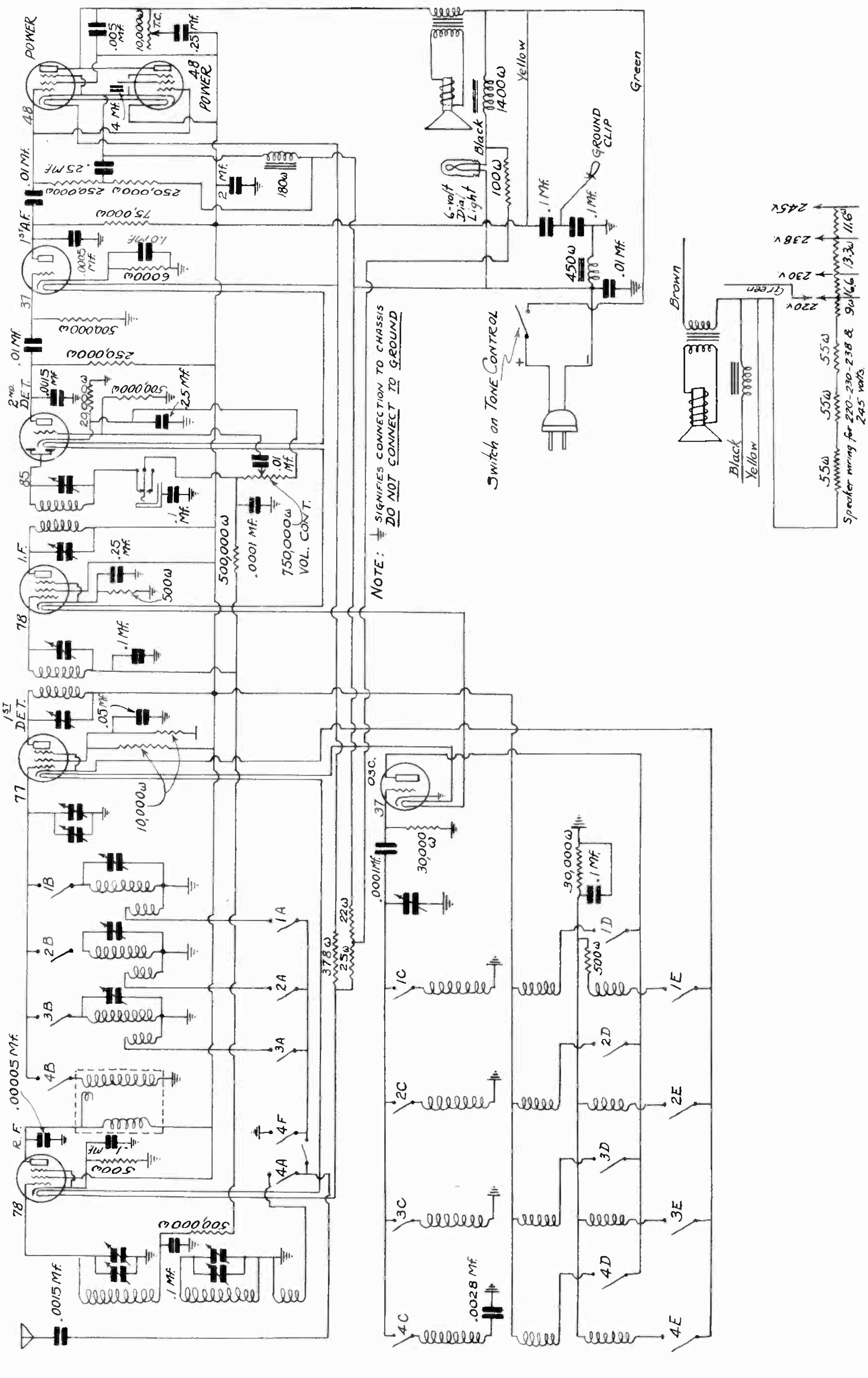
	R.F.	Osc.	1st Det.	Int. Amp.	2nd Det.	Pwr Pentode	Rectifier	N.S.C.
	58	56	57	58	2A6	2A5	5Z3	57
Plate	235	85	230	230	*88	205	335	235
Cathode	3	—	5	2	2	14	—	2
Screen	82	—	80	83	—	220	—	0 to 83
Filament	2.4	2.4	2.4	2.4	2.4	2.4	2.4	4.8

All plate voltages measured to cathode. Screen voltages measured to cathode.

All cathode voltages measured to chassis frame. Measurement at the 5Z3 tube made from filament to center tap of power transformer high voltage center tap. Speaker Field Voltage 100 V.

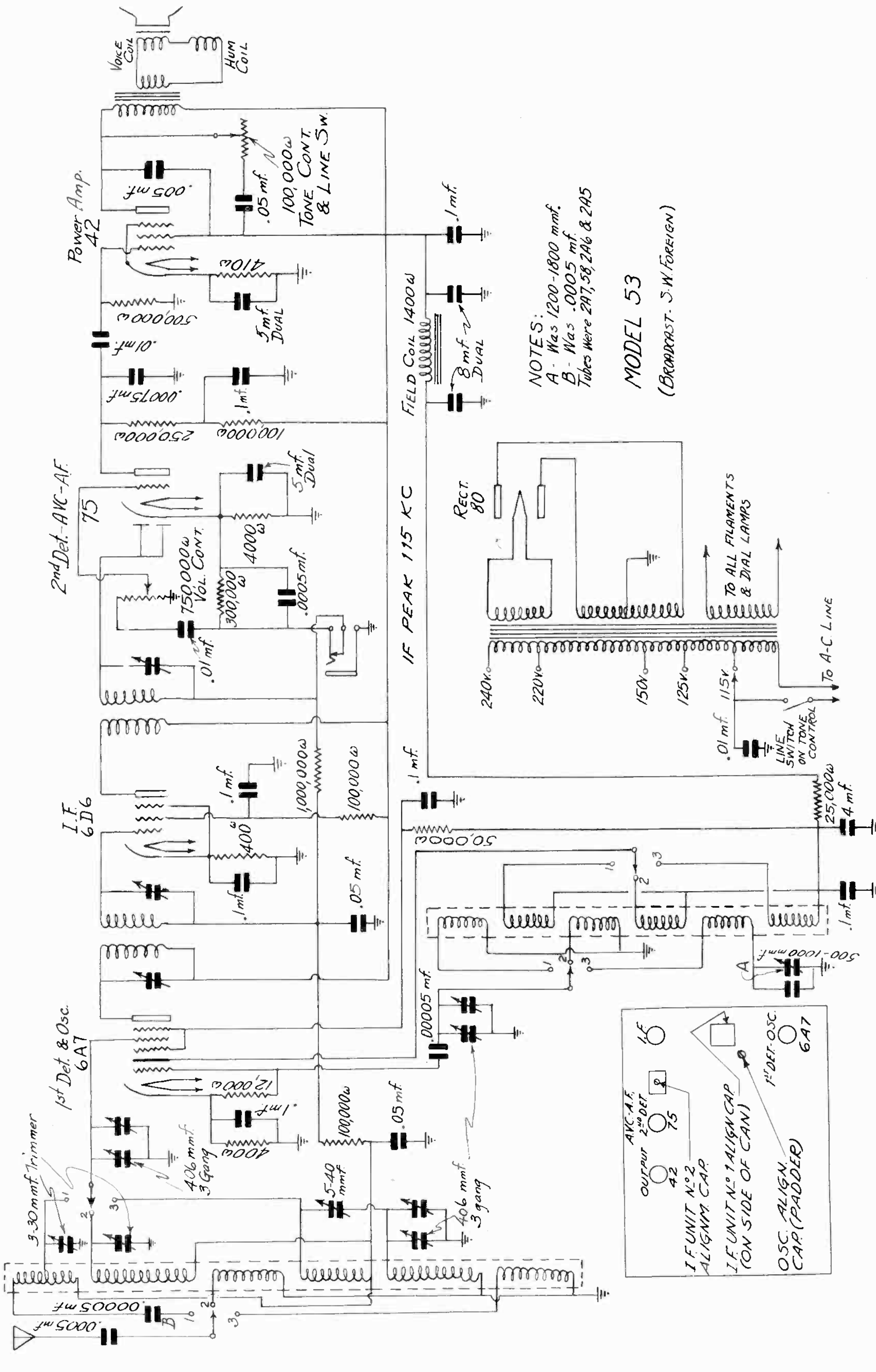
MODEL 28
Schematic

PILOT RADIO CO. (New Co.)



MODEL 53
Schematic
Socket Layout

PILOT RADIO CO. (New Co.)



MODELS 53 and 55
Alignment Data

PILOT RADIO & TUBE CORP.

ALIGNMENT OF INTERMEDIATE-FREQUENCY AMPLIFIER:

The I-F. peak frequency is 115 kc. Remove the chassis from the cabinet. To do this remove the slip-on knobs from the controls at the front of the receiver. Next remove the four screws which hold the chassis to the base of the cabinet. Set the signal generator at 115 kc. Connect the ground lead of the signal generator to the chassis of the receiver. Place the fixed condenser in series with the antenna lead from the signal generator (approximately .002 mf.) and connect the antenna lead to the control grid of the 6A7 tube. Adjust the intermediate-frequency capacitors of the I-F. unit No.1 and No.2 for maximum sensitivity. It is advisable to make these adjustments at least twice. Use a low input from the signal generator when aligning the receiver in order that greater accuracy may be obtained.

BROADCAST BAND ALIGNMENT:

Connect the antenna and ground leads of the signal generator to the antenna and ground leads of the chassis. Use a dummy antenna in place of the .002 mf. condenser, if one be available. Set the frequency range switch of the receiver in the broadcast position. Set the signal generator at 1400 kc. Rotate the tuning condenser of the receiver until the compass dial pointer coincides with the 1400 kc. calibration mark on the dial scale. Adjust the oscillator trimmer on the gang condenser until resonance is indicated in the loudspeaker circuit. Next adjust the heterodyne stage and preselector stage for maximum sensitivity. Next set the signal generator at a frequnecy of 1630 kc. Adjust the image suppression circuit condenser for minimum signal response, as noted in the loudspeaker circuit. When adjusting the image suppression condenser, a strong R-F. signal should be applied to the receiver. Again set the signal generator to 1400 kc. and adjust the oscillator, heterodyne stage and preselector trimmer condensers for maximum sensitivity. Next, set the signal generator at 600 kc. and rotate the tuning condenser on the chassis until resonance is noted in the loudspeaker output circuit. Adjust the 600 kc. alignment capacitor (padder) at the same time, slowly rocking the gang condenser to the right or left for maximum sensitivity. Again, set the signal generator at 1400 kc. Rotate the tuning condenser on the chassis until the compass dial pointer coincides with the 1400 kc. calibration mark on the dial scale. Readjust the oscillator, the heterodyne stage and the preselector circuit trimmer on the gang condenser. for maximum sensitivity. Check the sensitivity of the receiver at 1000 kc. and 600 kc.

SHORT-WAVE BAND No.2 ALIGNMENT:

Set the frequency range switch of the receiver on position Band No.2. Set the signal generator at 6100 kc. (49 meters.) Adjust the Band No.2 alignment capacitor for maximum sensitivity. Set the signal generator at 2400 kc. Check the sensitivity of the receiver at this point also.

SHORT-WAVE BAND No.1 ALIGNMENT:

Set the signal generator at 17,800 kc. (16.85 meters). Rotate the tuning condenser until the signal is noted in the loudspeaker circuit. The compass dial pointer should then be approximately on the 17.8 megacycle mark on the dial scale. Adjust the Band No.1 trimmer for maximum sensitivity. Set the signal generator at 7500 kc. and check the sensitivity of the set at this point.

When making all adjustments, it is advisable to have the volume control and tone control turned on full in a clockwise direction.

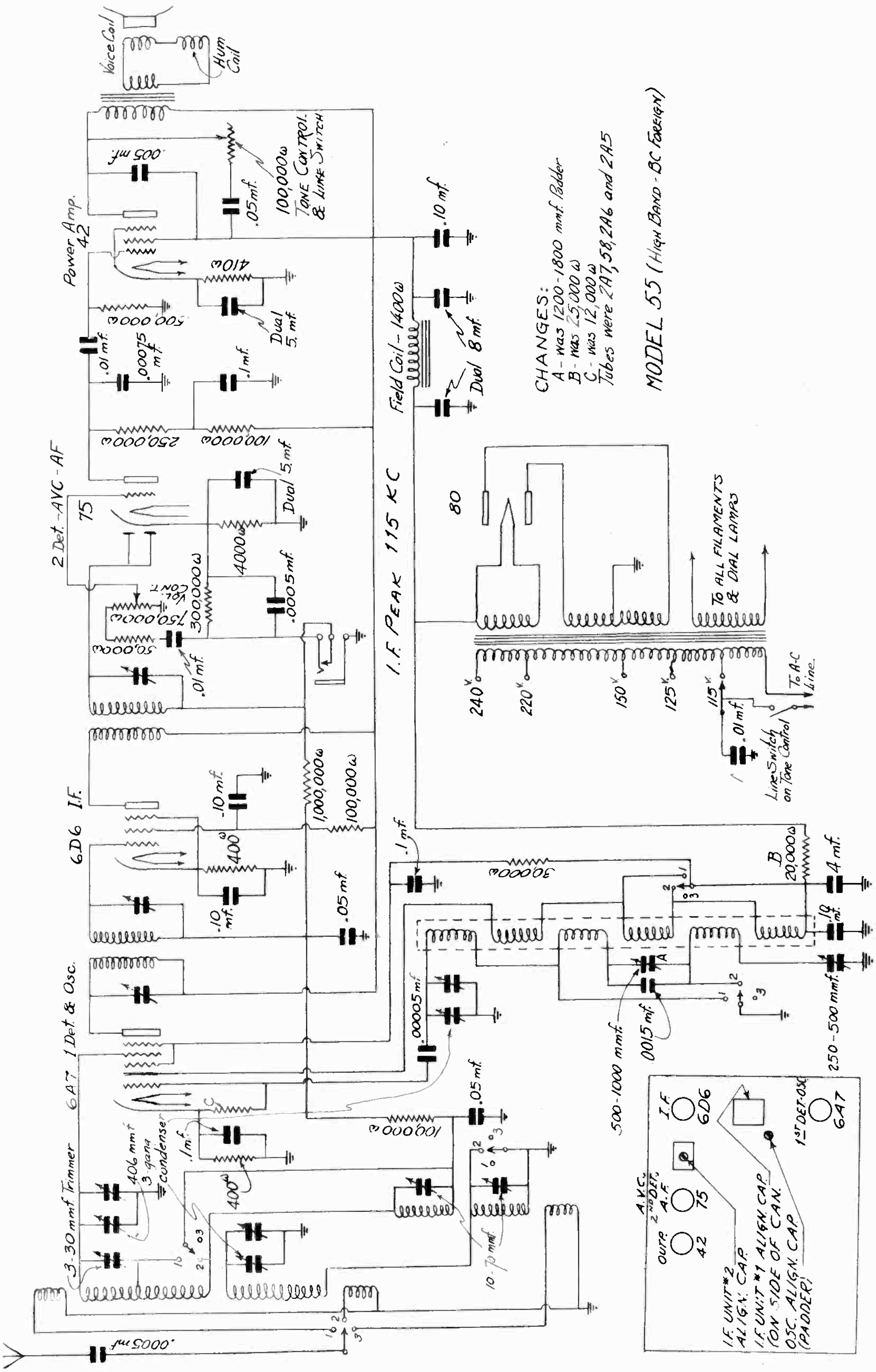
HIGH BAND SECTION ALIGNMENT:

Rotate the frequency range switch to the position marked "High Band". Set the signal generator at 300 kc. Rotate the tuning condenser until the 300 kc. signal is noted in the loudspeaker circuit. The signal should be observed when the dial pointer is on the 1000 meter calibration. Adjust the First Detector and the Preselector circuit alignment capacitors for maximum sensitivity. There is no oscillator capacitor adjustment at 1000 meters.

Set the signal generator at 155 kc. Rotate the tuning condenser until the signal is noted in the loudspeaker circuit at 1930 meters on the dial. Adjust the "High Band" padder condenser for maximum sensitivity. Realign the set at 1000 meters and check the sensitivity at 1500 meters (200 kc.).

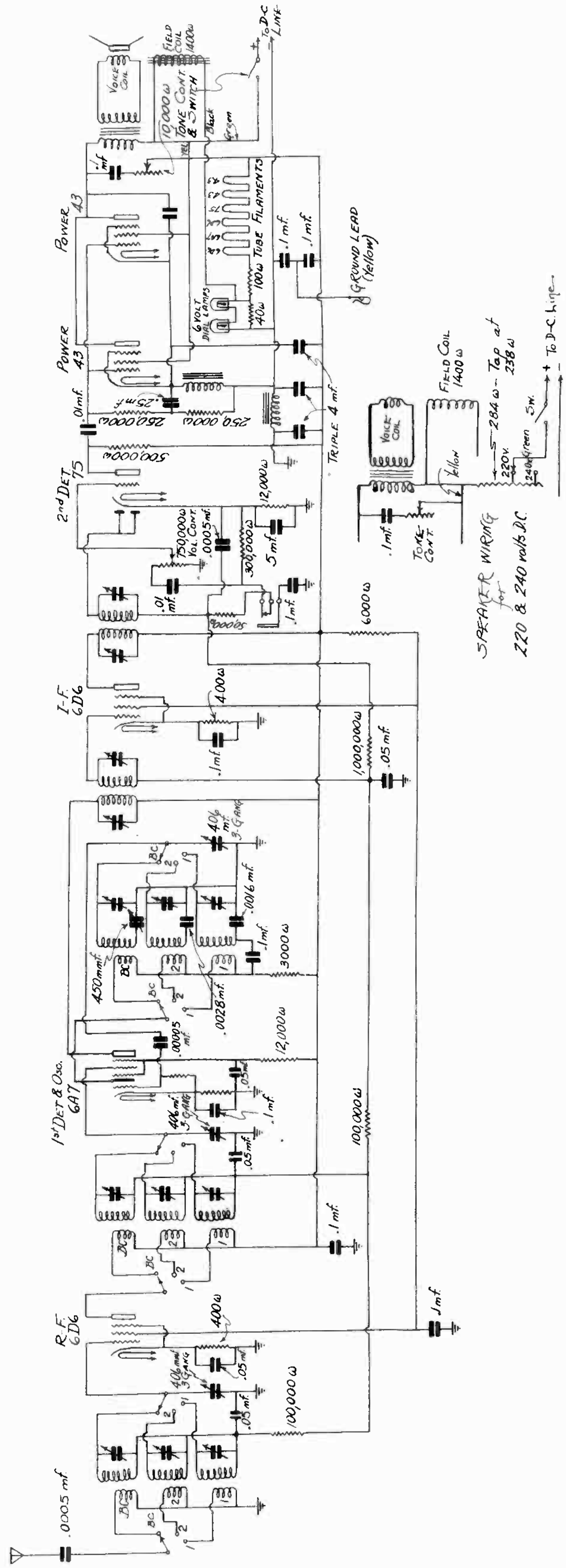
MODEL 55
Schematic
Socket Layout

PILOT RADIO CO. (New Co.)



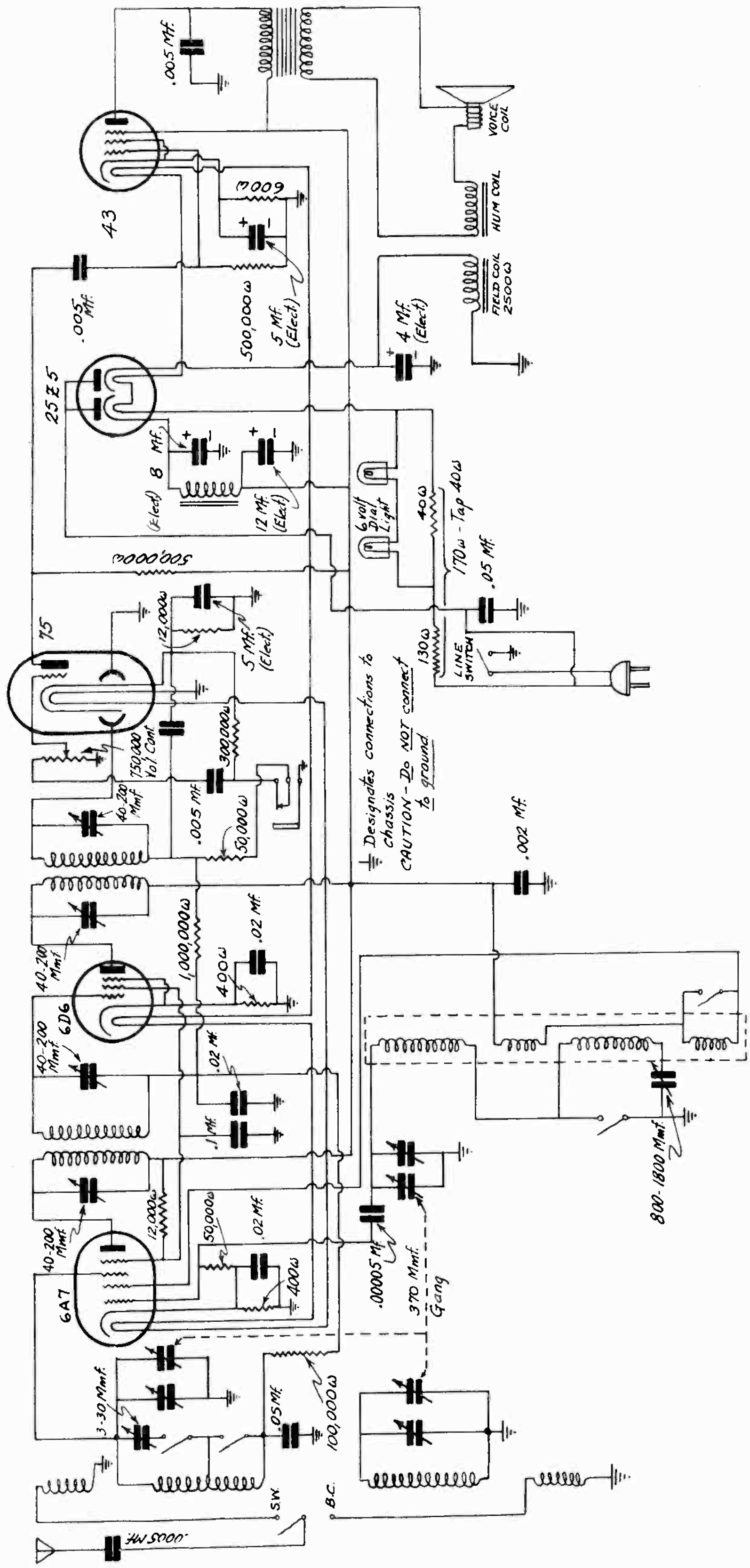
MODEL 68
Schematic

PILOT RADIO CO. (New Co.)



MODEL 93
Schematic

PILOT RADIO CO. (New Co.)



MODEL R-27, Revised
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.

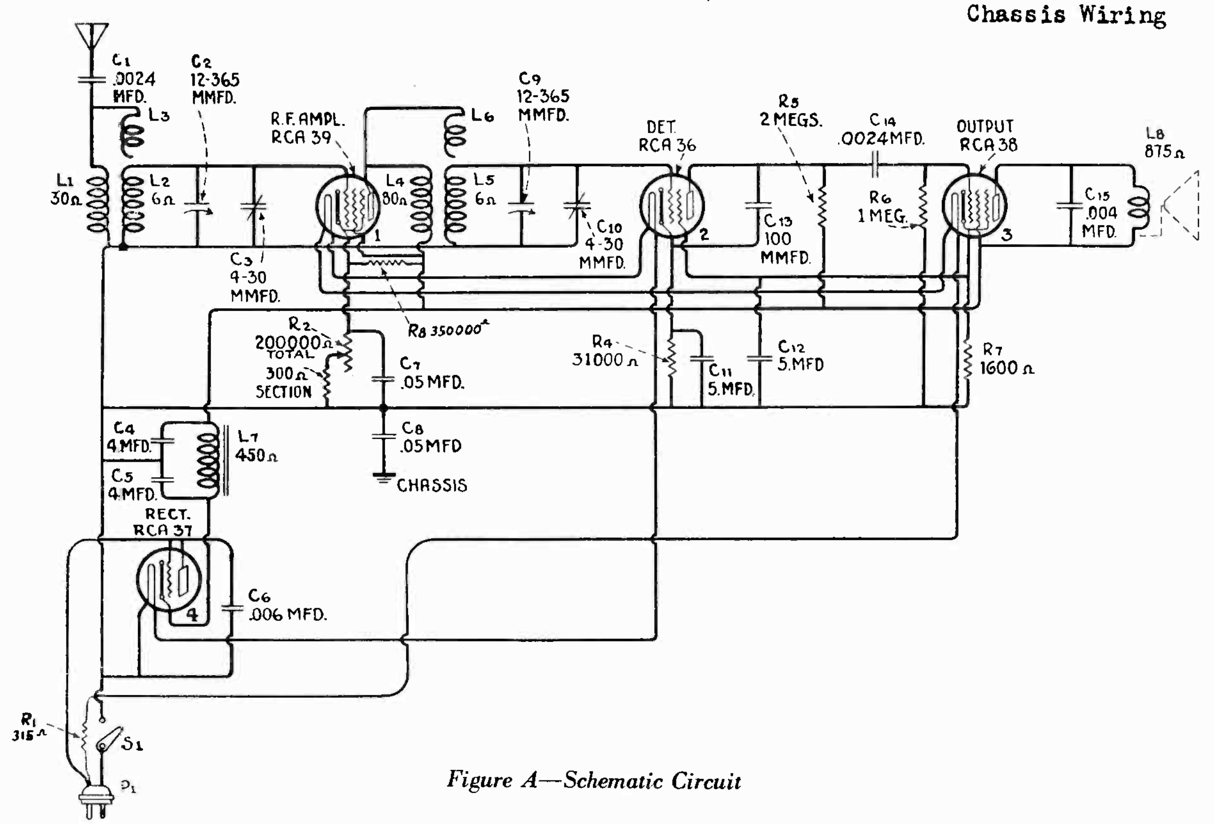


Figure A—Schematic Circuit

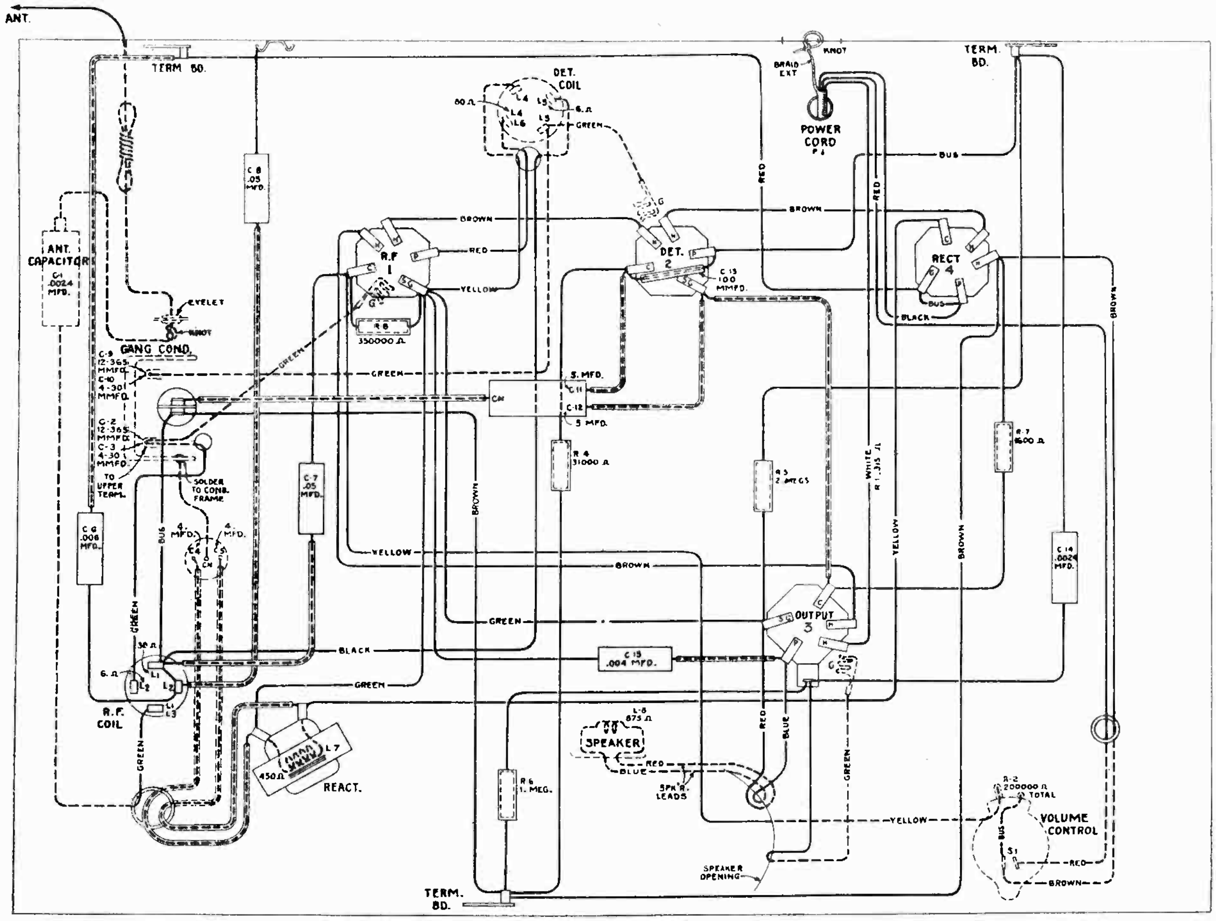


Figure B—Wiring Diagram

MODEL R-27, Revised
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating—
105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption....................40 Watts
Frequency Range...........540 K. C.–1712 K. C.
Type and Number of Radiotrons.......1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation of both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105	105	7.0	6.0
2. RCA-36 Det.	*0.75	11.0	*60	.025	6.0
3. RCA-38 Output	11.0	100	95	5	6.0
4. RCA-37 Rect.	—	—	115	15	6.0

* Impossible to measure on ordinary voltmeter

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3076	Resistor—1 megohm—Carbon type (R6)—Package of 5	$1.00
3537	Reactor—Filter reactor (L7)	1.10
3542	Volume control—Complete with mounting nut (R2, S1)	1.18
3559	Resistor—31,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
3560	Resistor — 1,600 ohms — Carbon type — ½ watt (R7)—Package of 5	1.00
3567	Escutcheon — Station selector escutcheon—Package of 2	.42
3568	Escutcheon — Volume control escutcheon—Package of 2	.42
3569	Knob—Station selector or volume control knob—Package of 5	.65
3713	Capacitor—0.05 mfd. (C7, C8)	.32
3714	Coil—Detector coil (L4, L5, L6)	.98
3715	Coil—R. F. coil complete (L1, L2, L3)	1.08
4007	Capacitor—2,400 mmfd. (C1, C14)	.35
4070	Capacitor—0.004 mfd. (C15)	.42
4071	Capacitor—0.006 mfd. (C6)	$0.42
4073	Resistor—350,000 ohms—Carbon type—½ watt—(R8)—Package of 5	1.00
6188	Resistor—2 megohm—Carbon type—½ watt (R5)—Package of 5	1.00
6451	Condenser—2-gang variable tuning condenser (C2, C3, C9, C10)	2.04
6819	Resistor—Filament resistor—Power cord—315 ohms (R1)	1.00
6844	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors (C11, C12)	1.10
6845	Capacitor—Filter capacitor—Two 4.0 mfd. (C4, C5)	1.18
7484	Socket—Radiotron socket—5-contact	.35
10820	Capacitor—100 mmfd. (C13)	.40
	LOUDSPEAKER ASSEMBLIES—MAGNETIC TYPE	
7594	Cone—Speaker cone—Package of 5	5.00
7595	Support—Cone support	.60
7596	Mechanism—Speaker mechanism complete with magnet (L8)	3.00
9426	Loudspeaker complete	4.38

RCA-VICTOR CO., INC.

MODEL R-28-BW
Schematic
Chassis Wiring

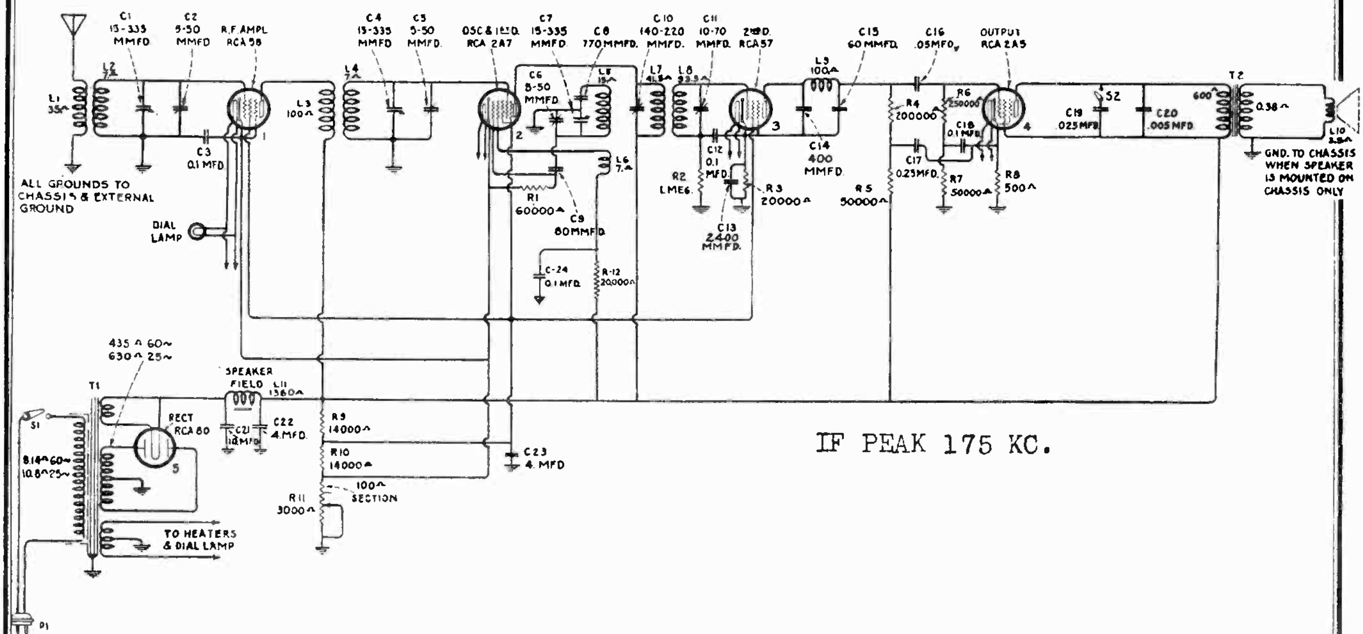


Figure 1—Schematic Circuit Diagram

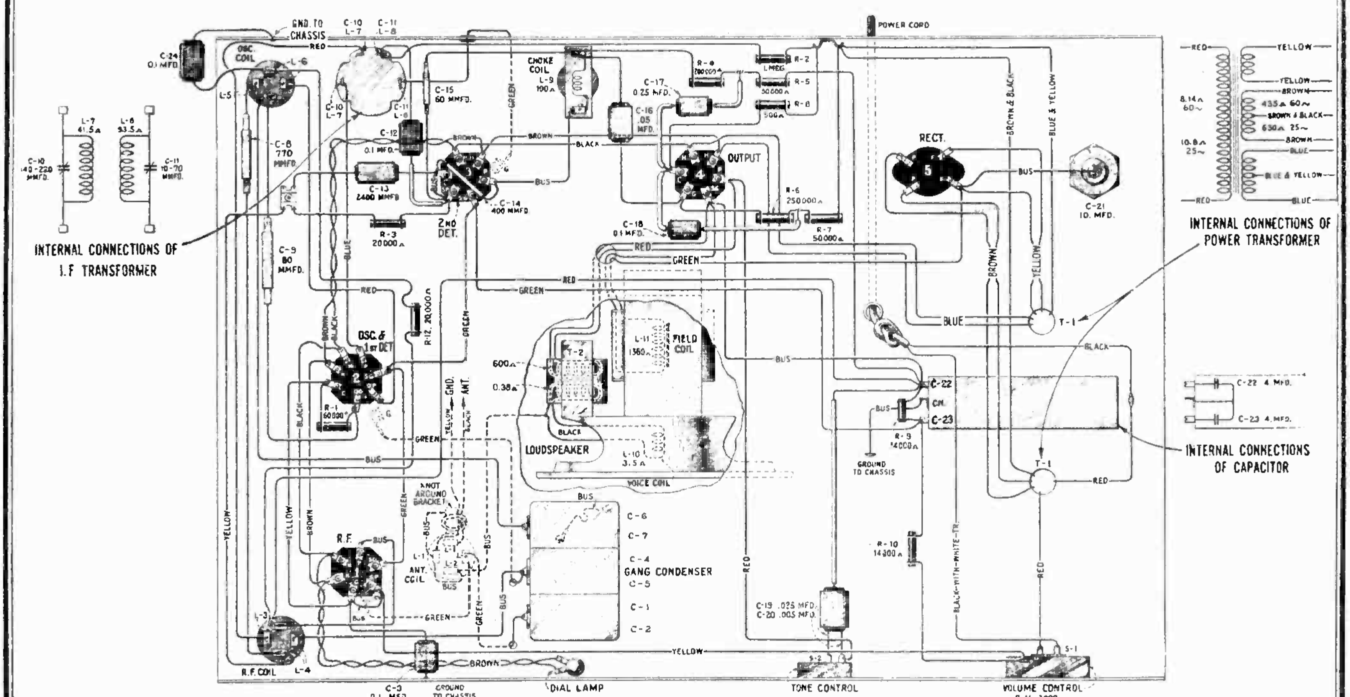


Figure 2—Wiring Diagram

MODEL R-28-BW
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating .... 105–125 Volts
Frequency Rating .... 25–40 Cycles and 50–60 Cycles
Power Consumption .... 70 Watts
Number and Types of Radiotrons .... 1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5
Undistorted Output .... 1.75 Watts
Frequency Range .... 540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	725 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2749	Capacitor—2,400 mmfd.	1.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.60
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3586	Scale—Dial scale	.50
3587	Socket—Dial lamp socket and bracket	.32
3588	Volume control—Complete with mounting nut	1.40
3589	Switch—Tone control switch	.54
3592	Knob—Station selector, operating switch or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3601	Coil—Choke coil	.68
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3604	Capacitor—400 mmfd.	.30
3605	Capacitor—770 mmfd.	$0.30
3606	Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors	.40
6143	Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5	2.00
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	2.50
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	2.50
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	2.50
6443	Capacitor—10 mfd.	1.50
6464	Transformer—I. F. transformer	1.88
6470	Coil—Antenna coil	1.08
6471	Coil—Oscillator coil assembly	.74
6472	Coil—R. F. coil assembly	.94
7485	Socket—Radiotron 6 contact socket	.70
7487	Shield—Radiotron tube shield	.50
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7592	Condenser—3 gang variable tuning condenser	3.35
8985	Transformer—Power transformer—105-125 volts—50-60 cycles	4.26
8986	Transformer — Power transformer — 200-250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105-125 volts—25-50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9004	Coil assembly—Comprising field coil, magnet and cone support	2.35

RCA-VICTOR CO., INC.

MODEL R-28-BWC
Schematic
Chassis Wiring

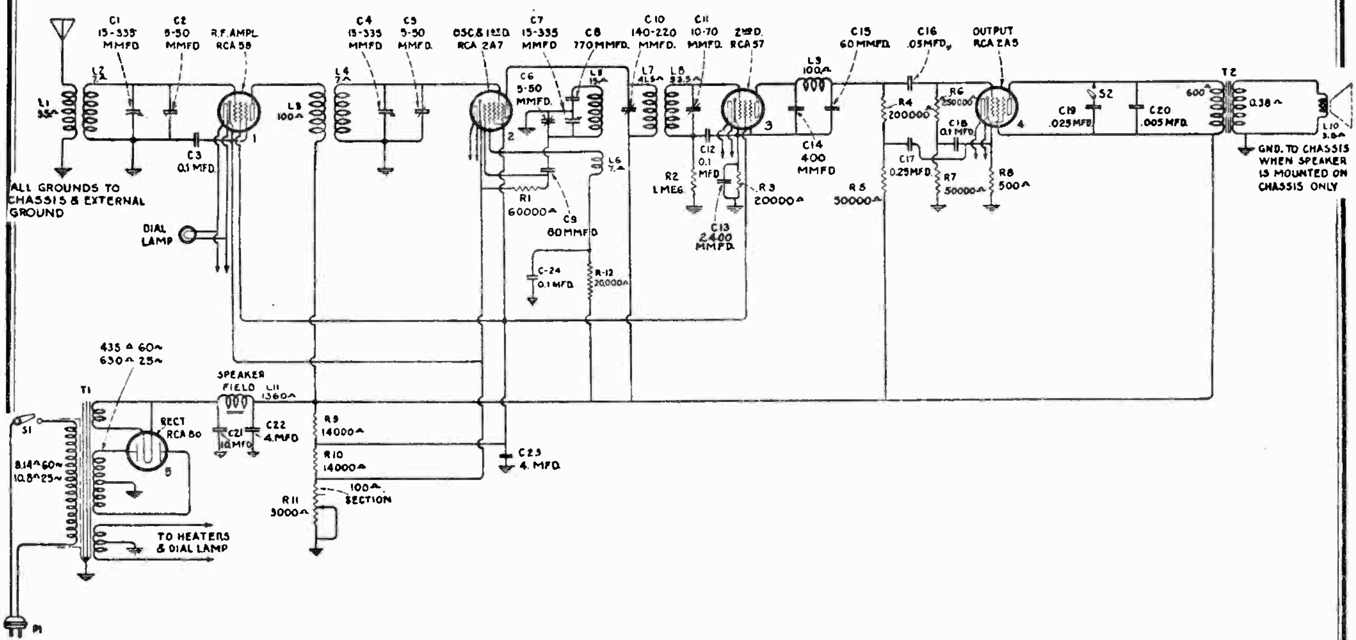


Figure 1—Schematic Circuit Diagram—Note—Sign lamps are connected across R. F. heater

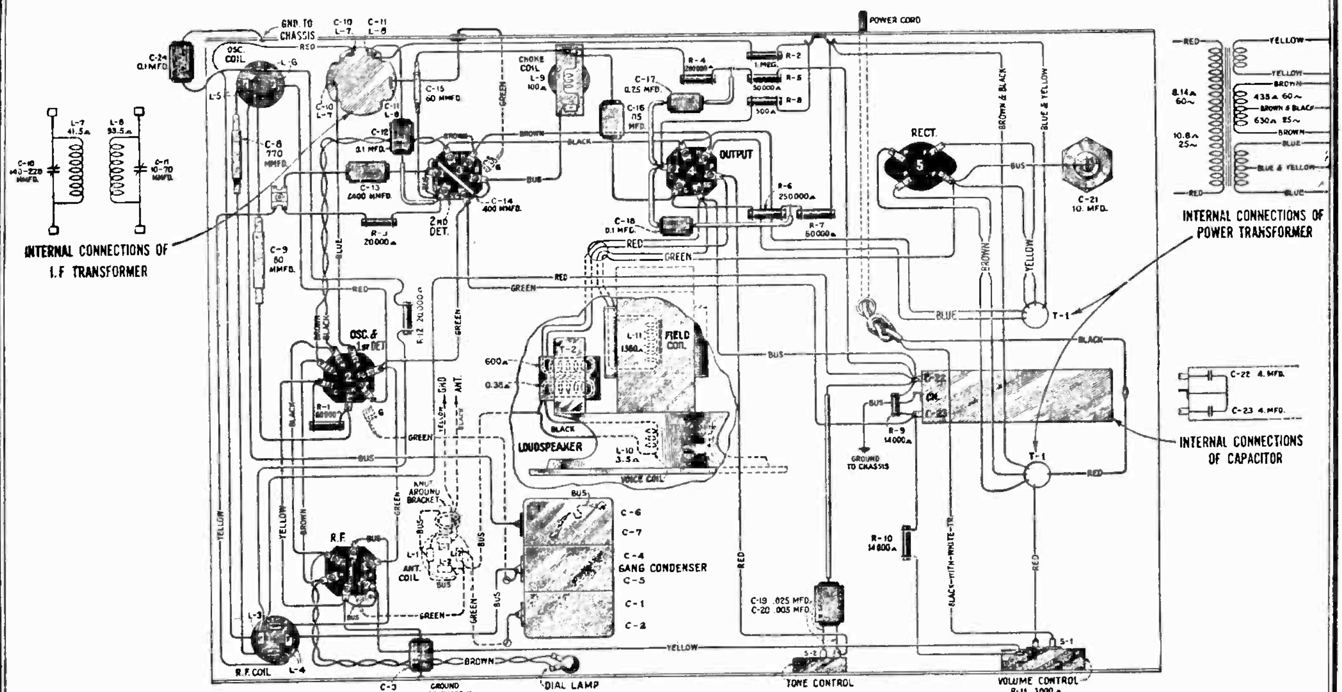


Figure 2—Wiring Diagram—Note—Speaker is not mounted on chassis and sign lamps are connected to R. F. heater

MODEL R-28-BWC
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating .... 115 Volts

Frequency Rating .... 25–40 Cycles and 50–60 Cycles

Power Consumption .... 70 Watts

Number and Types of Radiotrons .... 1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5

Undistorted Output .... 1.75 Watts

Frequency Range .... 540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker, two-point tone control, single heater type Pentode Output and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	725 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

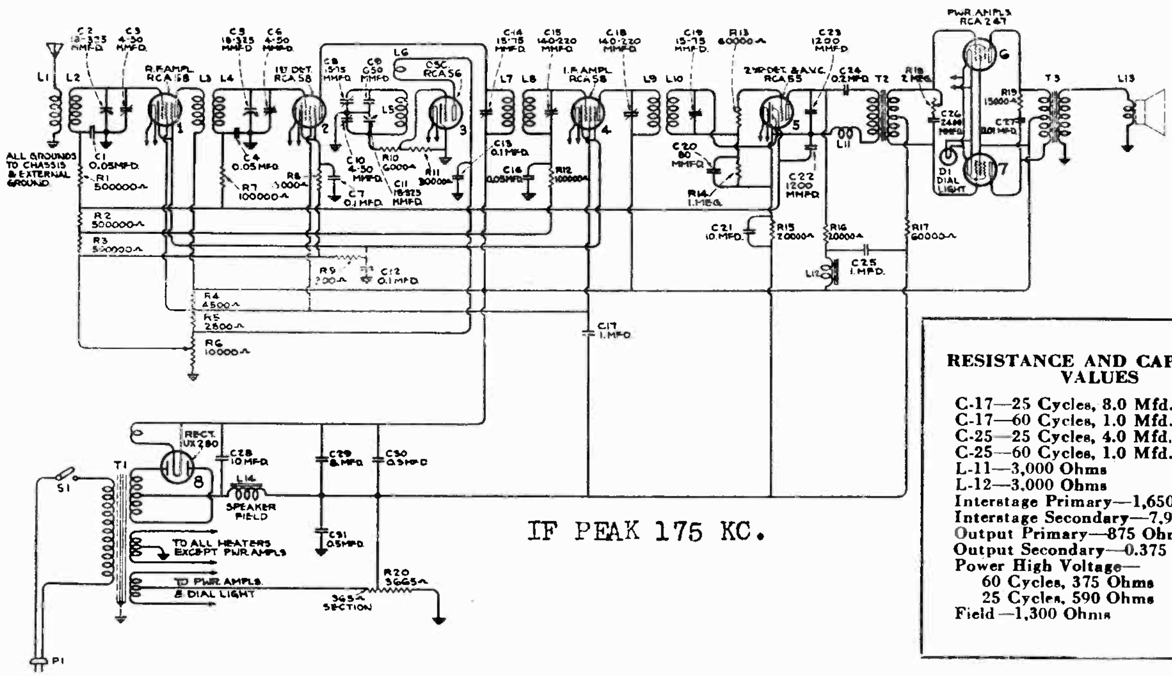
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2747	Contact cap—Package of 5	.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3588	Volume control—Complete with mounting nut	1.40
3589	Switch—Tone control switch	.54
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3602	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3604	Capacitor—400 mmfd.	.30
3605	Capacitor—770 mmfd.	.30
3606	Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors	.40
3623	Shield—Antenna or R. F. Coil Shield	.30
3624	Socket—Lamp socket and bracket—Located behind aperture wings	.40
3739	Knob—Station selector or volume control knob—Package of 5	$0.80
3740	Knob—Operating switch knob—Package of 5	.75
3741	Escutcheon—Station selector escutcheon	.30
3742	Screen—Ivory colored screen—Located behind front panel covering aperture "wings"—Package of 2	.54
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6470	Coil—Antenna coil	1.08
6471	Coil—Oscillator coil assembly	.74
6472	Coil—R. F. coil assembly	.94
6473	Scale—Dial scale	.50
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7589	Capacitor—Filter capacitor—Two 4. 0 mfd. in container	1.64
7590	Capacitor—10 mfd.	1.40
7592	Condenser—3 gang variable tuning condenser	3.35
8986	Transformer — Power transformer — 200-250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105-125 volts—25-50 cycles	6.00
9025	Transformer—Power transformer—105-125 volts—50-60 cycles	4.26
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9004	Coil assembly—Comprising field coil, magnet and cone support	2.35

MODEL R-73
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.



RESISTANCE AND CAPACITOR VALUES

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
60 Cycles, 375 Ohms
25 Cycles, 590 Ohms
Field—1,300 Ohms

Figure 3—Schematic Circuit

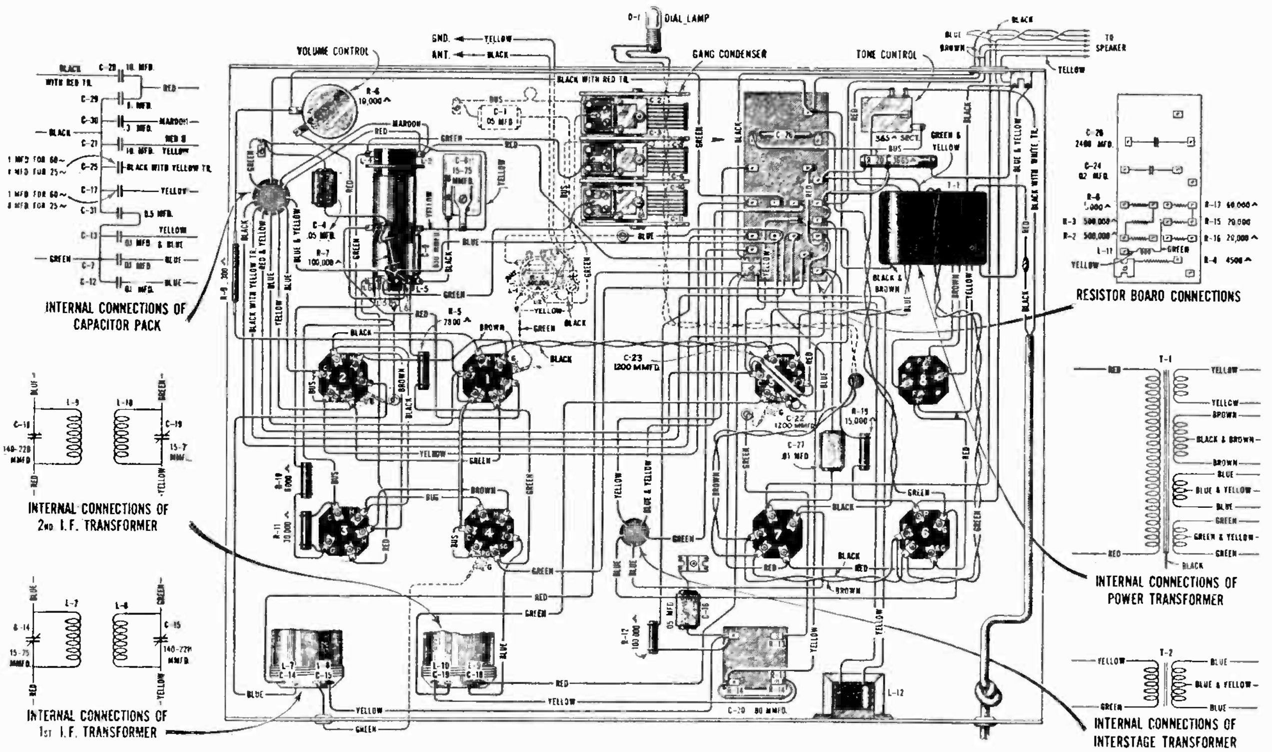


Figure 4—Chassis Wiring Diagram

MODEL R-73
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption..........................100 Watts
Type and Number of Radiotrons......3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit.......................Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output...............................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency.......................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Push-Pull Pentode Output. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

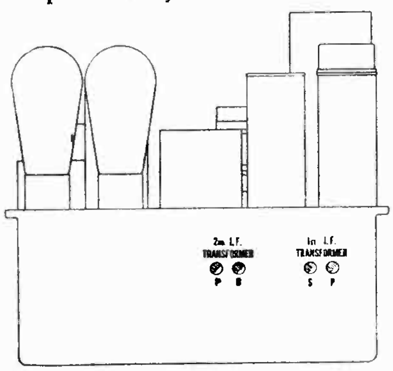


Figure 5—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure 5 for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

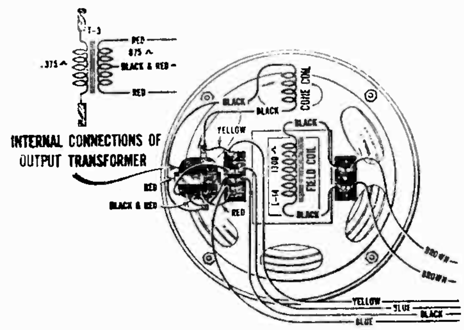


Figure 6—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. At Maximum and no Signal

Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Oscillator RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. Power RCA-247	19.0	235	225	20.0	2.37
7. Power RCA-247	19.0	235	225	20.0	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field . 105 Volts
Chassis to Low Side of Field.......................90 Volts
Voltage Across Field...........................120 Volts
Rectifier. . 370 Volts R.M.S. Each Plate—80 M.A. Each Plate

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2746	Socket—Dial lamp socket	$0.50
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd. capacitor	1.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.50
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	2.50
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	2.75
3369	Resistor—4,500 ohms—Porcelain type—20 watts	1.00
3437	Knob—Noise suppressor knob	.60
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd. mounted on resistor board	.46
3451	Bracket—Dial lamp bracket and indicator—Package of 2	.38
3455	Capacitor—0.01 mfd.	.44
3456	Capacitor—0.05 mfd.	.44
3457	Resistor — Porcelain type — 3,665 ohms — Tapped at 365 ohms	.78
3458	Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd. capacitor	.44
3460	Capacitor—1,200 mmfd. capacitor	.54
3468	Resistor—300 ohms—Flexible type—Pk. of 5	.60
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	2.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	2.50
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	2.50
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.50
6298	Cord—3 gang variable tuning capacitor drive cord—Package of 5	1.00
6300	Socket—4 contact Radiotron socket	.55
6301	Reactor—Filter reactor	2.00
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	2.50
6308	Coil—R. F. coil complete with mounting bracket	1.90
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	.85
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer — Second intermediate frequency transformer	2.14
6369	Volume control—Complete with mounting nut	1.16
6370	Tone control—Complete with mounting nut	$1.34
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.	1.00
7065	Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers	1.10
7439	Drum—Dial drum with 3 dial mounting nuts	.50
7440	Scale—Dial and dial scale	.75
7481	Coil—Detector and oscillator coil complete with mounting bracket	3.50
7484	Socket—UY type Radiotron socket	.65
7485	Socket—6 contact Radiotron socket	.70
7510	Shield — Radiotron tube shield — Maroon finish	.50
7511	Shield—Radiotron tube shield top—Maroon finish	.50
7549	Transformer—Interstage audio transformer	2.48
7550	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	7.40
7551	Transformer—Power transformer—105–125 volts—50–60 cycles	6.40
7552	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	4.52
7556	Transformer—Power transformer—105–125 volts—25–50 cycles	8.50
7564	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation	7.24
7565	Shield—Radiotron tube shield top—Red	.36
7566	Shield—Radiotron tube shield—Red	.38
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board complete with 3 terminals—Package of 5	.50
6371	Transformer—Output transformer	1.90
8920	Ring—Cone retaining ring	.50
8935	Cone—Reproducer cone complete with voice coil—Package of 5	12.50
9421	Coil assembly—Comprising field coil, magnet and cone support	4.32
	CABINET ASSEMBLIES	
6113	Foot—Cabinet felt foot—Package of 5	
7523	Escutcheon—Station selector escutcheon	
X181	Cabinet—Complete less equipment	
X182	Baffle board and grille cloth	

MODEL R-75 (47s Output)
MODEL R-75 (2A5s Output)
Parts Lists

RCA-VICTOR CO., INC.

MODEL R-75

(2A5 OUTPUT TUBES)

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	2.50
3078	Resistor—10,000 ohms—½ watt—Carbon type—Package of 5	2.50
3241	Resistor—300,000 ohms—Carbon type—½ watt—Package of 5	2.50
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	2.75
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd.	.46
3451	Bracket—Dial lamp bracket and indicator—Package of 2	.38
3455	Capacitor—0.01 mfd.	.44
3453	Resistor—2,800 ohms—Carbon type—½ watt—Package of 5	1.00
3460	Capacitor—1200 mmfd.	.54
3472	Capacitor—0.0024 mfd.	.32
3548	Knob—Noise suppressor knob	.24
3549	Capacitor—400 mmfd.	.34
3550	Resistor—370 ohms—Flexible type—Package of 5	.80
3556	Capacitor—0.05 mfd.	.34
3565	Socket—Dial lamp socket	.50
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	2.00
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	2.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6250	Resistor—4,000 ohms—Carbon type—½ watt—Package of 5	2.00
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	2.50
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	2.50
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.50
6298	Cord—3 gang variabe tuning capacitor drive cord—Package of 5	1.00
6300	Socket—4 contact Radiotron socket	.55
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	2.50
6312	Capacitor—650 mmfd.—Located on detector oscillator coil—Package of 5	2.50
6318	Resistor—10,000 ohms—Porcelain type—20 watt	1.00
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	$0.85
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer—Second intermediate frequency transformer	2.14
6370	Tone control—Complete with mounting nut	1.34
6452	Volume control—Complete with mounting nut	1.40
6453	Rheostat—Noise suppressor rheostat	1.10
6454	Coil—R. F. coil complete with mounting bracket	.90
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.	1.00
7065	Screw driver—Micarta screw driver for I. F., R. F., and oscillator condensers	1.10
7439	Drum—Dial drum with 3 dial mounting nuts	.50
7440	Scale—Dial and dial scale	.75
7481	Coil—Detector and oscillator coil complete with mounting bracket	3.50
7484	Socket—UY type Radiotron socket	.65
7485	Socket—6 contact Radiotron socket	.70
7501	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	5.20
7549	Transformer—Interstage audio transformer	2.48
7582	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., two 1.0 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	8.06
7583	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 4.0 mfd., capacitors in metal container—For 25 cycle operation	10.00
7584	Transformer—Power transformer 105-125 volts—50-60 cycles	5.72
7585	Transformer—Power transformer—105-125 volts—25-50 cycles	9.86
7586	Transformer—Power transformer 200-250 volts—50-60 cycles	5.88
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets	.50
6184	Board—Terminal board complete with 3 terminals	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.50
8969	Cone—Reproducer cone complete with voice coil	6.35
9421	Coil assembly—Comprising field coil, magnet, and cone support	4.32

0556

MODEL R-75

('47 OUTPUT TUBES)

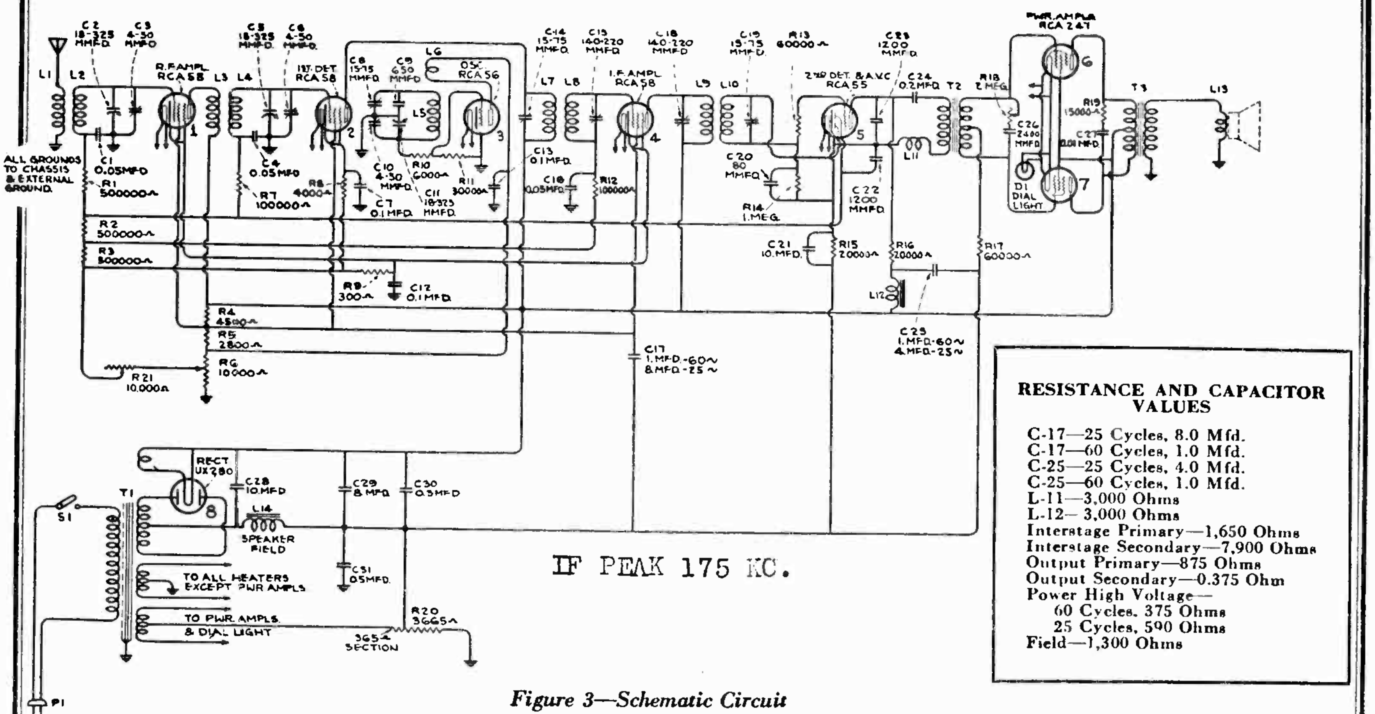
REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2746	Socket—Dial lamp socket	$0.50
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd. capacitor	1.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.50
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	2.50
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	2.75
3369	Resistor—4,500 ohms—Porcelain type—20 watts	1.00
3437	Knob—Noise suppressor knob	.60
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd. mounted on resistor board	.46
3451	Bracket—Dial lamp bracket and indicator—Package of 2	.38
3455	Capacitor—0.01 mfd.	.44
3456	Capacitor—0.05 mfd.	.44
3457	Resistor—Porcelain type—3,665 ohms—Tapped at 365 ohms	.78
3458	Resistor—2,800 ohms—Carbon type—½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd. capacitor	.44
3460	Capacitor—1,200 mmfd. capacitor	.54
3468	Resistor—300 ohms—Flexible type—Pk. of 5	.60
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	2.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	2.50
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	2.50
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.50
6298	Cord—3 gang variable tuning capacitor drive cord—Package of 5	1.00
6300	Socket—4 contact Radiotron socket	.55
6301	Reactor—Filter reactor	2.00
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	2.50
6308	Coil—R. F. coil complete with mounting bracket	1.90
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	.85
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer—Second intermediate frequency transformer	2.14
6369	Volume or noise suppressor control—Complete with mounting nut	1.16
6370	Tone control—Complete with mounting nut	$1.34
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.	1.00
7065	Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers	1.10
7439	Drum—Dial drum with 3 dial mounting nuts	.50
7440	Scale—Dial and dial scale	.75
7481	Coil—Detector and oscillator coil complete with mounting bracket	3.50
7484	Socket—UY type Radiotron socket	.65
7485	Socket—6 contact Radiotron socket	.70
7510	Shield—Radiotron tube shield—Maroon finish	.50
7511	Shield—Radiotron tube shield top—Maroon finish	.50
7549	Transformer—Interstage audio transformer	2.48
7550	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	7.40
7551	Transformer—Power transformer—105-125 volts—50-60 cycles	6.40
7552	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	4.52
7556	Transformer—Power transformer—105-125 volts—25-50 cycles	8.50
7564	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation	7.24
7565	Shield—Radiotron tube shield top—Red	.36
7566	Shield—Radiotron tube shield—Red	.38
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board complete with 3 terminals—Package of 5	.50
6371	Transformer—Output transformer	1.90
8920	Ring—Cone retaining ring	.50
8935	Cone—Reproducer cone complete with voice coil—Package of 5	12.50
9421	Coil assembly—Comprising field coil, magnet and cone support	4.32
	CABINET ASSEMBLIES	
7441	Escutcheon—Station selector escutcheon	
X-174	Cabinet—Complete less equipment	
X-175	Stretcher assembly—Comprising front, side, and back rails	
X-176	Top—Cabinet top	
X-177	Foot—Cabinet foot	
X-178	Leg—Cabinet center leg	
X-179	Panel—Control panel	

RCA-VICTOR CO., INC.

MODEL R-75 (47s Output)
Schematic
Chassis Wiring



RESISTANCE AND CAPACITOR VALUES

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
60 Cycles, 375 Ohms
25 Cycles, 590 Ohms
Field—1,300 Ohms

Figure 3—Schematic Circuit

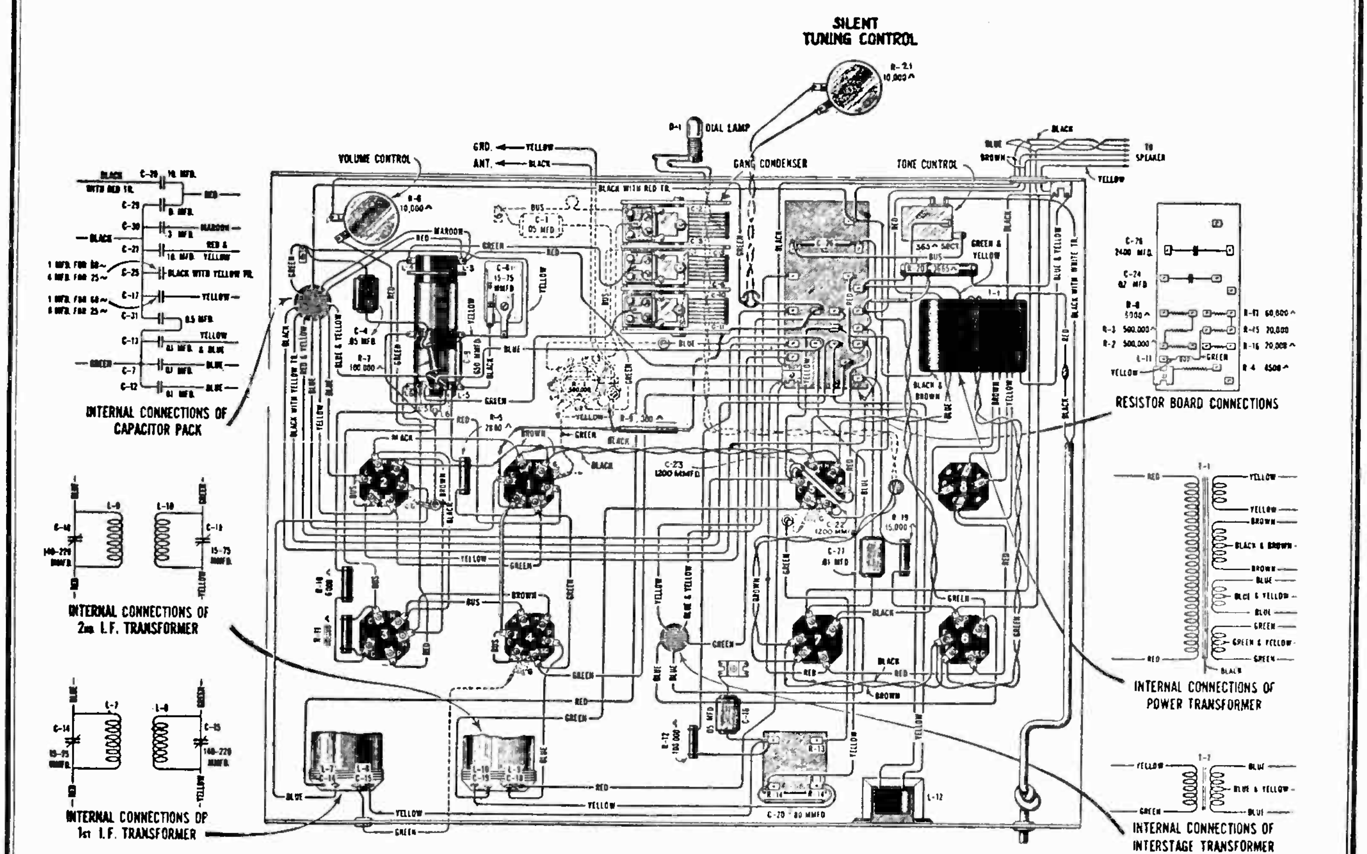


Figure 4—Chassis Wiring Diagram

MODEL R-75 (47s Output)
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating .... 105–125 Volts
Power Consumption .... 100 Watts
Type and Number of Radiotrons ...... 3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit .... Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output .... 3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency .... 175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Push-Pull Pentode Output. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

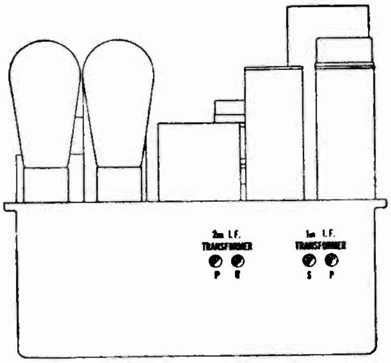


Figure 5—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure 5 for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

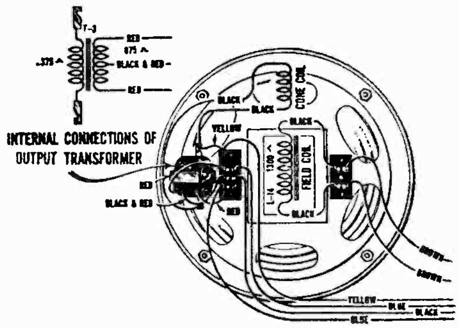


Figure 6—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. At Maximum and No Signal

Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Oscillator RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. Power RCA-247	19.0	235	225	20.0	2.37
7. Power RCA-247	19.0	235	225	20.0	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field . 105 Volts
Chassis to Low Side of Field .... 90 Volts
Voltage Across Field .... 120 Volts
Rectifier . . 370 Volts R.M.S. Each Plate—80 M.A. Each Plate

RCA-VICTOR CO., INC.

MODEL R-75 (2A5s Output)
Schematic
Chassis Wiring

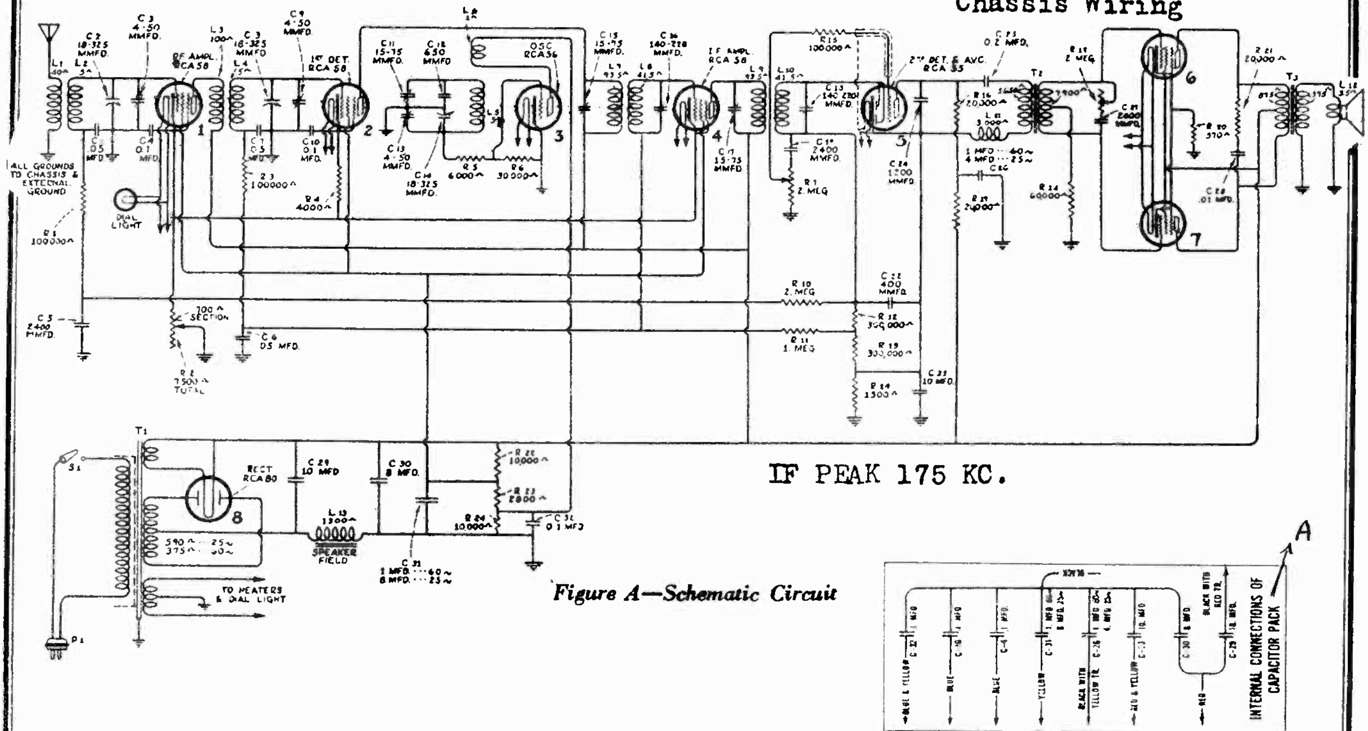


Figure A—Schematic Circuit

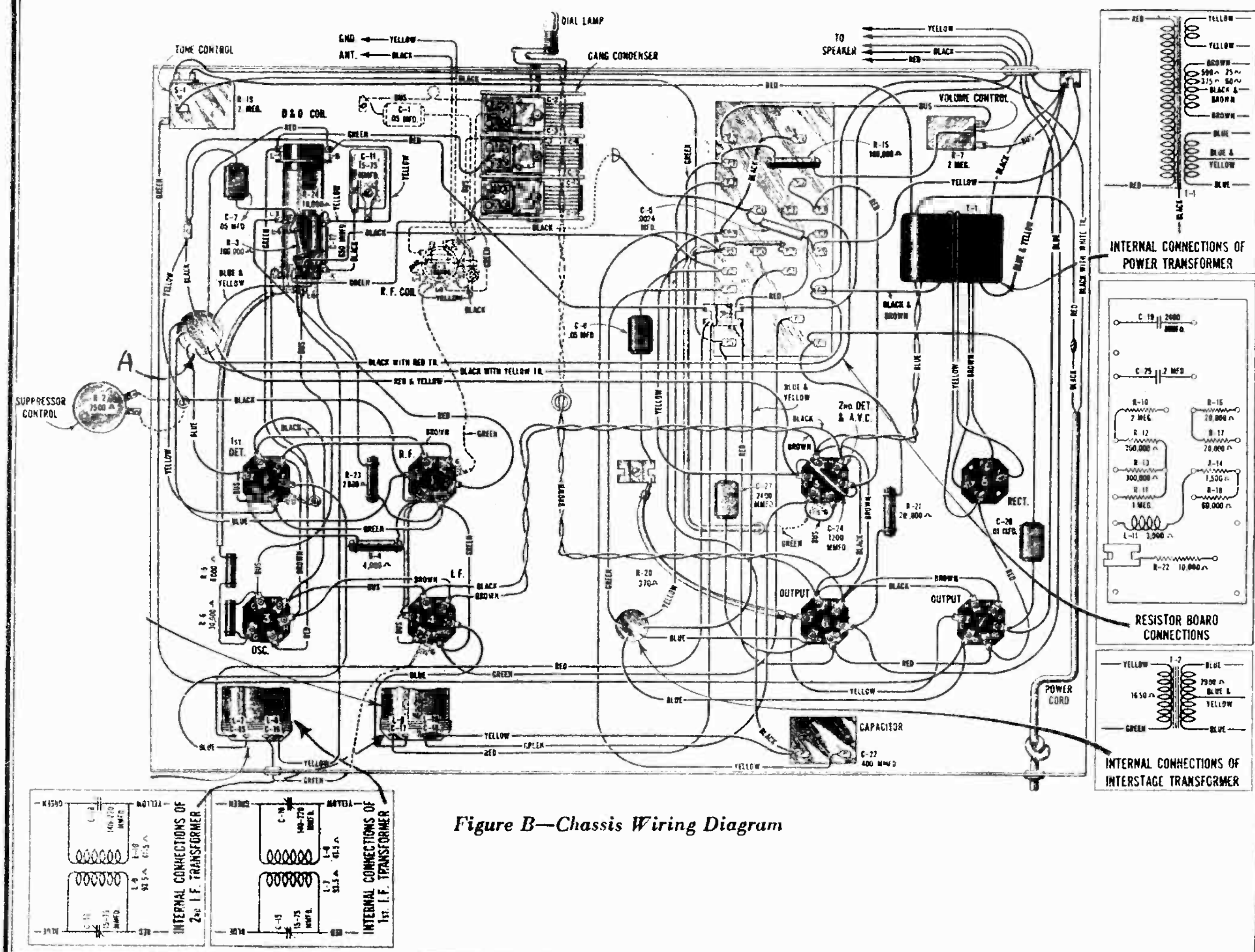


Figure B—Chassis Wiring Diagram

MODEL R-75 (2A5s Output)
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating..........................105–125 Volts
Power Consumption.........................100 Watts
Type and Number of Radiotrons..3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-2A5, 1 UX-280—Total, 8
Type of Circuit..Super-Heterodyne with A.V.C., tone control and push-pull Universal Output Tubes
Undistorted Output............................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C., and 1400 K. C.
Intermediate Frequency......................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Universal Output tubes operated as a push-pull pentode stage, Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

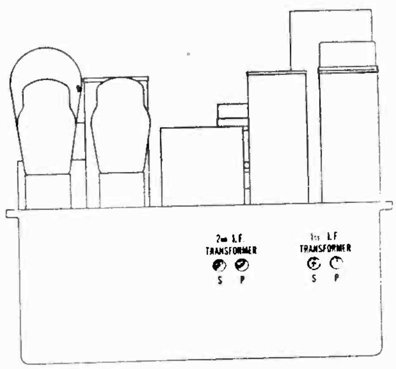


Figure C—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C., and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

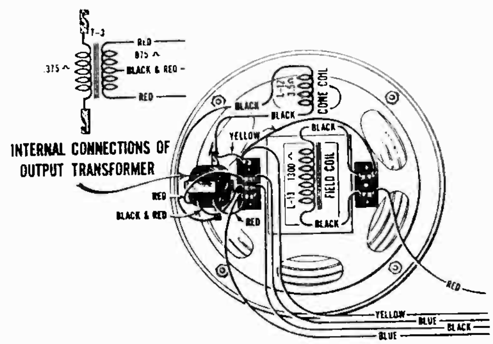


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors, accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. at Maximum and No Signal

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Filament or Cathode, Volts	Plate to Filament or Cathode, Volts	Plate Current, M. A.	Heater or Filament, Volts
1. R. F. RCA-58	4.0	100	240	6.0	2.4
2. 1st Det. RCA-58	10.0	90	230	2.0	2.4
3. Osc. RCA-56	—	—	75	4.5	2.4
4. I. F. RCA-58	4.0	100	240	6.0	2.4
5. 2nd Det. RCA-55 and A.V.C.	5.8	—	100	4.0	2.4
6. PWR. RCA-2A5	19.0	230	220	20.0	2.4
7. PWR. RCA-2A5	19.0	230	220	20.0	2.4

Rectifier—370 Volts R.M.S. Each Plate

RCA-VICTOR CO., INC.

MODEL 91-B
Schematic
Chassis Wiring

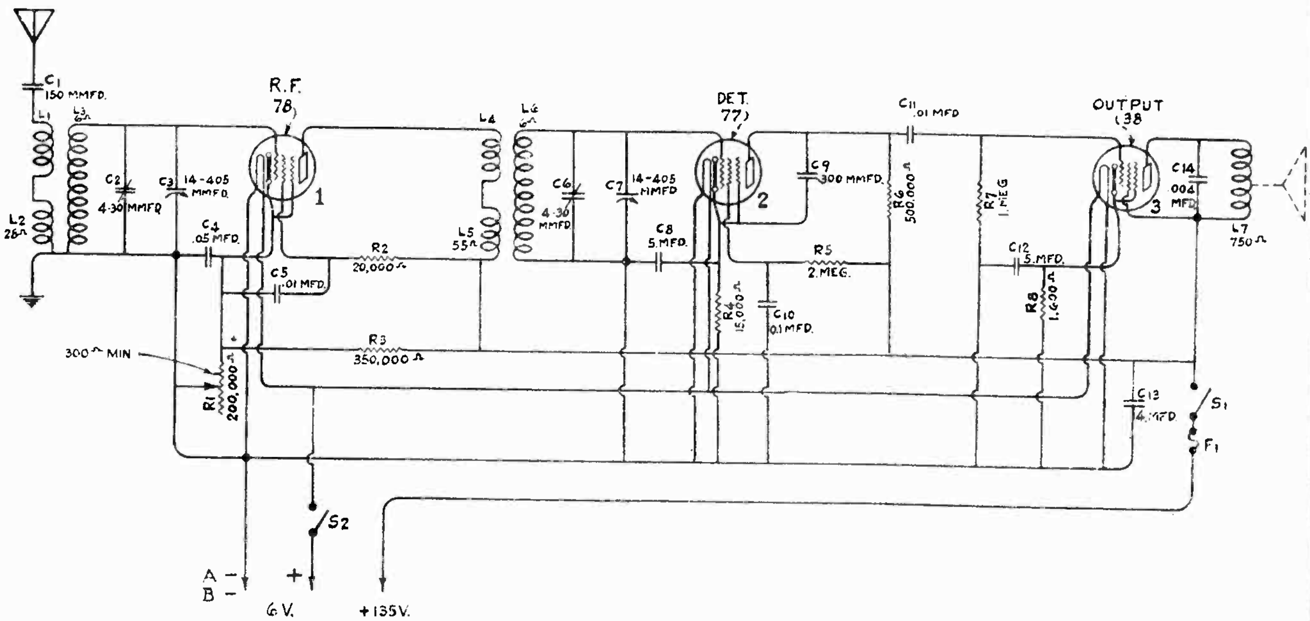


Figure A—Schematic Circuit Diagram

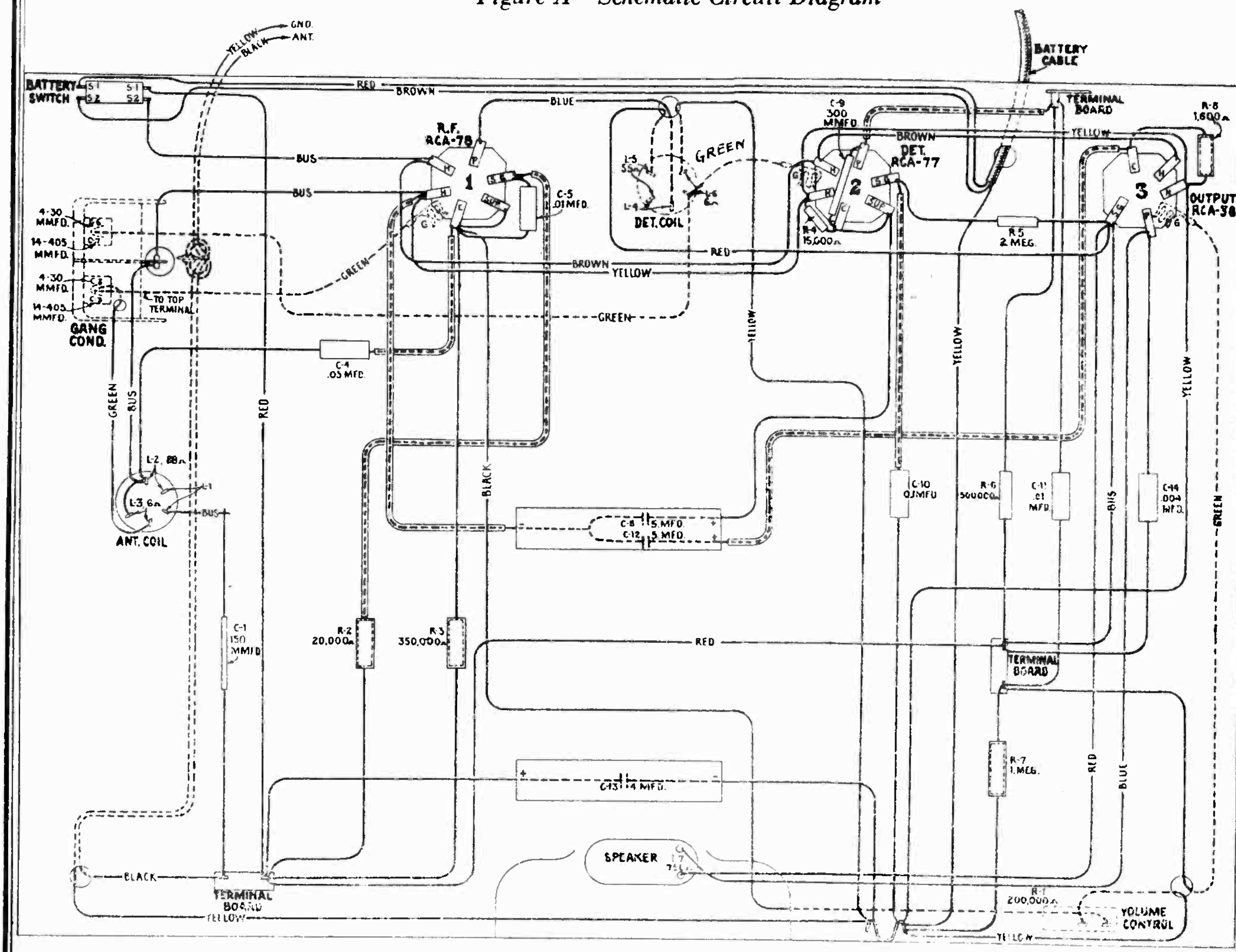


Figure B—Wiring Diagram

MODEL 91-B
Capacitor Adjustment
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

"A" Battery Required .... Six-Volt Storage Battery
"B" Battery Required .... Three 45-Volt Blocks
"A" Current .... 0.9 Ampere
"B" Current .... (Maximum Volume) 18 M. A / (Minimum Volume) 9 M. A.
Type and Number of Radiotrons
1 RCA-78, 1 RCA-77, 1 RCA-38, Total 3
Undistorted Output .... 0.2 Watts
Tuning Range .... 540–1712 K. C.
Type of Loudspeaker .... Magnetic

This battery type tuned R. F. receiver incorporates excellent performance in conjunction with minimum cost and up-keep requirements. Service work consists principally of replacements and line-up adjustments. The proper method of aligning the receiver follows.

R. F. Line-up Capacitor Adjustments

Two adjustable capacitors are provided for adjusting the R. F. circuits to maximum electrical alignment. In order to properly adjust the capacitors, a Stock No. 9050 Test Oscillator and 7065 adjustment screwdriver are required. Also an output meter should be connected across or in place of the loudspeaker winding. Proceed as follows:

(A) Place the oscillator in operation at 1400 K. C. and connect its output to the antenna and ground of the receiver. Connect the output meter and place the receiver in operation.

(B) Tune in the signal from the oscillator and adjust the volume control and oscillator output until a deflection is obtained in the output meter. Adjust each trimmer until maximum output is obtained. The proper adjustment is when a minimum value of trimmer capacity is used. Readjusting the dial may be necessary to arrive at such a condition. Then slightly reduce the setting of the detector trimmer by turning it clockwise. This compensates for a slight increase in the capacity of this circuit that occurs when the chassis is returned to its case. A little experimenting will disclose the proper amount of this reduction.

RADIOTRON SOCKET VOLTAGES

Maximum Volume Control Setting

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Filament or Heater, Volts
1. RCA-78 R. F.	2.5	95	132.5	7.0	6.0
2. RCA-77 Detector	2.5*	27*	50*	0.135	6.0
3. RCA-38 Output	12.0	123	115	7.5	6.0

* Cannot be measured with ordinary voltmeter.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3546	Capacitor—150 mmfd. (C1)	$0.32
3560	Resistor—1,600 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3640	Capacitor—0.05 mfd. (C4)	.25
3701	Capacitor—0.01 mfd. (C5, C11)	.30
3748	Fuse—0.5 ampere (F1)—Package of 5	.40
3848	Capacitor—300 mmfd. (C9)	.30
3860	Socket—5-contact Radiotron socket	.32
3877	Capacitor—0.1 mfd. (C10)	.32
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
4070	Capacitor—0.004 mfd. (C14)	.42
4073	Resistor—350,000 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
4076	Escutcheon—Volume control escutcheon—Package of 2	.26
4077	Escutcheon—Station selector escutcheon—Package of 2	.26
4078	Knob—Station selector knob—Package of 5	.76
4079	Foot—Rubber foot—Package of 4	.22
4096	Knob—Volume control knob—Package of 5	.75
4097	Switch—Operating switch—Double pole—Single throw (S1, S2)	.94
6114	Resistor—20,000 ohms—Carbon type—1 watt (R2)—Package of 5	$1.10
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R6)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R5)—Package of 5	1.00
6516	Connector—Fuse connector	.16
6820	Coil—Antenna coil (L1, L2, L3)	.86
6821	Coil—Detector coil (L4, L5, L6)	.96
6822	Condenser—2-gang variable tuning condenser (C2, C3, C6, C7)	2.34
6829	Volume control (R1)	1.05
6830	Cable—Battery cable	1.12
6831	Capacitor—Two 5.0 mfd. (C8, C12)	.94
6832	Capacitor—4.0 mfd. (C13)	.85
7485	Socket—6-contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
7712	Support—Cone support	.50
7713	Mechanism—Speaker mechanism complete (L7)	3.72
9470	Reproducer—Complete	4.62
9471	Cone—Speaker cone—Package of 5	3.50

MODEL R-92 Recorder
Schematic
Voltage

RCA-VICTOR CO., INC.

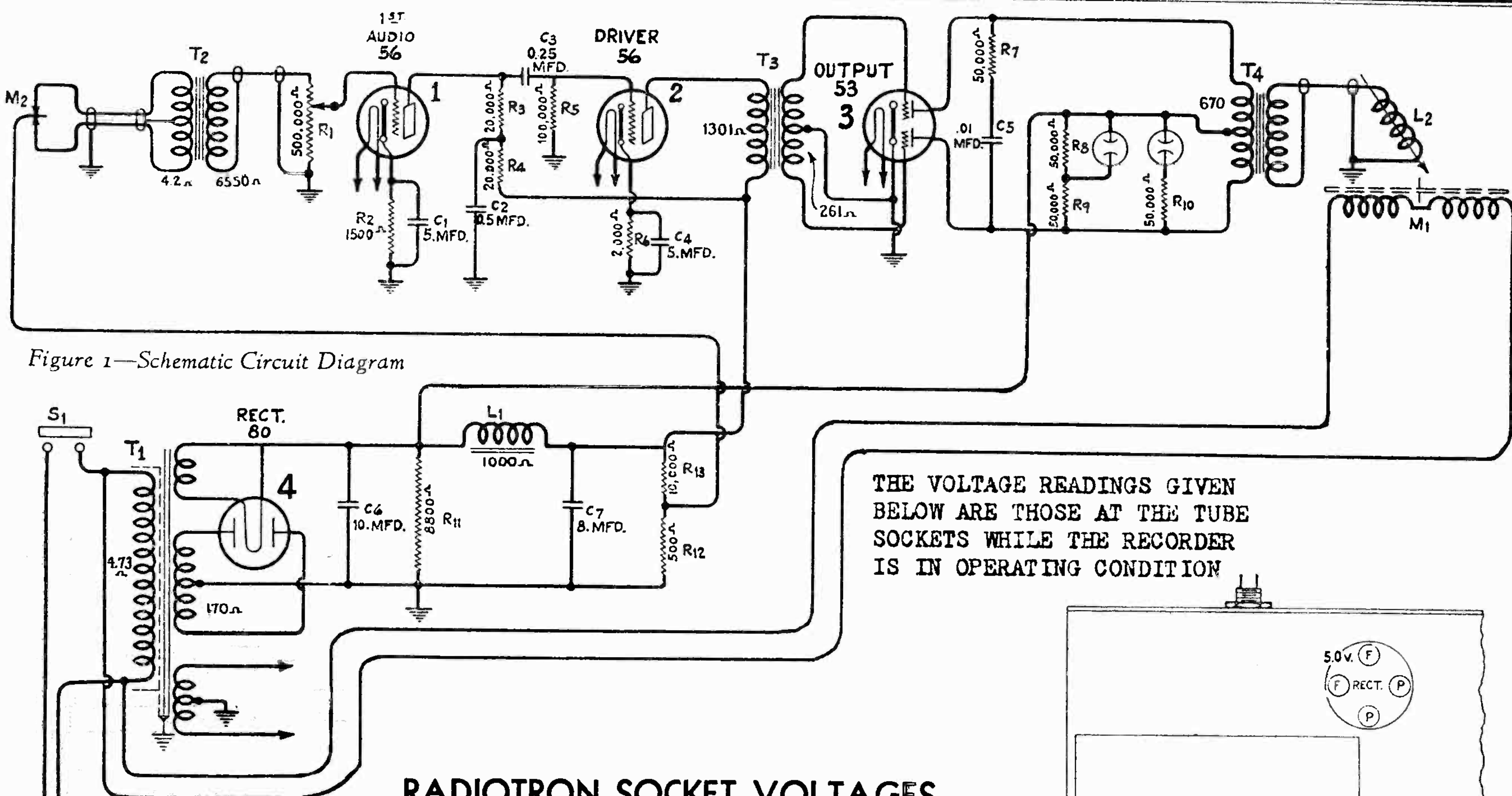


Figure 1—Schematic Circuit Diagram

THE VOLTAGE READINGS GIVEN BELOW ARE THOSE AT THE TUBE SOCKETS WHILE THE RECORDER IS IN OPERATING CONDITION

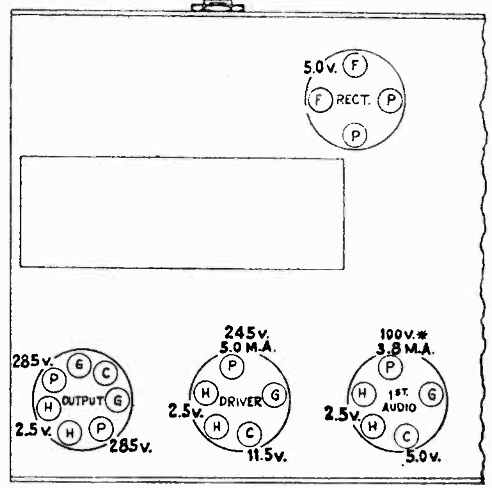


Figure 3—Voltage Readings at Radiotron Sockets

RADIOTRON SOCKET VOLTAGES

Radiotron No.	Cathode to Ground, Volts	Plate to Ground, Volts	Plate Current, M. A.	Heater Volts
RCA-56—1st A. F.	5.0	100*	3.8	2.5
RCA-56—2nd A. F.	11.5	245	5.0	2.5
RCA-53—Power	—	285	30.0	2.5
RCA-80—Rectifier	Total Rectified Voltage—290 Volts			5.0

*Calculated—High Resistance Circuit.

MODEL R-92 Recorder
Chassis Wiring

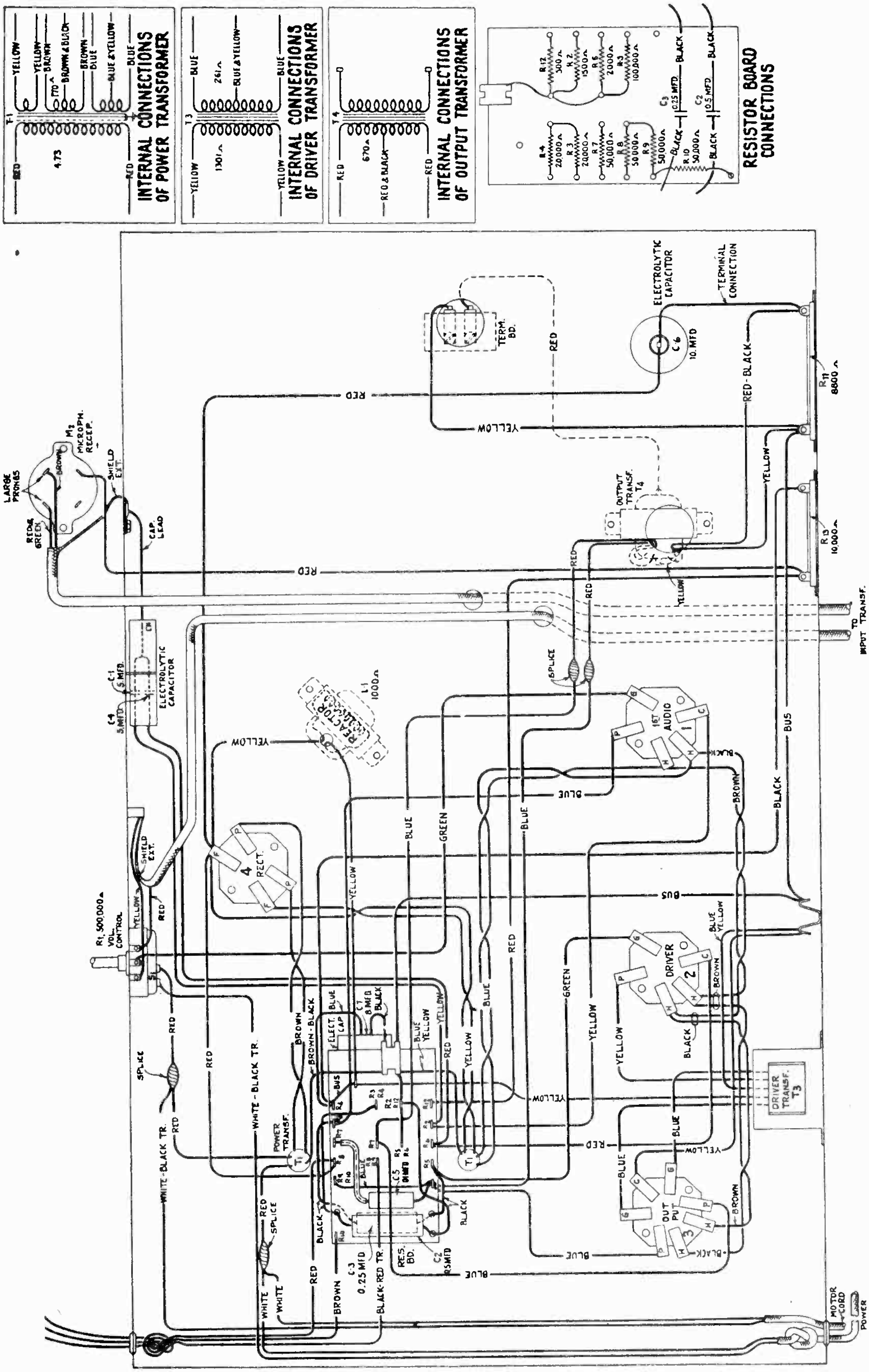


Figure 2—Wiring Diagram

RCA VICTOR MODEL R-92

STORE RECORDER

SERVICE DATA

Except for the replacement of defective Radiotrons, very little service work will be required in conjunction with this instrument. Figure 1 shows the schematic circuit diagram, Figure 2 the wiring diagram, and Figure 3 the various socket voltages. Figure 4 shows the assembly wiring diagram.

Service Data on Magnetic Pickup

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure 6), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

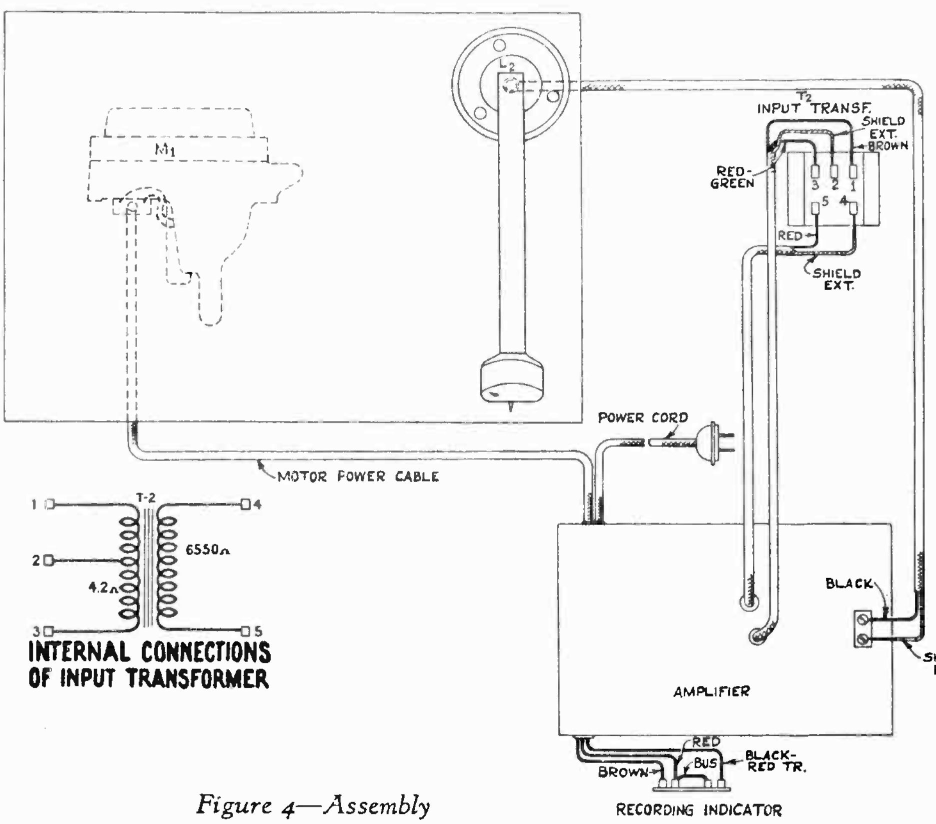


Figure 4—Assembly

MODEL R-92 Recorder
Pickup Adjustments
Parts List

RCA-VICTOR CO., INC.

(d) Remove screws A and B, Figure 6, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

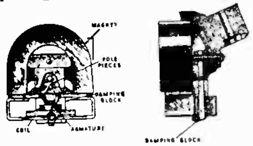


Figure 5

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 6), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009″ on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

(4) Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

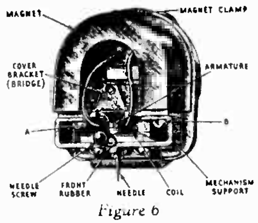


Figure 6

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 7, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly

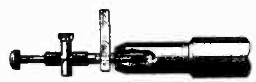


Figure 7

called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h).

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	AMPLIFIER ASSEMBLIES	
3787	Capacitor—0.01 mfd. (C5)	$0.30
6648	Capacitor—0.25 mfd. (C3)	.42
3772	Capacitor—0.5 mfd. (C2)	.32
4498	Capacitor—8.0 mfd. (C7)	1.25
7590	Capacitor—10.0 mfd. (C6)	1.40
3787	Capacitor pack—Comprising two 5.0 mfd. (C1, C4)	.94
6552	Reactor—Filter reactor (L1)	1.04
3114	Resistor—500,000 ohms—Carbon type—¼ watt (R8, R9, R10)—Package of 5	1.00
4396	Resistor—500 ohms—Carbon type—½ watt (R12)—Package of 10	2.00
3047	Resistor — 1500 ohms — Carbon type — ½ watt (R2)—Package of 5	1.00
3526	Resistor — 2000 ohms — Carbon type — ½ watt (R6)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R3, R4)—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
4398	Resistor—10,000 ohms—6.5 watts (R13)	.74
4400	Resistor—8800 ohms—10.5 watts (R11)	.68
4399	Socket—4-contact socket	.44
6300	Socket—4 contact Radiotron socket	.35
7484	Socket—5-contact Radiotron socket	.35
3719	Socket—7-contact Radiotron socket	.35
6551	Transformer—Driver transformer (T3)	1.48
6556	Transformer—Output transformer (T4)	1.50
9026	Transformer—Power transformer (T1)	4.80
4401	Volume control (R1)	1.10
	MICROPHONE ASSEMBLIES	
4403	Cord—Microphone cord	.62
3216	Cushions—Microphone rubber cushions—Package of 6	.24
4500	Housing—Microphone housing	3.15
4499	Mechanism—Microphone mechanism	6.80
4501	Microphone complete	7.50
4402	Plug—Microphone cord plug	.28
	RECORDING INDICATOR ASSEMBLIES	
4381	Escutcheon—Recorder indicator escutcheon	.72
4161	Lamp—Neon lamp	.56
4164	Screen—Recording indicator lamp screen	.18
4382	Screw—Screen escutcheon and terminal board mounting screw assembly—Comprising two screws, two spacers, two nuts and two lockwashers	.20
	PICKUP AND ARM ASSEMBLIES	
4196	Arm—Pickup arm complete	4.70
3417	Armature—Pickup armature	.72
3733	Back—Pickup housing back	.60

Stock No.	Description	List Price
3385	Coil—Pickup coil	$0.50
4383	Cover—Pickup cover	.34
3836	Cover—Pickup back cover	.34
4497	Pickup—Magnetic pickup unit complete (L2)	4.60
4384	Plate—Pickup lifter adjustment plate, spring and screw—Located in arm	.20
3387	Screw—Pickup mounting screw assembly—Comprising one screw, one nut and one washer—Package of 10	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3419	Screw—Pickup cover holding screw—Package of 10	.40
	TURNTABLE ASSEMBLIES	
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3344	Cover—Grease retainer cover—Package of 2	.70
4394	Lever—Speed shifter lever	.38
3341	Pin—Groov-pin—Package of 2	.56
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3343	Sleeve—Sleeve complete with ball race	2.86
3347	Spring—Speed shifter lever spring—Package of 2	.30
7668	Turntable—Complete less shift lever	8.34
3340	Washer—Thrust washer—Package of 2	.56
	MOTOR ASSEMBLIES	
4395	Mounting assembly—Motor mounting assembly—Comprising 3 studs, 9 washers, 3 cushions	.38
9510	Motor—105-120 volt 60-cycle motor complete	27.44
8942	Rotor and shaft for motor	7.00
8945	Spindle—Turntable spindle and fibre gear for motor	4.68
	MISCELLANEOUS ASSEMBLIES	
4391	Box—Needle box	.70
3261	Bushing—Record drive bushing—Package of 5	.40
4392	Knob—Volume control knob—Package of 5	.75
4385	Lifter—Pickup lifter mechanism complete	3.00
4387	Screw—No. 6-32-¼″ headless set screw for pickup lifter cam—Package of 10	.25
4388	Screw—No. 6-32-5/16″ headless set screw for pickup lifter cam—Package of 10	.25
4389	Screw—No. 6-32-3/16″ headless set screw for pickup lifter cam—Package of 10	.25
4390	Screw—No. 6-32-⅛″ headless set screw for pickup lifter cam—Package of 10	.25
4393	Screw—No. 8-32-5/16″ headless set screw for volume control knob—Package of 10	.25
4386	Spring—Pickup lifter spring—Package of 10	.20
6226	Transformer—Input transformer (T2)	2.75

RCA VICTOR DUO JUNIOR MODEL R-93

SERVICE NOTES

Electrical Specifications

Voltage Rating........105–125 Volts	Turntable Speed........78 R.P.M.
Frequency Rating........25, 50 and 60 Cycles	Pickup Impedance at 1000 Cycles........2450 Ohms
Power Consumption........4 Watts	Pickup Output Voltage........0.4 Volt at 400 Cycles
Type of Motor........Synchronous Reaction	Volume Control Resistance........20,000 Ohms

Physical Specifications

Turntable Diameter........7 Inches	Width........11 Inches
Height........5 Inches	Depth........8 Inches

This phonograph turntable and pickup assembly is designed to provide record reproduction to the owner of a modern radio receiver. Use of the audio amplifying system and loudspeaker of the radio receiver provides a quality of reproduction equal to or better than that obtained from radio stations. A switch is provided for changing from radio to record reproduction, or vice-versa. Simplicity, compact size and ease of connections are outstanding features of this instrument.

Electrically, the instrument consists of a magnetic pickup—for transforming the mechanical variations of the record grooves to voltage variations—a volume control for adjusting the output voltage to any desired level and a radio-record switch for shifting the connections to the receiver so that either radio or record reproduction may be obtained as desired by the user.

Figure 1 shows a typical layout for an ideal installation. Figure 2 shows the proper connections to be made between the pickup unit and the switch assembly. Figure 3 shows the schematic diagram, while Figures 4 and 5 show the chassis and cable wiring diagrams respectively.

Connecting Phonograph to the Radio Receiver

When connecting a phonograph unit to a radio receiver, there are a few fundamental facts to be considered. First, the output of the pickup must be connected to the receiver at a point where sufficient audio gain between it and the speaker is available to give normal sound output. Second, when doing this some attention should be given to the possibilities of introducing hum and other undesired noise, both in the audio and in the radio circuits.

In general, it will be found that the grid or cathode circuits of the second detector of a super-heterodyne circuit are suitable for phonograph input. On tuned R. F. receivers, either the detector cathode or the first audio transformer primary circuit may be employed, depending upon the amount of audio gain and the type of detector used.

It is fairly common to find radio receivers employing a volume control located in the audio circuit. In these cases, it is advisable to run the phonograph volume control at maximum and use the radio receiver volume control for adjusting the phonograph output. In circuits using aurally compensated volume controls, advantage of this feature is not taken unless the radio receiver volume control is used.

Investigation of a large number of receivers has shown that four general types of connections, all of which may be made without removing the chassis from the cabinet, cover practically every type of receiver. These connections are as follows:

(1) Receivers having phonograph input jacks and Radio-Record Switches. With these receivers the cable and switch supplied with the R-93 is not used. The phonograph output is connected direct to the phonograph input jack and the Radio-Record Switch on the Receiver is used for changing from Record to Radio reproduction. The 1929 Victor Receiver and numerous Stromberg-Carlson Receivers are typical examples of this type of connection.

(2) Receivers having phonograph terminal board connections. Such connections are made in accordance with the instructions pertaining to that particular instrument.

(3) Receivers using the 2B7 or 6B7 Second Detectors. With receivers of this type, the yellow and green leads are connected in series with the grid cap connection of this tube.

(4) Receivers not having any of the foregoing features. On receivers of this type, an adaptor having a split cathode connection is necessary. Stock No. 4611, five-prong adaptor, or Stock No. 4612, six-prong adaptor, may be used. In such cases, the yellow and green leads are connected in series with the cathode, which is placed under the tube used in the second detector socket of the receiver.

It will be noted that red and blue leads are brought out from the switch for "killing" the radio during record reproduction. With most receivers, these may be connected in series with the antenna lead. However, in event this does not work satisfactorily, then one of the split cathode adaptors must be used in the oscillator socket and the leads connected in series with the cathode. This will effectually "kill" the radio on any super-heterodyne receiver. On the following page, a list of numerous receivers and their proper connections are given.

PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is of simple design and fool-proof construction. Among its many features are low power consumption, single moving part, ease of starting, oilless main bearing, resilient bumper, and long life with freedom from service repairs.

Figure 6 shows the main parts of the motor and the points that may require attention.

Operation:

The two stator coils are connected as shown in Figure 2 and the motor is started by giving it a clockwise spin with the hand. If it is found to be difficult of starting, or if it runs at a sub-synchronous speed such as at 70 R.P.M., such action may result from one of the following causes:

Difficult to Start—This may be due to the stator failing to rotate on the outer bearing. This can be caused by the lug being bent and rubbing in the slot, or sticking to the resilient bumper. The outer bearing not being properly lubricated may also cause this condition. It is important that the ball bearing be at the bottom of the main bearing assembly.

Slow Speed—If the turntable is jarred or slowed down, the motor may run at a sub-synchronous speed, such as 70 R.P.M. This is remedied by merely lifting the tone arm from the turntable, thereby removing the load. The turntable speed will then immediately increase to normal.

Excessive Vibration and Hum:

A small amount of hum when starting, decreasing to a negligible amount while running, is normal. If excessive vibration occurs either at starting or running, it may be due to one of the following:

(1) Insufficient lubricant in outer bearing or any other failure that will cause the stator to bind.

(2) Metal washer not above the leather washer at the bottom of the main bearing.

(3) Motor not properly supported from motor board. Unless the motor is properly supported from the motor board, normal vibration will be excessive.

Removing Rotor from Stator:

The rotor which includes the turntable may be removed by loosening the screw shown in Figure 7 until it clears the rotor and then lifting the turntable. Be careful not to lose the ball end-bearing when this is removed. After replacing the rotor, tighten the retaining screw securely to eliminate the possibility of rattle in operation.

Power Consumption:

The motor consumes 4 watts. It should never be turned on when the rotor is removed, as in this condition excessive current will be drawn with consequent increase in temperature.

NOTE—The above values of power consumption are average for a 60-cycle motor at 125 volts. At lower voltages the power consumption will be less.

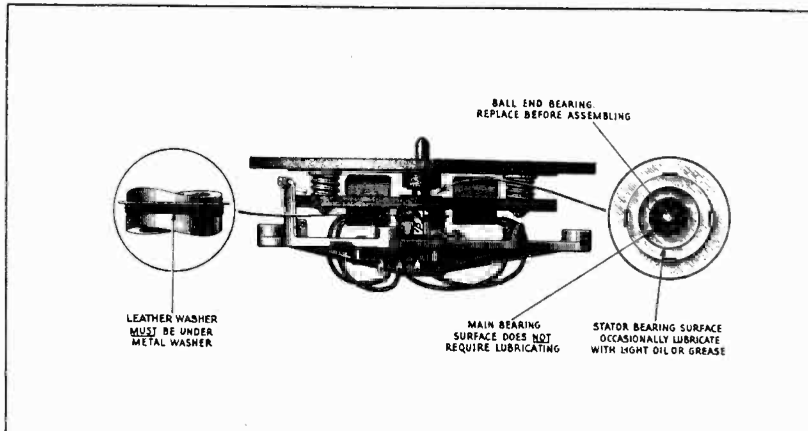


Figure 7—Details of Motor

MODEL R-93 Phonograph
Pickup Data
Parts List

RCA-VICTOR CO., INC.

PICKUP UNIT SERVICE DATA

The magnetic pickup and tone arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature and replacing the rubber pivots, damping block and replacing the magnet coil.

Disassembling the Pickup:

The pickup may be disassembled in the following manner:

(a) Unsolder the two cable connections to the terminal strip.

(b) Remove the needle screw and screws "A" and "B."

(c) Remove the pickup assembly from the arm and housing.

(d) Unsolder the two magnet coil leads attached to the terminals and then remove screw E. This will allow the removal of the terminal board.

(e) If centering the pickup armature is the only adjustment required, such centering can be done without removing the terminal board indicated in (d). The armature is centered by loosening screw F, accessible through the hole shown, and holding the armature with the finger in proper position while screw F is tightened. "Feeling" the armature while deflecting it between its two extremes is the best manner of ascertaining proper centering. When centering, after work has been done or the magnet removed, it is important that the magnet be remagnetized while in place.

(f) If the coil or pivot rubbers are to be replaced, the pickup must be further disassembled. This is done by removing the magnet and then removing screws C and D. The pole piece may now be removed and the old coil and sleeve disassembled. Acetone will be found helpful for dissolving the old cement that holds the coil in place. The new coil, with its sleeve, may now be replaced and cemented in a similar position to that occupied by the old coil. Duco household or Ambroid cement may be used to hold the coil in place. Be careful to center the coil with its paper sleeve before cementing. Only rosin core solder should be used for soldering the coil leads in the pickup.

(g) The pivot rubbers are replaced by loosening the armature adjusting screw F and removing screw G, clamp H and washer I and removing the armature from its bracket. Damping block J must be removed from the armature. After putting the new pivot rubbers in place, a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block. The rubbers can then be removed by slipping them from each end of the pivot shaft.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

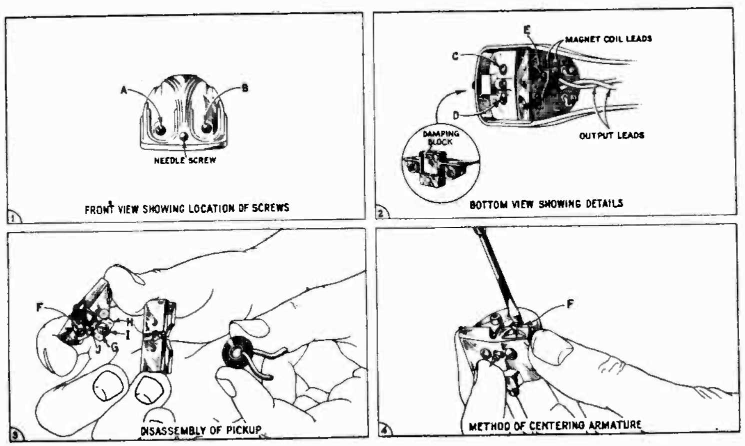


Figure 8—Details of Pickup Assembly

(b) Remove the damping block from the armature and clean the armature shaft with emery paper.

(c) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the shaft diameter. This is done so that a snug fit will be obtained.

(d) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 9, will prove desirable for fusing the block in place. The iron should be applied only long enough to melt the block sufficiently to cause a small bulge on each side, and must be removed before any bubbling occurs. The pickup should then be reassembled.

It is important to remember that in all operations after reassembling but before placing in the tone arm,

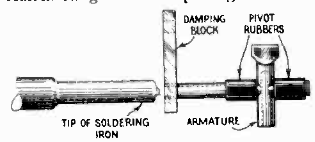


Figure 9—Replacing Damping Block

the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	MOTOR ASSEMBLIES	
10194	Ball—Steel ball bearing—Package of 20	$0.25
7657	Base—Motor base and bearing assembly—50-60 cycle—105-125/200-250 volt operation	1.20
9523	Base—Motor base and bearing assembly—25 cycle operation	1.20
9519	Coil—Stator assembly—Comprising coil and laminations—105-125 volt, 60 cycle operation	2.50
9521	Coil—Stator assembly—Comprising coil and laminations—105-125 volt, 50 cycle operation	2.35
9524	Coil—Stator assembly—Comprising coil and laminations—105-125 volt, 25 cycle operation	2.25
9529	Coil—Stator coil assembly—Comprising coil and laminations—50 cycle, 200-250 volt operation	2.50
9515	Motor—105-125 volts—60 cycle motor	8.80
9516	Motor—105-125 volts—50 cycle motor	8.42
9517	Motor—105-125 volts—25 cycle motor	9.00
9528	Motor—200-250 volts—50 cycle motor	9.60
4456	Motor accessories—Comprising 3 nuts, 1 shield and 1 screw	.10
3813	Motor suspension assembly—Comprising one screw, one metal bushing, two rubber bushings, one flat washer, one lockwasher and one nut—Package of 3	.56
4457	Spring, screw and washer assembly—Used to mount rotor laminations to turntable—Comprising 3 springs, 3 screws and 9 washers	.15
9520	Turntable — Turntable assembly complete with rotor laminations—60 cycle operation	4.45
9525	Turntable — Turntable assembly complete with rotor laminations—25 cycle operation	4.85

Stock No	Description	List Price
9522	Turntable — Turntable assembly complete with rotor laminations—105-125/200-250 volt—50 cycle operation	$4.25
4083	Washer—Leather washer—Package of 10	.20
4084	Washer—Metal washer—Package of 10	.26
	PICKUP AND ARM ASSEMBLIES	
3812	Armature—Pickup armature	.32
4462	Cable—Pickup cable	.20
3810	Coil—Pickup coil	.32
4543	Damper — Damper block complete with damper clamp, washer	.10
4503	Pickup and arm assembly complete	4.95
3811	Screw—Needle holding screw—Package of 10	.46
	CABINET ASSEMBLIES	
X-249	Bottom—Lower section of wood cabinet	2.95
X-248	Cover—Top half of wood cabinet	3.00
	MISCELLANEOUS ASSEMBLIES	
4611	Adaptor—Five-prong split cathode adaptor	1.00
4612	Adaptor—Six-prong split cathode adaptor	1.00
4461	Cable — 5-conductor—Radio-Record switch cable	.28
4459	Bracket—Volume control mounting bracket	.10
4463	Foot—Felt foot for bottom cover—Package of 10	.20
3829	Knob—Radio-Record switch knob—Package of 5	1.10
3961	Knob—Volume control knob—Package of 5	.60
4458	Post—Binding post—Package of 10	2.50
4507	Rest—Pickup rest—Package of 5	.60
4119	Screw—No 8-32-¼-inch headless set screw for knob—Package of 20	.38
4460	Switch—Radio-Record switch	.40
4502	Volume control (R1)	1.16

RCA-VICTOR CO., INC.

MODEL R-93 Phonograph
Models Listing
Connection Diagram

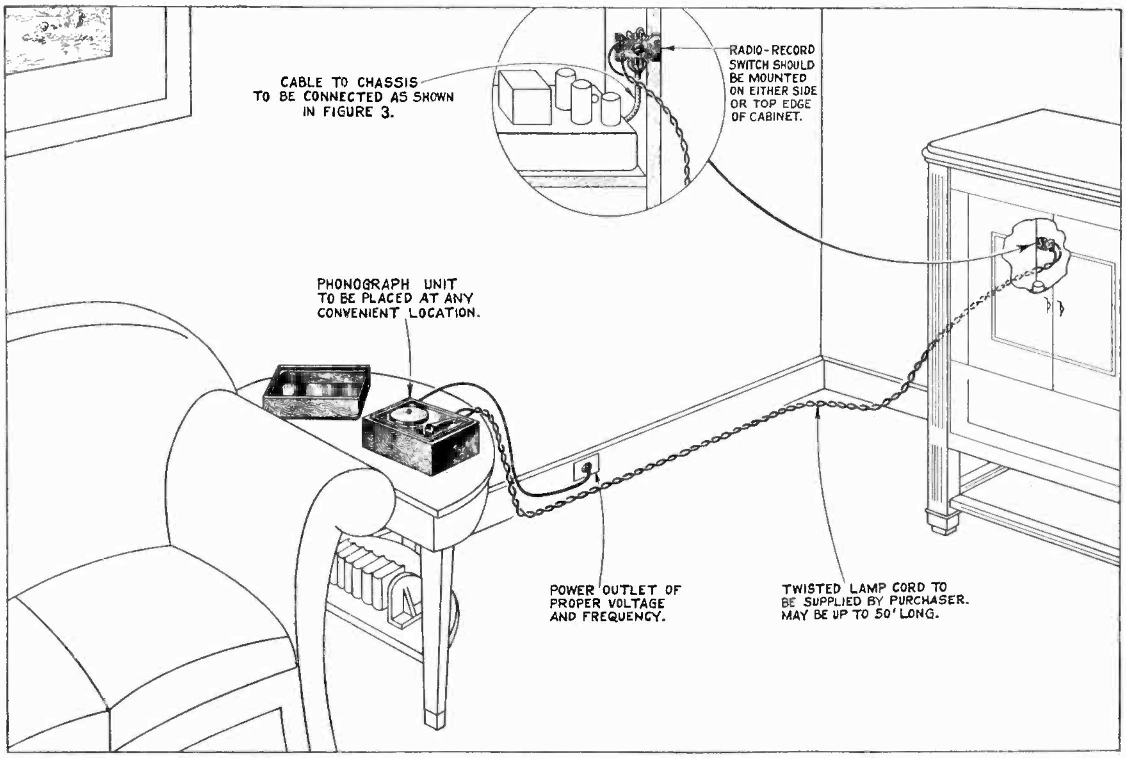


Figure 1—Typical Layout and Connections for Model R-93

RCA VICTOR RECEIVERS — DETAILS OF LEAD CONNECTIONS

Model	*Method of Connection*	*Green*	*Yellow*	*Red*	*Blue*	*Shield*
R-4, 6	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-5	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
R-7	2. Term. Board	Term. 2 (Open Link)	Term. 1	Ant.	Ant. Lead	Term. 4
R-7A	2. Term. Board	Term. 2 (Open Link)	Term. 1	Ant.	Ant. Lead	Term. 4
R-8, 10, 12	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-11	2. Term. Board	Term. 2 (Open Link)	Term. 3	Term. 4	Term. 5	Term. 6
R-17M	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
R-18W	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
R-21	2. Term. Board	Term. 2 (Open Link)	Term. 3	Term. 4	Term. 5	Term. 6
R-22	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
RO-23	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-27	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
R-28	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-37, 38	3. Grid Clip	Grid Cap of Tube	Grid Clip Contact	Ant.	Ant. Lead	Chassis
Rad. 48	2. Term. Board	Term. 4 (Open Link)	Term. 5	Term. 2	Term. 3	Term. 5
R-50, 55	2. Term. Board	Term. 3 (Open Link)	Term. 4	Term. 1 (Open Link)	Term. 2	Term. 6
R-70	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-71, 72	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-73, 75	3. Grid Clip	Grid Cap of Tube	Grid Clip	Ant.	Ant. Lead	Chassis
R-73A, 75A	3. Grid Clip	Grid Cap of Tube	Grid Clip	Ant.	Ant. Lead	Chassis
R-74, 76, 77	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-78	2. Term. Board	Term. 7 (Open Link)	Term. 8	Term. 1	Term. 2	Chassis
Rad. 80	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Bind. Post	Chassis
Rad. 82	2. Term. Board	Term. 2 (Open Link)	Term. 3 (Tie-in Term. to Term. 3)	Term. 1	Term. 3	Term. 3
R-90, 260, 261	4. Adaptor	Det. Cathode	Cathode Socket Contact	Osc. Cathode*	Osc. Cathode Socket Contact	Chassis
110, 111, 115, 210	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead or Bind. Post	Cathode Socket Contact
114	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
120, 124, 220	3. Grid Clip	Grid Cap of Tube	Grid Clip	Ant.	Ant. Lead on Bind. Post	Chassis
121, 122, 221	3. Grid Clip	Grid Cap of Tube	Grid Clip	Ant.	Ant. Lead on Bind. Post	Chassis
140, 141, 240	2. Term. Board	Term. 3	Term. 1 (Open Link)	Term. 1	Term. 2	Term. 1
280	4. Adaptor	Det. Cathode	Cathode Socket Contact	Osc. Cathode*	Osc. Cathode Socket Cont.	Chassis

MODEL R-93 Phonograph
Schematics

RCA-VICTOR CO., INC.

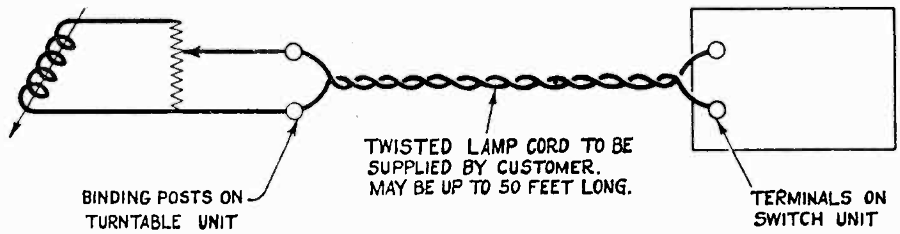


Figure 2—Connections from Pickup to Switch Unit

25 and 50 cycle connections

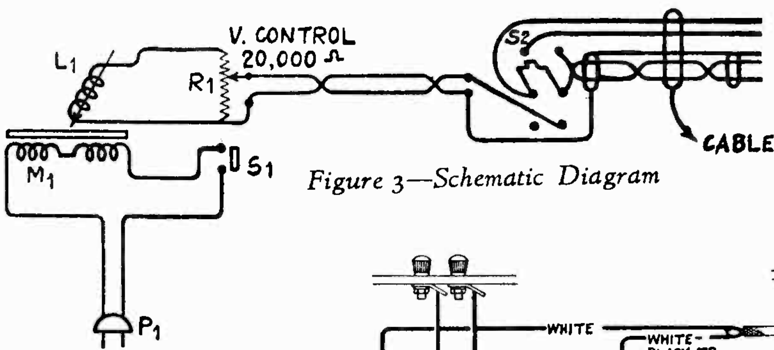


Figure 3—Schematic Diagram

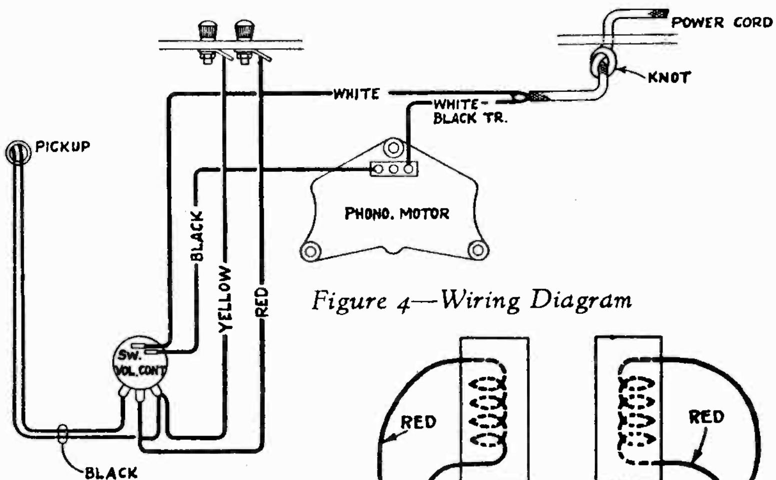


Figure 4—Wiring Diagram

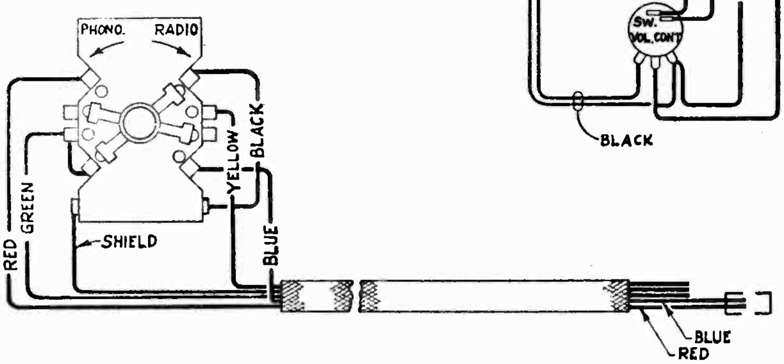
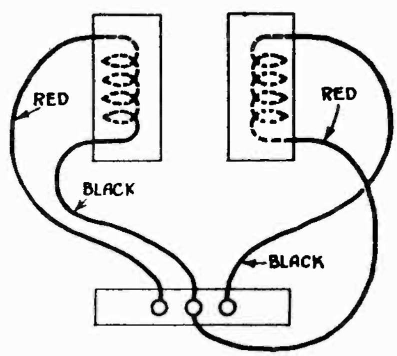
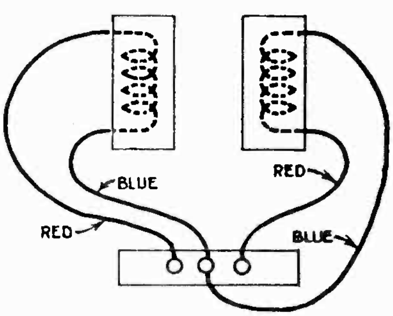


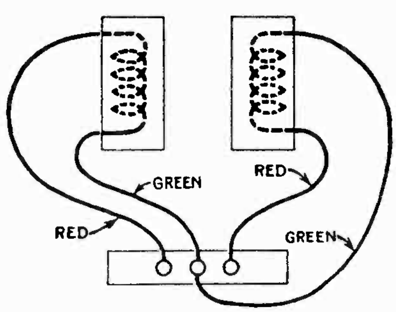
Figure 5—Cable Connections



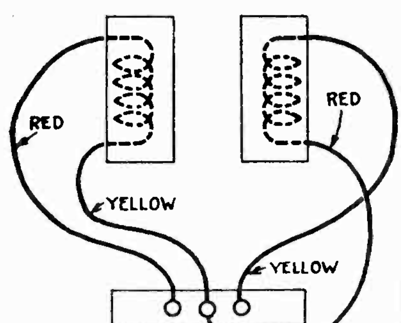
220 Volt—50 Cycle



110 Volt—25 Cycle



110 Volt—50 Cycle



110 Volt—60 Cycle

Figure 6—Motor Wiring Connections

RCA-VICTOR CO., INC.

MODEL 102
Schematic
Chassis Wiring

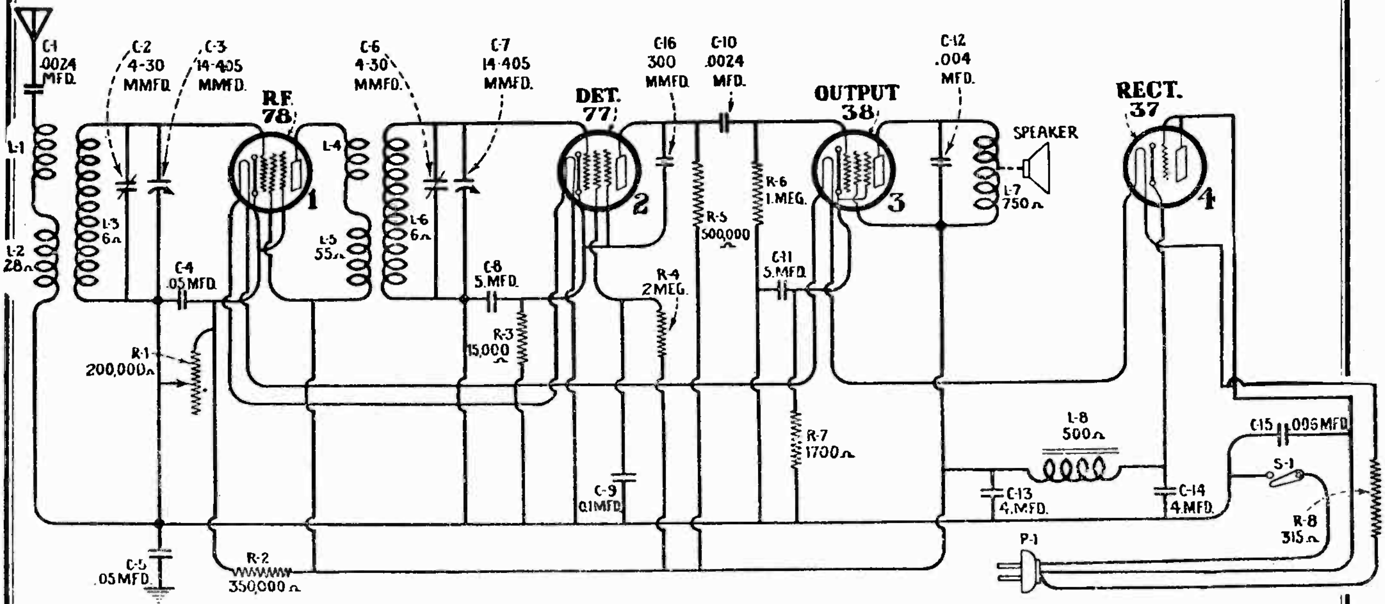
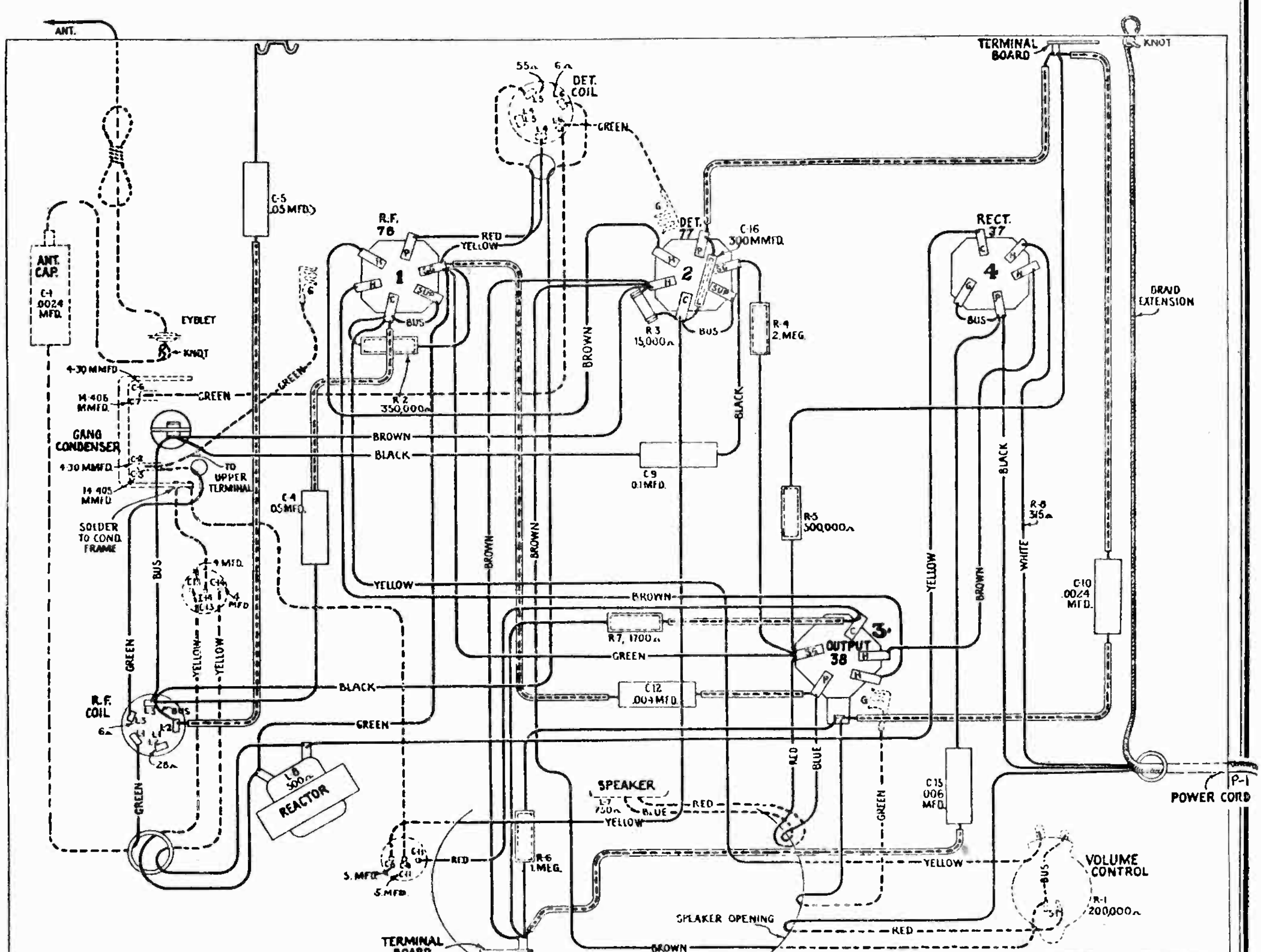


Figure A—Schematic Circuit Diagram



MODEL 102
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating. . 105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption . . . . 40 Watts
Frequency Range . . . . 540 K. C.–1712 K. C.
Type and Number of Radiotrons—
1 RCA-77, 1 RCA-37, 1 RCA-38, 1 RCA-78—Total 4
Undistorted Output . . . . 0.18 Watts

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

The receiver is aligned at 1400 K. C. by means of the two trimmer capacitors located on the main tuning capacitor. The proper alignment is made by adjusting the trimmers for maximum output after tuning in a 1400 K. C. signal. This adjustment should be made when they are near their extreme minimum position. After alignment a check to make sure that a 1712 K. C. signal can be heard when the main tuning capacitor is near its extreme minimum position should be made. Stock No. 9050 Test Oscillator and Stock No. 7065 non-metallic screwdriver are desirable for making this adjustment.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-78 R. F.	2.5	105	105	7.0	6.0
2. RCA-77 Det.	*2.0	17.0*	*40	0.1	6.0
3. RCA-38 Output	10.0	100	95	5.5	6.0
4. RCA-37 Rect.	—	—	115 RMS	16.0	6.0

* Impossible to measure on ordinary voltmeter.
Note—Above voltages will be approximately 5% lower on 115 volts D. C. except for heater voltages which will be the same.

Stock No.	DESCRIPTION	List Price
	CHASSIS ASSEMBLIES	
2747	Cap—Contact Cap—Package of 5	$0.50
3048	Resistor—500,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R6)—Package of 5	1.00
3537	Reactor—Filter reactor (L8)	1.10
3542	Volume control (R1, S1)	1.18
3713	Capacitor—0.05 mfd. (C4, C5)	.32
3860	Socket—5-contact Radiotron socket	.32
3932	Capacitor—2400 mmfd. (C10)	.30
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
4007	Capacitor—2400 mmfd. (C1)	.35
4046	Resistor—2 megohm—Carbon type—½ watt (R4)—Package of 5	1.00
4068	Lead—Antenna lead	.30
4069	Capacitor—0.1 mfd. (C9)	.36
4070	Capacitor—0.004 mfd. (C12)	.42
4071	Capacitor—0.006 mfd. (C15)	.42
4072	Capacitor—300 mmfd. (C16)	.26
4073	Resistor—350,000 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
4074	Resistor—1700 ohms—Carbon type—1 watt (R7)—Package of 5	.88
6819	Cord—Power cord—315 ohms (R8, P1)	$1.00
6820	Coil—RF coil (L1, L2, L3)	.86
6821	Coil—Detector coil (L4, L5, L6)	.96
6822	Condenser—2-gang variable tuning condenser (C2, C3, C6, C7)	2.34
6823	Capacitor—Two 4. mfd. capacitors (C13, C14)	1.14
6824	Capacitor—Two 5. mfd. capacitors (C8, C11)	.94
7485	Socket—6-contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
7712	Support—Cone support	50
7713	Mechanism—Speaker mechanism complete (L7)	3.72
9470	Reproducer—Complete	4.62
9471	Cone—Speaker cone—Package of 5	3.50
	MISCELLANEOUS PARTS	
4076	Escutcheon—Volume control escutcheon—Package of 2	.26
4077	Escutcheon—Station selector escutcheon—Package of 2	.26
4078	Knob—Station selector knob—Package of 5	.75
4079	Foot—Rubber foot—Package of 4	.22
4096	Knob—Volume control knob—Package of 5	.75

MODEL M-105
Alignment Data
Voltage, Service Data

RCA-VICTOR CO., INC.

SERVICE DATA

Type and Number of Radiotrons Used........ 1 RCA-41, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7—Total, 4
Total Battery Current (With 6.3 volts between chassis and A (hot) terminal) 5.35 Amperes
Undistorted Output........................1.35 Watts
Loudspeaker Field Current..................1.35 Amperes
Filtered D. C. Voltage from Rectifier.............227 Volts
Total Plate Current..........................47.5 M. A.

This four tube Superheterodyne Automobile Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, "B" battery eliminator and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

"B" Battery Eliminator

This receiver uses a vibrator-type Inverter-Rectifier that provides a source of direct current voltage for use as plate and grid supply for all Radiotrons. *This unit is accurately adjusted and sealed at the factory and service adjustments should not be attempted.*

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for these adjustments:

R. F Adjustment

A satisfactorily accurate and rapid adjustment of the three R. F line-up capacitors can be made by ear, although, for optimum results, the use of an output meter connected across the loudspeaker voice coil is recommended. The latter method however, involves removal of the rear cover to connect the meter, thus in turn eliminating the shielding effect of the case. Temporary shielding for the bottom and Radiotron sides of the chassis and for the transformer therefore must be provided to prevent vibrator interference.

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and a non-metallic screw driver.

(b) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(c) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(d) Then adjust the three line-up capacitors until maximum sound in the speaker or maximum deflection of the output meter is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

Chevrolet 1933—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10' to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

Plymouth 1933—Mount chassis on left side, back against car bulkhead and use 33⅞" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

Ford V-8 1932 or 1933—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.42	83	222	5.25	6.0
RCA-6A7	First Detector	4.42	83	222	11.0	6.0
	Oscillator	4.42	—	223	Total	
RCA-6B7 Second Detector		3.22	84	218	5.25	6.0
RCA-41 Power		13.0	214	200	26.0	6.0

Equipment

A. Equipment Furnished:

1. *Receiver Package*—Includes the receiver and remote control units joined by the wiring cable:

(a) The receiver contains one each of the following Radiotrons installed in sockets: RCA-78, RCA-6A7, RCA-6B7, RCA-41.

(b) The remote control unit contains one dial lamp (6–8 volts).

(c) The wiring cable includes one fuse (20 amperes) installed in attached fuse receptacle.

2. *Outfit Package*—Containing:

(a) Flexible shaft (33⅞ inches long).

(b) Receiver unit mounting bolt (5/16 inch diameter), dash support plate, and nuts (2).

(c) Self-tapping screws, washers and rubber bumpers (4 each).

(d) Steering column bracket for remote control unit with strap, screws (2), plain washer (1) and lockwasher (1).

(e) Shield clamp for antenna lead-in wire with screw (1), lockwasher (1) and nut (1).

(f) Key (1) and knob (1) for remote control unit and eyelets (2) for antenna connector packed in small envelope.

(g) Ignition Interference Suppression Equipment:

6 Spark plug type suppressors (additional obtain able from your dealer).

1 Distributor type suppressor.

2 Capacitors.

(h) Instruction Book.

B. Additional Equipment Required:

1. *Antenna*—One of the following types:

(a) Roof (built-in) type—recommended.

(b) Roof (interior) type for attachment to head-lining inside car—also recommended. A special antenna of this type complete with pin-hooks and lead-in wire may be purchased from your dealer.

(c) Plate (sub-mounted) type for attachment to channel members of car chassis—alternative. An efficient plate antenna completely equipped for mounting and a specially-designed shielded lead-in wire also are obtainable from the dealer.

Location of Units

Receiver and Remote Control Units—The arrangement of units shown in Figure 1 is recommended and will be found applicable to the majority of automobiles. Consideration should be given to the possibility of interference of the receiver with other equipment beneath the instrument panel or of the mounting bolt with apparatus on the engine side of the dash. By placing the receiver unit toward the right-hand side of the dash, the flexible shaft will be of correct length as furnished in practically all cases. This position, however, may be considered impractical because of its universal preference for heating devices, necessitating installation of the receiver unit either near the center or at the extreme left-hand side of the dash and the use of a shorter flexible shaft. In such cases, the shaft may be either shortened (as described under "Mounting of Units") or exchanged for one of proper length by the dealer.

NOTE—Two support brackets are attached to the receiver case, one on the rear surface and the other on the right-hand side viewing the loud speaker opening. The side bracket must be used when the unit is mounted at the extreme left-hand end of the dash in order to avoid sharp bends in the flexible shaft and resultant unsatisfactory operation.

As furnished, the remote control unit is equipped for attachment to the steering column of the car. Its clamp bracket is so designed that the driver may select from a wide variety of possible mounting positions for maximum accessibility. The associated bracket strap will be found to accommodate practically any diameter steering column. If considered desirable, however, the remote control unit may be supported upon the instrument panel by means of an accessory bracket procurable from the dealer.

Antenna:

(a) *Roof (Built-in) Type*—Best results will be obtained by use of a built-in roof antenna. The majority of modern automobiles (closed body types only) are already equipped with such an antenna installed at the factory, the lead-in wire from which will usually be found coiled-up beneath the instrument panel. Many other earlier cars employ a piece of metallic screen—for top material support—which, if ungrounded (not in electrical contact with the metallic frame), may be readily utilized as an antenna.

NOTE—The presence of a top support screen and of grounds in that screen may be determined without removing any portion of the inside fabric (head-lining). First procure any sharp-pointed metallic tool, push the point through the fabric (at several points if necessary) and feel around in an attempt to scrape the screen surface—being careful not to puncture the weather-proof top. If a screen is found, connect an ordinary dash or head-lamp between either terminal of the automobile ammeter and the tool, re-insert the tool through the head-lining and make contact with the screen. If the lamp lights, however dimly, it shall be assumed that the screen is grounded.

In order to use an ungrounded support screen, first release the head-lining at the front corner nearest the receiver. Then connect a flexible rubber-insulated lead to the corner of the screen and solder the joint. Feed the free end of the lead down the adjacent pillar-post of the car into the driving compartment and replace the head-lining.

If the top support screen is grounded, or if no screen is present, it will be necessary to drop the entire head-lining (see Figure 2). In the former case, the screen may be insulated by removal of a strip several inches from all edges and from the dome

RCA-VICTOR CO., INC.

light fixture. The possibility of subsequent shifting may be eliminated by tacking the screen to one or more of the ribs and by lacing the sides with cord. Where no support screen is used, a copper screen having a total area of at least ten square feet should be inserted. It should be located as far to the rear as possible and insulated from all metallic parts grounded to the frame of the car. The antenna finally should be tested for grounds (see the foregoing "NOTE" for test procedure). If satisfactory, attach the lead-in wire and replace the head-lining of the car.

NOTE—Since a degree of skill—only acquired by experience—is necessary in removing and replacing the top fabric material, such work should be allotted to a competent "trim" man.

(b) *Roof (Interior) Type*—The accessory interior-type roof antenna also will provide very satisfactory performance and, in addition, is extremely simple to install. It may be quickly attached to the head-lining inside the car (preferably as far to the rear as possible) by means of pin-hooks, thereby precluding removal of the fabric. An antenna of this type, however, should not be used in any automobile having a *grounded* top material support screen since the proximity of that screen would seriously reduce its efficiency. Before purchase, therefore, it will be advisable to check this possibility, following the test procedure described under "*Roof (Built-in) Type.*"

As furnished, the interior-type antenna is equipped with a sufficient length of lead-in wire ready-attached. The effective antenna wire is enclosed by long-wearing paper procurable either in "gray" or "tan" finish as desired to harmonize with the car upholstery.

(c) *Plate Type*—For those cases where the installation of a built-in roof antenna is considered too costly and the interior roof antenna impractical, good reception from local or semi-distant powerful stations may be procured with the special plate-type antenna also obtainable as an accessory. This unit should be clamped to the frame of the chassis as far to the rear as possible. It is adjustable in length and may be mounted either lengthwise or crosswise of the chassis, which position should be selected with due regard to the prevention of over-crowding. The plate must be placed as close to the ground as possible, but not below the lowest portion of the chassis at the desired location, as sufficient road clearance must be retained. It is also important to avoid any position in which the plate will impede free motion of chassis parts such as springs, drive shaft, or axles in order to prevent damage to the antenna.

Mounting of Units

Details of mounting the various units are shown in Figure 1. The following procedures are recommended:

Receiver Unit—It is necessary first to determine the electrical polarity of the storage battery supply. This may be done most conveniently by making an examination of the battery connections and ascertaining which terminal is grounded (that is, connected to the frame of the car). The positive terminal is usually marked (+) and tends to form corrosion far more rapidly than the negative (—). If the positive terminal is grounded, no change in the electrical connections of the receiver unit will be required. However, if the opposite is true, the cover of the receiver case must be removed and the *red* and *green* leads (attached by spade-type connectors to the two terminals nearest the bottom of the chassis terminal board) shown in Figure 1 must be reversed.

Now replace the case cover and support the assembled unit against the dash in the chosen position. Allowing a clearance of at least two inches above the top surface, where possible, to permit subsequent removal of the case from the mounting bolt head, mark with a pencil or crayon on the dash four points corresponding to the corners of the adjacent case surface. Then determine the exact center of the area bounded by those four points (by drawing diagonal lines between opposite corners) and mark that position with a center-punch. Next drill a ½ inch hole at the center-punch mark and insert the mounting bolt. The support plate and the two nuts then should be assembled upon the bolt from the engine side of the dash as shown but should not be tightened. Attach the four rubber bumpers, by means of the washers and self-tapping screws, at the four small holes on the selected mounting surface of the case. Finally hang the receiver over the bolt head, align sides vertically and tighten the nuts in place.

Remote Control Unit—In attaching the remote control unit to the steering column of the car, it will be advisable first to examine the detailed view (in Figure 1) showing the assembly of its mounting bracket. Four small holes are contained in the associated flexible strap at distances proper for use with steering columns of the most common diameters (1½, 1⅝, 1¾, 1⅞ inches) but the strap length will be found sufficient to permit the insertion of an additional hole if necessary to accommodate a 2 inch column. The proper hole may be determined by wrapping the clamp strap tightly around the column, inserting the machine screw furnished through that hole found to be nearest in alignment with the tapped hole in the clamp bracket. Three tapped holes are provided in the back of the remote control unit, permitting support of that unit either at the right- or left-hand side or above the steering column.

Flexible Shaft—Insert that end of the flexible shaft to which is attached the slotted coupling through the bushed opening in the left side of the receiver unit. Then rotate the shaft from the free end until the coupling slot is felt to engage over the pin contained in the tuning mechanism and slide the shaft forward to the full depth of the slot. With the shaft held in this position, insert the opposite end of the shaft through the bushing at the rear of the remote control unit and push forward until the flatted portion of the shaft protrudes through the front cover. Then proceed to tighten the external set-screw (located at the bottom of the case—see Figure 3) adjusting the shaft position as necessary until the screw is felt to engage in the groove. Tighten the screw fully to the bottom of the slot and then loosen it approximately one-quarter of a turn. Finally, secure the flexible casing in place by tightening the set-screws at each end *firmly*, so as to provide good electrical contact as well as solid mechanical support.

NOTE—In many installations it will be found necessary or desirable to use a flexible shaft of shorter length than 33⅞ inches. While it is simplest to procure a shaft of proper length from the dealer as mentioned heretofore, very little difficulty should be experienced in shortening the original part if deemed expedient. To shorten the shaft, refer to Figure 3 and proceed as follows:

1. Determine the minimum shaft length permissible for the installation.
2. Remove the slotted coupling (using a soldering iron) and withdraw the shaft from its casing.
3. Cut the shaft only at the center of a swaged joint, selecting that joint which allows at least the required length.
4. Cut from the shaft casing a length equal to the amount of shaft removed. (This operation may be simplified by placing the casing between wooden blocks in a vise so that the block ends will serve to guide the hack saw blade.)
5. Replace the shaft in its casing and solder the slotted coupling to the end of the shaft.

Connections

Refer to Figure 1 and make connections as follows:

Antenna to Receiver—For least ignition interference, any portion of the antenna lead-in wire which extends behind the instrument panel or into the engine compartment of the car should be fully shielded and cut to eliminate excessive slack when attached to the receiver antenna connector. Before connecting the antenna to the receiver, the following comments applying to the particular type of antenna adopted should be observed:

(a) *Roof Antenna* (Built-in Type)—The lead-in wire from a factory-installed built-in roof antenna usually is unshielded and often is of insufficient length to reach the receiver. If necessary, an extra length of insulated wire may be spliced to the existing lead-in, in which case the joint must be soldered and wrapped with tape. In general, it will be advisable to shield the exposed length of lead-in wire, procuring for this purpose from your dealer a length of shield braid and an equivalent length of insulating loom (or rubber tubing) sufficient to extend between the end of the lead-in wire and its point of entrance from the body pillar post. Slip the loom over the lead-in wire and the shield braid over the loom.

(b) *Roof Antenna (Interior Type)*—If an interior type antenna is used, the lead-in wire should be brought down the outside of that front pillar post nearest the receiver.

(c) *Plate Type Antenna*—With the plate type antenna, the full-shielded end of the special cable should be brought into the automobile driving compartment through a ½ inch hole drilled in the toe-board (if no other opening is available). This end is to be connected to the receiver unit antenna lead (as explained in following paragraphs) and the opposite (unshielded) end then cut off as required to eliminate excessive slack upon connection to the plate. The pigtail extension from the end of the shield must be soldered or bonded to the frame of the car.

Refer to the detailed view of the antenna connector shown in Figure 1 and proceed to attach the lead-in wire (if shielded) as follows: First, cut the end of the lead-in so that the internal insulated wire and loom (if present) are flush with the end of the shield covering and push back the shield approximately 1½ inches. Cut the loom to the end of the shield and then remove sufficient insulation to expose one inch of clean bare-conductor. Now disconnect the female portion of the connector attached to the receiver antenna lead and remove the small internal bushing and spring.

To assemble, slip the bared conductor through the female portion of the connector and then through the spring and bushing, making certain that the insulation enters the end of the connector. Bend over and spread the strands of the conductor against the forward end of the bushing and then force one of the eyelets (packed in small envelope in outfit package) into the bushing to hold the conductor in position. Cut off the ends of the conductor strands approximately ⅛ inch beyond the edge of the eyelet and bend the strands over toward the center of the eyelet. The assembly may be now attached to the receiver portion of the connector and the shield covering on the lead-in wire pushed forward to cover the adjacent end of the female portion. Finally, bond the shield to the connector by means of the small clamp furnished. No soldering operations are required.

NOTE—An unshielded lead-in wire (as in the case of the interior-type antenna) may be attached to the antenna connector as described above except that all references to the shield braid and loom may be neglected.

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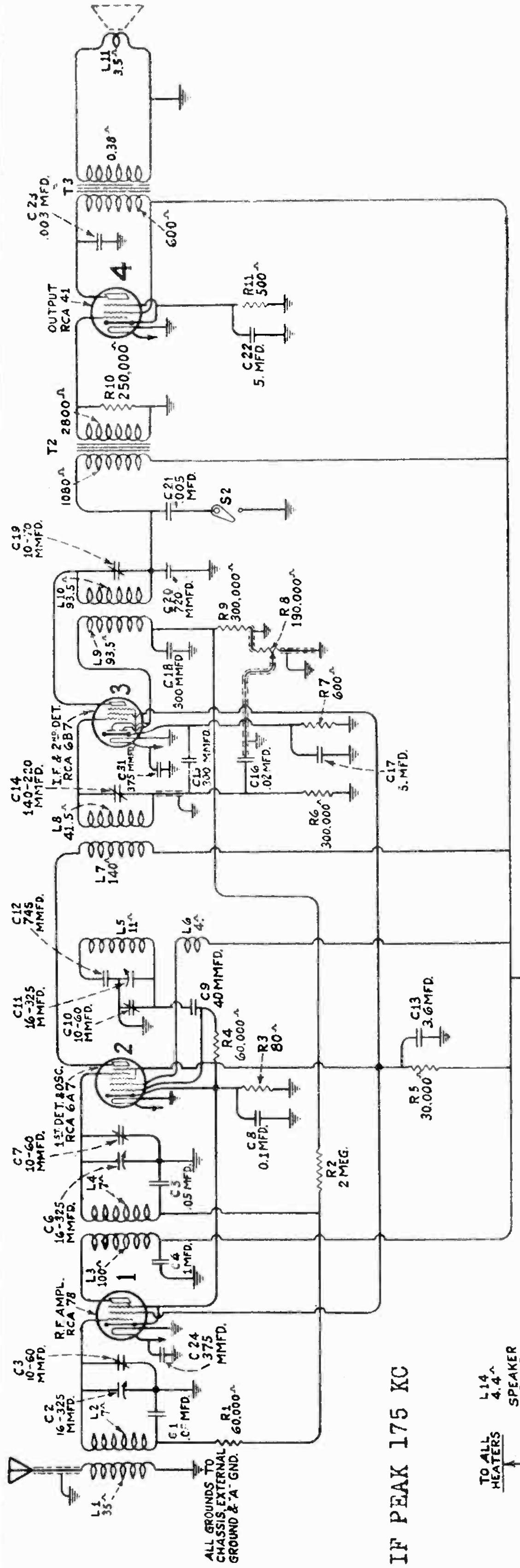
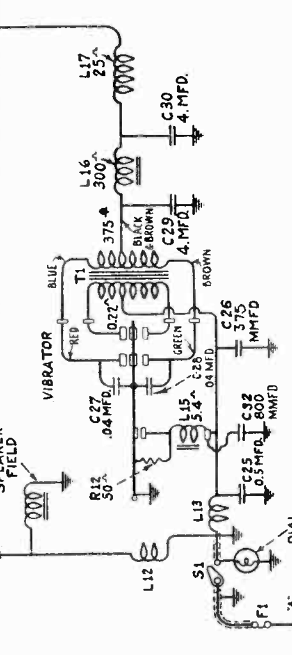
MODEL M-105
Schematic
Installation Details

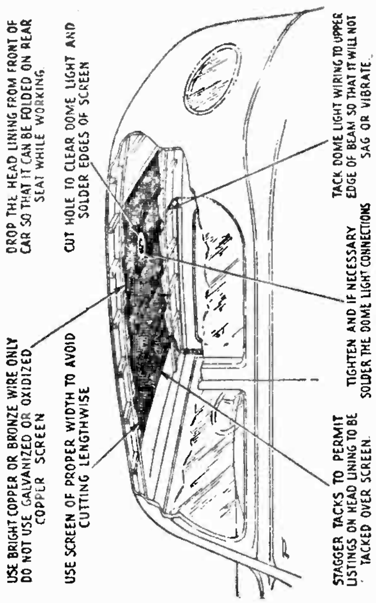


Figure 2

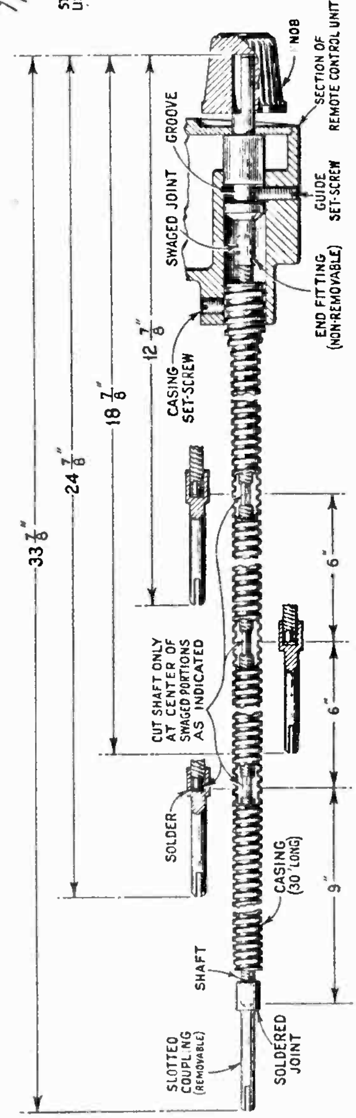


Figure 3

MODEL M-105
Installation Details

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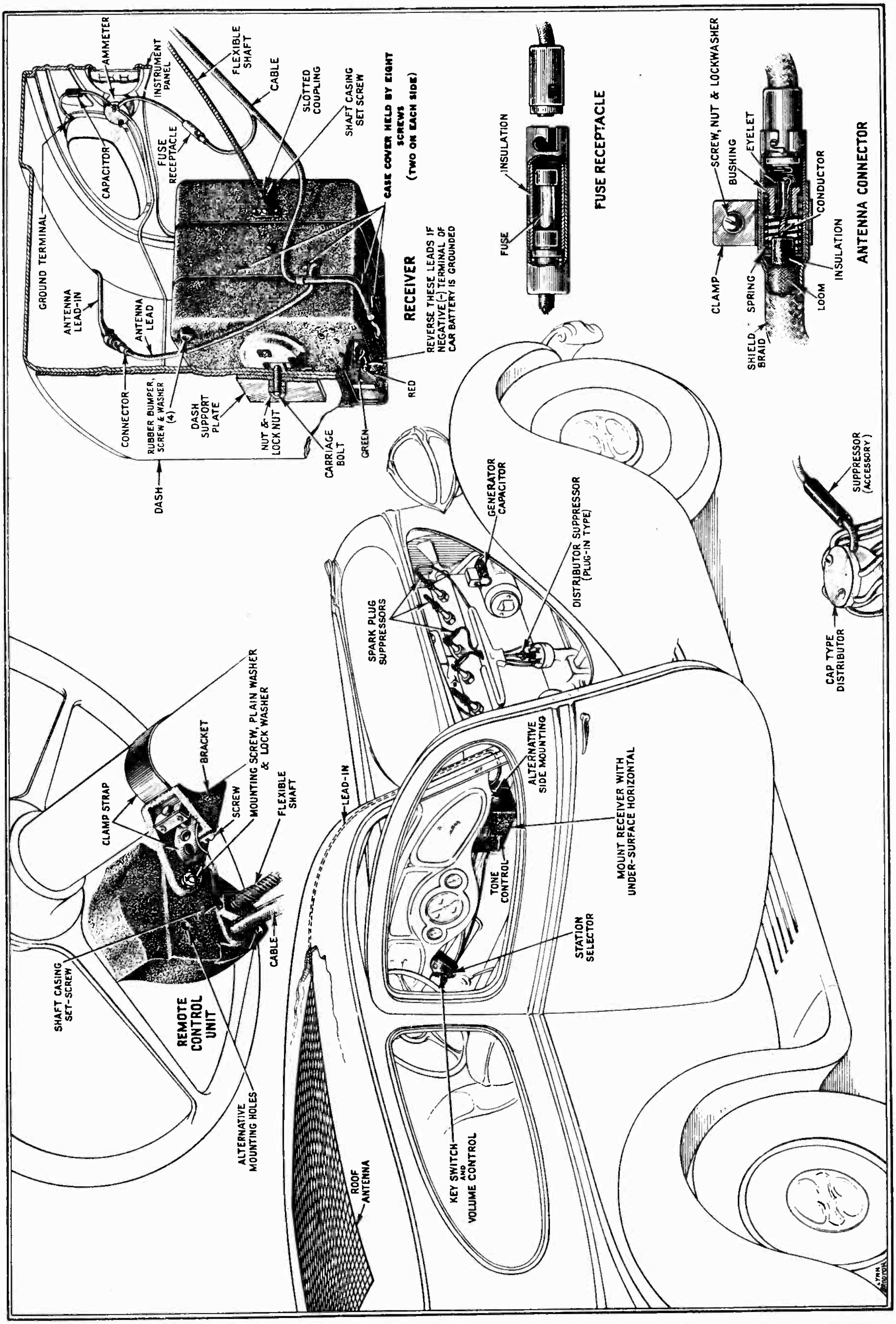


MODEL M-105
Chassis Wiring

RCA-VICTOR CO., INC.

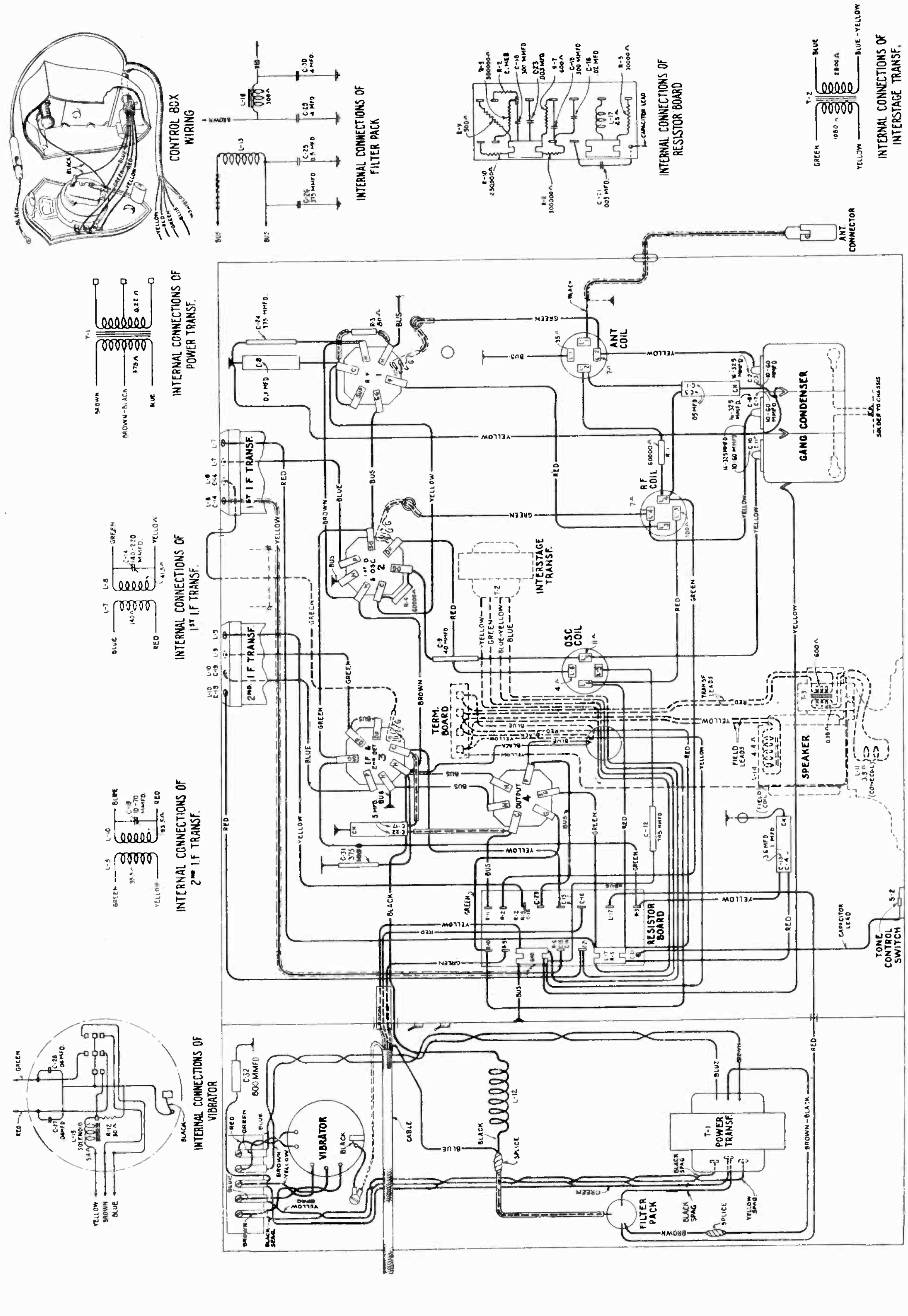


Figure B—Wiring Diagram

MODEL M-105
Parts List

RCA-VICTOR CO., INC.

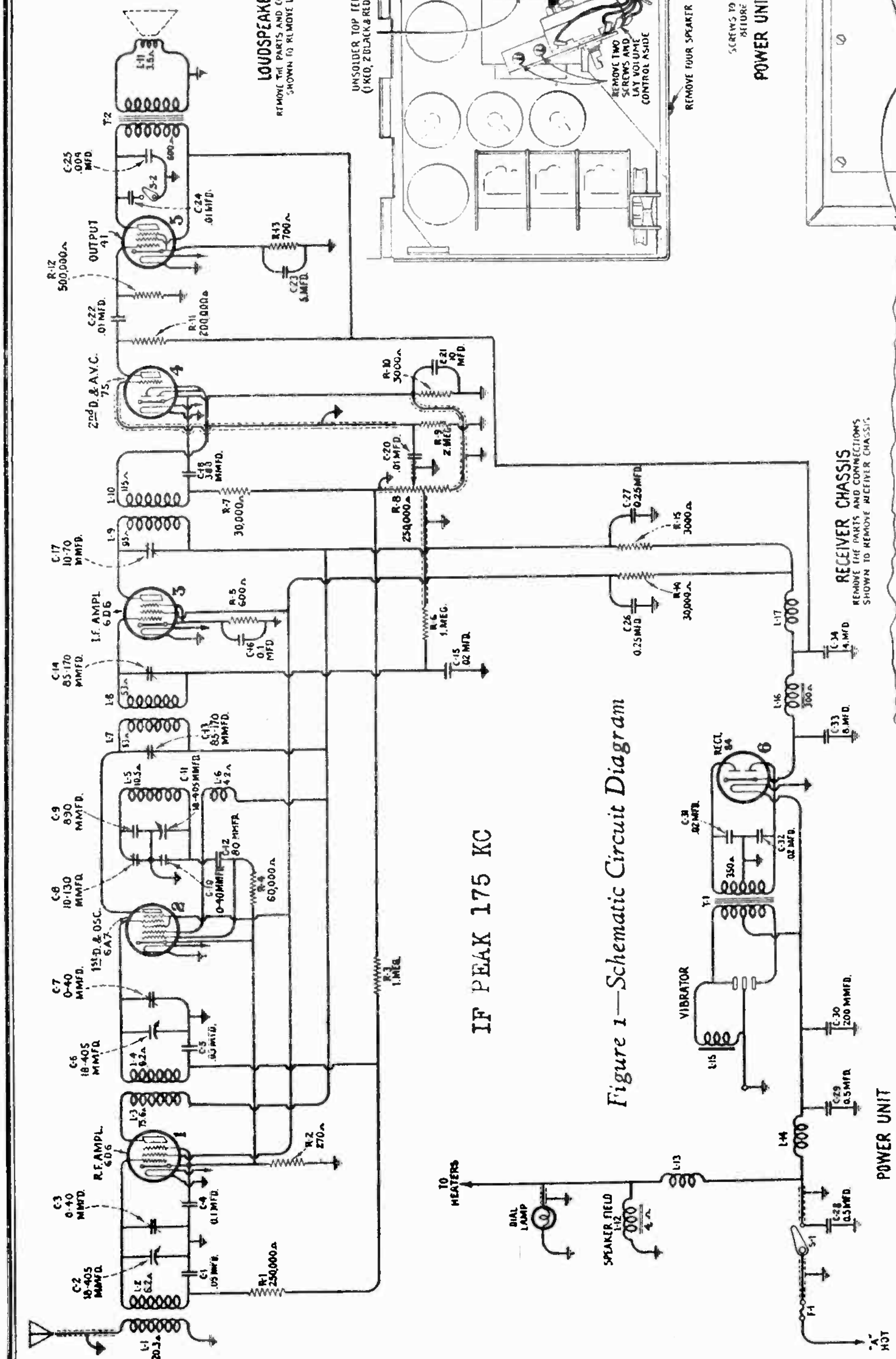
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3536	Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22)	1.10
3572	Socket—Radiotron 7-contact socket	.38
3584	Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C15, C18)	.34
3617	Capacitor—0.005 mfd. (C21)	.38
3618	Capacitor—0.02 mfd. (C16)	.38
3621	Coil—Choke coil—Located on resistor board (L17)	.35
3623	Shield—Antenna R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3636	Transformer—First intermediate frequency transformer (L7, L8, C14)	1.74
3637	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.65
3641	Capacitor—0.1 mfd. (C8)	.35
3645	Knob—Tone control knob—Package of 5	.90
3695	Capacitor—375 mmfd. (C24, C31)	.22
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C20)	.40
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
3745	Capacitor—745 mmfd. (C12)	.34
3746	Capacitor—800 mmfd. (C32)	.34
3920	Capacitor—.003 mfd. (C23)	.25
3921	Mounting screws, washer and bushing assembly—For 3-gang variable tuning condenser—Comprising three spacers, three screws, three washers and three lockwashers	.34
3922	Resistor—300,000 ohms—Carbon type—¼ watt (R6, R9)—Package of 5	1.00
4091	Resistor—80 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt (R2)—Package of 5	1.00
6298	Cord—Tuning condenser drive cord—Package of 5	.60
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6490	Tone control switch	.35
6492	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitor (C4, C13)	1.08
6493	Drum—Tuning condenser drive drum	.40
6514	Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5)	.28
6515	Cable—Shielded cable with antenna connector	.32
6516	Connector—Fuse connector	.16
6517	Cable—Main cable complete with fuse connector	1.40
6540	Coil—R. F. coil assembly (L3, L4)	.94
6731	Coil—Antenna coil (L1, L2)	.88
6732	Transformer—Interstage audio transformer (T2)	2.00
7485	Socket—Radiotron 6-contact socket	.40
7600	Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30)	4.06
7601	Condenser—3-gang variable tuning condenser	2.84
9049	Transformer—Power transformer (T1)	3.75
	CONTROL BOX ASSEMBLIES	
3649	Key—Volume control and switch key	$0.18
3650	Screw—Self locking No. 10–32–5/16" fulldog point set screw—Package of 10	.32
3651	Screw—Self locking No. 10–32–5/16" cupped point set screw—Package of 10	.32
3652	Screw—Self locking No. 10–32–¼" cupped point set screw—For flexible drive shaft—Package of 10	.32
3690	Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
3718	Bracket—Control box dash mounting bracket	.25
3757	Coupling—Slotted coupling for end of flexible drive shaft—Package of 5	.40
3758	Connector—For control box end of flexible drive shaft—Package of 5	.68
6161	Knob—Station selector knob—Package of 5	.90
6496	Shaft—Flexible drive shaft complete with connectors—Approximately 24⅛" long	1.60
6497	Shaft—Flexible drive shaft complete with connectors—Standard length—Approximately 33⅛" long	1.75
6499	Volume control—Combination volume control and switch (R8)	1.36
6500	Nut—Volume control and switch lock nut	.24
6531	Shaft—Flexible drive shaft complete with connectors—Approximately 12⅛" long	.85
6532	Shaft—Flexible drive shaft—Complete with connectors—Approximately 18⅛" long	1.24
6784	Scale—Dial scale	.58
7695	Box—Control box complete	3.70
7698	Cover—Control box cover	.44
	MISCELLANEOUS PARTS	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
3647	Nut—Cap nut and lock washer—Package of 10	.35
3648	Screw—No. 10–32–5/16" cap screw and lockwasher—Package of 10	.32
3689	Bracket—Receiver mounting bracket, bolt and nut assembly—One set	.30
3791	Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case	.30
3827	Cable—From fuse connector to ammeter	.10
3856	Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10	.30
3884	Clamp—Cable clamp—Package of 10	.20
4051	Bumper—Rubber bumper used in mounting receiver chassis—Package of 4	.20
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor splice-in suppressor	.56
6494	Capacitor—Ammeter capacitor—0.5 mfd.	.46
6495	Capacitor—Generator capacitor—0.5 mfd.	.72
6670	Suppressor—Spark plug suppressor—"Elbow type"	.56
7065	Screw-driver—For R. F. and I. F. adjustments	.80
7621	Antenna—Roof antenna—Paper type (Brown)	1.50
7622	Antenna—Roof antenna—Paper type (Gray)	1.50
7686	Housing—Front section of housing complete with mounting screws	3.48
7689	Vibrator Complete	7.84
7699	Housing—Rear section of housing complete with mounting screws	1.92
9050	Oscillator—Test oscillator—150-25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
3688	Transformer—Output transformer (T3)	1.50
7607	Screen—Metal screen	.44
7608	Coil assembly—Comprising field coil, magnet and cone support (L14)	2.40
9023	Cone—Reproducer cone complete (L11)—Package of 5	5.00

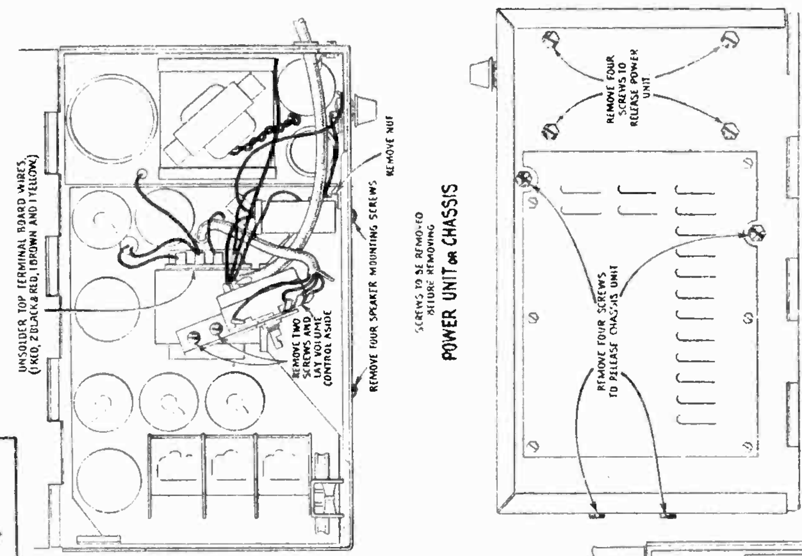
RCA-VICTOR CO., INC.

MODEL M-107
Schematic
Service Details



IF PEAK 175 KC

Figure 1—Schematic Circuit Diagram



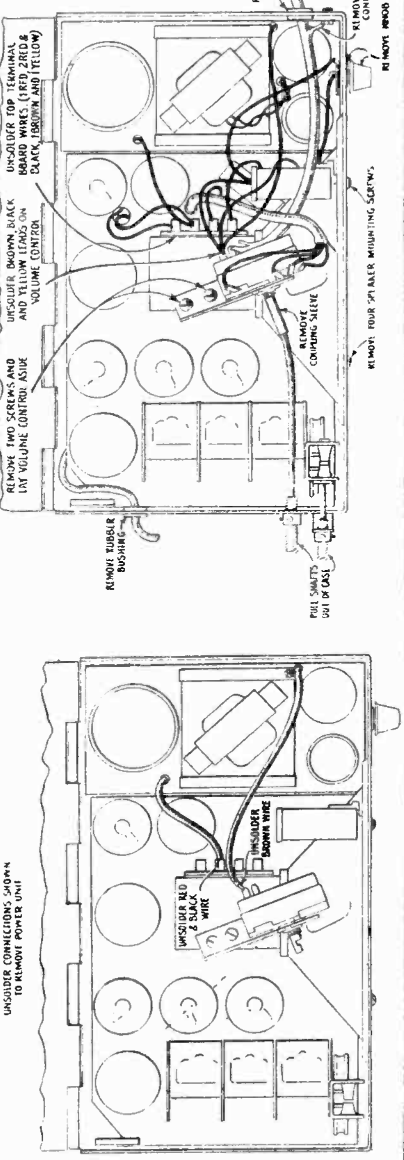


Figure 2

Details of Removing Units from Chassis

MODEL M-107
Chassis Wiring

RCA-VICTOR CO., INC.

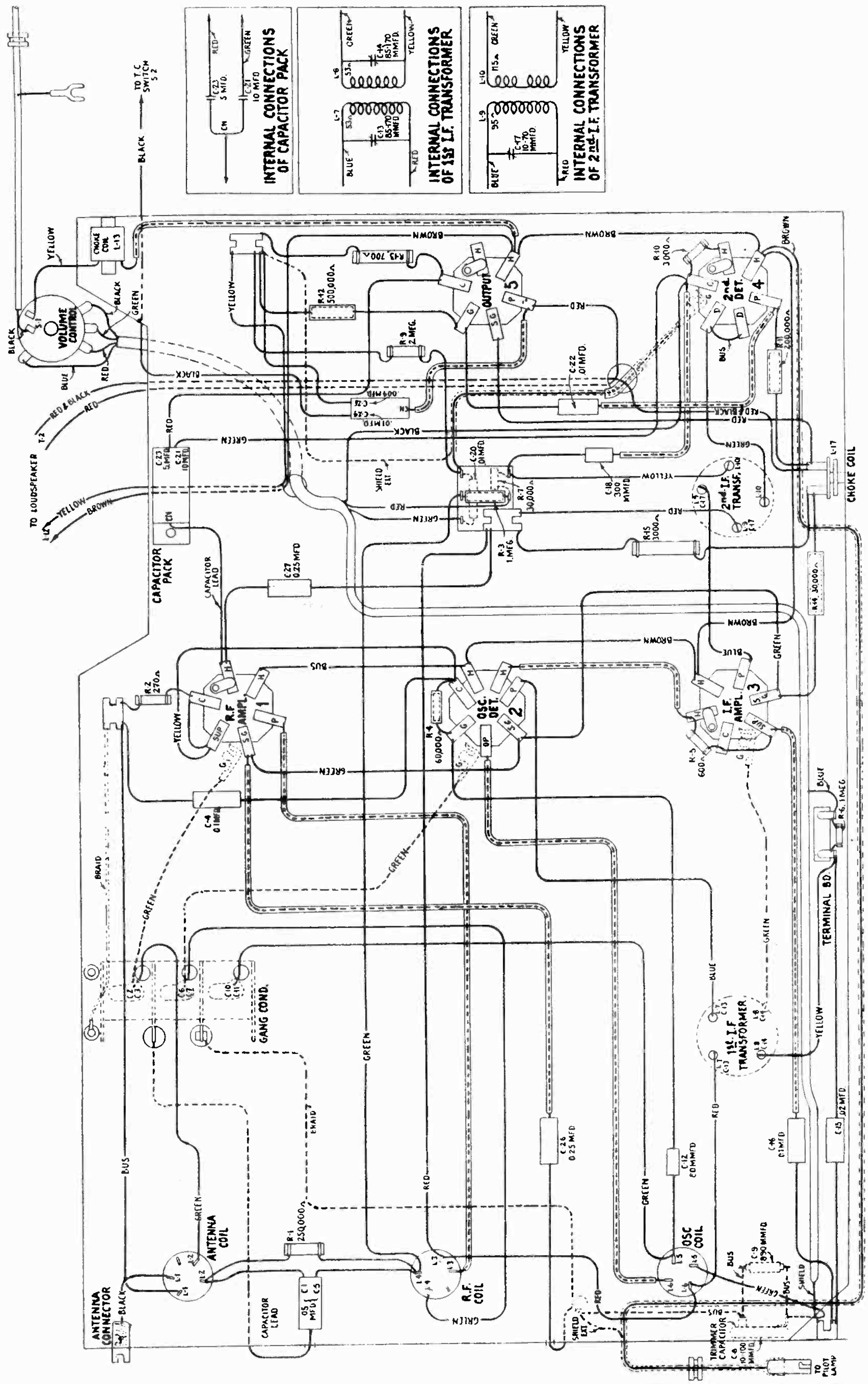


Figure 5—Receiver Assembly Wiring Diagram

RCA-VICTOR CO., INC.

SERVICE DATA

(1) Removing Units from Chassis:

The three major units, the power unit, the loudspeaker and the receiver chassis, are easily removed independently without disturbing the other units not removed. To do this, the use of a screwdriver and soldering iron are the only tools required. Figure 2 shows the details of the screws and terminals to be removed in each individual case.

(2) Line-Up Capacitor Adjustments:

Adjustable capacitors are provided in the R. F. oscillator and intermediate frequency amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator such as Full-Range Test Oscillator, type TMV-97-B (Stock No. 9050), a non-metallic screwdriver such as alignment wrench Stock No. 4160 and an output meter are required for properly aligning this receiver. Refer to Figure 3 for the location of the line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the primary and secondary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments:

The three-gang capacitor trimmer screws are located on the main tuning capacitor, accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Place the receiver in operation and attach the control box as in normal operation. Turn the tuning control until the tuning capacitors are fully meshed. Then set the indicator on the dial at the 530 K. C. reading. Turn the tuning control until the dial reads 1400. Then set the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the three-gang capacitor trimmer screws until maximum output is obtained. Be careful not to disturb the relation of the control box to the receiver after setting the dial.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the side of the chassis for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

(4) R. F. Interference from Vibrator with Shielded Lead-In Disconnected from Antenna:

In event R. F. interference originating with the vibrator inverter-rectifier unit is encountered, check the following points:

(a) Vibrator not properly seated. The vibrator must be pushed tight against its socket at all times.

(b) The various by-pass capacitors, such as C-28, C-29 and C-30 and chokes L-13, L-14 and L-16, must be properly connected, and in operating condition. It is well to remember that some of the interference produced by the vibrator is of a frequency as high as one meter and any replacement of capacitors must always be made with one of similar mechanical as well as electrical construction.

MODEL M-107
Vibrator Data
Trimmer Locations
Socket Layout

RCA-VICTOR CO., INC.

(5) Voltage Readings:

The following voltages are those at the tube socket while the receiver is in operating condition. No allowance has been made for currents drawn by the meter and if low resistance meters are used, such allowances must be made.

(6) Vibrator Inverter:

The Vibrator Inverter unit used in this receiver is of advanced design and construction. It is adjusted by means of special equipment at the factory and then sealed to prevent tampering. The unit is provided with a special plug-in base so that in event of suspected failure it may be easily interchanged with one of known condition.

With the seals unbroken, the Vibrator carries the standard ninety-day guarantee, which also applies to all parts of the receiver. Vibrator defects should be remedied by replacement, not by attempted adjustment.

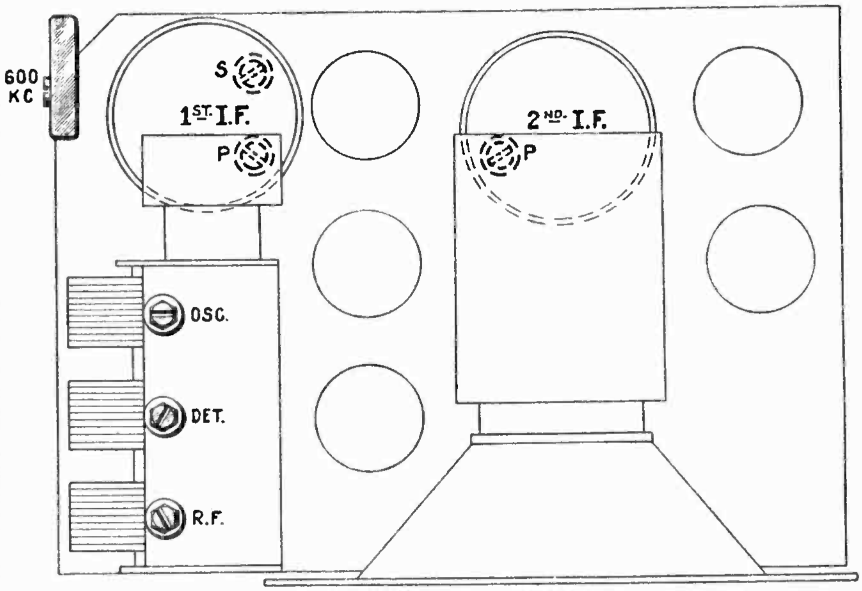


Figure 3—Location of Line-Up Capacitors

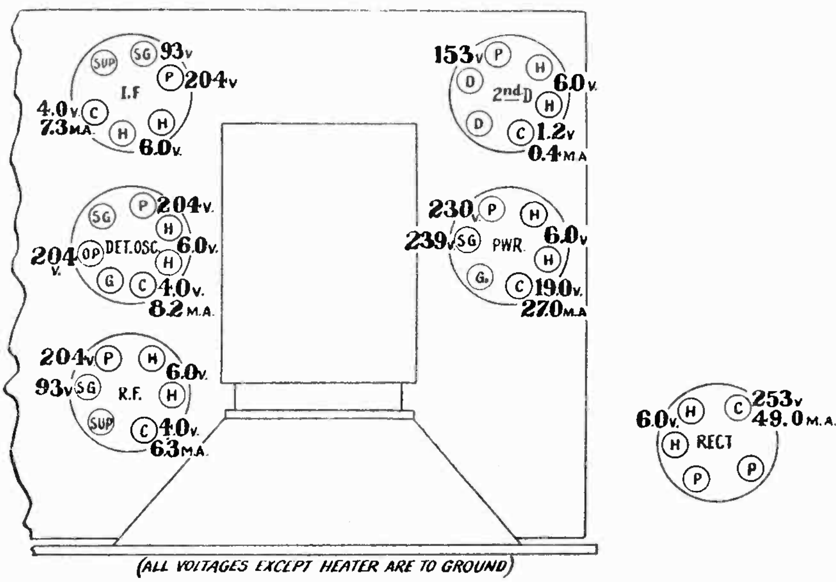


Figure 4—Voltages at Individual Socket Contacts

MODEL M-107
Voltage
Chassis Wiring

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal—Minimum Volume

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, D. C.
RCA-6D6—R. F.		4.0	93	204	6.3	6.0
RCA-6A7	1st Det.	4.0	93	204	8.2	6.0
	Osc.	—	—	204		
RCA-6D6—I. F.		4.0	93	204	7.3	6.0
RCA-75—2nd Det.		1.2	—	153*	0.4	6.0
RCA-41—Pwr.		19.0	239	230	27.0	6.0
RCA-84—Rect.		253	—	—	49.0	6.0

* Voltage impossible to measure with ordinary voltmeter.

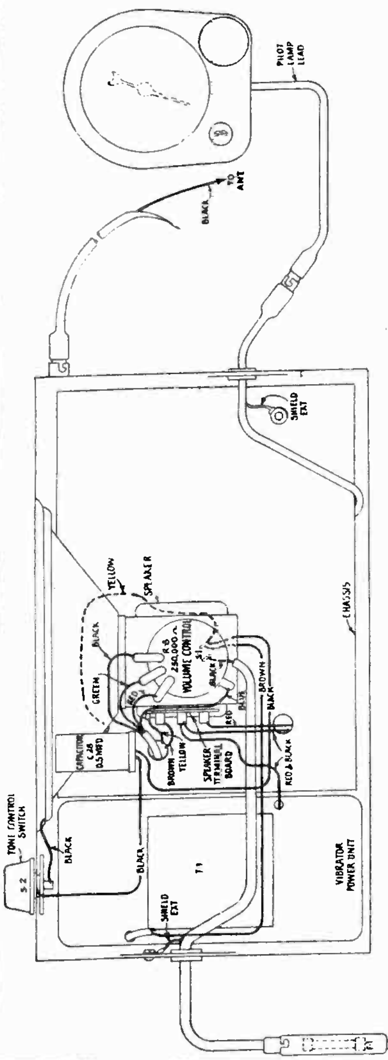


Figure 6—Assembly Wiring Diagram

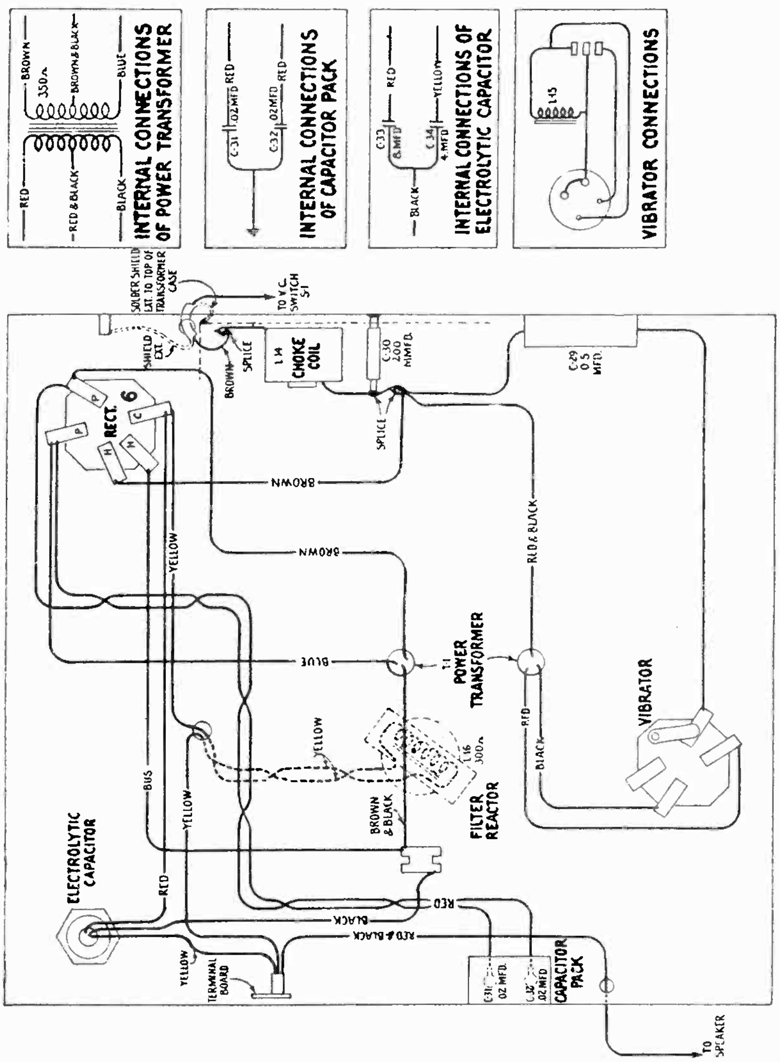


Figure 7—Power Unit Wiring Diagram

MODEL M-107
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	REPRODUCER ASSEMBLIES	
4305	Bracket—Tuning condenser drive bracket assembly	$0.45
6981	Cable—4-conductor shielded volume control cable	.42
4300	Cable—Single-conductor—Power input cable	.56
4301	Cable—Single-conductor—Dial lamp cable	.38
3861	Capacitor—Adjustable trimmer capacitor (C8)	.78
4246	Capacitor—80 mmfd. (C12)	.24
4248	Capacitor—300 mmfd. (C18)	.22
4245	Capacitor—890 mmfd. (C9)	.26
3639	Capacitor—.02 mfd. (C15)	.25
3701	Capacitor—.01 mfd. (C20, C22)	.30
3877	Capacitor—0.1 mfd. (C4, C16)	.32
3597	Capacitor—.25 mfd. (C26, C27)	.40
4304	Capacitor—0.5 mfd. (C28)	.72
6979	Capacitor pack—Comprising one .01 and one .004 mfd. (C24, C25)	.28
6963	Capacitor pack—Comprising one 5. mfd. and one 10 mfd. capacitor (C21, C23)	1.10
4243	Capacitor pack—Comprising two .05 mfd. capacitors (C1, C5)	.35
6965	Coil—Antenna coil (L1, L2)	.70
4299	Coil—Choke coil (L13)	.35
4298	Coil—Choke coil (L17)	.28
6967	Coil—Oscillator coil (L5, L6)	.52
6966	Coil—R. F. coil assembly (L3, L4)	.80
7768	Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11)	4.75
4306	Cord—Tuning condenser drive cord—Package of 10	1.05
6493	Drum—Tuning condenser dial drum and hub with set screws	.40
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
4307	Roller—Tuning condenser idler roller—Package of 5	.25
6135	Resistor—270 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3218	Resistor—600 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
4242	Resistor—3,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
3152	Resistor—30,000 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R11)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R12)—Package of 5	1.00
3033	Resistor — 1 megohm — Carbon type — ¼ watt (R3, R6)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R9)—Package of 5	1.00
4302	Resistor—700 ohms—Carbon type—1 watt (R13)—Package of 10	$2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R14)	.22
4239	Resistor—3,000 ohms—Carbon type—3 watt (R15)	.25
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
4233	Shield—Detector oscillator or output Radiotron shield	.22
4236	Shield—I. F. or R. F. amplifier Radiotron shield	.22
4232	Socket—6-contact Radiotron socket	.35
3572	Socket—7-contact Radiotron socket	.38
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6960	Transformer—First intermediate frequency transformer (L7, L8, C13, C14)	1.80
6962	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.85
6978	Volume control (R8)	1.20
	CONTROL BOX ASSEMBLIES	
6976	Back—Control box back	.75
7769	Box—Control box complete	3.90
3690	Bracket and strap assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
7770	Cover—Control box front cover	.86
4259	Cover—Station selector dial cover—Transparent celluloid—Package of 5	.92
4261	Dial—Station selector dial	.15
4258	Key—Volume control key	.20
4256	Lamp—Dial lamp	.30
4260	Pointer—Station selector indicator	.18
4257	Ring—Station selector dial cover ring (escutcheon)	.75
4262	Screen—Dial light screen—Package of 5	.26
4255	Screw—No. 4-40-¼ inch oval head machine screw for holding cover to control box back—Package of 10	.16
4252	Screw—No. 10-32-1$\frac{1}{16}$-inch fillister head set screw for holding condenser drive and pinion gear and volume coupling control shaft—Package of 10	.32
3652	Screw—No. 10-32-¼-inch cupped point set screw for holding station selector or volume control flexible drive shaft to control box—Package of 10	.32
4254	Shaft—Volume control coupling shaft	.36
4250	Shaft and gear—Station selector pointer shaft and gear	.56
4251	Shaft and gear—Station selector drive shaft and pinion gear	.20
4253	Spring—Volume control key holding spring—Package of 10	.32

REPLACEMENT PARTS—Continued

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	FLEXIBLE SHAFT AND CABLE ASSEMBLIES	
7762	Cable—Dial lamp cable with socket and section of connector	$.76
4264	Clamp—Metal clamp for holding flexible shafts—Package of 10	.35
4295	Screw—No. 10-32-¼-inch cupped point set screw—Fastens flexible shaft housing to metal case—Package of 10	.20
7771	Shaft—Station selector flexible drive shaft approximately 28 inches long	1.44
7773	Shaft—Station selector flexible drive shaft approximately 23 inches long	1.32
7772	Shaft—Volume control flexible drive shaft approximately 32 inches long	1.68
7774	Shaft—Volume control flexible drive shaft approximately 27 inches long	1.56
4265	Sleeve—Coupling sleeve for volume control shaft—Package of 5	.15
4263	Socket—Dial lamp socket	.20
	POWER SUPPLY UNIT	
4013	Capacitor—200 mmfd. (C30)	.30
4293	Capacitor—0.5 mfd. (C29)	.60
7779	Capacitor—Comprising two .02 mfd. capacitors (C31, C32)	.96
7776	Capacitor—Comprising one 8. mfd. and one 4 mfd. capacitors (C33, C34)	1.90
3956	Clamp—Capacitor mounting clamp—Package of 5	.32
7778	Coil—Filter reactor choke coil (L14)	.45
7777	Reactor—Filter reactor (L16)	1.14
4308	Screw—Binder head No. 6-32-¼-inch screw for mounting capacitor pack—package of 10	.18
6980	Socket—4-contact vibrator socket	.20
7484	Socket—5-contact Rectifier socket	.35
7775	Transformer—Vibrator transformer (T1)	3.78
7780	Vibrator complete (L15)	4.96
	REPRODUCER ASSEMBLIES	
9496	Coil—Field coil, magnet and cone support (L12)	2.95
9492	Cone—Reproducer cone (L11)—Package of 5	3.70
6982	Transformer—Output transformer (T2)	1.35
9494	Reproducer complete	5.65
4277	Screw—No. 8-32-⅜-inch binder head reproducer mounting screw—Package of 10	.22
	HOUSING ASSEMBLIES	
4322	Bracket assembly—Station selector drive shaft bracket and bushing	.28
4321	Cloth—Grille cloth	.22
7781	Housing—Front section of housing complete—Less hinge pin	3.38
7782	Housing—Rear section of housing complete—Less hinge pin	$2.68
4320	Nut—Wing nut—Package of 10	.38
4266	Pin—Hinge pin—Package of 5	.42
4318	Screw—Wing screw—Package of 10	.98
4319	Screw—No. 6-¼-inch slotted hex head self tapping—Fastens case bottom to front section of housing—Package of 10	.50
4295	Screw—No. 10-32-¼-inch headless set screw—Used to fasten drive shafts to housing—Package of 10	.20
	MISCELLANEOUS ASSEMBLIES	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
3689	Bracket—Receiver mounting bracket, bolt and nut assembly	.30
4283	Cable — Antenna lead-in cable — Approximately 35 inches long	.80
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
4293	Capacitor—Ammeter capacitor—.5 mfd.	.60
4292	Capacitor—Generator capacitor—.5 mfd.	.90
4291	Clip—"A" supply clip—Package of 10	.70
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
3646	Fuse—20 ampere (F1)—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
4323	Knob—Tone control switch knob—Package of 5	.70
4282	Knob—Station selector knob—Package of 5	.65
7766	Lead—Power lead with female section of fuse connector—From power cable to battery	.30
4492	Plate—Ornamental plate located on housing front—Package of 2	.58
4494	Plate—RCA Victor name plate	.94
4493	Screw—No. 4 self-tapping screw for mounting ornamental plates—Package of 10	.56
4495	Screw—No. 8 self-tapping screw for mounting station selector drive shaft and bushing—Package of 10	.52
4294	Screw—No. 10-32-$\frac{5}{16}$-inch hex head used to mount receiver chassis to housing—Package of 10	.45
4303	Screw—No. 10-32-$\frac{7}{16}$-inch hex head used to mount power unit to housing—Package of 10	.22
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
6152	Suppressor—Distributor suppressor	.56
6151	Suppressor—Spark plug suppressor	.56
6669	Switch—Tone control switch (S2)	.50
4285	Washer—Antenna or fuse connector insulating washer—Package of 10	.22

RCA-VICTOR CO., INC.

Power Requirements . . . . .105–125 volt, 50–60 Cycle A. C. or 6-volt Storage Battery
Power Consumption. .115 Volts, 60 Cycles A. C.—40 Watts, Battery—5.7 Amperes at 6.3 Volts
Number and Types of Radiotrons. . . . . .1 RCA-78, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-41, 1 RCA-1-V—Total 5
Maximum Undistorted Power Output. . . . . .1.8 Watts
Maximum Output. . . . . .3.6 Watts
Type of Rectifier. . . . . .A. C.—Radiotron RCA-1-V Battery—Vibrator Inverter-Rectifier
Tuning Frequency Range. . . . . .540 K. C.–1500 K. C.

This automobile receiver is of unique design and construction. Among its many features is its adaptability to either battery or 110-volt alternating current operation. This is accomplished by having a separate power transformer and a tube rectifier for alternating current, while the conventional vibrator inverter-rectifier with its associated transformer is used for battery operation.

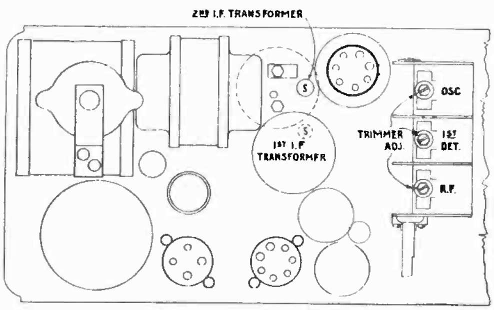


Figure C—Location of Line-up Capacitors

Other important features include its compact portable size, full vision "airplane" type dial, tone control, sensitivity switch, electro-dynamic loudspeaker and the inherent sensitivity, selectivity and tone quality characteristic of the superheterodyne.

Figure A shows the schematic diagram, Figure B the wiring diagram, Figure C the location of the line-up capacitors and Figure D the wiring of the battery cable. A brief description of the circuit follows:

Radio Circuit—The radio circuit consists of four Radiotrons; namely, an RCA-78 R. F. stage, an RCA-6A7 first detector-oscillator, an RCA-6B7 intermediate frequency amplifier, second detector and A. V. C. and an RCA-41 output amplifier.

Power Circuit—The power circuit for battery operation consists of a vibrator inverter-rectifier with its associated transformer and filter circuits. The heaters of the various Radiotrons are powered direct from the car storage battery. The operating switch is so arranged that at one position battery operation is obtained. while at the other position, proper connections are made for A. C. operation.

When the switch is at the A. C. position, the A. C. input current is connected to the primary of the A. C. transformer. Two secondaries are provided, one for furnishing power to the Radiotron heaters and the dial lamp, the other for plate supply to Rectifier RCA-1-V. The output of the rectifier is then filtered by the same filtering system as that used for battery operation. The loudspeaker field is used as a filter reactor.

Inverter-Rectifier Adjustments

This receiver uses a vibrator inverter-rectifier for supplying all plate and grid voltages when operated from a battery source. *This unit is accurately adjusted and sealed at the factory and service adjustment should not be attempted.*

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. In order to make these adjustments, it is first necessary to remove the cover of the instrument. The following procedure should be used:

R. F. Adjustment:

(a) Check the position of the dial pointer. It should be aligned with the low-frequency end graduation, as indicated by the small arrow marked "Max. Cap." when the tuning capacitor rotor is fully meshed with the stator.

(b) Procure a modulated oscillator giving a signal at 1400 K. C. (Stock No. 9050), a non-metallic screw driver (Stock No. 7065) and an output meter. Connect the output meter across the cone coil of the loudspeaker.

(c) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(d) Place the oscillator and receiver in operation and adjust the oscillator output so that a small deflection is obtained in the output meter when the volume control is at its maximum position.

(e) Then adjust the three line-up capacitors until a maximum deflection in the output meter is obtained. Readjust these capacitors a second time, as there is a slight interlocking of adjustments.

I. F. Adjustments:

(a) Procure a modulated oscillator giving a signal at 175 K. C. (Stock No. 9050), a non-metallic screw driver (Stock No. 7065) and an output meter.

(b) Connect the oscillator between the control grid of the first detector and ground.

(c) Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(d) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output. At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

RADIOTRON SOCKET VOLTAGES

115 Volts A. C. or 6.3 Volt Battery—No Signal—Max. Sensitivity

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.2	86	216	5.5	5.9
RCA-6A7	First Detector	4.2	86	216	10.0 Total	5.9
	Oscillator		—	216		
RCA-6B7 Second Det.		2.7	87	207	4.5	5.9
RCA-41 Power		15.0	255	235	30.0	5.9
RCA-1-V		—	—	325 RMS	50.0	5.9

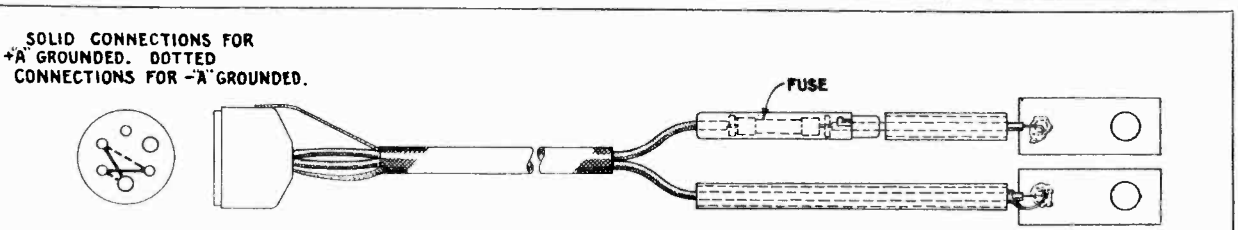


Figure D—Internal Connections of Cable

MODEL M-116
Chassis Wiring

RCA-VICTOR CO., INC.

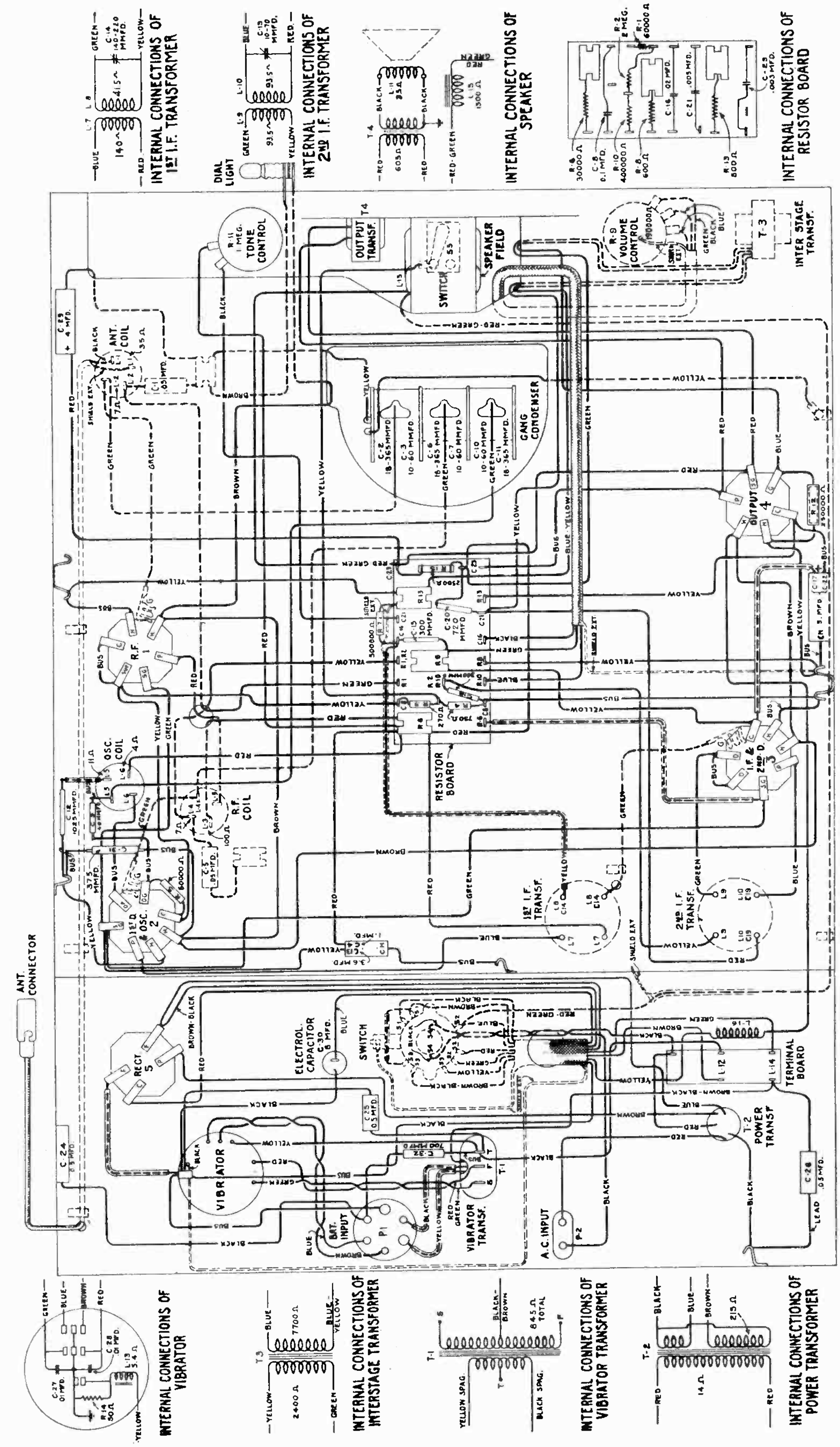


Figure B—Wiring Diagram

MODEL M-116
Schematic

RCA-VICTOR CO., INC.

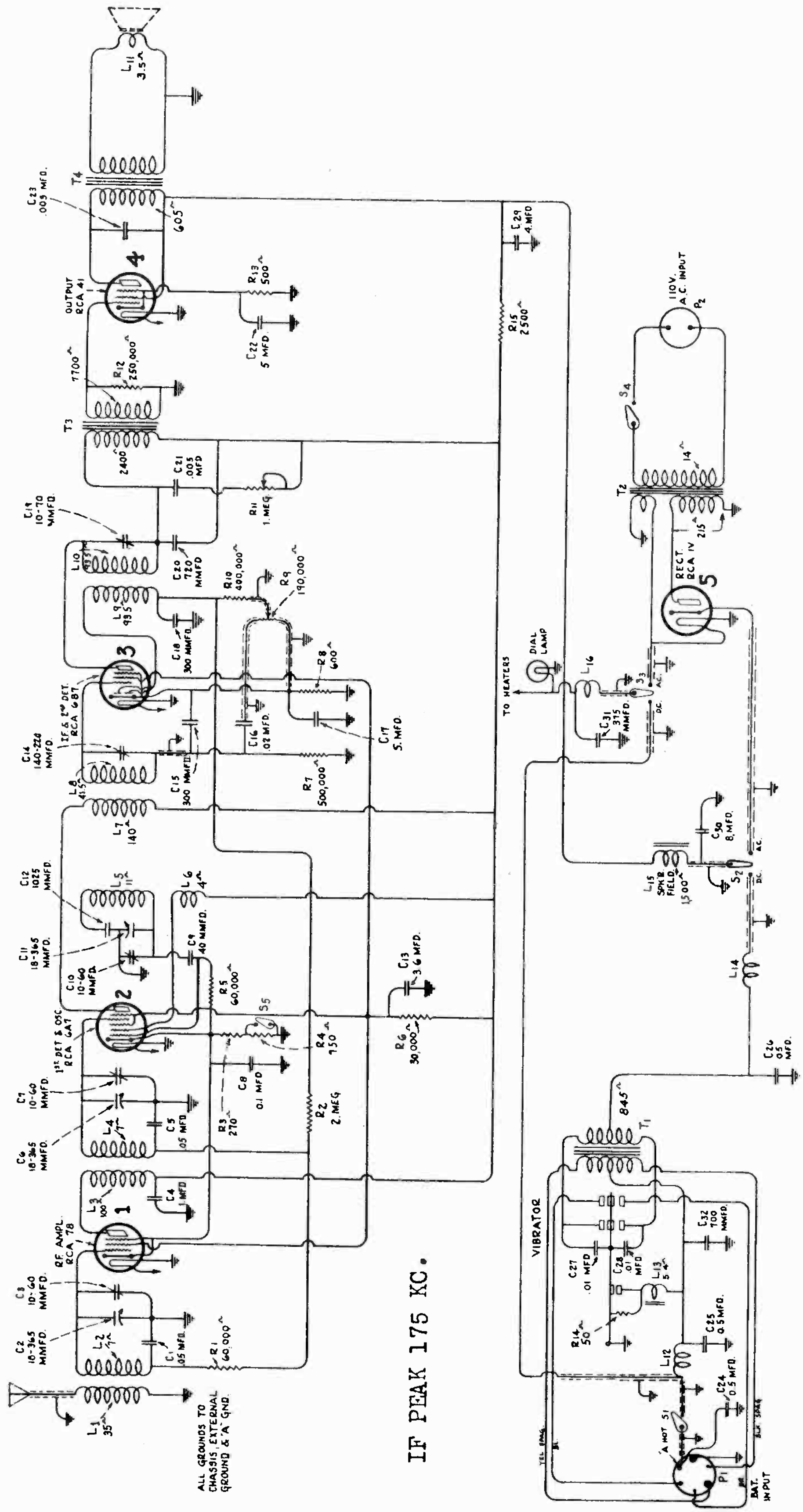


Figure A—Schematic Circuit Diagram

MODEL M-116
Installation Notes
Parts List

RCA-VICTOR CO., INC.

INSTALLATION

Automobile Installation

A typical installation of this receiver in an auto is accomplished in the following manner: Lift the seat upon which the instrument will rest, lay the battery cable and antenna shielded lead-in wire in position and then replace the seat. In cases where the automobile battery is mounted beneath that seat, however, it will be necessary to connect the battery cable to the battery (as described in the subsequent paragraph entitled "Connection to Battery") before replacing the seat. Finally, mount the receiver on the seat, attach the connector of the lead-in wire to the short (antenna) lead extending from the rear of the instrument and, with the power switch "off" (in AC position), insert the battery cable plug in the receptacle located adjacent to the antenna lead entrance.

Connection to Antenna—Feed the antenna lead-in wire beneath floor mat to the side of car nearest the wire extending from the antenna. The wire from a factory-installed roof antenna ordinarily is brought down one of the front pillar posts and left in a coil behind the instrument panel. In such cases, therefore, the lead-in wire after leaving the floor mat should be concealed behind the kick-board, then soldered to the wire extending from the antenna at the lower end of the body pillar post, after cutting the necessary length from each wire to eliminate excessive slack. Insulate the joint with tape and then solder or bond the pig-tail extension from the lead-in shield braid to the car frame.

A similar procedure is followed when either alternative form of antenna ("interior" roof or plate type) is employed except that the lead-in wire probably will follow a different route in each case. Such antennas should be mounted as far to the rear of the car as possible to insure minimum ignition interference. The lead-in wire for the interior type unit thus may be carried down the rear quarter of top and then behind the back cushion of seat in open and convertible models or may be anchored to any convenient pillar post in closed models. With the plate antenna, the lead-in wire should be fed through any opening in the floor board.

Connection to Battery—Since, in most cars, the storage battery is located below the floor boards of the driving compartment, the battery cable has been made sufficiently long to reach the battery after passing beneath the driver's seat (see note concerning longer cable available for rear seat operation—Equipment, "Battery Cable Package"). Run the cable under the floor mat and through the floor opening provided above the battery and connect the cable lugs to the battery terminal clamps as illustrated. The lug stamped "BATT. GROUND" must be connected to that side of the battery grounded to the car frame and the remaining lug (on lead with fuse receptacle) attached to the supply side of the battery. Finally, replace the floor cover, notching the side of the opening if necessary to provide clearance for the battery cable.

Suppression of Ignition Interference—

1. Disconnect all wires from the spark plugs. Fasten one spark-plug suppressor to the top of each plug and re-attach the wires to the free ends of the suppressors. These suppressors may be mounted either in line with or at right angles to the plugs in order to avoid interference with metallic parts grounded to the engine or frame.

2. If the distributor is of the plug-in type, disconnect the center wire from the head. Plug the distributor suppressor into the distributor head and insert the wire in the free end of the suppressor.

NOTE—For cap-type distributors, exchange the distributor suppressor at your dealer's for one of a special type. Cut the wire leading from the distributor to the coil and screw the suppressor into the end attached to the distributor. Screw the other end of the wire (leading to the coil) into the opposite end of the suppressor.

3. Clamp the generator capacitor against the generator frame. The screw holding the cut-out ordinarily may be utilized for securing this unit. Connect the capacitor lead to the terminal on the generator side of the cut-out switch. (In some cases, however, less interference will be encountered with this lead connected to the opposite side of the cutout; the most suitable position therefore should be determined by trial.)

4. The ignition capacitor (unit with two leads) must be connected between the battery terminal of the ammeter and any convenient screw on the instrument panel. In certain cars, interference will be reduced still further by connecting an additional capacitor (obtainable from your dealer) between the battery side of the ignition coil and the car frame.

Home Installation

The circular insert on the frontispiece illustrates a typical installation of this receiver on lighting-circuit operation. Simply place the instrument upon a table or other level surface, attach the antenna lead-in wire (using the small connector furnished) and, with the power switch "off" (in "AUTO" position), connect the power cord to an electrical outlet supplying *alternating current* at the voltage and frequency (cycles) specified on the rating label inside the case.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—¼ watt (R6)	$0.22
2734	Capacitor—745 mfd. (C-36)—Package of 5	1.50
2747	Cap—Contact cap—Package of 5	.50
2917	Washer—"C" washer for condenser drum and shaft assembly—Package of 10	.25
3218	Resistor—600 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3469	Resistor—2,500 ohms—Carbon type—1 watt (R15)—Package of 5	1.10
3536	Capacitor—Comprising two 5.0 mfd. (C17, C22)	1.10
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
3597	Capacitor—0.25 mfd. (C33)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1, R5)—Package of 5	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
3621	Coil—Choke coil—Located on terminal board (L14)	.35
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type (R13)—Package of 5	1.10
3639	Capacitor—0.02 mfd. (C16)	.25
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C20)	.40
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R12)—Package of 5	1.00
3751	Capacitor—0.5 mfd. (C25)	.40
3877	Capacitor—0.1 mfd. (C8)	.32
3888	Capacitor—0.05 mfd. (C1, C5)	.25
3920	Capacitor—0.003 mfd. (C23)	.25
3937	Capacitor—300 mmfd. (C15, C18)	.34
3950	Shield—Radiotron shield	.26
3954	Screw—Chassis mounting screw and washer assembly—Package of 10	.32
3955	Coil—Choke coil—Located on terminal board (L12)	.68
3956	Clamp—Capacitor mounting clamp—Package of 5	.32
3957	Indicator—Station selector indicator pointer—Package of 5	.42
3958	Plug—2-contact "AC" connection plug	.50
3959	Plug—6-contact "DC" connection plug	.40
3968	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
3969	Cord—Tuning condenser drive cord—Package of 10	1.22
3970	Drum and shaft assembly—Small—For tuning condenser drive	.24
3971	Escutcheon—Switch escutcheon engraved "AC-DC"	.24
3972	Drum and bushing assembly—Large—For tuning condenser drive	.34
3993	Screw—Set screw for tuning condenser drive drum—Package of 10	.25
4001	Capacitor—1.02 5mmfd. (C12)	.32
4002	Capacitor—375 mmfd. (C31)	.30
4003	Capacitor—700 mmfd. (C32)	.30
4020	Resistor—750 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
4089	Capacitor—Two 0.05 mfd. (C34, C35)	.40
6135	Resistor—270 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
6165	Lamp—Station selector dial lamp—Package of 5	1.75
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R2)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6512	Capacitor—0.005 mfd. (C21)	.28
6738	Capacitor—8.0 mfd. (C30)	1.54
6739	Condenser—3-gang variable tuning condenser assembly (C2, C3, C6, C7, C10, C11)	5.16
6740	Transformer—First intermediate frequency transformer (L7, L8, C14)	2.16
6741	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.78
6742	Coil—Antenna coil assembly (L1, L2)	.88
6743	Coil—R. F. coil assembly (L3, L4)	.98
6744	Capacitor—0.05 mfd. (C26)	.30
6745	Coil—Oscillator coil assembly (L5, L6)	.62
6746	Volume control (R9)	1.20
6747	Tone control (R11)	1.20
6748	Switch—Noise suppressor switch (S5)	.40
6749	Switch—AC-DC switch (S1, S2, S3, S4)	2.14
6759	Transformer—Interstage transformer (T3)	2.55
6781	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. (C4, C13)	1.10
6782	Capacitor—4.0 mfd. (C29)	1.10
7485	Socket—6-contact Radiotron socket	.40

Stock No.	DESCRIPTION	List Price
9456	Transformer—Power transformer—105-125 volts, 50-60 cycles (T2)	$4.00
9457	Transformer—Power transformer—9 volts (T1)	4.78
	CABLE ASSEMBLIES	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
4008	Shield—Metal shield for cable plug—Package of 5	.58
4009	Terminal—Metal terminal (plain) for battery connection—Package of 5	.44
4010	Terminal—Metal terminal engraved "Batt-Ground"—For battery connection—Package of 5	.44
6150	Plug—Battery cable plug	.50
6516	Connector—Fuse connector	.16
6760	Cable—7-conductor shielded—Switch cable	.40
6761	Cable—2-conductor shielded—Approximately 10½ inches long, from resistor board to volume control	.26
6762	Lead—Antenna lead-in—Approximately 15½ inches long—With connector	.44
6773	Cable—Battery cable—Plus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
6774	Cable—Battery cable—Minus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
6775	Cable—Battery cable—Plus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.30
6776	Cable—Battery cable—Minus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.30
6777	Cable—Antenna lead-in cable—Shielded—Approximately 98 inches long—With connector	1.26
6778	Cable—7-conductor shielded cable	.42
6779	Cable—2-conductor shielded cable—Approximately 58 inches long	1.10
6780	Cable—2-conductor shielded cable—Approximately 102 inches long	2.04
6834	Cable—Battery cable—Minus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal	3.92
6835	Cable—Battery cable—Plus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal	3.92
6836	Lacquer—Touch up lacquer (1 pint of lacquer and 1 pint of thinner)	2.25
	MISCELLANEOUS PARTS	
3960	Handle—Carrying handle	.44
3961	Knob—Tone control, volume control or suppressor switch knob—Package of 5	.60
3962	Knob—Station selector knob—Package of 5	1.00
3963	Knob—"AC-DC" switch knob—Package of 5	.60
3964	Bezel—Metal bezel for station selector dial glass	.54
3965	Glass—Station selector dial glass	.22
3966	Spring—Contact spring—Grounds vibrator shield to case—Package of 10	.92
4011	Capacitor—0.5 mfd. (C24)	.60
4017	Scale—Station selector dial scale—Package of 5	1.38
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor suppressor—Splice in type	.56
6494	Capacitor—0.5 mfd.—Ammeter capacitor	.46
6495	Capacitor—0.5 mfd.—Generator capacitor	.72
6670	Suppressor—Spark plug suppressor—"Elbow" type	.56
6763	Cord—Power cord with connectors	.94
7694	Vibrator—Complete (C27, C28, L13, R14)	10.04
7696	Housing—Metal housing—Top section	5.44
7697	Base—Housing base	.90
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6750	Screen—Dust screen	.28
6751	Screen—Metal screen	.46
6764	Transformer—Output transformer (T4)	1.42
6772	Ring—Felt ring—Used between speaker and metal housing—Package of 5	1.20
8987	Cone—Reproducer cone (L11)—Package of 5	5.00
9458	Reproducer complete	5.20
9459	Coil—Comprising field coil, magnet and cone support (L15)	3.34

RCA-VICTOR CO., INC.

MODEL 118,211
Schematic
Trimmer Locations

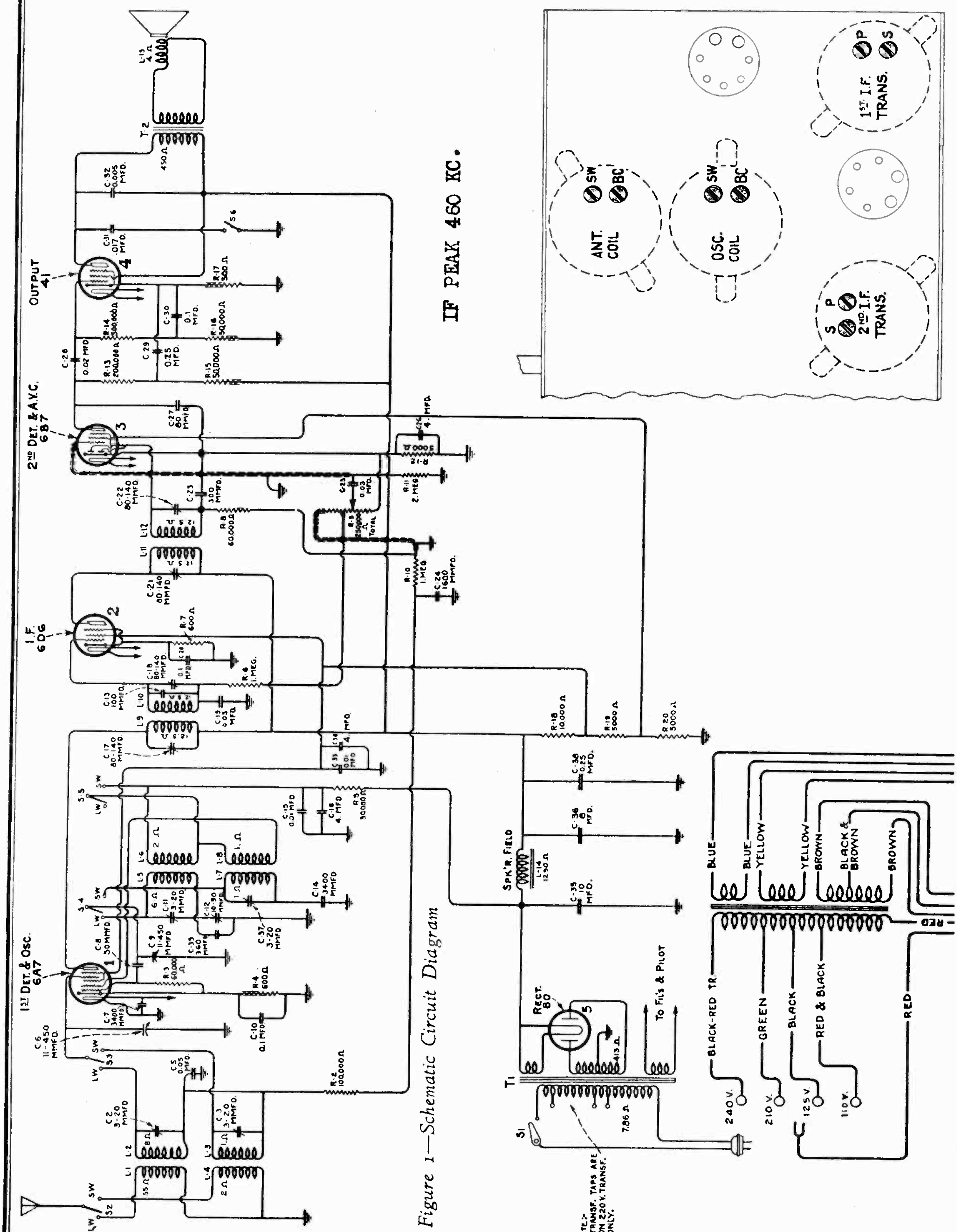


Figure 1—Schematic Circuit Diagram

Figure 5—Power Transformer Connections

Figure 6—Location of Line-Up Capacitors

MODEL 118,211
Chassis Wiring

RCA-VICTOR CO., INC.

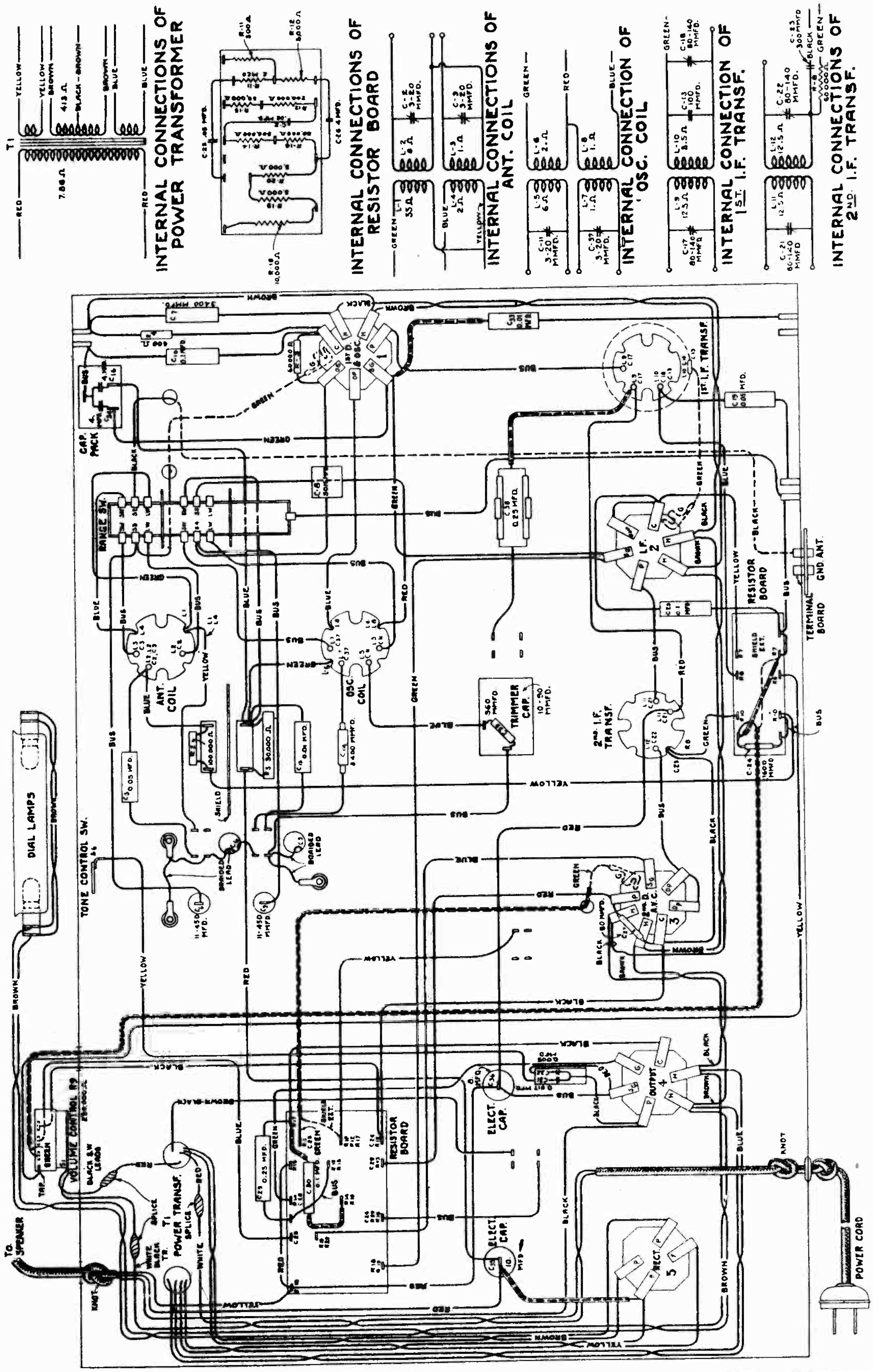


Figure 2—Wiring Diagram

MODEL 118,211
Voltage
Socket Layout
Loud Speaker Wiring

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES

115-Volt, A. C. Line—Maximum Volume Control—No Signal

		Cathode to Grid Volts	Screen Grid to Ground	Plate to Ground	Plate M.A.	Heater Volts
	Detector		105	265	3.5	
6A7		6.0				6.3
	Oscillator		---	220	4.5	
6D6	I.F.	6.0	105	265	9.0	6.3
6B7	2nd Det. AVC	3.0	50*	90*	0.7	6.3
41	Power Output	16.5	265	245	30.0	6.3
80	Rectifier	---	---	690**	64.0	5.0

* = Voltage calculated from 265 v. +B
** = Plate to plate

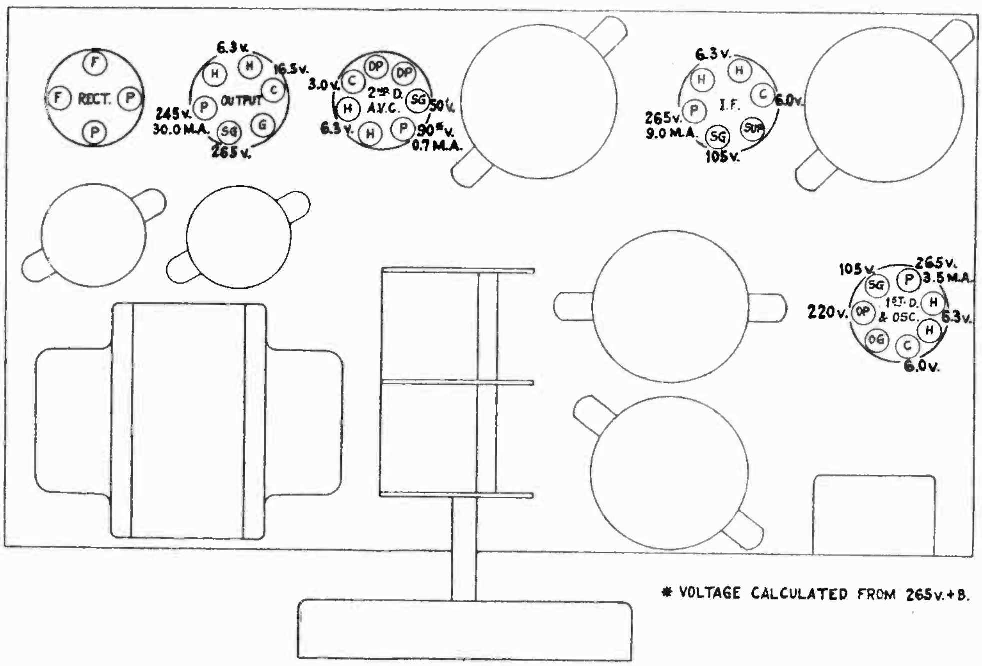


Figure 7—Radiotron Socket Voltages

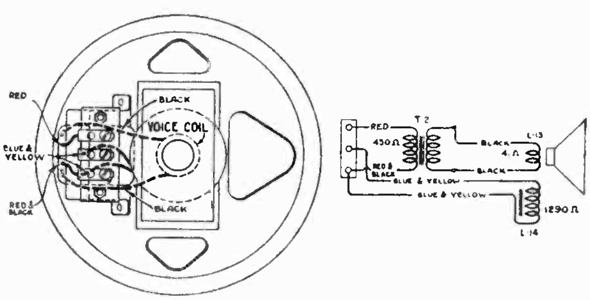


Figure 3—Table Model Loudspeaker Wiring

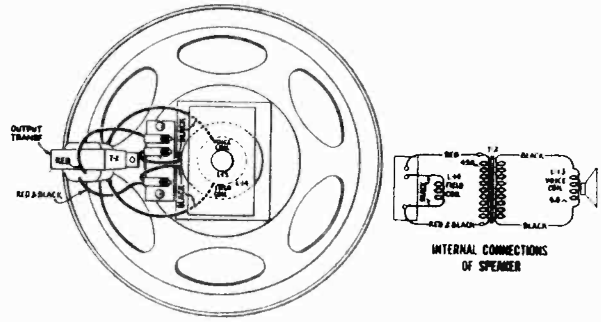


Figure 4—Console Model Loudspeaker Wiring

MODEL 118,211
Alignment Data
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

(1) Line-Up Capacitor Adjustments:

To properly align this receiver, it is essential that a modulated R. F. oscillator, such as Stock No. 9050, an output indicator and an alignment tool (Stock No. 4160) be available. Figure 5 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 460 K. C. and the adjustment screws are accessible as shown in Figure 6. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments:

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the top of he chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1720 K. C., the dial indicator at 1720 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the two trimmers under the two R. F. coils, designated as BC in Figure 6, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 18,000 K. C. and set the dial at 18M. Adjust the two trimmer capacitors designated as SW in Figure 5 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. The detector trimmer *must* be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Both of these adjustments must be made as indicated irrespective of output.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

(2) Radiotron Socket Voltages:

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made:

(3) Power Transformer Connections:

Models supplied for 220-volt power supply, use a power transformer having a tapped primary. The tapped primary permits it to be used either on lines of 100-130 volts or 195-250 volts. Figure 5 shows the internal connections of the transformer and the voltages to be used with the various taps. The taps are located on a terminal strip at the top of the transformer so that necessary changes may be made without removing the receiver from the cabinet.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
10194	Ball—Steel ball for condenser drive assembly—Package of 20	$0.25
4358	Bracket—Capacitor mounting bracket	.15
4427	Bracket—Volume control mounting bracket	.18
2747	Cap—Contact cap—Package of 5	.50
4428	Capacitor—8 mfd. (C36)	1.05
7790	Capacitor—10 mfd. (C35)	1.05
4442	Capacitor—50 mmfd. (C8)	.22
4509	Capacitor—80 mmfd. (C27)	.15
4413	Capacitor—360 mmfd. (C39)	.22
4441	Capacitor—1600 mmfd. (C24)	.35
4439	Capacitor—3400 mmfd. (C14)	.35
4471	Capacitor—3400 mmfd. (C7)	.44
4443	Capacitor—0.01 mfd. (C15)	.25
4444	Capacitor—0.01 mfd. (C33)	.22
4435	Capacitor—0.02 mfd. (28)	.25
3888	Capacitor—0.05 mfd. (C25)	.25
4417	Capacitor—0.05 mfd. (C5)	.25
3901	Capacitor—0.05 mfd. (C19)	.36
3877	Capacitor—0.1 mfd. (C20, C30)	.32
4415	Capacitor—0.1 mfd. (C10)	.22
3597	Capacitor—0.25 mfd. (C29, C38)	.40
3796	Capacitor—4.0 mfd. (C26)	.60
3861	Capacitor — Adjustable trimmer capacitor (C12)	.78
6787	Capacitor pack—Comprising one 0.005 and one 0.017 mfd. capacitors (C31, C32)	.30
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34)	1.64
4422	Clutch—Condenser drive clutch assembly complete	.88
4430	Coil—Antenna coil (L1, L2, L3, L4, C2, C3)	1.92
4432	Coil—Oscillator coil (L5, L6, L7, L8, C11, C37)	1.65
4504	Condenser—2-gang variable tuning condenser (C6, C9)	2.78
4434	Drive—Tuning condenser drive assembly complete	2.42
3632	Resistor—500 ohms—Carbon type—¼ watt (R17)—Package of 5	1.10
3218	Resistor—600 ohms—Carbon type—¼ watt (R4, R7)—Package of 5	1.00
4436	Resistor—5,000 ohms—Carbon type—¼ watt (R12)—Package of 10	2.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R16)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R6, R10)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R11)—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3891	Resistor—5,000 ohms—Carbon type—1 watt (R19, R20)—Package of 5	1.10
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	.22
6318	Resistor—10,000 ohms—Porcelain type (R18)	.80
3943	Screen—Translucent screen for dial lamps—Package of 2	.18
4445	Screen—Chassis mounting screw assembly—Comprising 4 screws, 4 lockwashers, 4 washers, 4 spacers and 4 cushions	.28

Stock No.	Description	List Price
3993	Screw—No. 6-32-⅝" square head set screw for condenser drive—Package of 10	$0.25
7800	Shield—Antenna, oscillator or I. F. transformer coil shield	.45
4145	Shield—First detector and oscillator Radiotron shield	.30
4103	Shield—I. F. Radiotron shield	.20
4438	Shield—Second detector—AVC Radiotron shield	.25
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
7485	Socket—6-contact Radiotron socket	.40
6676	Socket—6-contact output Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4426	Switch—Tone control switch (S6)	.35
4437	Switch—Range switch (SW-BC) (S2, S3, S4, S5)	2.35
9511	Transformer—105-125 volts—50-60 cycles	4.78
4431	Transformer—First intermediate frequency transformer (L9, L10, C13, C17, C18)	2.28
9512	Transformer—Power transformer—105-125 volts—25-40 cycles	6.58
9513	Transformer—Power transformer—200-230 volts—50-60 cycles (T1)	4.85
4433	Transformer—Second intermediate frequency transformer (L11, L12, R8, C21, C22, C23)	2.15
4429	Volume control (R9)	1.40
	REPRODUCER ASSEMBLIES (CONSOLE)	
4473	Board—Reproducer terminal board	.26
4445	Cable—3-conductor-reproducer cable	.36
9460	Coil—Field coil—Magnet and cone support	6.00
8935	Cone—Reproducer cone—Package of 5	5.25
9527	Reproducer complete	8.00
4472	Transformer—Output transformer	1.40
	REPRODUCER ASSEMBLIES (TABLE)	
4448	Board—Reproducer terminal board	.25
4445	Cable—3-conductor-reproducer cable	.36
9531	Coil—Field coil magnet and cone support	2.75
9492	Cone—Reproducer cone (L13)—Package of 5	3.70
9514	Reproducer complete	6.00
4447	Shield—Terminal board shield	.18
4505	Transformer—Output transformer (T2)	1.55
	MISCELLANEOUS ASSEMBLIES	
6706	Bezel—Station selector dial escutcheon bezel—Model 118	42
4450	Dial—Station selector dial—Model 211	.52
4474	Dial—Station selector dial—Model 118	.76
6840	Escutcheon—Station selector escutcheon—Model 211	.56
6707	Glass—Station selector dial glass—Model 118	.20
6614	Glass—Station selector dial glass—Model 211	.30
4449	Knob—Station selector, volume control, tone or range switch knob—Package of 5	.60
4348	Lamp—Pilot lamp	.38
4363	Pointer—Station selector indicator pointer—Model 211	.18
4475	Pointer—Station selector indicator pointer—Model 118	.18
6708	Ring—Spring retaining ring for dial glass—Package of 5—Model 118	.44
6615	Ring—Spring retaining ring for dial glass—Package of 5—Model 211	.34
4613	Screw—8-32-1⁄16" headless set screw for knob—Package of 10	.25

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Type and Number of Radiotrons Used—2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-41, 1 RCA-79 —Total, 6

Battery Current (6.3 Volt Battery):
- Speaker Field (Cold) .... 1.35 Amperes
- Tubes .... 2.2 Amperes
- Dial Lamp .... 0.15 Ampere
- Power Supply (No Signal) .... 2.8 Amperes
- Total (No Signal) .... 6.5 Amperes
- Total (Maximum Output) .... 8.0 Amperes (Average)

Tuning Frequency Range ..... 540 K. C.–1600 K. C.
Maximum Undistorted Output .... 4.2 Watts
Maximum Output .... 6.8 Watts
Line-up Frequencies .... 175 K. C., 600 K. C., 1400 K. C.

(1) Removing Units from Chassis:

The three major units, the power unit, the loudspeaker and the receiver chassis, are easily removed independently without disturbing the other units not removed. To do this, the use of a screwdriver is the only tool required. Figure 2 shows the details of the screws and terminals to be removed in each individual case.

(2) Loose or Tight Tuning Action:

An adjustment screw is provided at the worm drive unit, so that proper tension may be provided for the particular worm being used. The instruction book accompanying the instrument describes the proper manner of turning the drive assembly when using either right or left hand drives. However, whenever this change is made, the adjusting screw located on the front of the drive unit should be loosened or tightened until a satisfactory amount of tension and elimination of backlash is obtained.

(3) Line-up Capacitor Adjustments:

Adjustable capacitors are provided in the R. F. oscillator and intermediate frequency amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator such as Full Range Test Oscillator, Type TMV-97-B (Stock No. 9050), a non-metallic screwdriver such as alignment wrench Stock No. 4160 and an output meter are required for properly aligning this receiver. Refer to Figure 3 for the location of the line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

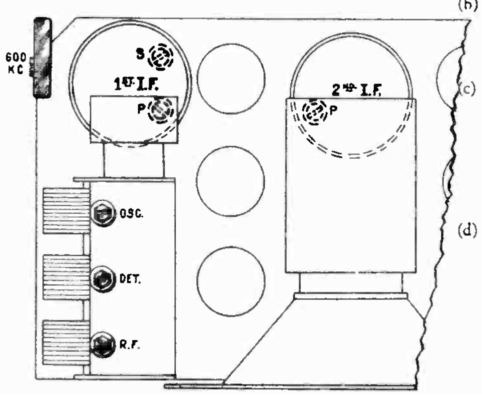


Figure 3—Location of Line-up Capacitors

R. F. and Oscillator Adjustments:

The three-gang capacitor screws are located on the main tuning capacitor, accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Place the receiver in operation and attach the control box as in normal operation. Turn the tuning control until the tuning capacitors are fully meshed. Then set the indicator on the dial at the 530 K. C. reading. Turn the tuning control until the dial reads 1400. Then set the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the three-gang capacitor trimmer screws until maximum output is obtained. Be careful not to disturb the relation of the control box to the receiver after setting the dial.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the side of the chassis for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

(4) R. F. Interference from Vibrator:

In event R. F. interference originating with the vibrator inverter-rectifier unit is encountered, check the following points:

(a) Vibrator not properly seated. The vibrator must be pushed tight against its socket at all times.

(b) The clip from the top of the R. F. tube shield to the gang-capacitor must be in place.

(c) The various by-pass capacitors, such as C-29, C-30, C-31, C-34, C-37, and chokes L-16 and L-14, L-13, must be properly connected, and in operating condition. It is well to remember that some of the interference produced by the vibrator is of a frequency as high as one meter and any replacement of capacitors must always be made with ones of similar mechanical as well as electrical construction.

(5) Voltage Readings:

The following voltages are those at the tube socket while the receiver is in operating condition. No allowance has been made for currents drawn by the meter and if low resistance meters are used, such allowances must be made.

(6) Vibrator Inverter-Rectifier:

The Vibrator Inverter-Rectifier unit used in this receiver is of advanced design and construction. It is adjusted by means of special equipment at the factory and then sealed to prevent tampering. The unit is provided with a special plug-in base so that in event of suspected failure it may be easily interchanged with one of known condition.

With the seals unbroken, the Vibrator carries the standard ninety-day guarantee, which also applies to all parts of the receiver. Vibrator defects should be remedied by replacement, not by attempted adjustment.

(7) Stiff Tuning Mechanism:

In event the station selector turns hard or stiff, it is probably due to excessive pressure between the worm and drive gear. Proper tension between these units exists when the gear is pushed 1/16" beyond the point of contact with the worm, before being tightened.

(8) Antenna Lead Clamp

A clamp has been provided for holding the antenna lead securely to the side of case. This clamp is held by one of the chassis mounting screws and prevents the antenna lead from interfering with the operation of the brake pedal or starter button. When making an installation it is important to see that this lead is securely clamped.

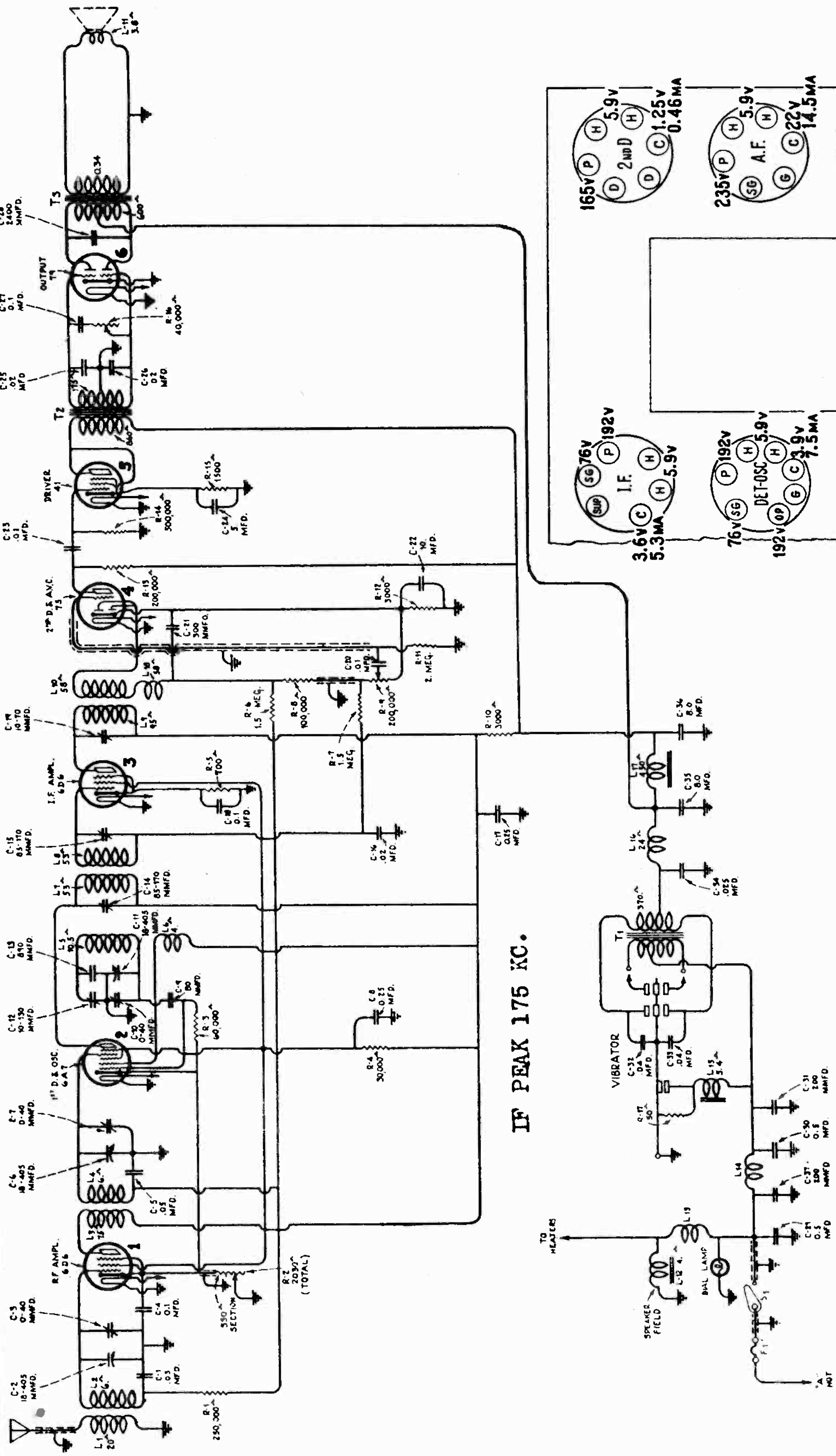
RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal—Maximum Sensitivity

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, D. C.
RCA-6D6—R. F.		3.9	76	192	4.5	5.9
RCA-6A7	1st Det.	3.9	76	192	7.5	5.9
	Osc.		—	192		
RCA-6D6—I. F.		3.6	76	192	5.3	5.9
RCA-75—2nd Det.		1.25	—	165	.46	5.9
RCA-41—A. F.		22.0	—	235	14.5	5.9
RCA-79—Pwr.		0	—	256	10.5	5.9

MODEL M-123
Schematic
Socket Layout

RCA-VICTOR CO., INC.



IF PEAK 175 KC.

Figure 1—Schematic Circuit Diagram

All voltages except heater are to ground.

Figure 4—Voltages at Individual Socket Contacts

RCA VICTOR MODEL M-123

Six-Tube "DeLuxe" Automobile Receiver

[First Edition
Copyright June, 1934]

MODEL M-123
Service Details

RCA-VICTOR CO., INC.

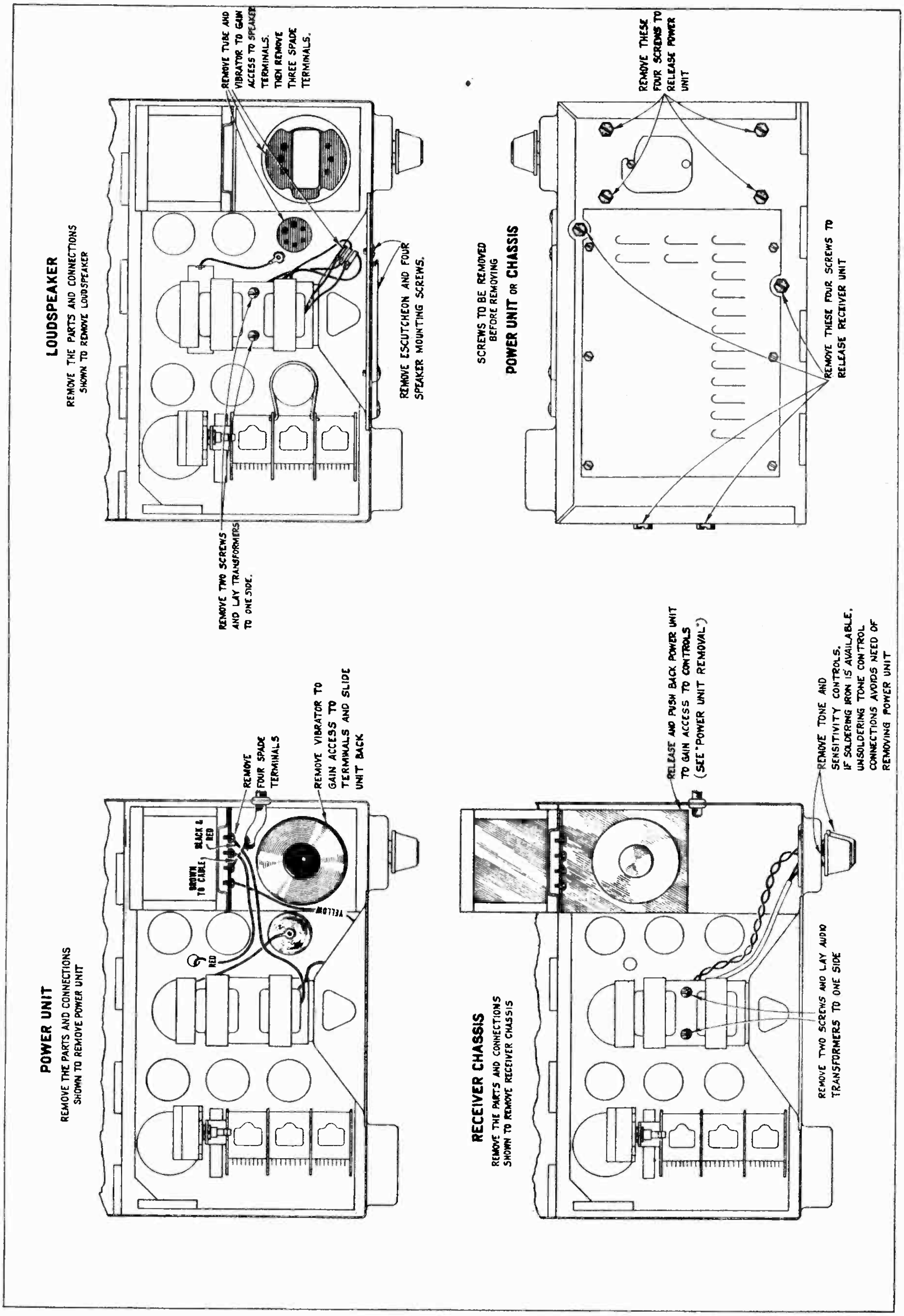


Figure 2—Details of removing units individually from chassis

MODEL M-123
Chassis Wiring

RCA-VICTOR CO., INC.

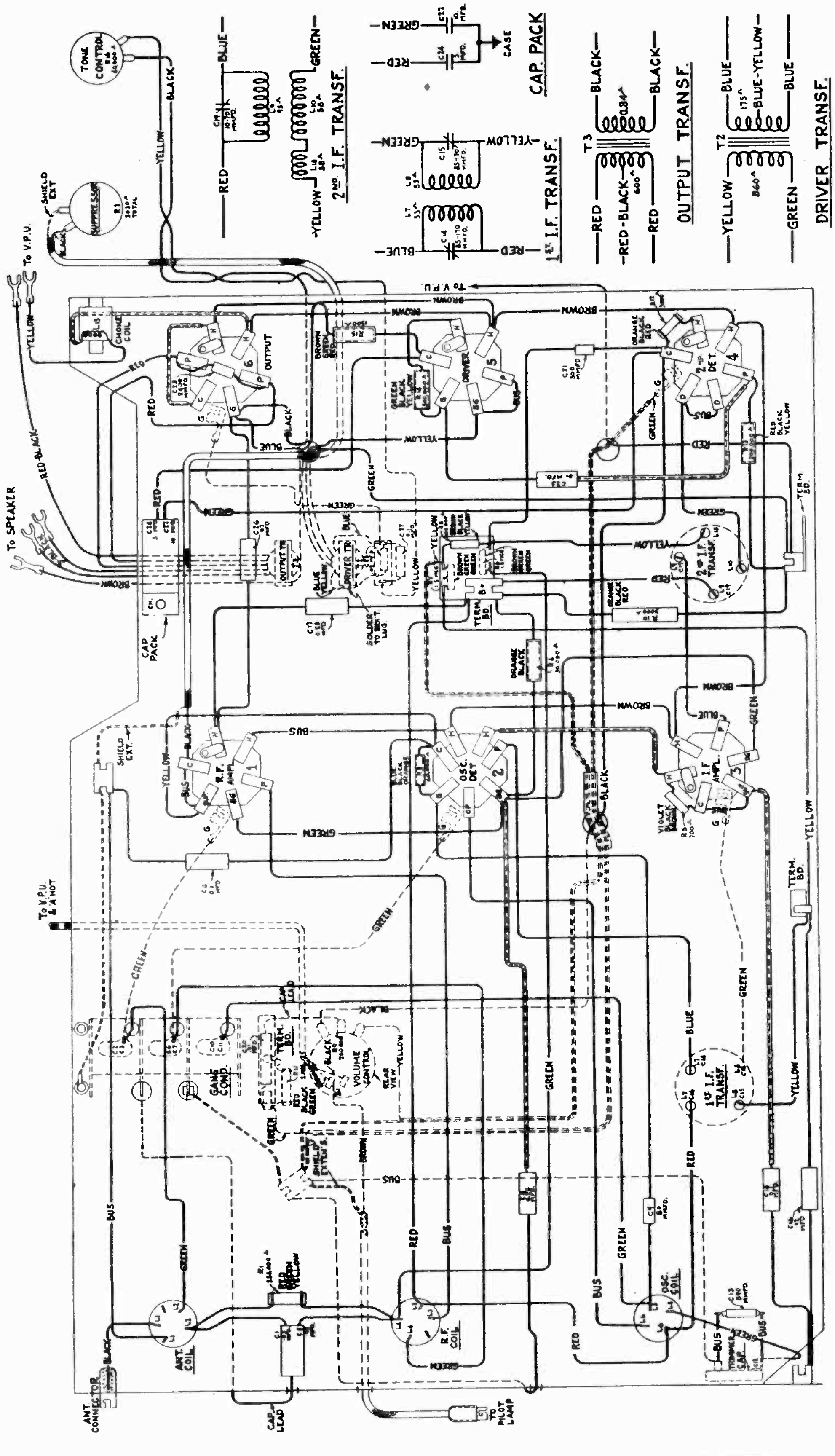


Figure 5—Receiver Assembly Wiring Diagram

RCA-VICTOR CO., INC.

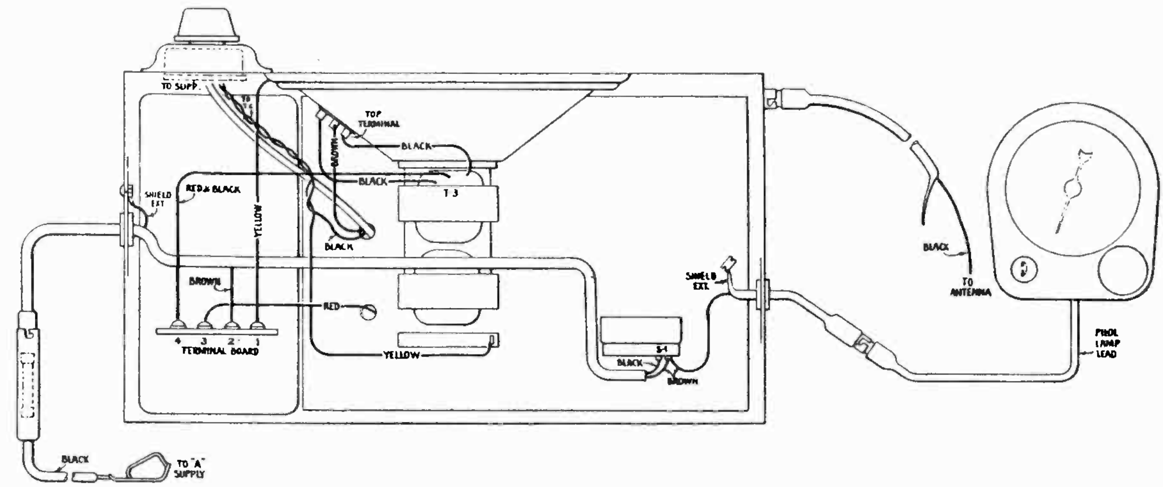


Figure 6—Assembly Wiring Diagram

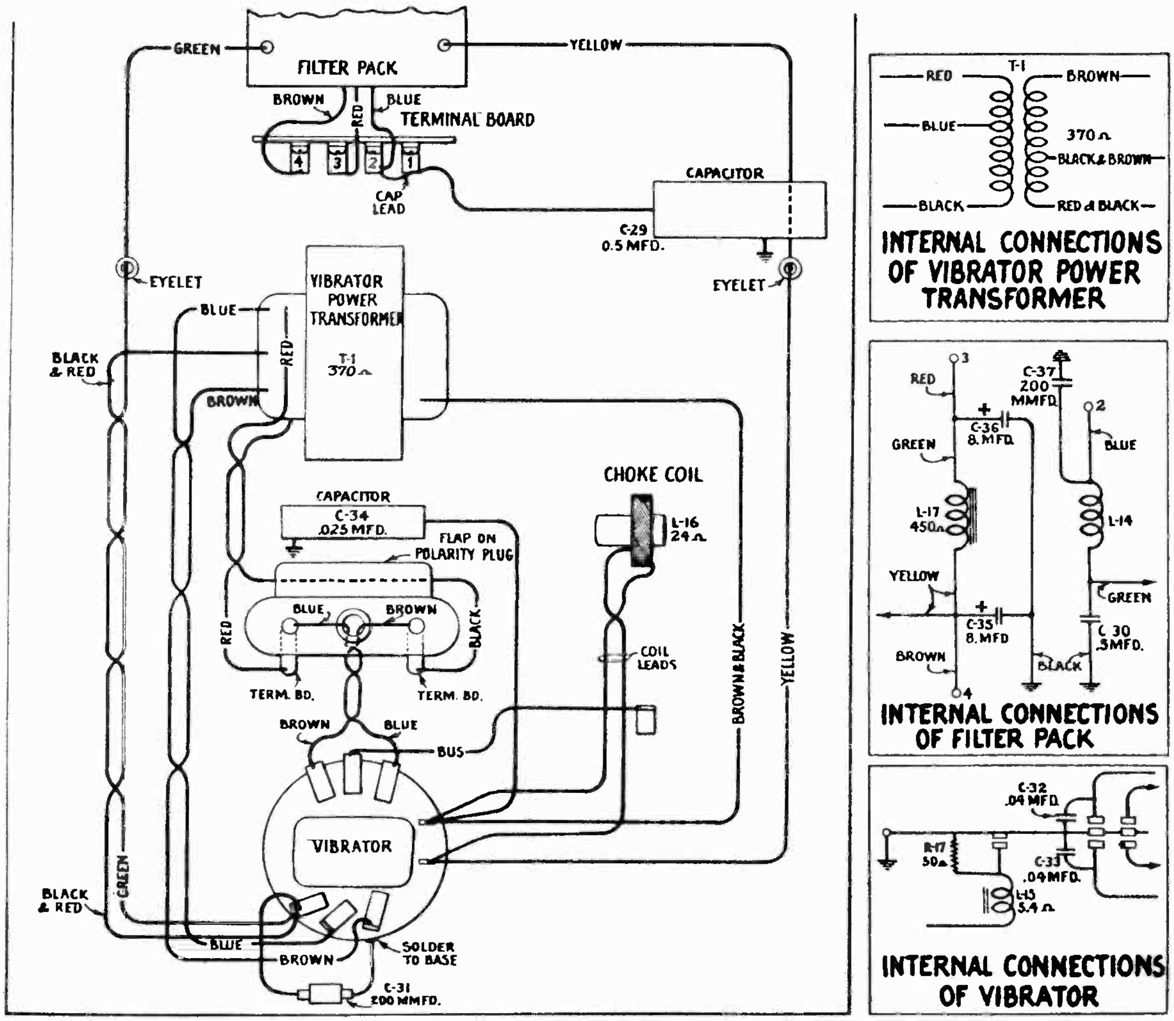


Figure 7—Vibrator Inverter-Rectifier Unit Wiring

MODEL M-123
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4237	Cable—Single-conductor shielded cable with female section of connector—From volume control switch to pilot lamp cable	$0.35
4238	Cable—Two-conductor power cable from S1 to power lead connector	.95
4244	Cap—Contact cap—Package of 5	.20
3861	Capacitor—Adjustable capacitor (C12)	.78
4246	Capacitor—80 mmfd. (C9)	.24
4248	Capacitor—300 mmfd. (C21)	.22
4245	Capacitor—890 mmfd. (C13)	.26
4247	Capacitor—2,400 mmfd. (C28)	.34
3702	Capacitor—0.25 mfd. (C8)	.42
3639	Capacitor—.02 mfd. (C16, C25, C26)	.25
3701	Capacitor—.01 mfd. (C20, C23)	.30
3641	Capacitor—0.1 mfd. (C27)	.35
3877	Capacitor—0.1 mfd. capacitor (C4, C18)	.32
3597	Capacitor—0.25 mfd. (C17)	.40
4243	Capacitor pack—Comprising two 0.05 mfd. capacitors (C1, C5)	.35
6963	Capacitor pack—Comprising one 10. and one 5. mfd. capacitors (C22, C24)	1.10
6965	Coil—Antenna coil (L1, L2)	.70
6967	Coil—Oscillator coil (L5, L6)	.52
6966	Coil—R. F. coil (L3, L4)	.80
6961	Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11)	3.85
6973	Drive assembly—Variable tuning condenser drive assembly	.40
4249	Drive bracket and worm assembly—For variable tuning condenser drive	1.20
6968	Reactor (L13)	.35
4240	Resistor—700 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
4242	Resistor — 3,000 ohms — Carbon type — ¼ watt (R12)—Package of 5	1.00
3602	Resistor — 60,000 ohms — Carbon type — ¼ watt (R3)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R13)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
4241	Resistor—1.5 megohms—Carbon type—¼ watt (R6, R7)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11)—Package of 5	1.00
3047	Resistor—1,500 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R4)	.22
4239	Resistor — 3,000 ohms — Carbon type — 3 watts (R10)	$0.25
6972	Rheostat—Noise suppressor rheostat (R2)	.90
3584	Ring—Retaining ring for antenna, radio frequency or oscillator coils—Package of 5	.40
3993	Screw—No. 6-32-⅛-inch square head set screw—For mounting condenser drive assembly to shaft—Package of 10	.25
3623	Shield—Antenna, radio frequency or oscillator coil shield	.30
4233	Shield—Oscillator or second detector Radiotron shield	.22
4235	Shield — Intermediate frequency Radiotron shield	.24
4236	Shield—Radio frequency Radiotron shield	.22
4232	Socket—6-contact Radiotron socket	.35
3572	Socket—7-contact Radiotron socket	.38
6971	Tone control (R16)	.90
6969	Transformer—Audio driver transformer (T2)	1.50
6970	Transformer—Audio output transformer (T3)	1.52
6960	Transformer — First intermediate frequency transformer (L7, L8, C14, C15)	1.80
6962	Transformer—Second intermediate frequency transformer (L9, L10, L18, C19)	1.85
6964	Volume control (R9, S1)	1.20
	CONTROL BOX ASSEMBLIES	
6974	Box—Control box complete	3.80
6976	Back—Control box back	.75
6975	Cover—Control box front cover	.86
4259	Cover—Station selector dial cover—Transparent celluloid—Package of 5	.92
4261	Dial—Station selector dial	.15
4258	Key—Volume control key	.20
4256	Lamp—Dial lamp	.30
4260	Pointer—Station selector indicator	.18
4257	Ring—Station selector dial cover ring	.75
4262	Screen—Dial light screen—Package of 5	.26
4252	Screw—No. 10-32-11/32-inch fillister head set screw for holding condenser drive and pinion gear and volume coupling control shaft—Package of 10	.32
3652	Screw—No. 10-32-¼-inch cupped point set screw for holding station selector or volume control flexible drive shaft to control box—Package of 10	.32
4255	Screw—No. 4-40-¼-inch oval head machine screw for holding control box cover—Package of 10	.16
4254	Shaft—Volume control coupling shaft	.36
4250	Shaft and gear—Station selector pointer shaft and gear	.56
4251	Shaft and gear—Station selector drive shaft and pinion gear	.20

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
4253	Spring—Volume control key holding spring—Package of 10	$0.32
3690	Strap and bracket assembly—For mounting control box to steering column—Comprising one bracket, two screws, one lockwasher and one strap	.40
	FLEXIBLE SHAFT AND CABLE ASSEMBLIES	
7762	Cable—Dial lamp cable with socket and section of connector	.76
4264	Clamp—Metal clamp—Package of 10	.35
4295	Screw—No. 10-32-¼-inch cupped point set screw—Fastens flexible shaft housing to shaft bushing—Package of 10	.20
7760	Shaft—Station selector flexible drive shaft—Approximately 31½ inches long	1.60
7764	Shaft—Station selector flexible drive shaft—Approximately 27 inches long	1.55
7761	Shaft—Volume control flexible shaft—Approximately 29 inches long	1.60
7763	Shaft—Volume control flexible drive shaft—Approximately 24 inches long	1.55
4265	Sleeve—Coupling sleeve for volume control shaft—Package of 5	.15
4263	Socket—Dial lamp socket	.20
	REPRODUCER ASSEMBLIES	
9493	Coil—Field coil magnet and cone support (L12)	2.70
9492	Cone—Reproducer cone (L11)—Package of 5	3.70
9491	Reproducer complete	4.16
	VIBRATOR ASSEMBLIES	
4280	Board—Terminal board—Located on filter pack	.35
4013	Capacitor—200 mmfd. (C31)	.30
4274	Capacitor—.025 mfd. (C34)	.80
4273	Capacitor—0.5 mfd. (C29)	.90
4275	Coil—Choke coil (L16)	.30
7758	Filter pack—Comprising one reactor, one choke coil, two 8. mfd. capacitors, one 0.5 and one 200 mmfd. capacitors (C30, C35, C36, C37, L14, L17)	6.00
4276	Plug—2-prong plug	.25
4279	Screw—Binder head No. 6-32-¼-inch screw—Fastens shield to cover—Package of 10	.22
4278	Socket—Vibrator mounting socket	.26
7759	Transformer—Vibrator transformer (T1)	3.95
7757	Vibrator assembly complete (R17, C32, C33, L15)	8.50
	HOUSING ASSEMBLIES	
4272	Bracket—Volume control shaft bracket—For left-hand mounting located on front of receiver housing	.28
4270	Cover—Tuning condenser drive bracket and worm assembly cover	$0.25
7755	Housing—Front section of housing complete—Less hinge pin	.80
7756	Housing—Rear section of housing complete—Less hinge pin	.54
4267	Nut—Wing nut—Package of 10	.46
4266	Pin—Hinge pin—Package of 5	.42
4268	Screw—Wing screw—Package of 10	.68
4269	Screw—No. 6 self-tapping screw for fastening front and bottom sections of housing—Package of 10	.50
4271	Screw—Self-tapping No. 6 screw for fastening tuning condenser drive bracket and worm cover to housing—Package of 10	.50
4295	Screw—No. 10-32-¼-inch headless set screw—Located in worm gear cover and bracket used to fasten drive shafts—Package of 10	.20
	MISCELLANEOUS ASSEMBLIES	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
4283	Cable — Antenna lead-in cable — Approximately 35 inches long	.80
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
4293	Capacitor—Ammeter capacitor—0.5 mfd.	.60
4292	Capacitor—Generator capacitor—0.5 mfd.	.90
4291	Clip—"A" supply clip—Package of 10	.70
7767	Escutcheon—Grille escutcheon and name plate	1.06
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
3646	Fuse—20 ampere—Package of 5	.40
7765	Grille—Baffle board and grille cloth	.38
4290	Insulator—Fuse connector insulator—Package of 10	.35
4132	Knob—Noise suppressor or tone control knob—Package of 5	.55
4282	Knob—Station selector knob—Package of 5	.65
7766	Lead—Power lead with female section of fuse connector—From power cable to battery	.30
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
6152	Suppressor—Distributor suppressor	.56
6151	Suppressor—Spark-plug suppressor	.56
4277	Screw—No. 8-32-⅜-inch binder head screw used to mount escutcheon—Package of 10	.22
4294	Screw—No. 10-32-5/16-inch hexagon head screw—Used to mount chassis to housing—Package of 10	.45
4285	Washer—Antenna or fuse connector insulating washer—Package of 10	.22

MODEL 124
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Voltage Rating .... 105–125 Volts
Frequency Rating .... 25–60 and 50–60 Cycles
Power Consumption ... 60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons .... 2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output .... 1.75 Watts
Frequency Range .... 540 K. C. to 1500 K. C. and 1400 to 2800 K. C.

This receiver is a six tube Superheterodyne incorporating features such as Dynamic Loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

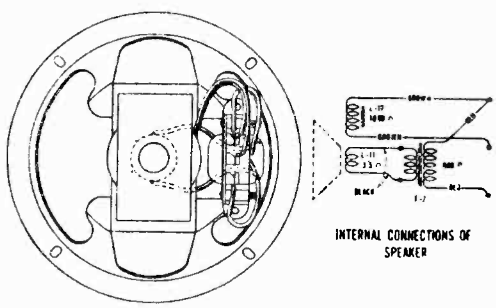


Figure C—Loudspeaker Wiring

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

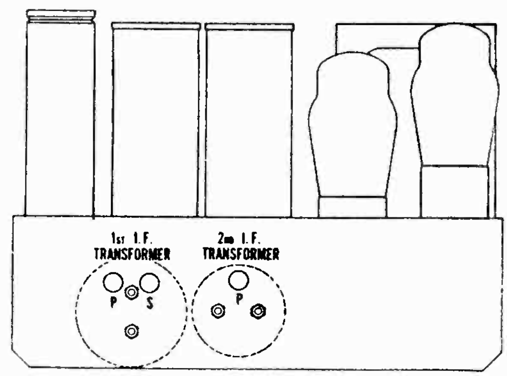


Figure D—Location of I. F. Line-up Adjustment Screws

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be opposite the last division of the low frequency end of scale with the indicator at its center position. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important points to remember are that the receiver volume control must be at its maximum position and that the input signal from the external oscillator must be no greater than necessary.

TUBE SOCKET VOLTAGES

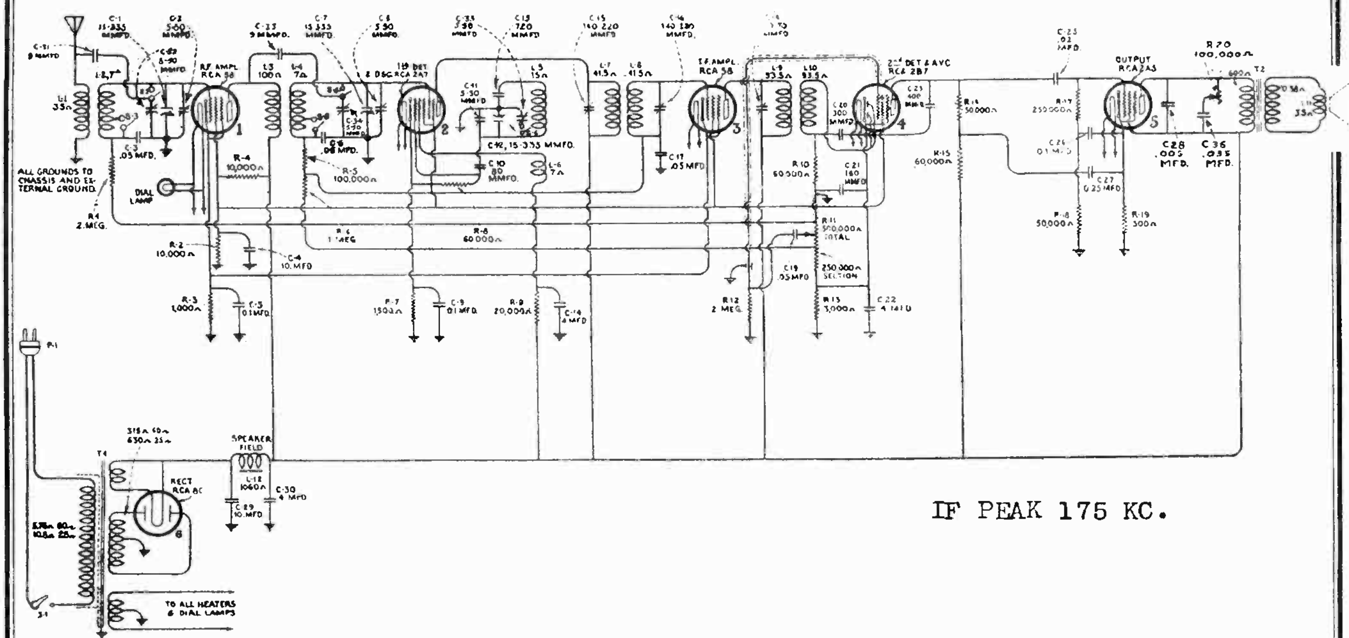
115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	4.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	5.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	4.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.81
6. RCA-80 Rectifier	700–350 Volts—75 M. A. Total Current				4.82

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

MODEL 124
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.



IF PEAK 175 KC.

Figure A—Schematic Circuit Diagram

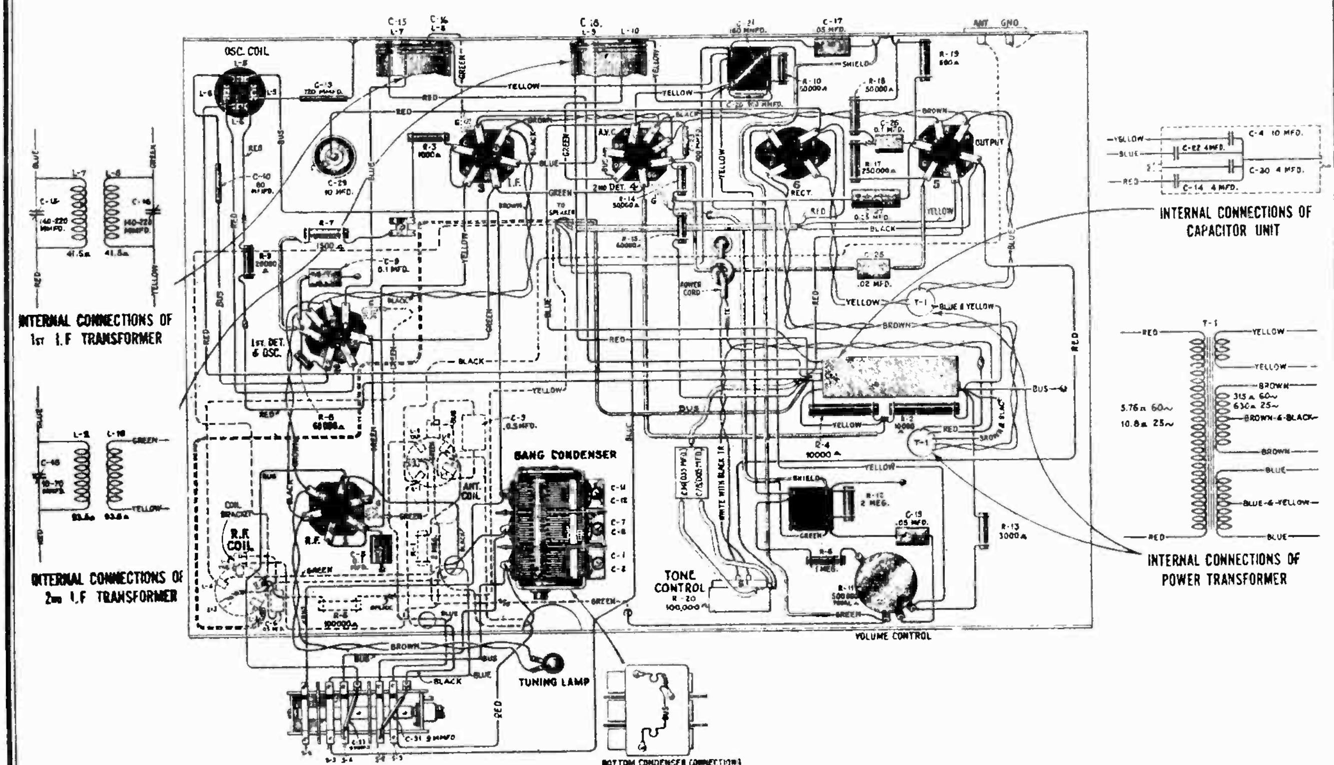


Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

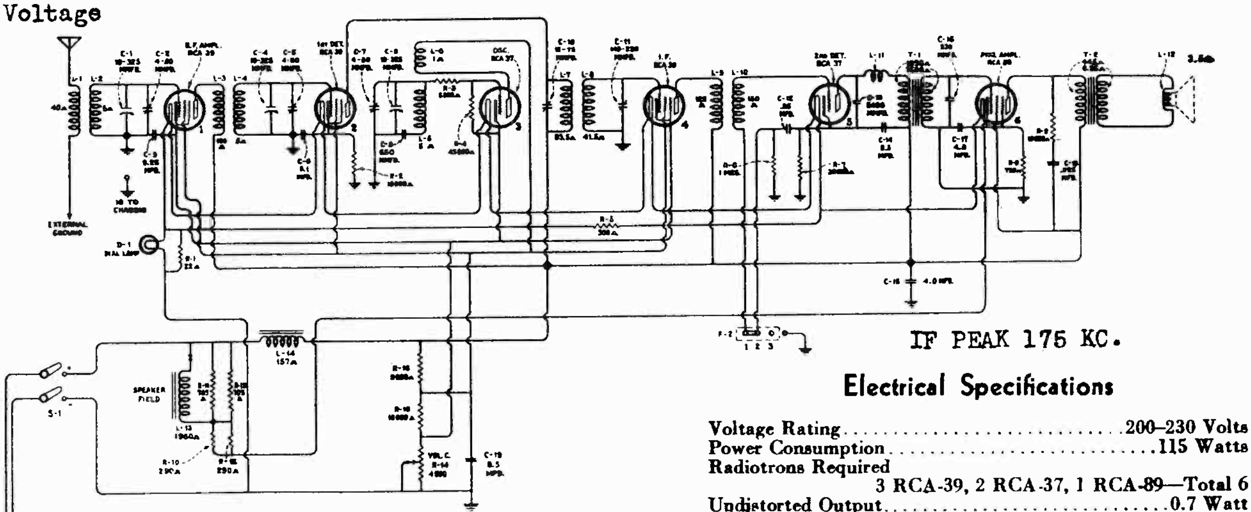
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd. (C13)	$0.75
2747	Cap—Contact cap—Package of 5	.50
3047	Resistor — 1500 ohms — Carbon type — ½ watt (R7)—Package of 5	1.00
3076	Resistor — 1 megohm — Carbon type — ½ watt (R6)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt (R13)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C10)	.44
3514	Resistor—250,000 ohms—Carbon type—½ watt (R17)—Package of 5	1.00
3572	Socket—Radiotron 7-contact socket	.38
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C27)	.40
3598	Capacitor—0.1 mfd.—R. F. and I. F. by-pass (C5)	.36
3616	Capacitor—300 mmfd. (C20)	.34
3623	Shield—Antenna or R. F. coil shield	.30
3626	Shield—Oscillator coil shield	.22
3630	Resistor — 10,000 ohms — Carbon type — 3 watt (R2, R4)	.25
3632	Resistor — 500 ohms — Carbon type — 1 watt (R19)—Package of 5	1.10
3633	Capacitor—400 mmfd. (C23)	.38
3634	Capacitor—160 mmfd. (C21)	.34
3639	Capacitor—0.02 mfd. (C25)	.25
3640	Capacitor—0.05 mfd. (C3, C6, C17, C19)	.25
3641	Capacitor—0.1 mfd. (C9, C26)	.35
3721	Resistor — 1,000 ohms — Carbon type — ½ watt (R3)—Package of 5	1.00
3783	Capacitor—9 mmfd. (C31, C33)—Package of 2	.50
4103	Shield—Radiotron shield—I. F. or R. F.	.20
4133	Knob—Station selector, volume control, tone control or range switch knob—Package of 5	.80
4135	Socket—Dial lamp socket and bracket	$0.25
4140	Shield—Radiotron shield—1st detector	.30
4141	Shield—Radiotron shield—2nd detector	.36
6188	Resistor — 2 megohm — Carbon type — ½ watt (R1, R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R8, R10, R15)—Package of 5	1.00
6300	Socket—Radiotron 4-contact socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
6471	Coil—Oscillator coil (L5, L6)	.74
6483	Transformer—1st intermediate frequency transformer (L7, L8, C15, C16)	1.84
6484	Transformer—2nd intermediate frequency transformer (L9, L10, C18)	1.70
6485	Volume control—With mounting nut (R11)	1.20
6487	Capacitor assembly—Comprising three 4.0 mfd. and one 10.0 mfd. capacitors (C4, C14, C22, C30)	2.26 2.90
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil (L3, L4)	.94
6534	Switch—Range switch (S2, S3, S4, S5, S6, C32, C34, C35)	1.25
6598	Condenser—3-gang variable tuning condenser (C1, C2, C7, C8, C11, C12)	3.00
6619	Tone control with mounting nut (R20)	1.44
6620	Capacitor—Comprising one .005 and one .035 mfd. (C28, C36)	.50
6851	Scale—Dial scale and drive assembly	1.22
6853	Escutcheon—Station selector escutcheon	.34
7485	Socket—Radiotron 6-contact socket	.40
7590	Capacitor—10.0 mfd. (C29)	1.40
9005	Transformer—Power transformer—105-125 volts, 50-60 cycles (T1)	4.80
9006	Transformer—Power transformer—200-250 volts, 50-60 cycles	5.05
9024	Transformer—Power transformer—105-125 volts, 25-40 cycles	5.85
	REPRODUCER ASSEMBLIES	
6476	Transformer—Output transformer (T2)	1.44
6852	Cable—3-conductor reproducer cable	.26
9032	Coil assembly—Comprising coil, magnet and cone support (L12)	2.35
9428	Cone—Reproducer cone (L11)—Package of 5	5.00
9440	Reproducer complete	4.75

MODEL 25 DC
Schematic
Chassis Wiring
Voltage

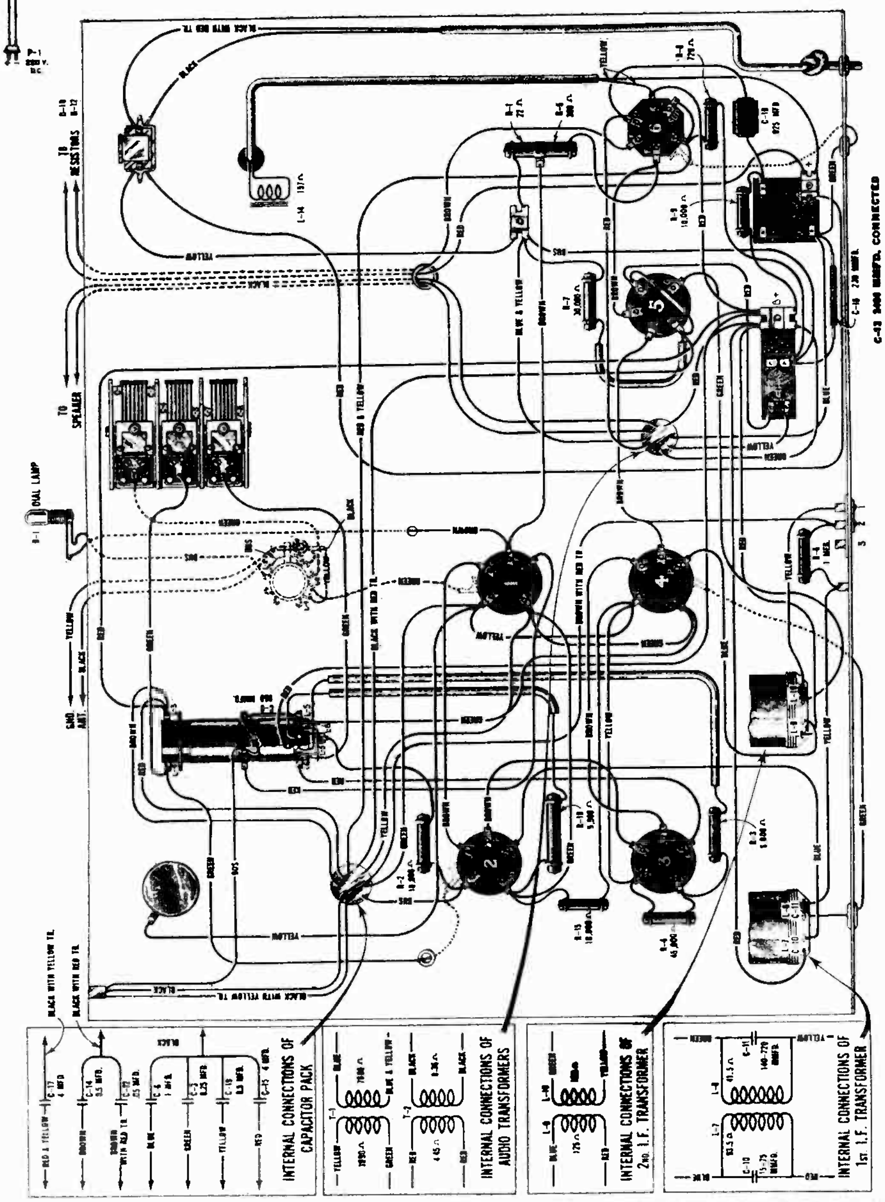
RCA-VICTOR CO., INC.



IF PEAK 175 KC.

Electrical Specifications

Voltage Rating............................200–230 Volts
Power Consumption..........................115 Watts
Radiotrons Required
3 RCA-39, 2 RCA-37, 1 RCA-89—Total 6
Undistorted Output..............................0.7 Watt
Intermediate Frequency..........................175 K. C.
R. F. and Oscillator Line-up Frequency.....1400 K. C. Only



Radiotron Socket Voltages

Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Heater or Filament, Volts
1. R. F. RCA-39	3.5	90	205	5.0	6.0
2. 1st Detector RCA-39	10	83	200	1.0	6.0
3. Oscillator RCA-37	—	—	90	4.5	6.0
4. I. F. RCA-39	3.5	90	205	5.0	6.0
5. 2nd Detector RCA-37	20	—	185	.75	6.0
6. Power RCA-89	18.5	190	180	15.0	6.0

All above voltages measured at maximum volume control setting with no signal impressed on input. 220 Volt, D. C. source used.

RCA-VICTOR CO., INC.

MODEL 126-B
Schematic
Socket Layout

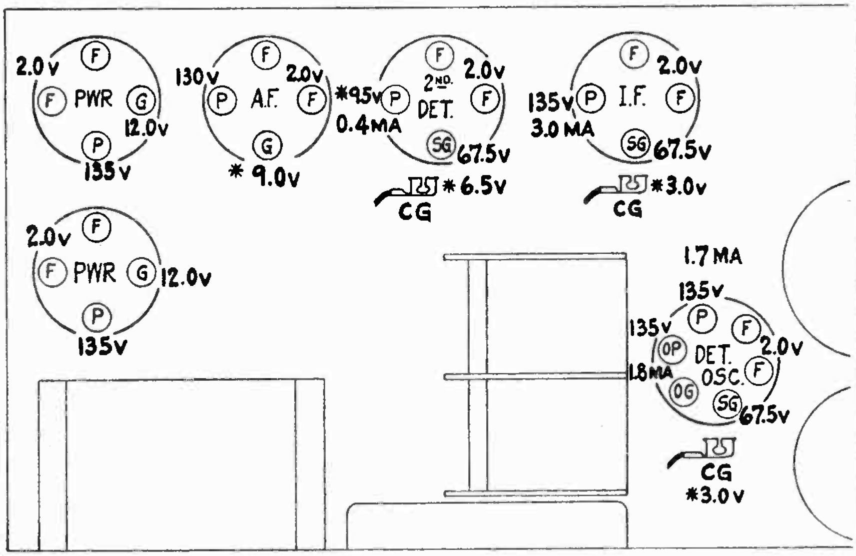


Figure 5—Socket Voltage Readings

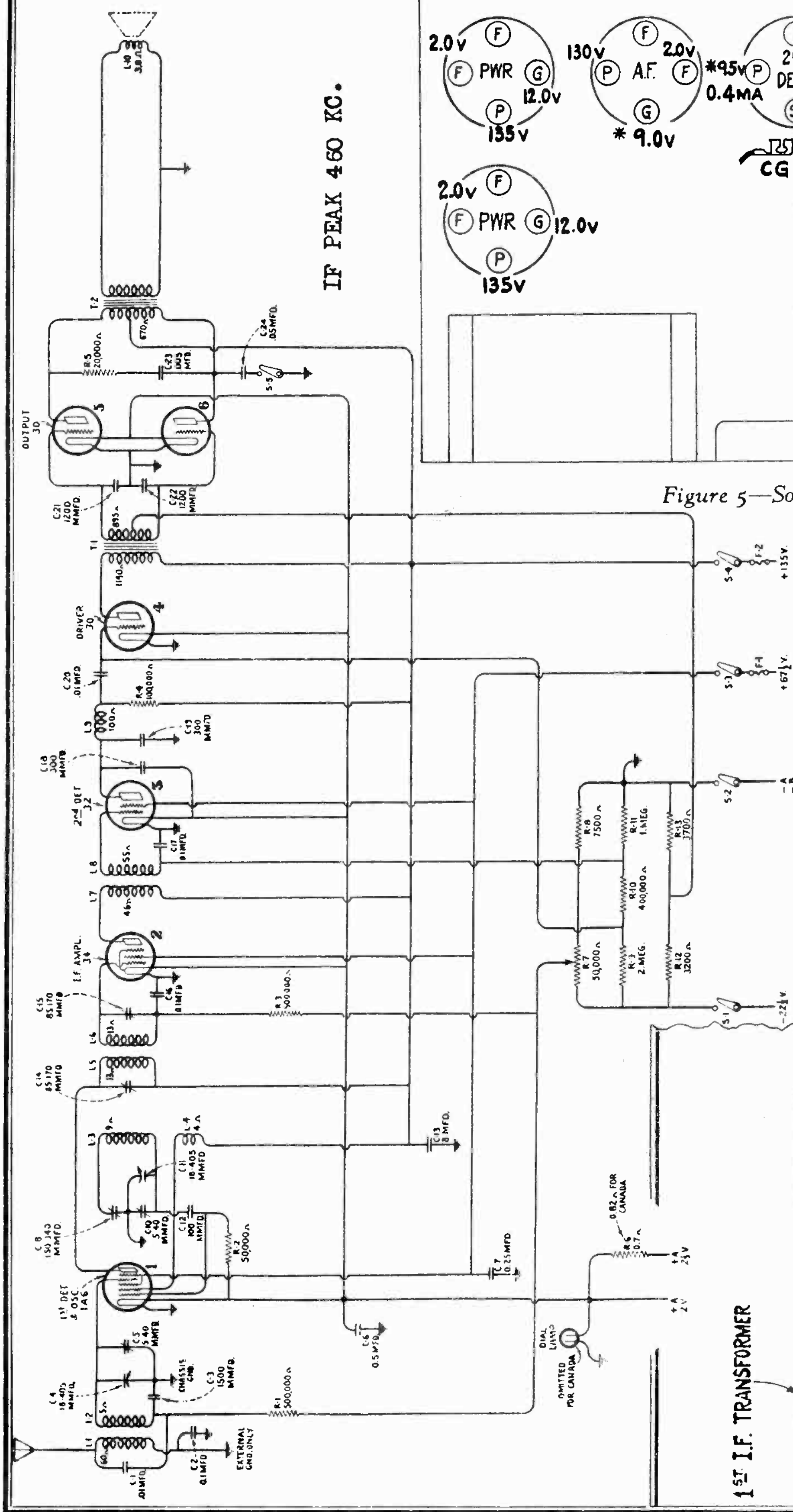


Figure 1—Schematic Circuit Diagram

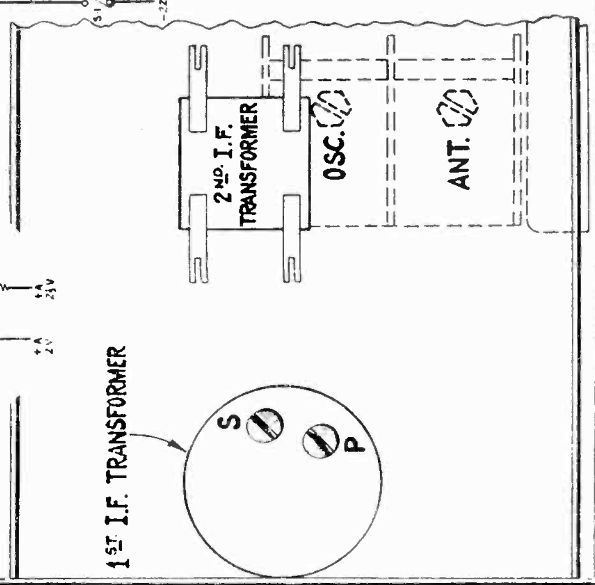


Figure 4—Location of Line-up Capacitors

MODEL 126-B
Chassis Wiring

RCA-VICTOR CO., INC.

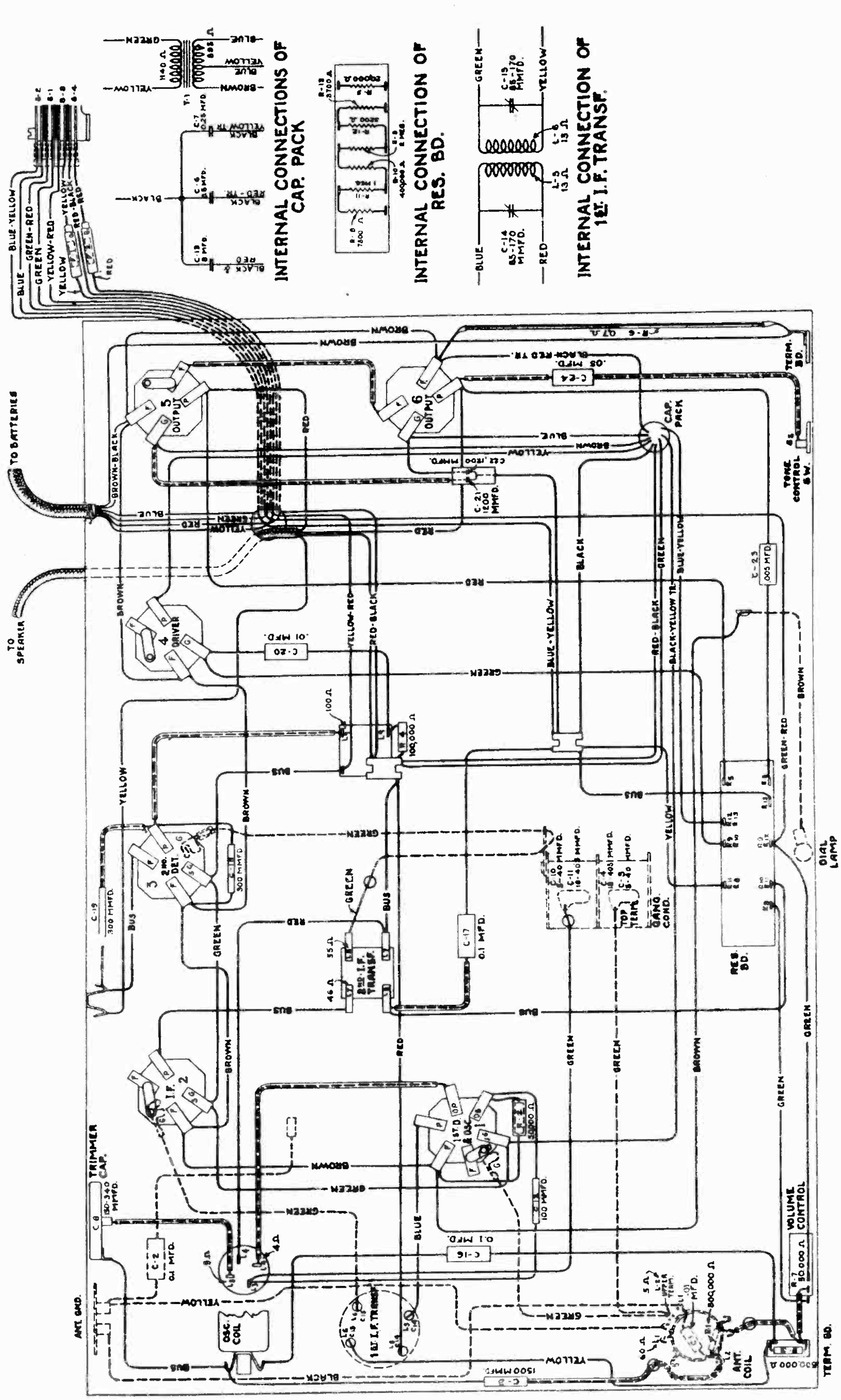


Figure 2—Chassis Wiring Diagram

MODEL 126-B
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

(1) Important

Always disconnect the batteries before attempting to remove the chassis from the cabinet. Always turn the operating switch "off" before changing tubes, batteries or fuses.

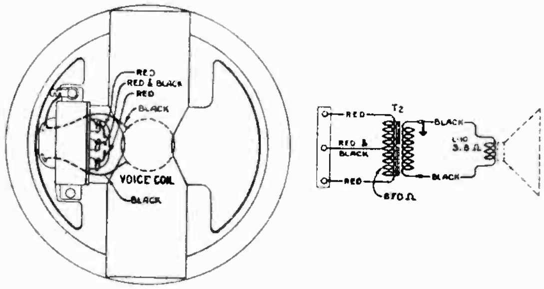


Figure 3—Loudspeaker Wiring

(2) Line-up Capacitor Adjustments

Line-up capacitors are provided in the first detector, oscillator and intermediate amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator, such as Full Range Test Oscillator, type TMV-97-B (Stock No. 9050), a non-metallic screw driver, such as alignment wrench (Stock No. 4160), and an output indicator are required for properly aligning this receiver. Refer to Figure 4 for the location of the line-up capacitors.

I. F. Adjustments

Two transformers comprising four circuits, two of which have trimmer capacitors, are used in the I. F. amplifier. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and connect the output of the oscillator between the control grid cap of the first detector (RCA-1A6) and ground. Connect an output indicator across the voice coil leads of the loudspeaker. Place the oscillator in operation at 460 K. C. and adjust its output and the receiver volume control until a deflection is obtained in the output indicator.

(b) Adjust the secondary and then the primary of the first I. F. transformer (see Figure 4) until a maximum deflection is obtained in the output indicator.

This completes the I. F. adjustments. It is good practice to always follow the I. F. adjustments with the detector and oscillator adjustment, as there is an interlocking of adjustments that always occurs.

Detector-Oscillator Adjustments

The two-gang capacitor trimmer screws are accessible at the top of chassis. The series (600 K. C.) trimmer is accessible from the rear. Proceed as follows:

(a) Connect the oscillator between the antenna and ground terminals of the receiver. Connect the output meter across the voice coil leads of the loudspeaker.

(b) Place the oscillator in operation at 1400 K. C., set the dial at 140 and adjust the oscillator output and receiver volume control until a deflection is obtained in the output indicator.

(c) Adjust each trimmer on the gang capacitor until a maximum deflection is obtained.

(d) Set the oscillator at 600 K. C. and tune in the signal on the receiver. Then adjust the series trimmer, located on the rear of the chassis, until maximum output is obtained. While making this adjustment, rock the tuning capacitor back and forth through the signal. Then again check the adjustments in (b).

(3) Voltage Readings

The following voltages are those at the tube sockets while the receiver is in operating condition. No allowance has been made for current drawn by the meter and if low resistance meters are used, such allowances must be made.

RADIOTRON SOCKET VOLTAGES

135-Volt "B" Supply—No Signal—Maximum Volume Control

Radiotron No.		Control Grid to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Plate, M. A.	Filament Volts, D. C.
RCA-1A6	1st Det.	*3.0	67.5	135	1.7	2.0
	Osc.	—	—	135	1.8	
RCA-34—I. F.		*3.0	67.5	135	3.0	2.0
RCA-32—2nd Det.		*6.5	67.5	*95	0.4	2.0
RCA-30—Driver		*9.0	—	130	3.5	2.0
RCA-30—Output		12.0	—	135	1.0	2.0
RCA-30—Output		12.0	—	135	1.0	2.0

*These voltages cannot be measured with ordinary voltmeter, as they are obtained by means of high resistance bleeders across a 22½-volt "C" battery.

MODEL 126-B
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

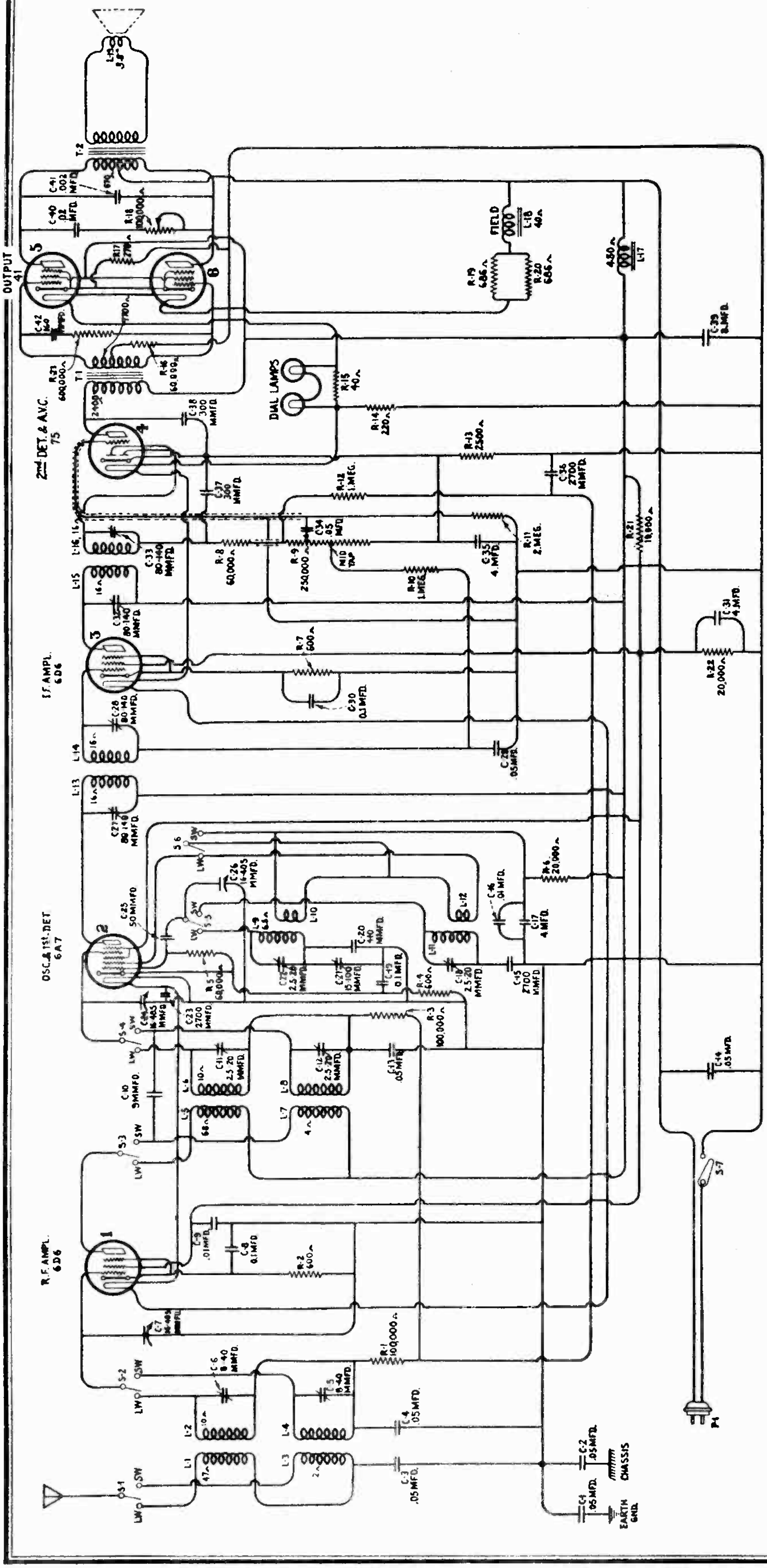
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
4000	Capacitor—Adjustable trimmer capacitor (C8)	.78
4353	Capacitor—100 mmfd. (C12)	.30
4354	Capacitor—1500 mmfd. (C3)	.36
4352	Capacitor—300 mmfd. (C18, C19)	.25
6512	Capacitor—0.005 mfd. (C23)	.28
3888	Capacitor—0.05 mfd. (C24)	.25
3701	Capacitor—0.01 mfd. (C1, C20)	.30
3877	Capacitor—0.1 mfd. (C2, C16, C17)	.32
4355	Capacitor pack—Comprising two 1200 mmfd. capacitors (C21, C22)	.26
4349	Capacitor and transformer pack—Comprising one 8.0 mfd., one 0.5, one 0.25 mfd. capacitor and driver transformer (C7, C6, C13, T1)	3.95
6992	Coil—Antenna coil (L1, L2, R1, C1)	.98
4343	Coil—Choke coil (L9)	.60
6664	Coil—Oscillator coil (L3, L4)	.94
6660	Condenser—2-gang variable tuning condenser (C4, C5, C10, C11)	2.78
4356	Resistor—0.7 ohm—Flexible type (R6)—Package of 10	1.50
4345	Resistor—3200 ohms—Carbon type—¼ watt (R12)—Package of 10	2.00
4346	Resistor—3700 ohms—Carbon type—¼ watt (R13)—Package of 10	2.00
4344	Resistor—7500 ohms—Carbon type—¼ watt (R8)—Package of 10	2.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R11)—Package of 5	1.00
6242	Resistor—2 megohm—Carbon type—¼ watt (R9)—Package of 5	1.00
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
3682	Shield—First detector and oscillator—Radiotron shield	.22
4351	Shield—I. F. Radiotron socket shield	.25
6665	Shield—Oscillator coil shield	.34
3056	Shield—Second detector—Radiotron shield—Package of 2	.40
3858	Socket—Dial lamp socket	.26
6300	Socket—4-contact second detector—Radiotron socket	.35
6980	Socket—4-contact output (No. 5) Radiotron socket	$0.20
3859	Socket—4-contact output (No. 6) Radiotron socket	.30
4232	Socket—6-contact—1st detector and oscillator—Radiotron socket	.35
6669	Switch—Tone control switch (S5)	.50
4347	Terminal strip—Engraved "ANT-GND"	.25
6993	Transformer—First intermediate frequency transformer (L5, L6, C14, C15)	2.10
6994	Transformer—Second intermediate frequency transformer (L7, L8)	1.05
6995	Volume control (R7)	1.10
	REPRODUCER ASSEMBLIES	
4350	Cable—4-conductor—Reproducer cable	.54
9428	Cone—Reproducer cone (L10)—Package of 5	5.00
9503	Housing—Cone housing and core assembly	2.70
3949	Magnet	1.40
9502	Reproducer assembly complete	8.40
6996	Transformer—Output transformer (T2)	1.68
	MISCELLANEOUS ASSEMBLIES	
4289	Body—Fuse connector body—Package of 10	.35
4357	Cable—Battery cable—6-conductor	1.52
4288	Cap—Fuse connector cap—Package of 10	.36
6516	Connector—Fuse connector complete	.16
4468	Dial—Station selector dial	.22
6176	Escutcheon—Operating switch escutcheon—Package of 5	.50
4286	Ferrule—Fuse connector ferrule and bushing—Package of 10	.38
3748	Fuse—0.5 ampere (F1, F2)—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
3088	Knob—Operating switch knob—Package of 5	.50
4085	Knob—Station selector knob and pointer—Package of 5	.60
4132	Knob—Volume control or tone control switch knob—Package of 5	.55
4348	Lamp—Dial lamp	.38
9050	Oscillator—Test oscillator—90 to 25,000 K.C.	29.50†
3886	Reflector—Dial light reflector	.30
3238	Screw—Set screw for operating switch knob—Package of 10	.25
4393	Screw—No. 8-32-5/16-inch headless set screw for knobs—Package of 10	.25
4160	Screw driver—Combination insulated screw driver and socket wrench for I. F. and R. F. adjustments	1.00
4284	Spring—Fuse connector spring—Package of 10	.30
4540	Switch—Operating switch (S1, S2, S3, S4)	2.28
4285	Washer—Fuse connector insulating washer—Package of 10	.22

† Full Discount Not Allowed

RCA-VICTOR CO., INC.

MODEL 127
Schematic
Trimmer Locations



IF PEAK 370 KC.

Figure 1
Schematic Circuit

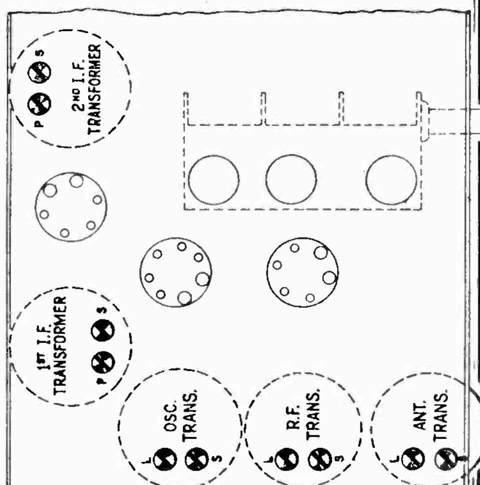


Figure 4—Location of Line-up Capacitors—Viewing bottom of chassis

MODEL 127
Chassis Wiring

RCA-VICTOR CO., INC.

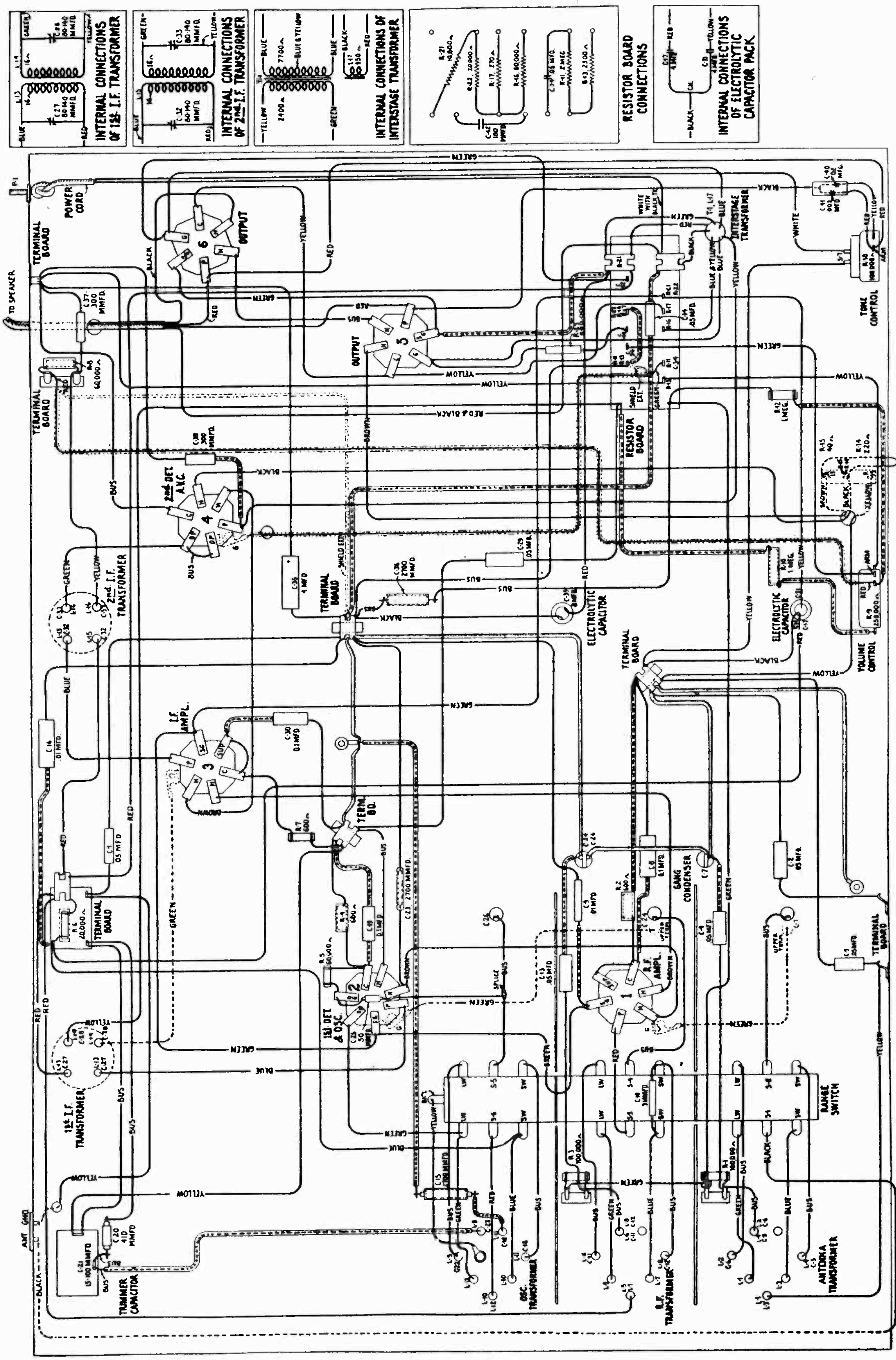
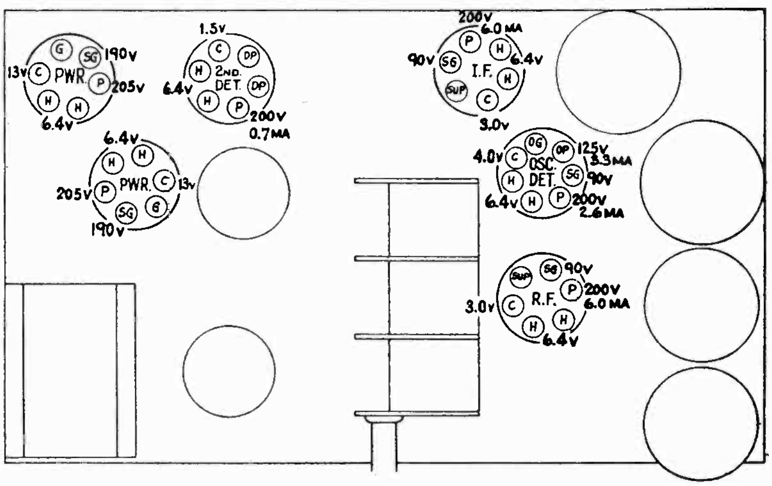


Figure 2—Wiring Diagram

MODEL 127
Socket Layout
Voltage

RCA-VICTOR CO., INC.



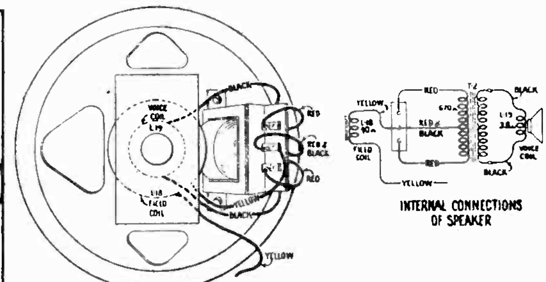


Figure 3—Loudspeaker Wiring

ALL VOLTAGES ARE TO—B

Figure 5—Radiotron Socket Voltages

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made.

RADIOTRON SOCKET VOLTAGES

220-Volt, D. C. Line—No Signal

Radiotron No.		Cathode to B— Volts, D. C.	Screen Grid to B— Volts, D. C.	Plate to B— Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		3.0	90	200	6.0	6.4
RCA-6A7	1st Detector	4.0	90	200	2.6	6.4
	Oscillator	—	—	125	3.3	
RCA-6D6 I. F.		3.0	90	200	6.0	6.4
RCA-75 2nd Detector		1.5	—	200	0.7	6.4
RCA-41 Power		13.0	190	205	25.0	6.4
RCA-41 Power		13.0	190	205	25.0	6.4

MODEL 127
Alignment Data
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
10194	Ball—Steel ball for condenser drive assembly—Package of 20	$0.25
2747	Cap—Contact cap—Package of 5	.50
3938	Capacitor—9 mmfd. (C10)	.25
3849	Capacitor—50 mmfd. (C25)	.30
6314	Capacitor—160 mmfd. (C23)—Package of 5	2.00
4352	Capacitor—300 mmfd. (C37, C38)	.25
4297	Capacitor—410 mmfd. (C20)	.30
4031	Capacitor—2700 mmfd. (C15, C23, C36)	.50
3701	Capacitor—0.01 mfd. (C9, C16)	.30
4211	Capacitor—0.05 mfd. (C1, C2, C3, C14, C34)	.30
3901	Capacitor—0.05 mfd. (C4, C13)	.36
3888	Capacitor—0.05 mfd. (C29)	.25
3877	Capacitor—0.1 mfd. (C8, C19, C30)	.32
3796	Capacitor—4.0 mmfd. (C35)	.60
6986	Capacitor—8.0 mmfd. (C39)	1.60
3861	Capacitor — Adjustable trimmer capacitor (C21)	.78
6985	Capacitor—Comprising two 4.0 mmfd. capacitors (C17, C31)	1.50
4373	Capacitor pack—Comprising one 0.002 mfd. and one 0.02 mfd. capacitors (C40, C41)	.30
6983	Coil—Antenna coil (L1, L2, L3, L4, C5, C6)	2.68
6700	Coil—Oscillator coil (L9, L10, L11, L12, C18, C22)	2.30
6699	Coil—R. F. coil (L5, L6, L7, L8, C11, C12)	2.44
6694	Condenser—3-gang variable tuning condenser (C7, C24, C26)	3.75
3941	Dial—Station selector dial scale—Package of 5	1.75
4467	Drive—Variable tuning condenser drive assembly complete	2.40
4340	Lamp—Dial lamp—Package of 5	.60
3906	Mounting assembly—Variable condenser mounting assembly—Comprising 3 bushings, 3 lock-washers, 3 nuts and 3 washers—Package of 1 set	.28
3940	Pointer—Station selector indicator—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R4, R7)—Package of 5	1.00
4338	Resistor — 2500 ohms — Carbon type — ¼ watt (R13)—Package of 10	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5, R8, R16)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5	1.00
3439	Resistor—600,000 ohms—Carbon type—¼ watt (R23)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10, R12)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11)—Package of 5	1.00
4337	Resistor—270 ohms—Carbon type—1 watt (R17)—Package of 10	2.20
6114	Resistor—20,000 ohms—Carbon type—1 watt (R6, R22)—Package of 5	1.10
4339	Resistor — 260 ohms — Porcelain type — Tapped at 220 ohms (R14, R15)	.52

Stock No.	Description	List Price
3991	Resistor — 10,000 ohms — Porcelain type (R21)	$0.60
3943	Screen—Translucent celluloid screen—For dial lamps—Package of 2	.18
3878	Screw—No. 8-32-⅛ headless cup point set screw for fastening station selector pointer—Package of 20	.25
3768	Screw—Square head No. 6-32-¼ set screw for condenser drive—Package of 10	.35
6704	Shaft—Tuning condenser drive shaft assembly	.64
4145	Shield—First detector and oscillator Radiotron shield	.30
4103	Shield—I. F. amplifier Radiotron shield	.20
3950	Shield—R. F. amplifier Radiotron shield	.26
4216	Shield—Radiotron shield top	.10
4215	Shield—Second detector Radiotron shield	.15
3529	Socket—Dial lamp socket	.32
6676	Socket—6-contact Radiotron socket	.40
7485	Socket—6-contact second detector and AVC Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
6696	Switch—Range switch (S1, S2, S3, S4, S5, S6)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C27, C28)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C32, C33)	1.78
6987	Transformer pack—Audio transformer pack—Comprising one reactor and one interstage transformer (T1, L17)	4.50
6705	Tone control (R18, S7)	1.20
6695	Volume control (R9)	1.20
	REPRODUCER ASSEMBLIES	
7811	Cable—Reproducer cable	.45
9498	Coil—Field coil, magnet and cone support (L18)	3.50
9499	Cone—Reproducer cone (L19)—Package of 5	6.10
9497	Reproducer complete	6.75
6988	Transformer—Output transformer (T2)	1.60
	MISCELLANEOUS ASSEMBLIES	
6706	Bezel—Metal bezel for station selector dial	.42
6707	Glass—Station selector dial glass	.20
6989	Knob—Range switch or tone control knob—Package of 5	.65
6991	Knob—Station selector knob—Package of 5	1.15
6990	Knob—Volume control knob—Package of 5	1.15
9050	Oscillator — Test oscillator — 90-25,000 K. C.	29.50†
4341	Resistor—Porcelain type—686 ohms (R19, R20)	2.12
6708	Ring—Retaining ring for dial glass—Package of 5	.44
4342	Screw—Receiver mounting screw assembly—Comprising four bushings, four screws and four washers	.30
4160	Screwdriver—Combination insulated screwdriver and socket wrench for I. F. and R. F. adjustments	1.00

† Full discount not allowed.

SERVICE DATA

CAUTION—This receiver operates on 220-volt direct current without a transformer between the line and the various parts of the receiver, such as A. C. receivers use. It is therefore extremely important to use the utmost caution when operating the receiver outside of the cabinet. Also a knob must always be placed on the shaft of the main tuning capacitor, as under certain conditions the full line voltage is obtained between this point and ground.

(1) Line-up Capacitor Adjustments

To properly align this receiver, it is essential that a modulated R. F. oscillator, such as Stock No. 9050, an output indicator and an alignment tool (Stock No. 4160) be available. Figure 4 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground, preferably through a series condenser. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis.

Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L in Figure 4, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as S in Figure 4 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

MODEL 128,224
Schematic
Transformer Data

RCA-VICTOR CO., INC.

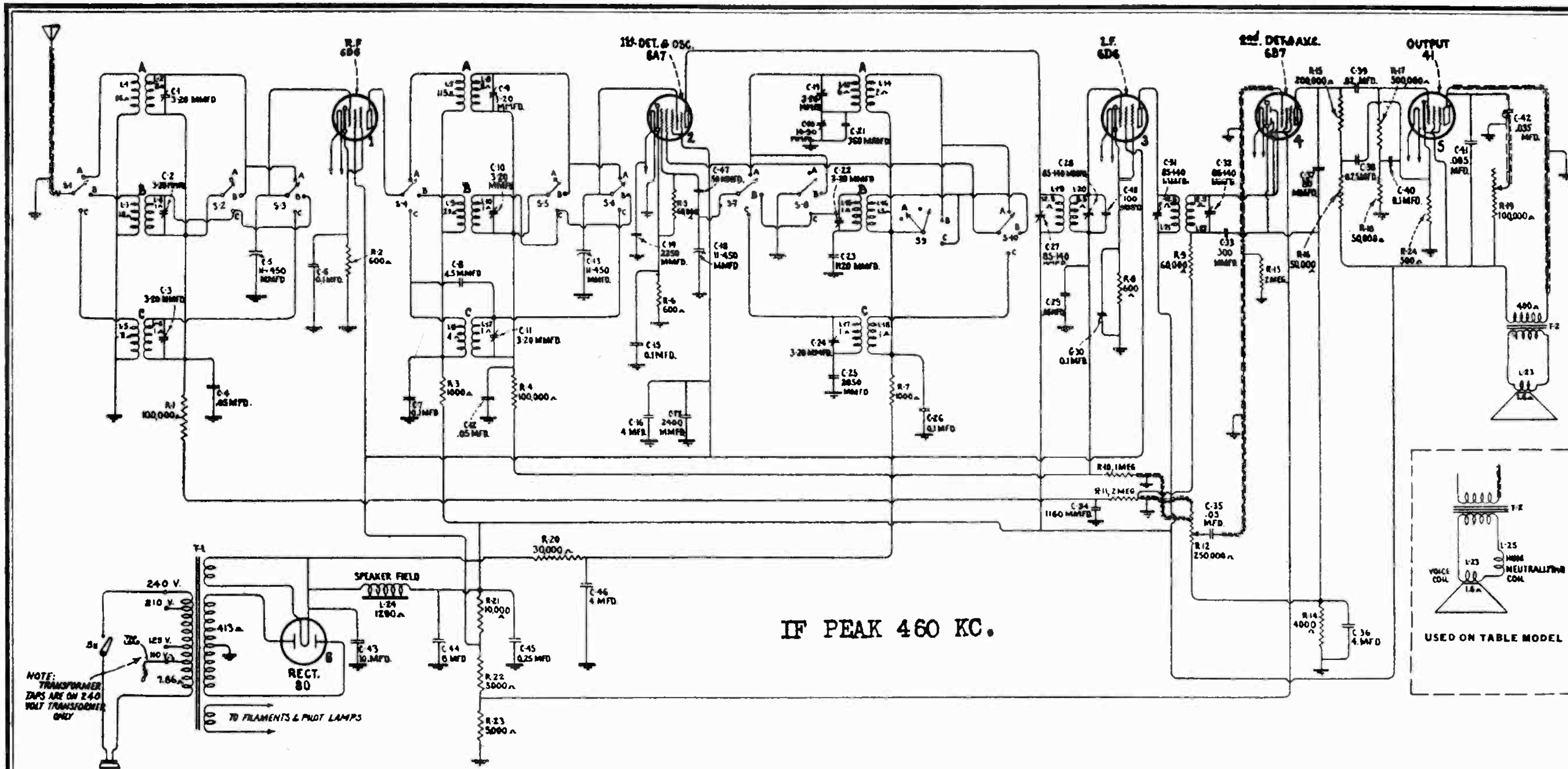
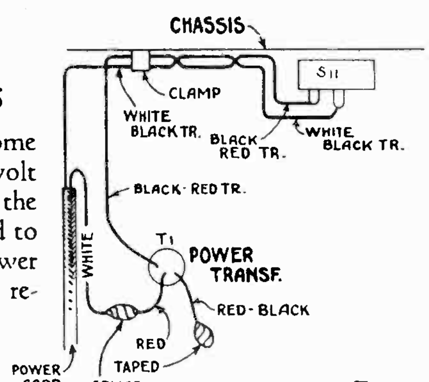
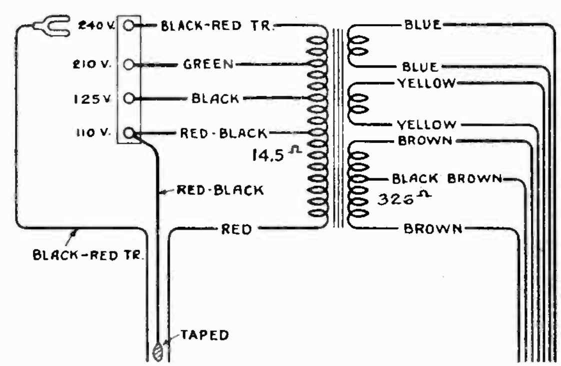


Figure 1—Schematic Circuit Diagram

POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 5 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.





INTERNAL CONNECTIONS OF POWER TRANSF.

Figure 5—Universal Transformer Connections

MODEL 128, 224
Chassis Wiring

RCA-VICTOR CO., INC.

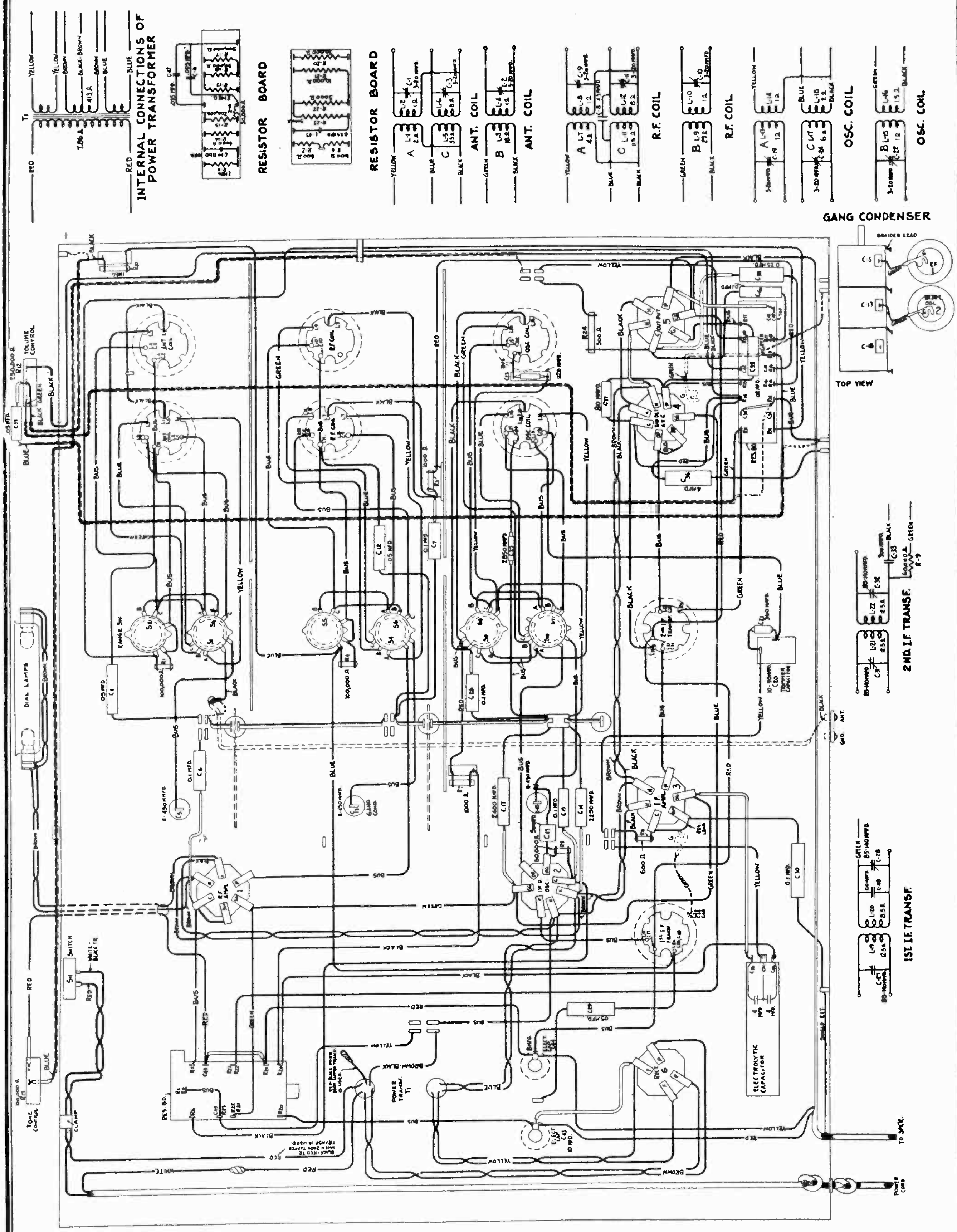


Figure 2—Chassis Wiring Diagram

MODEL 128,224
Trimmer Layout
Socket Layout
Circuit Data

RCA-VICTOR CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, an I. F. stage, a combined second detector and automatic volume control and a single Pentode output stage. An RCA-80 rectifier, together with a suitable filtering system, provides plate and grid voltages for all tubes and field excitation for the loudspeaker. Figure 1 shows the schematic circuit diagram, Figure 2 the chassis wiring, and Figures 3 and 4 the loudspeaker wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in this circuit.

In conjunction with these three tuned circuits, it is well to point out that three different groups of tuned circuits are used, one for each tuning band. A three-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to the absorption effects caused by the coils, the natural period of which, with tuning capacitor disconnected, fall in the next higher frequency band.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 K. C.

The output of the I. F. amplifier is then applied to the diode electrodes of the RCA-6B7, which is a combined second detector, automatic volume control and A. F. amplifier. The direct current component of the rectified signal produces a voltage drop across resistor

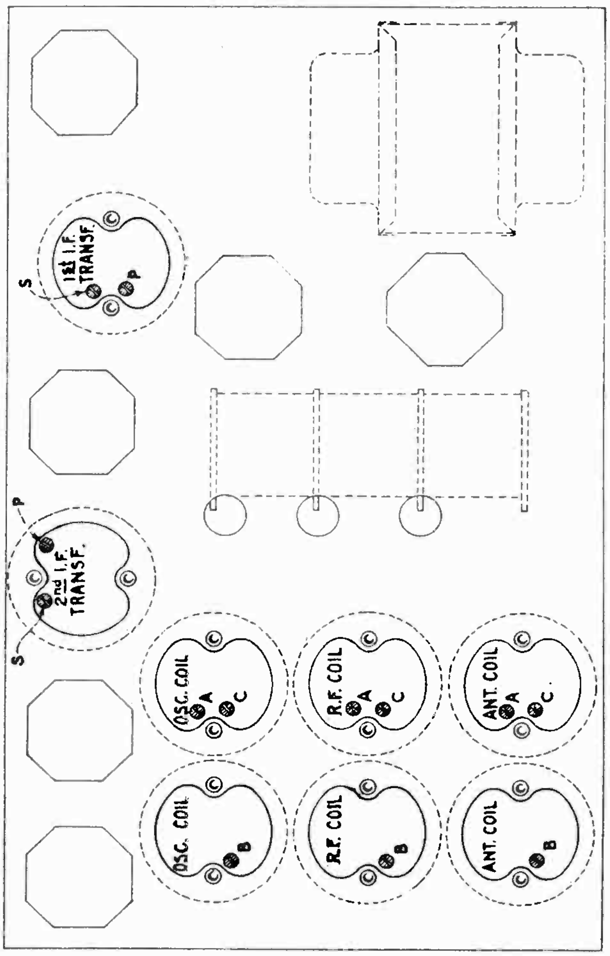


Figure 6—Location of Line-up Capacitors

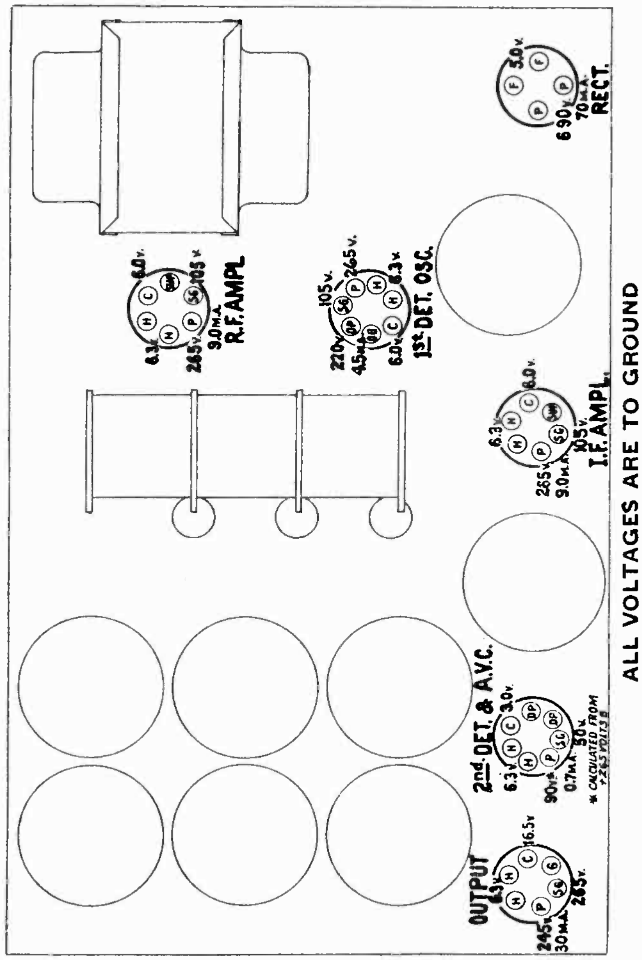


Figure 7—Tube Socket Voltages

RCA-VICTOR CO., INC.

R-12. The full voltage drop constitutes the automatic bias voltage for the R. F. while a tap is provided for the first detector and I. F. voltage. These automatic bias voltages for the R. F. first detector and I. F. give

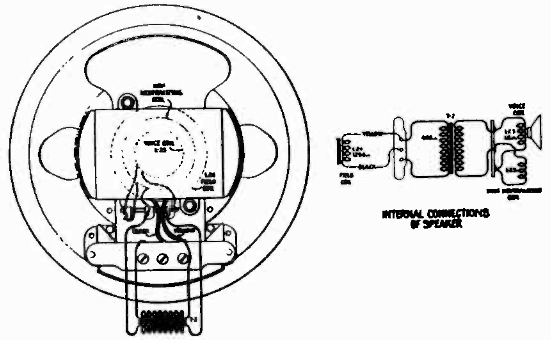


Figure 3—Table Loudspeaker Wiring

the automatic volume control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-6B7 and thereby regulates the audio output of the entire receiver.

The output of the RCA-6B7 is resistance coupled to the grid of the RCA-41 tube, which is the power output amplifier. This tube is operated as a Pentode and provides high audio gain and satisfactory output power. The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

The tone control consists of a variable resistor and fixed capacitor connected in series across the primary of the output transformer. At the minimum resistance position of the variable resistor, maximum attenuation of the high audio frequencies is obtained.

Plate and grid voltages for all tubes are supplied from the output of the rectifier-filter system. An RCA-80 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

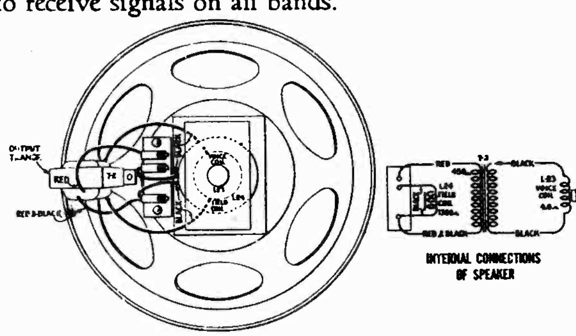


Figure 4—Console Loudspeaker Wiring

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 8. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in, and the output indicator should be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has one I. F. stage, two transformers having four adjustable capacitors may require adjustment. The transformers are all peaked, being tuned to 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

RCA-VICTOR CO., INC.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in band "A." Three are required in bands "B" and "C."

To properly align the various bands, each band must be aligned individually in the order given. This is "A," "B" and "C." The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64-inch of the horizontal line at the highest frequency end of band "A."

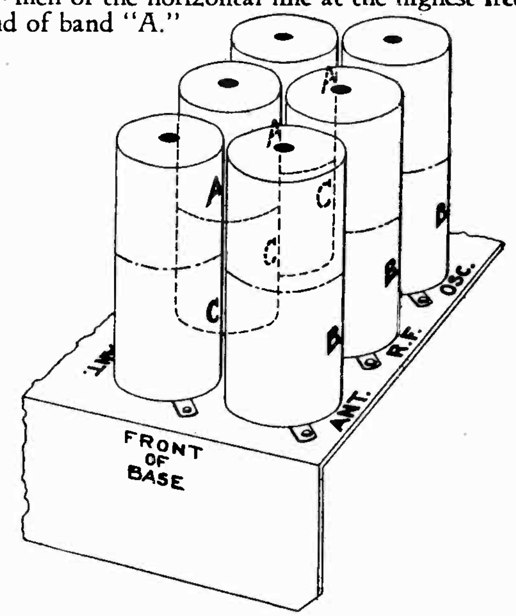


Figure 8—Location of Coils in Shields

Figure 6 shows the location of the trimmers for each band. Care must be exercised to merely adjust the trimmers in the band under test.

Band "A"

(a) Set the Band Switch at "A."

(b) The oscillator series capacitor, located on the rear apron of the chassis, should be set at about the center of its range.

(c) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(d) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, located on rear apron of chassis, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (c).

Band "B"

(a) Set the Band Switch at "B."

(b) The detector and antenna trimmers should first be tightened to approximately 3/4 maximum capacity (turned 3/4 inch).

(c) Tune the external oscillator to 5,160 K. C., set the pointer at 5,160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(d) Check for the image signal which should be received at approximately 4,240 K. C. on the dial. It may be necessary to increase the external oscillator output for this check.

(e) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(f) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "C"

(a) Set the Band Switch at "C."

(b) The detector and antenna trimmers should first be tightened to approximately 3/4 maximum capacity (turned 3/4 in.)

(c) Tune the external oscillator to 18,000 K. C., set the pointer at 18 M. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(d) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(e) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(f) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

RCA-VICTOR CO., INC.

VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition.

115-Volt A. C. Line—No Signal—Volume Control Maximum

Radiotron Number		Cathode to Ground, Volts, D. C.	Screen Grid to Ground, Volts, D. C.	Plate to Ground, Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		6.0	105	265	9.0	6.3
RCA-6A7	Det.	6.0	105	265	3.5	6.3
	Osc.	—	—	220	4.5	
RCA-6D6—I. F.		6.0	105	265	9.0	6.3
RCA-6B7—2nd Detector		3.0	50	90*	0.7	6.3
RCA-41—Pwr		16.5	265	245	30.0	6.3
RCA-80—Rectifier		—	—	690 (RMS)	70.0	5.0

*Voltage calculated from 265 V. + B.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
9511	Transformer—Power transformer 105-125 volts, 50-60 cycles (T1)	$4.78
9512	Transformer—Power transformer 105-125 volts, 25-40 cycles	6.58
9513	Transformer—Power transformer—105-250 volts—40-60 cycles	4.85
4519	Volume control (R12)	1.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
4422	Clutch—Clutch drive assembly for variable condenser drive	.22
4510	Drive—Tuning condenser drive assembly	2.42
4361	Indicator—Band indicator (celluloid)	.12
3943	Screen—Dial light screen (celluloid)—Package of 2	.18
3993	Screw—Number 6-32-5/32 square head set screws for band indicator operating arm—Package of 10	.25
4669	Screw—Number 8-32-5/32 set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
1378	Stud—Band indicator operating arm stud—Package of 5	.25
	REPRODUCER ASSEMBLY TABLE MODEL	
4526	Cable—3-conductor—Reproducer cable	$0.32
7818	Reproducer complete	6.58
	REPRODUCER ASSEMBLY CONSOLE MODEL	
4473	Board—Terminal board assembly	.26
9460	Coil—Field coil, magnet and cone support (L24)	6.00
8935	Cone—Reproducer cone (L23)—Package of 5	5.25
9527	Reproducer—Complete	8.00
4472	Transformer—Output transformer (T2)	1.40
	MISCELLANEOUS ASSEMBLY	
4677	Bezel—Station selector dial (escutcheon) bezel	.56
4661	Dial—Station selector dial	.62
6614	Glass—Station selector dial glass	.30
4520	Indicator—Station selector indicator pointer	.18
4449	Knob—Station selector, volume control, tone control, range switch or operating switch knob—Package of 5	.60
4678	Ring—Dial glass retaining ring—Package of 5	.34
4527	Screw—Chassis mounting screw assembly comprising 4 spacers, 4 screws, 4 lockwashers, 4 washers, 8 cushions—For table model	.40
4685	Screw—Chassis mounting screw assembly—Comprising 4 spacers, 4 screws, 4 lockwashers, 4 washers and 8 cushions—For console model	.40
4613	Screw—Number 8-32-7/16 headless set screw for knobs—Package of 10	.25

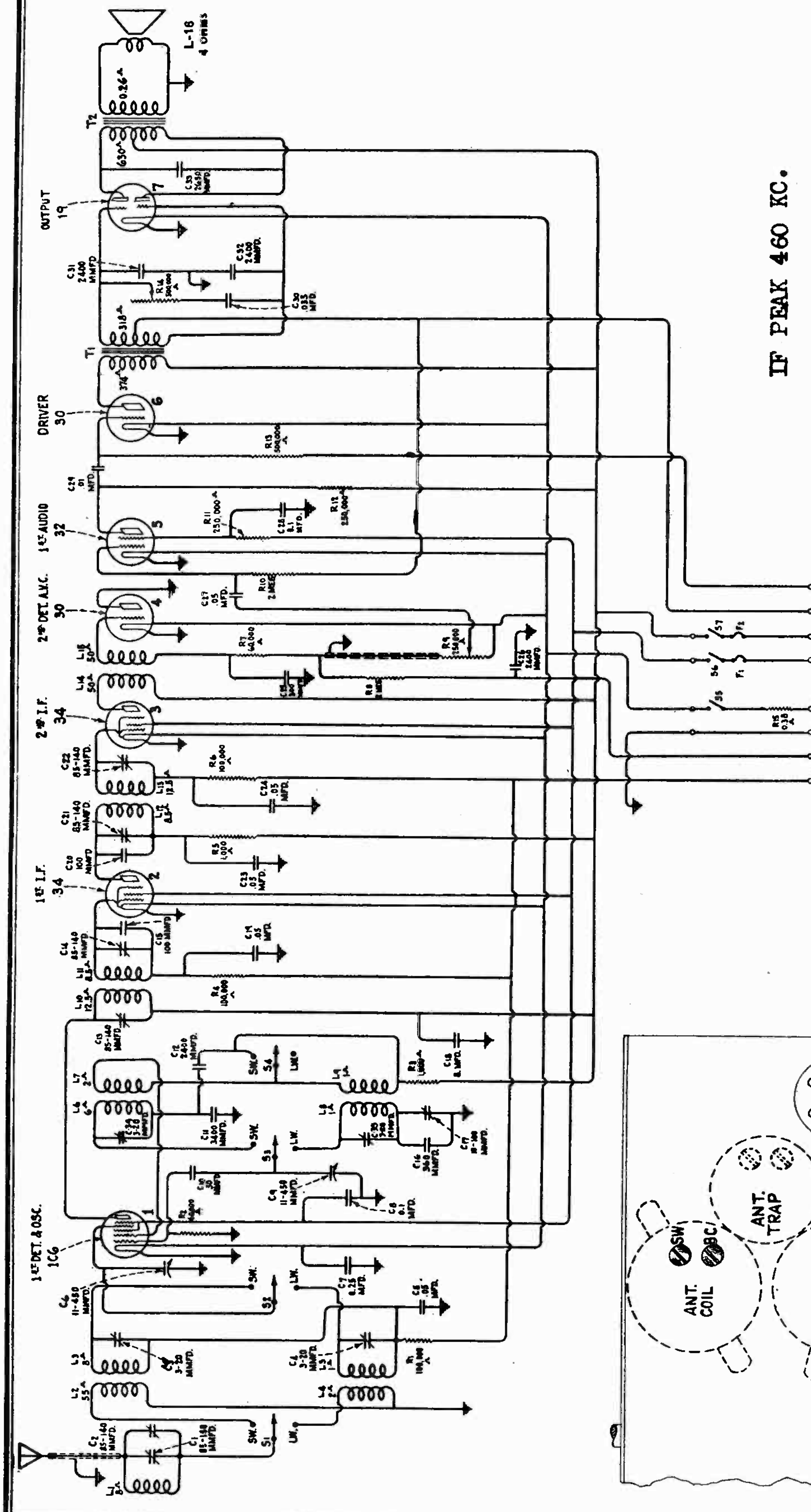
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control or tone control mounting bracket	$0.18
2747	Cap—Contact cap—Package of 5	.50
3861	Capacitor — Adjustable trimmer capacitor (C20)	.78
4442	Capacitor—50 mmfd. (C47)	.22
4662	Capacitor—80 mmfd. (C37)	.28
4413	Capacitor—360 mmfd. (C21)	.22
4412	Capacitor—1120 mmfd. (C23)	.25
4515	Capacitor—1160 mmfd. (C34)	.22
4670	Capacitor—2250 (C14)	.30
4523	Capacitor—2400 mmfd. (C17)	.26
4524	Capacitor—2850 mmfd. (C25)	.35
4435	Capacitor—.02 mfd. (C39)	.25
4518	Capacitor—.05 mfd. (C35)	.52
4417	Capacitor—.05 mfd. (C4, C12, C29)	.25
3877	Capacitor—.1 mfd. (C40)	.32
4415	Capacitor—.1 mfd. (C6, C15, C30)	.30
4645	Capacitor—.1 mfd. (C7, C26)	.25
3597	Capacitor—.25 mfd. (C38, C45)	.40
4525	Capacitor—4.0 mfd. (C36)	.70
4428	Capacitor—8 mfd. (C44)	1.05
7790	Capacitor—10 mfd. (C43)	1.05
4692	Capacitor pack—Comprising one 0.035 mfd. and one 0.005 mfd. capacitors (C41, C42)	.30
7589	Capacitor Pack—Comprising two 4. mfd. capacitors (C16, C46)	1.64
4358	Clamp—Capacitor mounting clamp	.15
4516	Coil—Antenna coil "PB" (L3, L4, C2)	1.65
7803	Coil—Antenna coil "B & SW" (L1, L2, L5, L6, C1, C3)	1.82
4514	Coil—Detector Coil "PB" (L9, L10, C10)	1.65
7805	Coil—Detector coil "B & SW" (L7, L8, L11, L12, C8, C9, C11)	2.15
7807	Coil—Oscillator coil "B & SW" (L13, L14, L17, L18, C19, C24)	1.62
4511	Coil—Oscillator coil "PB" (L15, L16, C22)	1.52
7801	Condenser—3-gang variable tuning condenser (C5, C13, C18)	4.42
4340	Lamp—Dial lamp—Package of 5	.60
3632	Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5	1.10
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R6, R8)—Package of 5	$1.00
4370	Resistor—1000 ohms—Carbon type—¼ watt (R3, R7)—Package of 10	2.00
3997	Resistor—4000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
6318	Resistor—10,000 ohms (R21)	.80
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R16, R18)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R15)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R17)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11, R13)—Package of 5	1.00
3413	Resistor—5000 ohms—Carbon type—½ watt (R22, R23)—Package of 5	1.00
4513	Resistor — 30,000 ohms—Carbon type—3 watt (R20)	.25
4521	Shield—Antenna R. F. or oscillator coil shield	.42
4145	Shield—First detector or output Radiotron shield	.30
4103	Shield—I. F. amplifier Radiotron shield	.20
6955	Shield—R. F. amplifier Radiotron shield	.25
3782	Shield—Second detector Radiotron shield	.26
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4379	Strip—Antenna terminal engraved "ANT-GND"	.20
6466	Switch—Operating switch (S11)	.45
4512	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	3.42
4517	Tone control (R19)	.90
4431	Transformer — First intermediate frequency transformer (L19, L20, C27, C28, C48)	2.28
4433	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9)	2.15

RCA-VICTOR CO., INC.

MODEL 135-B, 235-B
Schematic
Trimmer Layout



IF PEAK 460 KC.

Figure 1—Schematic Circuit Diagram

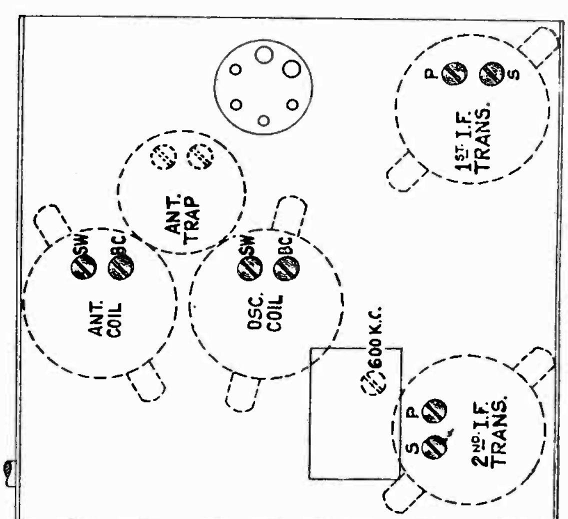


Figure 4—Location of Line-Up Capacitors

MODEL 135-B,235-B
Socket Layout
Voltage

RCA-VICTOR CO., INC.

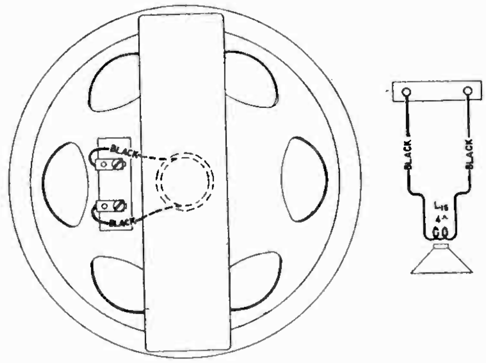


Figure 3—Loudspeaker Wiring

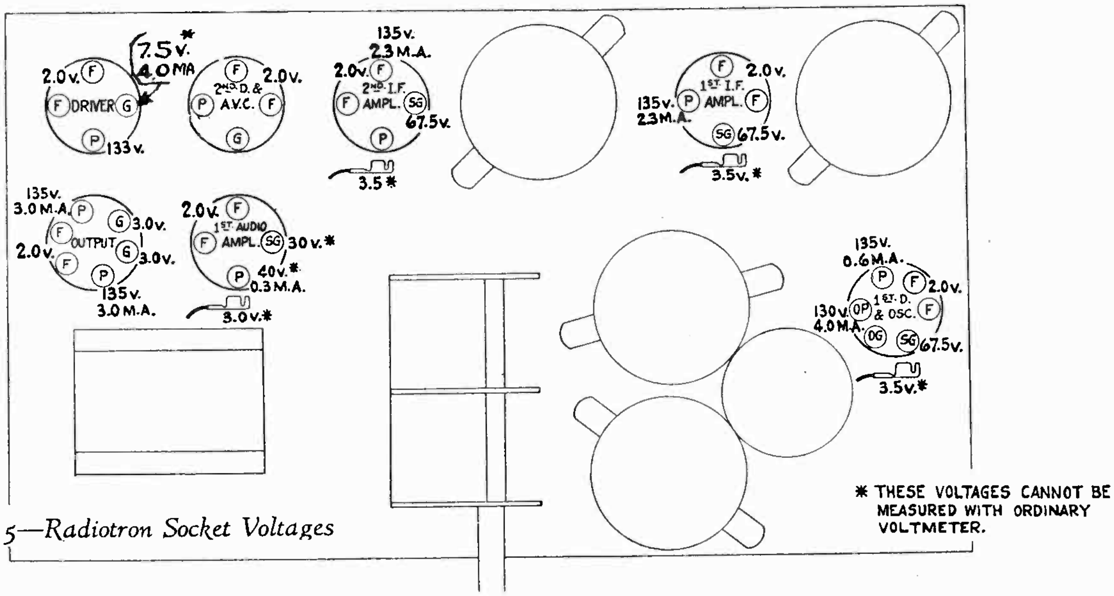


Figure 5—Radiotron Socket Voltages

Volume Control at Maximum—No Signal—135 Volt "B" Battery—4.5 and 7.5-Volt Bias Batteries

Radiotron No.		Control Grid to Ground	Screen Grid to Ground	Plate to Ground	Plate, M. A.	Filament Volts
RCA-1C6	1st Detector	3.5*	67.5	135	0.6	2.0
	Oscillator	—	—	130	4.0	
RCA-34—I. F.		3.5*	67.5	135	2.3	2.0
RCA-34—I. F.		3.5*	67.5	135	2.3	2.0
RCA-30—Detector AVC		—	—	—	—	2.0
RCA-32—Audio		3.0*	30*	40*	0.3	2.0
RCA-30—Driver		7.5*	—	133	4.0	2.0
RCA-19—Power		3.0	—	135	3.0	2.0

*These voltages cannot be measured with ordinary voltmeter.

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MODEL 135-B, 235-B
Chassis Wiring

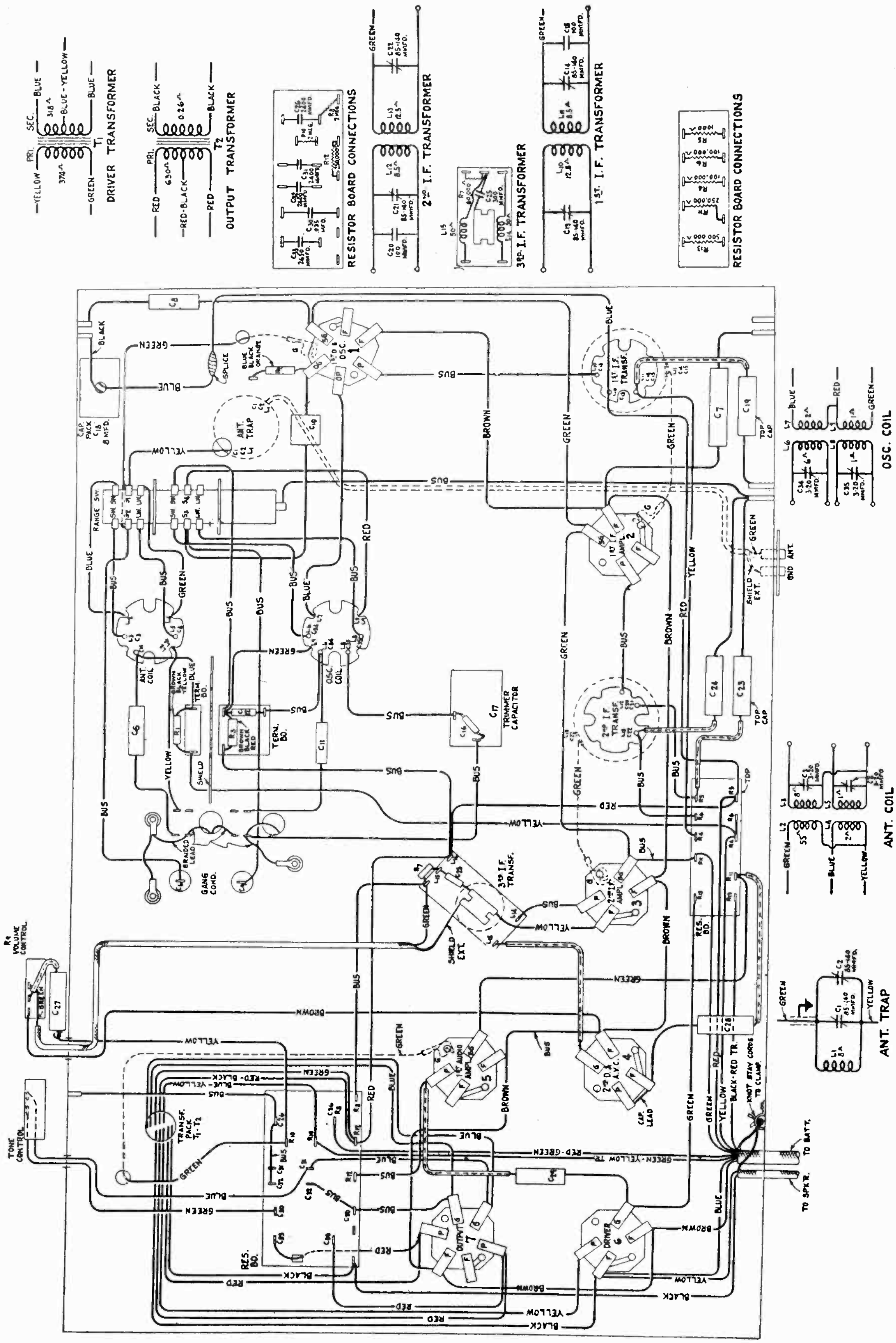


Figure 2—Wiring Diagram

MODEL 135-B, 235-B
Alignment Data
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

(1) Line-Up Capacitor Adjustments

To properly align this receiver, it is essential that a modulated R. F. oscillator of suitable frequency range such as Stock No. 9050, an output indicator, Stock No. 4317, and an alignment tool, Stock No. 4160, be available. Figure 4 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments

The I. F. amplifier comprises two stages which have three transformers. The third transformer is untuned so that only a total of four tuned circuits is used. Refer to Figure 4 and proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight indication is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the top of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540.

(b) Then set the Test Oscillator at 1720 K. C., the dial indicator at 1720, the Range Switch at the "in" position, and adjust the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

Adjust the two trimmers under the two R. F. coils, designated as BC in Figure 4, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 18,000 K. C. and set the dial at 18M. Adjust the two trimmer capacitors designated as SW in Figure 4 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. The detector trimmer *must* be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. *Both of these adjustments must be made as indicated.*

Trap Circuit Adjustment

A trap circuit, tuned to the I. F. frequency (460 K. C.) is used in the antenna circuit to reduce interference from signals approximately the same frequency as that of the I. F. amplifier. Two parallel trimmers are used and adjustment may be made by means of either or both. Proceed as follows:

(a) Place the receiver in operation and connect the test oscillator output from the antenna to ground terminals of the receiver. Adjust the test oscillator frequency to 460 K. C. and connect the output indicator across the cone coil of the reproducer.

(b) Adjust either or both of the trap circuit trimmers, accessible from the top of the chassis, Figure 4, until a *minimum* output from the receiver is obtained. The point of minimum output is the proper adjustment.

It should be remembered that the trimmers provide an adjustment over a small range. However, in event constant interference is experienced at a slightly different frequency from 460 K. C., adjusting the trap to the frequency of the interference will materially reduce its effect.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume or tone control mounting bracket	$0.18
2747	Cap—Contact cap—Package of 5	.50
4498	Capacitor—8 mfd. (C18)	1.25
4442	Capacitor—50 mmfd. (C10)	.22
3981	Capacitor—300 mmfd. (C25)	.30
4413	Capacitor—360 mmfd. (C16)	.22
2749	Capacitor—2400 mmfd. (C26)	.35
4440	Capacitor—2400 mmfd. (C12, C31, C32)	.26
4529	Capacitor—2650 mmfd. (C33)	.32
4439	Capacitor—3400 mmfd. (C11)	.35
4212	Capacitor—0.01 mfd. (C29)	.30
4518	Capacitor—0.05 mfd. (C27)	.52
4417	Capacitor—0.05 mfd. (C5, C19, C23, C24)	.25
4643	Capacitor—0.035 mfd. (C30)	.30
3877	Capacitor—0.1 mfd. (C8, C28)	.32
4537	Capacitor—0.25 mfd. (C7)	.38
3861	Capacitor — Adjustable trimmer capacitor (C17)	.78
4430	Coil—Antenna coil (L2, L3, L4, L5, C3, C4)	1.92
4432	Coil—Oscillator coil (L6, L7, L8, L9)	1.65
4539	Coil and shield assembly—Antenna trap circuit (L1, C1, C2)	2.05
4504	Condenser—2-gang variable tuning condenser (C6, C9)	2.78
4370	Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R3, R5)	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2, R7)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4, R6)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R11, R12)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R13)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R8, R10)—Package of 5	1.00
4521	Shield—Antenna, oscillator or I. F. transformer shield	.42
4103	Shield—Driver Radiotron shield	.20
4145	Shield—First detector and oscillator Radiotron shield	.30
3056	Shield—First I. F. amplifier Radiotron shield —Package of 2	.40
4530	Socket—4-contact Radiotron socket	.28
4532	Socket—4-contact audio amplifier—Radiotron socket	.28
4232	Socket—6-contact Radiotron socket	.35
4531	Socket—6-contact output Radiotron socket	.30
4534	Switch—Range switch (S1, S2, S3, S4, SW, LW)	3.64
4536	Tone control (R14)	.95
4431	Transformer—First intermediate transformer (L10, L11, C13, C14, C15)	2.28
7840	Transformer — Second intermediate transformer (L12, L13, C20, C21, C22)	2.35
4538	Transformer—Third intermediate frequency transformer (L14, L15)	2.15
4533	Transformer pack—Audio transformer pack —Comprising driver and output transformer (T1, T2)	3.98
4535	Volume control (R9)	1.40
	REPRODUCER ASSEMBLIES (CONSOLE MODEL)	
4541	Cable—2-conductor reproducer cable	.38
9432	Cone—Reproducer cone (L16)	1.88
7820	Magnet—Cone housing and magnet assembly	8.98
7819	Reproducer complete	12.18
4234	Rivet—Cone mounting rivet—Package of 100	.66

Stock No.	Description	List Price
	REPRODUCER ASSEMBLIES (TABLE MODEL)	
9539	Cone—Reproducer cone—Package of 5	$4.30
9540	Magnet assembly—Comprising cone bracket core and magnet	5.72
9538	Reproducer complete	7.65
	DRIVE ASSEMBLY	
4422	Clutch—Condenser drive clutch assembly complete	.88
4641	Dial—Station selector dial (console model)	.80
4588	Dial—Station selector dial (table model)	.80
4586	Drive—Variable tuning condenser drive assembly complete	2.42
4587	Pointer—Station selector pointer (table model)	.18
4363	Pointer—Station selector pointer (console model)	.18
	MISCELLANEOUS ASSEMBLIES	
6706	Bezel—Metal bezel (escutcheon) for station selector dial glass (table model)	.42
6840	Bezel—Metal bezel (escutcheon) for station selector dial glass (console model)	.56
4289	Body—Fuse connector body—Package of 10	.35
4642	Cable—Battery cable—8-conductor—Complete with switch and connectors (table model)	3.60
4542	Cable—8-conductor battery cable complete with switch and connectors (console model)	3.82
4288	Cap—Fuse connector cap—Package of 10	.36
6516	Connector—Fuse connector complete	.16
6175	Escutcheon—"OFF-ON" operating switch escutcheon—Package of 5	.50
4286	Ferrule—Fuse connector ferrule and bushing —Package of 10	.38
3748	Fuse—0.5 ampere—Package of 5	.40
6614	Glass—Station selector dial glass (console model)	.30
6707	Glass—Station selector dial glass (table model)	.20
4290	Insulator—Fuse connector insulator—Package of 10	.35
3088	Knob—Operating switch knob—Package of 5	.50
4449	Knob—Station selector, volume control, tone control or range switch knob—Package of 5	.60
4644	Resistor—0.42 ohms—Flexible type—Filament series (R15)—Package of 5	.80
6615	Ring—Retaining ring for dial glass—Package of 5 (console model)	.34
6708	Ring—Retaining ring for dial glass—Package of 5 (table model)	.44
4638	Screw—Chassis mounting screw assembly—Comprising eight cushions, four screws, four washers, four lockwashers and four spacers	.52
3238	Screw—6-40-11/32" knurled head—Set screw for operating switch knob No. 3088—Package of 10	.25
4613	Screw—8-32-1/16" headless set screw for station selector volume control, tone control or range switch knob—Package of 10	.25
4284	Spring—Fuse connector spring—Package of 10	.30
4540	Switch—Operating switch	2.28
4285	Washer—Fuse connector insulating washer—Package of 10	.22

MODEL 140,141,141-E, 240 Revised
Circuit Data
Alignment Data

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............100–125 Volts and 200–250 Volts
Frequency Rating
25–60 (100–125 Volts Only) and 50–60 Cycles
Power Consumption.............................110 Watts
Type and Number of Radiotrons
3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total, 8
Type of Circuit
Straight Super-Heterodyne for all frequencies with Class "B" Output Stage.
Undistorted Output.............................6 Watts

This all-wave super-heterodyne receiver is of the continuous tuning type, utilizing a straight super-heterodyne circuit in all bands. The bands are as follows:

Selector Switch Position	*Frequency Range (Kilocycles)*	*Wave-Length Range (Meters)*
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–300
D	8000–18000	37.5–16.7

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly, with the selector switch, is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure D and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure D.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and, on the three lowest frequency bands, a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low-frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers, due to the additional F. R. stage used.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 90 K. C. to 25,000 K. C., continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300-ohm resistor, for use as a "dummy" antenna, a non-metallic screw-driver such as Stock No. 4160, and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with a 300-ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver. This is done by connecting the 300-ohm resistor between the antenna and ground terminals of the receiver and attaching a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

MODEL 140,141,141-E,
240 Revised
Voltage
Wave Band Data

RCA-VICTOR CO., INC.

Power Supply—The instruments in this series are supplied in either of two alternating current power supply ratings: (1) 100–125/200–250 volts, 50–60 cycles and (2) 100–125 volts, 25–60 cycles (see rating label inside cabinet). To insure correct Radiotron operating voltages, both types are equipped to permit rearrangement of the internal connections to conform with the actual voltage available. Thus, the 50–60 cycle models may be adapted for 100–115, 115–125, 200–230 or 230–250 volts; and the 25–60 cycle models for either 100–115 or 115–125 volts.

Of course, alignment correction at the high-frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low-frequency end of a tuning range, it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure E for the location of the line-up capacitors.

Pickup Connections

A terminal board is provided at the rear of the chassis for attaching a magnetic pickup to this instrument. Such connections are shown in Figures F, G and H.

Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure J shows the proper manner of making the various connections possible for this transformer.

The 25–60 cycle transformer uses only one 100–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125-volt lines, but the connection shown in Figure I may be used for 100–115-volt lines.

TUBE SOCKET VOLTAGES

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Cathode, Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

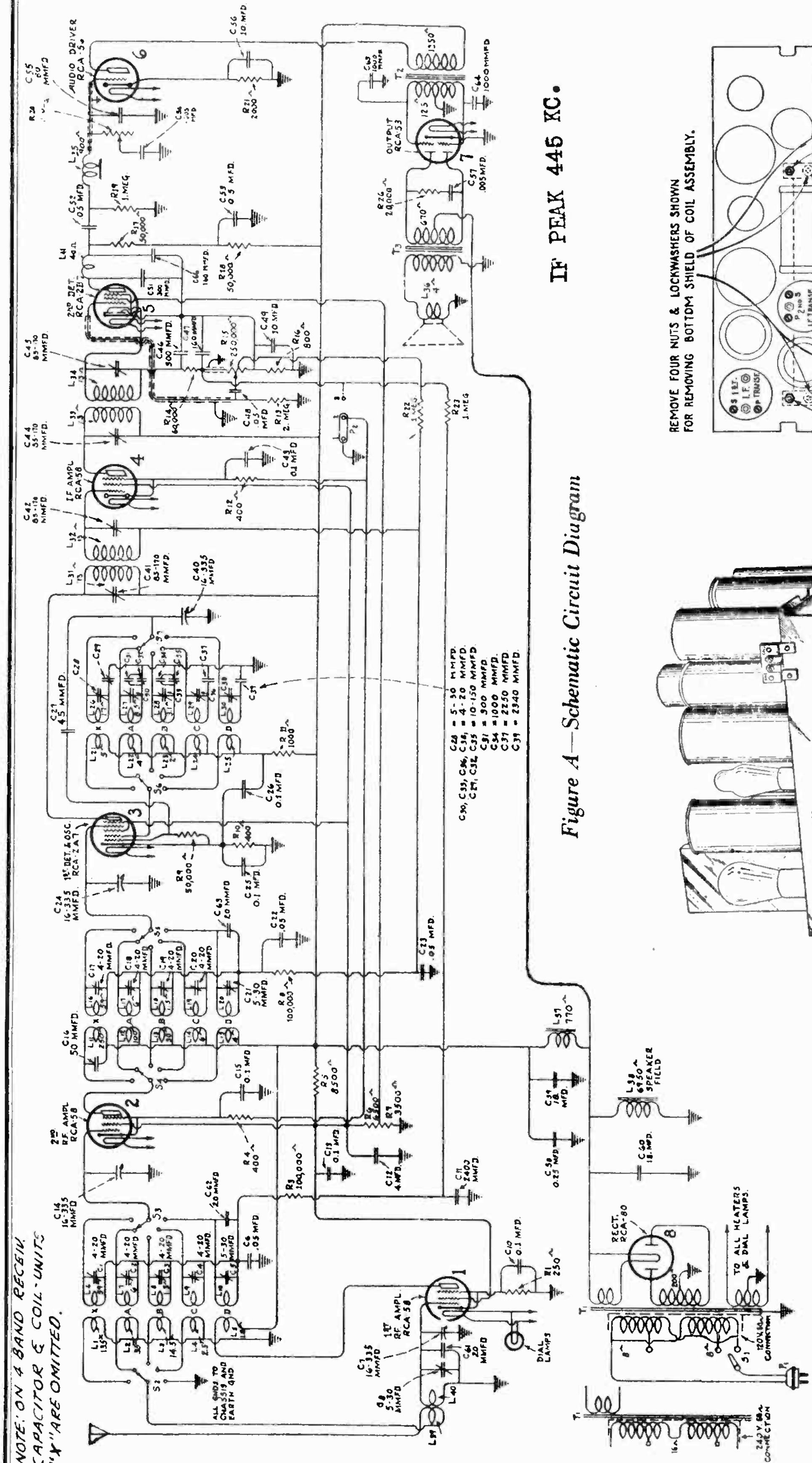
* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

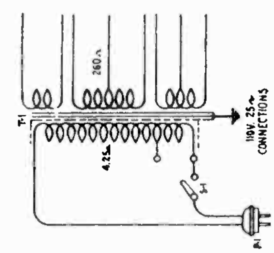
External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments To be Made
445 K. C.	Any setting that does not bring in station.	At rear of chassis.	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis.	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output. (See Note.)	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. (See Note.)	4

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.

RCA-VICTOR CO., INC.

MODEL 140, 141, 141-E, 240 Revised
Schematic, Trimmers





IF PEAK 445 KC.

Figure A—Schematic Circuit Diagram

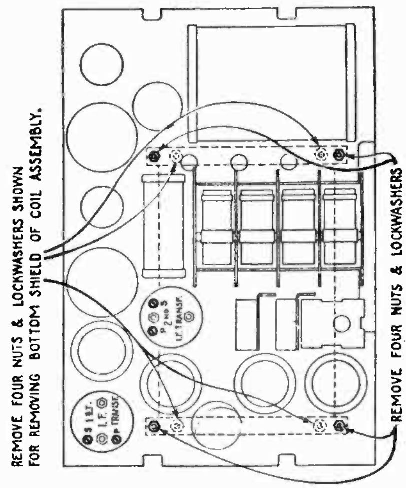


Figure D—Location of nuts and lockwashers holding coil assembly

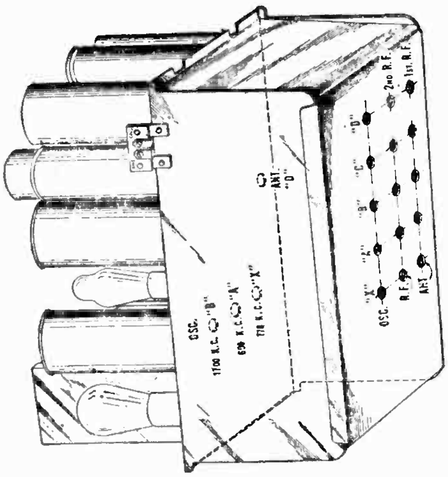


Figure E—Location of line-up capacitors

MODEL 140, 141, 141-E,
240 Revised
Chassis Wiring

RCA-VICTOR CO., INC.

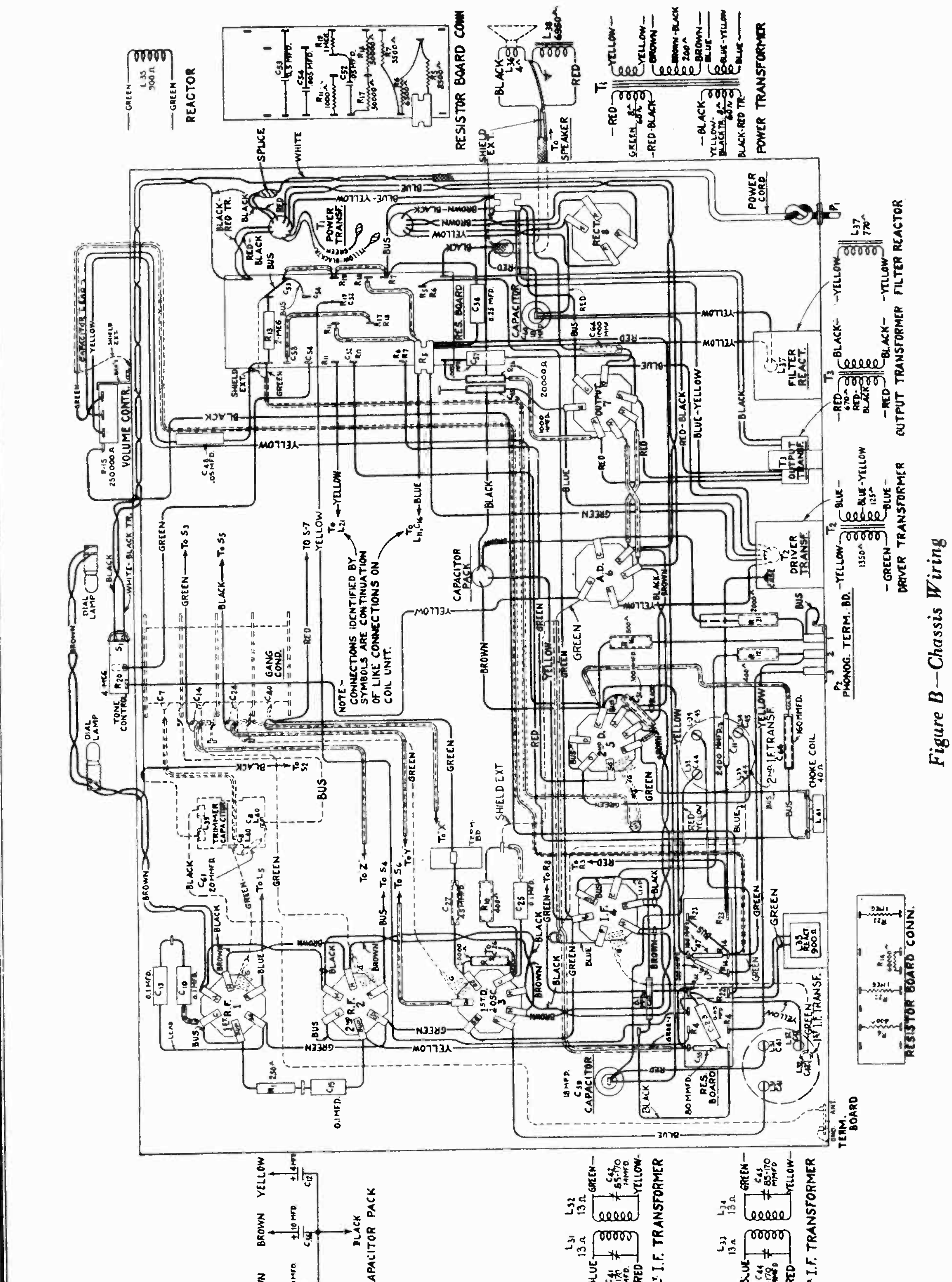


Figure B—Chassis Wiring

MODEL 140,141,141-E, 240 Revised

Coils Connections

RCA-VICTOR CO., INC.

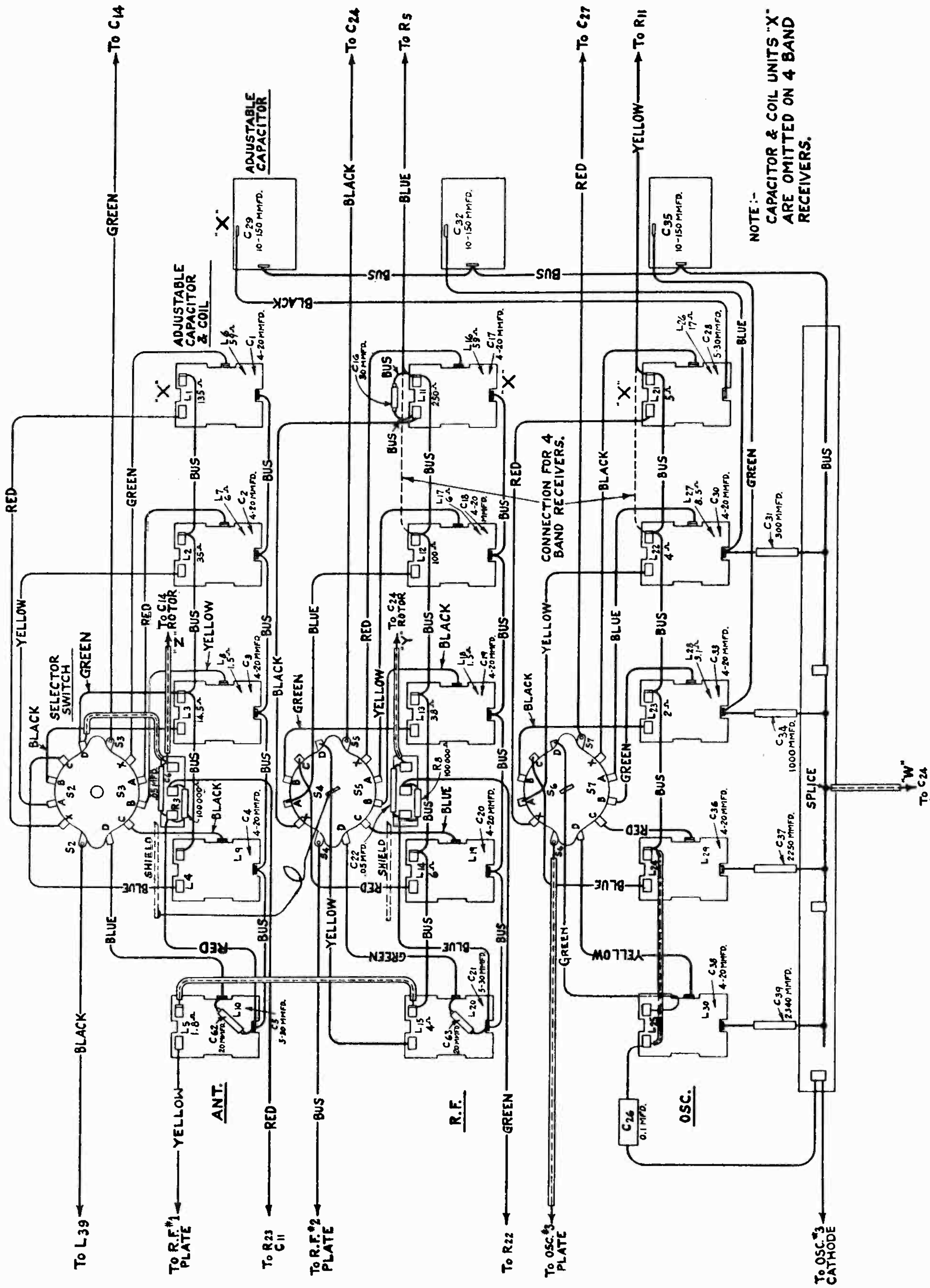


Figure C—Wiring Diagram of Coil Assembly

MODEL 140, 141, 141-E,
240 Revised
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16) Pkg. of 5	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C51)	.34
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3643	Capacitor—.005 mfd. (C57)	.25
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—8,500 ohms—Carbon type—3 watt (R5)	.25
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3888	Capacitor—.05 mfd. (C6, C22, C23, C52)	.25
3901	Capacitor—.05 mfd. (C48)	.36
3931	Capacitor—45 mmfd. (C27)	.30
3932	Capacitor—.0024 mfd. (C11)	.30
3973	Capacitor—1,000 mmfd. (C64, C65)	.34
4019	Capacitor—1,000 mmfd. (C34)	.34
4030	Bracket—Tone or volume control mounting bracket	.10
4033	Capacitor—20 mmfd. (C61, C62, C63)	.34
4103	Shield—First detector and R. F. Radiotron shield	.20
4104	Shield—I. F. Radiotron shield	.20
4205	Coil—Second detector choke (L41)	.50
4207	Capacitor—0.1 mfd. (C13, C43)	.34
6136	Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6512	Capacitor—.005 mfd. (C54)	.28
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48
6606	Reactor—Filter reactor (L37)	1.66
6607	Reactor—Tone control reactor (L35)	1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6612	Volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	1.00
6626	Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56)	1.86
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1)	$2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28)	1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L22, L27, C30)	1.40
6637	Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	
6889	Capacitor—18. mfd. (C60)	1.55
6890	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	2.40
6891	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	2.40
6892	Tone control (R20)	1.50
6955	Shield—Second R. F. Radiotron shield	.25
6956	Shield—Radiotron shield top	.15
7065	Screwdriver—Combination insulated screwdriver and alligator jaw end wrench for R. F. or I. F. adjustment	.80
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
9042	Transformer—Power transformer—105–250 volts—50–60 cycles (T1)	6.84
9046	Transformer—Power transformer—105–125 volts—25–40 cycles	9.22
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50†
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	MISCELLANEOUS	
3829	Knob—Volume control or tone control knob—Package of 5	1.10
3830	Knob—Station selector knob—Package of 5	1.08
3831	Knob—Range switch knob—Package of 5	1.08
3876	Cable—3-conductor for loudspeaker—4-band	.60
3878	Screws—No. 4–40–3/16 fillister head screw and washer for fastening station selector pointer—Package of 20	.25
3952	Escutcheon—Volume control escutcheon	.10
3953	Escutcheon—Range switch escutcheon—5-band	.10
3992	Escutcheon—Range switch escutcheon—4-band	.10
4160	Screwdriver—Combination insulated screwdriver and socket wrench for I. F. and R. F. adjustments	1.00
6112	Cushions—Rubber cushions for chassis—Package of 4	.25
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial (RCA)	.50
6671	Cable—2-conductor shielded for loudspeaker—5-band	.36
6672	Screen—Translucent celluloid screen—For dial lamps—Package of 5	.30
6673	Pointer—Station selector pointer—Package of 5	.64
6677	Dial—Station selector dial—5-band—Package of 5	1.42
6678	Dial—Station selector dial—4-band—Package of 5	1.42
6756	Bezel—Metal bezel for station selector dial (Plain)	.50
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

.0869 † Full discount not allowed.

PL 151

RCA-VICTOR CO., INC.

RCA VICTOR MODELS 143 AND 242

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts and 100–130/195–250 Volts (Double Range)
Frequency Rating	25–60 and 50–60 Cycles
Power Consumption	130 Watts (All Frequencies)
Type and Number of Radiotrons	2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-76, 2 RCA-42, 1 RCA-5Z3—Total, 8
Tuning Frequency Range	Band X— 140 K. C.– 410 K. C. Band A— 540 K. C.– 1720 K. C. Band B—1720 K. C.– 5400 K. C. Band C—5400 K. C.–18000 K. C.
Line-up Frequencies	175 K. C., 410 K. C, 460 K. C., 600 K. C., 1720 K. C., 5160 K. C., 18000 K. C.
Maximum Undistorted Output	4.0 Watts
Maximum Output	5.0 Watts

PHYSICAL SPECIFICATIONS

	Model 143	*Model 242*
Height	20$\frac{5}{16}$ Inches	41$\frac{1}{2}$ Inches
Width	17$\frac{7}{8}$ Inches	26 Inches
Depth	14$\frac{1}{32}$ Inches	14 Inches

This eight-tube, four-band Superheterodyne receiver is of the "all-wave" type, having a continuous tuning range extending from 140 K. C. to 18,000 K. C., except for one break between 410 K. C. and 540 K. C. Such a tuning range permits the listener to receive all of the important broadcasting, police, aircraft and amateur call bands used throughout the world.

Excellent sensitivity, selectivity and tone quality, together with a high output (4 watts undistorted), Class A amplifier gives the receiver outstanding performance. Operating features include an "airplane" type dial, a double-ratio vernier drive, a visual band indicator, and a special "second hand" on the dial for logging short-wave stations. Other important features include automatic volume control, sensitivity control, large loudspeaker unit and a terminal board for easily attaching a magnetic pickup.

DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, an I. F. stage, a combined second detector and automatic volume control, a first audio stage and a push-pull Pentode output stage. An RCA-80 rectifier, together with a suitable filtering system, provides plate and grid voltages for all tubes and field excitation for the loudspeaker. Figures 1 and 2 show the schematic diagrams, Figures 5 and 7 the chassis wiring, and Figures 3 and 4 the loudspeaker wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang capacitor.

Combined with the signal in the first detector is the local oscillator, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang capacitor are used in this circuit.

In conjunction with these three tuned circuits, it is well to point out that four different groups of tuned circuits are used, one for each tuning band. A four-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to the absorption effects caused by the coils, the natural period of which, with the tuning capacitor disconnected, falls in the next higher frequency band.

RCA-VICTOR CO., INC.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 K. C.

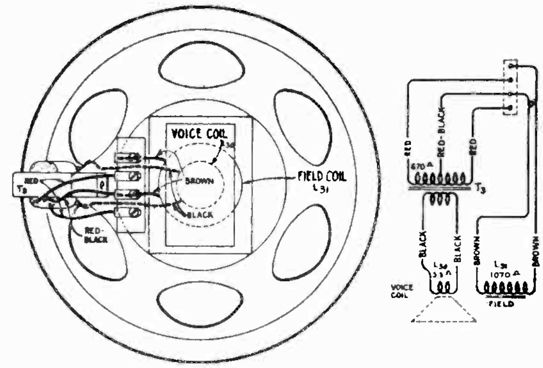


Figure 3—Console Loudspeaker Wiring

The output of the I. F. amplifier is then applied to the diode electrodes of the RCA-75, which is a combined second detector, automatic volume control and A. F. amplifier. The direct current component of the rectified signal produces a voltage drop across resistor R-32. The full voltage drop constitutes the automatic bias voltage for the R. F. while a tap is provided for the first detector and I. F. voltage. These automatic bias voltages for the R. F., first detector and I. F. give the automatic volume control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-75 and thereby regulates the audio output of the entire receiver.

The output of the detector is resistance coupled to the grid of the RCA-76, first audio stage, which is transformer coupled to the push-pull output stage. On some models the grid coupling resistor between the detector and audio stage is 1 megohm (R-21, Figure 1). Other models have two resistors, R-59, 400,000 ohms, and R-21, 2 megohms (Figure 2), with the band selector switch shorting out R-21 in bands B and C. The purpose of this latter type of connection is to reduce the low frequency output in bands B and C, thereby improving the performance of the receiver in these bands.

The output stage uses two RCA-42's, which give a low distortion, high audio output to the loudspeaker. A high frequency tone control, which consists of a variable resistor and capacitor, is connected across the grids of the output stage. At the minimum resistance position of the variable resistor, maximum attenuation of the high audio frequencies is obtained.

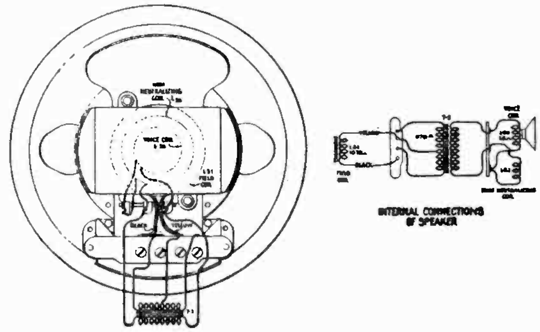


Figure 4—Table Loudspeaker Wiring

The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

Plate and grid voltages for all tubes are supplied from the output of the rectifier-filter system. An RCA-5Z3 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To properly align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts, which are shown on page 15, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

Checking With Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance,

MODEL 143,242
Alignment Data
Voltage

RCA-VICTOR CO., INC.

while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 6. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 K. C. and the signal tuned in, and the output indicator connected across the voice coil of the loudspeaker. Then the tuning wand should be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage with two transformers having four adjustable capacitors that may require adjustment. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 8. Adjust each trimmer of the I. F. transformers until maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F., OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in Bands "A" and "X." Three are required in Bands "B" and "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator across the voice coil of the loudspeaker. The volume and sensitivity controls must be at the maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of Band "A."

Figure 8 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "X"

(a) Set the band switch at "X."

(b) Tune the external oscillator to 410 K.C., set the dial pointer at 410 K.C. and adjust the oscillator, detector and R.F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 175 K.C. Tune in the 175 K.C. signal irrespective of scale calibration and adjust the series trimmer, marked 175 K.C. on Figure 8, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K.C. as described in (b).

Band "A"

(a) Set the band switch at "A."

(b) Tune the external oscillator to 1,720 K.C., set the pointer at 1,720 K.C. and adjust the oscillator, detector and R.F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 600 K.C. Tune in the 600 K.C. signal, irrespective of scale calibration, and adjust the series trimmers, marked 600 K.C., Figure 8, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K.C. as described in (b).

Band "B"

(a) Set the band switch at "B."

(b) Tune the external oscillator to 5,160 K.C. and set the pointer at 5,160 K.C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4,240 K.C. on the dial. It will be necessary to increase the external oscillator output for this check.

(d) The antenna and detector trimmers should now be peaked for maximum output.

Band "C"

(a) Set the band switch at "C."

(b) Tune the external oscillator to 18,000 K.C. and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then at the oscillator frequency and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 9 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

(5) MAGNETIC PICKUP CONNECTIONS

A Terminal Board is provided at the rear of the chassis for adding phonograph facilities to this instrument. Figure 11 shows the various types of connections that will be required for the different turntable assemblies.

(6) VARIATIONS IN MODELS

There are four slight variations in the electrical circuits of these receivers, which should be noted in event service work is necessary in the circuits that differ from the diagrams.

Group 1	C-52	1120 mmfd.
	R-18	60,000 ohms
	R-19	100,000 ohms
	R-20	15,000 ohms
Group 2	C-52	200 mmfd.
	R-18	100,000 ohms
	R-19	60,000 ohms
	R-20	10,000 ohms

RADIOTRON SOCKET VOLTAGES

120-Volt A.C. Line—Maximum Volume and Sensitivity—No Signal

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		4.2	110	272	10.5	6.3
RCA-6A7	Oscillator	—	—	225	11.4	6.3
	1st Detector	4.6	110	282		
RCA-6D6 I. F.		4.2	110	272	10.5	6.3
RCA-75 2nd Det.		1.2	—	170*	0.4	6.3
RCA-76 A. F.		14.0	—	252	2.8	6.3
RCA-42 Power		22.0	295	290	24.5	6.3
RCA-42 Power		22.0	295	290	24.5	6.3
RCA-5Z3 Rectifier		—	—	768/384 R. M. S.	110.0	5.0

*Cannot be measured with ordinary voltmeter.

MODEL 143,242
Trimmer Layout
Alignment Data

RCA-VICTOR CO., INC.

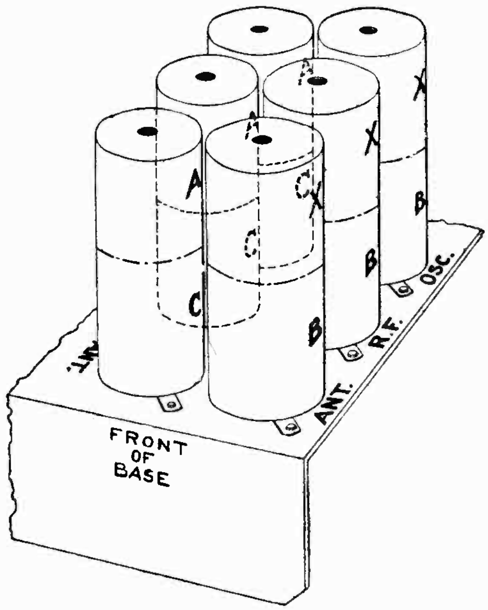


Figure 6—Location of Coils in Shields

Group 3—R-28 and C-52 are removed from the resistor board inside of chassis and mounted externally on phonograph terminal board. No. 3 terminal has been added to terminal board. Electrically, this group is identical with Group 2, the schematic and wiring diagrams being shown in Figures 1 and 5.

Group 4—Resistor R-10 has been removed. Resistor R-59 has been added and Resistor R-21 has been changed to 2 megohms. Capacitors C-52 and C-43 have been changed to 1120 mmfd. Figures 2 and 7 show the schematic and wiring diagrams of the models having these changes.

(7) FIDELITY LINK

It will be noted that a small link is mounted on the rear apron of the chassis which is closed on table models and open on console models. The purpose of the link is to increase the low frequency output of the receiver when open.

(8) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made.

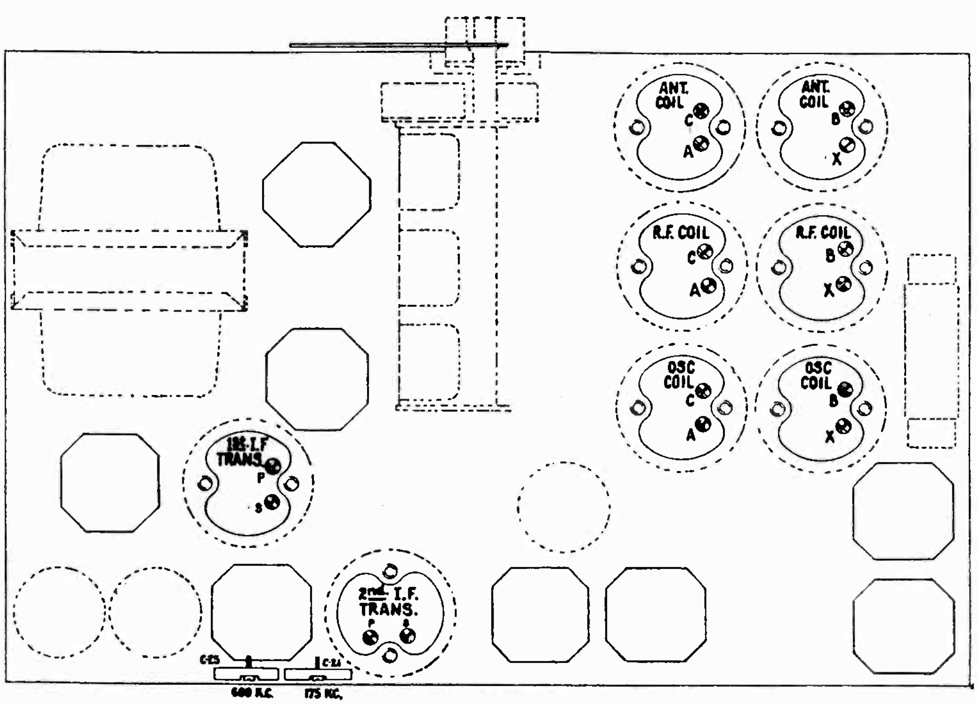
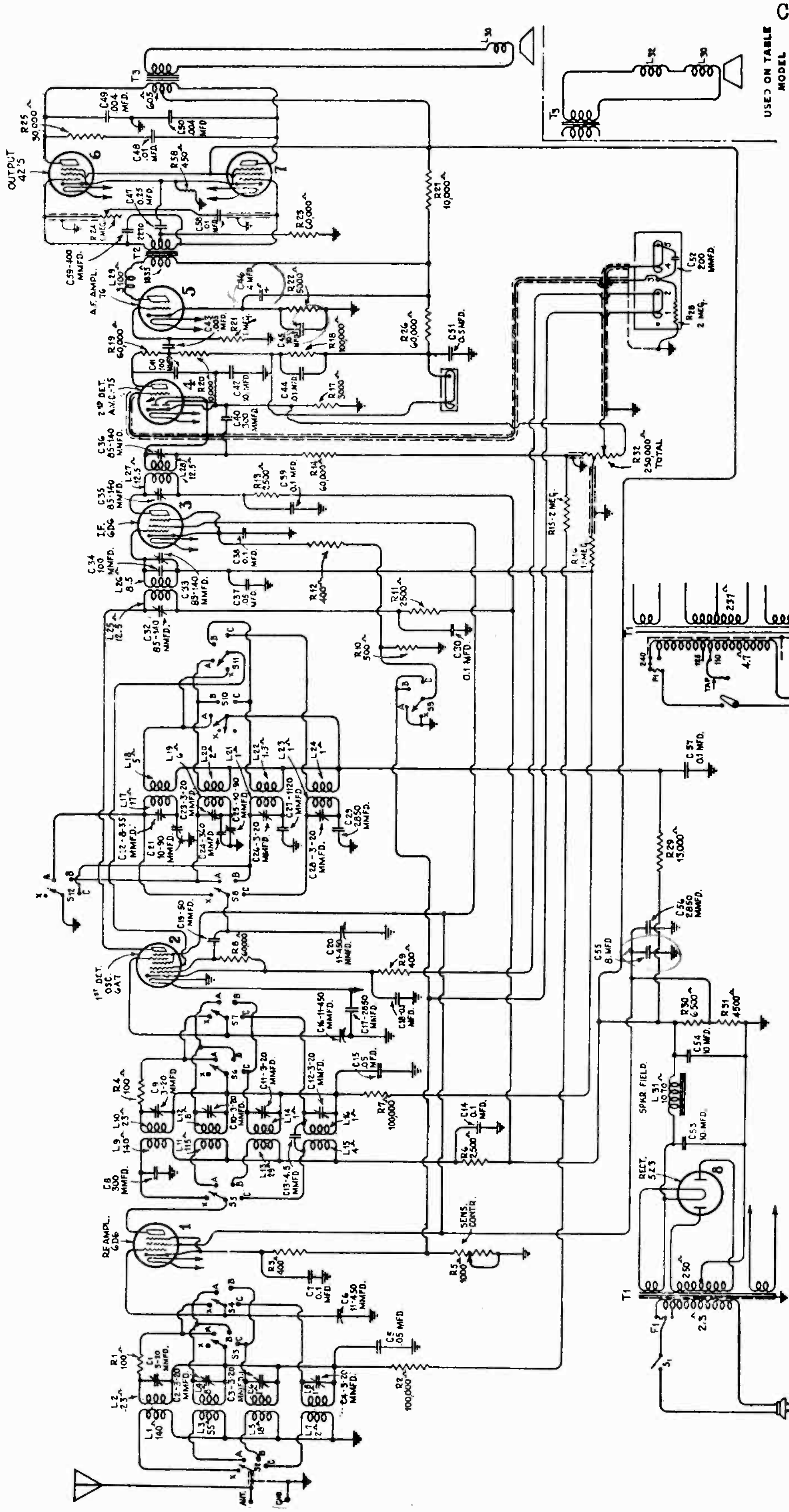


Figure 8—Location of Trimmer Capacitors

MODEL 143,242
Schematic with Sensitivity Cont. Change

RCA-VICTOR CO., INC.

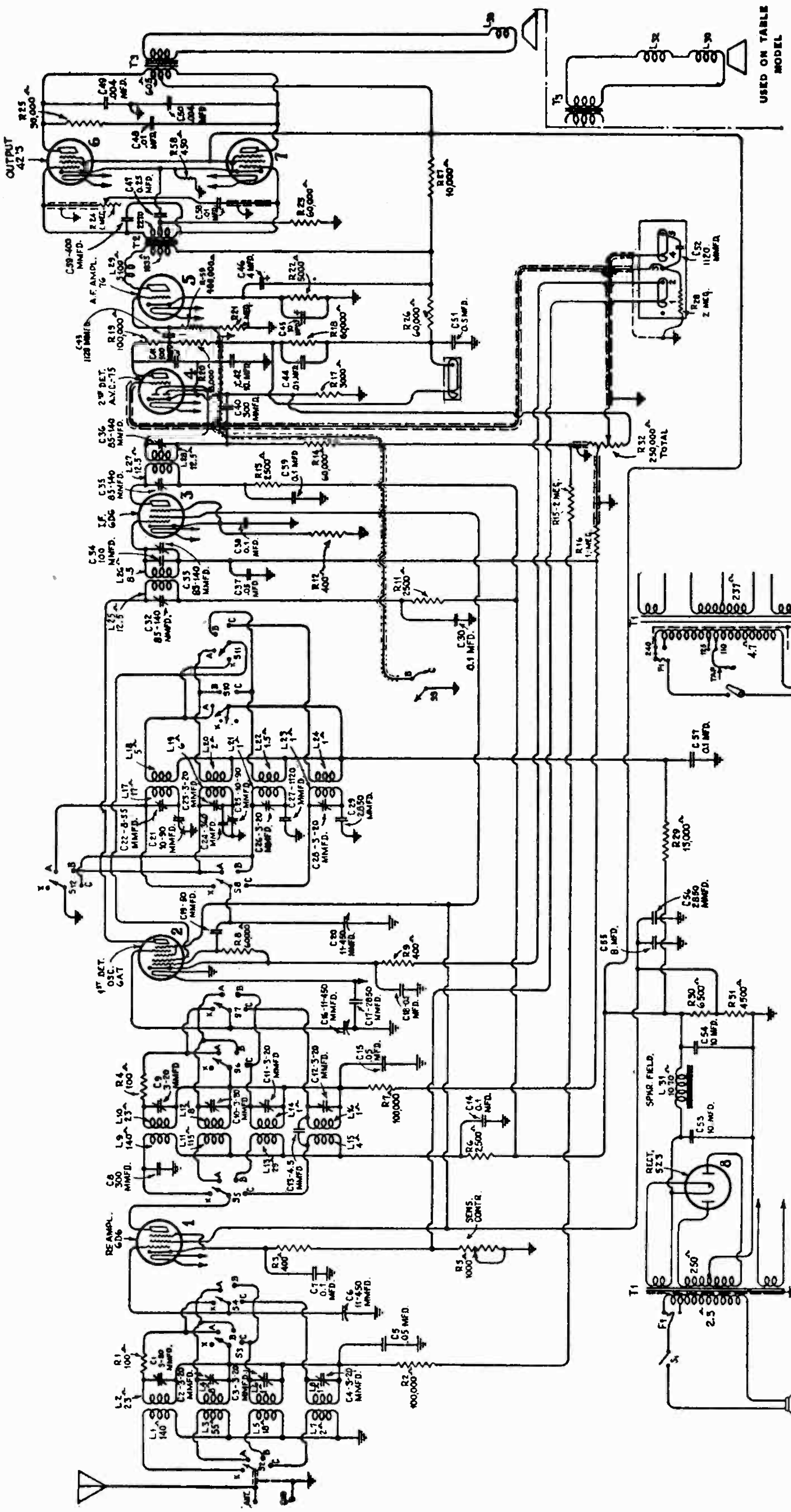


IF PEAK 460 KC.

Figure 1—Schematic Circuit Diagram—Sensitivity Control Change with Band position

MODEL 143,242
Schematic with
Fidelity Change

RCA-VICTOR CO., INC.



IF PEAK 460 KC.

Figure 2—Schematic Circuit Diagram—Fidelity Change with Band position

RCA-VICTOR CO., INC.

MODEL 143,242
Socket Layout
Parts Schematics

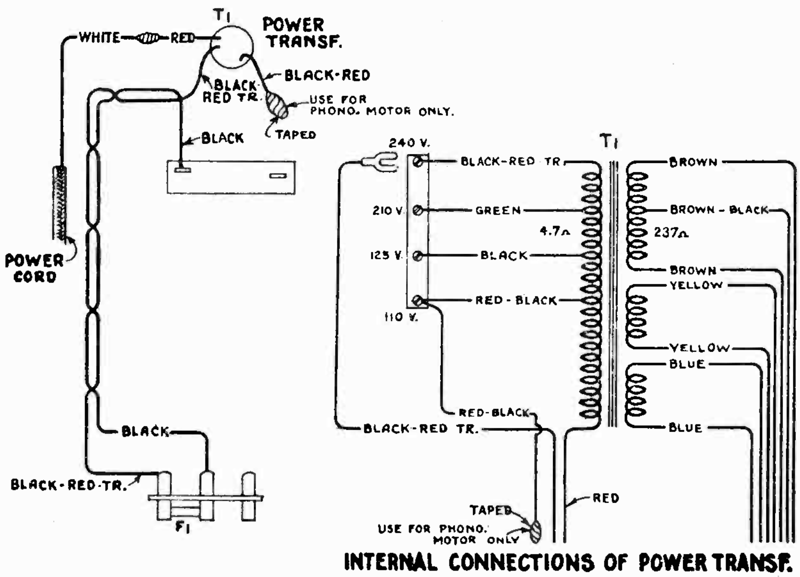
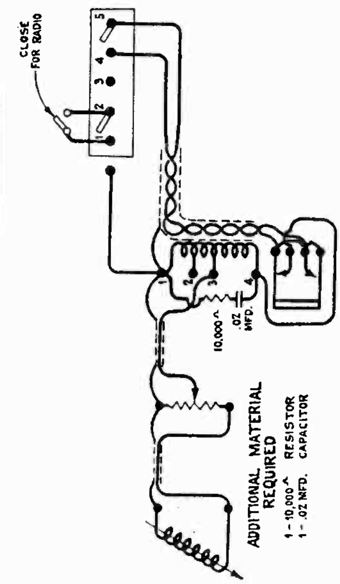
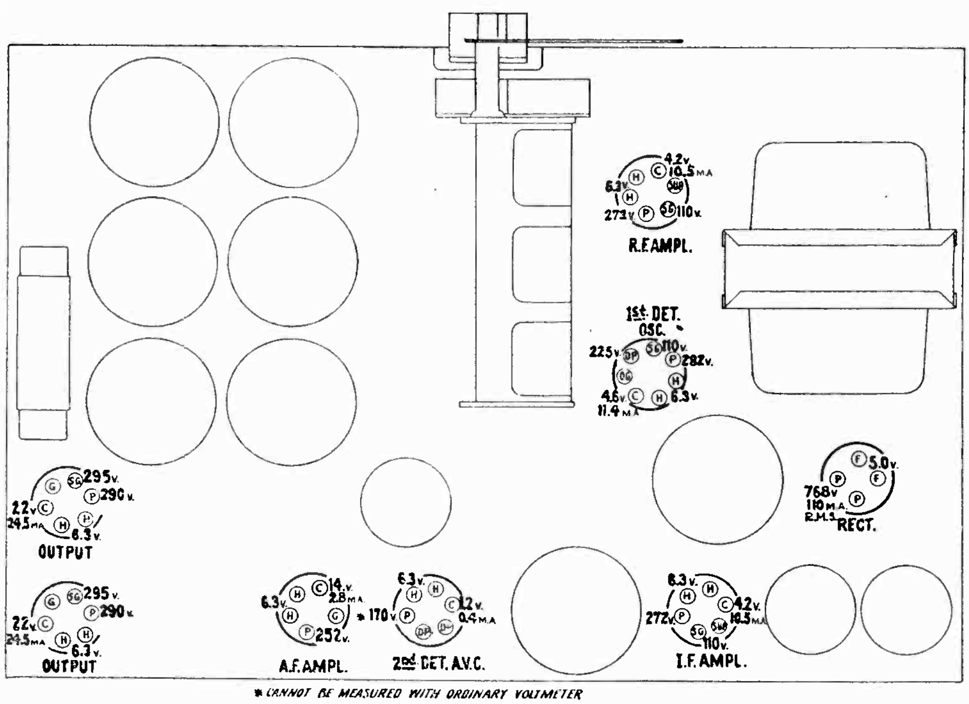


Figure 9—Universal Power Transformer Connections

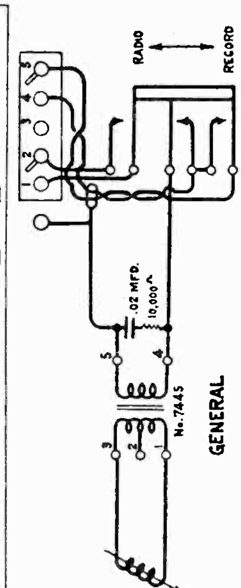


End-Table Connections

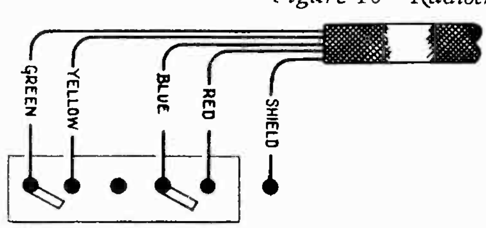


ALL VOLTAGES ARE TO GROUND

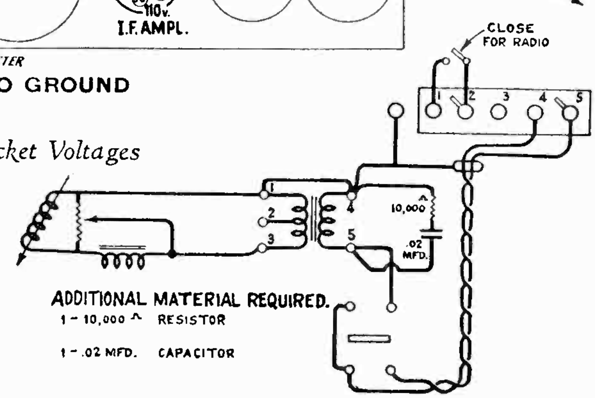
Figure 10—Radiotron Socket Voltages



General Connections



Junior "Duo" Connections



Portable Turntable Connections

Figure 11—Magnetic Pickup Connections—Place Range Switch in A or X position during record reproduction for models with fidelity switching

MODEL 143,242
Chassis Wiring
with Fidelity Change

RCA-VICTOR CO., INC.

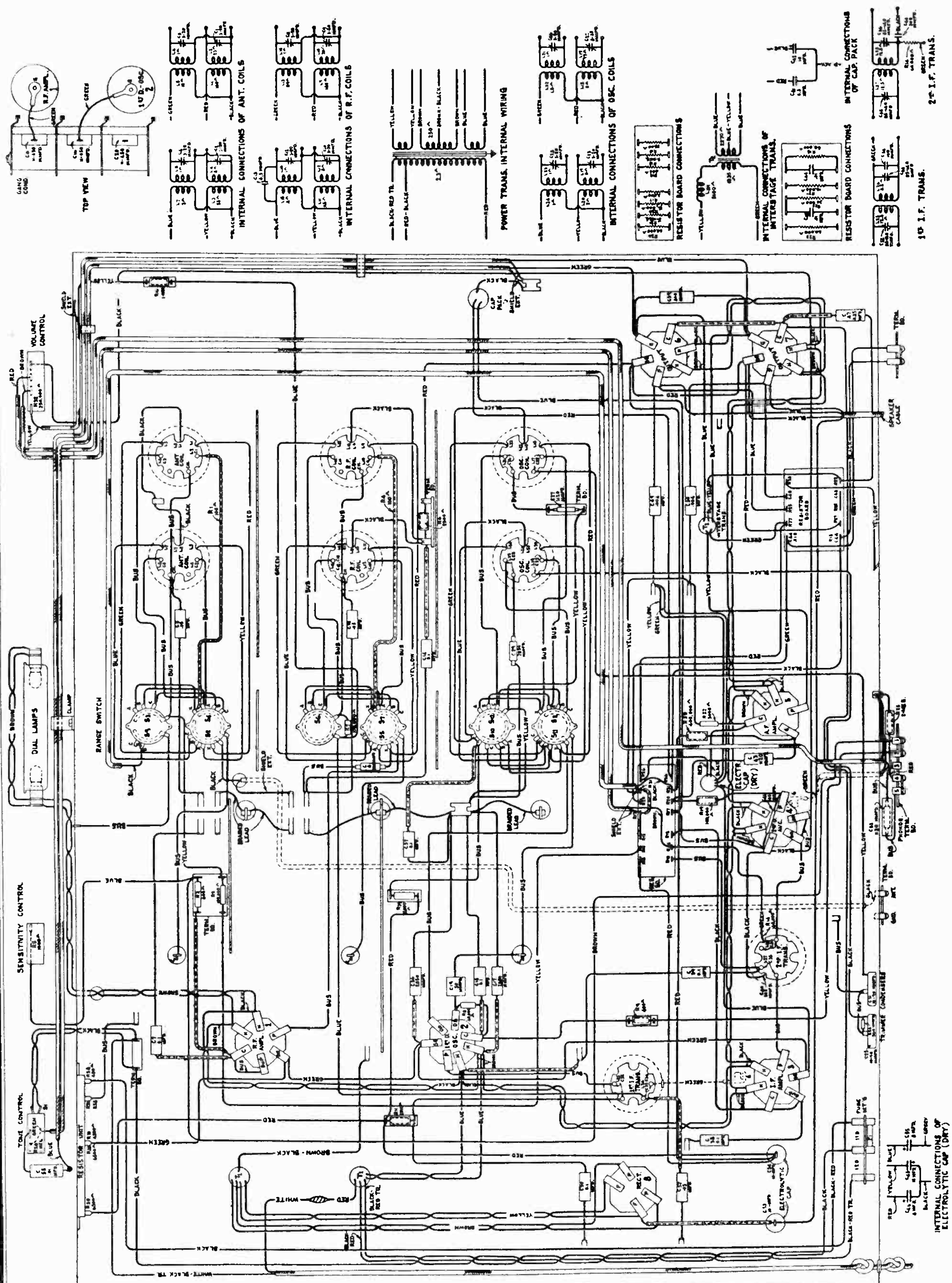


Figure 7—Wiring Diagram—Fidelity Change with Band position

RCA-VICTOR CO., INC.

MODEL 143,242
Chassis Wiring
with Sensitivity
Change

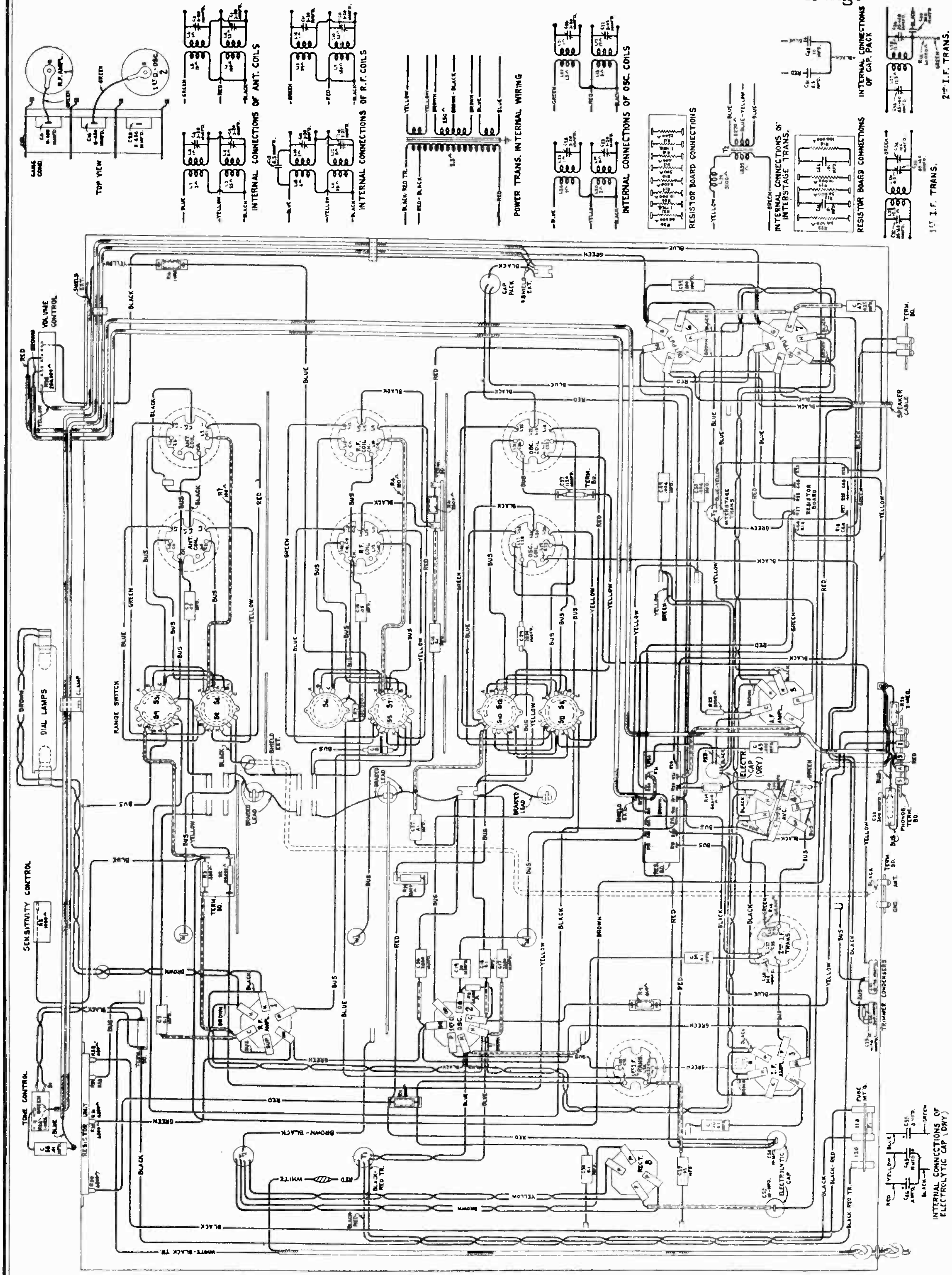


Figure 5—Wiring Diagram—Sensitivity Control Change with Band position

MODEL 143,242
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4632	Board—Terminal board—Two terminals and link—For changing fidelity	$0.25
4379	Board—Antenna terminal board	.20
4427	Bracket—Volume control, tone control or noise suppressor mounting bracket	.18
4244	Cap—Contact cap—Package of 5	.20
3861	Capacitor — Oscillator trimmer capacitor (C21, C25)	.78
4633	Capacitor—50 mmfd. (C19)	.25
4635	Capacitor—100 mmfd. (C41)	.25
4697	Capacitor—200 mmfd. (C52)	.35
3937	Capacitor—300 mmfd. (C8)	.34
4413	Capacitor—360 mmfd. (C24)	.22
4183	Capacitor—400 mmfd. (C59)	.26
4412	Capacitor—1120 mmfd. (C27)	.25
4409	Capacitor—1120 mmfd. (C43)*	.35
4634	Capacitor—1120 mmfd. (C52)*	.35
4524	Capacitor—2850 mmfd. (C29)	.35
4615	Capacitor—2850 mmfd. (C17, C56)	.34
4628	Capacitor—0.004 mfd. (C49, C50)	.28
6512	Capacitor—0.005 mfd. (C43)	.28
3787	Capacitor—0.01 mfd. (C48)	.30
4212	Capacitor—0.01 mfd. (C44)	.30
4624	Capacitor—0.01 mfd. (C58)	.54
3888	Capacitor—0.05 mfd. (C37)	.25
4417	Capacitor—0.05 mfd. (C5, C15)	.25
3877	Capacitor—0.1 mfd. (C38)	.32
4415	Capacitor—0.1 mfd. (C18)	.30
4645	Capacitor—0.1 mfd. (C7, C14, C30, C39, C57)	.25
3750	Capacitor—0.25 mfd. (C47)	.36
7790	Capacitor—10 mfd. (C53, C54)	1.05
4619	Capacitor pack—Comprising one 0.5 mfd., one 10 mfd. capacitor (C42, C51)	1.44
4626	Capacitor pack—Comprising one 4 mfd., one 10 mfd. and one 8 mfd. capacitor (C45, C46, C55)	2.82
4358	Clamp—Electrolytic capacitor clamp—For capacitor stock No. 7790	.15
4693	Clamp—Electrolytic capacitor clamp—For capacitor stock No. 4626	.15
7810	Coil—Antenna coil "PB-LW" (L1, L2, L5, L6, C1, C3)	2.10
7803	Coil—Antenna coil "B.S.W." (L3, L4, L7, L8, C2, C4)	1.82

* R18—60,000 ohms—Some models.
* R19—100,000 ohms—Some models.

Stock No.	Description	List Price
7808	Coil—Detector coil "P.B.-L.W." (L9, L10, L13, L14, C9, C11)	$2.05
7805	Coil—Detector coil "B.-S.W." (L11, L12, L15, L16, C10, C12, C13)	2.15
7807	Coil—Oscillator coil "B.S.W." (L19, L20, L23, L24, C23, C28)	1.62
7809	Coil—Oscillator coil "P.B.-L.W." (L17, L18, L21, L22, C22, C26)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C16, C20)	4.42
4371	Cover—Fuse mount cover	.15
4631	Cover—Terminal strip cover	.15
10907	Fuse—3-ampere—Package of 5	.40
3376	Mount — Fuse mount — 105-125-volt instrument	.40
4604	Mount—Fuse mount for 200-250-volt instrument	.35
4625	Resistor—Wire wound resistor—Comprising one 6500-ohm-4500-ohm and 450 section (R30, R31, R58)	.70
3704	Resistor—400 ohms—Carbon type—¼ watt—Package of 5 (R9, R3, R12)	1.00
4622	Resistor—500 ohms—Carbon type—¼ watt—Package of 10 (R10)	2.00
4338	Resistor — 2500 ohms — Carbon type — ¼ watt—Package of 10 (R6, R11, R13)	2.00
4242	Resistor — 3000 ohms — Carbon type — ¼ watt—Package of 5 (R17)	1.00
4436	Resistor — 5000 ohms — Carbon type — ¼ watt—Package of 10 (R22)	2.00
3881	Resistor—10,000 ohms—Carbon type—¼ watt (R20)—Package of 5	1.00
3998	Resistor—15,000 ohms—Carbon type—¼ watt—Package of 5 (R20)	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 (R8, R18*, R19, R23, R26)	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5 (R2, R7, R18, R19*)	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R59)—Package of 5	1.00
3033	Resistor — 1 megohm — Carbon type — ¼ watt—Package of 5 (R16, R21)	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt—Package of 5 (R15, R21,* R28)	1.00
3078	Resistor—10,000 ohms—Carbon type—½ watt—Package of 5 (R27)	1.00
4623	Resistor—13,000 ohms—Carbon type—½ watt—Package of 10 (R29)	2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R25)	.22
4418	Resistor—100 ohms—Flexible type—Package of 10 (R1, R4)	1.50
4618	Rheostat—Sensitivity control (R5)	1.25

* R20—15,000 ohms—Some models.
* R21—2 megohms—Some models.
* C52—1120 mmfd.—Some models.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
7800	Shield—Antenna, detector or oscillator coil shield	$0.45
4627	Shield—First detector—Oscillator Radiotron shield	.36
7488	Shield—First detector—Oscillator Radiotron shield top	.20
4452	Shield—I. F. amplifier Radiotron shield	.35
4629	Shield—I. F. amplifier Radiotron shield top	.15
4663	Shield—Oscillator coil wiring shield—Shields oscillator coil wiring from R. F. coil—Complete with terminal board, clamp and resistor	.32
4664	Shield—Oscillator wiring shield—Shields oscillator coil wiring from R. F. coil—Complete with terminal strip and resistor	.36
4630	Shield—R. F. amplifier—Radiotron shield	.36
4665	Shield—R. F. coil wiring shield with two resistors and terminal board	.50
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4617	Switch—Range switch (S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12)	3.32
4616	Tone control (R24, S1)	1.28
4431	Transformer—First intermediate frequency transformer (L25, L26, C32, C33, C34)	2.28
9505	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	6.35
9506	Transformer—Power transformer—105-125 volts—25-40 cycles	8.90
9507	Transformer—Power transformer—105-250 volts—40-60 cycles	6.40
4433	Transformer—Second intermediate frequency transformer (L27, L28, C35, C36, C40, R14)	2.15
4620	Transformer and reactor—Interstage transformer and reactor (T2, L29)	2.98
4519	Volume control (R32)	1.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled	.88
7799	Drive—Variable tuning condenser drive complete	2.45

Stock No.	Description	List Price
4364	Gear—Spring gear assembly complete with hub, pinion, gear, cover and spring	$0.96
4704	Indicator—Band indicator—Celluloid	.12
4367	Indicator—Station selector vernier pointer—Small	.15
4520	Indicator—Station selector main pointer—Large	.18
3943	Screen—Translucent screen for dial light—Package of 2	.18
3993	Screw—No. 6-32-5/32" square head set screw for band indicator operating arm or condenser drive—Package of 10	.25
4377	Spring — Band indicator and arm tension spring—Package of 5	.25
4360	Stem—Station selector pointer stem	.35
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	REPRODUCER ASSEMBLY (TABLE MODEL)	
9534	Coil—Field coil (L31)	1.90
9533	Cone—Cone mounted and centered on housing (L30)	3.50
9532	Reproducer complete	7.50
9535	Transformer—Output transformer (T3)	1.50
	REPRODUCER ASSEMBLY (CONSOLE MODEL)	
4636	Cable—4-conductor—Reproducer cable	.50
9537	Coil—Field coil magnet and cone support (L31)	3.85
8969	Cone—Reproducer cone—Package of 5 (L30)	6.35
9536	Reproducer complete	8.40
4637	Transformer—Output transformer (T3)	1.50
	MISCELLANEOUS PARTS	
4677	Bezel—Metal bezel (escutcheon) for station selector dial	.56
4621	Dial—Station selector dial	.65
6614	Glass—Station selector dial glass	.30
4449	Knob—Station selector, volume control, tone control, noise suppressor rheostat on range switch knob—Package of 5	.60
4340	Lamp—Dial lamp—Package of 5	.60
4678	Ring—Retaining ring for dial glass—Package of 5	.35
4446	Screw assembly—Chassis mounting screw assembly—Comprising four screws, four lockwashers, four washers, four spacers and eight cushions	28
4613	Screw—No. 8-32-$\frac{1}{16}$" headless set screw for knobs—Package of 10	.25

MODEL 221
Trimmer Data
Alignment Data
Voltage

RCA-VICTOR CO., INC.

Electrical Specifications

Voltage Rating ....100–125 Volts
Frequency Rating ....25–60 and 50–60 Cycle
Power Consumption ....60 Cycle, 75 Watts; 25 Cycle, 80 Watts
Number and Type of Tubes ....2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Tuning Ranges ....540 K. C.–1500 K. C.—5400 K. C.–15,350 K. C.
Undistorted Output ....1.75 Watts

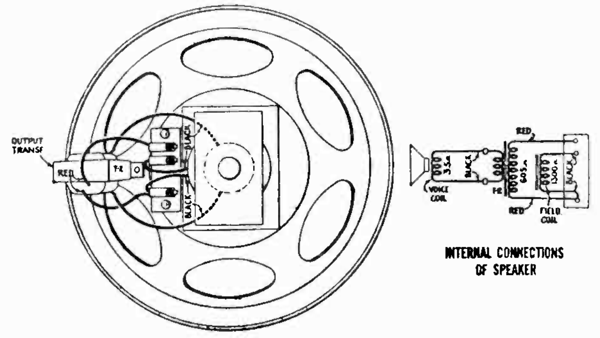


Figure C—Loudspeaker Wiring

This receiver is a six-tube two-band A. C. operated Superheterodyne Receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two-position switch. Other features include a double reduction vernier drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, ten-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Capacitor Adjustments

In order to properly align this receiver, it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1400 K. C., the dial indicator at 1400 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 15 on the megacycle scale. Adjust the three trimmer capacitors designated as S. W. in Figure D for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

Power Transformer Connections

The power transformer used in this model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts,

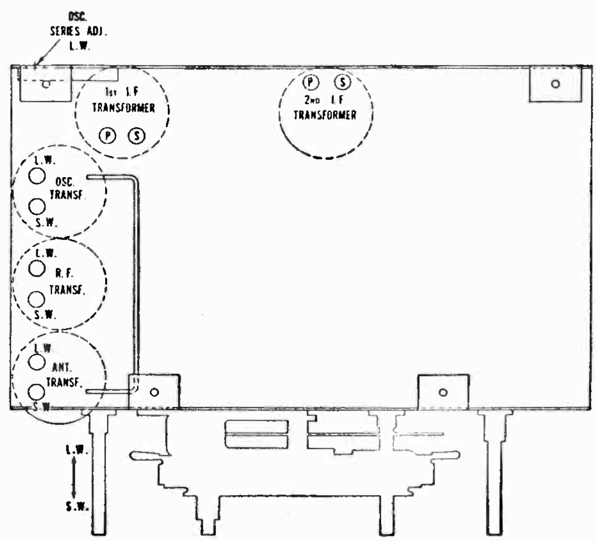


Figure D—Location of Line-Up Capacitors

the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

115 Volts, A. C. Line—No Signal

Type No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.42
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.42
3. RCA-58 I. F.	3.0	100	265	6.0	2.42
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.42
5. RCA-2A5 Power	16.0	255	240	35.0	2.42
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

* The voltages and current refer to the detector part of the tube.

MODEL 221
Chassis Wiring

RCA-VICTOR CO., INC.

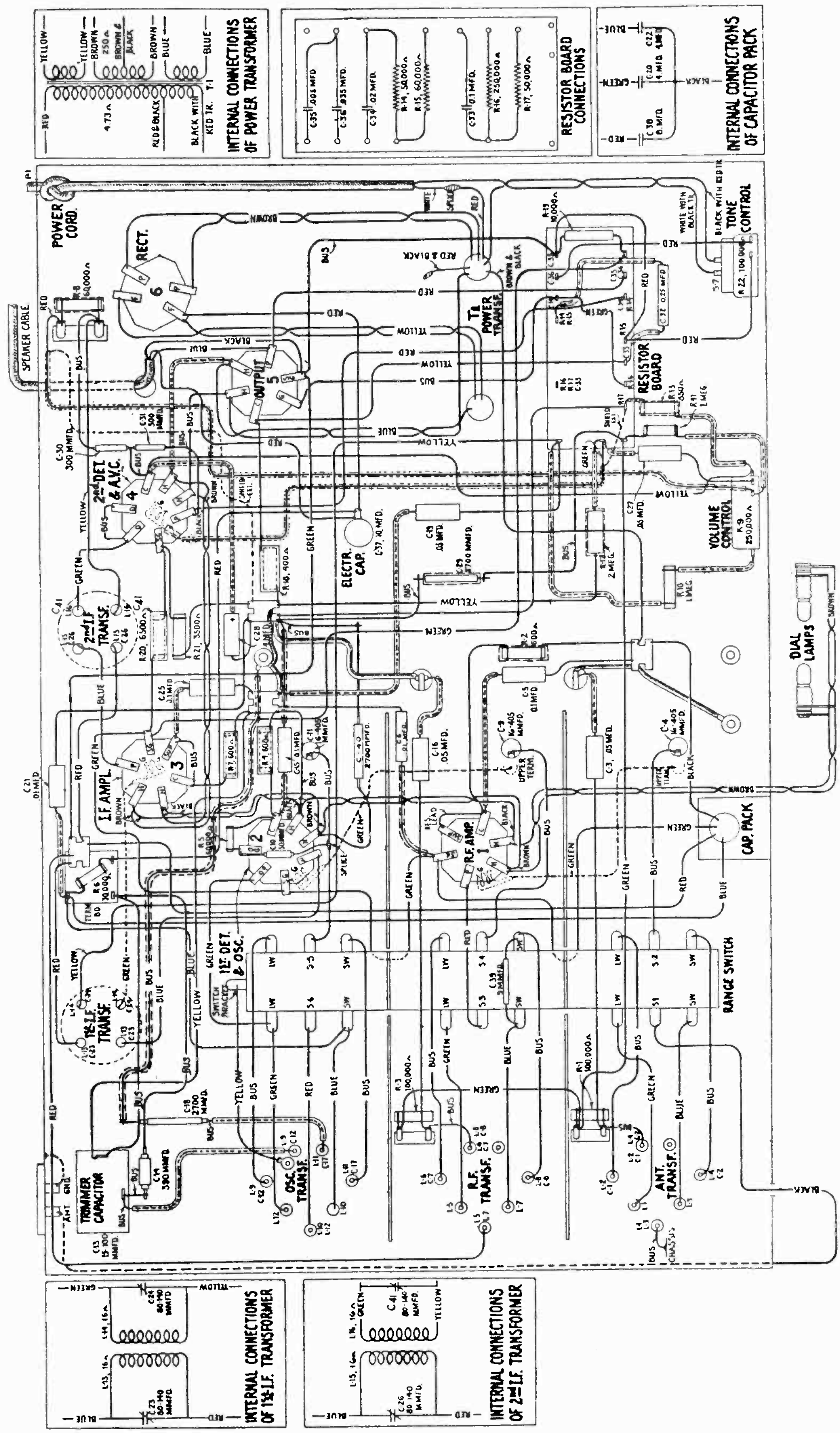


Figure B—Wiring Diagram

MODEL 221
Schematic

RCA-VICTOR CO., INC.

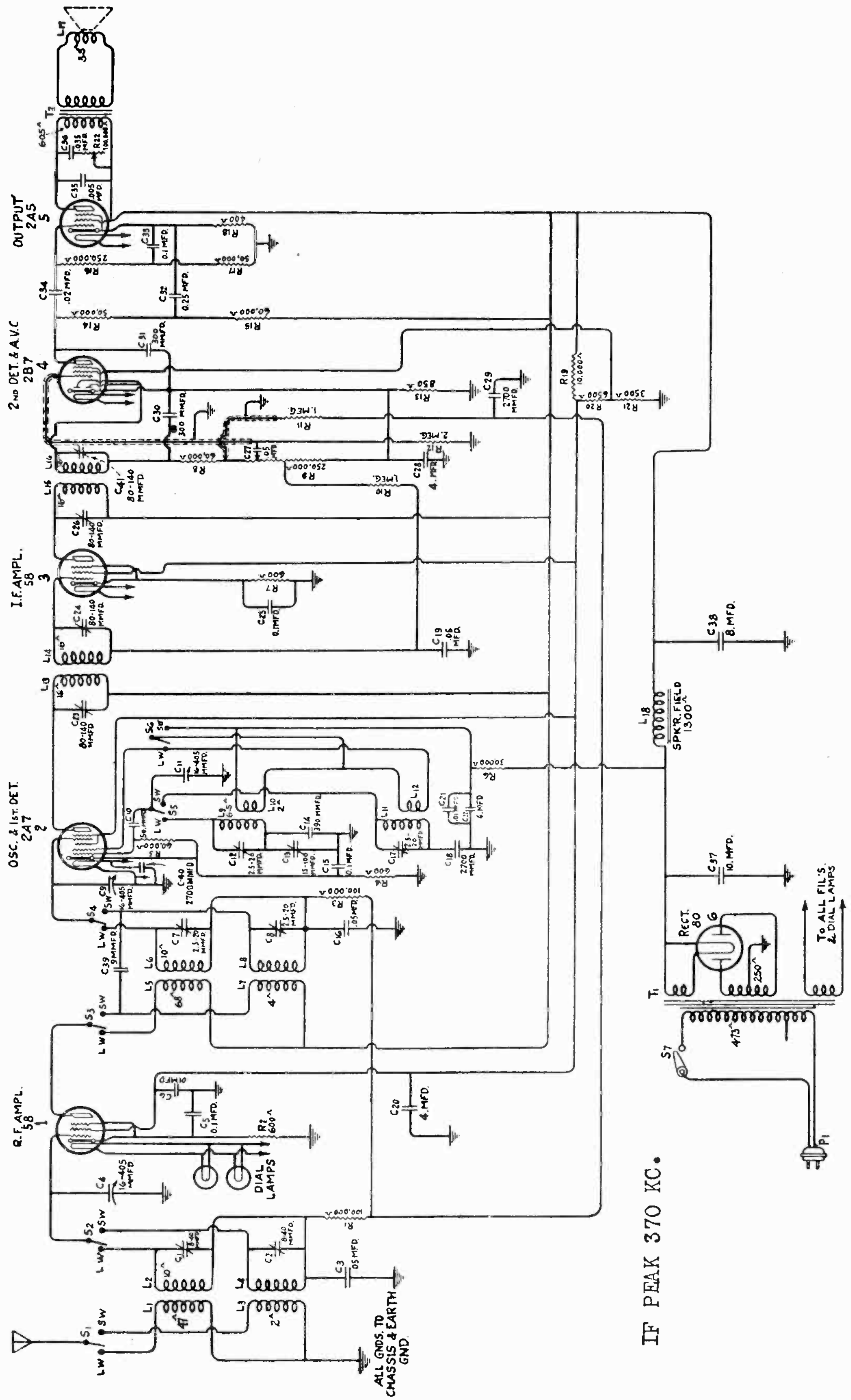


Figure A—Schematic Circuit Diagram

IF PEAK 370 KC.

MODEL 221
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R6)	
2747	Cap—Contact cap	
3056	Shield—2nd detector Radiotron shield	
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)	
3252	Resistor—100,000 ohms—Carbon type—½ watt (R1, R3)	
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)	
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)	
3529	Socket—Dial lamp socket	
3572	Socket—7-contact Radiotron socket	
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)	
3631	Resistor—850 ohms—Carbon type—½ watt (R13)	
3639	Capacitor—.02 mfd. (C34)	
3683	Shield—Radiotron shield top	
3701	Capacitor—.01 mfd. (C6, C21)	
3702	Capacitor—.25 mfd. (C32)	
3768	Screw—Square head No. 6-32-¼" set screw for condenser drive	
3796	Capacitor—4. mfd. (C28)	
3849	Capacitor—50 mmfd. (C10)	
3859	Socket—4-contact Radiotron socket	
3861	Capacitor—Adjustable capacitor (C13)	
3877	Capacitor—.1 mfd. (C5, C15, C25, C33)	
3878	Screw—No. 4-40-3/16" screw for fastening station selector pointer	
3888	Capacitor—.05 mfd. (C19, C27)	
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)	
3897	Resistor—400 ohms—Carbon type—1 watt (R18)	
3901	Capacitor—.05 mfd. (C3, C16)	
3905	Screw—Chassis mounting screw assembly comprising 4 screws, 4 washers, and 4 cushions	
3906	Mounting assembly — Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers	
3937	Capacitor—300 mmfd. (C30, C31)	
3938	Capacitor—9 mmfd. (C39)	
3939	Resistor — 3,500 ohms — Carbon type — ½ watt (R21)	
3942	Shield—1st detector Radiotron shield	
3943	Screen—Translucent screen for dial light	
3944	Shield—Antenna, R. F. or oscillator coil shield	
3991	Resistor—10,000 ohms—Porcelain type (R19)	
4031	Capacitor—2,700 mmfd. (C18, C29, C40)	
4032	Capacitor—390 mmfd. (C14)	
4075	Knob—Range switch or tone control knob	
4119	Screw—No. 8-32-¼" headless cup point set screw for station selector knob	
4120	Knob—Volume control knob	
4121	Knob—Station selector knob	
6188	Resistor—2 megohm—Carbon type—½ watt (R12)	
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)	
6571	Capacitor—10 mfd. (C37)	
6614	Glass—Station selector dial glass	
6615	Ring—Retaining ring for dial glass	
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	
6676	Socket—6-contact Radiotron socket—Output	
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	
6695	Volume control (R9)	
6696	Switch—Range switch (S1, S2, S3, S4)	
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26, C41)	
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	
6702	Drive—Variable tuning condenser drive assembly complete	
6703	Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38)	
6704	Shaft—Tuning condenser drive assembly shaft	
6705	Tone control complete (R22)	
6841	Dial—Station selector dial	
6842	Pointer—Station selector pointer	
7485	Socket—6-contact Radiotron socket	
7487	Shield—I. F. and R. F. amplifier Radiotron shield	
9446	Transformer—Power transformer—105-125 volts 50-60 cycles (T1)	
9451	Transformer—Power transformer—105-125 volts 25-40 cycles	
10194	Ball—Steel ball for condenser drive assembly	
	REPRODUCER ASSEMBLIES	
6770	Transformer—Output transformer (T2)	
6843	Cable—3-conductor reproducer cable	
8935	Cone—Reproducer cone (L17)	
9460	Coil—Field coil, Magnet and cone support (L18)	
9461	Reproducer complete	

MODEL 223
Circuit Data
Alignment Data
Voltage

RCA-VICTOR CO., INC

RCA VICTOR MODEL 223
SERVICE NOTES

Electrical Specifications

Voltage Rating...............26–40 Volts D. C.
Power Consumption.........60 Watts at 32 Volts
Number and Types of Radiotrons.....2 RCA-6D6, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-38, 1 RCA-84 —Total, 6
Type of Ballast Lamp.............Amperite 5-16
Undistorted Output....1.1 Watts (Max. 1.6 Watts)
Tuning Frequency Range.....540 K. C.–1500 K. C. and 1400 K. C.–2800 K. C.

This receiver is a six-tube, 32-volt D. C. superheterodyne designed primarily for operation from 32-volt farm lighting circuits. Excellent sensitivity and selectivity, large undistorted output and excellent tone quality are inherent features of this receiver. Other outstanding features include 10-inch electro-dynamic loudspeaker, wide tuning range (police, aviation and broadcast), ballast lamp for voltage fluctuations, and a separate power supply with a newly designed filter units.

Figure 1 shows the schematic circuit diagram, Figures 2 and 3 the chassis and power unit wiring, and Figure 5 the assembly wiring diagram. The replacement parts are given on page 9.

Description of Circuit

The circuit of this receiver is similar in many ways to the usual six-tube superheterodyne, although the power supply differs in several respects. Chiefly among the differences is the use of a vibrator interrupter for obtaining alternating current and a tube rectifier for rectifying it at a higher voltage.

The R. F. stage uses Radiotron RCA-6D6, which is a six-volt heater type super-control R. F. amplifying tube. The function of this stage is to select and amplify the desired incoming signal and apply it to the first detector.

The next tube is a combined oscillator-detector which is known as the RCA-6A7 and which provides a local signal and a detector for obtaining an I. F. frequency. The local oscillator, due to the bridge circuits used, provides a signal that has a constant frequency difference from the incoming R. F. signal (175 K. C. higher) at all points throughout the tuning range. The detector portion of the tube serves to extract the beat frequency from the combined signals (oscillator and signal) and apply it to the grid of the I. F. stage.

The plate circuit of the first detector and the grid and plate circuits of the I. F. tube are all tuned by means of small adjustable capacitors to 175 K. C. This group of tuned circuits, together with the R. F. circuits, provides the high selectivity of the receiver. Radiotron RCA-6D6 is used in the I. F. stage.

Radiotron RCA-6B7 is used as a diode second detector, automatic volume control and audio amplifier. The D. C. component of the rectified I. F. signal on the second detector diode is used for automatic bias on the R. F., first detector and I. F. tubes. The audio component of the rectified signal is applied to the pentode section of the RCA-6B7 for further amplification at audio frequencies.

The output of the second detector is applied to the grid of Radiotron RCA-38, pentode output amplifier. Resistance coupling is used between the detector and the output tube while a step-down transformer serves as an impedance matching device between the plate circuit of the RCA-38 and the voice coil of the loudspeaker.

Field excitation for the loudspeaker is obtained by connecting it directly across the 32-volt direct current supply. Heater excitation for the tubes described is obtained by connecting them in series and placing the entire circuit across the 32-volt line.

Plate and grid voltages for all tubes are obtained from a special plate supply unit which consists of a vibrator, a tube rectifier, a thermal voltage regulator and a special filter network for reducing hum or vibrator interference to a negligible degree. The purpose of the vibrator is to interrupt the direct current and apply it first in one direction and then in the opposite direction across individual sections of the primary of the power transformer. The transformer steps the voltage up several times and applies it to the plates of the full-wave rectifier, Radiotron RCA-84. The filament of this tube is connected in series with the Amperite 5-16 voltage regulating tube. This regulating tube maintains a constant current through the rectifier filament over a wide variation of line voltages.

The range switch provides a quick means of shifting from one frequency band to the other. The regular band covers from 540 K. C. to 1500 K. C., while the police band covers from 1400 K. C. to 2800 K. C. This shift is accomplished in the following manner.

A tap is provided on the grid coils of the R. F. and first detector circuits. Also additional coupling capacitors are connected from the antenna to the R. F. grid and from the R. F. plate to the first detector grid. In the oscillator, R. F. and detector circuits, an extra trimmer capacitor is available for paralleling to the main tuning condenser. The effect of these various taps and capacitors is to change the tuning range as follows:

1. At the broadcast position all of the additional circuits are open as shown in Figure 1.

2. At the police band position, all of the additional switches are closed. Shorting of turns in the grid coils reduces their inductance so that the tuning capacitors cover the high frequency range. Connecting the two coupling capacitors increases the coupling and thereby the sensitivity at the higher frequency position. The trimmer capacitor on the oscillator circuit provides proper tracking with the R. F. circuits.

Line-up Adjustments

Inoperation, poor tone quality, or lack of proper sensitivity and selectivity are direct results of lack of alignment. In event the receiver is to be aligned, carefully use the following procedure:

I. F. TUNING ADJUSTMENTS—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter. Test Oscillator, Stock No. 9050, is suitable and recommended for making these adjustments.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. AND OSCILLATOR ADJUSTMENTS—The three-gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C. (Stock No. 9050), a non-metallic screwdriver such as Stock No. 4160, and an output meter.

(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position. Also the minimum input signal necessary from the oscillator will permit a more accurate adjustment.

TUBE SOCKET VOLTAGES

32-Volt D.C. Input — No Signal — Volume Control at Minimum

Radiotron No.	Cathode to Ground, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A	Heater Volts
RCA-6D6 R. F.	8.4	77	216	4.2	6.2
RCA-6A7—Osc. Det.	9.7	76	215	6.5	6.2
RCA-6D6 I. F.	8.4	77	216	4.2	6.2
RCA-6B7—2nd Det.	5.7	80	52	1.9	6.2
RCA-38 Pwr.	19.5	205	197	21.5	6.2
RCA-84 Rect.	244			50	6.5–7.0*

*Varies with ballast tubes and with time.

MODEL 223
Noise Suppression
Assembly Wiring

RCA-VICTOR CO., INC.

SUPPRESSION OF GENERATOR AND IGNITION INTERFERENCE

Operating this receiver while the 32-volt generator is running may present difficulties caused by the radiation of radio-frequency interference from the generator and gasoline engine. This interference usually travels over the lighting lines and is picked up by the antenna system of the receiver. There are two methods of reducing this interference, both of which may be required in bad cases.

1. Suppression of the interference at its source by means of the accessories furnished with the receiver.
2. Placing the antenna in such a position that the interference will not be picked up, and using a Stock No. 7718 Shield Kit for transmitting the signal from the antenna to the receiver without picking up noise on the lead-in.

Figure 4 shows a typical installation of the suppression equipment. This equipment is connected as follows:

Suppressor:—In single-cylinder installations, the suppressor is connected to the spark-plug for the suppression of the high-tension interference generated at this point. In twin-cylinder installations, the single-distributor type suppressor should be installed and should eliminate this interference. However, in some cases it may be necessary to install both distributor and plug suppressors.

Generator Capacitor:—A capacitor is connected from each brush of the generator to the generator frame, which must be grounded. This reduces the interference caused by sparking at the commutator of the generator. If excessive sparking occurs, it is very unlikely that the capacitors will reduce the noise sufficiently. In this case, the commutator must be thoroughly cleaned and sanded and the brushes reseated. In bad cases it is usually best to clean the foreign matter from between the commutator segments by means of a three-cornered file, and then sand the commutator by placing the sand-paper around a small block and holding it squarely against the commutator while it is running. *Never use emery cloth.*

Coil Capacitor:—Some installations will require a capacitor connected from the battery side of the ignition coil to ground. This reduces the interference caused by the primary breaker.

Grounds:—It is important that the frame of the generator be thoroughly grounded. A steel ground-rod, driven at least six feet in moist earth, provides a good ground. In event one side of the line is grounded, it is important that the ground be a good one. The ground should be applied at the generator, at the point where the line enters the building where the radio receiver is located and at the extreme far end of the line.

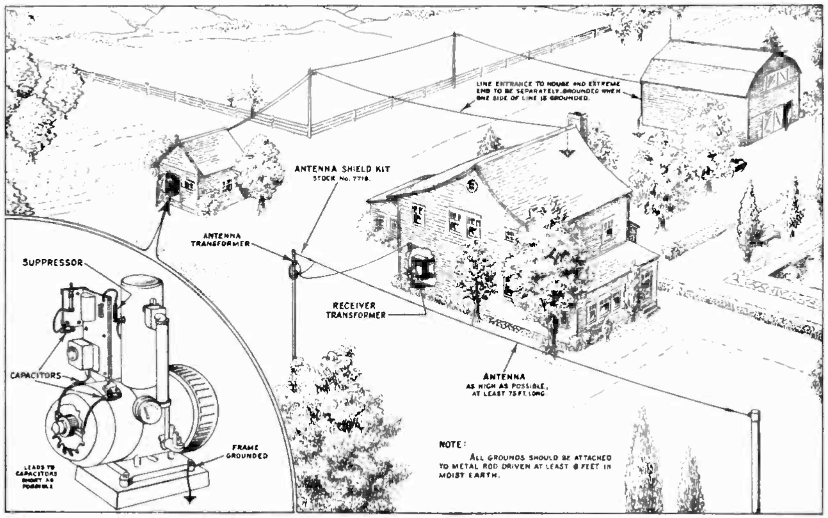


Figure 4—Typical Installation showing suppression equipment and proper antenna system

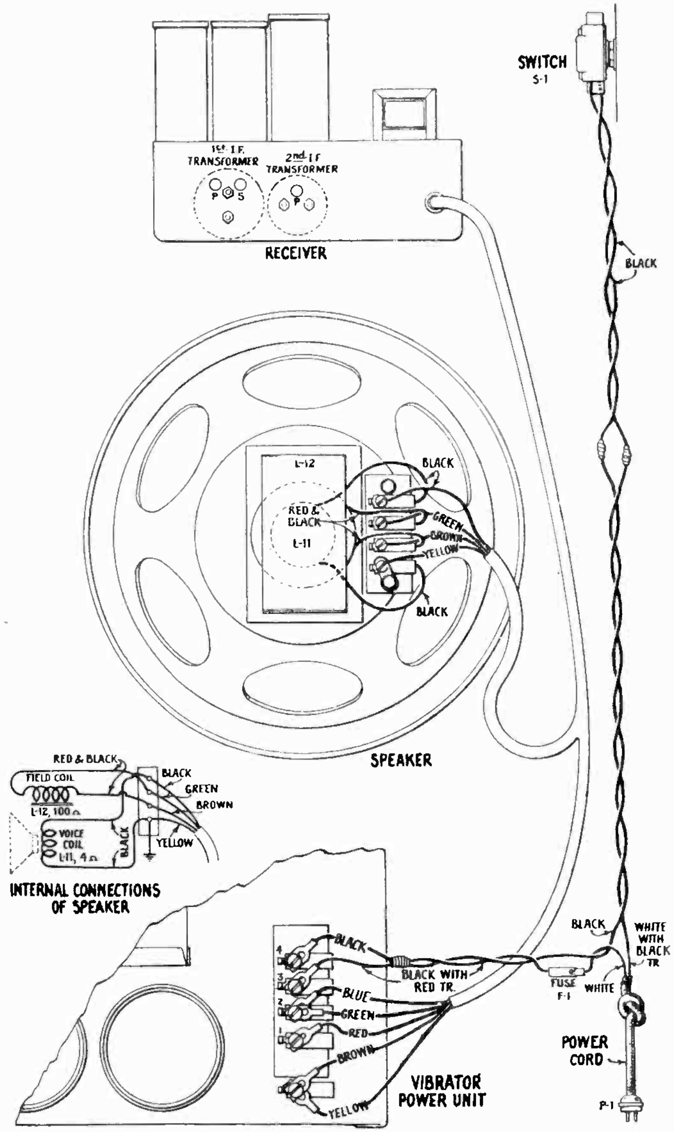


Figure 5—Assembly Wiring Diagram

MODEL 223
Schematic

RCA-VICTOR CO., INC.

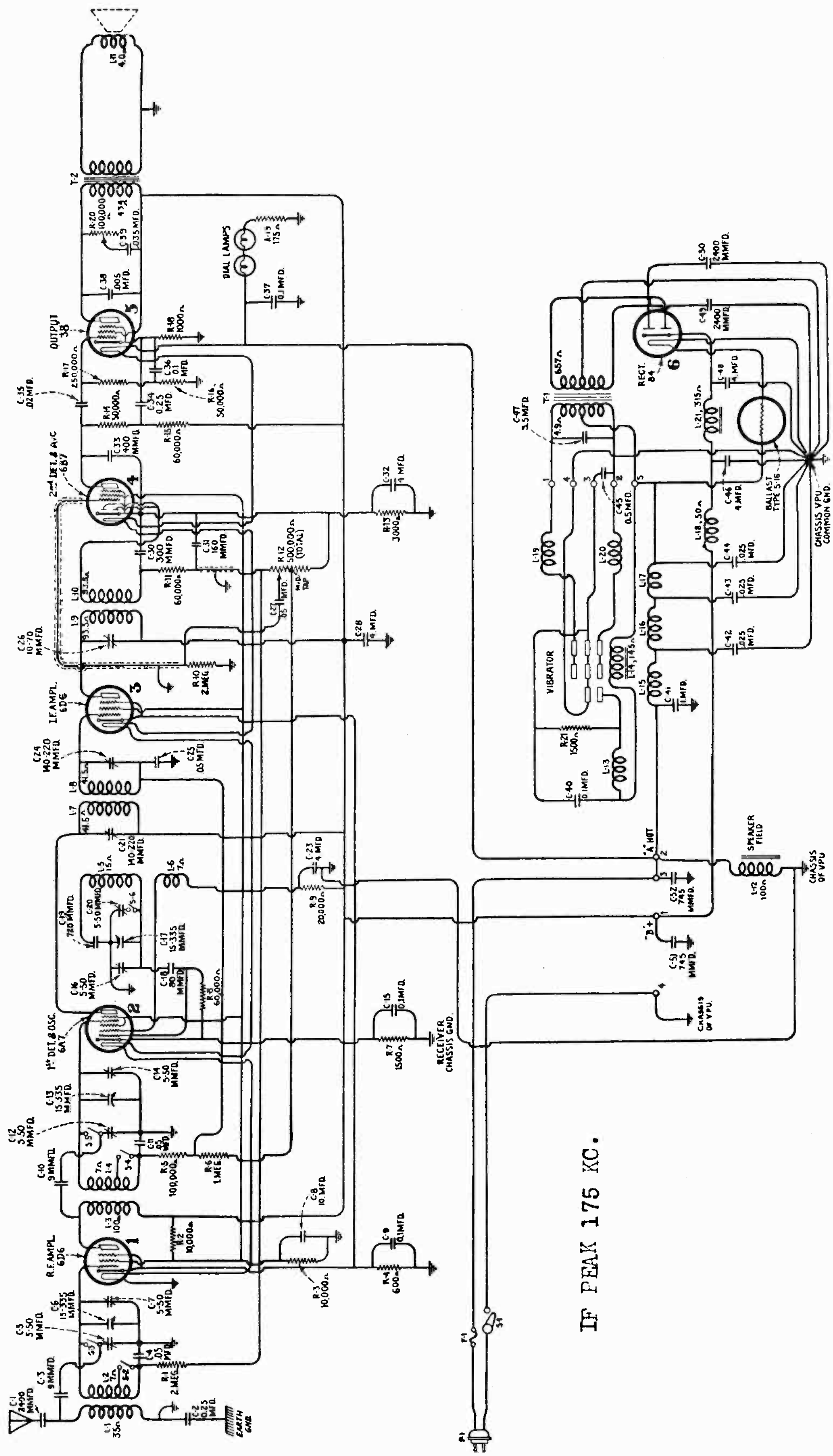


Figure 1—Schematic Circuit Diagram

IF PEAK 175 KC.

MODEL 223
Chassis Wiring

RCA-VICTOR CO., INC.

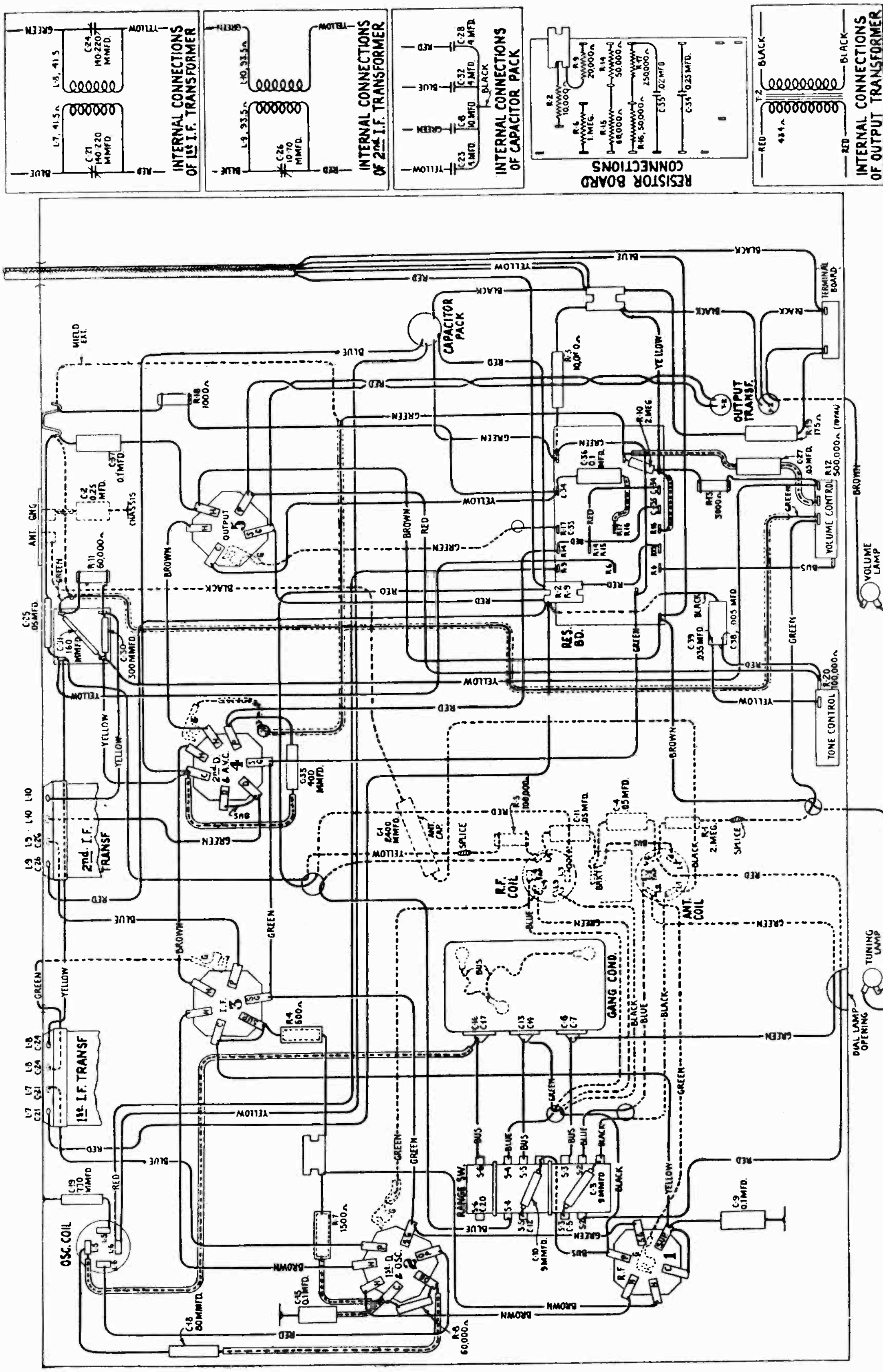


Figure 2—Chassis Wiring Diagram

MODEL 223
SPU Chassis Wiring

RCA-VICTOR CO., INC.

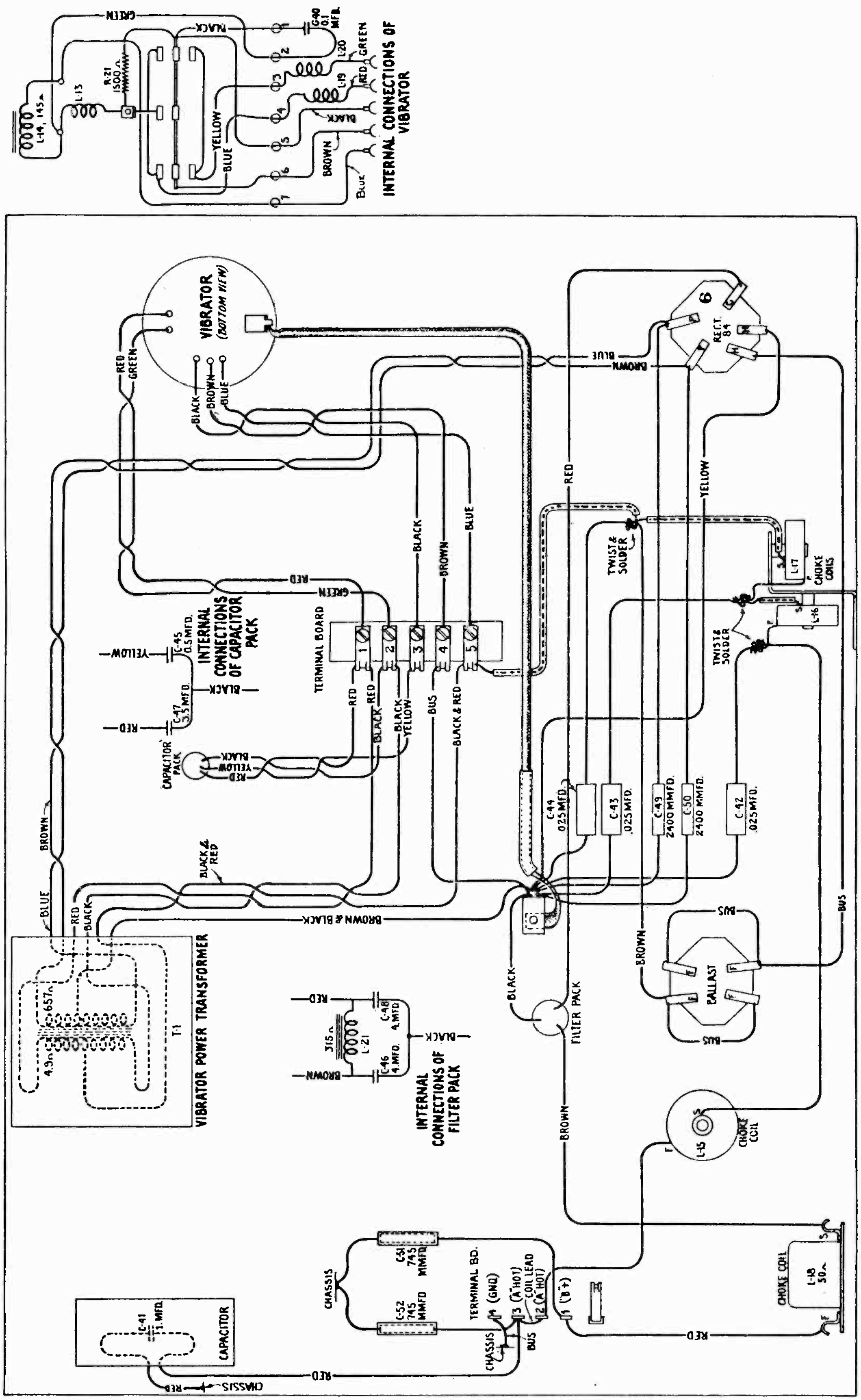


Figure 3—Power Unit Wiring Diagram

MODEL 223
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
2816	Resistor — 1,000 ohms — Carbon type — ½ watt (R18)—Package of 5	$1.00
3047	Resistor — 1,500 ohms — Carbon type — ½ watt (R7)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R6)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt (R13)—Package of 5	1.00
3514	Resistor—250,000 ohms—Carbon type—½ watt (R17)—Package of 5	1.00
3572	Socket—Contact Radiotron socket	.38
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R16)—Package of 5	1.00
3597	Capacitor—.25 mfd. (C34)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8, R11)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C30)	.34
3622	Shield—Antenna or R. F. coil shield	.36
3624	Socket—Dial lamp socket and bracket	.40
3625	Scale—Volume indicator scale assembly	.40
3626	Shield—Oscillator coil shield	.22
3630	Resistor—10,000 ohms—Carbon type—3 watt (R2, R3)	.25
3634	Capacitor—160 mmfd. (C31)	.34
3639	Capacitor—.02 mfd. (C35)	.25
3750	Capacitor—.25 mfd. (C2)	.36
3783	Capacitor—9 mmfd. (C3, C10)—Package of 2	.50
3877	Capacitor—.1 mfd. (C9, C15, C36, C37)	.32
3888	Capacitor—.05 mfd. (C4, C11, C25, C27)	.25
3892	Resistor—600 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
3993	Screw—Set screw for volume control dial Package of 10	.25
4046	Resistor—2 megohm—Carbon type—½ watt (R1)—Package of 5	1.00
4142	Mounting assembly for receiver chassis—Comprising 8 cushions, 8 washers, 4 spacers, 4 lockwashers and 4 screws	.38
4143	Capacitor—2400 mmfd. (C1)	.25
4144	Clamp—Capacitor mounting clamp—Package of 5	.20
4145	Shield—Radiotron shield	.30
4181	Capacitor—720 mmfd. (C19)	.30
4182	Capacitor—80 mmfd. (C18)	.25
4183	Capacitor—400 mmfd. (C33)	.26
4184	Capacitor pack—Comprising one .035 and one .005 mfd. capacitors (C38, C39)	.30
4185	Resistor—175 ohms—Wire wound (R19)	.78
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R10)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
6471	Coil—Oscillator coil (L5, L6)	.74
6483	Transformer—First intermediate frequency transformer (L7, L8, C21, C24)	1.84
6484	Transformer—Second intermediate frequency transformer (L9, L10, C26)	1.70
6485	Volume control with mounting nut (R12)	$1.20
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil (L3, L4)	.94
6534	Switch—Range switch (S2, S3, S4, S5, S6, C5, C12, C20)	1.25
6598	Condenser—3-gang variable tuning condenser (C6, C7, C13, C14, C16, C17)	3.00
6622	Dial—Station selector dial scale and drive assembly	.95
6859	Capacitor—Comprising three 4 mfd. and one 10 mfd. capacitors (C8, C23, C28, C32)	2.85
6860	Tone control with mounting nut (R20)	1.15
6851	Transformer—Output transformer (T2)	1.36
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
	VIBRATOR POWER UNIT ASSEMBLIES	
3765	Capacitor—.025 mfd. (C42, C43, C44)	.34
3859	Socket—4-contact Radiotron socket	.30
3860	Socket—5-contact Radiotron socket	.32
4145	Shield—Radiotron shield—Rectifier	.30
4148	Suspension assembly—Comprising one bolt assembly, one "C" washer, two cup washers, two springs, two damping bushings	.40
4150	Clamp assembly—Vibrator mounting clamp assembly	.22
4186	Capacitor—2400 mmfd. (C49, C50)	.28
4187	Capacitor—745 mmfd. (C51, C52)	.25
6862	Filter pack—Comprising one reactor and two 4.0 mfd. capacitors (C46, C48, L21)	3.34
6863	Capacitor—Comprising one 3.5 mfd. and one .5 mfd. capacitors (C45, C47)	3.46
6864	Tube—Regulator tube	3.00
6865	Shield—Regulator tube shield	.22
6865	Coil—Line R. F. choke coil (L15)	.96
6867	Coil—Line R. F. choke coil	.54
6868	Coil—Line R. F. choke coil (L16)	.78
6869	Capacitor—1.0 mfd. capacitor (C41)	.88
6870	Shield—Outer shield with felt pad for vibrator assembly	.60
6871	Coil—Filter coil (L18)	.76
7734	Transformer—Power transformer (T1)	3.60
7735	Vibrator complete (L13, L14, L19, L20, C40, R21)	8.20
	REPRODUCER ASSEMBLIES	
4149	Shield—Terminal board shield	.20
8935	Cone—Reproducer cone (L11) Package of 5	5.25
9474	Reproducer complete	7.10
9475	Coil—Field coil magnet and cone support (L12)	4.55
	MISCELLANEOUS PARTS	
3592	Knob—Station selector—Volume control or tone control knob—Package of 5	.80
3615	Knob—Range switch knob—Package of 5	.60
3881	Escutcheon—Station selector escutcheon	.42
3899	Escutcheon—Volume control escutcheon	.42
4292	Capacitor—Generator capacitor—.5 mfd.	.90
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6516	Connector—Fuse connector complete	.16

MODEL 262
Circuit Data

RCA-VICTOR CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, and I. F. stage, a combined second detector and automatic volume control, an audio stage, a push-pull driver stage and a push-pull Pentode output stage. Plate and grid voltages are supplied by the RCA-5Z3 heavy duty rectifier combined with a suitable filtering stage, of which the loudspeaker field is a part. Figures 1 and 2 show the schematic circuit diagrams.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator signal, which is always at a 460 KC frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in the oscillator circuit.

In conjunction with these three tuned circuits it is well to point out that five different groups of tuned circuits are used, one group for each tuning band. A five-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to absorption effects caused by the coils, the natural period of which without the gang-capacitor connected falls in the next higher frequency band. This gang-switch also has additional contacts for changing the sensitivity in the various bands.

The sensitivity control in bands X and A controls the R. F. and first detector while in bands B, C and D it controls the R. F., first detector and I. F. stage. This is caused by the action of the selector switch. It should also be noted that the sensitivity control is paralleled with a 500-ohm resistor (R-12, Figure 1) in bands B, C and D.

The output of the first detector, which is the I. F. signal (460 KC), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 KC.

The output of the I. F. amplifier is then applied to the grid of the RCA-76 second detector. The plate of this tube is connected to its cathode and the tube operated as a diode detector and automatic volume control. The direct current component of the rectified signal produces a voltage drop across resistors R-32 and R-17. The voltage drop across both resistors constitutes the automatic bias voltage for the R. F. stage, while the drop across R-17 alone constitutes the bias voltage for the first detector and I. F. stage. These automatic bias voltages for the R. F., first detector and I. F. stages give the automatic volume control action of the receiver. It should be noted that resistor R-33 is connected in parallel across resistors R-32 and R-17. This reduces the total amount of resistance in the circuit to a proper value. Resistor R-34 and capacitor C-43, which are connected in series and from a tap on the volume control to ground, provide low frequency, low volume compensation.

The volume control selects the amount of audio voltage that is applied to the grid of the RCA-76 A. F. stage and thereby regulates the volume of the entire receiver. The first audio stage is coupled through a high and low frequency tone control system and transformer to the grid circuit of the push-pull drive stage. It should be noted that a link has been provided in series with the cathode of this stage, so that phonograph connections may be easily made if required.

The driver stage is transformer coupled to the output stage, which consists of two Radiotrons, RCA-42, connected in push-pull. A feature of the output stage is the use of fixed bias, which reduces distortion and increases the available output. This is accomplished by the use of the drop across R-29, which carries the entire DC output from the rectifier. Naturally the output stage uses but a portion of the total rectified current and current variations in it have but little effect on the drop across the resistor.

The output of the power stage is coupled through a step-down transformer to the voice coil of the loudspeaker. A separate winding, which is shunted by a capacitor, has been provided in this transformer which gives a very sharp, high-frequency cut-off for the entire audio system. This greatly reduces the reproduction of any high-frequency interchannel interference or other disturbance of a high-frequency character which is outside of the useful musical range.

VARIATIONS IN MODELS

The preceding description of the electrical circuit applies to numerous models of this receiver. However, there are other models in which a change from the foregoing has been made. This change consists of using the section of the band selector switch that formerly changed the sensitivity control, for changing the fidelity in various bands, the sensitivity remaining the same in all bands. This permits the receiver to maintain the utmost fidelity in bands X and A while reducing the low frequency output in bands B, C and D. Such a change results in improved performance.

The sensitivity control in these models operates as formerly in bands X and A. That is, the sensitivity control adjusts the residual bias for the R. F. and first detector stages.

MODEL 262
Schematic with
Sensitivity Change

RCA-VICTOR CO., INC.

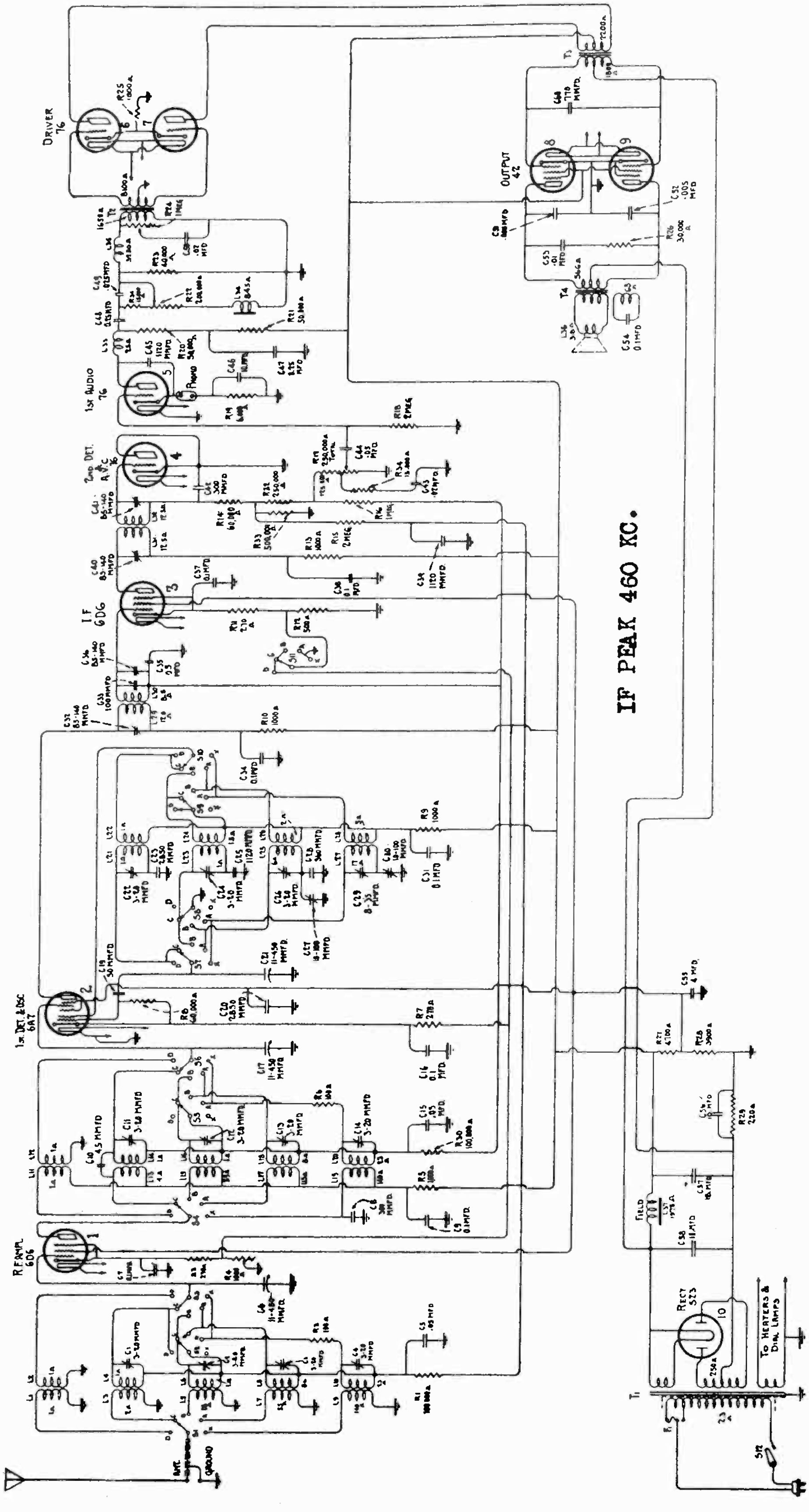


Figure 1—Schematic Circuit Diagram—Models with sensitivity control change for band position

RCA-VICTOR CO., INC.

**MODEL 262
Schematic with
Fidelity Change**

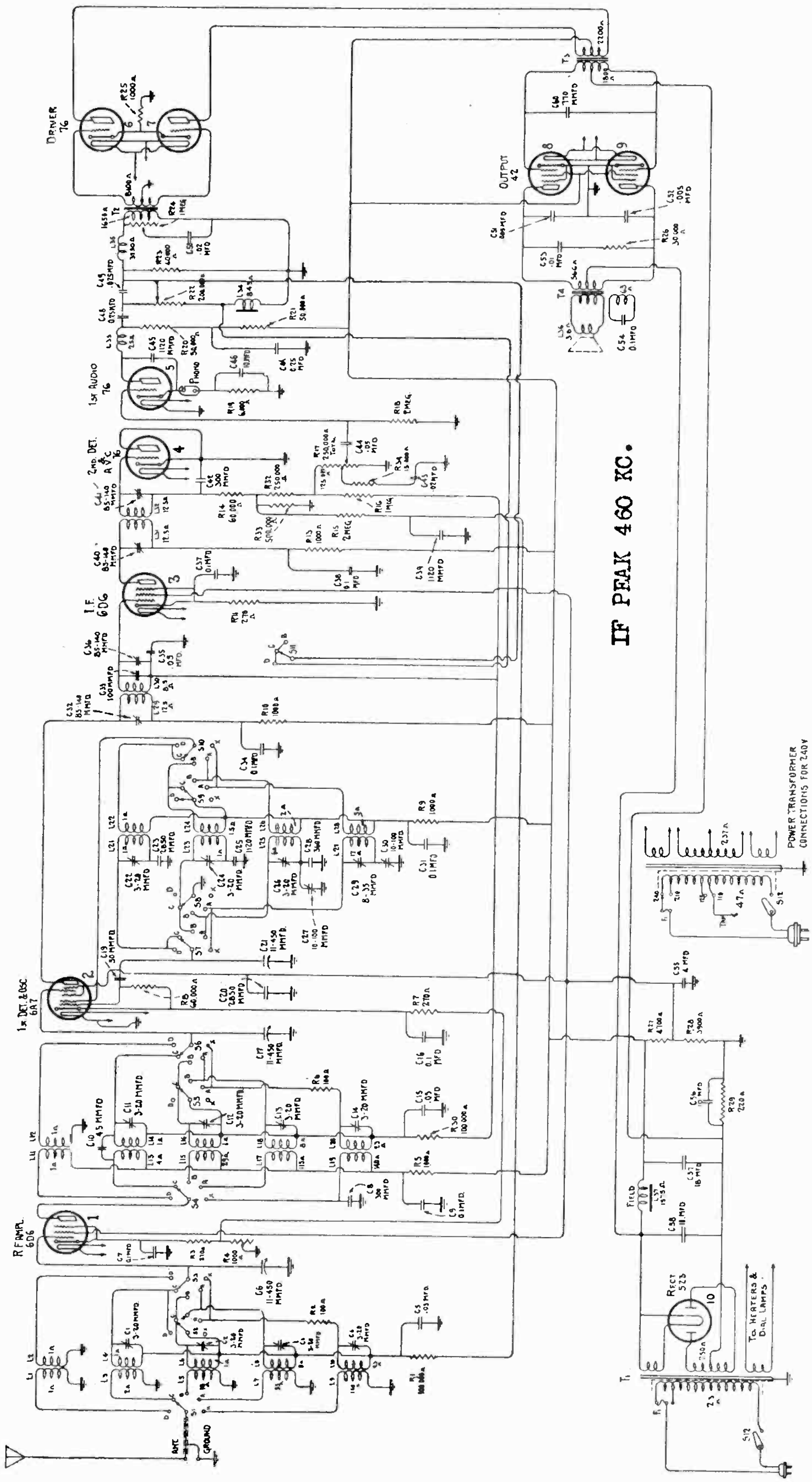


Figure 2—Schematic Circuit Diagram—Models with fidelity change for band position

MODEL 262
Chassis Wiring
with Senitivity
Change

RCA-VICTOR CO., INC.

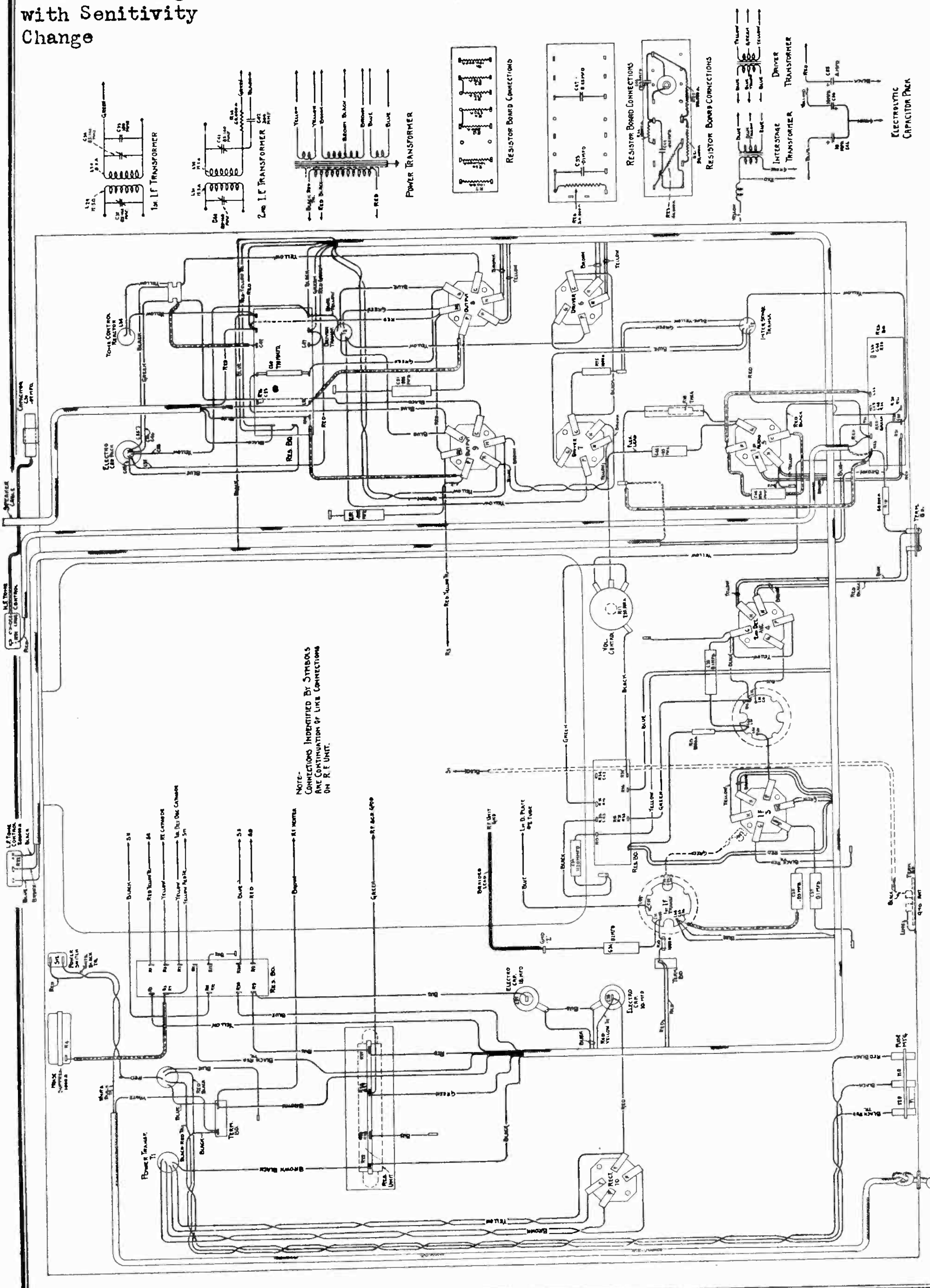


Figure 4—Chassis Wiring Diagram—Models with sensitivity control change for band position

RCA-VICTOR CO., INC.

MODEL 262
Chassis Wiring with Fidelity Change

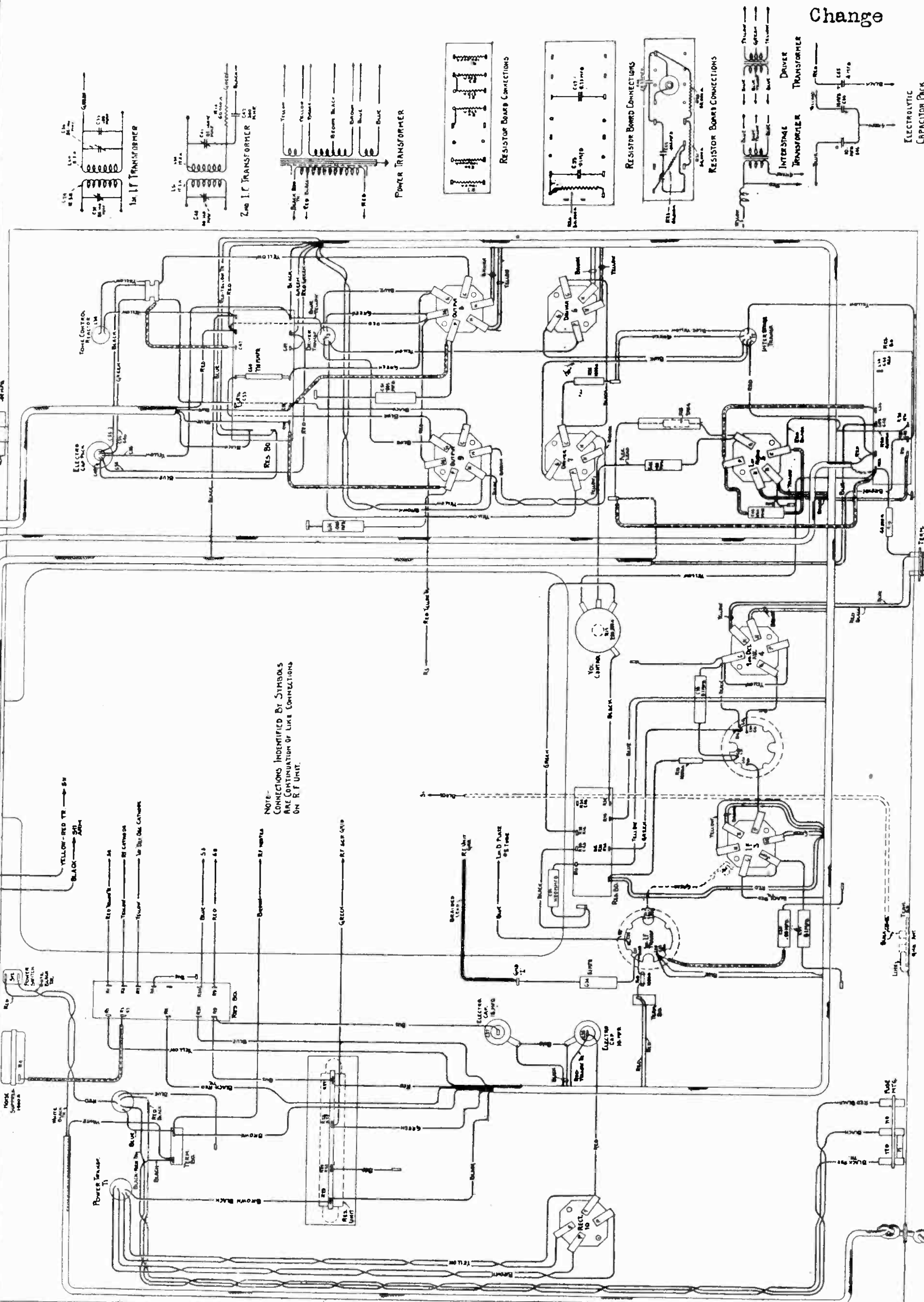


Figure 6—Chassis Wiring Diagram—Models with fidelity change for band position

MODEL 262
RF Unit Wiring with
Sensitivity Change

RCA-VICTOR CO., INC.

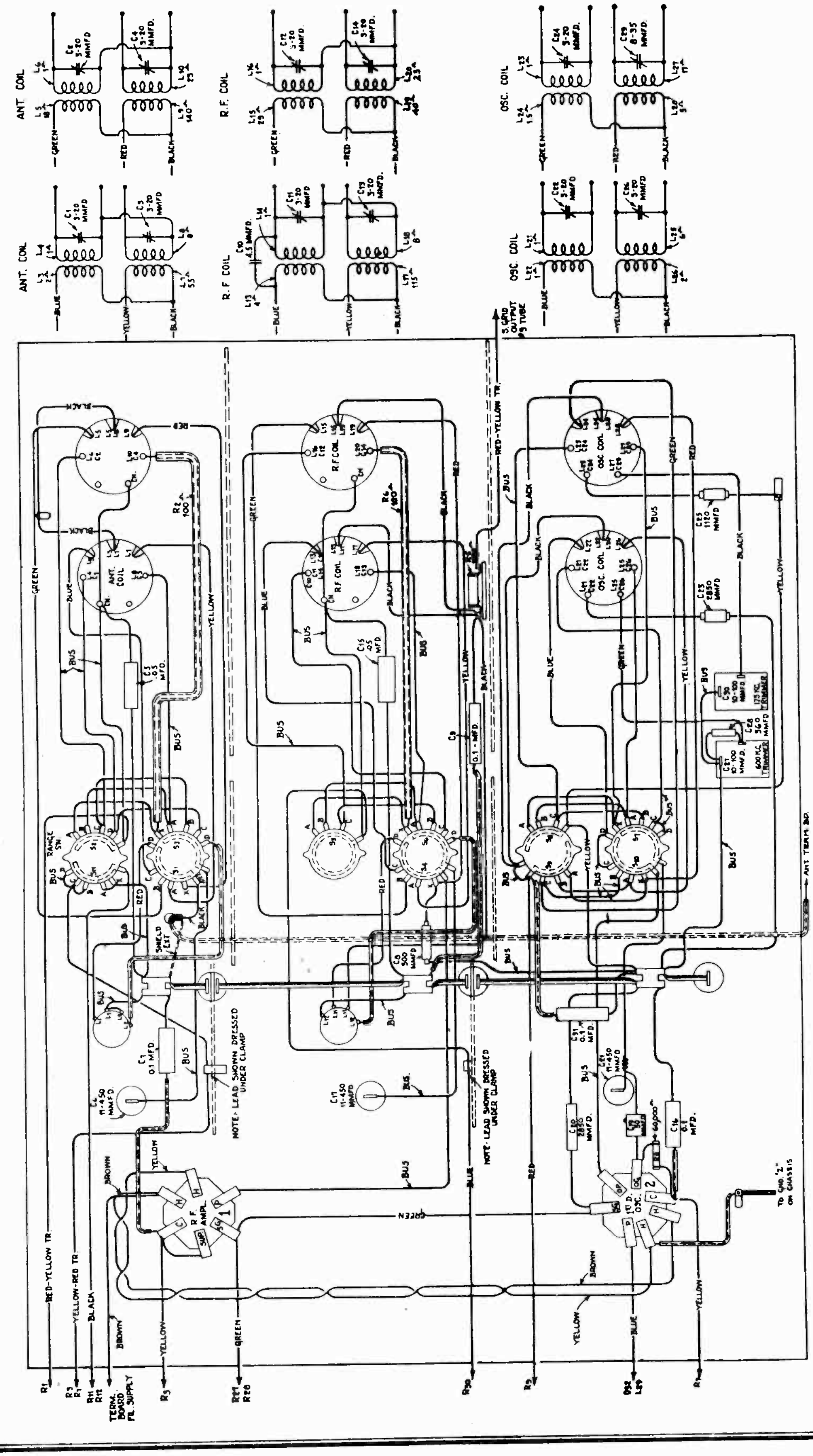


Figure 8—R. F. Unit Wiring Diagram—Models with sensitivity control change for band position

RCA-VICTOR CO., INC.

MODEL 262
RF Unit Wiring with Fidelity Change

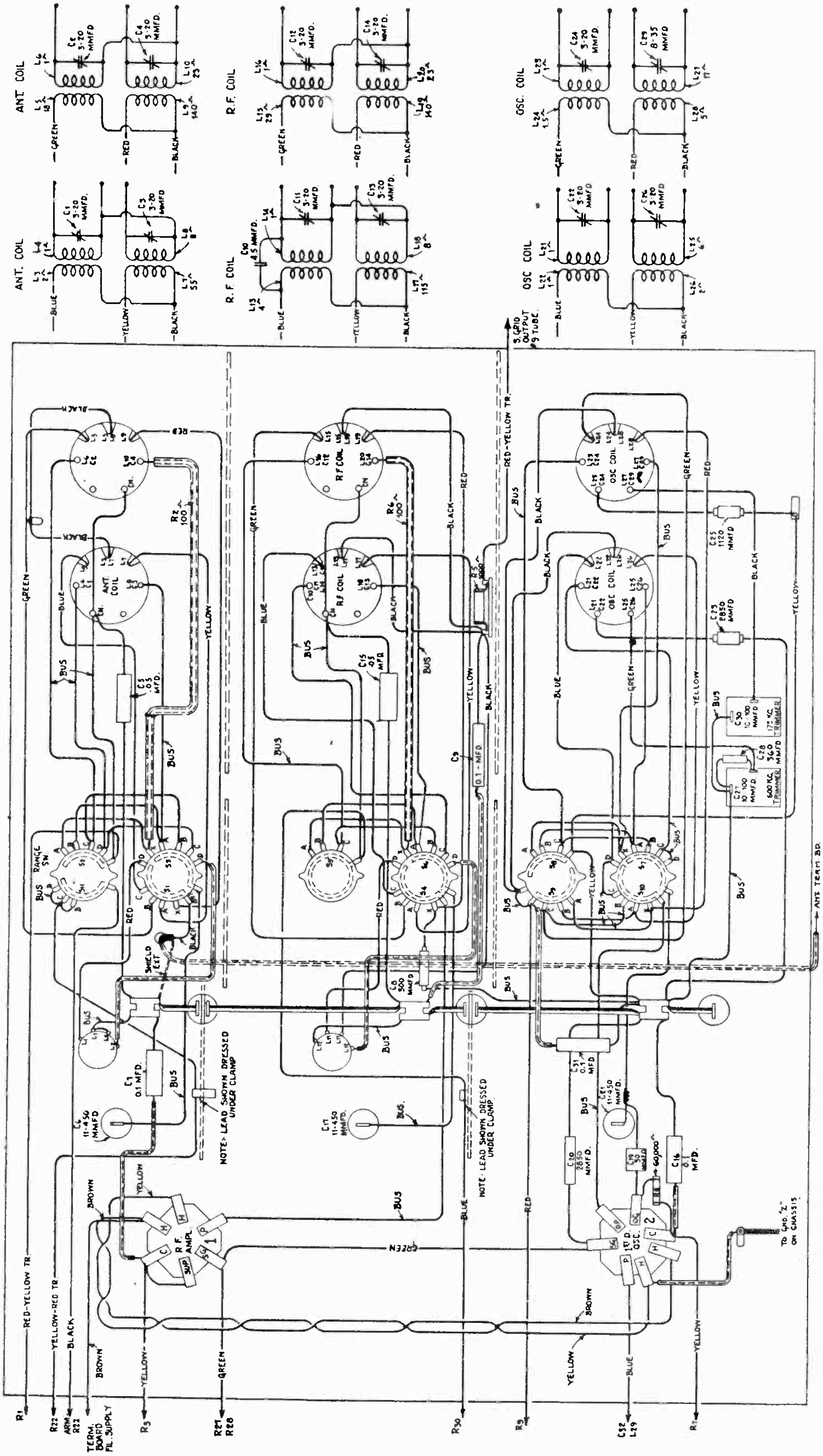


Figure 10—R. F. Unit Wiring Diagram—Models with fidelity change for band position

MODEL 262
Socket and Trimmer Layouts RCA-VICTOR CO., INC.

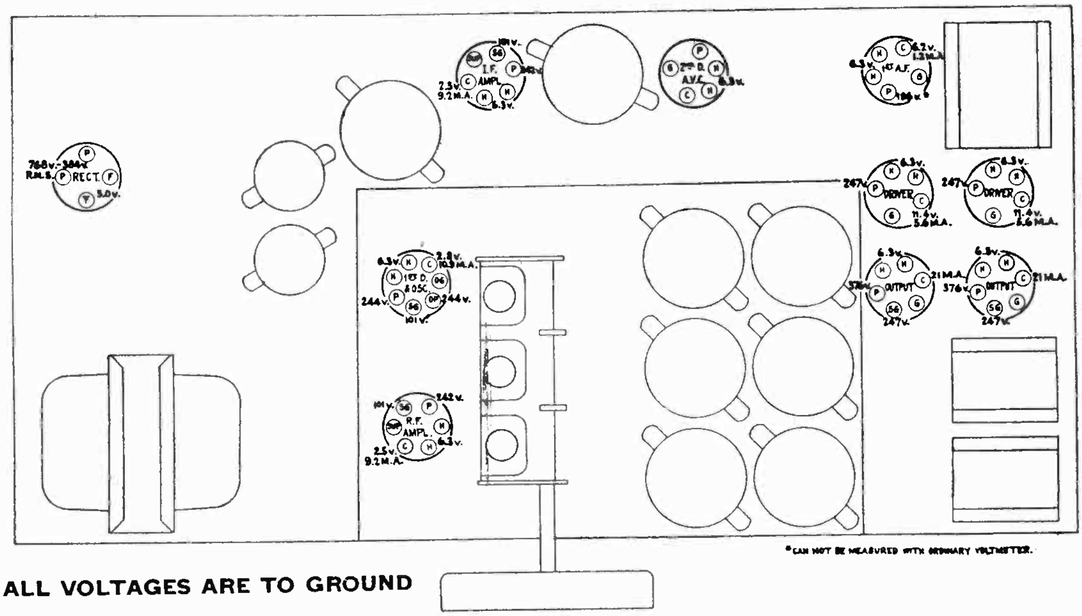


Figure 11—Radiotron Socket Voltages

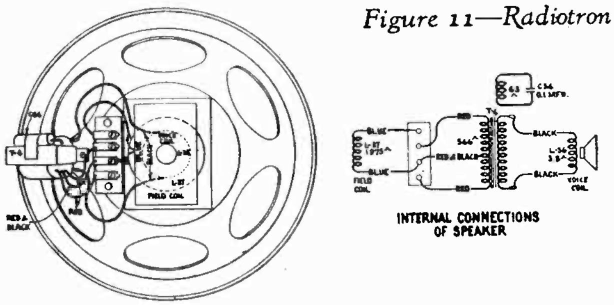


Figure 3—Loudspeaker Wiring

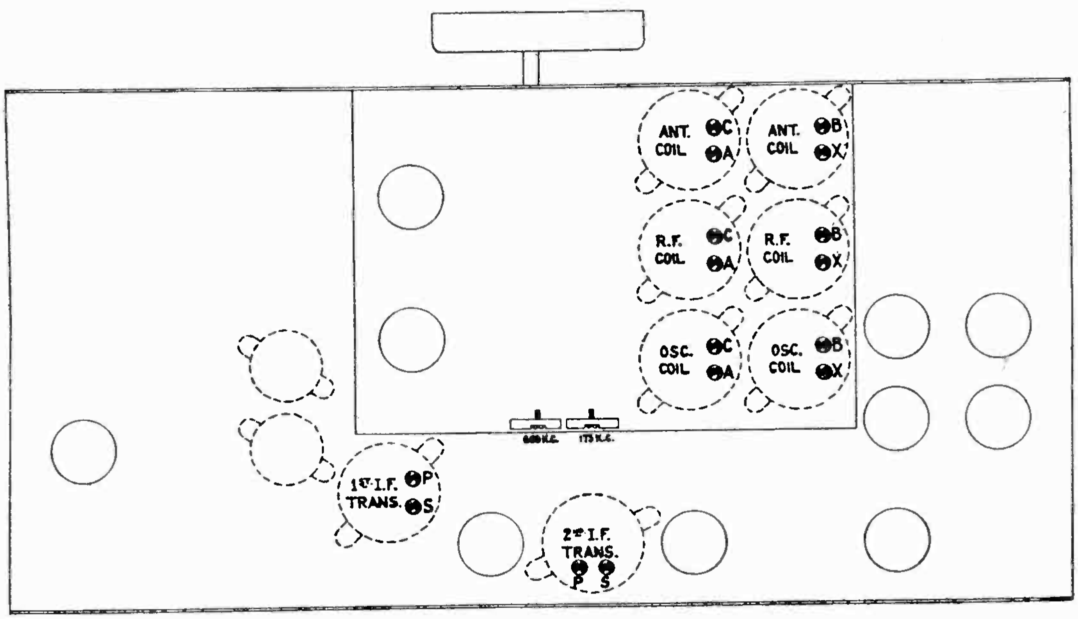


Figure 7—Location of Trimmer Capacitors

RCA-VICTOR CO., INC.

Tuning Frequency Range .... Band X— 140 KC - 410 KC; Band A— 540 KC - 1720 KC; Band B— 1720 KC - 5400 KC; Band C— 5400 KC - 18,000 KC; Band D—18,000 KC - 36,000 KC

Line-up Frequencies .... 175 KC, 410 KC, 460 KC, 600 KC, 1720 KC, 5160 KC, 18,000 KC
Maximum Undistorted Output .... 7 Watts
Maximum Output .... 14 Watts

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts, which are shown on page 15, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 KC and the signal tuned in. The output indicator should be connected across the voice coil of the loudspeaker. Then insert the tuning wand, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage, and two transformers having four adjustable capacitors which may require adjustment. The transformers are all peaked at 460 KC.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 KC between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 KC. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

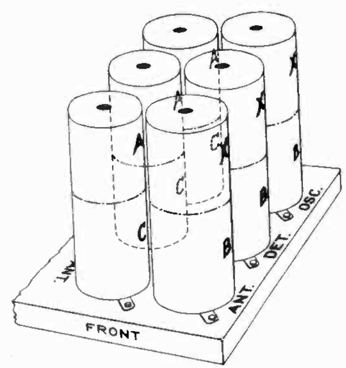


Figure 5—Location of Coils in Shields

(c) Refer to Figure 7. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "A" and "X." Three are required in bands "B" and "C." None are required in band "D."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeakers. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of band "A."

Figure 7 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "X"

(a) Tune the external oscillator to 410 KC, set the pointer at 410 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 175 KC. Tune in the 175 KC signal irrespective of scale calibration and adjust the series trimmer marked 175 KC on Figure 7, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 KC as described in (a).

Band "A"

(a) Tune the external oscillator to 1720 KC, set the pointer at 1720 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 600 KC. Tune in the 600 KC signal irrespective of scale calibration and adjust the series trimmer, marked 600 KC on Figure 7, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 KC as described in (a).

Band "B"

(a) Tune the external oscillator to 5160 KC, and set the pointer at 5160 KC. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(b) Check for the image signal, which should be received at approximately 4240 on the dial. It will be necessary to increase the external oscillator output for this check.

(c) The antenna and detector trimmers should now be peaked for maximum output.

Band "C"

(a) Tune the external oscillator to 18,000 KC, and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

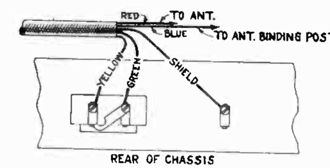


Figure 9—Junior "Duo" Connections

(b) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(c) Reduce the capacity of the detector trimmer while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(d) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "D"

No adjustments are required for band "D."

(4) MAGNETIC PICKUP CONNECTIONS

A terminal board (link in series with first audio stage cathode) is provided at the rear of the chassis for adding phonograph facilities to this instrument. Figure 9 shows the connections that will be required for the Junior "Duo" turntable assembly.

(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 11 shows a chart in which the various voltages of the tube contacts are shown.

MODEL 262
Voltage
Parts List

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES

120-Volt A. C. Input—Volume and Sensitivity Controls Maximum—Band Switch at "A"—No Signal

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		2.5	101	242	9.2	6.3
RCA-6A7	Detector	2.8	101	244	10.9	6.3
	Oscillator	—	—	244		
RCA-6D6—I. F.		2.5	101	242	9.2	6.3
RCA-76—2nd Det. AVC		0	—	—	0	6.3
RCA-76—A. F.		6.2	—	196*	1.2	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-5Z3—Rectifier		—	—	768/384 R. M. S.	112	5.0

*Cannot be measured with ordinary voltmeter.

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4372	Bracket—Bass tone control mounting bracket	$0.20
4683	Bracket—Treble tone control mounting bracket	.25
4406	Bracket—Volume control mounting bracket	.25
3794	Capacitor—100 mmfd.—Located on first I. F. transformer (C33)	.30
3981	Capacitor—300 mmfd.—Located on second I. F. transformer (C42)	.30
4668	Capacitor—770 mmfd. (C60)	.30
4409	Capacitor—1120 mmfd. (C39, C45)	.35
3643	Capacitor—0.005 mfd. (C51, C52)	.25
3787	Capacitor—0.01 mfd. (C53)	.30
3639	Capacitor—0.02 mfd. (C43)	.25
4652	Capacitor—0.02 mfd. (C50)	.60
3888	Capacitor—0.05 mfd. (C35)	.25
4694	Capacitor—0.05 mfd. (C44)	.30
3765	Capacitor—0.025 mfd. (C49)	.34
3877	Capacitor—0.1 mfd. (C37)	.32
4354	Capacitor—0.1 mfd. (C34, C38)	.36
3597	Capacitor—0.25 mfd. (C47)	.40
3702	Capacitor—0.25 mfd. (C48)	.42
7790	Capacitor—10. mfd. (C58)	1.05
7788	Capacitor—18. mfd. (C57)	1.10
7833	Capacitor pack—Comprising two 10. mfd. and one 4. mfd. capacitor (C46, C55, C56)	2.00
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4358	Clamp—Mounting clamp for capacitor—Stock No. 7788 or No. 7790	.15
7806	Coil—First audio plate choke (L33)	.30
4371	Cover—Fuse mount cover	.15
10907	Fuse—3 amperes—Package of 5	.40
3376	Mount—Fuse mount—105-125 volt operation	.40
4604	Mount—Fuse mount for 200-250 volt operation	$0.35
7784	Reactor—Tone control reactor (L34)	1.30
6135	Resistor—270 ohms—Carbon type—¼ watt—Package of 5 (R3, R7, R11)	1.00
4622	Resistor—500 ohms—Carbon type—¼ watt—Package of 10 (R12)*	2.00
4370	Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R9, R10, R13, R25)	2.00
6243	Resistor—6,000 ohms—Carbon type—¼ watt—Package of 5 (R19)	1.00
3998	Resistor—15,000 ohms—Carbon type—¼ watt—Package of 5 (R34)	1.00
6143	Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5 (R23)	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 (R14)	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5 (R1, R30)	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt—Package of 5 (R32)	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Package of 5 (R33)	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt—Package of 5 (R16)	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt—Package of 5 (R15, R18)	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5 (R20, R21)	1.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R26)	.22
4649	Resistor—Flat type—Total resistance 8820 ohms—Divided as follows: one 220 ohms, one 3,900 ohms and one 4,700 ohms section (R27, R28, R29)	1.05
7804	Rheostat—Sensitivity control rheostat (R4)	1.30

*R12 Resistor—500 ohms—Some Models

REPLACEMENT PARTS (Continued)

Stock No.	Description	List Price
4656	Screw—Volume control mounting assembly—Comprising one bushing, one washer, one shakeproof washer and one nut	$0.18
4452	Shield—First audio, second detector A.V.C. or driver Radiotron shield	.35
3683	Shield—Second detector—A.V.C. Radiotron shield top	.20
4453	Shield—I. F. Radiotron shield	.32
7800	Shield—Intermediate frequency transformer shield	.45
3859	Socket—4-contact rectifier Radiotron socket	.30
7484	Socket—5-contact first audio, second detector A.V.C. or driver Radiotron socket	.35
7485	Socket—6-contact I. F. Radiotron socket	.40
6676	Socket—6-contact output Radiotron socket	.40
4686	Strip—"ANT-GND" terminal strip—Two terminals and link	.20
7796	Switch—Operating switch (S12)	62
7795	Tone control—Bass tone control (R22)	1.30
4648	Tone control—Treble tone control (R24)	1.25
7841	Transformer—Audio transformer pack comprising interstage transformer and reactor (T2, L35)	4.05
4431	Transformer—First intermediate frequency transformer (L29, L30, C32, C33, C36)	2.28
4433	Transformer—Second intermediate frequency transformer (L31, L32, C40, C41, C42)	2.15
7832	Transformer—Driver transformer (T3)	2.85
9505	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	6.35
9506	Transformer—Power transformer—105-125 volts—25-40 cycles	8.90
9507	Transformer—Power transformer—105-250 volts—40-60 cycles	6.40
4650	Volume control (R17)	1.38
	R. F. UNIT ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	.50
4646	Capacitor—4.5 mmfd. (C10)	.20
4633	Capacitor—50 mmfd. (C19)	.25
3981	Capacitor—300 mmfd. (C8)	.30
4413	Capacitor—360 mmfd. (C28)	.22
4412	Capacitor—1,120 mmfd. (C25)	.25
4524	Capacitor—2,850 mmfd. (C23)	.35
4615	Capacitor—2,850 mmfd. (C20)	.34
4417	Capacitor—0.05 mfd. (C5, C15)	.25
4415	Capacitor—0.1 mfd. (C7, C16)	.30
4645	Capacitor—0.1 mfd. (C9, C31)	.25
3861	Capacitor—Adjustable capacitor (C27, C30)	.78
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4410	Coil—Antenna coil—Band "D" (L1, L2)	.70
7803	Coil—Antenna coil—B.-S.W. (L3, L4, L7, L8, C1, C3)	1.82
7810	Coil—Antenna coil—P.B.-L.W. (L5, L6, L9, L10, C2, C4)	2.10
7805	Coil—Detector coil—B.-S.W. (L13, L14, L17, L18, C11, C13)	2.15
7808	Coil—Detector coil—P.B.-L.W. (L15, L16, L19, L20, C12, C14)	2.05
4421	Coil—Detector coil—Band "D" (L11, L12)	.70
7807	Coil—Oscillator coil—B.-S.W. (L21, L22, L25, L26, C22, C26)	1.62
7809	Coil—Oscillator coil—P.B.-L.W. (L23, L24, L27, L28, C24, C29)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C17, C21)	4.42
4340	Lamp—Dial lamp—Package of 5	.60
4370	Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R5)	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 (R8)	1.00
4418	Resistor—100 ohms—Flexible type—Package of 10 (R2, R6)	1.50
4656	Screw—Chassis mounting screw assembly—Comprising one bushing, one washer, one shakeproof washer, and one nut (four sets required to mount chassis)	$0.18
7800	Shield—Antenna, detector or oscillator coil shield	.45
4452	Shield—First detector-oscillator Radiotron shield	.35
3683	Shield—Radiotron shield top	.20
4454	Shield—R. F. amplifier Radiotron shield	.44
3529	Socket—Dial lamp socket	.32
7485	Socket—6-contact R. F. amplifier Radiotron socket	.40
3572	Socket—7-contact first detector-oscillator Radiotron socket	.38
7836	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11)	3.05
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shafts, balls, ring, spring and washers—Assembled	.88
4455	Dial—Station selector dial	.60
7799	Drive—Variable tuning condenser drive assembly complete	2.45
4364	Gear—Spring gear assembly complete with hub, pinion, gear cover and spring	.96
4361	Indicator—Band indicator—Celluloid lettered—D. C. B. A. X	.12
4363	Pointer—Station selector main (large) pointer	.18
4367	Pointer—Station selector vernier (small) pointer	.15
3943	Screen—Celluloid screen for dial light—Package of 2	.18
3993	Screw—No. 6-32-5/32" square head set screw for band indicator operating arm or variable condenser drive—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	CABLE ASSEMBLIES	
4653	Cable—Main cable	1.90
4654	Cable—4-conductor—Reproducer cable	.58
4655	Cable—Shielded cable—From low-frequency tone control to resistor boards	.58
	REPRODUCER ASSEMBLY	
4645	Capacitor—0.1 mfd.—Located on output transformer (C54)	.25
7835	Coil—Field coil, magnet and cone support (L37)	4.55
8969	Cone—Reproducer cone (L36)—Package of 5	6.35
9543	Reproducer—Reproducer complete	10.36
6999	Screen—Dust (cloth) screen—Package of 6	.12
7834	Transformer—Output transformer and capacitor (T4, C54)	3.75
	MISCELLANEOUS PARTS	
4677	Bezel—Metal bezel (escutcheon) for station selector dial glass	.56
6614	Glass—Station dial glass	.30
3829	Knob—Bass or treble tone control, volume or sensitivity control range switch or operating switch knob—Package of 5	1.10
4657	Knob—Knob station selector knob—Package of 5	.65
4678	Ring—Retaining ring for dial glass—Pkg. of 5	.34
4119	Screw—8-32-¼" headless set screw for knob—Stock No. 4657—Package of 20	.38
4393	Screw—8-32-5/16" headless set screw for knob—Stock No. 3829—Package of 10	.25

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DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector stage, two I. F. stages, a combined second detector and automatic volume control, a push-pull audio driver stage and a push-pull Class A output stage. Plate and grid voltages are supplied by the RCA-5Z3 heavy duty rectifier combined with a suitable filtering system. In addition, a double channel A. V. C. stage is provided which uses two additional tubes. Figure 1 shows the over-all schematic circuit diagram while Figure 2 shows the R. F. assembly wiring.

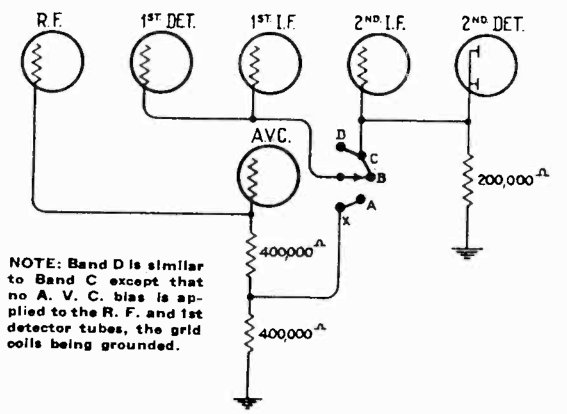

Figure 3—Switching Arrangement of Automatic Volume Control Systems

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator signal, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in the oscillator circuit.

In conjunction with these three tuned circuits it is well to point out that five different groups of tuned circuits are used, one group for each tuning band. A five-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to absorption effects caused by the coils, the natural period of which without the gang capacitor connected falls in the next higher frequency band. This gang switch also has additional contacts for performing other functions which will be discussed.

The output of the first detector which is the I. F. signal (460 K. C.) is fed directly through two tuned circuits to the grid of the automatic volume control I. F. amplifier stage. A coupling coil adjacent to the secondary of this transformer is connected directly to the signal I. F. stage, which is in effect parallel to the A. V. C., I. F. stage. Examining the signal amplifier further we find that the output of the first signal I. F. stage is applied through a transformer to the second I. F. stage and thence through a second transformer to the second detector. Both circuits of each transformer are accurately tuned to the I. F. signal, which is 460 K. C.

Further examining the A. V. C., I. F. stage it will be seen that the output of this stage is applied to the A. V. C. tube through an untuned I. F. transformer. The A. V. C. stage, which is an RCA-76, is operated as a straight rectifier, its plate being grounded and only the grid being used. This tube is shielded in the usual manner. A small grid voltage, approximately 5.0 volts, is maintained so that rectification does not occur until the signal level exceeds this grid voltage. When this occurs, a portion of the rectified signal produces a voltage drop across resistors R-18 and R-19. The drop across both of these resistors constitutes the automatic bias voltage for the R. F. stage. The drop across R-19 alone gives the automatic bias voltage for the first detector and first I. F. stage on bands X and A.

Examining the second detector, the diode electrodes provide the detector action while the grid and plate give audio amplification. A portion of the rectified signal also gives a voltage drop across R-23 which is a second automatic volume control system for the receiver. The voltage drop is applied to the second I. F. stage in all bands and to the first detector and first I. F. stage in bands B and C. The change in automatic volume control systems is made by an additional group of contacts on the band selector switch. Figure 3 shows the switching arrangements for changing the A. V. C. system in the various bands.

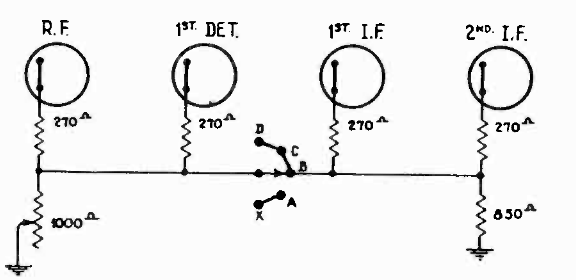

Figure 4—Sensitivity Control Switching Arrangement

MODEL 281
Schematic
Pickup Connections

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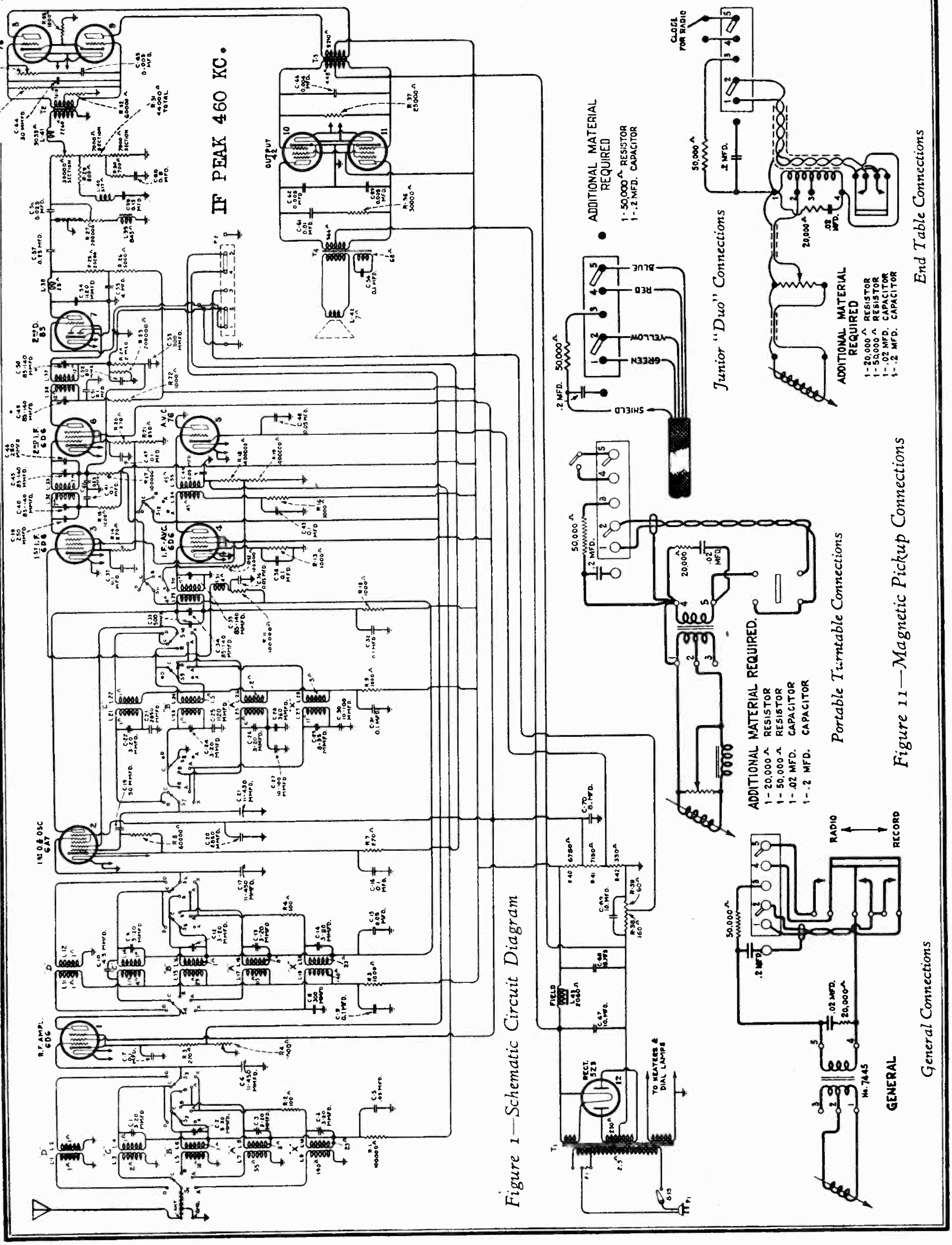

Figure 1—Schematic Circuit Diagram

Junior "Duo" Connections

Portable Turntable Connections

General Connections

End Table Connections

Figure 11—Magnetic Pickup Connections

MODEL 281
Chassis Wiring

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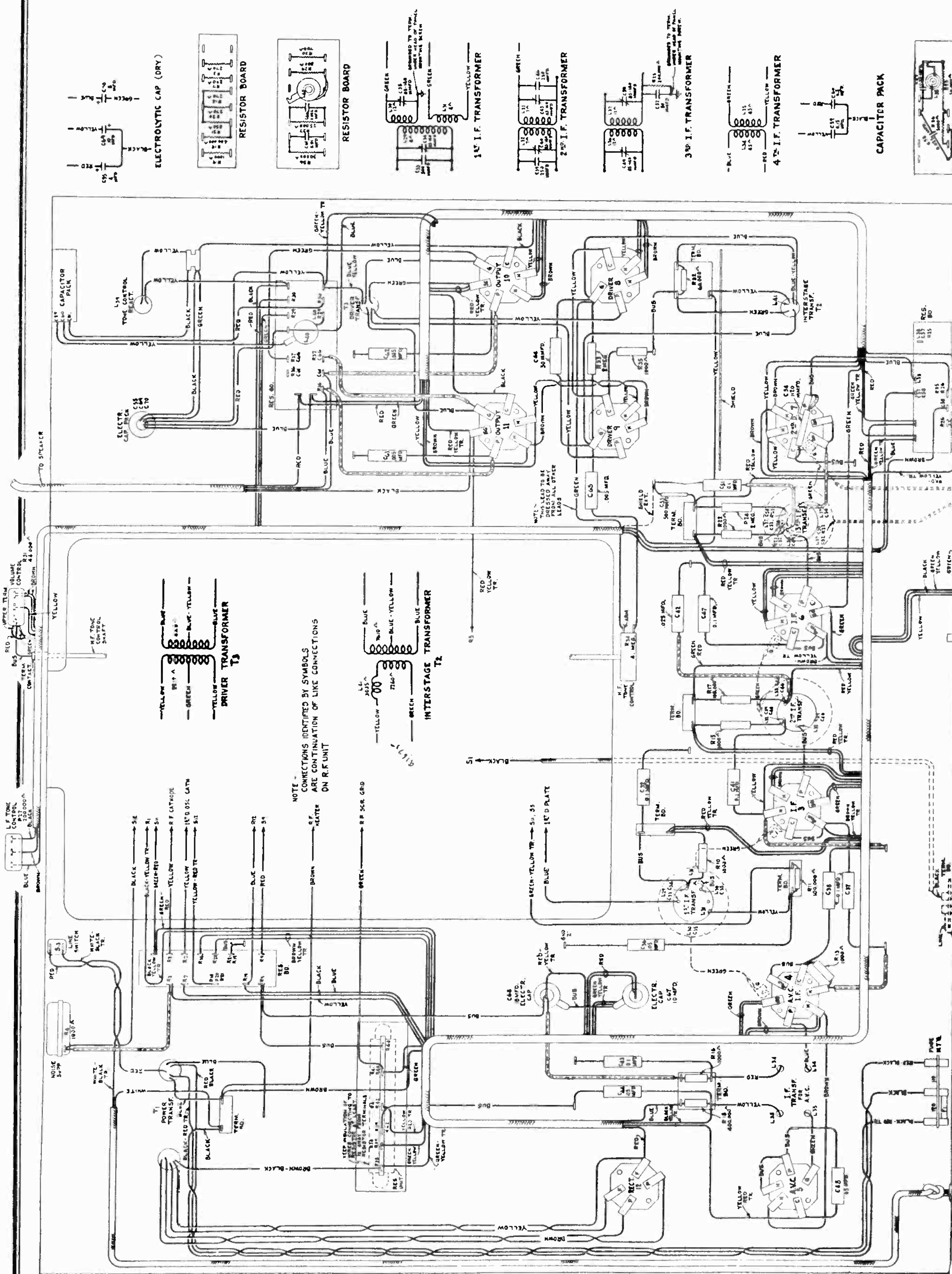

Figure 5—Chassis Assembly Wiring Diagram

MODEL 281
RF Wiring

RCA-VICTOR CO., INC.

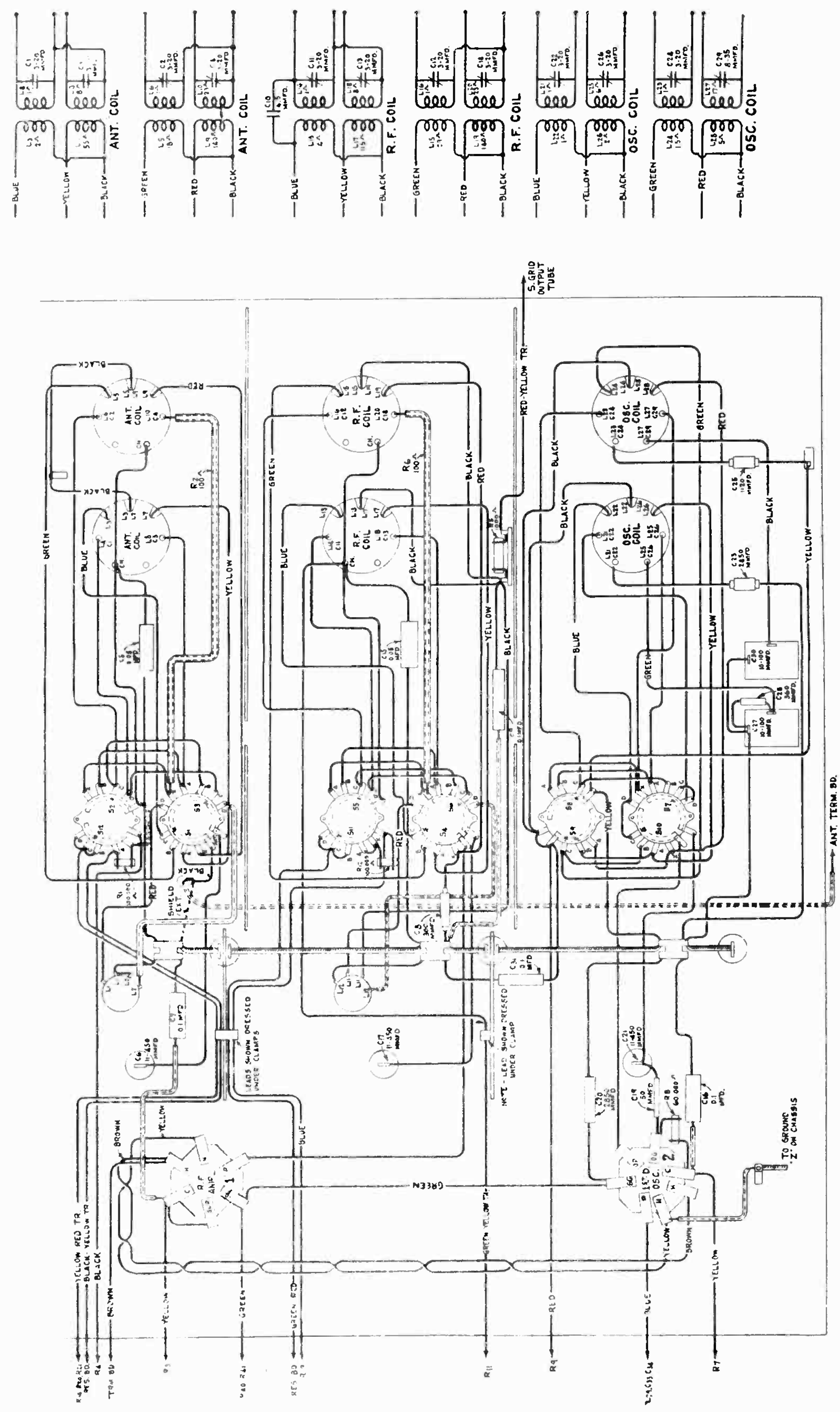

Figure 2—R. F. Assembly Wiring Diagram

Tuning Frequency Range

- Band X .... 140 K. C.–410 K. C.
- Band A .... 540 K. C.–1720 K. C.
- Band B .... 1720 K. C.–5400 K. C.
- Band C .... 5400 K. C.–18,000 K. C.
- Band D .... 18,000 K. C.–36,000 K. C.

MODEL 281
Socket and
Trimmer Layouts

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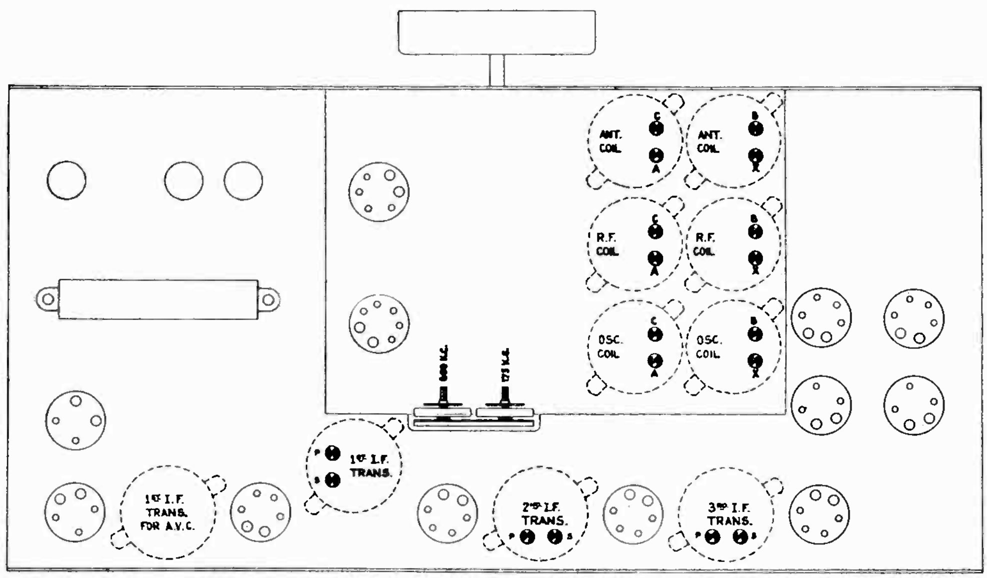

Figure 9—Location of Various Trimmer Capacitors

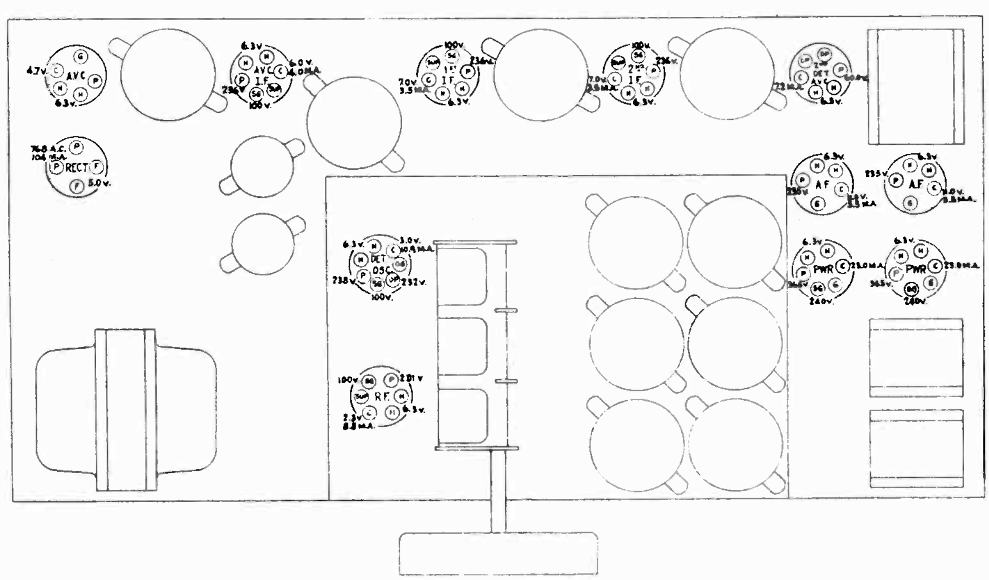

Figure 10—Radiotron Socket Voltages

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At this point, an explanation as to why two automatic volume control systems are used and why the sensitivity control is changed in different bands may be in order.

Two automatic volume control systems are used because of the different receiving conditions in different bands. For example, in the broadcast and long-wave band (X and A) signal levels are very high. Also due to the use of an aurally compensated volume control, a constant input to the second detector must be maintained. From this, it is evident that the double channel I. F. automatic volume control is ideal. It maintains a constant input to the second detector and yet does not function on an extremely weak signal. In the short-wave bands, however, conditions are different. Signal strengths are always very low and fluctuate widely. For this reason it is important to have some automatic volume control action below the level at which the double channel system works. This is provided by the diode A. V. C. of the second detector, which functions on the first detector and two I. F. stages on the short-wave bands. It should be noted that this action is present on the second I. F. stage on all bands. This further flattens the action of the double-channel system in bands X and A.

At this point it is well to examine the sensitivity control which also changes on different bands. The sensitivity control adjusts the residual bias on the R. F. and first detector stages in bands X and A while it controls the R. F., 1st detector and both I. F. stages on bands B, C, and D. Figure 4 shows the switching arrangement used.

The sensitivity control is changed so that in bands X and A it controls the R. F. and 1st detector while in bands B, C, and D it controls the R. F., 1st detector, 1st I. F. and 2nd I. F. stages. The reason for this is that for a given degree of sensitivity in bands X and A the residual bias will be considerably higher in the R. F. and 1st detector stages than in the bands B, C, and D used. This is to prevent possible overloading of these stages due to the high-signal strengths encountered in bands X and A. Also, in bands B, C, and D, for a given degree of sensitivity the R. F. stage operates at a higher gain, which gives an improved signal to noise ratio. This is caused by the paralleling of the sensitivity control with an 850-ohm resistor in these bands.

Returning to the second detector, we find its output circuit is coupled to the grid circuit of the driver stage through a compensated volume control system, tone control system and transformer. The volume control uses two stages of compensation, which serves to increase the high and low frequencies as the volume is reduced. This compensates for the natural loss in sensitivity of the human ear to the high and low frequencies at low sound levels. A low and a high frequency tone control enables the listener to alter the fidelity of the receiver to his individual taste.

The driver stage, which is a pair of RCA-76 Radiotrons connected in push-pull, is transformer coupled to a pair of RCA-42's which are the output stage. A feature of the output stage is the use of fixed bias, which reduces distortion and increases the available output. This is accomplished by the use of the drop across R-38 and R-39, which carries the entire D. C. output from the rectifier. Naturally the output stage uses but a portion of the total rectified current and current variations in it will have but little effect on the drop across the resistor.

The output of the power stage is coupled through a step-down transformer to the voice coil of the loudspeaker. A separate winding, which is shunted by a capacitor, has been provided in this transformer which gives a very sharp, high-frequency cut-off for the entire audio system. This greatly reduces the reproduction of any high-frequency interchannel interference or other disturbance of a high-frequency character which is outside of the useful musical range.

The loudspeaker used is of the large field ten-inch type. It is fully capable of handling the high-power, high-quality output of the receiver and converting it into faithful sound reproduction.

Figure 5 shows the chassis wiring while Figure 6 shows the loudspeaker wiring.

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To properly align this receiver, the following equipment must be used. This is a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool, a tuning wand, and a "dummy" Radiotron RCA-76. These parts, which are shown in Figure 8, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments. The "dummy" Radiotron, RCA-76, is obtained by removing one heater prong from an otherwise perfect tube.

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 7. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in. The A. V. C. tube would be replaced by the "dummy" RCA-76 and the output indicator could be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has three I. F. stages, two for the signal and one for the A. V. C., only three transformers having six adjustable capacitors require adjustment. The fourth transformer is in the A. V. C. circuit and is broadly tuned, not requiring adjustments. The transformers are all peaked, being tuned to 460 K. C.

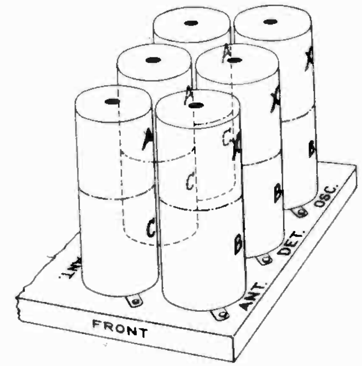

Figure 7—Location of Various Coils in Shields

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker. Replace the A. V. C. tube in the receiver with the "dummy" RCA-76.

(b) Place the oscillator in operation at 460 K. C.; place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn both the volume and sensitivity controls to their maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 9. Adjust each trimmer of the I. F. tuning capacitors until a maximum output is obtained. Go over the adjustments a second time.

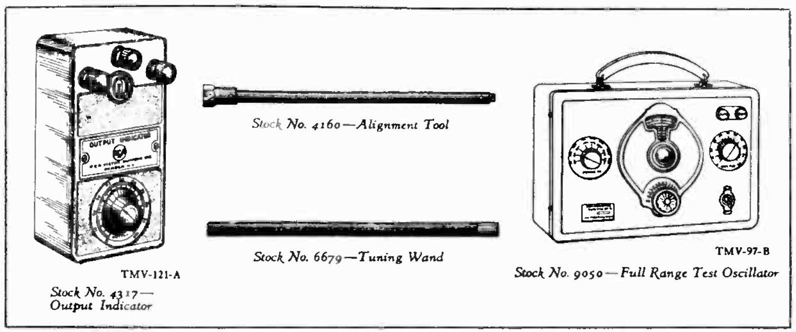

Figure 8—Equipment Required for Aligning Receiver

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This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and Oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "X" and "A." Three are required in bands "B" and "C" while none are required in band "D." Band "D" uses the second harmonic of the oscillator while the detector and R. F. coils do not have trimmers.

To properly align the various bands, each band must be aligned individually in the order given. This is "X," "A," "B," "C," and "D." The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver. The output indicator must be connected across the voice coil of the loudspeaker while the "dummy" RCA-76 must be placed in the A. V. C. socket. The sensitivity and volume controls must be at their maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The Dial Pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64" of the horizontal line at the highest frequency end of band "A."

Figure 9 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "X"

(a) The oscillator series capacitor, marked 175 K. C., Figure 9, is first tightened to near its maximum capacity position (screwed "in").

(b) Tune the external oscillator to 410 K. C., set the pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer marked 175 K. C. on Figure 9, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (b).

Band "A"

(a) The oscillator series capacitor, marked 600 K. C., Figure 9, should be set at about the center of its range.

(b) Tune the external oscillator to 1720 K. C., set the pointer at 1720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator to 600 K. C. Tune in the 600 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 600 K. C. on Figure 9, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 K. C. as described in (b).

Band "B"

(a) The detector and antenna trimmers should first be tightened to approximately ¾ maximum capacity (turned ¾ in).

(b) Tune the external oscillator to 5160 K. C., and set the pointer at 5160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4240 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "C"

(a) The detector and antenna trimmers should first be tightened to approximately ¾ maximum capacity (turned ¾ in).

(b) Tune the external oscillator to 18,000 K. C., and set the pointer at 18 M. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "D"

No adjustments are required for Band D.

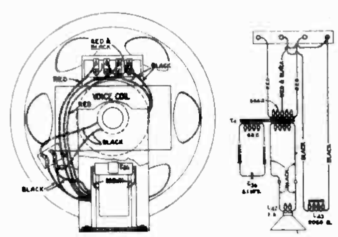


Figure 6—Loudspeaker Wiring

(4) MAGNETIC PICKUP CONNECTIONS

A Terminal Board is provided at the rear of the chassis for adding phonograph facilities to this instrument. In general, it is best to operate the phonograph with its volume control at its maximum output position and use the radio receiver volume control for adjusting volume. The radio volume control is compensated and will result in much better tone quality at low volume than will be obtained if it is operated open and the volume adjusted from the pickup volume control. Figure 11 shows the various types of connections that will be required for the different turntable assemblies.

(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made.

RADIOTRON SOCKET VOLTAGES

Maximum Sensitivity—No Signal—120-Volt A. C. Input

Radiotron No.		Cathode to Ground, Volts	Screen Grid to Ground, Volts	Plate to Ground, Volts	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		2.3	100	231	8.8	6.3
RCA-6A7	Osc.	3.0	—	232	10.9	6.3
	Det.		100	238		
RCA-6D6—1st I. F.		7.0	100	236	3.5	6.3
RCA-6D6—2nd I. F.		7.0	100	236	3.5	6.3
RCA-6D6—A. V. C.-I. F.		6.0	100	236	4.0	6.3
RCA-76—A. V. C.		4.7	—	0	0	6.3
RCA-85—2nd Det.		0	—	60	7.2	6.3
RCA-76—A. F.		11.0	—	235	5.5	6.3
RCA-76—A. F.		11.0	—	235	5.5	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-5Z3—Rectifier		—	—	768/384 RMS	104.0	5.0

Power Transformer connected to 120-volt Tap.

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4372	Bracket—Low frequency tone or volume control mounting bracket	$0.20
4406	Bracket—High frequency tone control mounting bracket	.25
2747	Cap—Contact cap—Package of 5	.50
4407	Capacitor—30 mmfd. (C64)	.25
4405	Capacitor—80 mmfd. (C52)—Package of 5	.85
4376	Capacitor—250 mmfd.—Located on second intermediate frequency transformer (C39, C46)—Package of 5	.80
4404	Capacitor—500 mmfd. (C33, C53)—Package of 5	.85
4409	Capacitor—1120 mmfd. (C54)	.35
4070	Capacitor—.004 mfd. (C66)	.42
3643	Capacitor—.005 mfd. (C62, C63)	.25
6512	Capacitor—.005 mfd. (C65)	.28
3787	Capacitor—.01 mfd. (C61)	.30
3888	Capacitor—.05 mfd. (C36, C44, C48)	.25
3765	Capacitor—.025 mfd. (C42, C58)	.34
4645	Capacitor—.1 mfd. (C32, C41, C43, C51)	.25
3877	Capacitor—.1 mfd. (C37, C38, C47)	.32
3702	Capacitor—.25 mfd. (C57)	.42
7790	Capacitor—10 mfd. (C67)	1.05
7788	Capacitor—18 mfd. (C68)	1.10
7787	Capacitor pack—Comprising one .15 mfd. and one .5 mfd. capacitors (C59, C60)	1.10
7789	Capacitor pack—Comprising one 4, one 8 and one 10. mfd. capacitors (C55, C69, C70)	2.68
4358	Clamp—Electrolytic capacitor clamp	.15
7806	Coil—Second detector plate choke coil (L38)	.30
4371	Cover—Fuse mount cover	.15
4359	Cover—Terminal board cover	.15
10907	Fuse—3-ampere—Package of 5	.40
3376	Mount—Fuse mount 105-125-volt instrument	.40
7784	Reactor—Tone control reactor (L39)	1.30
7483	Reactor—Volume control compensating reactor (L40)	.68
6135	Resistor—270 ohms—Carbon type—¼ watt (R3, R7, R14, R20)—Package of 5	1.00
4240	Resistor—700 ohms—Carbon type—¼ watt (R30)—Package of 5	1.00
4375	Resistor—800 ohms—Carbon type—¼ watt (R29)—Package of 10	2.00
6247	Resistor—850 ohms—Carbon type—¼ watt (R21)—Package of 5	1.00
4370	Resistor—1,000 ohms—Carbon type—¼ watt (R9, R10, R15, R16, R22, R35)—Package of 10	$2.00
4687	Resistor—1,000 ohms—Carbon type—¼ watt (R13)—Package of 10	2.00
3110	Resistor—25,000 ohms—Carbon type—¼ watt (R37)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R32)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R11, R17)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt—Located on third I. F. transformer (R23)—Package of 5	1.00
4368	Resistor—400,000 ohms—Carbon type—¼ watt (R18, R19)—Package of 10	2.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R24, R33)—Package of 5	1.00
3413	Resistor—5,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R36)	.22
5817	Resistor—20,000 ohms—Carbon type—3 watt (R25)	.25
6997	Resistor—Total resistance 14,470 ohms with 160-60-350-7150 and 6750 ohm sections (R38, R39, R40, R41, R42)	.95
7804	Rheostat—Noise suppressor rheostat (R4)	1.30
4453	Shield—First I. F., AVC—I. F. or second I. F. Radiotron shield	.32
3683	Shield—Radiotron shield top	.20
4452	Shield—Second detector or AVC Radiotron shield	.35
7800	Shield—Shield for intermediate frequency coils	.45
3859	Socket—4-contact rectifier Radiotron socket	.30
7484	Socket—5-contact AVC Radiotron socket	.35
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact driver Radiotron socket	.40
7796	Switch—Operating switch (S13)	.62
7795	Tone control—Low frequency (R27)	1.30
7797	Tone control—High frequency (R34)	1.35
7794	Transformer—AVC intermediate frequency transformer (L34, L35)	.82
7785	Transformer—Driver transformer (T3)	2.40
7791	Transformer—First intermediate frequency transformer (L29, L30, L31, C33, C34, C35)	2.35
9505	Transformer—Power transformer 105-125-volt, 50-60 cycle (T1)	6.35
9506	Transformer—Power transformer 105-125 volts, 25-40 cycles	8.90
7792	Transformer—Second intermediate frequency transformer (L32, L33, C39, C40, C45, C46)	2.22

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
7793	Transformer—Third intermediate frequency transformer (L36, L37, C49, C50, C52, R23)	$2.50
7786	Transformer pack—Comprising one reactor and interstage transformer (L41, T2)	4.25
7798	Volume control (R31)	2.05
	R. F. UNIT ASSEMBLIES	
4646	Capacitor—4.5 mmfd. (C10)	.20
4416	Capacitor—50 mmfd. (C19)—Package of 5	1.25
3981	Capacitor—300 mmfd. (C8)	.30
4413	Capacitor—360 mmfd. (C28)	.22
4412	Capacitor—1120 mmfd. (C25)	.25
4524	Capacitor—2850 mmfd. (C23)	.35
4615	Capacitor—2850 mmfd. (C20)	.34
4417	Capacitor—0.05 mfd. (C5, C15)	.25
4415	Capacitor—0.1 mfd. (C7, C16)	.30
4545	Capacitor—0.1 mfd. (C9, C31)	.36
3851	Capacitor—Adjustable capacitor (C27, C30)	.78
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4410	Coil—Antenna coil—Band "D" (L1, L2)	.70
7803	Coil—Antenna coil—"B"—"SW" (L3, L4, L7, L8, C1, C3)	1.82
7810	Coil—Antenna coil—"PB"—"LW" (L5, L6, L9, L10, C2, C4)	2.10
7805	Coil—Detector coil—"B-SW" (L13, L14, L17, L18, C11, C13)	2.15
7808	Coil—Detector coil—"PB-LW" (L15, L16, L19, L20, C12, C14)	2.05
4421	Coil—Detector coil—Band "D" (L11, L12)	.70
7807	Coil—Oscillator coil—"B-SW" (L21, L22, L25, L26, C22, C26)	1.62
7809	Coil—Oscillator coil—"PB-LW" (L23, L24, L27, L28, C24, C29)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C17, C21)	4.42
4419	Lead—Shield single-conductor antenna lead	.45
4370	Resistor—1,000 ohms—Carbon type—¼ watt (R5)—Package of 10	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R12)—Package of 5	1.00
4418	Resistor—100 ohms—Flexible type (R2, R6)—Package of 10	1.50
7800	Shield—Antenna, detector or oscillator coil shield	.45
4452	Shield—First detector oscillator coil shield	.35
3683	Shield—Radiotron shield top	.20
4454	Shield—R. F. amplifier Radiotron shield	.44
3529	Socket—Dial lamp socket	.32
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4585	Strip—Terminal strip engraved "ANT-GND"	.20
7802	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12)	4.05
	CABLE ASSEMBLIES	
7815	Cable—Audio cable	$0.62
7813	Cable—From L. F. tone control, volume control to resistor boards	.72
7812	Cable—Main cable	1.30
7814	Cable—Reproducer cable—4-conductor	.45
	REPRODUCER ASSEMBLIES	
4193	Board—Terminal board	.32
9509	Coil—Field coil, magnet and cone support (L43)	11.46
7000	Cone—Reproducer cone (L42)—Package of 5	9.45
9508	Reproducer complete	17.40
6999	Screen—Dust screen—Package of 6	.12
4506	Transformer—Output transformer and capacitor (T4, C56)	2.85
	MISCELLANEOUS ASSEMBLIES	
4677	Bezel—Metal bezel (escutcheon) for station selector dial	.56
6614	Glass—Station selector dial glass	.30
4425	Knob—Station selector knob—Package of 5	.75
3829	Knob—Volume control, tone control, noise suppressor or range switch knob—Package of 5	1.10
4340	Lamp—Dial lamp—Package of 5	.60
4678	Ring—Station selector dial glass retaining ring—Package of 5	.34
4119	Screw—8-32-¼" headless set screw for knob—Stock Number 4425—Package of 20	.38
4393	Screw—8-32-⅜" headless set screw for knob—Stock Number 3829—Package of 10	.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled	.88
4455	Dial—Station selector dial	.60
7799	Drive—Variable tuning condenser drive assembly complete	2.45
4364	Gear—Spring gear assembly complete with hub pinion, gear cover and spring	.96
4361	Indicator—Band indicator—Celluloid-lettered D-C-B-A-X	.12
4363	Pointer—Station selector main pointer—Large	.18
4367	Pointer—Station selector vernier pointer—Small	.15
3993	Screw—No. 6-32-⅛" square head set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4360	Stem—Pointer stem assembly	.35
4378	Stud—Band indicator operating arm stud—Package of 5	.25

MODEL 301
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.

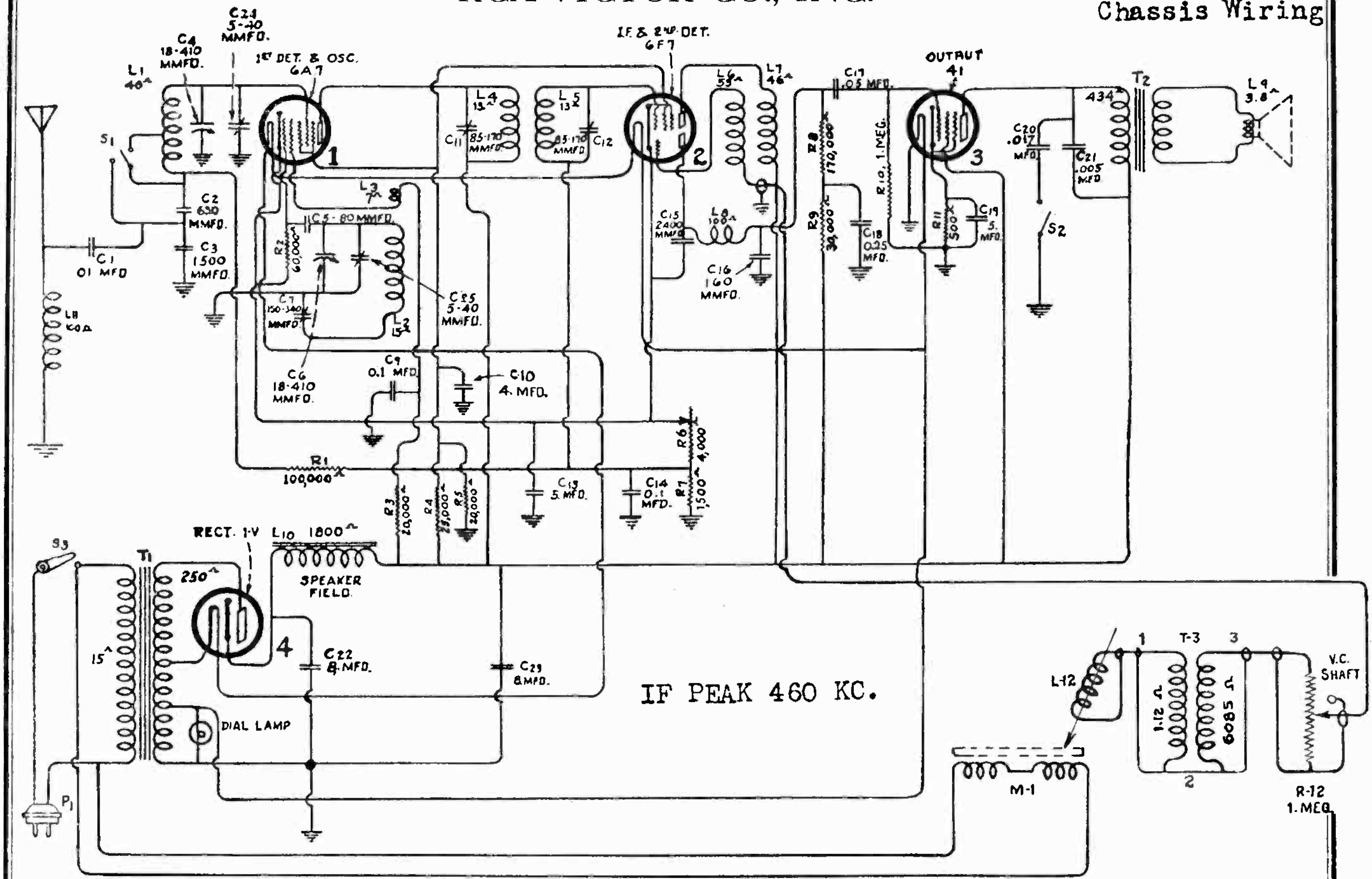
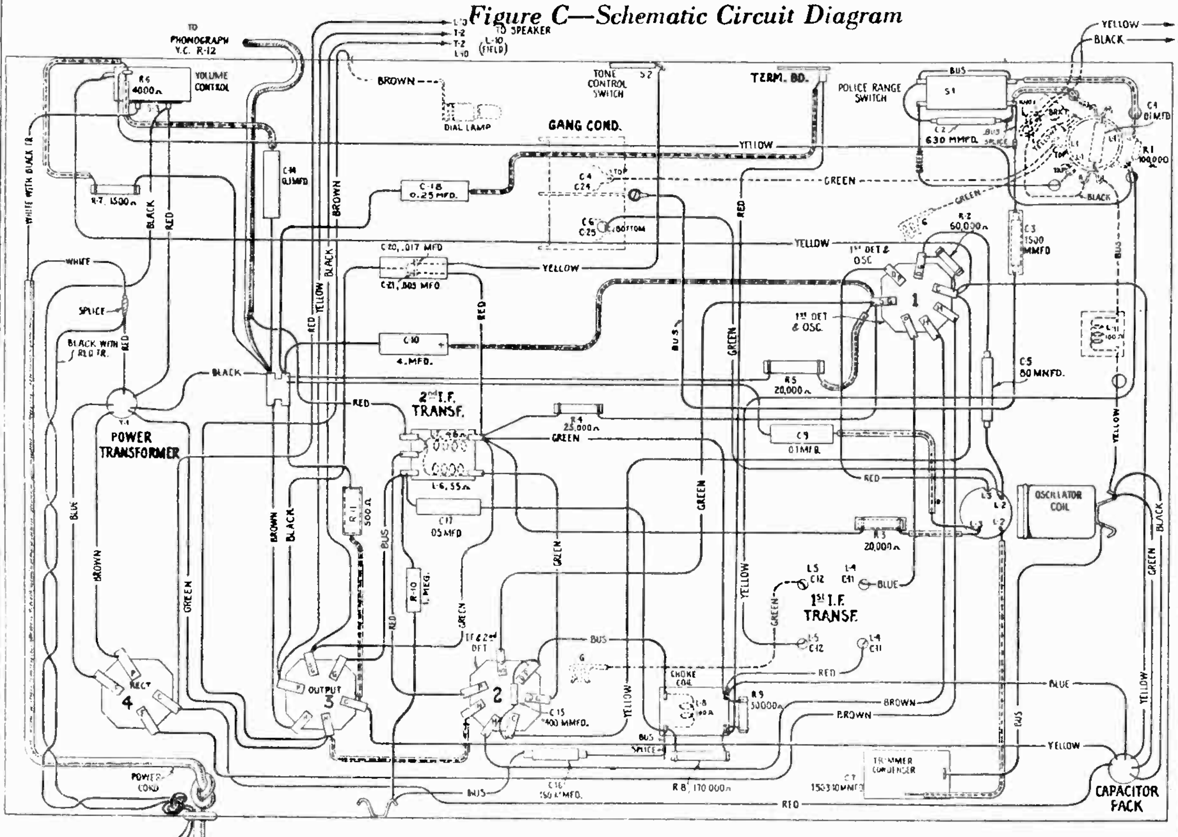
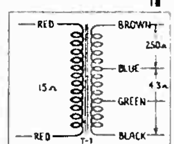
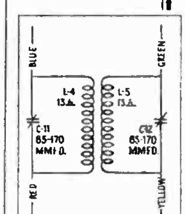


Figure C—Schematic Circuit Diagram





INTERNAL CONNECTIONS OF POWER TRANSFORMER



INTERNAL CONNECTIONS OF 1ST I.F. TRANSFORMER

INTERNAL CONNECTIONS OF CAPACITOR PACK

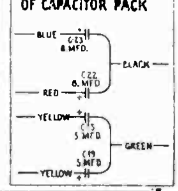


Figure D—Wiring Diagram

MODEL 301
Voltage, Alignment
Pickup Data

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating..105–125 Volts
Frequency Rating...............................25, 50 and 60 Cycles
Power Consumption...45 Watts
Number and Types of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-41, 1 RCA-1-V
Undistorted Output...1.9 Watts
Frequency Range.................540–1500 K. C. and 1600–3500 K. C.

This table type combination instrument consists of a four tube superheterodyne chassis and a new compactly constructed motor board assembly. The receiver incorporates features such as wide tuning range, electrodynamic loudspeaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the super-heterodyne.

The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F. frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-41.

The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

Figure A shows the pickup details, Figure B the assembly wiring, Figure C the schematic circuit and Figure D the wiring diagram and Figure E the loudspeaker wiring.

RADIOTRON SOCKET VOLTAGES

120 Volt, 60 Cycle Line—Maximum Volume Control Setting—No Signal

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts D. C.	Cathode to Plate, Volts D.C.	Plate Current, M.A.	Heater or Filament, Volts
RCA-6A7	First Detector	1.25	70	235	2.5	6.3
	Oscillator	—	—	180	3.5	
RCA-6F7	I. F.	1.25	70	235	5.5	6.3
	Second Det.	19	—	145*	0.4	
RCA-41	Output	17	240	230	26.5	6.3
RCA-1-V	Rectifier	—	—	335 RMS	50	6.3

* Actual voltage cannot be measured with ordinary voltmeter.

Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

Pickup Service Data

The magnetic pickup and tone-arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature, replacing the rubber pivots and replacing the magnet coil.

Disassembling the Pickup

The pickup may be disassembled in the following manner:

(a) Unsolder the two cable connections to the terminal strip.

(b) Remove the needle screw and screws "A" and "B."

(c) Remove the pickup assembly from the arm and housing.

(d) Unsolder the two magnet coil leads attached to the terminals and then remove screw E. This will allow the removal of the fibre terminal board.

(e) If centering the pickup armature is the only adjustment required, such centering can be done without removing the fibre terminal board indicated in (d). The armature is centered by loosening screw F, accessible through the hole shown, and holding the armature with the finger in proper position while screw F is tightened. "Feeling" the armature while deflecting it between its two extremes is the best manner of ascertaining proper centering. When centering, after work has been done or the magnet removed, it is important that the magnet be remagnetized while in place.

(f) If the coil or pivot rubbers are to be replaced, the pickup must be further disassembled. This is done by removing the magnet and then removing screws C and D. The pole piece may now be removed and the old coil and sleeve disassembled. Acetone will be found helpful for dissolving the old cement that holds the coil in place. The new coil, with its sleeve, may now be replaced and cemented in a similar position to that occupied by the old coil. Duco household or Ambroid cement may be used to hold the coil in place. Be careful to center the coil with its paper sleeve before cementing.

(g) The pivot rubbers are replaced by loosening the armature adjusting screw F and removing the armature from its bracket. The rubbers can then be removed by slipping them from each end of the pivot shaft.

It is important to remember that in all operations after reassembling but before placing in the tone arm, the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.

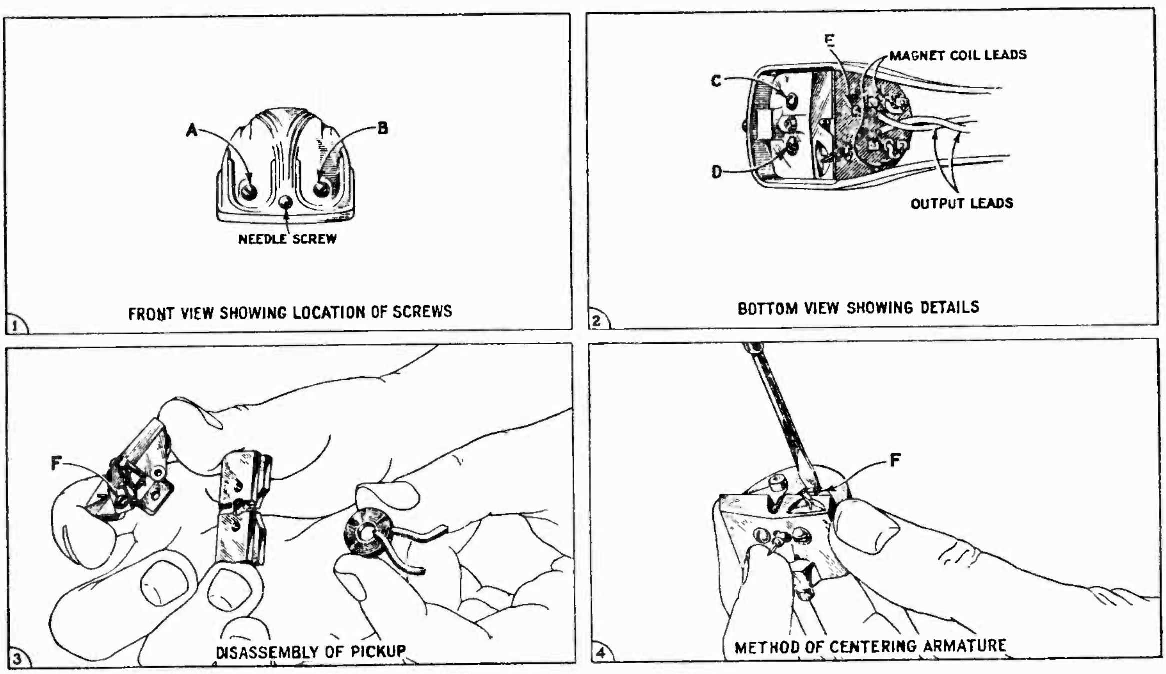


Figure A—Pickup Details

RCA-VICTOR CO., INC.

PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is of simple design and foolproof construction. Among its many features are low power consumption, single moving part, ease of starting, oilless main bearing, resilient bumper, and long life with freedom from service repairs.

Figure E shows the main parts of the motor and the points that may require attention.

Operation—The two stator coils are connected in series and the motor is started by giving it a clockwise spin with the hand. If it is found to be difficult of starting, or if it runs at a sub-synchronous speed such as at 70 R. P. M., such action may result from one of the following causes:

Difficult to Start—This may be due to the stator failing to rotate on the outer bearing. This can be caused by the spaghetti sleeve being jammed in the slot, or sticking to the resilient bumper. The outer bearing not being properly lubricated may also cause this condition. It is important that the ball bearing be at the bottom of the main bearing assembly.

Slow Speed—If the turntable is jarred or slowed down, the motor may run at a sub-synchronous speed, such as 70 R. P. M. This is remedied by merely lifting the tone arm from the turntable, thereby removing the load. The turntable speed will then immediately increase to normal.

Excessive Vibration and Hum—A small amount of hum when starting decreasing to a negligible amount while running is normal. If excessive vibration occurs either at starting or running, it may be due to one of the following:

(1) Insufficient lubricant in outer bearing or any other failure that will cause the stator to bind.

(2) The metal washer should be above the leather washer at the bottom of the main bearing.

(3) Motor not properly supported from motor board. Unless the motor is properly supported from the motor board, normal vibration will be excessive.

Removing Rotor from Stator—The rotor which includes the turntable may be removed by loosening the screw shown in Figure E until it clears the rotor and then lifting the turntable. Be careful not to lose the ball end-bearing when this is removed. After replacing the rotor, tighten the restraining screw securely to eliminate the possibility of rattle in operation.

Power Consumption—The motor consumes 4 watts. It should never be turned on when the rotor is removed, as in this condition excessive current will be drawn with consequent increase in temperature.

NOTE: The above values of power consumption are average for a 60 cycle motor at 125 volts. At lower voltages the power consumption will be less.

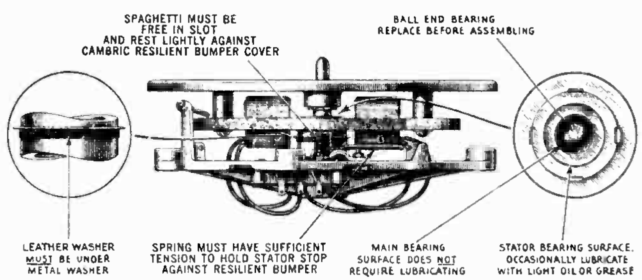


Figure E—Details of Motor

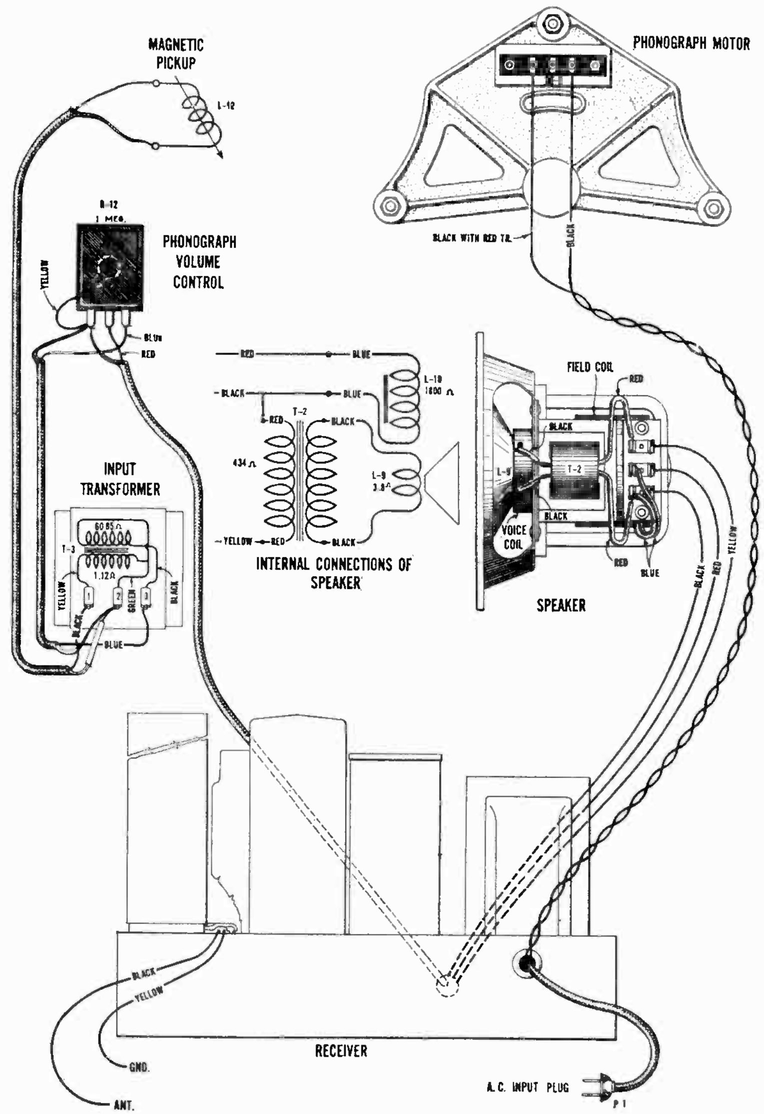


Figure B—Assembly Wiring

MODEL 301
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
3047	Resistor—1500 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R10)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3077	Resistor—30,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C5)	.44
3597	Capacitor—0.25 mfd. (C18)	.40
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3641	Capacitor—0.1 mfd. (C9)	.35
3682	Shield—Radiotron shield	.22
3701	Capacitor—0.01 mfd. (C1)	.30
3713	Capacitor—0.05 mfd. (C17)	.32
3857	Coil—Detector choke coil (L8)	.90
3858	Socket—Dial lamp socket and bracket	.26
3859	Socket—4-contact Radiotron socket	.30
3862	Screw—Chassis mounting screw and washer—Package of 4	.24
3865	Capacitor—160 mmfd. (C16)	.30
3869	Resistor—170,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3873	Capacitor—1500 mmfd. (C3)	.30
3877	Capacitor—0.1 mfd. (C14)	.32
3886	Reflector—Dial light reflector	.30
3887	Scale—Dial scale—Package of 5	.60
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4)	.25
3917	Capacitor—0.25 mfd. (C18)	.40
3932	Capacitor—2400 mmfd. (C15)	.30
3933	Capacitor—630 mmfd. (C2)	.32
4000	Capacitor—Adjustable capacitor (C7)	.78
4018	Coil—Choke coil (L11)	.90
6676	Socket—6-contact socket	.40
6787	Capacitor—Comprising one .005 mfd. and one .017 mfd. capacitors (C20, C21)	.30
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5	1.10
6660	Condenser—2-gang variable condenser (C4, C6, C24, C25)	2.78
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23)	2.70
6662	Transformer—First intermediate frequency transformer (L4, L5, C11, C12)	2.34
6663	Transformer—Second intermediate frequency transformer (L6, L7)	1.06
6664	Coil—Oscillator coil (L2, L3)	.94
6665	Shield—Oscillator coil shield and mounting bracket	.34
6666	Coil—Antenna coil (L1, C1, R1)	1.08
6667	Volume control (R6, S3)	1.58
6668	Switch—Range switch (S1)	.58
6669	Switch—Tone control switch (S2)	$0.50
6832	Capacitor—4.0 mfd. (C10)	.86
9464	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	3.20
9465	Transformer—Power transformer—105-125 volts—25-40 cycles	4.38
	REPRODUCER ASSEMBLIES	
6788	Transformer—Output transformer (T2)	1.60
8987	Cone—Reproducer cone complete (L9)—Package of 5	5.00
9437	Coil assembly—Comprising field coil, magnet and cone support (L10)	2.72
9467	Reproducer complete	5.15
	TURNTABLE AND MOTOR ASSEMBLIES	
3808	Board—Motor terminal board	.20
4052	Spring—Package of 5	.40
3813	Motor suspension assembly—Comprising one screw, one metal bushing, two rubber bushings, one flat washer, one lockwasher and one nut—3 sets	.56
4083	Washer—Leather washer—Package of 10	.20
4084	Washer—Metal washer—Package of 10	.26
7651	Coil—Stator coil—60 cycle operation	.48
7652	Coil—Stator coil—50 cycle operation	.48
7653	Lamination—Stator laminations—Assembled—60 cycle operation—110 or 220 volts	.66
7654	Lamination—Stator laminations—Assembled—50 cycle operation	.66
7655	Lamination—Rotor lamination assembly—60 cycle operation	1.00
7656	Lamination—Rotor lamination assembly—50 cycle operation	1.00
7657	Base—Motor base and bearing assembly	1.20
7714	Lamination—Rotor laminations—Assembled—60 cycles—220 volts	1.76
7715	Coil—Stator coil—60 cycles—220 volts	.68
9038	Motor complete—105-125 volts—60 cycles	4.20
9039	Motor complete—105-125 volts—50 cycles	4.20
9040	Turntable complete—With spindle for 50 or 60 cycle operation	1.16
10194	Ball—Steel ball bearing—Package of 20	.25
	PICKUP AND ARM ASSEMBLIES	
3811	Screw—Needle holding screw—Package of 10	.46
3812	Armature	.32
6825	Pickup and arm assembly complete	4.82
6826	Coil—Pickup coil (L12)	.64
	MISCELLANEOUS PARTS	
3961	Knob—Phonograph volume control knob—Package of 5	.60
4075	Knob—Range switch or volume control knob—Package of 5	1.00
4086	Knob—Tone control switch knob—Package of 5	1.00
4087	Screw and washer—Chassis mounting screw and washer assembly—Package of 4	.20
6827	Volume control—Phonograph volume control (R12)	1.46
6828	Transformer—Phonograph input transformer (T3)	2.60

RCA-VICTOR CO., INC.

Electrical Specifications

Voltage Rating .... 105-125 Volts
Frequency Rating .... 25, 50 and 60 Cycles
Power Consumption .... 50 and 60 Cycle, 100 Watts; 25 Cycle 105 Watts
Number and Type of Radiotrons 2 RCA-58
1 RCA-2A7 1 RCA-2B7 1 RCA-2A5 1 RCA-80—Total 6.
Tuning Ranges .... 540 K. C.-1500 K. C.—5400 K. C.-15,350 K. C.
Undistorted Output .... 1.75 Watts

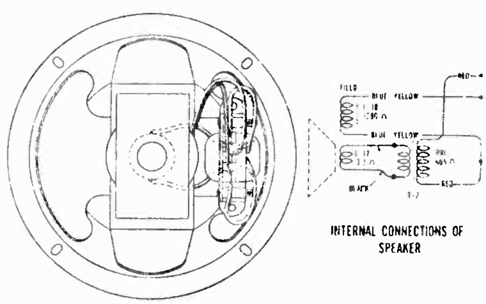


Figure D—Loudspeaker Wiring

This "Selective Short-Wave" combination instrument utilizes the new six tube double band superheterodyne together with the standard two-speed motor board assembly. Excellent quality of record reproduction together with unusual radio performance characterize this instrument.

The receiver is a six-tube two-band A. C. operated Superheterodyne receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two position switch. Other features include a double reduction vernier tuning drive using two concentric knobs giving a 10-1 and a 55-1 ratio of speed reduction, a continuously variable tone control, six-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the assembly wiring and Figure D the loudspeaker wiring. Service data on the magnetic pickup is given on one of the following pages.

Line-Up Capacitor Adjustments

In order to properly align this receiver it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid, and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor accessible from the rear of the chassis should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as SW in Figure D for a peak, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two peaks. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

Power Transformer Connections

The power transformer used in this model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

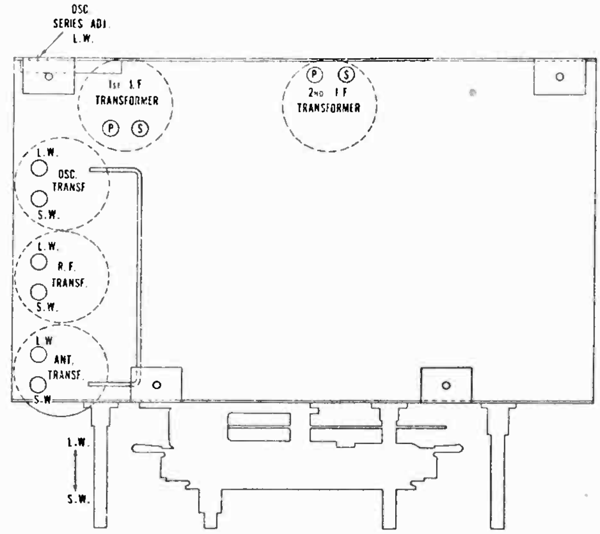


Figure E—Location of Line-Up Capacitors

TUBE SOCKET VOLTAGES (RADIO OPERATION)

115 VOLTS, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.32
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.32
3. RCA-58 I. F.	3.0	100	265	6.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.32
5. RCA-2A5 Power	16.0	255	240	35.0	2.32
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

* The voltages and current refer to the detector part of the tube.

MODEL Duo 320
Schematic

RCA-VICTOR CO., INC.

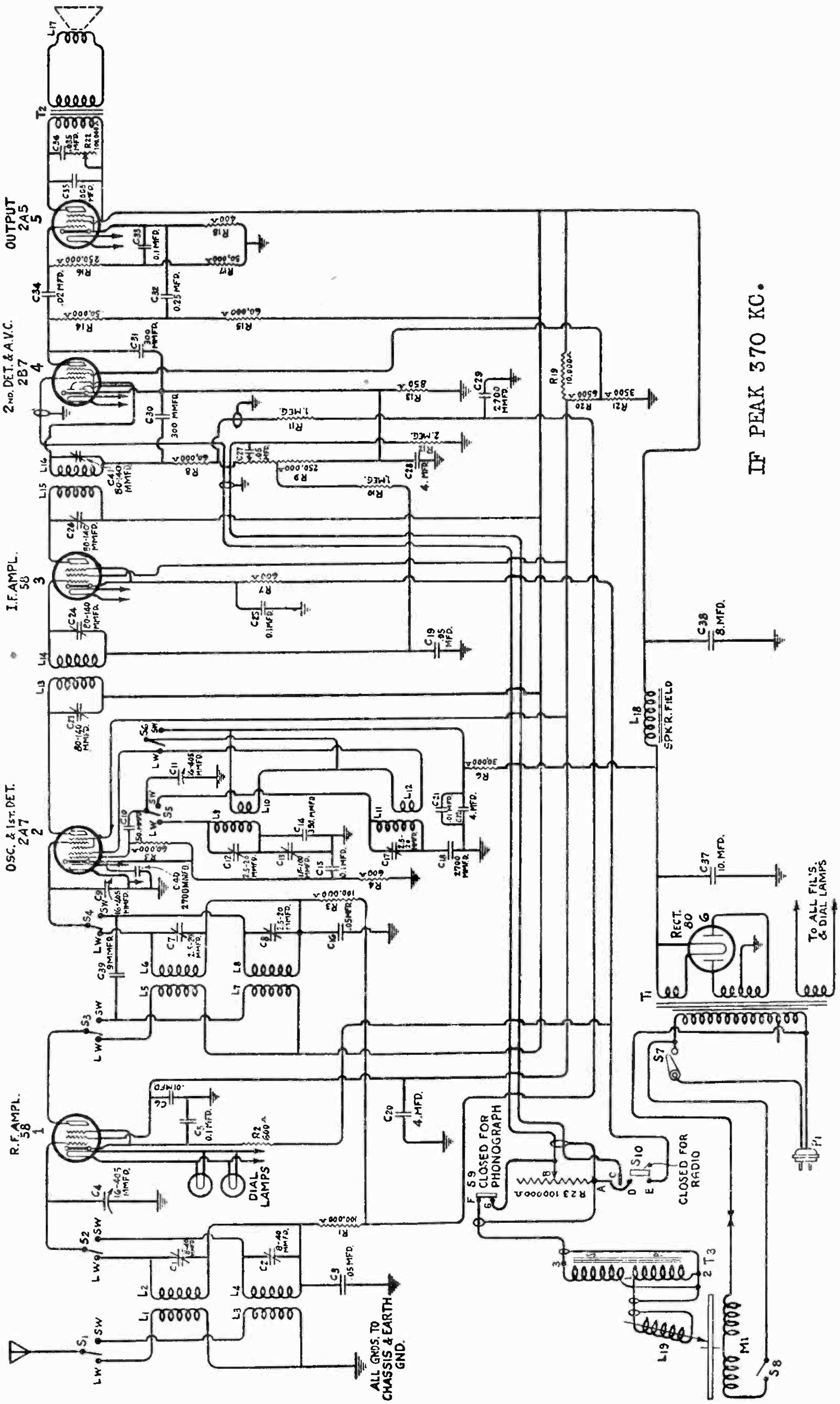


Figure A—Schematic Circuit Diagram

MODEL Duo 320
Chassis Wiring

RCA-VICTOR CO., INC.

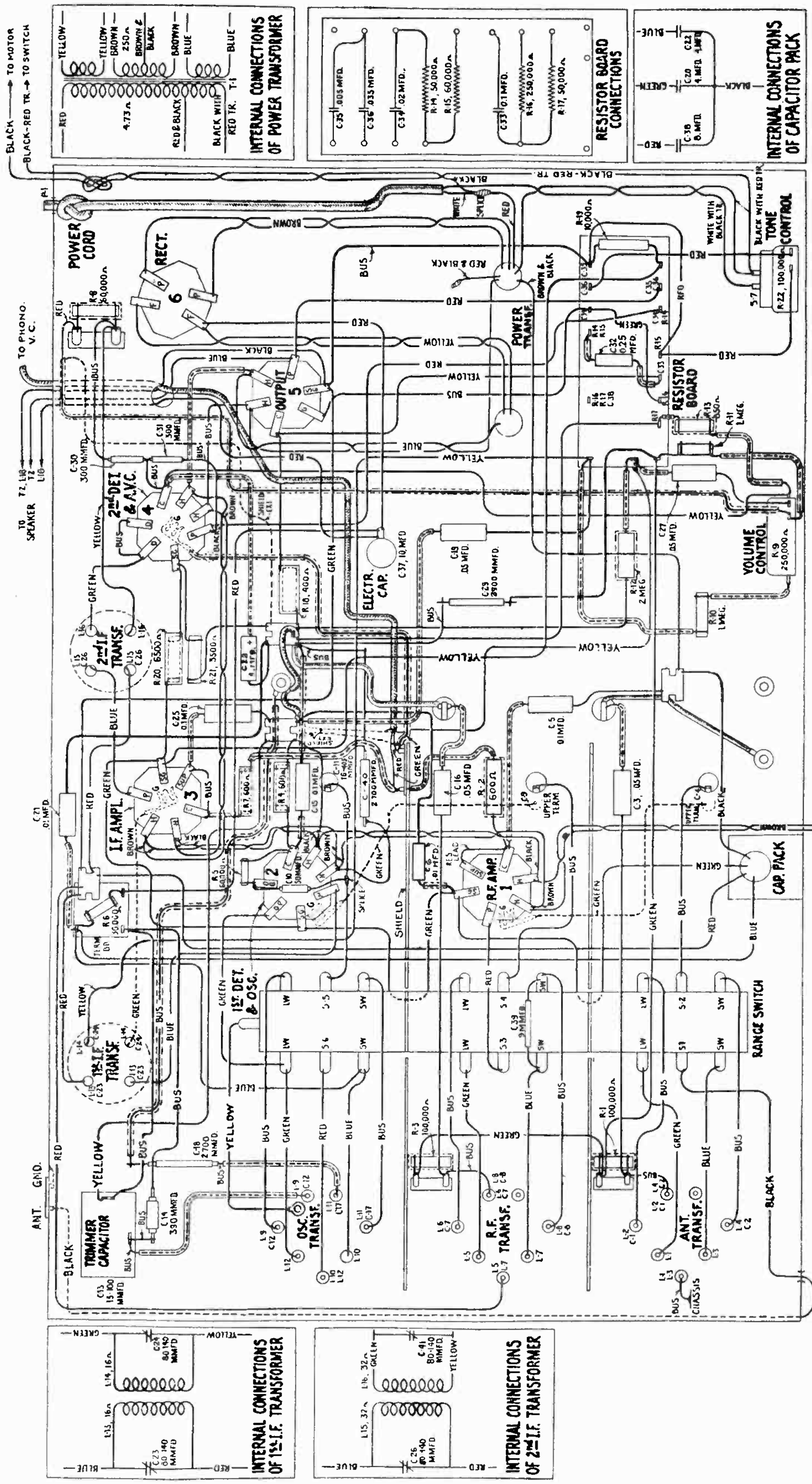


Figure B—Wiring Diagram

MODEL Duo 320
Assembly Wiring

RCA-VICTOR CO., INC.

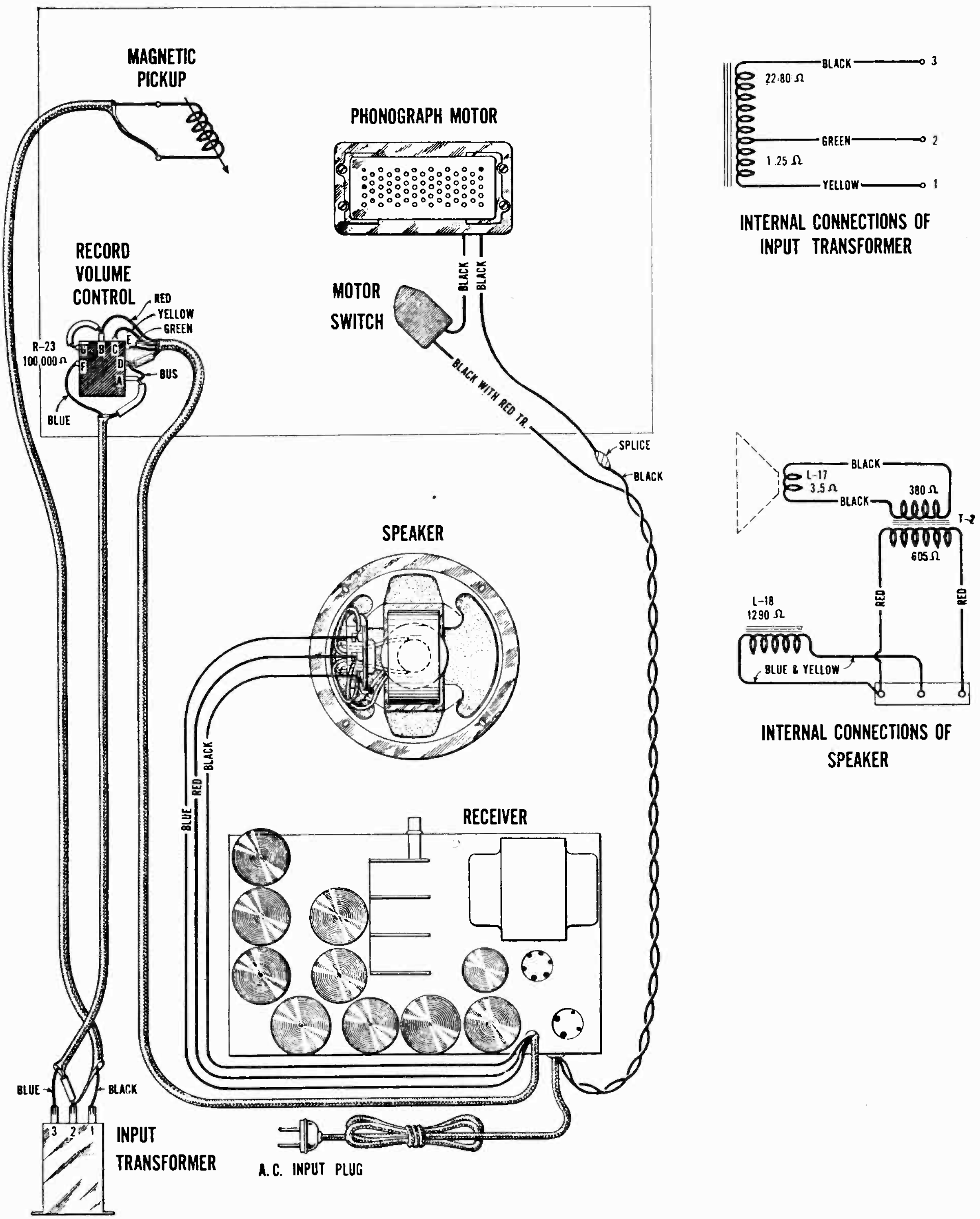


Figure C—Assembly Wiring Diagram

RCA-VICTOR CO., INC.

SERVICE DATA FOR MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure G), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

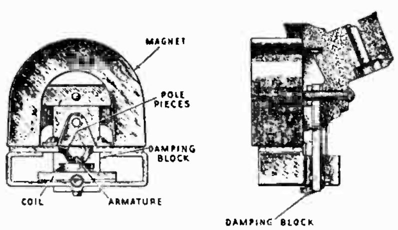


Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

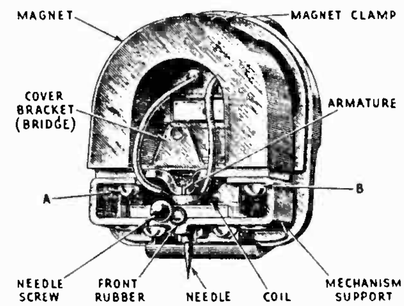


Figure G

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

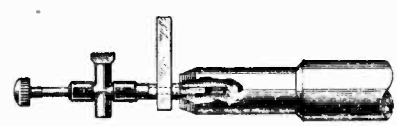


Figure H

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL Duo 320
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R6)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3056	Shield—Second detector Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)—Package of 5	1.00
3631	Resistor—850 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3639	Capacitor—0.02 mfd. (C34)	.25
3683	Shield—Radiotron shield top	.20
3701	Capacitor—0.01 mfd. (C6, C21)	.30
3702	Capacitor—0.25 mfd. (C32)	.42
3768	Screw—Square head No. 6-32-¼" set screw for condenser drive—Package of 10	.35
3796	Capacitor—4.0 mmfd. (C28)	.60
3849	Capacitor—50 mmfd. (C10)	.30
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor (C13)	.78
3877	Capacitor—0.1 mfd. (C5, C15, C25, C33)	.32
3878	Screw—No. 4-40-3/16" screw for fastening station selector pointer—Package of 20	.25
3881	Escutcheon—Volume control escutcheon	.42
3888	Capacitor—0.05 mfd. (C19, C27)	.25
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)—Package of 5	1.00
3897	Resistor—400 ohms—Carbon type—1 watt (R18)—Package of 5	1.10
3899	Escutcheon—Station selector escutcheon	.42
3901	Capacitor—0.05 mfd. (C3, C16)	.36
3902	Knob—Station selector knob complete	.44
3903	Screw—No. 8-32-3/16" headless cup point set screw for station selector knob—Package of 20	.36
3904	Knob—Volume control knob—Package of 5	.88
3905	Screw—Chassis mounting screw assembly—Comprising 4 screws, 4 washers and 4 cushions	.46
3906	Mounting assembly—Variable condenser mounting assembly—Comprising 3 bushings, 3 lockwashers, 3 nuts and 3 washers	.28
3935	Capacitor—340 mmfd. (C14)	.34
3936	Capacitor—3,900 mmfd. (C18, C29, C40)	.68
3937	Capacitor—300 mmfd. (C30, C31)	.34
3938	Capacitor—9 mmfd. (C39)	.25
3939	Resistor—3,500 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3940	Pointer—Station selector pointer—Package of 5	.50
3941	Dial—Station selector dial—Package of 5	1.75
3942	Shield—First detector Radiotron shield	.18
3943	Screen—Translucent screen for dial light—Package of 2	.18
3944	Shield—Antenna, R. F. or oscillator coil shield	.28
3991	Resistor—10,000 ohms—Porcelain type (R19)	.60
6188	Resistor—2 megohm—Carbon type—½ watt (R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)—Package of 5	1.00
6571	Capacitor—10 mmfd. (C37)	1.20
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	.50
6676	Socket—6-contact Radiotron socket—Output	.40
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	3.75
6695	Volume control (R9)	1.20
6696	Switch—Range switch (S1, S2, S3, S4)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26)	1.78
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	2.44
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	2.30
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	2.64
6702	Drive—Variable tuning condenser drive assembly complete	1.86
6703	Capacitor pack—Comprising one 8.0 mmfd. and two 4.0 mmfd. capacitors (C20, C22, C38)	2.46
6704	Shaft—Tuning condenser drive assembly shaft	.64
6705	Tone control complete (R22)	1.20
6707	Glass—Station selector dial glass	.20
6708	Ring—Retaining ring for dial glass—Package of 5	.44
6755	Bezel—Metal bezel for station selector dial	.50
7065	Screw driver—For I. F. and R. F. adjustments	.80
7485	Socket—6-contact Radiotron socket	$0.40
7487	Shield—I. F. and R. F. amplifier Radiotron shield	.25
9446	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	5.40
9451	Transformer—Power transformer—105-125 volts—25-40 cycles	5.40
10194	Ball—Steel ball for condenser drive assembly—Pkg. of 20	.25
	PICKUP, PICKUP ARM ASSEMBLIES	
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly—Comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Pkg. of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—Package of 5 sets	1.10
3419	Screw—Pickup cover mounting screw—Package of 10	.40
6335	Pickup—Pickup unit complete	4.00
6346	Back—Pickup housing back	.45
7693	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long-playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MOTOR ASSEMBLIES	
3599	Motor mounting washer assembly—Comprising one screw, one washer and one lockwasher—Package of 3 sets	.30
8989	Motor—Motor complete—105-125 volts—60 cycles	18.52
8990	Motor—Motor complete—105-125 volts—50 cycles	18.52
8991	Motor—Motor complete—105-125 volts—40 cycles	23.36
8992	Motor—Motor complete—105-125 volts—25 cycles	23.36
8993	Rotor and shaft for 105-125 volts, 60 cycles motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycles motor	4.75
8995	Rotor and shaft for 105-125 volts, 50 cycles motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycles motor	4.75
8997	Rotor and shaft for 105-125 volts, 40 cycles motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycles motor	5.50
8999	Rotor and shaft for 105-125 volts, 25 cycles motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycles motor	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws (S8)	.75
3430	Box—Needle box with lid—Package of 2	.90
3615	Knob—Tone control, range switch, or phonograph volume control knob—Package of 5	.60
3994	Cover—Motor starting switch cover	.26
6757	Volume control—Phonograph volume control (R23, S9, S10)	2.70
6758	Transformer—Phonograph input transformer (T3)	2.70
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
10174	Springs—Automatic brake springs—One set of 4 springs	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40
	REPRODUCER ASSEMBLIES	
6476	Transformer—Output transformer (T2)	1.44
9428	Cone—Reproducer cone complete (L17)—Package of 5	5.00
9449	Reproducer complete	5.20
9450	Coil—Field coil magnet and cone support (L18)	2.80

MODEL Duo 321
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating..105–125 Volts
Frequency Rating ....25, 30, 50 and 60 Cycles
Power Consumption..30, 50 and 60 Cycle, 105 Watts; 25 Cycle, 110 Watts
Number and Type of Radiotrons...........................2 RCA-58
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Tuning Ranges......540 K. C.–1500 K. C. and 5400 K. C.–15,350 K. C.
Undistorted Output......................................1.75 Watts

This "Selective Short-Wave" combination instrument utilizes the new six tube double band superheterodyne together with the standard two-speed motor board assembly. Excellent quality of record reproduction together with unusual radio performance characterize this instrument.

The receiver is a six-tube two-band A. C. operated Superheterodyne receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two position switch. Other features include a double reduction vernier tuning drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, eight-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the assembly wiring and Figure D the location of the line-up capacitors. Service data on the magnetic pickup is given on one of the following pages.

Line-Up Capacitor Adjustments

In order to properly align this receiver it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid, and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1400 K. C., the dial indicator at 1400 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor accessible from the rear of the chassis should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 15 on megacycle scale. Adjust the three trimmer capacitors designated as S.W. in Figure D for a peak, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two peaks. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

Power Transformer Connections

The power transformer used in this model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

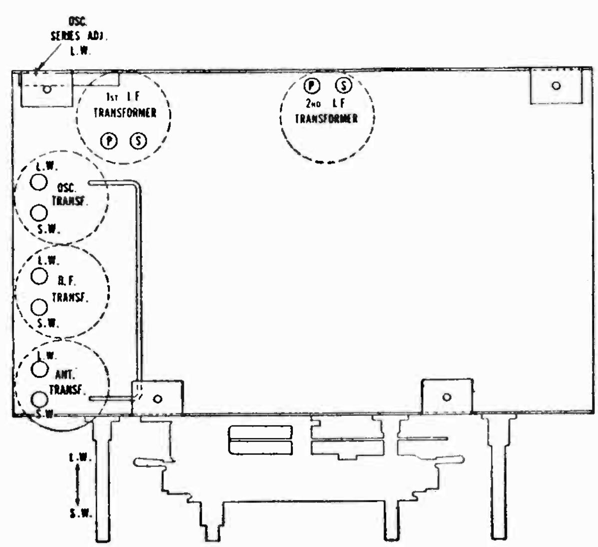


Figure D—Location of Line-Up Capacitors

TUBE SOCKET VOLTAGES (RADIO OPERATION)

115 VOLTS, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.32
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.32
3. RCA-58 I. F.	3.0	100	265	6.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.32
5. RCA-2A5 Power	16.0	255	240	35.0	2.32
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

* The voltages and current refer to the detector part of the tube.

MODEL Duo 321
Schematic

RCA-VICTOR CO., INC.

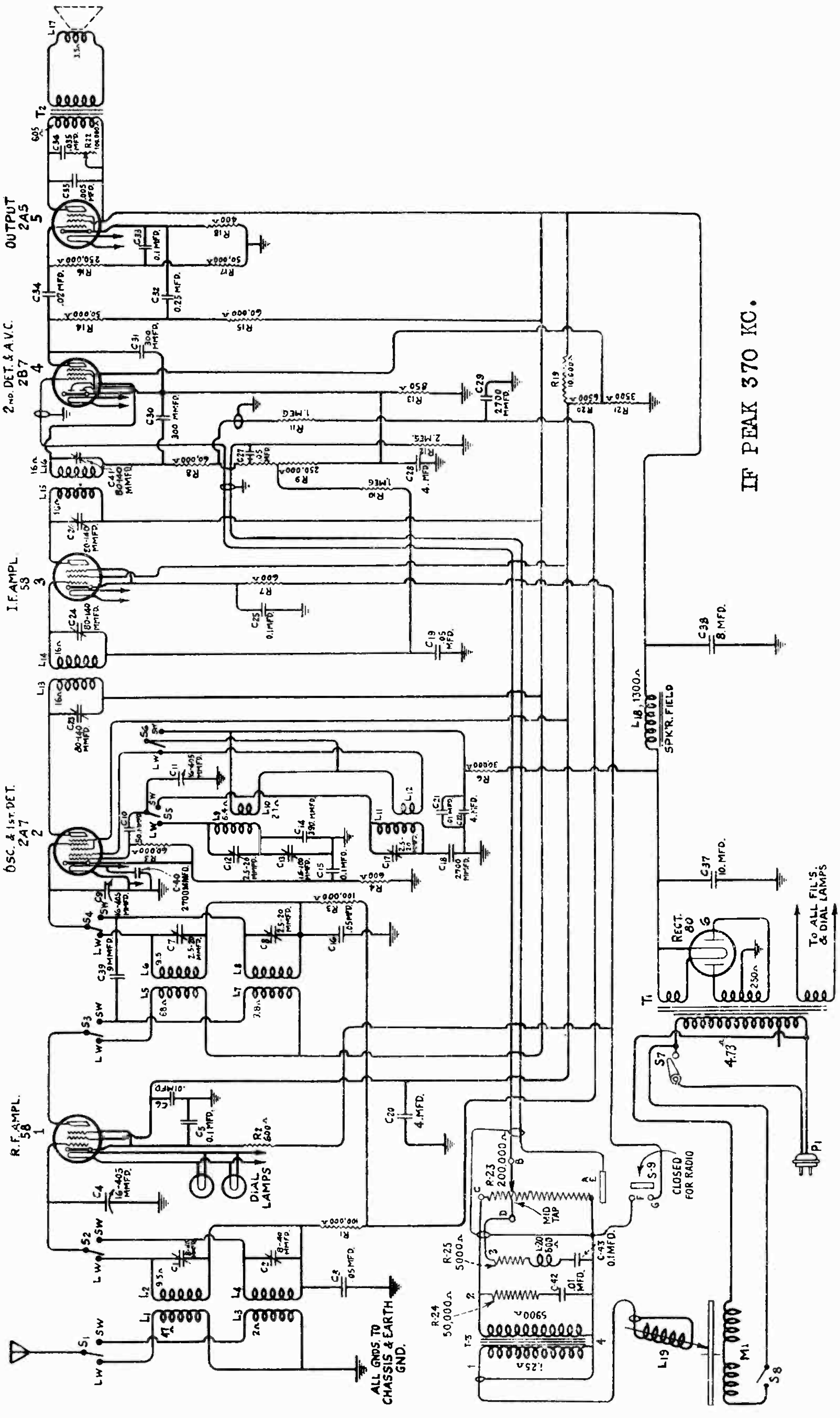


Figure A—Schematic Circuit Diagram

RCA-VICTOR CO., INC.

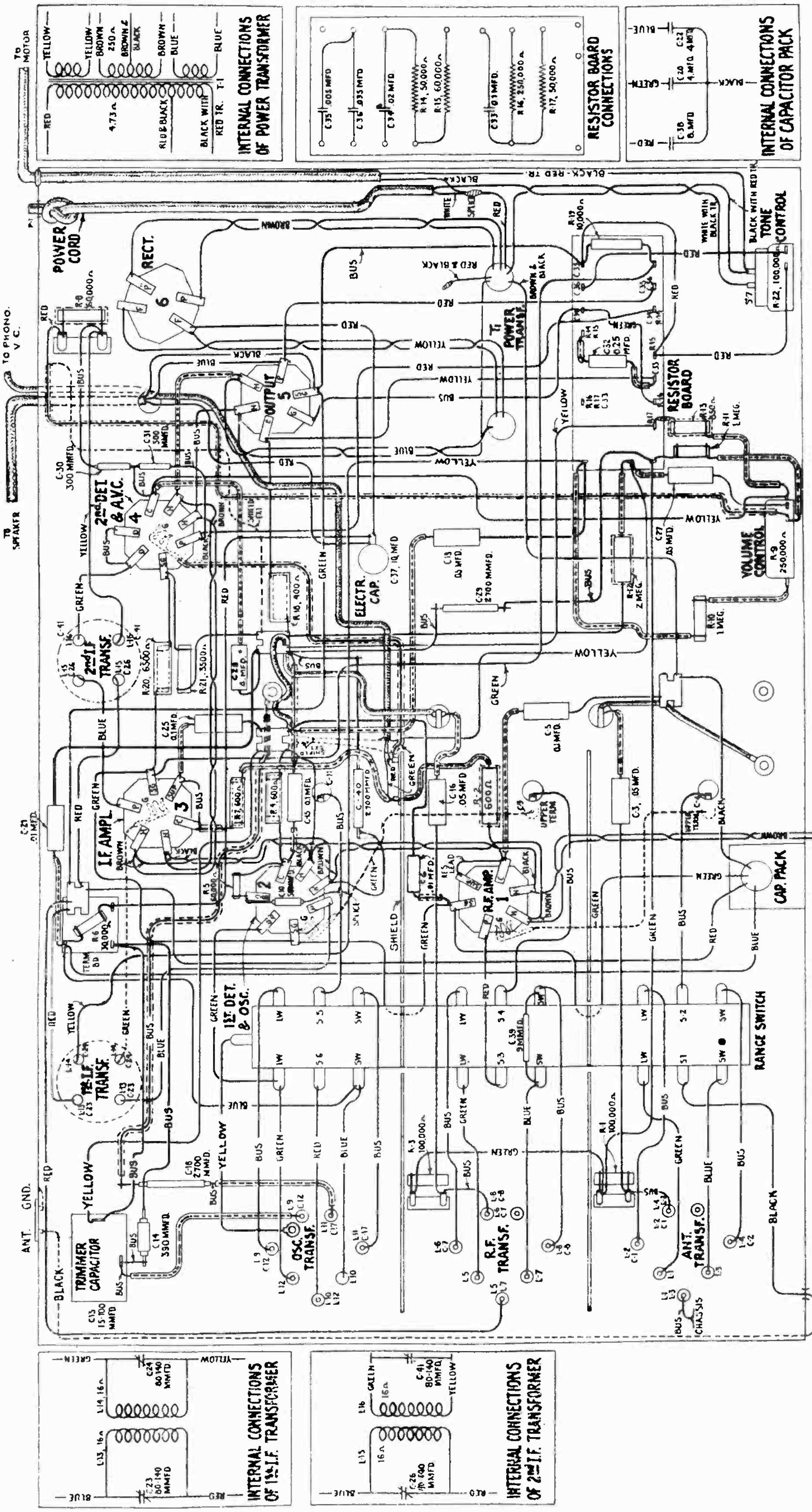


Figure B—Chassis Wiring Diagram

MODEL Duo 321
Assembly Wiring

RCA-VICTOR CO., INC.

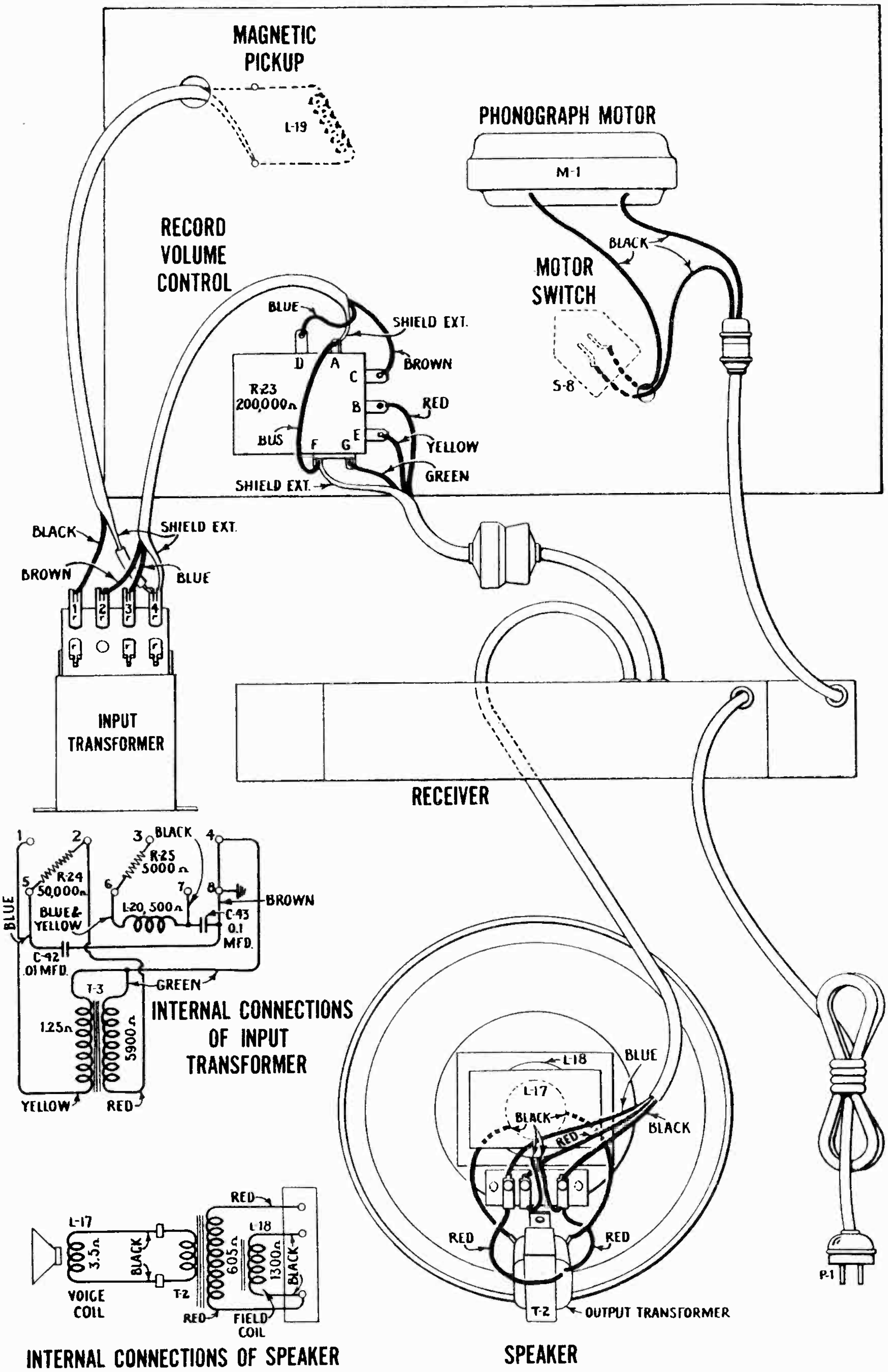


Figure C—Assembly Wiring Diagram

MODEL Duo 321
Pickup Data

RCA-VICTOR CO., INC.

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure F), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

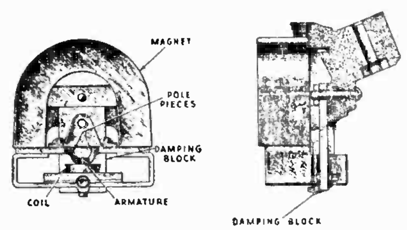


Figure E

(d) Remove screws A and B, Figure F, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure F), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

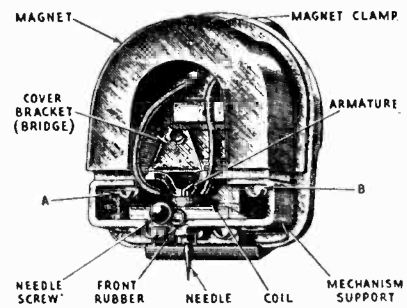


Figure F

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure G, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

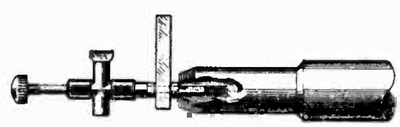


Figure G

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL Duo 321
Parts List

RCA-VICTOR CO., INC.

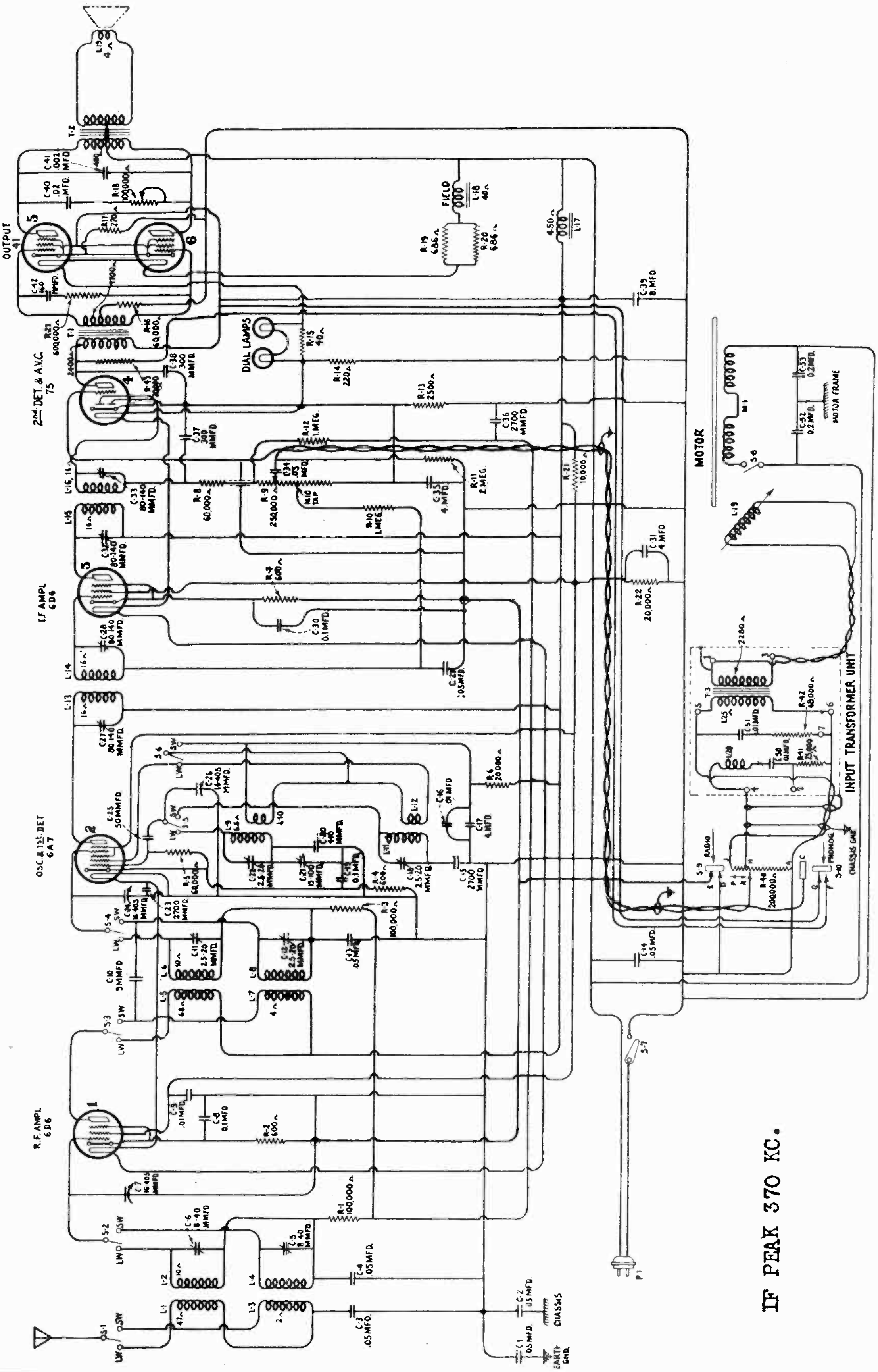
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R6)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3056	Shield—2nd detector Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R1, R3)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)—Package of 5	1.00
3631	Resistor—850 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3639	Capacitor—.02 mfd. (C34)	.25
3683	Shield—Radiotron shield top	.20
3701	Capacitor—.01 mfd. (C6, C21)	.30
3702	Capacitor—.25 mfd. (C32)	.42
3768	Screw—Square head No. 6-32-¼" set screw for condenser drive—Package of 10	.35
3796	Capacitor—4. mfd. (C28)	.60
3849	Capacitor—50 mmfd. (C10)	.30
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor (C13)	.78
3877	Capacitor—.1 mfd. (C5, C15, C25, C33)	.32
3878	Screw—No. 4-40-⅛" screw for fastening station selector pointer—Package of 20	.25
3888	Capacitor—.05 mfd. (C19, C27)	.25
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)—Package of 5	1.00
3897	Resistor—400 ohms—Carbon type—1 watt (R18)—Package of 5	1.10
3901	Capacitor—.05 mfd. (C3, C16)	.36
3906	Mounting assembly—Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers	.28
3937	Capacitor—300 mmfd. (C30, C31)	.34
3938	Capacitor—9 mmfd. (C39)	.25
3939	Resistor—3,500 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3942	Shield—1st detector Radiotron shield	.18
3943	Screen—Translucent screen for dial light—Package of 2	.18
3944	Shield—Antenna, R. F. or oscillator coil shield	.28
3991	Resistor—10,000 ohms—Porcelain type (R19)	.60
4031	Capacitor—2,700 mmfd. (C18, C29, C40)	.50
4032	Capacitor—390 mmfd. (C14)	.34
4119	Screw—No. 8-32-¼" headless cup point set screw for station selector knob—Package of 20	.38
6188	Resistor—2 megohm—Carbon type—½ watt (R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)—Package of 5	1.00
6571	Capacitor—10 mfd. (C37)	1.20
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	.50
6676	Socket—6-contact Radiotron socket—Output	.40
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	3.75
6695	Volume control (R9)	1.20
6696	Switch—Range switch (S1, S2, S3, S4)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26, C41)	1.78
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	2.44
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	2.30
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	2.64
6702	Drive—Variable tuning condenser drive assembly complete	1.86
6703	Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38)	2.46
6704	Shaft—Tuning condenser drive assembly shaft	.64
6705	Tone control complete (R22)	1.20
6841	Dial—Station selector dial—Package of 5	2.74
6842	Pointer—Station selector pointer—Package of 5	.46
7485	Socket—6-contact Radiotron socket	.40
7487	Shield—I. F. and R. F. amplifier Radiotron shield	.25
9446	Transformer—Pow ertransformer—105-125 volts—50-60 cycles (T1)	5.40
9451	Transformer—Power transformer—105-125 volts—25-50 cycles	5.40
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	PICKUP AND PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod—Package of 5	.40
3417	Armature—Pickup armature	$0.72
3419	Screw—Cover mounting screw—Package of 10	.40
3516	Damper assembly—Comprising 1 upper and 1 lower damper 1 upper and 1 lower bearing—For pickup base	.14
3521	Cover—Pickup back cover	.18
3737	Damper—Viscoloid damping block—Package of 5	.65
6346	Back—Pickup housing back	.45
6601	Pickup—Magnetic pickup complete	4.54
6602	Coil—Pickup coil (L19)	.65
7731	Arm—Pickup arm complete less pickup and escutcheon	5.40
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.50
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
8948	Turntable—Complete	5.50
	MOTOR ASSEMBLIES	
3398	Motor mounting assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
3817	Stud—Motor mounting stud—Package of 3	.18
8989	Motor—Motor complete—105-125 volts—60 cycle	18.52
8990	Motor—Motor complete—105-125 volts—50 cycle	18.52
8991	Motor—105-125 volts—40 cycles	23.36
8992	Motor—Motor complete—105-125 volts—25 cycle	23.36
8993	Rotor and shaft for 105-125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105-125 volts—50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105-125 volts—40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105-125 volts—25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws (S8)	.75
3391	Suspension spring and washer assembly for motor board. Comprising one bolt, one top spring, one bottom spring, 2 cup washers, one "C" washer, and one nut	.50
3430	Box—Needle box with lid—Package of 2	.90
3994	Cover—Automatic switch brake cover	.26
4075	Knob—Tone control or range switch knob—Package of 5	1.00
4120	Knob—Volume control knob—Package of 5	1.18
4121	Knob—Station selector knob—Package of 5	1.18
4136	Screw—Chassis mounting screw assembly—Comprising four screws, four washers, eight cushions	.62
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6288	Knob—Phonograph volume control knob—Package of 5	1.00
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6766	Volume control—Phonograph volume control (R23, S9)	2.28
6840	Bezel—Metal bezel for station selector dial	.56
6855	Cable—3-conductor cable with spade terminals—Reproducer cable	.44
6856	Cable—3-conductor shielded with male section of connection plug—Phonograph volume control	.85
6857	Cable—2-conductor motor cable	1.24
6858	Transformer—Phonograph input transformer—Comprising one transformer, one reactor, one .01 mfd. and 0.1 mfd. capacitors, one 5,000 and one 50,000 ohm resistor (T3, R24, R25, C42, C43, L20)	2.50
10174	Spring—Automatic brake springs—One set of 4 springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40
	REPRODUCER ASSEMBLIES	
6770	Transformer—Output transformer (T2)	2.00
8969	Cone—Reproducer cone (L17)—Package of 5	6.35
9460	Coil assembly—Comprising field coil magnet and cone support (L18)	6.00
9473	Reproducer complete	8.00

MODEL 327
Schematic

RCA-VICTOR CO., INC.



IF PEAK 370 KC.

Figure 1—Schematic Circuit Diagram

MODEL 327
Chassis Wiring

RCA-VICTOR CO., INC.

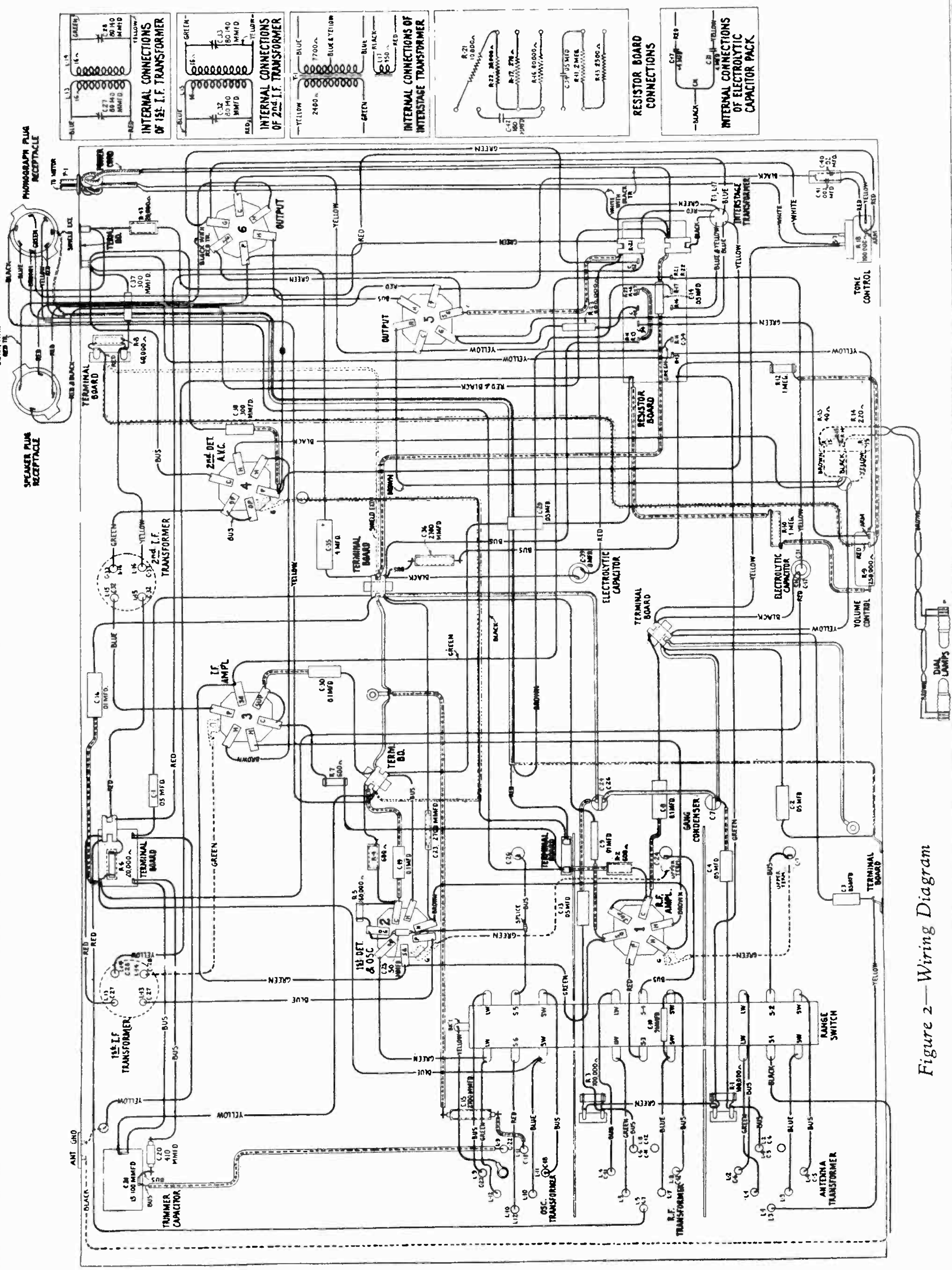


Figure 2—Wiring Diagram

MODEL 327
Voltage
Alignment Data
Assembly Wiring

RCA-VICTOR CO., INC.

SERVICE DATA

CAUTION—This receiver operates on 220-volt direct current without a transformer between the line and the various parts of the receiver, such as A. C. receivers use. It is therefore extremely important to use the utmost caution when operating the receiver outside of the cabinet. Also a knob must always be placed on the shaft of the main tuning capacitor, as under certain conditions the full line voltage is obtained between this point and ground.

(1) Line-Up Capacitor Adjustments

To properly align this receiver, it is essential that a modulated R. F. oscillator, such as Stock No. 9050, an output indicator (Stock No. 4317) and an alignment tool, (Stock No. 4160) be available. Figure 4 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground, preferably through a series condenser. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L in Figure 4, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as S in Figure 4 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by tuning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustments, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

(3) Service Data on Magnetic Pickup

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

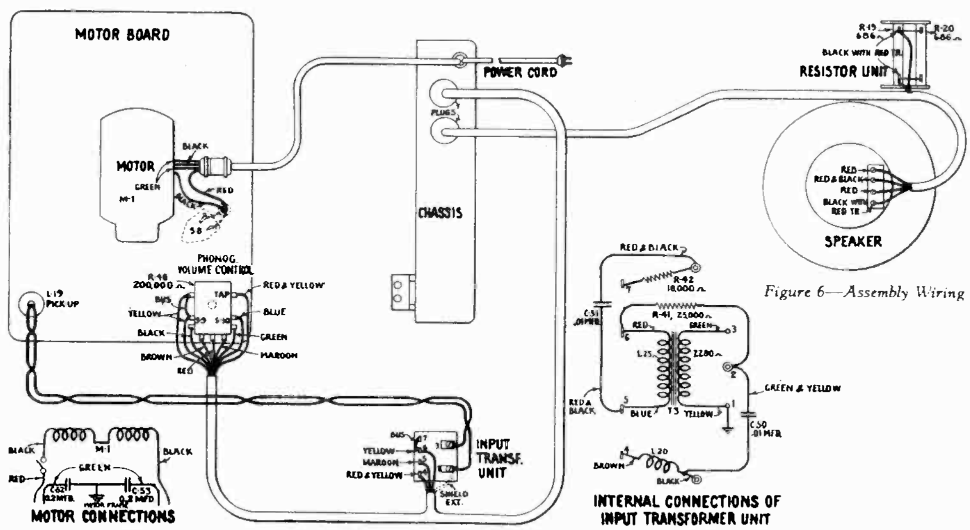


Figure 6—Assembly Wiring Diagram

RADIOTRON SOCKET VOLTAGES

220-Volt, D. C. Line—No Signal

The voltages at the right are those taken while the set is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made.

Radiotron No.		Cathode to B— Volts, D. C.	Screen Grid to B— Volts, D. C.	Plate to B— Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		3.0	90	200	6.0	6.4
RCA-6A7	1st Detector	4.0	90	200	2.6	6.4
	Oscillator	—	—	125	3.3	
RCA-6D6 I. F.		3.0	90	200	6.0	6.4
RCA-75 2nd Detector		1.5	—	200	0.7	6.4
RCA-41 Power		13.0	190	205	25.0	6.4
RCA-41 Power		13.0	190	205	25.0	6.4

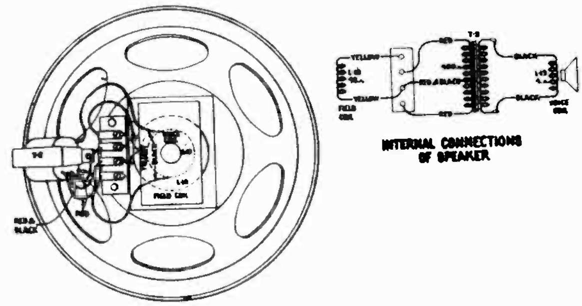


Figure 3—Loudspeaker Wiring

(4) Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure 8), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 8, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is

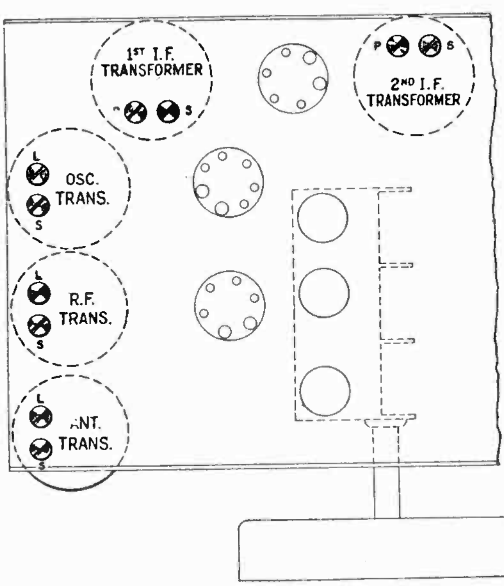
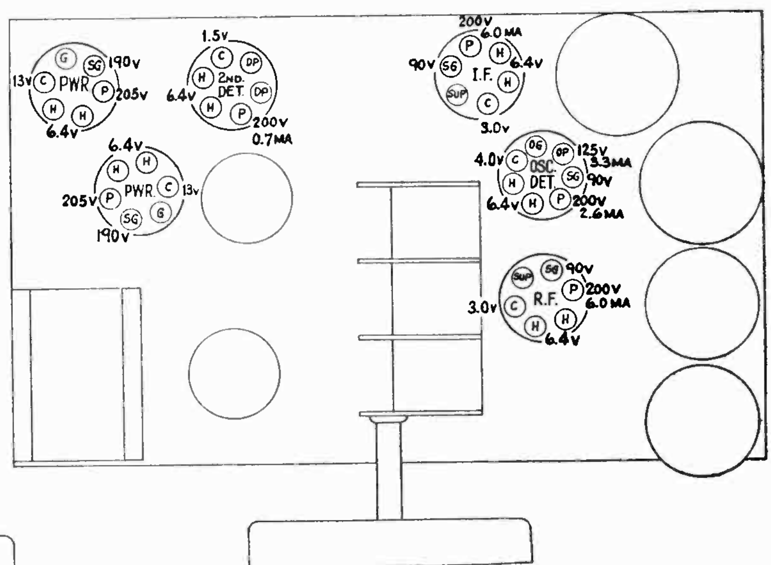


Figure 4—Location of Line-Up Capacitors Viewing bottom of chassis



ALL VOLTAGES ARE TO — B

Figure 5—Radiotron Socket Voltages

inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 8), and sliding the mechanism slightly in relation to the pole pieces.

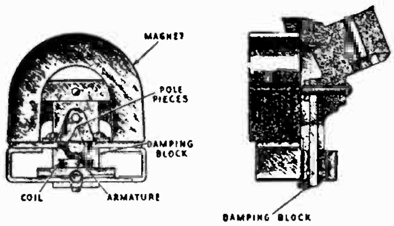


Figure 7

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009" on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

(5) Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 9, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the

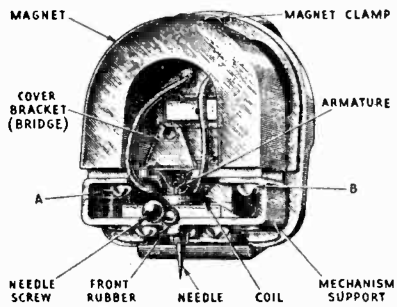


Figure 8

end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious

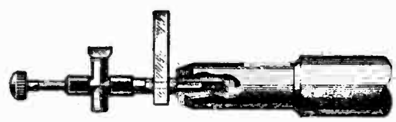


Figure 9

subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h).

MODEL 327
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
10194	Ball—Steel ball for condenser drive assembly—Package of 20	$0.25
2747	Cap—Contact cap—Package of 5	.50
3938	Capacitor—9 mmfd. (C10)	.25
3849	Capacitor—50 mmfd. (C25)	.30
6314	Capacitor—160 mmfd. (C42)—Package of 5	2.00
4352	Capacitor—300 mmfd. (C37, C38)	.25
4297	Capacitor—410 mmfd. (C20)	.30
4031	Capacitor—2700 mmfd. (C15, C23, C36)	.50
3701	Capacitor—0.01 mfd. (C9, C16)	.30
4211	Capacitor—0.05 mfd. (C1, C2, C3, C14, C34)	.30
3901	Capacitor—0.05 mfd. (C4, C13)	.36
3888	Capacitor—0.05 mfd. (C29)	.25
3877	Capacitor—0.1 mfd. (C8, C19, C30)	.32
3796	Capacitor—4.0 mmfd. (C35)	.60
6986	Capacitor—8.0 mmfd. (C39)	1.60
3861	Capacitor—Adjustable trimmer capacitor (C21)	.78
6985	Capacitor—Comprising two 4.0 mmfd. capacitors (C17, C31)	1.50
4373	Capacitor pack—Comprising one 0.002 mfd. and one 0.02 mfd. capacitors (C40, C41)	.30
6983	Coil—Antenna coil (L1, L2, L3, L4, C5, C6)	2.68
6700	Coil—Oscillator coil (L9, L10, L11, L12, C18, C22)	2.30
6699	Coil—R. F. coil (L5, L6, L7, L8, C11, C12)	2.44
6694	Condenser—3-gang variable tuning condenser (C7, C24, C26)	3.75
6841	Dial—Station selector dial scale—Package of 5	2.74
4467	Drive—Variable tuning condenser drive assembly complete	2.40
4340	Lamp—Dial lamp—Package of 5	.60
3906	Mounting assembly—Variable condenser mounting assembly—Comprising 3 bushings, 3 lock-washers, 3 nuts and 3 washers—Package of 1 set	.28
3940	Pointer—Station selector indicator—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R4, R7)—Package of 5	1.00
4338	Resistor—2500 ohms—Carbon type—¼ watt (R13)—Package of 10	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5, R8, R16)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5	1.00
3439	Resistor—600,000 ohms—Carbon type—¼ watt (R23)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10, R12)—Package of 5	1.00

Stock No.	Description	List Price
6242	Resistor—2 megohms—Carbon type—¼ watt (R11)—Package of 5	$1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R43)—Package of 5	1.00
4337	Resistor—270 ohms—Carbon type—1 watt (R17)—Package of 10	2.20
6114	Resistor—20,000 ohms—Carbon type—1 watt (R6, R22)—Package of 5	1.10
4339	Resistor—260 ohms—Porcelain type—Tapped at 220 ohms (R14, R15)	.52
3991	Resistor—10,000 ohms—Porcelain type (R21)	.60
3943	Screen—Translucent celluloid screen—For dial lamps—Package of 2	.18
3878	Screw—No. 8-32-3⁄16 headless cup point set screw for fastening station selector pointer—Package of 20	.25
3768	Screw—Square head No. 6-32-¼ set screw for condenser driver—Package of 10	.35
6704	Shaft—Tuning condenser drive shaft assembly	.64
4145	Shield—First detector and oscillator Radiotron shield	.30
4103	Shield—I. F. amplifier Radiotron shield	.20
3950	Shield—R. F. amplifier Radiotron shield	.26
4216	Shield—Radiotron shield top	.10
4215	Shield—Second detector Radiotron shield	.15
3529	Socket—Dial lamp socket	.32
6676	Socket—6-contact Radiotron socket	.40
7485	Socket—6-contact second detector and AVC Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
6696	Switch—Range switch (S1, S2, S3, S4, S5, S6)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C27, C28)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C32, C33)	1.78
6987	Transformer pack—Audio transformer pack—Comprising one reactor and one interstage transformer (T1, L17)	4.50
6705	Tone control (R18, S7)	1.20
6695	Volume control (R9)	1.20
	REPRODUCER ASSEMBLIES	
4600	Cable—Reproducer cable—4-conductor with male section of connector—From receiver to resistors and reproducer	.60
7825	Coil—Field coil, magnet and cone support (L18)	4.38
8969	Cone—Reproducer cone (L19)—Package of 5	6.35
7824	Reproducer complete	8.00
4599	Transformer—Output transformer (T2)	1.34

REPLACEMENT PARTS—Continued

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	MOTOR ASSEMBLIES	
3524	Brush—Motor brush—Package of 2	$0.60
3525	Cap—Brush holder cap for motor brush—Package of 2	.64
4598	Capacitor—Motor capacitor—Two 2.0 mfd. capacitors (C52, C53)	.98
4596	Escutcheon—Speed regulator escutcheon	.36
3487	Governor assembly—Comprising friction disc, two springs and two balls—Assembled and mounted	2.00
3489	Indicator pointer—Speed indicator pointer complete, with mounting screws and washers	1.65
7823	Motor—220—volt D. C. motor complete (M1)	34.66
3488	Pin—Governor (speed) regulator pin	.30
4597	Screw—Motor mounting screw assembly—Comprising four screws, four spacers, four lockwashers and four nuts	.22
	PICKUP AND ARM ASSEMBLIES	
7821	Arm—Pickup arm complete, less escutcheon and pickup	5.36
3417	Armature—Pickup armature	.72
6346	Back—Pickup housing back	.45
3385	Coil—Pickup coil (L30)	.50
3386	Cover—Pickup cover	.56
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—5 sets	1.10
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
6335	Pickup—Pickup unit complete	4.00
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3419	Screw—Pickup cover mounting screw—Package of 10	.40
	SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	.26
10184	Plate—Automatic brake latch plate—Package of 5	.40
10174	Springs—Automatic brake springs—Package of 4	.50
6896	Switch—Eccentric automatic switch complete	2.50
3322	Switch—Motor switch (S8)	.75

Stock No.	Description	List Price
	TURNTABLE ASSEMBLIES	
7084	Cover—Turntable cover	$0.40
7838	Turntable complete	2.15
	MISCELLANEOUS ASSEMBLIES	
4677	Bezel—Metal bezel (escutcheon) for station selector dial glass	.56
4594	Box—Needle box	.30
4592	Cable—Phonograph input cable—9-conductor—From chassis to input transformer and volume control	2.25
6614	Glass—Station selector dial glass	.30
3829	Knob—Phonograph volume control knob—Package of 5	1.10
6989	Knob—Range switch or tone control knob—Package of 5	.65
6991	Knob—Station selector knob—Package of 5	1.15
6990	Knob—Volume control knob—Package of 5	1.15
3824	Nut—Cap nut for motor board suspension assembly—Package of 4	.82
9050	Oscillator—Test oscillator 90–25,000 K. C.	29.50
4601	Plug—4-prong male section of connector plug for reproducer cable	.54
4602	Plug—7-prong male section of connector plug for reproducer cable	.56
4341	Resistor—Porcelain type—686 ohms (R19, R20)	2.12
4678	Ring—Retaining ring for dial glass—Package of 5	.34
4342	Screw—Receiver mounting screw assembly—Comprising four bushings, four screws and four washers	.30
4591	Screw assembly—Receiver chassis mounting assembly—Comprising eight cushions, four screws, four washers and four spacers	.44
4160	Screwdriver—Combination insulated screwdriver and socket wrench for I. F. and R. F. adjustments	1.00
4593	Socket—4-contact socket for reproducer cable plug	.42
4595	Socket—7-contact socket for phonograph input cable plug	.52
3391	Suspension spring and washer assembly—For motor board—Comprising one bolt, one top spring, one bottom spring, two cup washers, one "C" washer and one nut	.50
4603	Transformer—Input transformer pack—Comprising one input transformer, one choke coil, one 18,000 ohm resistor, one 25,000 ohm resistor and two 0.01 mfd. capacitors (T3, L20, R41, R42, C50, C51)	4.65
4590	Volume control—Phonograph volume control (R40, S9, S10)	2.18

† Full discount not allowed.

RCA-VICTOR CO., INC.

MODEL "All Wave Duo"
340,340-E
Schematic

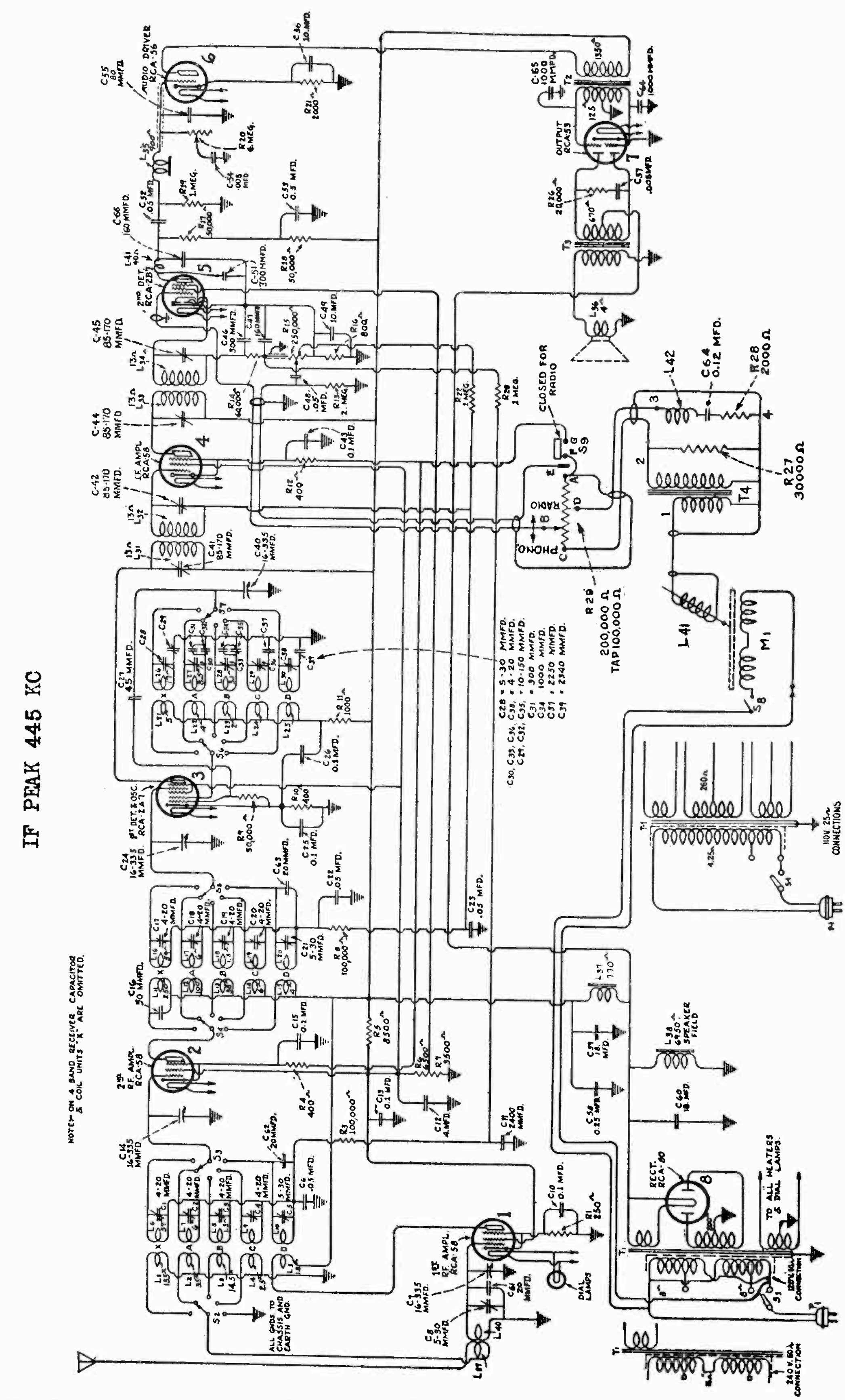


Figure A—Schematic Circuit Diagram

MODEL "All Wave Duo"
340,340-E
Chassis Wiring

RCA-VICTOR CO., INC.

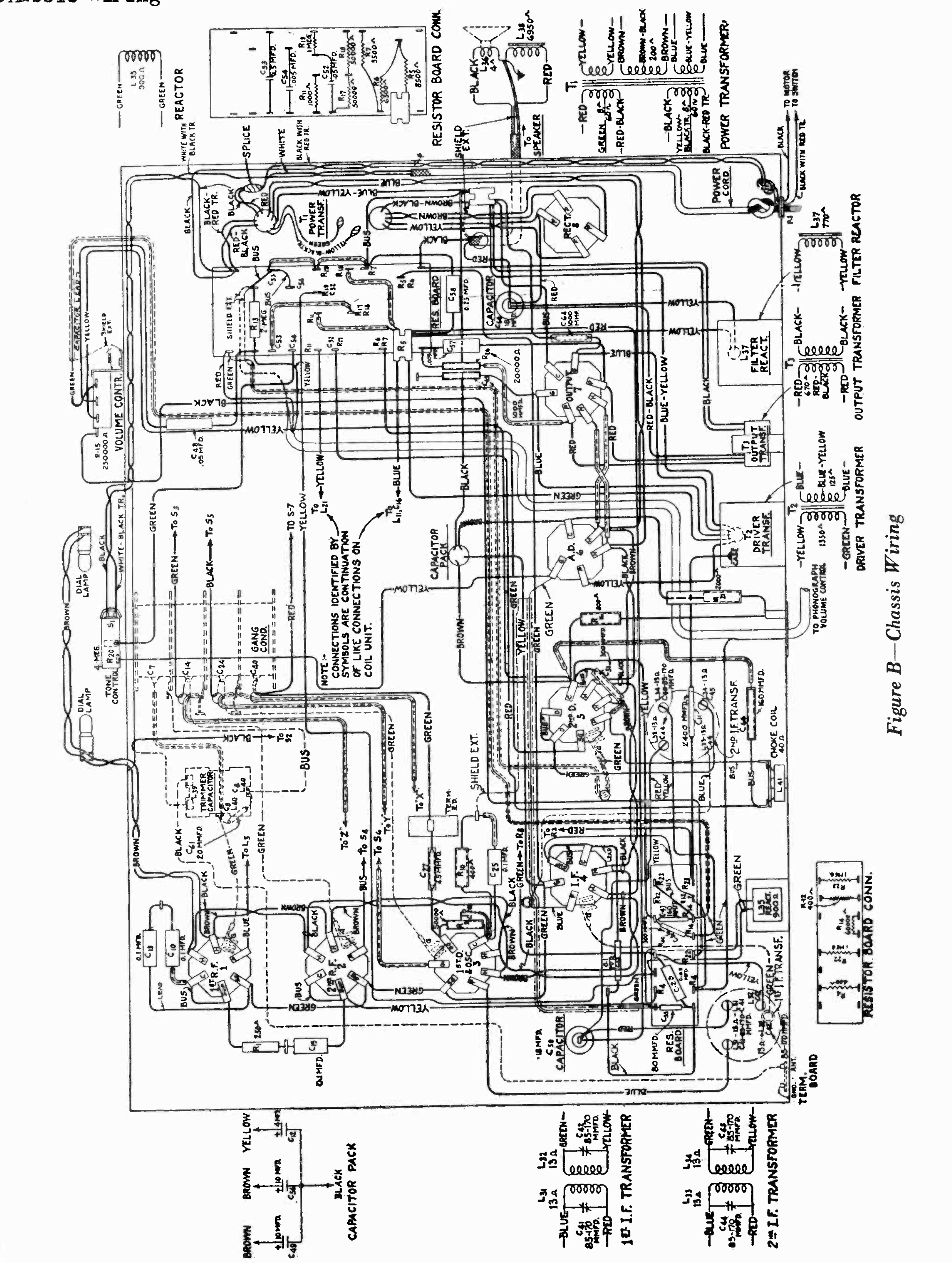


Figure B—Chassis Wiring

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MODEL "All Wave Duo"
340, 340-E
Coils Wiring Diagram

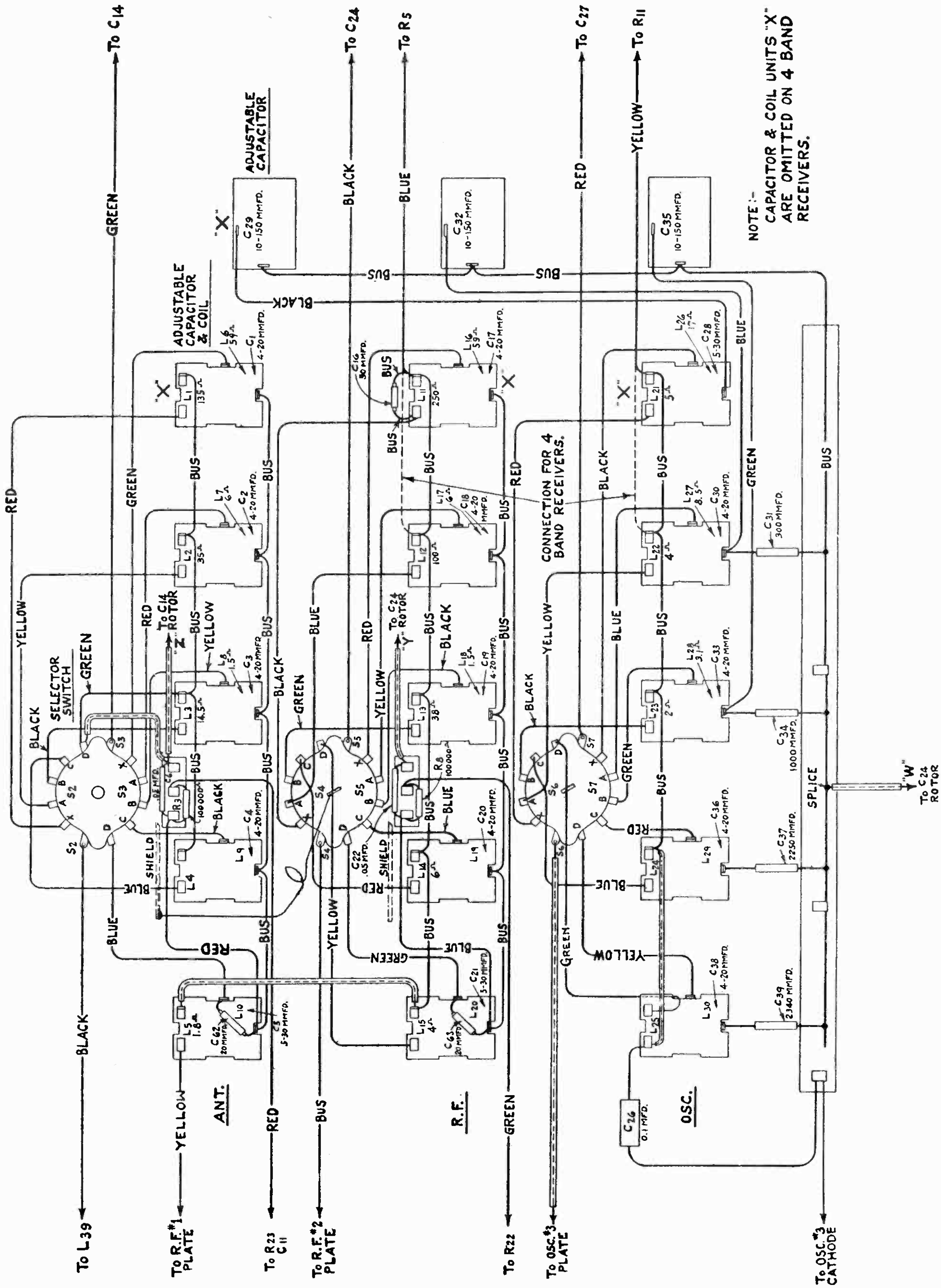


Figure C—Wiring Diagram of Coil Assembly

MODEL "All Wave Duo"
340,340-E
Assembly Wiring
Voltage,Alignment

RCA-VICTOR CO., INC.

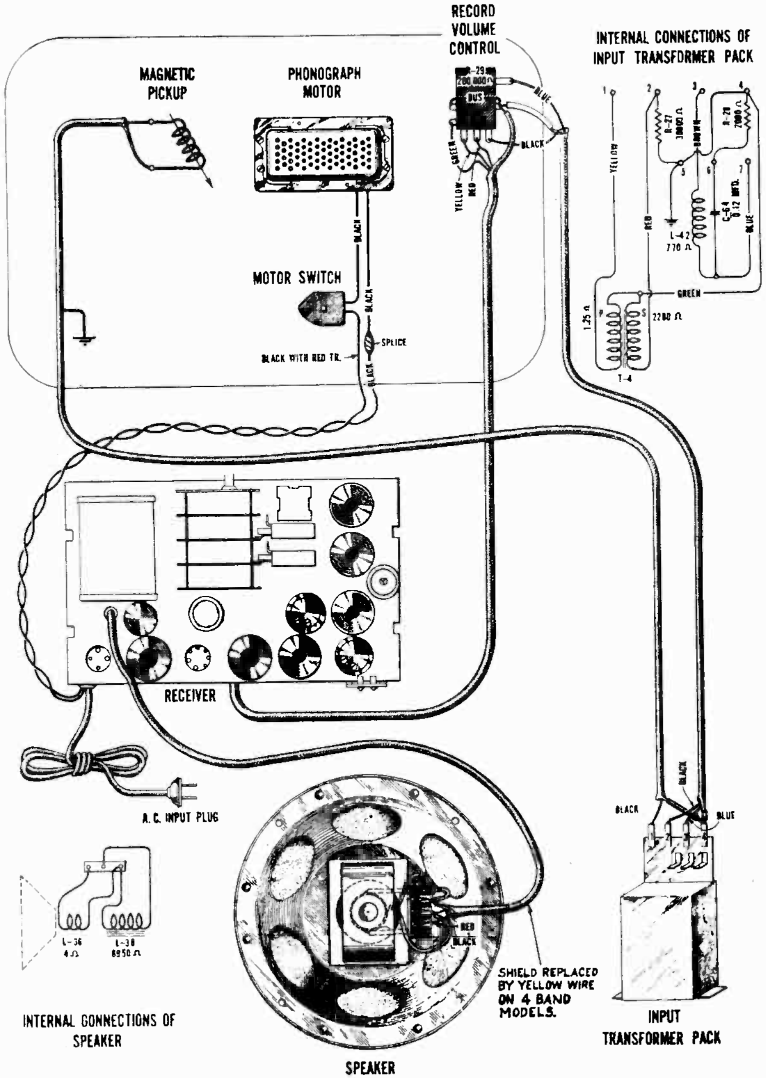


Figure D—Assembly Wiring

SERVICE DATA

Electrical Specifications

Voltage Rating . . . . 105–125 Volts
Frequency Rating . . . . 25, 30, 50 and 60 Cycles
Power Consumption . . . . 140 Watts
Type and Number aof Rdiotrons . . . 3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 8
Type of Circuit . . . . Straight Superheterodyne for all frequencies with Class "B" output
Undistorted Output . . . . 6 Watts

This all-wave combination instrument utilizes the new perfected continuous tuning superheterodyne chassis and the standard two speed motor-board assembly. Excellent quality of record reproduction, together with unusual radio performance, characterizes this instrument.

Service data for the magnetic pickup used on the tone arm of the motor-board assembly is given on the following pages. Service data for the radio receiver follows.

The tuning bands for the receiver chassis are as follows:

Selector Switch Position	*Frequency Range (Kilocycles)*	*Wave-Length Range (Meters)*
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–30.0
D	8000–18000	37.5–16.7

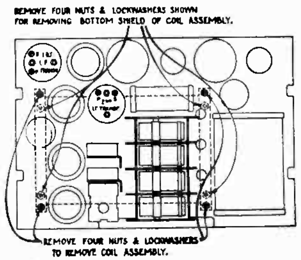


Figure E—Location of nuts and lockwashers holding coil assembly

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss, static and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly with the selector switch is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure E and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure E.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

TUBE SOCKET VOLTAGES (RADIO OPERATION)

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode Volts	Screen Grid to Cathode Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

MODEL "All Wave Duo"
340,340-E
Alignment Data

RCA-VICTOR CO., INC.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 90 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300-ohm resistor for use as a "dummy" antenna, a non-metallic screwdriver (such as Stock No. 4160), and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

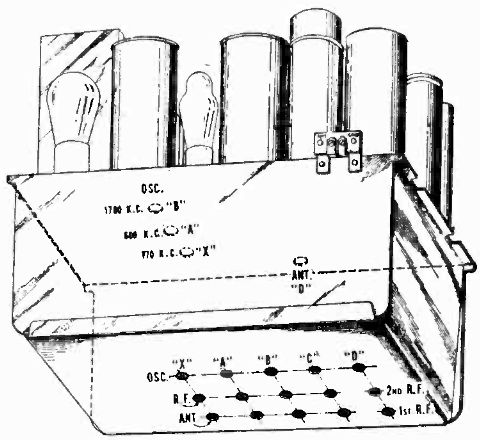


Figure F—Location of line-up capacitors

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with a 300-ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver. This is done by connecting the 300-ohm resistor between the antenna and ground terminals of the receiver and attaching a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high-frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low-frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure F for the location of the line-up capacitors.

Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure H shows the proper manner of making the various connections possible for this transformer. Note: The transformer is normally connected for 115–125-volt lines, and a 100-volt motor supplied. The 220-volt connections must not be used unless the motor is also changed. However, 220-volt operation of the standard equipment may be obtained by using the Stock No. 9034 step-down line transformer.

The 25–60 cycle transformer uses only one 105–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125-volt lines, but the connection shown in Figure G may be used for 100–115-volt lines.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments to be Made
445 K. C.	Any setting that does not bring in station.	At rear of chassis.	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis.	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output. (See Note.)	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. (See Note.)	4

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.

MODEL "All Wave Duo"
340,340-E
Controls Data
Transformer Data

RCA-VICTOR CO., INC.

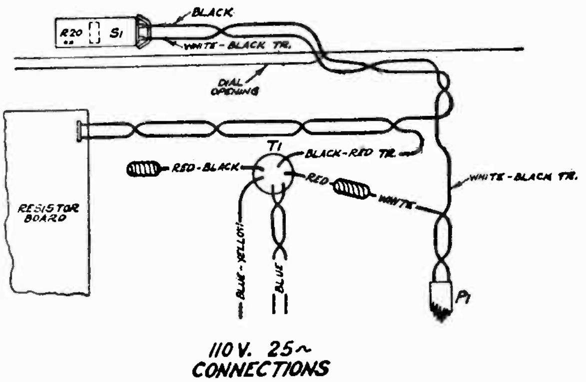


Figure G—100-115 Volt Connection of 25-60 Cycles Transformer

Controls

The four control knobs on the front panel of the cabinet serve the following purposes:

(1) ***Range Switch*** (Left-band Knob)—This switch converts the receiver for operation within any of the tuning ranges provided. As indicated on the selector dial, the letters on the switch escutcheon signify:

X—*Long-Wave Range*—150 to 410 kilocycles (2000 to 732 meters). This range is included only in certain models of the instrument (see "Introduction").

A—*Standard Broadcast Band*—540 to 1500 kilocycles (555 to 200 meters).

B—*Police Band*—1500 to 3900 kilocycles (200 to 77 meters). Services available within this band include police calls at 1574, 1712 and 2450 kilocycles, amateur radio "phone" communications between 1800 and 2000 kilocycles, and aviation communications (phone) between 2500 and 3500 kilocycles.

C—*Short-Wave Range*—3900 to 10,000 kilocycles (77 to 30 meters). Within the limits of this range are included two of the internationally-assigned short-wave broadcast bands. These are known as the 49 and 31 meter bands. (The portion of this range from 8000 to 10,000 kilocycles, which includes the latter band, is preferably received on range D.)

D—*Short-Wave Range* — 8,000 to 18,000 kilocycles (37.5 to 16.7 meters). This range embraces four of the standardized short-wave broadcast bands located at 31, 25, 19 and 16 meters, respectively.

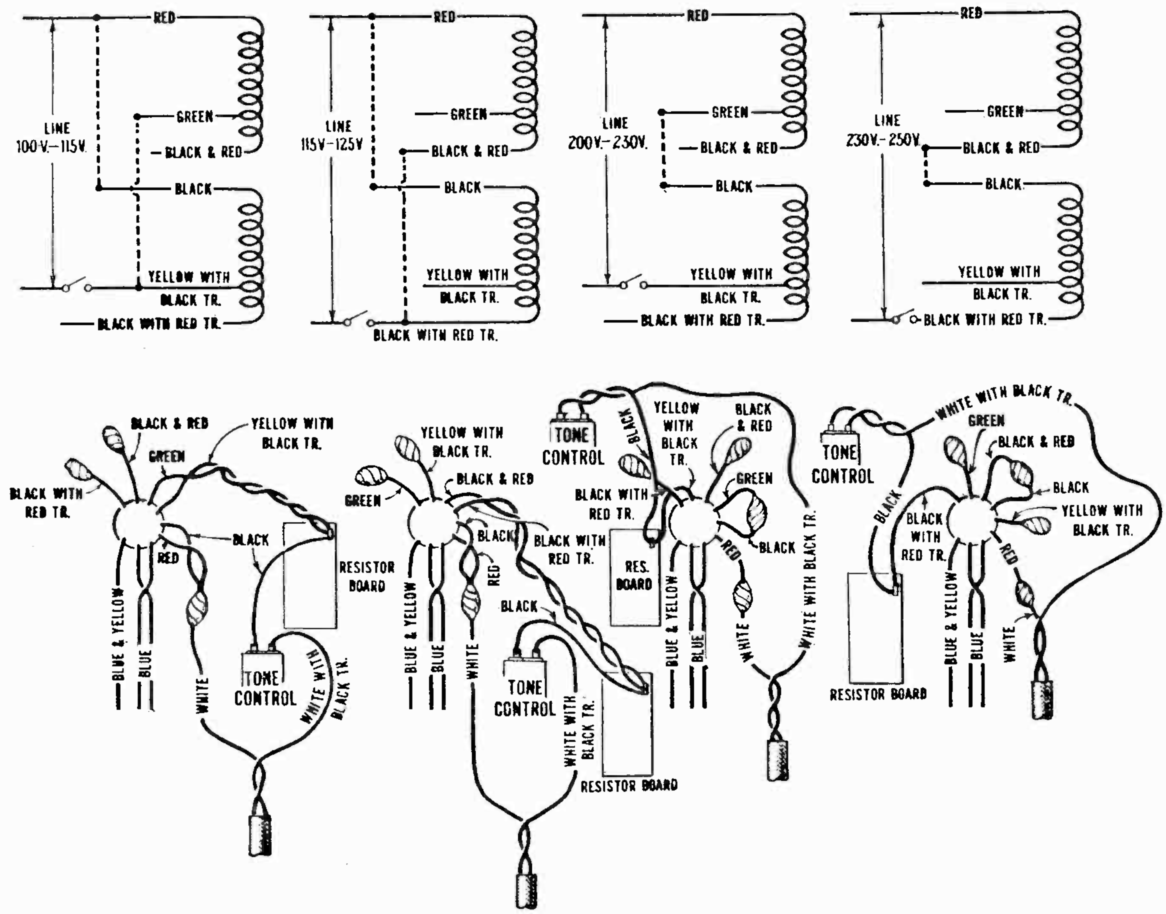


Figure H—Power Transformer Connections (50-60 cycles)

MODEL "All Wave Duo"
340,340-E
Pickup Data

RCA-VICTOR CO., INC.

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure K), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

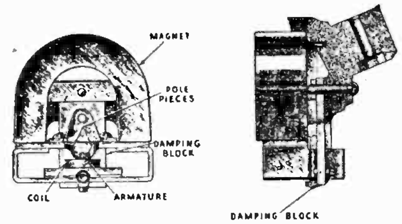


Figure I

(d) Remove screws A and B, Figure J, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure J), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

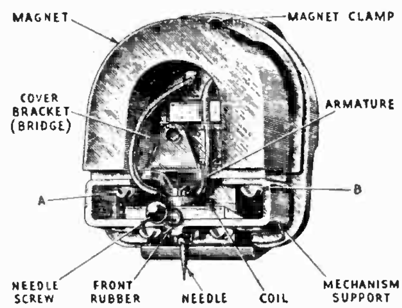


Figure J

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure K, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both side, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

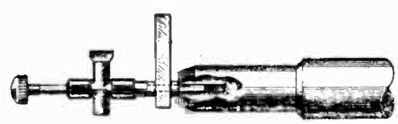


Figure K

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL "All Wave Duo"
340,340-E
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Pkg. of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C51)	.34
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3643	Capacitor—.005 mfd. (C57)	.25
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—8,500 ohms—Carbon type—3 watt (R5)	.25
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3888	Capacitor—.05 mfd. (C6, C22, C23, C52)	.25
3901	Capacitor—.05 mfd. (C48)	.36
3931	Capacitor—45 mmfd. (C27)	.30
3932	Capacitor—.0024 mfd. (C11)	.30
3973	Capacitor—1,000 mmfd. (C64, C65)	.34
4019	Capacitor—1,000 mmfd. (C34)	.34
4030	Bracket—Tone or volume control mounting bracket	.10
4033	Capacitor—20 mmfd. (C61, C62, C63)	.34
4103	Shield—First detector and R. F. Radiotron shield	.20
4104	Shield—I. F. Radiotron shield	.20
4205	Coil—Second detector choke (L41)	.50
4207	Capacitor—0.1 mfd. (C13, C43)	.34
6136	Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6512	Capacitor—.005 mfd. (C54)	.28
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48

Stock No.	DESCRIPTION	List Price
6606	Reactor—Filter reactor (L37)	$1.66
6607	Reactor—Tone control reactor (L35)	1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6612	Volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	1.00
6626	Capacitor pack—Comprising one 4. mfd., and two 10. mfd. capacitors (C12, C49, C56)	1.86
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1)	2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28)	1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L22, L27, C30)	1.40
6637	Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	1.10†
6889	Capacitor—18 mfd. (C60)	1.55
6890	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	2.40
6891	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	2.40
6892	Tone control (R20)	1.50
6955	Shield—Second R. F. Radiotron shield	.25
6956	Shield—Radiotron shield top	.15
7065	Screwdriver—For R. F. or I. F. adjustment	.80
7484	Socket—5-contact Radiotron socket	.35

† Full discount not allowed.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
7485	Socket—6-contact Radiotron socket	$0.40
9042	Transformer—Power transformer—105–250 volts—50–60 cycles (T1)	6.84
9046	Transformer—Power transformer—105–125 volts—25–40 cycles	9.22
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	MOTOR ASSEMBLIES	
3398	Motor mounting washer and spring assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
3817	Stud—Motor mounting stud—Package of 3	.18
8989	Motor—Motor complete 105–125 volts—60 cycle	18.52
8990	Motor—Motor complete 105–125 volts—50 cycle	18.52
8991	Motor—105–125 volts—40 cycle	23.36
8992	Motor—Motor complete 105–125 volts—25 cycle	23.36
8993	Rotor and shaft for 105–125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105–125 volts, 50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105–125 volts, 40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105–125 volts, 25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly, comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3516	Damper and bushing assembly—Comprising one upper and one lower damper, one upper bushing and one lower bearing—Located in bottom of pickup arm base	.14
3521	Cover—Pickup back cover	.18
3728	Coil—Pickup coil (L41)	.50
6346	Back—Pickup housing back	.45
6601	Pickup—Pickup unit complete	4.54
7706	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	1.30
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long-playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86

Stock No.	DESCRIPTION	List Price
3344	Cover—Grease retainer cover—Package of 2	$0.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Pkg. of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3391	Suspension spring and washer for motor board—Comprising one bolt, one top spring, one bottom spring, 2 cup washers, one "C" washer and one nut	.50
3430	Box—Needle box with lid—Package of 2	.90
3829	Knob—Radio or phonograph volume or tone control knob—Package of 5	1.10
3830	Knob—Station selector knob—Package of 5	1.08
3831	Knob—Range switch knob—Package of 5	1.08
3876	Cable—3 conductor cable for loudspeaker—4-band	.60
3878	Screws—No. 4-40—5/16" fillister head screw and washer for fastening station selector pointer—Package of 20	.25
3952	Escutcheon—Volume control escutcheon	.10
3953	Escutcheon—Range switch escutcheon—5-band	.10
3992	Escutcheon—Range switch escutcheon—4-band	.10
3994	Cover—Automatic brake switch cover	.26
4053	Cable—3-conductor cable—From phonograph volume control to resistor boards	.90
4160	Screwdriver—Combination insulated screwdriver and socket wrench for I. F. and R. F. adjustments	1.00
6112	Cushion—Chassis support cushion—Package of 4	.25
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial	.50
6671	Cable—2-conductor shielded for loudspeaker—5-band	.36
6672	Screen—Translucent celluloid screen—For dial lamps—Package of 5	.30
6673	Pointer—Station selector pointer—Pkg. of 5	.64
6677	Dial—Station selector dial—5-band—Pkg. of 5	1.42
6678	Dial—Station selector dial—4-band—Pkg. of 5	1.42
6766	Volume control—Phonograph volume control and switch (R29, S9)	2.28
6767	Transformer—Input transformer—Comprising one 30,000 ohm resistor, one 2,000 ohm resistor, one .12 mfd. capacitor, one compensating reactor and one transformer (T4, R27, R28, C64, L42)	5.62
6768	Cable—3-conductor shielded—From phonograph volume control to input transformer	.40
8837	Support—Metal support for chassis—Pkg. of 4	.48
9050	Oscillator—Test oscillator—150–25,000 K.C.	33.50†
10171	Springs—Automatic brake springs—One set of 4 springs	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

† Full discount not allowed.

MODEL 340, 340-E
Schematic

RCA-VICTOR CO., INC.

IF PEAK 445 KC.

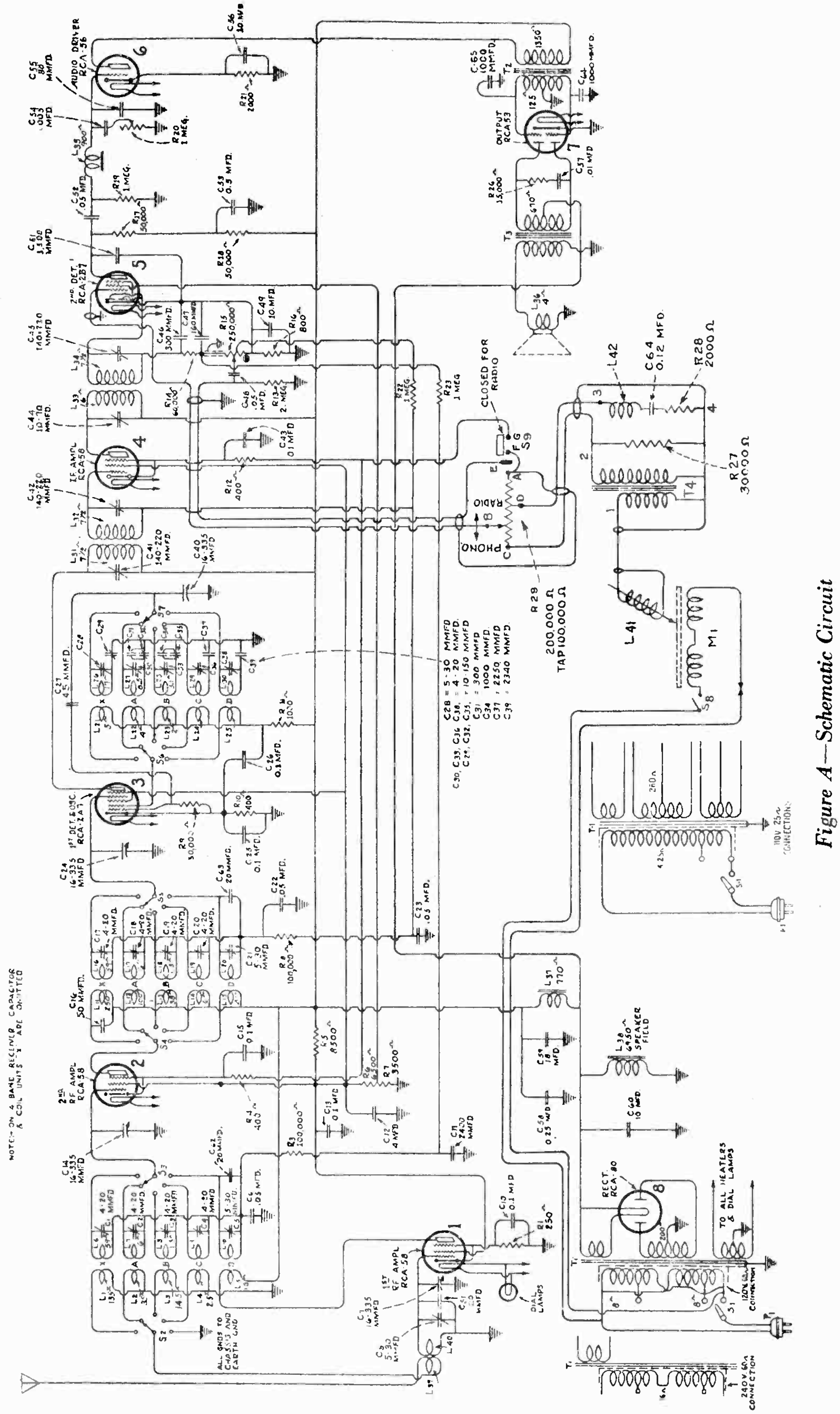


Figure A—Schematic Circuit

MODEL 340, 340-E
Chassis Wiring

RCA-VICTOR CO., INC.

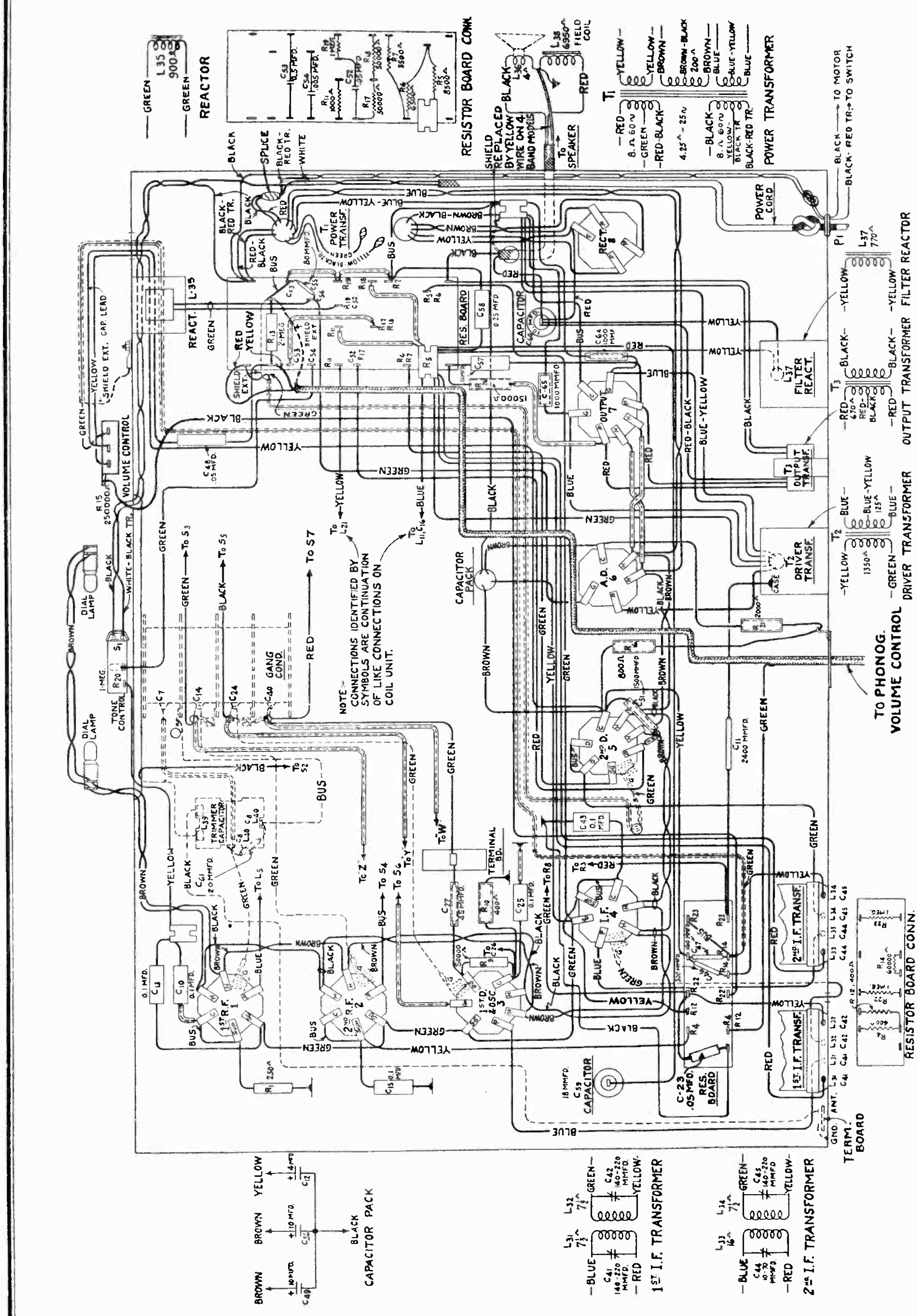


Figure B—Chassis Wiring Diagram

MODEL 340, 340-E
Coils Wiring Diagram

RCA-VICTOR CO., INC.

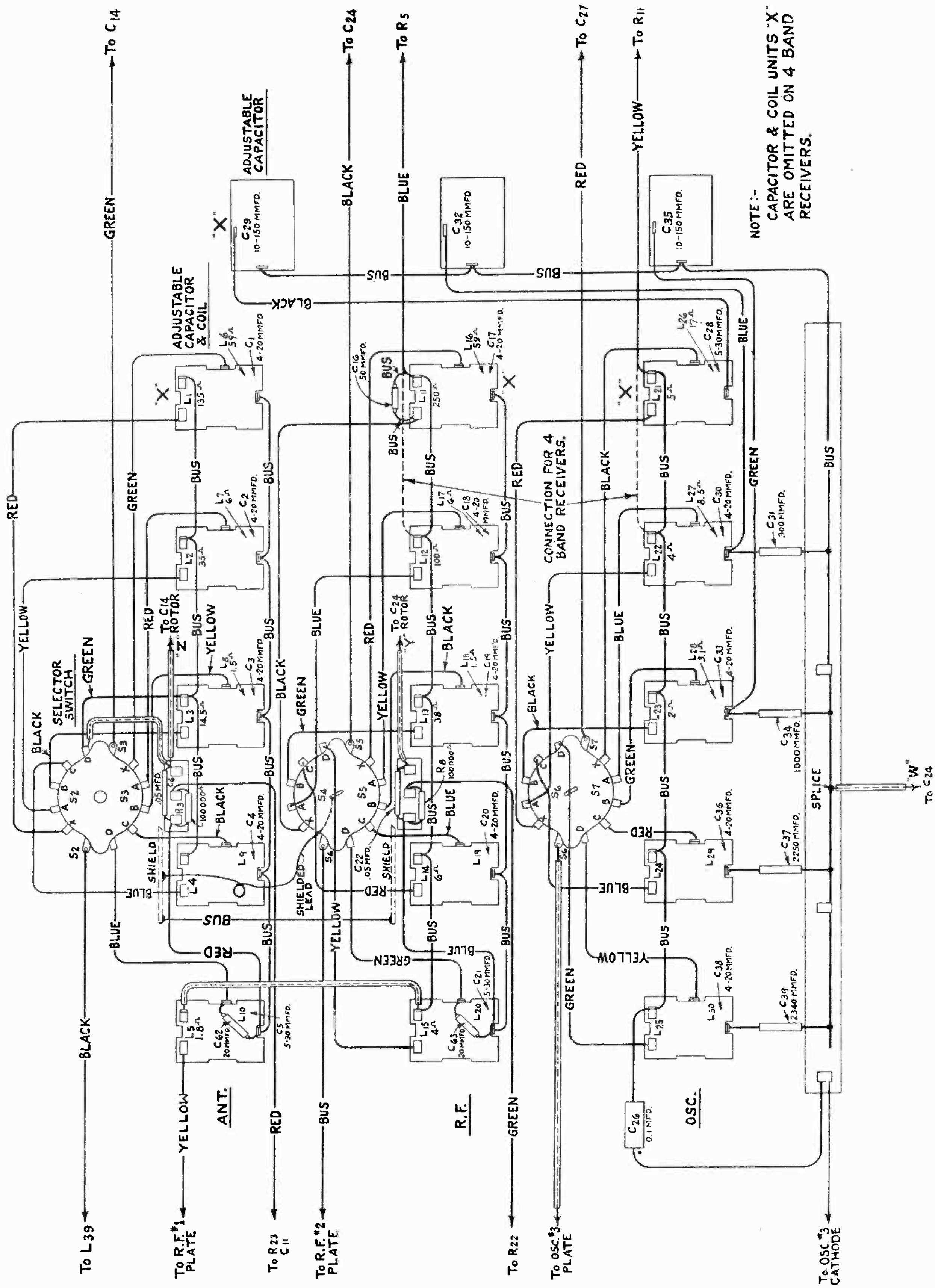


Figure C—Wiring Diagram of Coil Assembly

MODEL 340, 340-E
Assembly Wiring
Voltage, Circuit Data

RCA-VICTOR CO., INC.

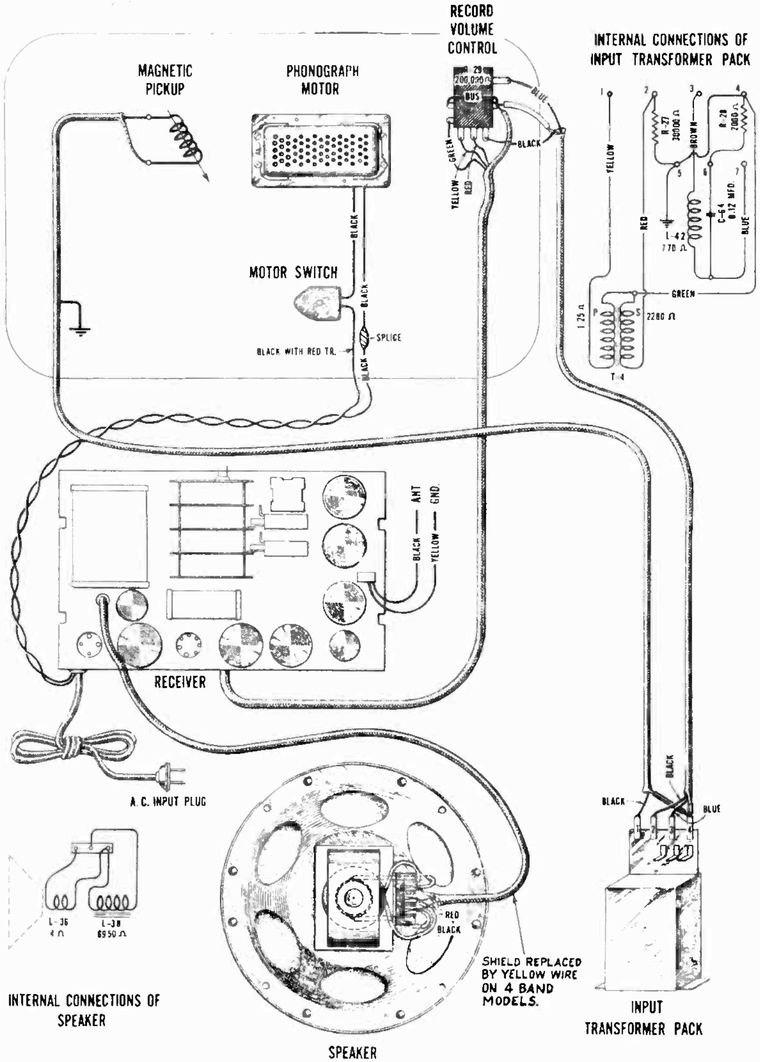


Figure D—Assembly Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating . . . . 105–125 Volts
Frequency Rating . . . . 25, 30, 50 and 60 Cycles
Power Consumption . . . . 140 Watts
Type and Number of Radiotrons . . . 3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 8
Type of Circuit . . . . Straight Superheterodyne for all frequencies with Class "B" output
Undistorted Output . . . . 6 Watts

This all-wave combination instrument utilizes the new perfected continuous tuning superheterodyne chassis and the standard two speed motor-board assembly. Excellent quality of record reproduction, together with unusual radio performance, characterizes this instrument.

Service data for the magnetic pickup used on the tone arm of the motor-board assembly is given on the following pages. Service data for the radio receiver follows.

The tuning bands for the receiver chassis are as follows:

Selector Switch Position	Frequency Range (Kilocycles)	Wave Length Range (Meters)
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–30.0
D	8000–18000	37.5–16.7

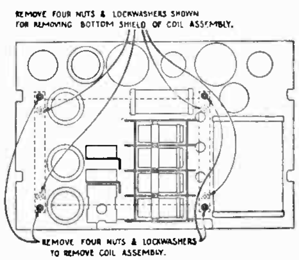


Figure E—Location of nuts and lockwashers holding coil assembly

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss, static and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly with the selector switch is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure E and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure E.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

TUBE SOCKET VOLTAGES (RADIO OPERATION)

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Cathode, Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

MODEL 340, 340-E
Alignment Data

RCA-VICTOR CO., INC.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300 ohm resistor for use as a "dummy" antenna, a non-metallic screwdriver (such as Stock No. 7065), and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

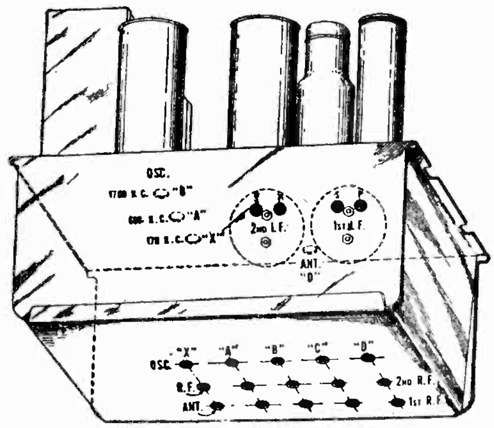


Figure F—Location of line-up capacitors.

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with the 300 ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver in the following manner: Connect the 300 ohm resistor between the antenna and ground terminals of the receiver and attach a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure F for the location of the line-up capacitors.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments To Be Made
445 K. C.	Any setting that does not bring in station.	At rear of chassis.	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis.	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output. (See Note)	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. (See Note)	4

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.

MODEL 340, 340-E
Transformer Data

RCA-VICTOR CO., INC.

Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure H shows the proper manner of making the various connections possible for this transformer. Note: The transformer is normally connected for 115–125-volt lines and a 110-volt motor supplied. The 220-volt connections must not be used unless the motor is also changed. However, 220-volt operation of the standard equipment may be obtained by using the Stock No. 9034 step-down line transformer.

The 25–60 cycle transformer uses only one 105–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125-volt lines, but the connection shown in Figure G may be used for 100–115-volt lines.

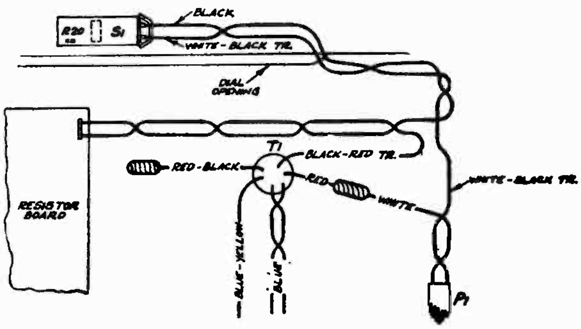


Figure G—100–115 Volt Connection of 25–60 Cycles Transformer

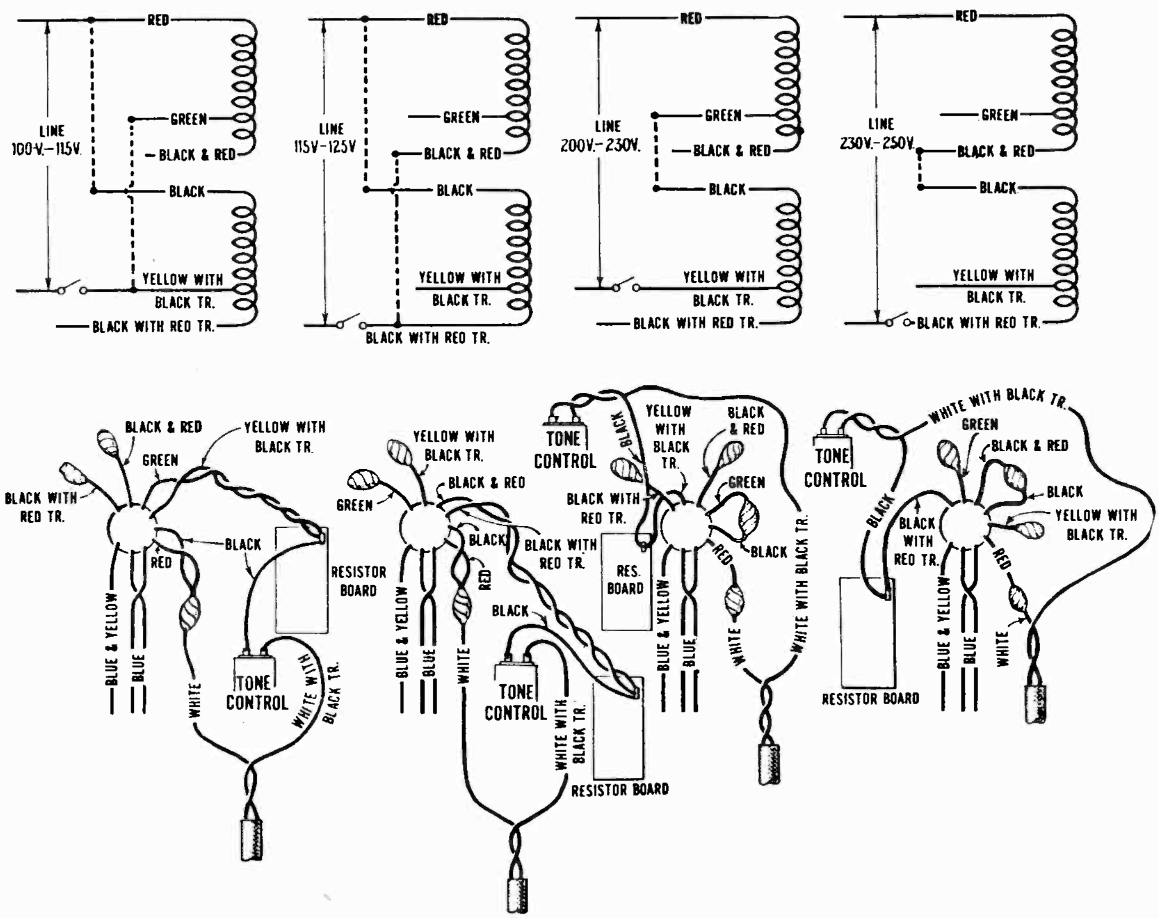


Figure H—Power Transformer Connections (50–60 cycles)

RCA-VICTOR CO., INC.

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure K), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

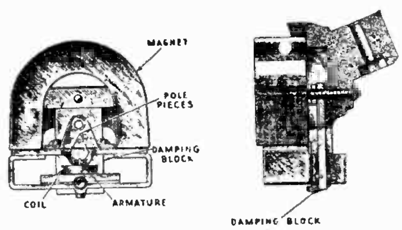


Figure I

(d) Remove screws A and B, Figure J, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure J), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

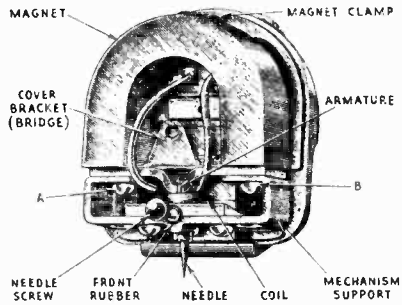


Figure J

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure K, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both side, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

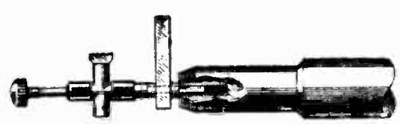


Figure K

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (b).

MODEL 340, 340-E
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2717	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3472	Capacitor—.0024 mfd. (C11)	.32
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16)	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3591	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3683	Shield—Radiotron shield top	.20
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—8,500 ohms—Carbon type—3 watt (R5)	.25
3787	Capacitor—.01 mfd. (C57)	.30
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3866	Capacitor—1,500 mmfd. (C51)	.34
3867	Capacitor—0.1 mfd. (C13, C43)	.32
3888	Capacitor—.05 mfd. (C6, C22, C23, C52)	.25
3901	Capacitor—.05 mmfd. (C48)	.36
3931	Capacitor—45 mmfd. (C27)	.30
3973	Capacitor—1,000 mmfd. (C64, C65)	.34
4019	Capacitor—1,000 mmfd. (C34)	.34
4030	Bracket—Tone or volume control mounting bracket	.10
4033	Capacitor—20 mmfd. (C61, C62, C63)	.34
4103	Shield—First detector and R. F. Radiotron shield	.20
4104	Shield—I. F. Radiotron shield	.22
6112	Cushion—Rubber cushions for chassis—Package of 4	.25
6136	Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6512	Capacitor—.005 mfd. (C54)	.28
6571	Capacitor—10 mfd. (C60)	1.20
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48
6606	Reactor—Filter reactor (L37)	1.66
6607	Reactor—Tone control reactor (L35)	$1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6610	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	1.55
6611	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	1.62
6612	Volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	1.00
6626	Capacitor pack—Comprising one 4 mfd., and two 10. mfd., capacitors (C12, C49, C56)	1.86
6627	Tone control (R20)	1.44
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1)	2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28)	1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L22, L27, C30)	1.40
6637	Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	
7065	Screwdriver—For R. F. or I. F. adjustment	.80
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
9042	Transformer—Power transformer—105–250 volt—50–60 cycles (T1)	6.84
9046	Transformer—Power transformer—105–125 volts—25–40 cycles	9.22
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25

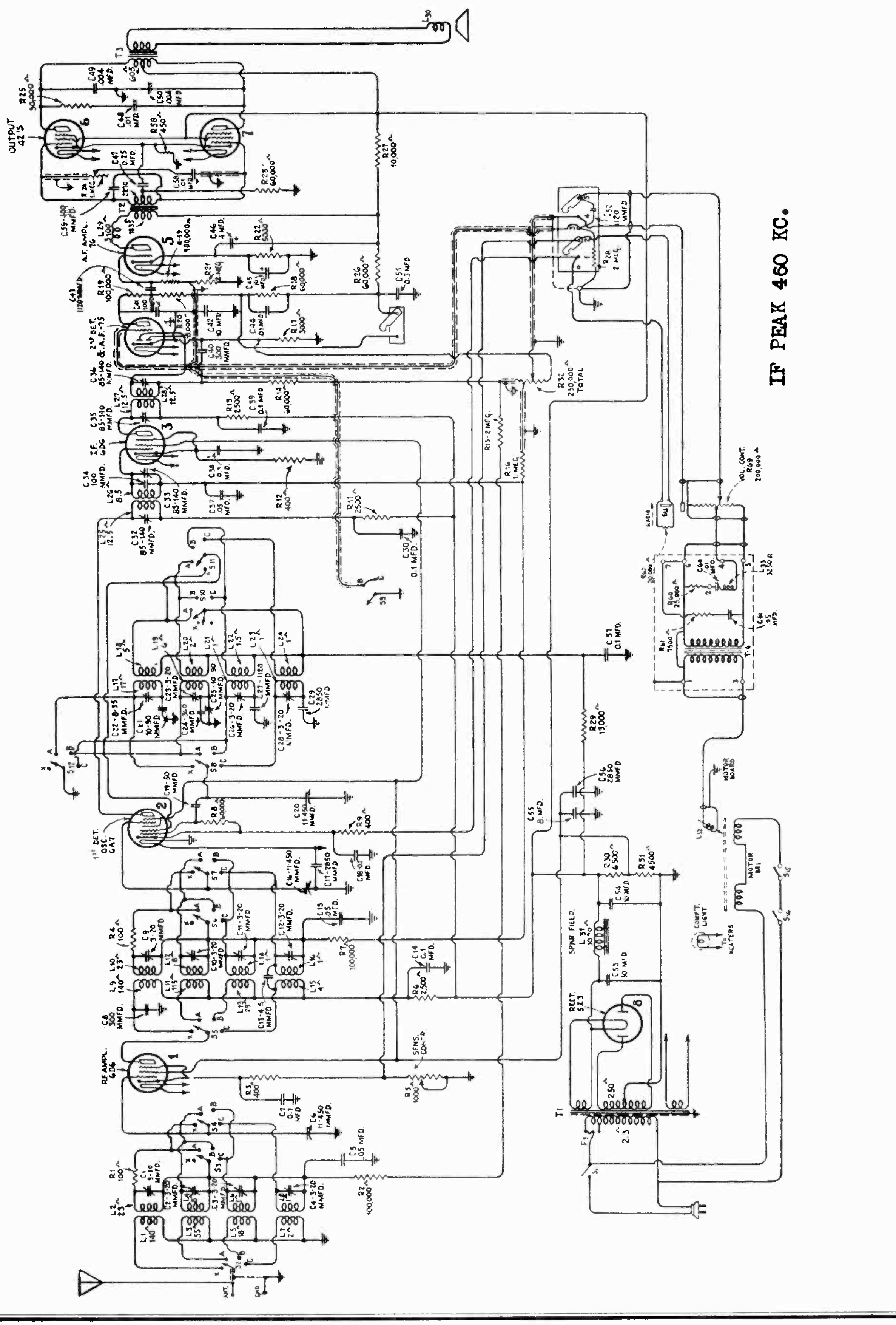
REPLACEMENT PARTS—Continued

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	MOTOR ASSEMBLIES	
3398	Motor mounting washer and spring assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	$0.48
3817	Stud—Motor mounting stud—Package of 3	.18
8989	Motor—Motor complete 105–125 volts—60 cycle	18.52
8990	Motor—Motor complete 105–125 volts—50 cycle	18.52
8991	Motor—105–125 volts—40 cycle	23.36
8992	Motor—Motor complete 105–125 volts—25 cycle	23.36
8993	Rotor and shaft for 105–125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105–125 volts, 50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105–125 volts, 40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105–125 volts, 25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly, comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3516	Damper and bushing assembly—Comprising one upper and one lower damper, one upper bushing and one lower bearing—Located in bottom of pickup arm base	.14
3521	Cover—Pickup back cover	.18
3728	Coil—Pickup coil (L41)	.50
6316	Back—Pickup housing back	.45
6601	Pickup—Pickup unit complete	4.54
7706	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	4.30
	MISCELLANEOUS PARTS	
2917	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3391	Suspension spring and washer for motor board—Comprising one bolt, one top spring, one bottom spring, 2 cup washers, one "C" washer and one nut	.50
3430	Box—Needle box with lid—Package of 2	.90
3829	Knob—Radio or phonograph volume or tone control knob—Package of 5	1.10
3830	Knob—Station selector knob—Package of 5	1.08
3831	Knob—Range switch knob—Package of 5	$1.08
3876	Cable—3-conductor cable for loudspeaker—4-band	.60
3878	Screws—No. 4-40-⅛" fillister head screw and washer for fastening station selector pointer—Package of 20	.25
3952	Escutcheon—Volume control escutcheon	.10
3953	Escutcheon—Range switch escutcheon—5-band	.10
3992	Escutcheon—Range switch escutcheon—4-band	.10
3994	Cover—Automatic brake switch cover	.26
4053	Cable—3-conductor cable—From phonograph volume control to resistor boards	.90
6112	Cushion—Chassis support cushion—Package of 4	.25
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial	.50
6671	Cable—2-conductor shielded for loudspeaker—5-band	.36
6672	Screen—Translucent celluloid screen—For dial lamps—Package of 5	.30
6673	Pointer—Station selector pointer—Package of 5	.64
6677	Dial—Station selector dial—5-band—Package of 5	1.42
6678	Dial—Station selector dial—4-band—Package of 5	1.42
6766	Volume Control—Phonograph volume control and switch (R29, S9)	2.28
6767	Transformer—Input transformer—Comprising one 30,000 ohm resistor, one 2,000 ohm resistor, one .12 mfd. capacitor, one compensating reactor and one transformer (T4, R27, R28, C64, L42)	5.62
6768	Cable—3-conductor shielded—From phonograph volume control to input transformer	.40
8837	Support—Metal support for chassis—Package of 4	.48
10174	Springs—Automatic brake springs—One set of 4 springs	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

MODEL 341
Schematic

RCA-VICTOR CO., INC.



MODEL 341
Chassis Wiring.

RCA-VICTOR CO., INC.

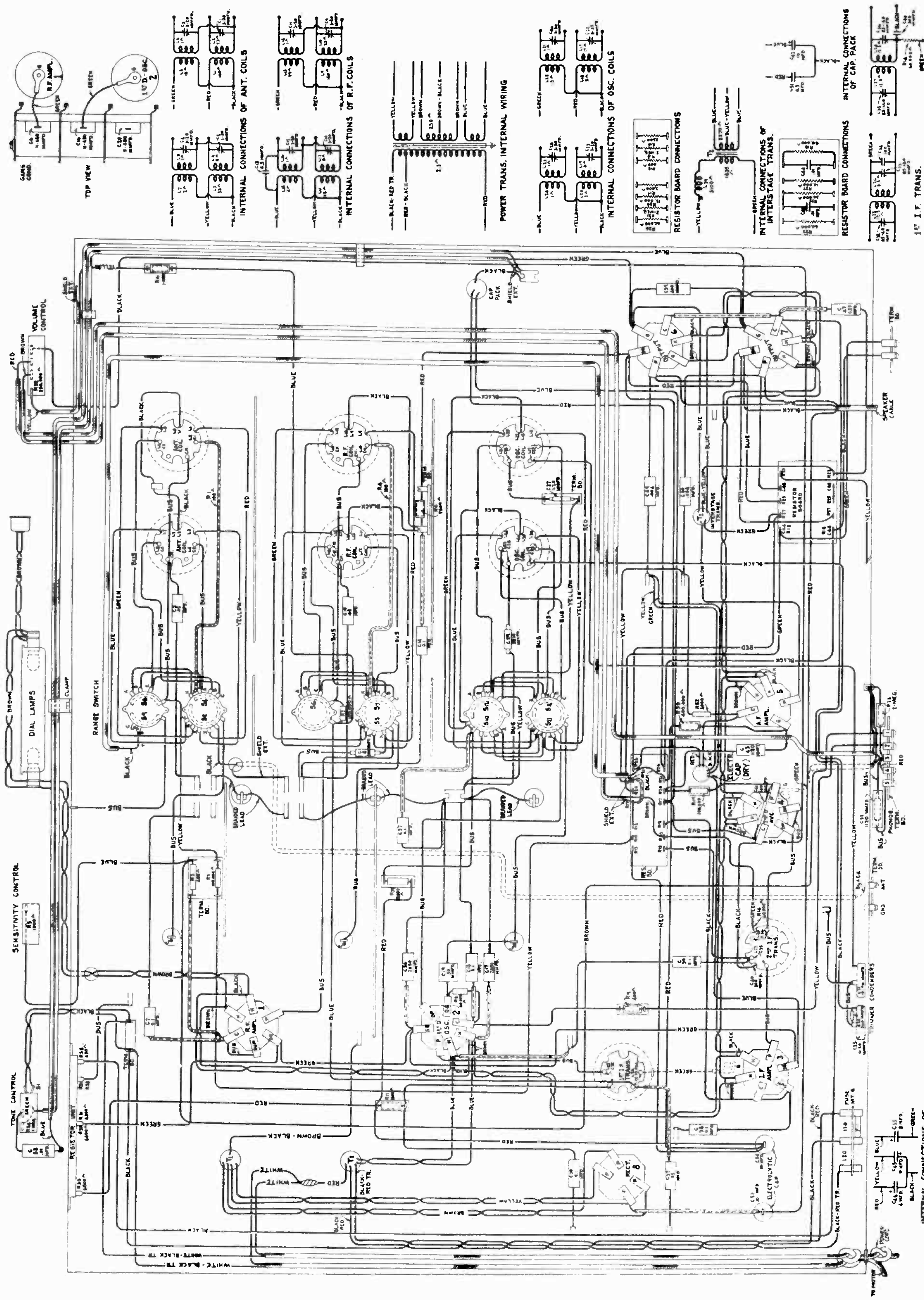
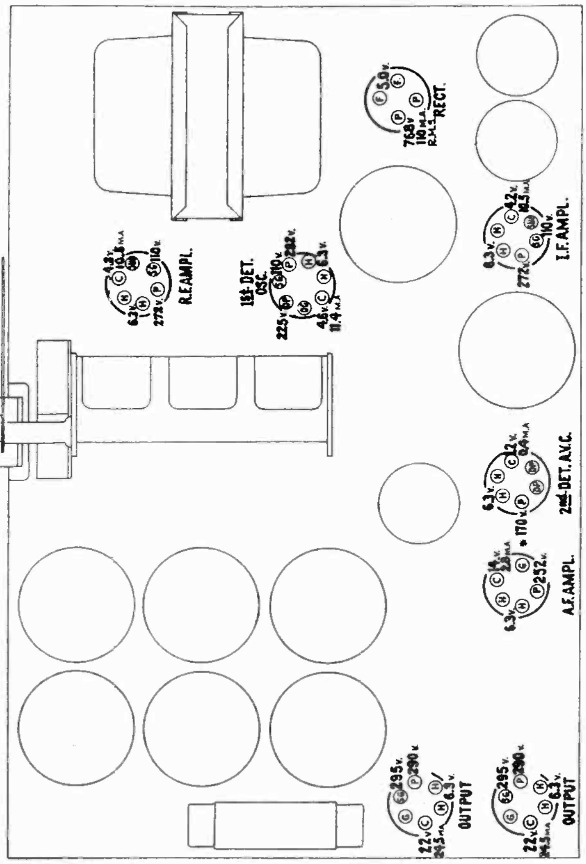


FIGURE 2 - CHASSIS WIRING

MODEL 341
Socket and
Trimmer Layouts

RCA-VICTOR CO., INC.



* CANNOT BE MEASURED WITH ORDINARY VOLTMETER

ALL VOLTAGES ARE TO GROUND

Figure 8- Radiotron Socket Voltages

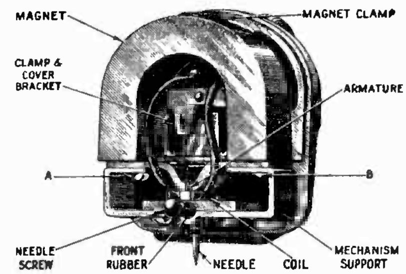


Figure 10—Pickup Nomenclature

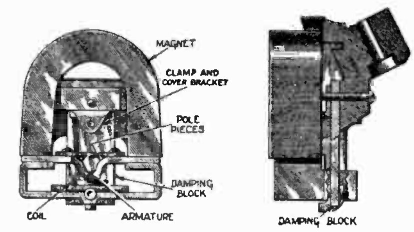


Figure 9—Details of Pickup

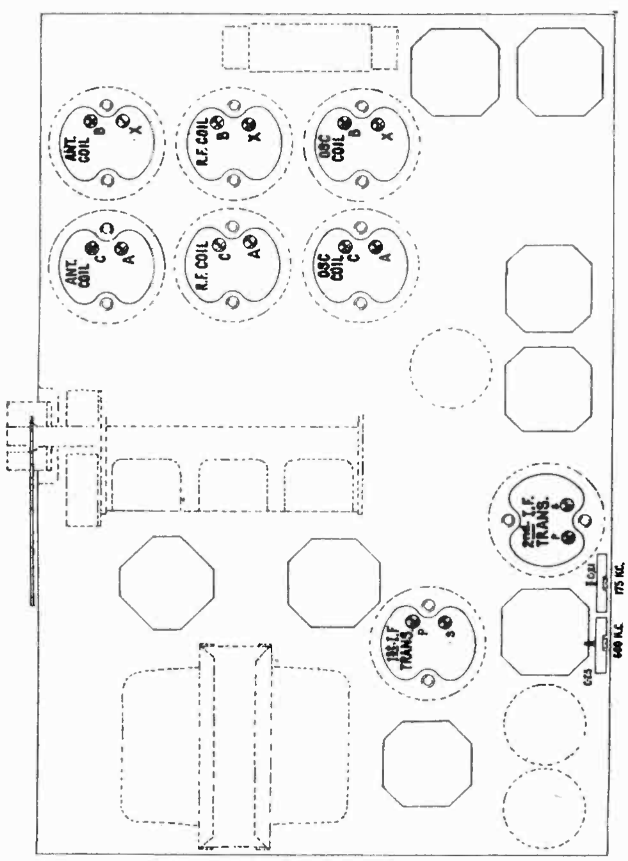


Figure 6—Location of Trimmer Capacitors

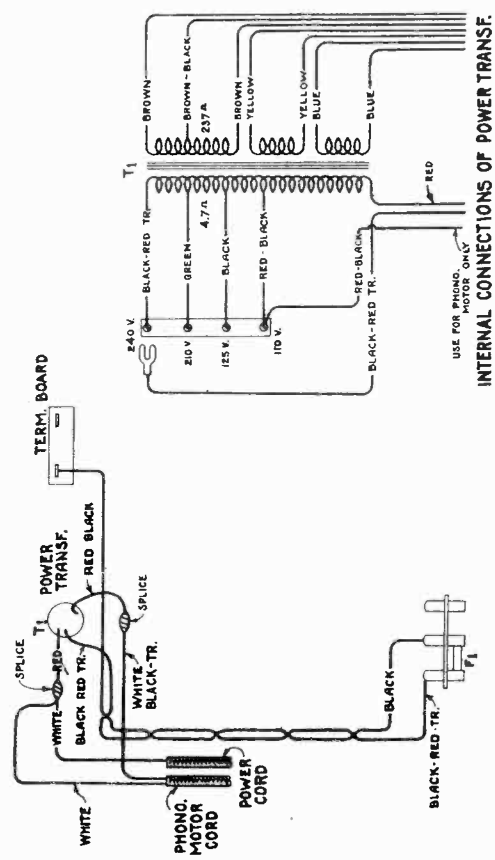


Figure 7—Universal Power Transformer Connections

RCA-VICTOR CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, an I. F. stage, a combined second detector, A. F. amplifier and automatic volume control, a driver audio stage and a push-pull Pentode output stage. An RCA-5Z3 rectifier, together with a suitable filtering system, provides plate and grid voltages for all tubes and field excitation for the loudspeaker. Figure 1 shows the schematic diagram, Figure 2 the chassis wiring, Figure 3 the loudspeaker wiring and Figure 4 the assembly wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang capacitor.

Combined with the signal in the first detector is the local oscillator, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang capacitor are used in this circuit.

In conjunction with these three tuned circuits, it is well to point out that four different groups of tuned circuits are used, one for each tuning band. A four-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to the absorption effects caused by the coils, the natural period of which, with the tuning capacitor disconnected, falls in the next higher frequency band.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 K. C.

The output of the I. F. amplifier is then applied to the input electrodes of the RCA-75, which is a combined second detector, A. F. amplifier and automatic volume control. The direct current component of the rectified signal produces a voltage drop across resistor R-32. The full voltage drop constitutes the automatic bias voltage for the R. F. while a tap is provided for the first detector and I. F. voltage. These automatic bias voltages for the R. F., first detector and I. F. give the automatic volume-control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-75 and thereby regulates the audio output of the entire receiver.

The output of the A. F. section of the RCA-75 is resistance coupled to the grid of the RCA-76, first audio stage, which is transformer coupled to the push-pull output stage.

The output stage uses two RCA-42's, which give a low distortion, high audio output to the loudspeaker. A high-frequency tone control, which consists of a variable resistor and capacitor, is connected across the grids of the output stage. At the minimum resistance position of the variable resistor, maximum attenuation of the high audio frequencies is obtained.

The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

Plate and grid voltages for all tubes are supplied from the output of the rectifier-filter system. An RCA-5Z3 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

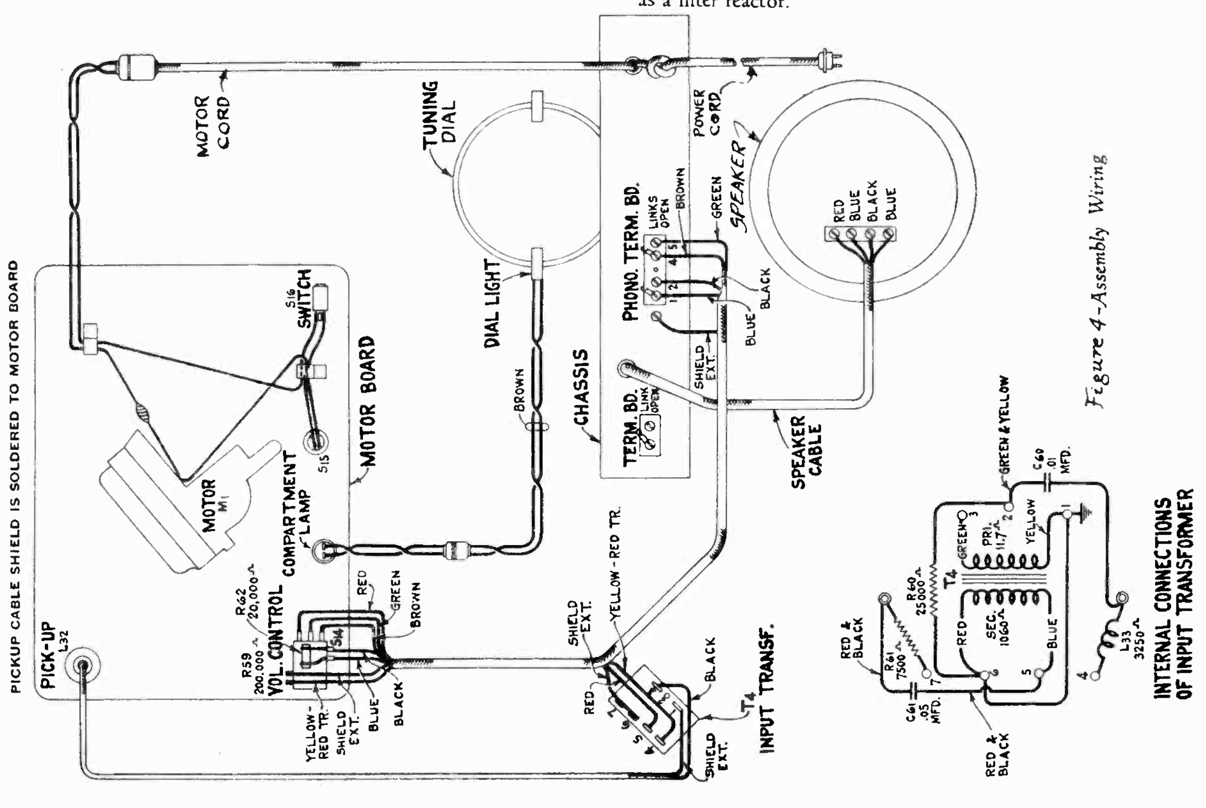


Figure 4—Assembly Wiring

RCA-VICTOR CO., INC.

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To properly align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts, which are shown have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 K. C. and the signal tuned in, and the output indicator connected across the voice coil of the loudspeaker. Then the tuning wand should be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage with two transformers having four adjustable capacitors that may require adjustment. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to to interlocking which always occurs.

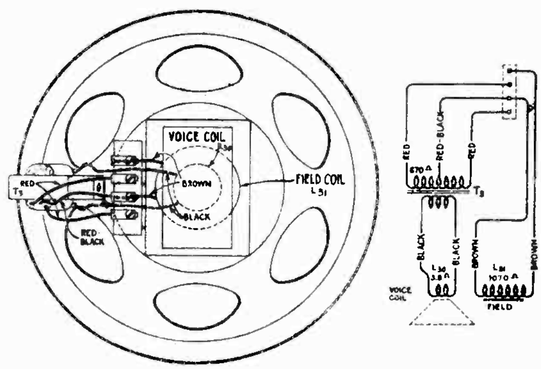


Figure 3—Loudspeaker Wiring

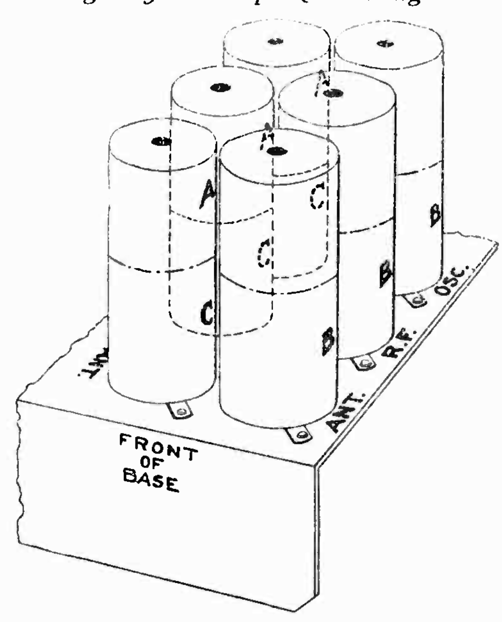


Figure 5—Location of Coils in Shields

RCA-VICTOR CO., INC.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in Bands "A" and "X." Three are required in Bands "B" and "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator across the voice coil of the loudspeaker. The volume and sensitivity controls must be at the maximum position and the input from the oscillator at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of Band "A."

Figure 6 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "A"

(a) Set the band switch at "A."

(b) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, marked 600 K. C., Figure 6, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (b).

Band "B"

(a) Set the band switch at "B."

(b) Tune the external oscillator to 5,160 K. C. and set the pointer at 5,160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4,240 K. C. on the dial. It will be necessary to increase the external oscillator output for this check.

(d) The antenna and detector trimmers should now be peaked for maximum output.

Band "C"

(a) Set the band switch at "C."

(b) Tune the external oscillator to 18,000 K. C. and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then at the oscillator frequency and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "X"

(a) Set the band switch at "X."

(b) Tune the external oscillator to 410 K. C., set the dial pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 175 K. C. on Figure 6, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (b).

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 7 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

(5) FIDELITY LINK

It will be noted that a small link is mounted on the rear apron of the chassis which is open. Closing the link reduces the low frequency output of the receiver.

(6) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 8 shows the voltages at each individual socket contact.

(7) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

(8) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective coil or the hardened pivot rubbers (see Figure 10), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 10, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization. The magnetizer shown on page 18 is useful for magnetizing pickups.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 10), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009" on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h), section (8).

(9) REPLACING THE DAMPING BLOCK

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

RCA-VICTOR CO., INC.

MODEL 341
Pickup Data
Record Changer Data

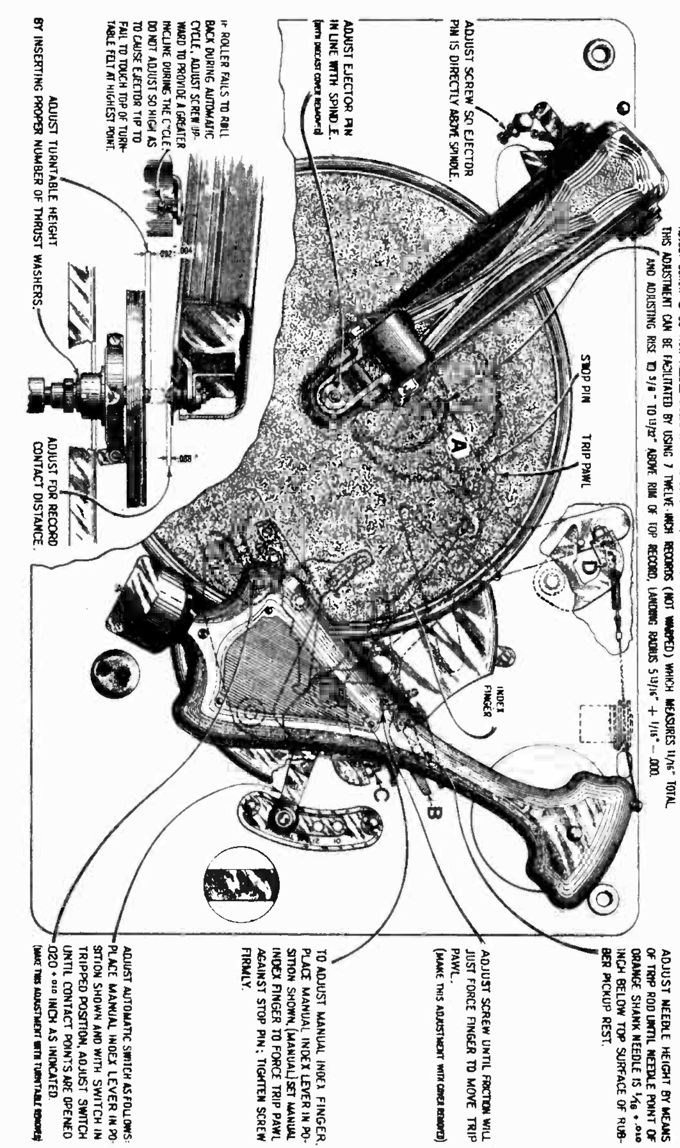


Figure 12—Automatic Record Changer Adjustments

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 11, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Figure 11—Special Soldering-Iron Tip

(f) Turn the dial to each extreme and to its center position and check the backlash of the back gear (closest to reflector). There should be definite backlash in each direction at each of these three positions.

(g) If this backlash is not obtained, loosen the nut on the back of the reflector which holds the shaft of these gears and slide the shaft toward the outer edge of the reflector. The hole is elongated to permit this adjustment.

(h) After making sure there is backlash at the three check points mentioned, turn the outside gear in a clockwise direction 1¼ turns. Hold it at this position and replace the stem gear.

(i) Turn the dial throughout its range. If the gears become noisy, move the gear further toward the reflector edges described in (g).

(j) Replace the dial scale, making sure the hole clears the spindle.

(k) Replace the vernier hand. It should point at zero when the tuning capacitor is fully meshed.

(l) Replace the large hand. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A" when the tuning capacitor is fully meshed.

The above covers the proper manner of making adjustments, assuming all parts are in normal condition. Of course, if any part is defective, it must be replaced. The spring gear may be checked by turning it until the spring is tight and unwinding it slowly. It should unwind 4¼ turns.

(10) AUTOMATIC RECORD CHANGER

The automatic record changer used in this instrument is of simple design and fool-proof construction. Under normal operating conditions service difficulties should be negligible. However, in event adjustments are required, a reference to Figure 12 will disclose the proper method of making all adjustments.

(11) ADJUSTMENT OF DIAL VERNIER MECHANISM

A small vernier indicator is provided for giving a simple means of band spread. Under normal conditions, adjustment of this mechanism will not be required. However, in event the initial adjustment is not satisfactory or adjustment is required because of replacement, the following procedure should be used:

(a) Remove the chassis from the cabinet to a place convenient for work.

(b) Check the tension on the vernier hand by pushing it in a clockwise direction. There should be considerable tension against such a push. If this tension does not exist, the action of the hand may be erratic and possibly fail to return to the same position for a particular station.

(c) Pull off the long hand with a pair of long-nose pliers.

(d) Straighten the lugs that hold the dial in place. Then remove the dial "vernier" hand and stem gear together.

(e) Then remove the "vernier" hand from the stem gear.

PHONOGRAPH

The record reproducing facilities consist of a low impedance magnetic pickup with its associated inertia type tone arm, a compensated volume control, the audio amplifier of the receiver and the loudspeaker of the receiver. The radio receiver is made inoperative by the switch used for changing from radio to record reproduction. The turntable assembly consists of the perfected automatic record changer, which is simple and fool-proof in operation.

MODEL 341
Voltage
Parts List

RCA-VICTOR CO., INC.

ELECTRICAL SPECIFICATIONS

Voltage Rating .... 105–125 Volts and 105–130/200–250 Volts (Double Range)
Frequency Rating .... 25, 30, 50 and 60 Cycles
Power Consumption .... 170 Watts, 60 Cycles
Type and Number of Radiotrons
2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-76, 2 RCA-42, 1 RCA-5Z3—Total, 8

Tuning Frequency Range ....
Band X— 140 K. C.– 410 K. C.
Band A— 540 K. C.– 1720 K. C.
Band B—1720 K. C.– 5400 K. C.
Band C—5400 K. C.–18,000 K. C.

Line up Frequencies ...... 175 K. C., 410 K. C., 460 K. C., 600 K. C., 1720 K. C., 5160 K. C., 18,000 K. C.
Maximum Undistorted Output .... 4.0 Watts
Maximum Output .... 5.0 Watts
Type of Magnetic Pickup .... Low Impedance, Viscoloid
Type of Record Changer .... Record Ejector Type
Capacity of Record Changer .... Eight 10" or seven 12" Records
Turntable Speed .... 33⅓ R. P. M. and 78 R. P. M.

This eight-tube, four-band all-wave combination radio-phonograph instrument provides entertainment either from the perfected all-wave radio receiver or from records of all types. Record or radio reproduction is characterized by unusual tone quality. The perfected phonograph enables one to play a number of selections without any attention whatever, due to its automatic record-changing feature.

The eight-tube, four-band Superheterodyne receiver is of the "all-wave" type, having a continuous tuning range extending from 140 K. C. to 18,000 K. C., except for one break between 410 K. C. and 540 K. C. Such a tuning range permits the listener to receive all of the important broadcasting, police, aircraft and amateur call bands throughout the world.

Excellent sensitivity, selectivity and tone quality, together with a high output (4 watts undistorted), Class A amplifier gives the receiver outstanding performance. Operating features include an "airplane" type dial, a double-ratio vernier drive, a visual band indicator, and a special "second hand" on the dial for logging short-wave stations. Other important features include automatic volume control, sensitivity control and a large loudspeaker unit.

RADIOTRON SOCKET VOLTAGES

120-Volt A. C. Line—Maximum Volume and Sensitivity—No Signal

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		4.2	110	272	10.5	6.3
RCA-6A7	Oscillator	—	—	225	11.4	6.3
	1st Detector	4.6	110	282		
RCA-6D6 I. F.		4.2	110	272	10.5	6.3
RCA-75 2nd Detector		1.2	—	170*	0.4	6.3
RCA-76 A. F.		14.0	—	252	2.8	6.3
RCA-42 Power		22.0	295	290	24.5	6.3
RCA-42 Power		22.0	295	290	24.5	6.3
RCA-5Z3 Rectifier		—	—	768/384 R. M. S.	110.0	5.0

*Cannot be measured with ordinary voltmeter.

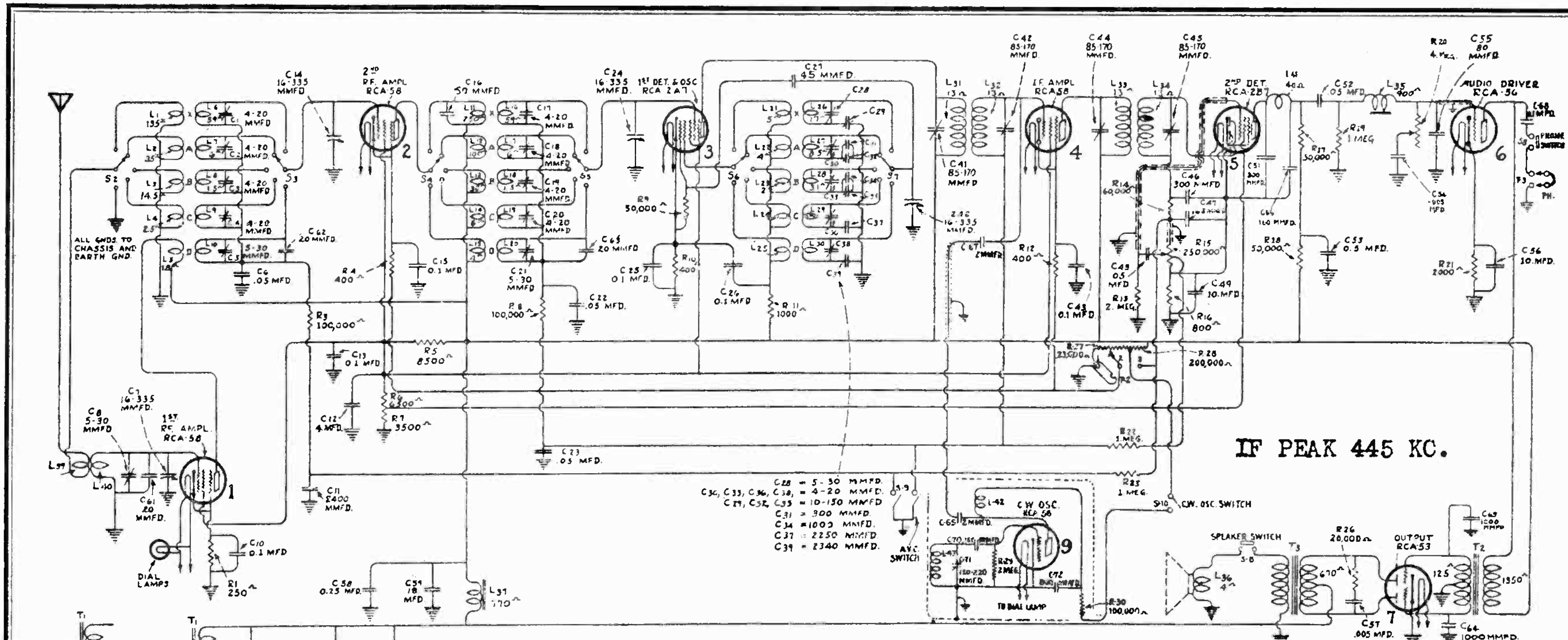
REPLACEMENT PARTS

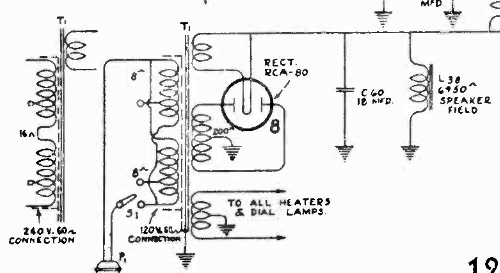
Stock No.	Description	List Price
3861	Capacitor—Oscillator trimmer capacitor (C21, C25)	.78
4633	Capacitor—50 mmfd. (C19)	.25
4635	Capacitor—100 mmfd. (C41)	.25
3937	Capacitor—300 mmfd. (C8)	.34
4413	Capacitor—360 mmfd. (C24)	.22
4183	Capacitor—400 mmfd. (C59)	.26
4412	Capacitor—1120 mmfd. (C27)	.25
4409	Capacitor—1120 mmfd. (C43)	.35
4634	Capacitor—1120 mmfd. (C52)	.35
4524	Capacitor—2850 mmfd. (C29)	.35
4615	Capacitor—2850 mmfd. (C17, C56)	.34
4628	Capacitor—0.004 mfd. (C49, C50)	.28
3787	Capacitor—0.01 mfd. (C48)	.30
4212	Capacitor—0.01 mfd. (C44)	.30
4624	Capacitor—0.01 mfd. (C58)	.54
3888	Capacitor—0.05 mfd. (C37)	.25
4417	Capacitor—0.05 mfd. (C5, C15)	.25
3877	Capacitor—0.1 mfd. (C38)	.32
4415	Capacitor—0.1 mfd. (C18)	.30
4645	Capacitor—0.1 mfd. (C7, C14, C30, C39, C57)	.25
3750	Capacitor—0.25 mfd. (C47)	.36
7790	Capacitor—10 mfd. (C53, C54)	1.05
4619	Capacitor pack—Comprising one 0.5 mfd., one 10 mfd. capacitor (C42, C51)	1.44
4626	Capacitor pack—Comprising one 4 mfd., one 10 mfd. and one 8 mfd capacitor (C45, C46, C55)	2.82
7810	Coil—Antenna coil "PB-LW" (L1, L2, L5, L6, C1, C3)	2.10
7803	Coil—Antenna coil "B.S.W." (L3, L4, L7, L8, C2, C4)	1.82
7808	Coil—Detector coil "P.B.-L.W." (L9, L10, L13, L14, C9, C11)	2.05
7805	Coil—Detector coil "B.-S.W." (L11, L12, L15, L16, C10, C12, C13)	2.15
7807	Coil—Oscillator coil "B.S.W." (L19, L20, L23, L24, C23, C28)	1.62
7809	Coil—Oscillator coil "P.B.-L.W." (L17, L18, L21, L22, C22, C26)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C16, C20)	4.42
4616	Tone control (R24, S1)	1.28
4431	Transformer—First intermediate frequency transformer (L25, L26, C32, C33, C34)	2.28
9505	Transformer—Power transformer—105–125 volts—50–60 cycles (T1)	6.35
9506	Transformer—Power transformer—105–125 volts—25–40 cycles	8.90
9507	Transformer—Power transformer—105–250 volts—40–60 cycles	6.40
4433	Transformer—Second intermediate frequency transformer (L27, L28, C35, C36, C40, R14)	2.15
4620	Transformer and reactor—Interstage transformer and reactor (T2, L29)	2.98
4519	Volume control (R32)	1.25

Stock No.	Description	List Price
4625	Resistor—Wire wound resistor—Comprising one 6500-ohm-4500-ohm and 450 section (R30, R31, R58)	.70
3704	Resistor—400 ohms—Carbon type—¼ watt (R9, R3, R12)—Package of 5	1.00
4338	Resistor—2500 ohms—Carbon type—¼ watt (R6, R11, R13)—Package of 10	2.00
4242	Resistor—3000 ohms—Carbon type—¼ watt (R17)—Package of 5	1.00
4436	Resistor—5000 ohms—Carbon type—¼ watt (R22)—Package of 10	2.00
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R20)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8, R18, R23, R26)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2, R7, R19)—Package of 5	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R59)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R16)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R15, R21, R28)—Package of 5	1.00
3078	Resistor—10,000 ohms—Carbon type—½ watt (R27)—Package of 5	1.00
4623	Resistor—13,000 ohms—Carbon type—½ watt (R29)—Package of 10	2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R25)	.22
4418	Resistor—100 ohms—Flexible type (R1, R4)—Package of 10	1.50
4618	Rheostat—Sensitivity control (R5)	1.25
9011	Motor—105–125 volts—60 cycles	19.72
9014	Motor—105–125 volts—50 cycles	19.72
9012	Motor—105–125 volts—25 cycles	24.16
9537	Coil—Field coil magnet and cone support (L31)	3.85
8969	Cone—Reproducer cone—Package of 5 (L30)	6.35
9536	Reproducer complete	8.40
4637	Transformer—Output transformer (T3)	1.50
6303	Resistor—20,000 ohms—Carbon type—¼ watt (R62)—Package of 5	1.00
4678	Ring—Dial retaining ring—Package of 5	.34
4613	Screw—8-32-7/16" headless set screw for knob	.25
4557	Shade—Phonograph compartment lamp shade	.35
4671	Switch—Toggle type—Motor starting switch (S16)	.72
4672	Transformer—Input transformer pack comprising one transformer, one reactor, one 0.01 mfd., one 0.05 mfd. capacitor, one 7500-ohm and one 25,000-ohm resistor (T4, L33, C60, C61, R60, R61)	5.42
6766	Volume control—Phonograph volume control (R69, S14)	2.28

MODEL 9-Tube General Purpose A-W. Schematic, Voltage

RCA-VICTOR CO., INC.





120 Volt, A. C. Line

Selector Switch Position	Frequency Range (Kilocycles)	Wave-Length Range (Meters)
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–30
D	8000–18000	37.5–16.7

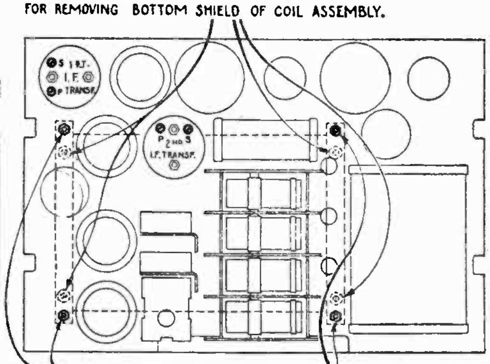
Figure A—Schematic Circuit Diagram—Additional Resistor–750,000 ohms–Parallel to R-28 on some models

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Cathode, Volts	Plate to Cathode, Volts	Plate Current, M. A.	Filament or Heater, Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0
RCA-56, CW-Osc.	**	—	20	0.1	2.6

* Voltages and current apply to detector portion of tube.

** These voltages cannot be measured because of the high resistance of the circuits.

REMOVE FOUR NUTS & LOCKWASHERS SHOWN FOR REMOVING BOTTOM SHIELD OF COIL ASSEMBLY.



REMOVE FOUR NUTS & LOCKWASHERS TO REMOVE COIL ASSEMBLY.

Figure D—Location of nuts and lockwashers holding coil assembly

MODEL 9-Tube General Purpose A-W. Chassis Wiring

RCA-VICTOR CO., INC.

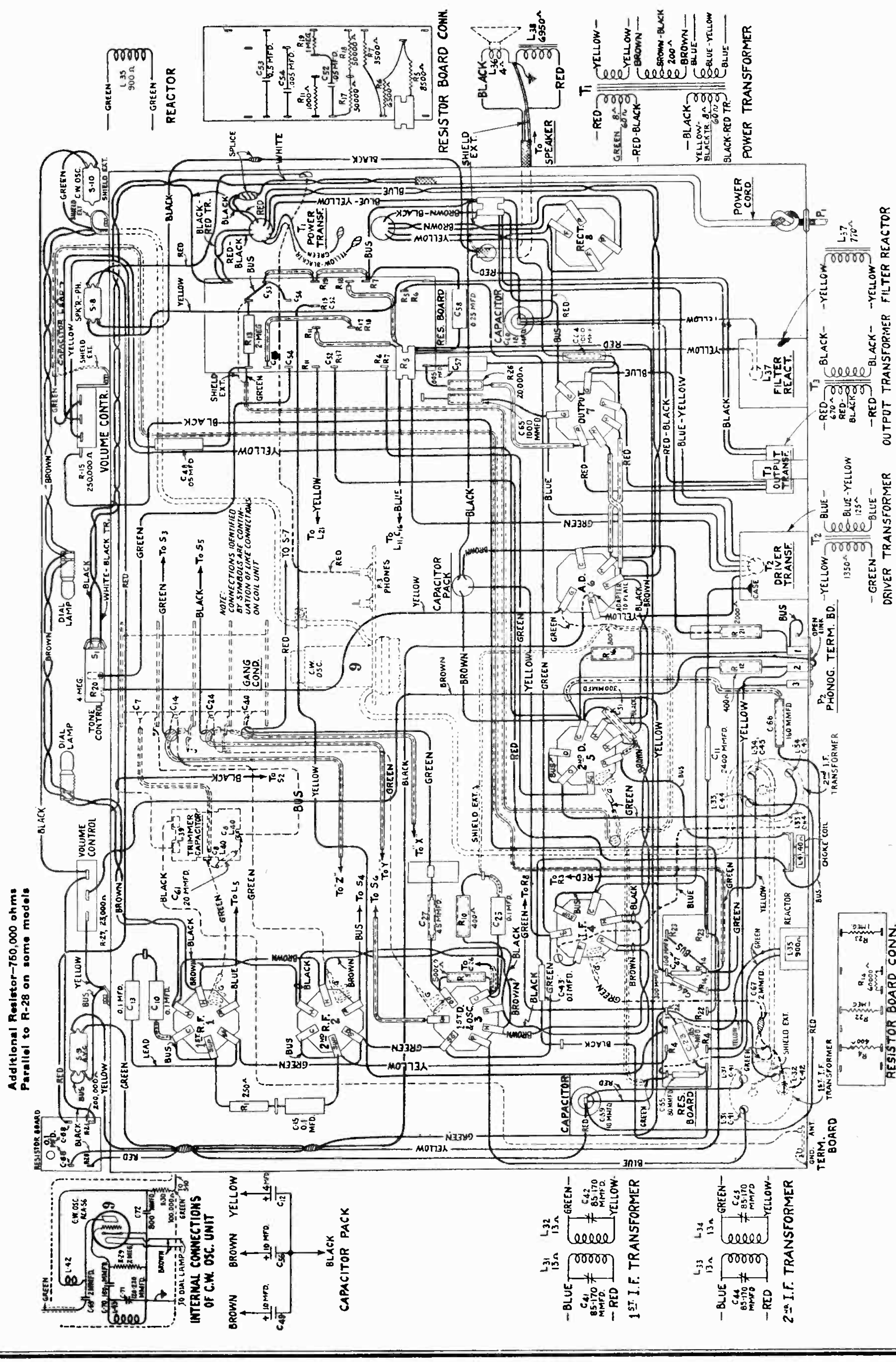


Figure B—Chassis Wiring

MODEL 9-Tube General Purpose A-W.
Coils Wiring Diagram

RCA-VICTOR CO., INC.

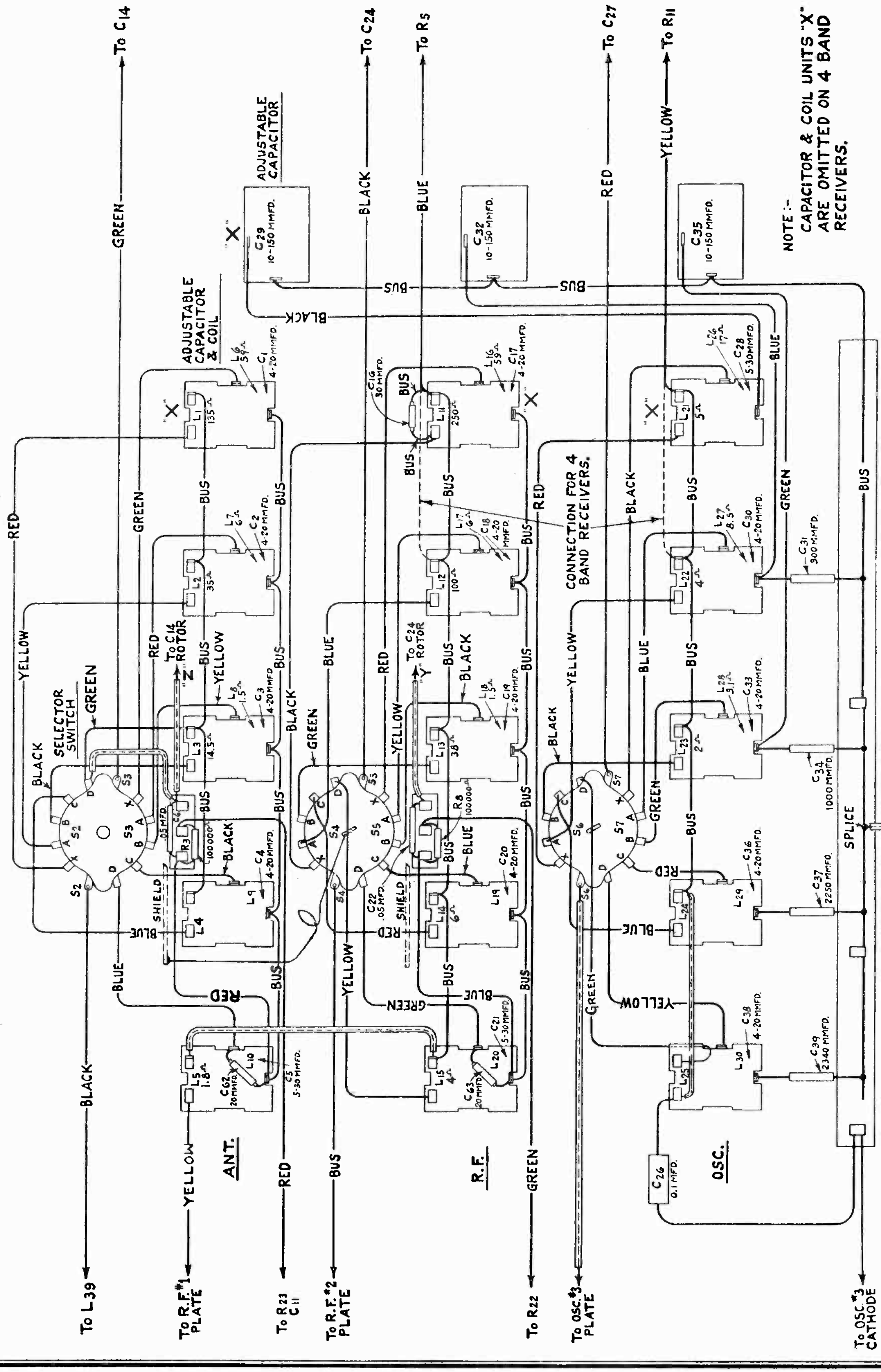


Figure C—Wiring Diagram of Coil Assembly

MODEL 9-Tube General Purpose A-W.
Alignment Data

RCA-VICTOR CO., INC.

SERVICE DATA

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing Radiotrons and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss and 445 K. C. signals or static.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and makes easier alignment of the oscillator at the higher frequency bands.

In order to receive pure C W signals, an I. F. heterodyne oscillator has been provided. This oscillator is an RCA-56 that operates at a 1000-cycle higher frequency than the I. F. An adjustable capacitor is provided so that the pitch of the heterodyne frequency may be varied throughout the audible range.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 90 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300 ohm resistor for use as a "dummy" antenna, a non-metallic screwdriver (such as Stock No. 4160), and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with a 300 ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver. This is done by connecting the 300 ohm resistor between the antenna and ground terminals of the receiver and attaching a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure E for the location of the line-up capacitors.

The CW oscillator beat frequency may be adjusted by means of the trimmer capacitor shown in Figure E. (It may be necessary to slightly loosen the shielding cover to gain access to this screw.) A weak modulated or telephone signal should be accurately tuned-in with the oscillator "off" The oscillator should then be turned "On" and the trimmer screw adjusted until a 1000 cycle note is obtained.

Line-up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments To Be Made
445 K. C.	Any setting that does not bring in station.	Top of chassis.	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis.	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output. (See Note)	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. (See Note)	4

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is reaction on the oscillator tuning.

MODEL 9-Tube General Purpose A-W.
Transformer Data
Trimmer Locations

RCA-VICTOR CO., INC.

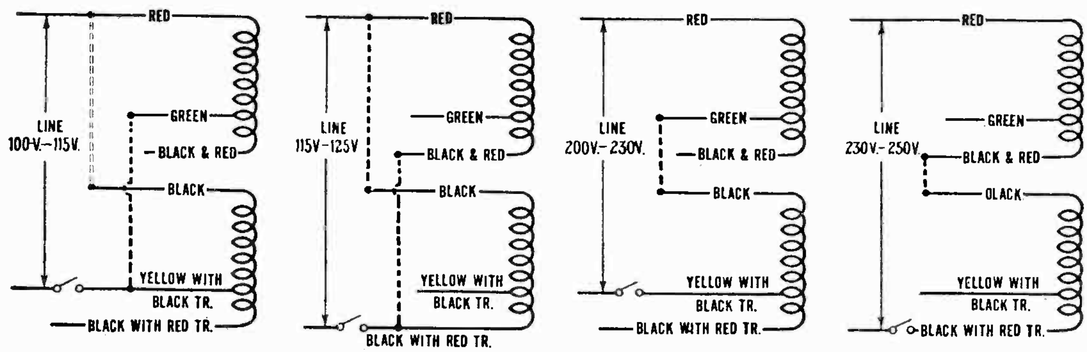
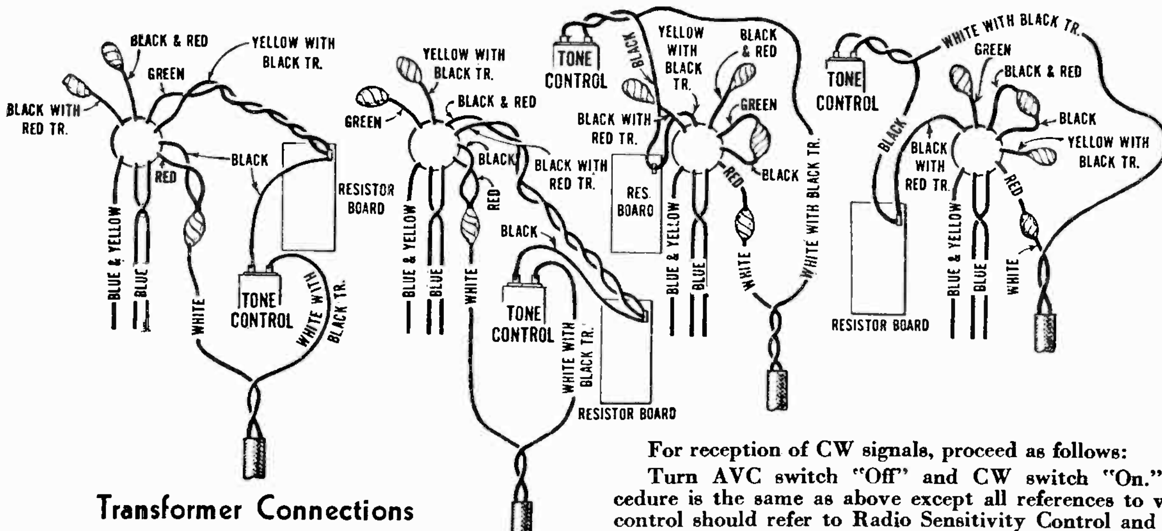


Figure F—Power Transformer Connections (50–60 cycles)



Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure F shows the proper manner of making the various connections possible for this transformer.

(1) **Range Switch** (Upper Left-hand Knob)—This switch converts the receiver for operation within any of the tuning ranges provided. As indicated on the selector dial, the letters on the switch escutcheon signify:

X—*Long-Wave Range*—150 to 410 kilocycles (2000 to 732 meters). Airport band.

A—*Standard Broadcast Band*—540 to 1500 kilocycles (555 to 200 meters).

B—*Police Band*—1500 to 3900 kilocycles (200 to 77 meters). Services available within this band include police calls at 1574, 1712 and 2450 kilocycles, amateur radio "phone" communications between 1800 and 2000 kilocycles, and aviation communications (phone) between 2500 and 3500 kilocycles.

C—*Short-Wave Range*—3900 to 10,000 kilocycles (77 to 30 meters). Within the limits of this range are included two of the internationally-assigned short-wave broadcast bands. These are known as the 49 and 31 meter bands. (The portion of this range from 8000 to 10,000 kilocycles, which includes the 31 meter band, is preferably received on range D.)

D—*Short-Wave Range*—8,000 to 18,000 kilocycles (37.5 to 16.7 meters). This range embraces four of the standardized short-wave broadcast bands located at 31, 25, 19 and 16 meters, respectively.

For reception of CW signals, proceed as follows:

Turn AVC switch "Off" and CW switch "On." Procedure is the same as above except all references to volume control should refer to Radio Sensitivity Control and Audio Volume Control should be near the extreme clockwise position. Each station tuned in will be indicated by a whistle caused by the beating of the CW oscillator frequency with the signal frequency. This feature provides unmistakable signal indication and may also be used when tuning signals other than CW, noting the presence of the signal with the oscillator "On" and tuning the station in finally with the oscillator turned "Off."

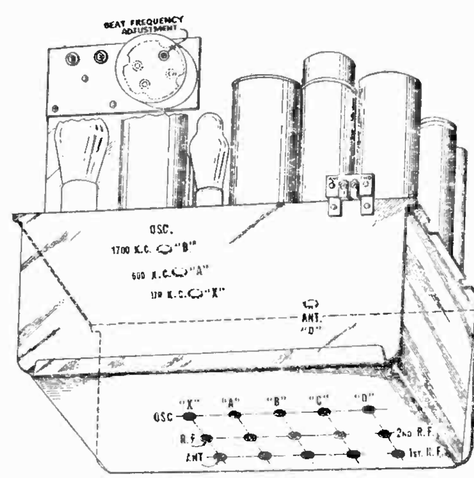


Figure E—Location of line-up capacitors.

MODEL 9-Tube General Purpose A-W. Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26, C68)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—¼ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R14—Package of 5	1.00
3616	Capacitor—300 mmfd. (C51)	.34
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3643	Capacitor—.005 mfd. (C57)	.25
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—8,500 ohms—Carbon type—3 watt (R5)	.25
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3888	Capacitor—.05 mfd. (C6, C22, C23, C52)	.25
3901	Capacitor—.05 mmfd. (C48)	.36
3931	Capacitor—45 mmfd. (C27)	.30
3932	Capacitor—.0024 mfd. (C11)	.30
3973	Capacitor—1,000 mmfd. (C64, C65)	.34
4019	Capacitor—1,000 mmfd. (C34)	.34
4030	Bracket—Tone or volume control mounting bracket	.10
4033	Capacitor—20 mmfd. (C61, C62, C63)	.34
4103	Shield—First detector and R. F. Radiotron shield	.20
4104	Shield—I. F. Radiotron shield	.20
4205	Coil—Second detector choke coil (L41)	.50
4207	Capacitor—0.1 mfd. (C13, C43)	.34
4217	Switch—Single pole—Single throw—"CW-OSC" (S10)	1.15
4218	Switch—Double pole—Single throw—"AVC" (S9)	1.00
4219	Switch—Single pole—Double throw—"Speaker-Phone" (S8)	1.90
4220	Resistor—200,000 ohms—Carbon type—1 watt (R28)—Package of 5	1.10
6112	Cushion—Rubber cushions for chassis—Package of 4	.25
6136	Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6278	Resistor—750,000 ohms—Carbon type—½ watt (R31)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6512	Capacitor—.005 mfd. (C54)	.28
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48
6606	Reactor—Filter reactor (L37)	1.66
6607	Reactor—Tone control reactor (L35)	1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6612	Volume control—Audio volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	1.00
6626	Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56)	1.86
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000-18,000 kilocycles—4- or 5-band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor—150-410 kilocycles—5-band (L1, L6, C1)	2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150-410 kilocycles—5-band (L11, L16, C17)	2.10

Stock No.	DESCRIPTION	List Price
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150-410 kilocycles—5-band (L21, L26, C28)	$1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly—540-1,500 kilocycles—4- or 5-band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540-1,500 kilocycles—4- or 5-band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540-1,500 kilocycles—4- or 5-band (L22, L27, C30)	1.40
6637	Coil and capacitor—Antenna coil and capacitor assembly—1,500-4,000 kilocycles—4- or 5-band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500-4,000 kilocycles—4- or 5-band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500-4,000 kilocycles—4- or 5-band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000-10,000 kilocycles—4- or 5-band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000-10,000 kilocycles—4- or 5-band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000-10,000 kilocycles—4- or 5-band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000-18,000 kilocycles—4- or 5-band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly—8,000-18,000 kilocycles—4- or 5-band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	1.10†
6889	Capacitor—18. mfd. (C60)	1.55
6890	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	2.40
6891	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	2.40
6892	Tone control (R20)	1.50
6953	Volume control—Radio sensitivity control (R27)	1.25
6955	Shield—Second R. F. Radiotron Shield	.25
6956	Shield—Radiotron shield top	.15
7065	Screwdriver—For R. F. or I. F. adjustment	.80
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
9042	Transformer—Power transformer—105-250 volts—50-60 cycles (T1)	6.84
9046	Transformer—Power transformer—105-125 volts—25-40 cycles	9.22
9050	Oscillator—Test oscillator—150-25,000 K. C.	33.50†
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	MISCELLANEOUS PARTS	
4224	Bezel—Station selector dial bezel	.50
4225	Ring—Dial glass retaining ring—Package of 5	.95
4226	Escutcheon — Engraved — "AVC-on-off" — "Radio Sensitivity" — "Power Tone-off-on" — "Speaker-Phone" — "CW-OSC-off-on"	.85
4227	Escutcheon—Audio sensitivity control escutcheon	.70
4228	Escutcheon—Range switch escutcheon	.35
4229	Knob—Audio volume control tone control or radio sensitivity control knob—Package of 5	1.15
4230	Knob—"AVC" — "CW-OSC" — "Speaker-Phone" and range switch knob—Package of 5	1.15
4231	Knob—Station selector knob—Package of 5	1.15
6614	Glass—Station selector dial glass	.30
6954	Adapter—5-prong adapter	.82
	OSCILLATOR ASSEMBLIES	
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R30)—Package of 5	1.00
3634	Capacitor—160 mmfd. (C70)	.34
3682	Shield—Radiotron shield	.22
4027	Capacitor—800 mmfd. (C72)	.44
4221	Jack—Pinjack—Package of 2	.45
4222	Shield—Coil shield	.28
6242	Resistor—2 megohms—Carbon type—¼ watt (R29)—Package of 5	1.00
6700	Coil—Oscillator coil (L42, L43, C69)	2.30
6899	Capacitor—Adjustable capacitor—120-220 mmfd. (C71)	.70
6951	Cable—3-conductor shielded cable	.32
6952	Cable—Single conductor shielded	.24
7484	Socket—5-contact Radiotron socket	.35
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

† Full Discount not allowed.

RCA-VICTOR CO., INC.

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption (60 Cycle)..................175 Watts
Type and Number of Radiotrons......4 RCA-56, 4 RCA-58,
1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range.540 K.C.-1500 K.C.—1400 K.C.-2800 K.C.
Undistorted Output............................10.0 Watts

This combination instrument utilizes the new perfected automatic record changing mechanism and the twelve-tube Deluxe Super-Heterodyne receiver. Excellent fidelity on both radio and record reproduction is an inherent feature of this instrument. Other features include double tuning range (540 K. C.–1500 K. C. and 1400 K. C.–2800 K. C.), high and low frequency tone control, compensated volume control and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

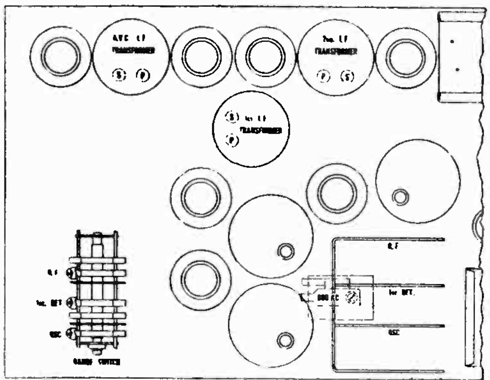


Figure B—Location of Line-up Capacitors

Figure A shows the schematic circuit, Figure B the location of the adjustable capacitors, Figure C the chassis wiring, and Figure D the assembly wiring diagram. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator, such as Stock No. 9050, giving a modulated signal at 600 K. C., 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.
(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.
(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.
(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.
(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.
(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure B, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment. as the tuning capacitor and oscillator series capacitor adjustments interlock.
(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator, such as Stock No. 9050, that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.
(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.
(e) Refer to Figure B. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

Antenna Connections—It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these will normally be used for the usual antenna and ground connections, while the third one is for use in connection with a shielded antenna system. The tap eliminates the need of the transformer usually used for coupling the shielded line to the radio receiver.

Stock No. 7717 shield kit, which comprises a lightning arrester, transformer assembly, a 200 mmfd. capacitor, and 100 feet of shielded wire, is recommended. When such an antenna system is used, it is necessary to connect the 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the Stock No. 7717 Kit.

Automatic Record Changer—The automatic record changer used in this instrument is of simple design and excellent construction. The various adjustments that may be required are shown in Figure E. A point to remember with this instrument is that it must always be level, otherwise proper operation will not be obtained.

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.–I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-5Z3 Rect.	990-495 R. M. S.			92 Total	5.0

MODEL Duo 380
Phonograph Data

RCA-VICTOR CO., INC.

OPERATION—PHONOGRAPH

Automatic Operation

Important Precautions—The following precautions must be observed during operation:

1. In loading the turntable, make certain that the first record inserted (last to be played) is flat—that is, essentially free from warpage.

2. Before starting the turntable, make certain that the reject pocket (at the left of the phonograph compartment) is either empty or sufficiently clear to permit proper disposal of records by the automatic mechanism.

3. Never restrain by force the normal motion of any part of the automatic mechanism while it is changing records.

Procedure—The phonograph operating controls are located on the front panel and in the playing compartment as shown in Figures 1 and 2. Proceed as follows:

1. Set the Transfer Switch counter-clockwise for record reproduction.

2. Apply power by turning the Radio Volume Control clockwise from the "off" position. Set the two Tone Controls for full-range reproduction (see paragraph 7 under "Operation—Radio").

3. With the Motor Switch in the "off" position (Record Volume Control fully counter-clockwise), load the turntable with records, as follows:

(a) Set the Index Lever at "Manual." *Always do this before loading or unloading records.*

(b) Place the electric pickup on the rubber rest.

(c) Raise the Record Ejector arm (*very slowly*, at first, until the internal weight has rolled to the rear of the arm, then as rapidly as desired) to its upper position of rest. *Always raise the ejector arm in this manner.*

(d) Select the records to be played. *All records for one loading must be of the same diameter (either ten or twelve inches), close to standard thickness and operable at the same speed (either 78 or 33⅓ R. P. M.).*

CAUTION—***Do not use thin flexible-type records for automatic operation.***

(e) Place the records, one at a time, on the turntable (see paragraph 1 under "Important Precautions"). The spindle should resume its normal height after each record is added. The turntable is fully loaded when the top surface of the uppermost record is nearly flush with the top of the spindle. (It should not be possible to slide off the top record without lifting its edge or depressing the spindle.)

(f) Lower the Record Ejector arm gently onto the spindle.

4. Insert a *new* needle in the pickup as far as it will go and tighten the needle screw. For long-playing (33⅓ R. P. M.) records, use *only* the *orange Chromium* needle. For standard (78 R. P. M.) records, use the latter needle or, if preferred, either the *green Chromium* or the full volume (full tone) *Tungstone* needle. Transparent-faced (illustrated) records, however, should not be reproduced with *Tungstone* needles.

NOTE—With care, the orange Chromium needle should play 75, the green Chromium 100, and the Tungstone 100 to 150 records. *Never re-insert in the pickup a Chromium needle which has been used (however slightly) as damage to the record grooves would result.*

5. Place the pickup needle on the smooth outer rim of the record, near the first groove. Then move the Index Lever to the position (12 or 10) corresponding to the diameter (inches) of the records on the turntable. Be careful not to move the lever *beyond* the proper index hole. Push the index pin firmly into the hole.

CAUTION—***Never attempt to move the Index Lever from the Manual position when the pickup is on the rubber rest.***

6. Start the turntable by turning the Motor Switch clockwise; then set the Speed Shifter for the speed (78 or 33⅓ R. P. M.) corresponding to the records on the turntable.

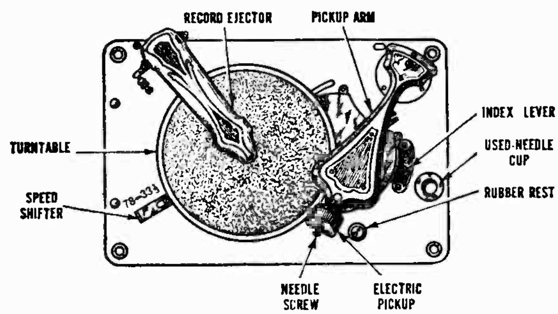


Figure 2

NOTE—The speed shifter should not be moved inward (from the 78 to the 33⅓ R. P. M. position) while the turntable is at rest.

7. Adjust the Record Volume Control to obtain the desired volume.

8. Close the cabinet doors to extinguish the compartment lamp and to render less prominent the mechanical noises incident to record playing and changing. If needle scratch reproduction (particularly noticeable with old records) is considered excessive, turn the *treble* Tone Control slightly counter-clockwise. For most faithful reproduction, however, both Tone Controls should be left in the positions which provide full illumination of the tone color indicator.

NOTE 1—When a record has been played, the ejector arm slides it off into the record pocket and the pickup moves to the outside of the next record. The records on the turntable are thus played consecutively until only one

MODEL Duo 380
Schematic

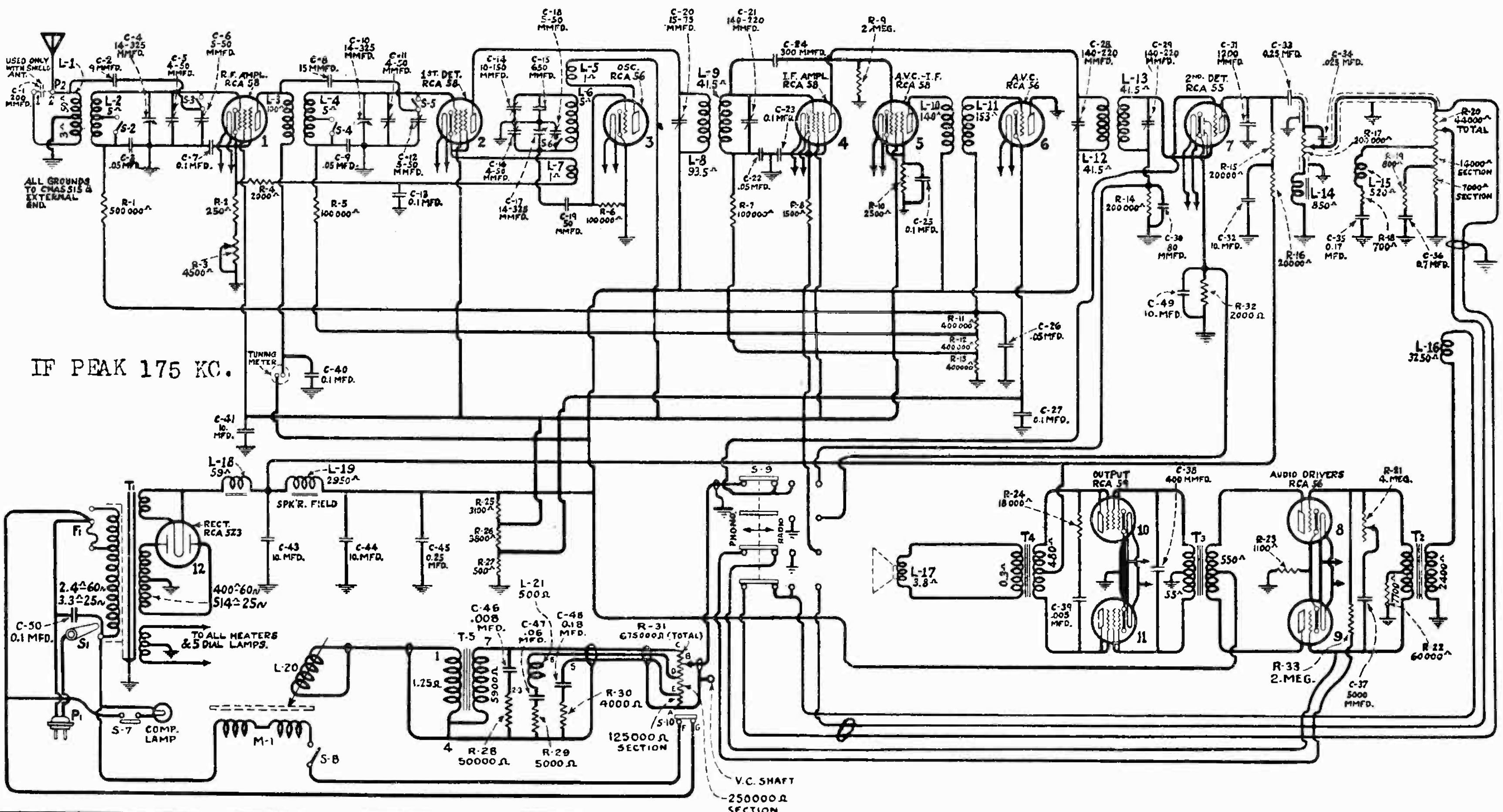
RCA-VICTOR CO., INC.

record remains on the turntable. This record will be played repeatedly until the motor is stopped by means of the Motor Switch.

NOTE 2—After a record has been played and changed, the needle is lowered automatically onto the smooth rim of the next record and is fed by gravity into the starting groove. After the instrument has been leveled with reference to the top of the cabinet, further slight compensation may be necessary, thus: (1) If the needle fails to enter the playing groove, the right-hand side of the instrument must be raised by inserting thin blocks under the front and rear legs on that side; or (2) If the needle slides over several grooves, thus failing to reproduce the beginning of the selection, the left-hand side of the instrument must be similarly raised.

9. To reject a record while playing, lift the pickup arm and move it to the extreme left. Hold the pickup lightly until it is moved by the mechanism.

10. Before reloading or when through operating, turn the Motor Switch to the "off" position, set the index lever at "Manual" and place the pickup on the rubber rest. Never leave the pickup resting on a record (or on the turntable) when not in use. Turn the power switch "off" and close the cabinet doors when discontinuing operation of the instrument.



RCA-VICTOR CO., INC.

SERVICE DATA FOR MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure G), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

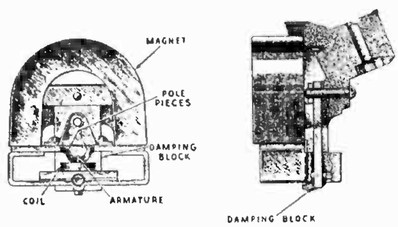


Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

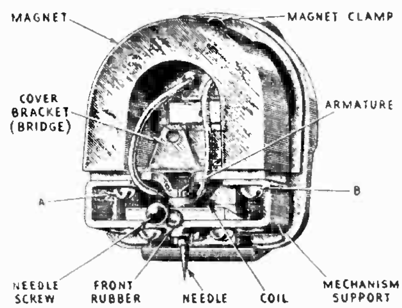


Figure G

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

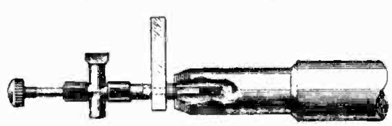


Figure H

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL Duo 380
Chassis Wiring

RCA-VICTOR CO., INC.

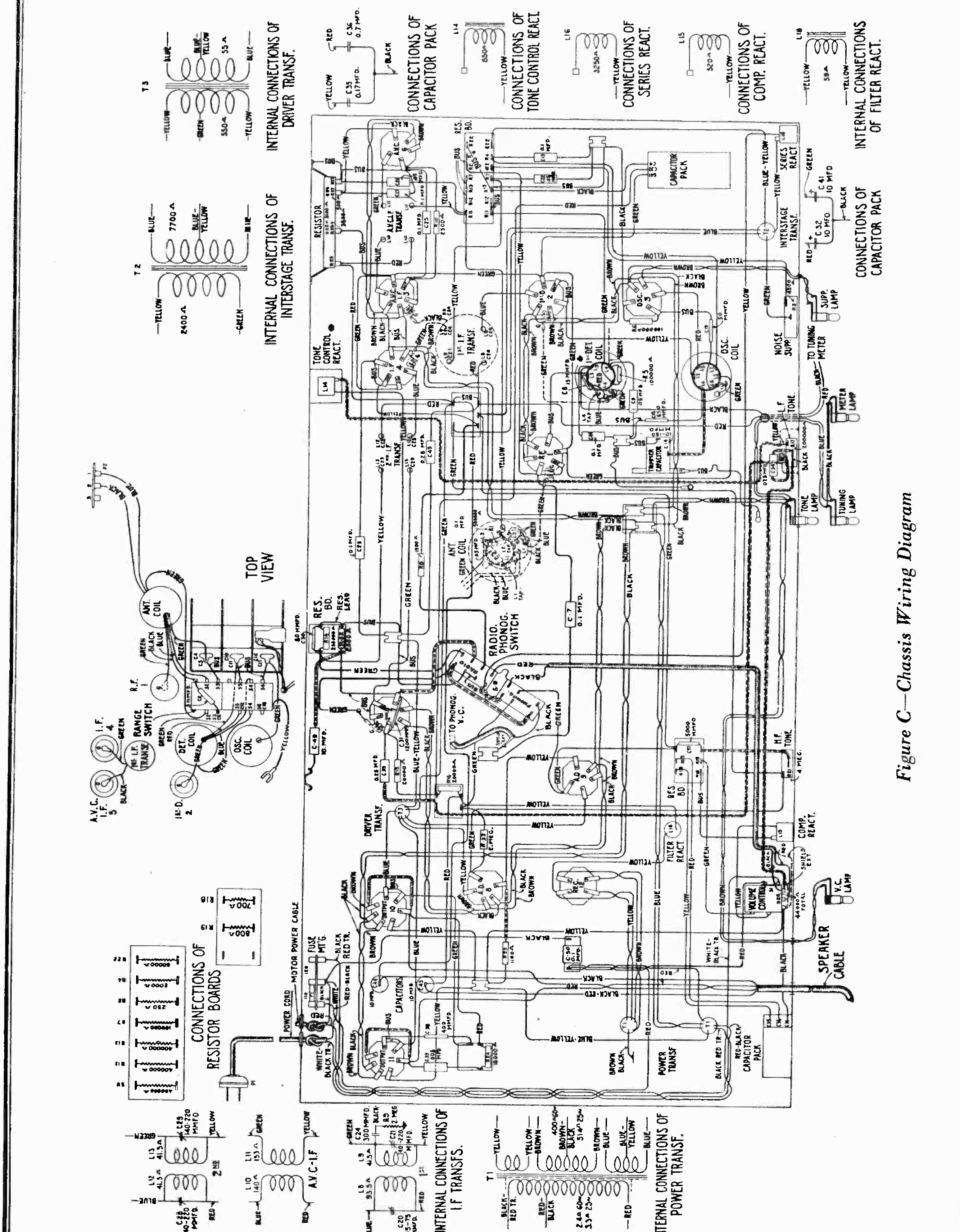


Figure C—Chassis Wiring Diagram

MODEL Duo 380
Parts List

RCA-VICTOR CO., INC.

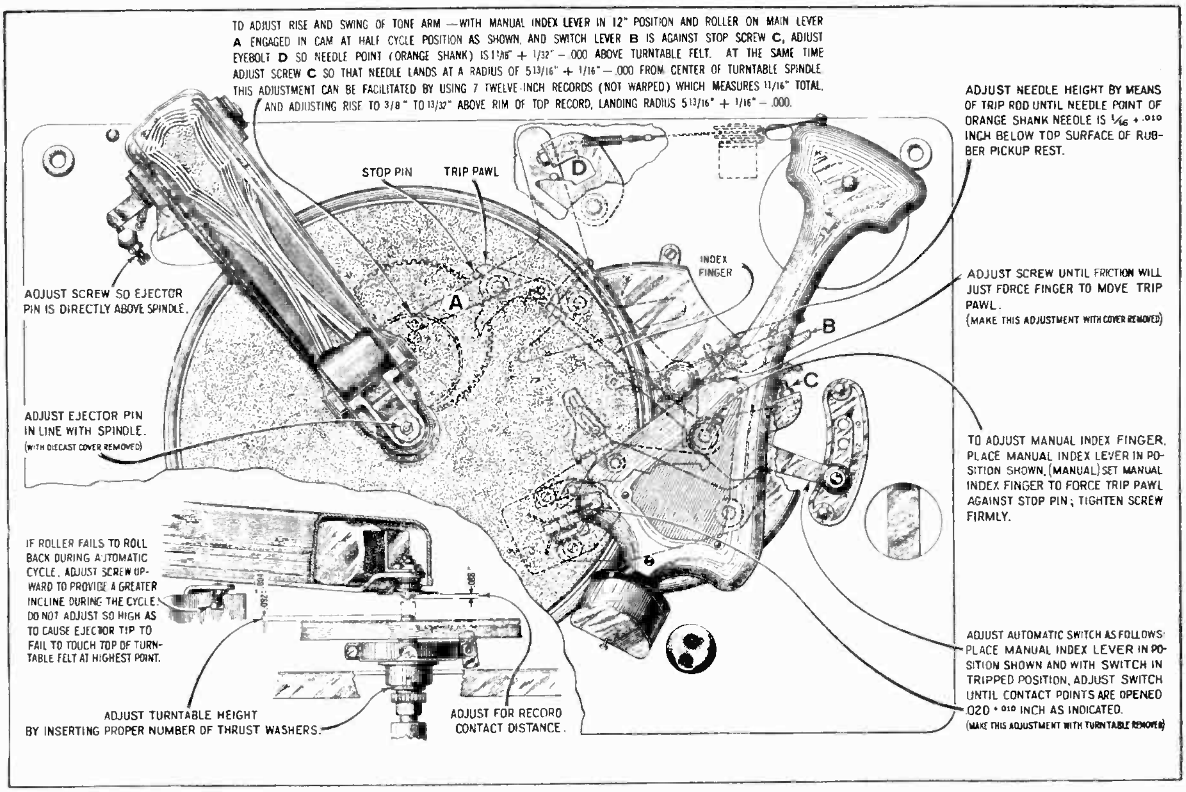


Figure E—Automatic Record Changer Adjustments

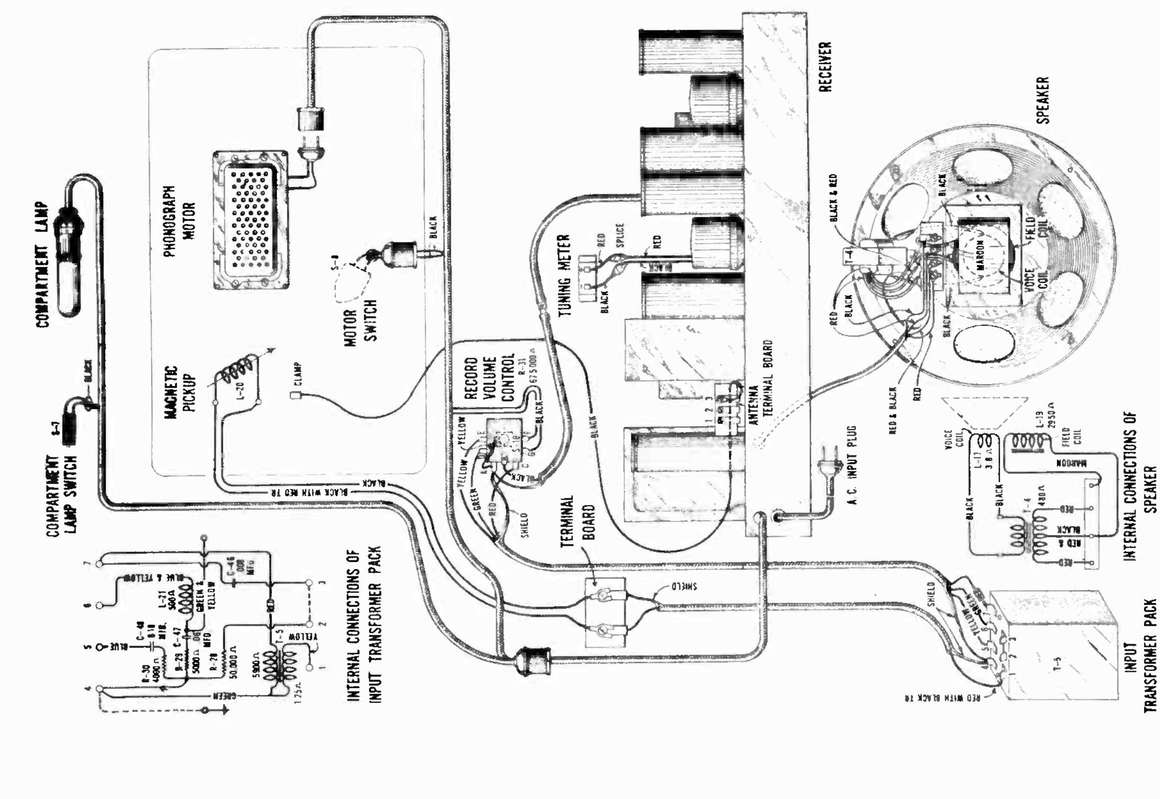


Figure D—Assembly Wiring Diagram

MODEL Duo 380
Assembly Wiring
Record Changer Data

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2730	Resistor—18,000 ohms—Carbon type—1 watt (R24)—Package of 5	$1.10
2747	Cap—Contact cap—Package of 5	.50
3024	Capacitor—9 mmfd. (C2)—Package of 2	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3085	Capacitor—400 mmfd. (C38)	.30
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R6, R7)—Package of 5	1.00
3376	Mount—Fuse mount	.40
3435	Resistor—250 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
3460	Capacitor—1,200 mmfd. (C31)	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt (R4, R32)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R19)—Package of 5	1.00
3528	Bracket—Noise suppressor or volume control lamp bracket	.18
3529	Socket—Noise suppressor or volume control lamp socket	.32
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency tone control lamp socket	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil (C3)	.34
3558	Capacitor—50 mmfd. (C19)	.36
3564	Bracket—Station selector dial lamp—Mounting bracket	.25
3565	Socket—Station selector dial lamp socket	.50
3597	Capacitor—0.25 mfd. (C33, C45)	.40
3640	Capacitor—0.05 mfd. (C9, C22, C26)	.25
3641	Capacitor—0.1 mfd. (C7, C13, C23, C25, C27)	.35
3643	Capacitor—0.005 mfd. (C39)	.25
3652	Screw—No. 10-32-¼ set screw for bracket and bushing assembly—Package of 10	.32
3719	Socket—7-contact Radiotron socket	.30
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.30
3747	Capacitor—15 mmfd. (C8)	.36
3749	Capacitor—0.1 mfd. (C40)	.30
3765	Capacitor—0.025 mfd. (C34)	.34
3774	Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms (R25, R26, R27)	.80
3797	Reactor—Volume control compensating reactor (L15)	.64
3798	Resistor—700 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3799	Capacitor—80 mmfd. (C30)	.70
3883	Fuse—2-ampere (F1)—Package of 5	.40
4035	Switch—Radio-Phonograph switch (S9)	2.10
4036	Shield—Low or high frequency tone control light shield	.30
4037	Shield—Antenna, detector or oscillator shield	.55
4038	Shield—Radiotron shield	.30
4039	Shield—Radiotron shield—Second detector shield	.30
4040	Shield—Radiotron tube shield top	.25
4041	Cover—Fuse cover	.25
4042	Reactor—Volume control series reactor (L16)	1.20
4046	Resistor—2-megohm—Carbon type—½ watt (R33)—Package of 5	1.00
4129	Bracket—Bracket and bushing assembly for radio-phonograph switch shaft—Located on receiver chassis	.28
4130	Shield—R. F. Radiotron shield	.30
5817	Resistor—20,000 ohms—Carbon type—3 watt (R15, R16)	.25
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Located on antenna coil (R1)—Package of 5	1.00
6192	Spring—3-gang tuning condenser drive cord tension spring—Package of 10	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
6277	Capacitor—0.1 mfd.—Located on rectifier socket shield (C50)	.35
6280	Resistor—400,000 ohms—Carbon type—½ watt (R11, R12, R13)—Package of 5	1.00
6281	Resistor—1,100 ohms—Carbon type—½ watt (R23)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R22)—Package of 5	$1.00
6298	Cord—3-gang tuning condenser drive cord—Package of 5	.60
6300	Socket—4-contact Radiotron socket	.35
6312	Capacitor—650 mmfd. (C15)—Package of 5	1.50
6316	Resistor—2,500 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
6437	Coil—Oscillator coil (L5, L6, L7)	1.24
6447	Volume control (R20, S1)	1.92
6448	Tone control—Low frequency (R17)	1.04
6449	Tone control—High frequency (R21)	1.06
6450	Rheostat—Noise suppressor rheostat (R3)	1.24
6512	Capacitor—0.005 mfd. (C37)	.28
6537	Switch—Range switch	1.30
6539	Coil—Detector coil (L3, L4)	1.44
6541	Dial—Tuning condenser dial and scale	.75
6561	Coil—Antenna coil (L1, L2, R1, C3)	1.65
6562	Transformer—Audio driver transformer (T3)	3.04
6564	Transformer—First intermediate frequency transformer (L8, L9, C20, C21, C24)	2.30
6565	Transformer—Second intermediate frequency transformer (L12, L13, C28, C29)	2.10
6566	Transformer—Third intermediate frequency transformer (L10, L11)	1.72
6567	Capacitor pack—Comprising one 0.17 mfd., and one 0.7 mfd. capacitors (C35, C36)	.95
6568	Transformer—Interstage audio transformer (T2)	3.10
6571	Capacitor—10 mfd. (C43, C44)	1.20
6572	Reactor—Tone control reactor (L14)	.90
6574	Capacitor pack—Comprising two 10.0 mfd. capacitors (C32, C41)	1.80
6578	Reactor—Filter reactor (L18)	3.22
6797	Capacitor—10.0 mfd. (C49)	1.04
6847	Shield—Rectifier socket shield and capacitor	.65
7062	Capacitor—Adjustable capacitor (C14)	.50
7439	Drum—Dial drum with set screw and three dial mounting nuts	.35
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
7700	Condenser—3-gang variable tuning condenser (C4, C5, C6, C10, C11, C12, C16, C17, C18, S2, S3, S4, S5, S6)	7.44
9468	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	7.75
9469	Transformer—Power transformer—105-125 volts—25-40 cycles	11.75
	CABLE ASSEMBLIES	
6793	Cable—2-conductor shielded—From radio volume control to Radio-Phonograph switch	.30
6794	Cable—Single conductor shielded—From Radio-Phonograph switch to Phonograph volume control (R31)	.38
6795	Cable—Phonograph motor cable—3-conductor with female section of connector plug	1.10
6796	Cable—2-conductor—Compartment lamp cable	.80
6798	Cable—Compartment lamp and switch cable	2.85
6848	Cable—Tapped cable with two connectors—From Phonograph Motor connector to motor starting switch plug and Phonograph volume control	2.12
6849	Cable—Single-conductor shielded cable with male section of connector—From Phonograph volume control to receiver chassis	.38
6850	Cable—Single-conductor shielded cable—From input transformer to terminal board	.50
	MOTOR BOARD ASSEMBLIES	
2893	Spring—Trip lever latch tension spring—Package of 10	.30
2917	Washer—Spring washer, "U" type—Package of 10	.25
3654	Roller—Guide roller assembly—Comprising bracket roller and guide pin	.34

MODEL Duo 380
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS (Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
3666	Spring—Cable lever tension spring—Package of 10	$0.44
3670	Finger—Friction finger	.32
3672	Pin—Manual index lever pin	.42
3673	Screw—Manual index lever adjustment screw and nut—Package of 5	.20
3676	Spring—Cam and gear pawl carrier tension spring—Package of 10	.52
3677	Lever—Cable lever assembly	.40
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4060	Escutcheon—Manual—12-10	.28
4061	Spring—Main spring	.38
4124	Plate—Actuating plate assembly	.50
4127	Spring—Actuating plate spring—Package of 10	.24
6502	Cam—Cam and gear assembly	1.18
6503	Pawl—Trip pawl assembly	.40
6806	Lever—Manual index lever—Less pin	.55
6807	Lever—Trip lever assembly	1.16
6808	Clutch—Trip lever friction clutch	.30
6809	Finger—Manual index finger assembly	.25
6810	Lever—Main spring lever	.44
6846	Lever—Main lever and link assembly	1.45
7710	Cover—Metal cover for trip lever and friction finger assemblies	.28
	MOTOR ASSEMBLIES	
3777	Motor mounting spring washers and stud assembly—Comprising three upper and three lower springs, six cup washers, three spring washers, and three studs	.62
9011	Motor—Motor complete—105-125 volts—60 cycles	19.72
9012	Motor—Motor complete—105-125 volts—25 cycles	24.16
9013	Motor—Motor complete—105-125 volts—40 cycles	24.16
9014	Motor—Motor complete—105-125 volts—50 cycles	19.72
	EJECT ARM ASSEMBLIES	
3655	Retainer—Ball retainer with three ball bearings	.45
3656	Bearing—Ejector tip bearing	.48
3657	Tip—Ejector tip	.30
3658	Ball—Ball bearing—Package of 20	.30
3662	Plate—Ejector plate—Package of 5	.95
3665	Screw—Eject arm horizontal adjustment screw and nut—Package of 5	.25
3729	Roller—Counter balance roller—Located inside of eject arm	.45
3930	Cushion—Counter balance cushion and bracket—Located inside of eject arm	.18
4054	Bracket—Eject arm bracket assembly	1.35
4055	Post—Vertical adjustment post—Located on eject arm	.30
4056	Yoke—Eject arm yoke assembly	1.04
4057	Shaft and collar—For eject arm	.24
4058	Collar—Eject arm shaft collar	.18
4067	Spring—Eject arm bracket spring—Package of 10	.30
4125	Spring—Eject arm horizontal action tension spring—60 cycle operation—Package of 10	.42
4126	Spring—Eject arm horizontal action tension spring—For 25 cycle operation—Package of 10	.60
7708	Arm—Eject arm complete	7.74
7709	Cover—Eject arm cover	1.38
	SWITCH ASSEMBLIES	
3322	Switch—Motor switch (S8)	.75
6805	Switch assembly—Automatic switch complete	1.90
10174	Springs—Automatic brake springs—Package of 4	.50
10184	Plate—Automatic brake latch plate—Package of 5	.40

Stock No.	DESCRIPTION	List Price
	PICKUP AND ARM ASSEMBLIES	
3388	Screw—Pickup needle holding screw—Package of 10	$0.60
3728	Coil—Pickup coil (L20)	.50
3737	Damper—Package of 5	.65
4062	Rod—Automatic brake trip rod	.20
4063	Screw—Pickup mounting screw assembly—Comprising one screw, one nut, and one washer—Package of 10	.54
4064	Cable—Pickup arm cable—Package of 5	1.00
4128	Armature—Pickup armature	.96
6811	Pickup—Pickup unit complete	4.30
6812	Cover—Pickup cover	.34
6813	Back—Pickup housing back	.68
6814	Cover—Pickup back cover	.34
6815	Escutcheon—Pickup arm escutcheon with mounting rivets	.64
7707	Arm—Pickup arm complete, less escutcheon, pickup, pickup mounting screw, nut and washer	4.12
	TURNTABLE ASSEMBLIES	
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3344	Cover—Grease retainer cover—Package of 2	.70
3347	Spring—Speed shifter lever spring—Package of 2	.30
4065	Bushing—Speed shifter lever bushing—Package of 4	.82
6816	Ring—Clamp ring assembly—Comprising spring, latch lever, and stud	.42
6817	Sleeve—Sleeve complete with ball race	2.25
6818	Lever—Speed shifter lever	.38
7711	Turntable—Complete	5.10
	MISCELLANEOUS PARTS	
3638	Scale—Tuning meter scale—Package of 5	.60
3763	Motor mounting board spring, washer and stud assembly—Comprising one bolt, two "C" washers, one bottom spring, one top spring, two cup washers, one shakeproof washer, and one nut	.42
3780	Shutter—Noise suppressor shutter	.30
3781	Shutter—Volume control shutter	.30
4043	Switch—Operating switch (S7)	.80
4044	Socket—Compartment lamp socket	1.28
4045	Shade—Compartment lamp shade	.50
4047	Receptacle—Needle receptacle	.55
4066	Rest—Pickup rest	.14
4080	Knob—Range switch knob—Package of 5	.75
4081	Knob—Station selector, volume control or noise suppressor knob—Package of 5	1.08
4082	Knob—High or low frequency tone control, radio-phonograph switch or phonograph volume control knob—Package of 5	1.08
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency escutcheon and color screen	.92
6461	Meter—Tuning meter	2.14
6547	Bezel—Tuning meter bezel	.45
6799	Volume control—Phonograph volume control (R31, S10)	3.00
6800	Transformer—Phonograph input transformer—Comprising one transformer, one .008 mfd., one 0.06 mfd., and one 0.18 mfd. capacitors, one 50,000 ohm, one 4,000 ohm, and one 5,000 ohm resistors, and one choke coil (R28, R29, R30, C46, C47, C48, L21, T5)	6.30
6801	Shaft—Flexible drive shaft for Radio-Phonograph switch	1.15
6802	Bearing and plate assembly—For Radio-Phonograph switch shaft—Located on cabinet	.34
	REPRODUCER ASSEMBLIES	
4131	Mounting assembly for reproducer—Comprising two plates, two bolts, two nuts, and two lockwashers	.44
6569	Transformer—Output transformer (T4)	1.95
6618	Cable—4-conductor—Reproducer cable	.54
8969	Cone—Reproducer cone (L17)—Package of 5	6.35
9031	Coil—Field coil magnet and cone support (L19)	4.90
9472	Reproducer complete	8.50

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption (60 Cycle)................175 Watts
Type and Number of Radiotrons......4 RCA-56, 4 RCA-58, 1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range. 540 K.C.-1500 K.C.—1400 K.C.-2800 K.C.
Undistorted Output...........................10.0 Watts

This combination home recording instrument utilizes the new perfected automatic record changing mechanism and the twelve-tube Deluxe Super-Heterodyne receiver. Excellent fidelity on both radio and record reproduction, together with facilities for recording either programs or voice are inherent features of this instrument. Other features include double tuning range (540 K. C.–1500 K. C. and 1400 K. C.–2800 K. C.), high and low frequency tone control, compensated volume control and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

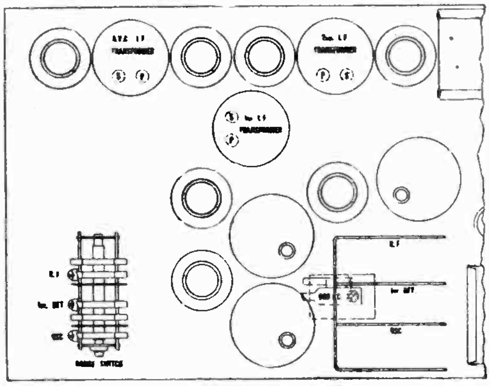


Figure D—Location of Line- Up Capacitors

Figure A shows the schematic circuit, Figure B the chassis wiring, and Figure C the assembly wiring diagram. The Radiotron socket voltages, the line-up procedure, special service hints and the replacement parts are given on the following pages.

R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors:

(a) Procure an R. F. Oscillator, such as Stock No. 9050, giving a modulated signal at 600 K. C., 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.
(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.
(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.
(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.
(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1250 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.
(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure D, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment, as the tuning capacitor and oscillator series capacitor adjustments interlock.
(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator, such as Stock No. 9050, that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.
(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.
(e) Refer to Figure D. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

When these adjustments are made, the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to repeat the R. F. and oscillator line-up capacitor adjustments after completing alignment of the I. F. system. The correct method of doing this is given in the preceding section.

Antenna Connections—It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these are used for the normal antenna and ground connections, while the third one is for use in connection with a shielded antenna system. The tap eliminates the need for the transformer usually used for coupling the shielded line to the radio receiver.

Stock No. 7717 shield kit, which comprises a lightning arrester, transformer assembly, a 200 mmfd. capacitor, and 100 feet of shielded wire, is recommended. When such an antenna system is used, it is necessary to connect the 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the Stock No. 7717 Kit.

Automatic Record Changer—The automatic record changer used in this instrument is of simple design and excellent construction. The various adjustments that may be required are shown in Figure G. A point to remember with this instrument is that it must always be level, otherwise proper operation will not be obtained.

MODEL Duo 380-HR
Schematic

RCA-VICTOR CO., INC.

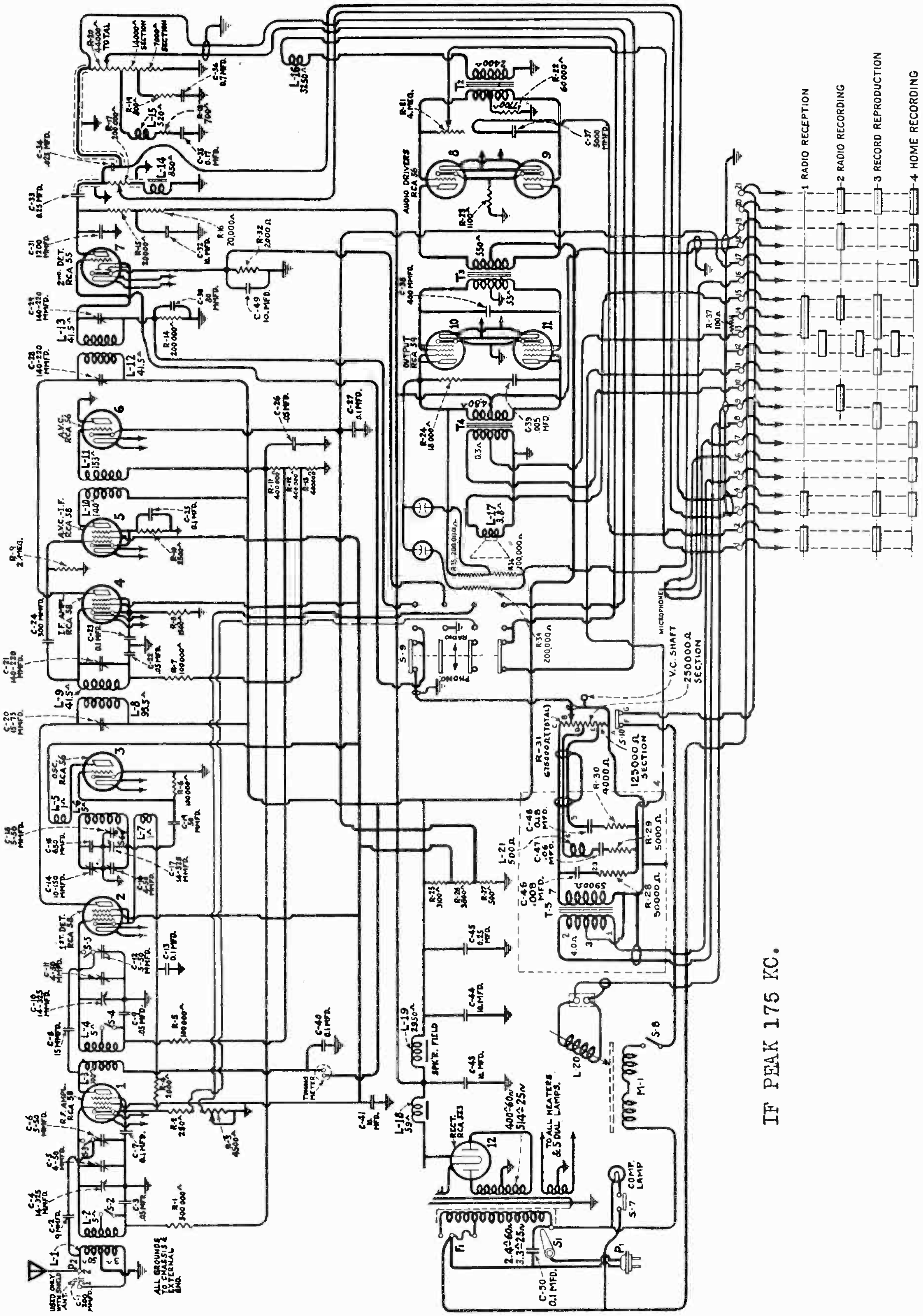


Figure A—Schematic Circuit Diagram

MODEL Duo 380-HR
Chassis Wiring

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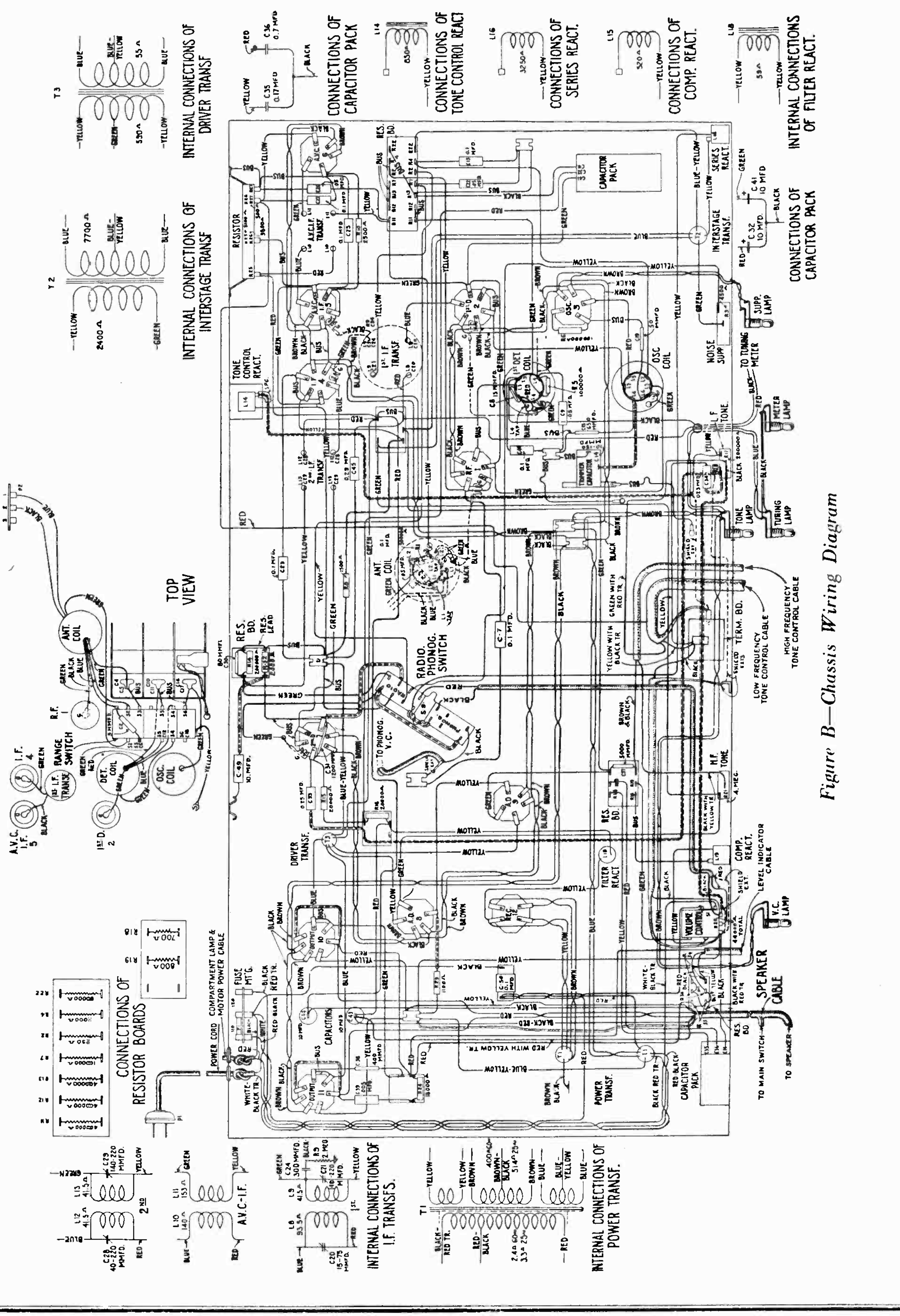

Figure B—Chassis Wiring Diagram

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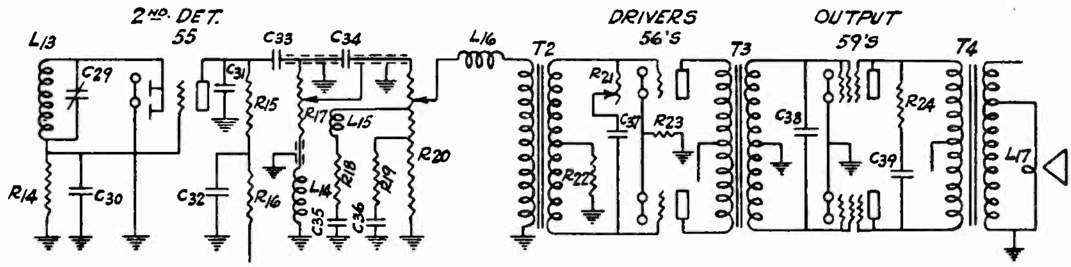
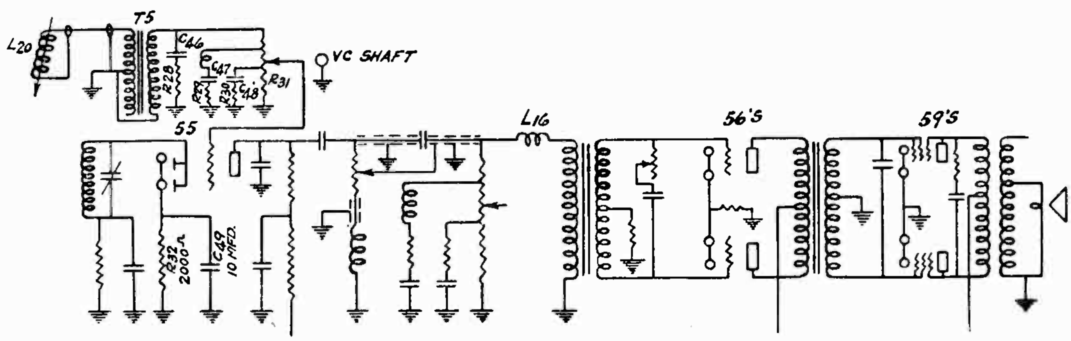
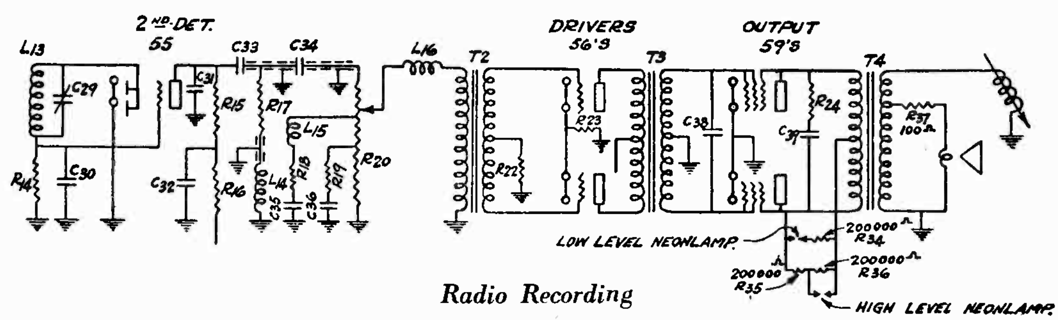


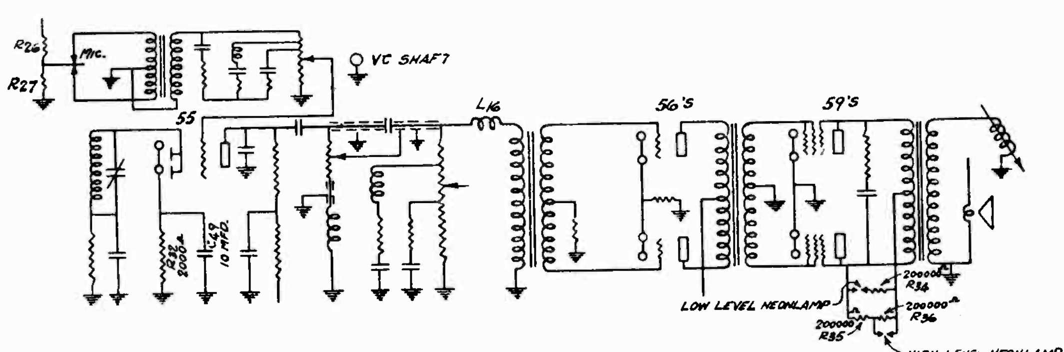
Radio Reproduction



Record Reproduction



Radio Recording



Home Recording

MODEL Duo 380-HR
Assembly Wiring

RCA-VICTOR CO., INC.

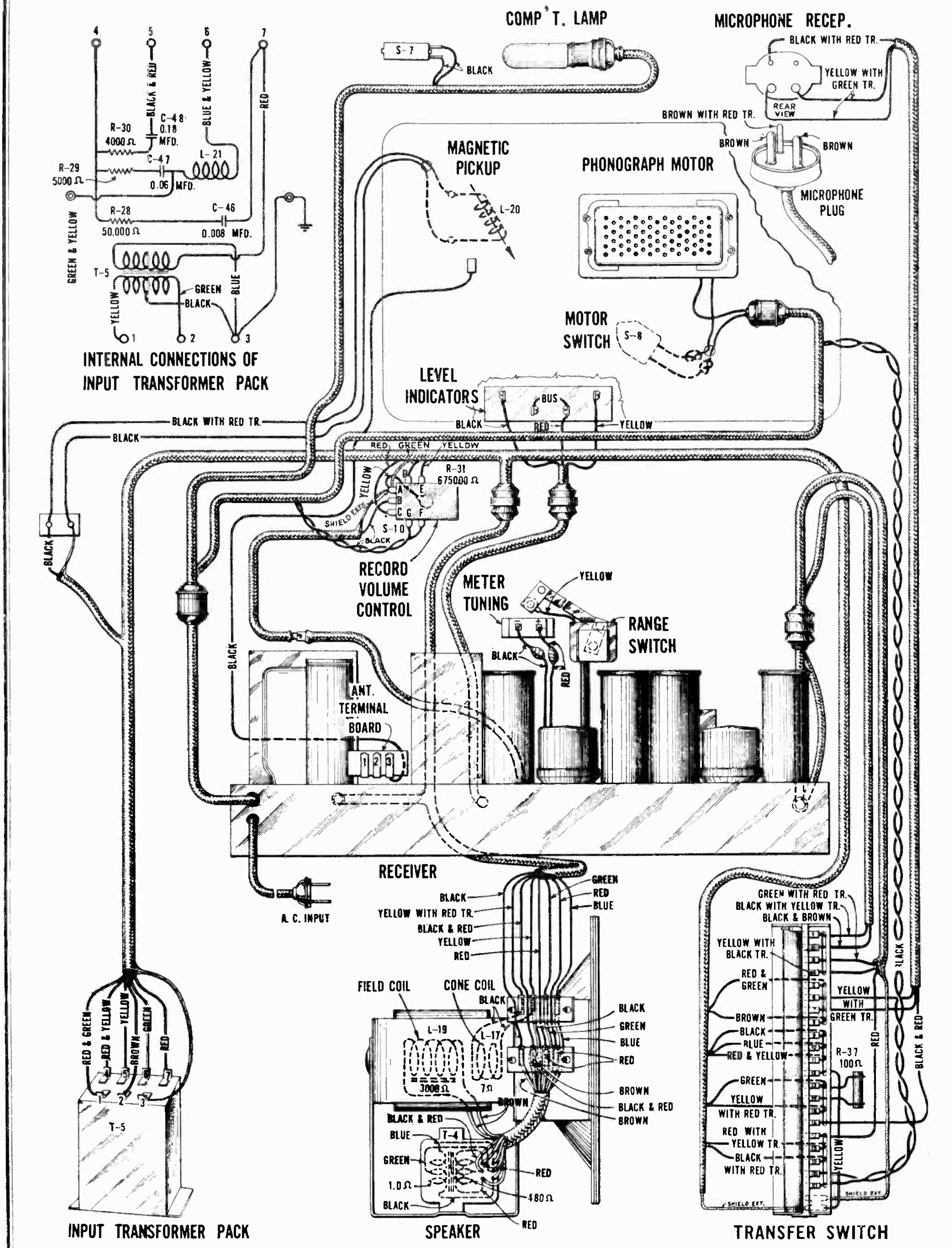


Figure C—Assembly Wiring Diagram

MODEL Duo 380-HE
Pickup Data

RCA-VICTOR CO., INC.

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure *J*), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

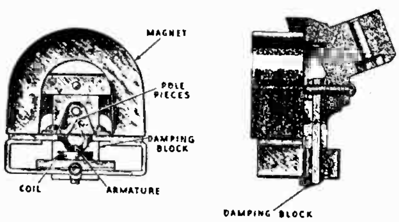


Figure I

(d) Remove screws A and B, Figure *J*, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure *J*), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

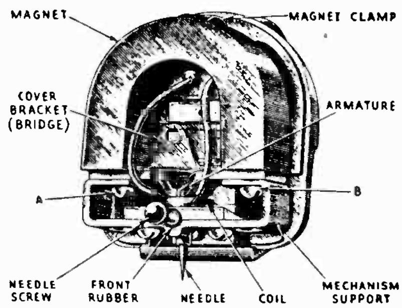


Figure J

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure *K*, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

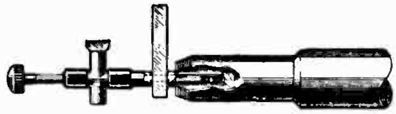


Figure K

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h).

RCA-VICTOR CO., INC.

OPERATION—PHONOGRAPH

Automatic Operation

Important Precautions—The following precautions must be observed during operation:

1. In loading the turntable, make certain that the first record inserted (last to be played) is flat—that is, essentially free from warpage.

2. Before starting the turntable, make certain that the reject pocket (at the left of the phonograph compartment) is either empty or sufficiently clear to permit proper disposal of records by the automatic mechanism.

3. Never restrain by force the normal motion of any part of the automatic mechanism while it is changing records.

Procedure—The phonograph operating controls are located on the front panel and in the playing compartment as shown in Figures 1 and 2. Proceed as follows:

1. Set the Transfer Switch for "Record Reproduction."

2. Apply power by turning the Radio Volume Control clockwise from the "off" position. Set the two Tone Controls for full-range reproduction (see paragraph 7 under "Operation—Radio").

3. With the Motor Switch in the "off" position (Record Volume Control fully counter-clockwise), load the turntable with records, as follows:

(a) Set the Index Lever at "Manual." *Always do this before loading or unloading records.*

(b) Place the electric pickup on the rubber rest.

(c) Raise the Record Ejector arm (*very slowly*, at first, until the internal weight has rolled to the rear of the arm, then as rapidly as desired) to its upper position of rest. *Always raise the ejector arm in this manner.*

(d) Select the records to be played. *All records for one loading must be of the same diameter (either ten or twelve inches), close to standard thickness and operable at the same speed (either 78 or 33⅓ R. P. M.).*

CAUTION—Do not use thin flexible-type records for automatic operation.

(e) Place the records, one at a time, on the turntable (see paragraph 1 under "Important Precautions"). The spindle should resume its normal height after each record is added. The turntable is fully loaded when the top surface of the uppermost record is nearly flush with the top of the spindle. (It should not be possible to slide off the top record without lifting its edge or depressing the spindle.)

(f) Lower the Record Ejector arm gently onto the spindle.

4. Insert a *new* needle in the pickup as far as it will go and tighten the needle screw. For long-playing (33⅓ R. P. M.) records, use *only* the *orange Chromium* needle. For standard (78 R. P. M.) records, use the latter needle or, if preferred, either the *green Chromium* or the full volume (full tone) *Tungstone* needle. Transparent-faced (illustrated) records, however, should not be reproduced with *Tungstone* needles.

NOTE—With care, the orange Chromium needle should play 75, the green Chromium 100, and the Tungstone 100 to 150 records. *Never re-insert in the pickup a Chromium needle which has been used (however slightly) as damage to the record grooves would result.*

5. Place the pickup needle on the smooth outer rim of the record, near the first groove. Then move the Index Lever to the position (12 or 10) corresponding to the diameter (inches) of the records on the turntable. Be careful not to move the lever *beyond* the proper index hole. Push the index pin firmly into the hole.

CAUTION—Never attempt to move the Index Lever from the Manual position when the pickup is on the rubber rest.

6. Start the turntable by turning the Motor Switch clockwise; then set the Speed Shifter for the speed (78 or 33⅓ R. P. M.) corresponding to the records on the turntable.

NOTE—The speed shifter should not be moved inward (from the 78 to the 33⅓ R. P. M. position) while the turntable is at rest.

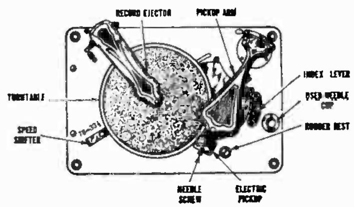


Figure 2

7. Adjust the Record Volume Control to obtain the desired volume.

8. Close the cabinet doors to extinguish the compartment lamp and to render less prominent the mechanical noises incident to record playing and changing. If needle scratch reproduction (particularly noticeable with old records) is considered excessive, turn the *treble* Tone Control slightly counter-clockwise. For most faithful reproduction, however, both Tone Controls should be left in the positions which provide full illumination of the tone color indicator.

NOTE 1—When a record has been played, the ejector arm slides it off into the record pocket and the pickup moves to the outside of the next record. The records on the turntable are thus played consecutively until only one record remains on the turntable. This record will be played repeatedly until the motor is stopped by means of the Motor Switch.

NOTE 2—After a record has been played and changed, the needle is lowered automatically onto the smooth rim of the next record and is fed by gravity into the starting groove. After the instrument has been leveled with reference to the top of the cabinet, further slight compensation may be necessary, thus: (1) If the needle fails to enter the playing groove, the right-hand side of the instrument must be raised by inserting thin blocks under the front and rear legs on that side: or (2) If the needle slides over several grooves, thus failing to reproduce the beginning of the selection, the left-hand side of the instrument must be similarly raised.

9. To reject a record while playing, lift the pickup arm and move it to the extreme left. Hold the pickup lightly until it is moved by the mechanism.

10. Before reloading or when through operating, turn the Motor Switch to the "off" position, set the Index Lever at "Manual" and place the pickup on the rubber rest. Never leave the pickup resting on a record (or on the turntable) when not in use. Turn the power switch "off" and close the cabinet doors when discontinuing operation of the instrument.

Manual Operation

Records may be played individually as follows:

1. Set the Transfer Switch for "Record Reproduction" and apply the power with the Radio Volume Control as directed for automatic operation. Adjust the two Tone Controls for full-range reproduction.

2. Make sure that the Index Lever is at "Manual," that the electric pickup is on its rubber rest, and that the Motor Switch is in the "off" position.

3. Raise the Record Ejector arm to the upper rest position (see paragraph 3 (c) under "Automatic Operation").

4. Place the record on the turntable and insert a needle in the pickup. For needle information, see paragraph 4 under "Automatic Operation."

NOTE—Ordinary steel needles (full volume or full tone) can be used with standard (78 R. P. M.) records, provided a new needle is inserted for each selection. Do not use *Tungstone* needles with either thin flexible type or transparent-faced (illustrated)records.

5. Start the turntable by turning the Motor Switch clockwise, then set the Speed Shifter for the speed corresponding to the record on the turntable. Lower the needle gently onto the smooth outer rim of the record.

6. Adjust the Record Volume Control and close the cabinet doors (see paragraph 8 under "Automatic Operation").

7. After the record has been played, stop the turntable by turning the Motor Switch to the "off" position (motor stops automatically at the end of any record having the *eccentric* final groove). Lift the electric pickup from the record and place it on the rubber rest.

8. When through operating, turn the power "off" and close the cabinet doors.

OPERATION—RECORDING

Recording Precautions

When using the home-recording facilities of this instrument, the following precautions must be observed:

1. Always place a flat (unwarped) 10- or 12-inch record of the commercial variety beneath the home-recording record when recording.

2. To prevent surface slippage, always record with the felt recording pad inserted between the home-recording and standard records. This pad need not be removed for "playing-back" purposes but must never be left on the turntable when automatic operation is intended.

3. Use only the special *home-recording* needle (identified by its yellow shank and blunt-point) for both recording and reproducing. Such needles, however, must not be used for playing other than home-recorded records.

4. For *recording*, the needle pressure on the record must be increased by placing the recording weight on the electric pickup. This weight must be removed for *reproducing* either the home-recorded or any other record.

Radio Recording

To record radio programs, refer to Figures 1 and 2, and proceed as follows:

1. Tune the receiver for the desired radio program as described under "Operation—Radio." Make sure that the Index Lever is at "Manual," that the electric pickup is on its rubber rest, and that the Motor Switch is in the "off" position.

2. Raise the Record Ejector arm to its upper position of rest (see paragraph 3 (c) under "Procedure—Automatic Operation—Phonograph").

3. Place a blank home-recording record on the turntable (see paragraphs 1 and 2 of preceding section "Recording Precautions") and lower the Record Ejector arm.

4. Insert a *home-recording* needle in the electric pickup and place the recording weight on the pickup head.

5. Set the Transfer Switch for "Radio Recording." In this position, the radio program should be heard at reduced volume.

6. Adjust the Radio Volume Control to obtain the correct recording volume as determined by observing the flashing of the two neon-lamp indicators located at the front of the playing compartment. The setting is correct when the left-hand lamp is at or near fixed illumination and the right-hand lamp is either "off" or flashing only at intervals. When both lamps are "off," the volume is too low and when both are flashing continuously, the volume is too high.

7. Start the turntable by turning the Motor Switch "on," then set the Speed Shifter for the desired turntable speed.

NOTE—For best results, always record at 78 R. P. M. If a record of longer duration is desired, recording may be done at 33⅓ R. P. M. Such records should be so marked, and must of course be reproduced at the same speed.

8. Place the needle in the outer groove of the blank record and recording will proceed automatically. During this process, however, watch the volume indicators and adjust the Radio Volume Control (if necessary) to compensate for changes in the program level.

9. Recording may be interrupted at any time by simply lifting the pickup from the record. It may be resumed on the same record if desired, provided care is taken to enter the needle in a *new* groove—that is, one slightly nearer the center than the last recorded groove.

10. Upon completing a recording, lift the electric pickup from the record, turn the Motor Switch "off" and place the pickup on the rubber rest.

Microphone Recording

To record voice or musical entertainment originating in the home, the procedure is essentially the same as for the recording of radio programs except that the microphone is employed. Remove this unit from the cabinet (leaving the cord connected) and place it in an *upright* position on a table or any other horizontal surface conveniently near the sound source.

For best results, special attention must be given to the location and arrangement of the person or persons presenting the program. All sounds to be recorded must be directed toward the *front* of the microphone, never toward the *rear* which is designated by the word "BACK" cast on the pedestal. Further, the microphone should be located at a height approximately the same distance from the floor as the sound source. Such conditions may be fulfilled easily in the case of the average adult (speaker or singer) by placing the microphone on the top of the cabinet.

When recording speech, the microphone should be spaced from three to six inches from the speaker's mouth; the speaker should talk in a normal even tone and enunciate clearly. The microphone should be at a somewhat greater distance (one to two feet) when recording musical vocal selections, the proper spacing naturally being dependent upon the number of singers present. For instrumental music, the most desirable distance between the artists and the microphone will depend upon the type (wind or string), as well as the number of instruments and may be from three to ten feet. In the case of a small

MODEL 380-HR
Phonograph Data
Voltage

RCA-VICTOR CO., INC.

orchestra, it would be preferable to group the members in a semi-circle with the stringed instruments nearest the microphone and the horns at the rear.

Adjustment of Recording Volume—Before the actual recording is undertaken, it will be advisable to test for the proper volume as follows:

1. Set the Transfer Switch for "Home Recording."

2. Turn the power "on" (Radio Volume Control rotated slightly clockwise). As for radio recording, make certain that the Index Lever is at "Manual," that the electric pickup is on its rubber rest and that the Motor Switch is "off."

3. Raise the Record Ejector arm and load the turntable with a blank home-recording record, first inserting a standard record and the felt recording pad, then lower the Record Ejector arm.

4. Set the Record Volume Control fully clockwise (turntable now should be rotating) and commence the program which is to be recorded.

5. Regulate the distance between the sound source and the microphone, while observing the flashing action of the neon-lamp indicators at the front of the playing compartment, until both lamps are illuminated continuously or at approximately the same intervals.

6. Turn the Record Volume Control counter-clockwise until the right-hand lamp is either "off" or flashing infrequently; however, do not reduce the setting sufficiently to change the action of the left-hand lamp. The instrument is now properly adjusted and the test program may be discontinued while making final preparations for recording.

Procedure—After the recording volume is adjusted, leave the Record Volume Control setting intact permitting the turntable to remain in rotation, and proceed as follows:

1. Insert a *home-recording* needle in the electric pickup and place the recording weight on the pickup head.

2. Set the Speed-Shifter for the desired turntable speed (see note in paragraph 7 under "Radio Recording").

3. Place the needle in the outer groove of the blank record and commence without delay the program to be recorded.

4. When the recording is complete (see paragraph 9 under "Radio Recording"), lift the electric pickup from the record, turn the Motor Switch "off" and place the pickup on its rubber rest.

Reproduction of Home Recordings

Home-recorded records (either radio or microphone recordings) may be reproduced in the manner described for manual operation of standard records under "Operation—Phonograph." Such records, however, must not be employed with the automatic record changer and always must be reproduced with the special *home-recording* needle. Always make certain to remove the recording weight from the electric pickup when "playing-back" recordings.

GENERAL

Fuse—This instrument is protected by a fuse located at the rear of the chassis, under the metal cover marked "Caution: Remove Power Supply Before Removing Cover." If the fuse burns out, check the power supply connections and rating, and have all tubes tested by your dealer before installing a new fuse. This is a special fuse—obtain replacement fuses from your dealer—*do not use any substitute for this fuse.*

In districts where the line voltage is always below 115 (225 for 200–250 volt models), the fuse should be set in the "110" position ("213" position for 200–250 volt models). Always disconnect the power cord from the a-c outlet before removing the fuse cover.

Maintenance—With normal use and handling, trouble-free service is to be expected. The automatic phonograph mechanism and associated parts, however, should be kept clean and well-lubricated. To insure continued efficient operation, it is recommended that the entire instrument be thoroughly inspected and adjusted by an experienced service man once each year.

RADIOTRON SOCKET VOLTAGES (RADIO OPERATION)

120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.-I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-5Z3 Rect.	990–495 R. M. S.			92 Total	5.0

RCA-VICTOR CO., INC.

MODEL 380-HR
Neon Lamp and Switching Data
Record Changer Data

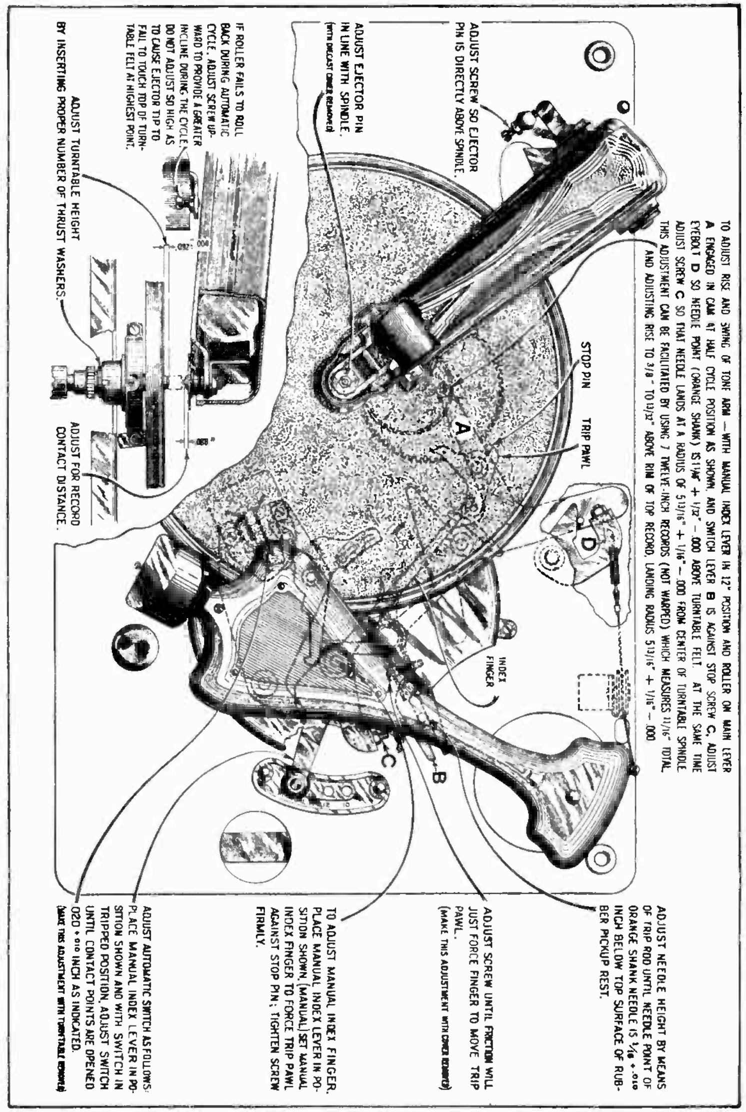


Figure H—Automatic Record Changer Adjustments

Testing Neon Level Indicating Lamps

Two Neon Level Indicating Lamps are provided so that a visual indication of the recording level may be obtained at all times. These lamps normally give long service without attention. However, if failure occurs, and all circuits have been checked and eliminated as possible source of failure, the lamps may be easily checked as indicated in the circuit shown in Figure E. The method for checking involves testing for lighting between certain voltages. The lamps must not light before 52 volts have been applied and must not require a voltage greater than 64 volts to cause them to light. Lamps requiring different voltages from these are defective and must not be used.

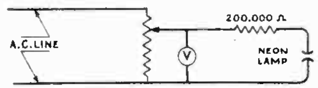


Figure E—Testing Circuit

Transfer Switch Mechanism

The transfer switch used in this model is a special four-position rotory switch located on the front panel and operated in conjunction with a two-position switch located in the chassis. The switches are coupled mechanically by means of a flexible shaft and operate as a single unit.

In event that any part of the switching system is removed, in order to replace or reconnect the assembly, the following procedure should be observed. Refer to Figure F.

(a) Set the two-position switch located in the chassis to its extreme clockwise position, and attach the transfer switch to front panel of the cabinet in proper position as shown. Set the transfer switch at position 1.

(b) Assemble the transfer switch end of the flexible shaft into the switch bracket. Place the "V" link loosely on end of shaft and tighten the pilot screw into its groove.

(c) Assemble the other end of the flexible shaft to the two-position switch (on chassis) so that one set screw points directly back, when facing the chassis from the rear, and the other to the left. Then tighten one set screw.

(d) Set the "V" link, at rear of large switch, so that the lower corner is approximately flush with the lower side of the switch. Tighten one set screw.

(e) Note the position of the pin as it approaches the "V" link when turning transfer switch clockwise toward position 2 and also when the pin approaches the "V" link when turning the transfer switch counter clockwise toward position 3 from position 4. In these positions the pin must contact the "V" at approximately the same points.

(f) Tighten all remaining set screws at each end of the shaft.

It will now be found that the transfer switch turns with maximum smoothness and the two-position chassis switch operates midway between positions 2 and 3 in either direction.

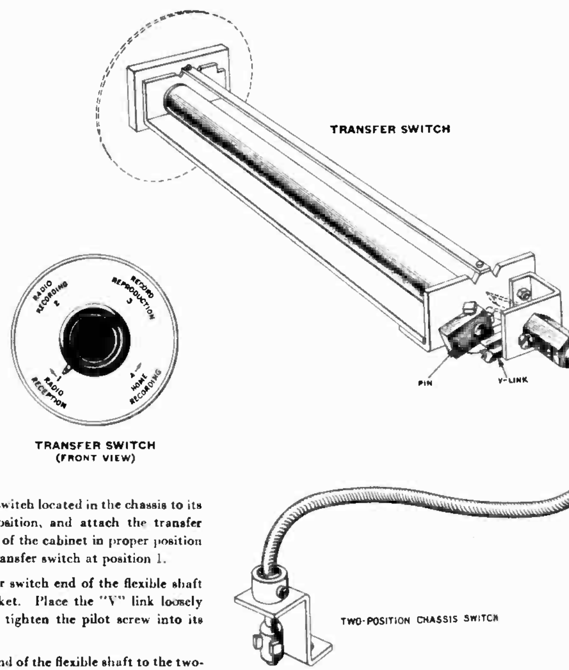


Figure F—Transfer Switch Mechanism

Audio Circuits

Figure G shows the schematic diagrams of the audio circuits that occur at each position of the transfer switch. A reference to these diagrams will enable the serviceman to quickly diagnose trouble in these circuits.

MODEL 380-HR
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2730	Resistor—18,000 ohms—Carbon type—1 watt (R24)—Package of 5	$1.10
2747	Cap—Contact cap—Package of 5	.50
3024	Capacitor—9 mmfd. (C2)—Package of 2	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3085	Capacitor—400 mmfd. (C38)	.30
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R6, R7)—Package of 5	1.00
3376	Mount—Fuse mount	.40
3435	Resistor—250 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
3460	Capacitor—1,200 mmfd. (C31)	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt (R4, R32)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R19)—Package of 5	1.00
3528	Bracket—Noise suppressor or volume control lamp bracket	.18
3529	Socket—Noise suppressor or volume control lamp socket	.32
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency tone control lamp socket	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil (C3)	.34
3558	Capacitor—50 mmfd. (C19)	.36
3564	Bracket—Station selector dial lamp—Mounting bracket	.25
3565	Socket—Station selector dial lamp socket	.50
3597	Capacitor—0.25 mfd. (C33, C45)	.40
3640	Capacitor—0.05 mfd. (C9, C22, C26)	.25
3641	Capacitor—0.1 mfd. (C7, C13, C23, C25, C27)	.35
3643	Capacitor—0.005 mfd. (C39)	.25
3652	Screw—No. 10-32-¼ set screw for bracket and bushing assembly—Package of 10	.32
3719	Socket—7-contact Radiotron socket	.30
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.30
3747	Capacitor—15 mmfd. (C8)	.36
3749	Capacitor—0.1 mfd. (C40)	.30
3765	Capacitor—0.025 mfd. (C34)	.34
3774	Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms (R25, R26, R27)	.80
3797	Reactor—Volume control compensating reactor (L15)	.64
3798	Resistor—700 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3799	Capacitor—80 mmfd. (C30)	.70
3883	Fuse—2-ampere (F1)—Package of 5	.40
4013	Capacitor—200 mmfd (C1)	.30
4035	Switch—Radio-Phonograph switch (S9)	2.10
4036	Shield—Low or high frequency tone control light shield	.30
4037	Shield—Antenna, detector or oscillator shield	.55
4038	Shield—Radiotron shield	.30
4039	Shield—Radiotron shield—Second detector shield	.30
4040	Shield—Radiotron tube shield top	.25
4041	Cover—Fuse cover	.25
4042	Reactor—Volume control series reactor (L16)	1.20
4129	Bracket—Bracket and bushing assembly for radio-phonograph switch shaft—Located on receiver chassis	.28
4130	Shield—R. F. Radiotron shield	.30
5817	Resistor—20,000 ohms—Carbon type—3 watt (R15, R16)	.25
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Located on antenna coil (R1)—Package of 5	1.00
6192	Spring—3-gang tuning condenser drive cord tension spring—Package of 10	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt (R14, R34, R35, R36)—Package of 5	1.00
6277	Capacitor—0.1 mfd.—Located on rectifier socket shield (C50)	.35
6280	Resistor—400,000 ohms—Carbon type—½ watt (R11, R12, R13)—Package of 5	1.00
6281	Resistor—1,100 ohms—Carbon type—½ watt (R23)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R22)—Package of 5	1.00
6298	Cord—3-gang tuning condenser drive cord—Package of 5	.60
6300	Socket—4-contact Radiotron socket	.35
6312	Capacitor—650 mmfd. (C15)—Package of 5	1.50
6316	Resistor—2,500 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
6437	Coil—Oscillator coil (L5, L6, L7)	1.24
6447	Volume control (R20, S1)	$1.92
6448	Tone control—Low frequency (R17)	1.04
6449	Tone control—High frequency (R21)	1.06
6450	Rheostat—Noise suppressor rheostat (R3)	1.24
6512	Cpacitor—0.005 mfd. (C37)	.28
6537	Switch—Range switch	1.30
6539	Coil—Detector coil (L3, L4)	1.44
6541	Dial—Tuning condenser dial and scale	.75
6561	Coil—Antenna coil (L1, L2, R1, C3)	1.65
6562	Transformer—Audio driver transformer (T3)	3.04
6564	Transformer—First intermediate frequency transformer (L8, L9, R9, C20, C21, C24)	2.30
6565	Transformer—Second intermediate frequency transformer (L12, L13, C28, C29)	2.10
6566	Transformer—Third intermediate frequency transformer (L10, L11)	1.72
6567	Capacitor pack—Comprising one 0.17 mfd., and one 0.7 mfd. capacitors (C35, C36)	.95
6568	Transformer—Interstage audio transformer (T2)	3.10
6571	Capacitor—10 mfd. (C43, C44)	1.20
6572	Reactor—Tone control reactor (L14)	.90
6574	Capacitor pack—Comprising two 10.0 mfd. capacitors (C32, C41)	1.80
6578	Reactor—Filter reactor (L18)	3.22
6797	Capacitor—10.0 mfd. (C49)	1.04
6847	Shield—Rectifier socket shield and capacitor	.65
7062	Capacitor—Adjustable capacitor (C14)	.50
7439	Drum—Dial drum with set screw and three dial mounting nuts	.35
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
7700	Condenser—3-gang variable tuning condenser (C4, C5, C6, C10, C11, C12, C16, C17, C18, S2, S3, S4, S5, S6)	7.44
9468	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	7.75
9469	Transformer—Power transformer—105-125 volts—25-40 cycles	11.75
	MOTOR BOARD ASSEMBLIES	
2893	Spring—Trip lever latch tension spring—Package of 10	.30
2917	Washer—Spring washer, "U" type—Package of 10	.25
3654	Roller—Guide roller assembly—Comprising bracket roller and guide pin	.34
3666	Spring—Cable lever tension spring—Package of 10	.44
3670	Finger—Friction finger	.32
3672	Pin—Manual index lever pin	.42
3673	Screw—Manual index lever adjustment screw and nut—Package of 5	.20
3676	Spring—Cam and gear pawl carrier tension spring—Package of 10	.52
3677	Lever—Cable lever assembly	.40
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4060	Escutcheon—Manual—12-10	.28
4061	Spring—Main spring—Package of 10	.38
4124	Plate—Actuating plate assembly	.50
4127	Spring—Actuating plate spring—Package of 10	.24
6502	Cam—Cam and gear assembly	1.18
6503	Pawl—Trip pawl assembly	.40
6806	Lever—Manual index lever—Less pin	.55
6807	Lever—Trip lever assembly	1.16
6808	Clutch—Trip lever friction clutch	.30
6809	Finger—Manual index finger assembly	.25
6810	Lever—Main spring lever	.44
6846	Lever—Main lever and link assembly	1.45
7710	Cover—Metal cover for trip lever and friction finger assemblies	.28
	MOTOR ASSEMBLIES	
3777	Motor mounting spring washers and stud assembly—Comprising three upper and three lower springs, six cup washers, three spring washers, and three studs	.62
9477	Motor—Motor complete—105-125 volts—60 cycles	25.88
9479	Motor—Motor complete—105-125 volts—25 cycles	36.48
9478	Motor—Motor complete—105-125 volts—50 cycles	25.88
	EJECT ARM ASSEMBLIES	
3655	Retainer—Ball retainer with three ball bearings	.45
3656	Bearing—Ejector tip bearing	.48
3657	Tip—Ejector tip	.30
3658	Ball—Ball bearing—Package of 20	.30
3662	Plate—Ejector plate—Package of 5	.95
3665	Screw—Eject arm horizontal adjustment screw and nut—Package of 5	.25
3729	Roller—Counter balance roller—Located inside of eject arm	.45

MODEL Duo 381
Schematic

RCA-VICTOR CO., INC.

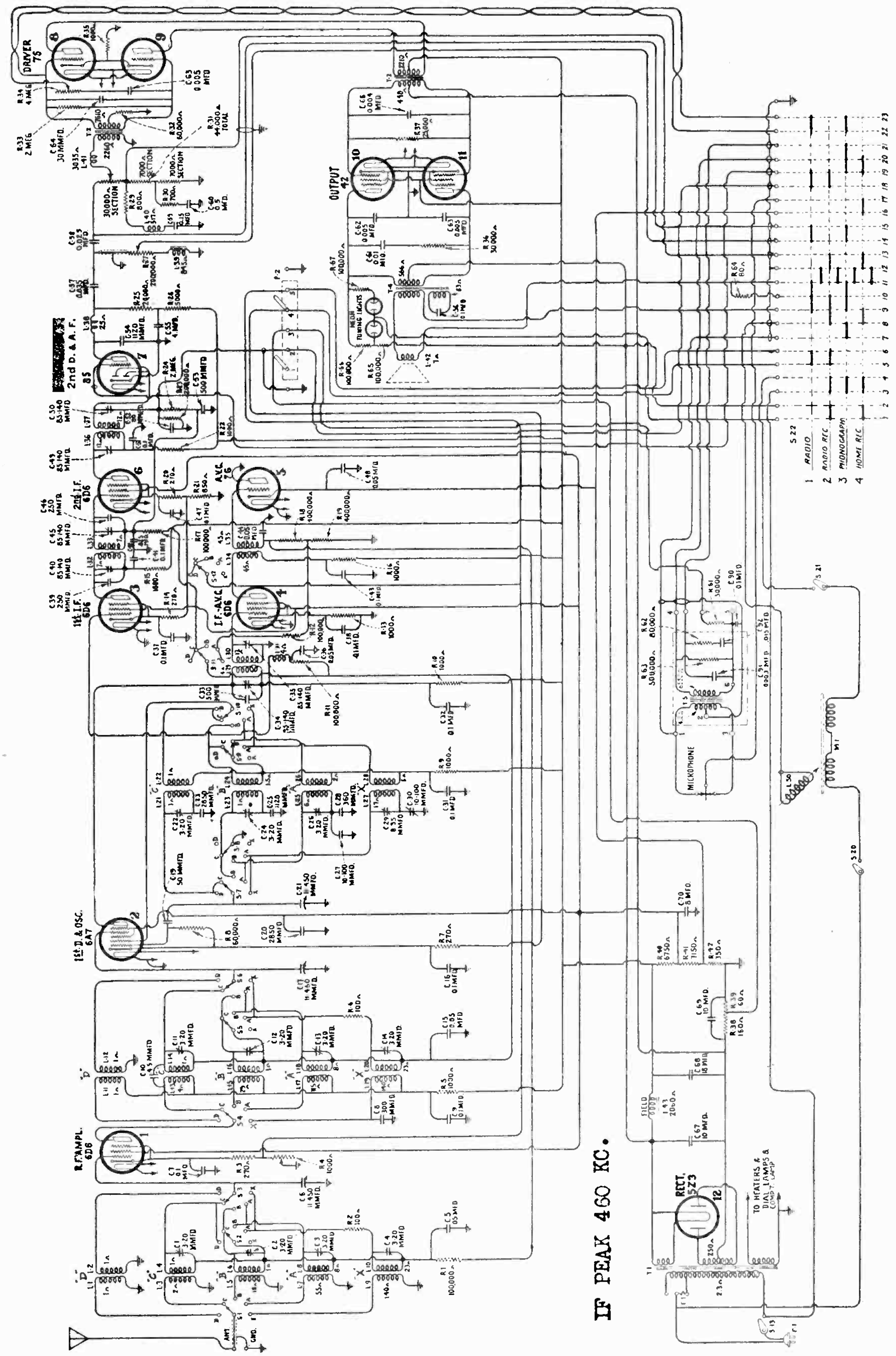


Figure 1—Schematic Circuit Diagram

MODEL Duo 381
RF Assembly Wiring

RCA-VICTOR CO., INC.

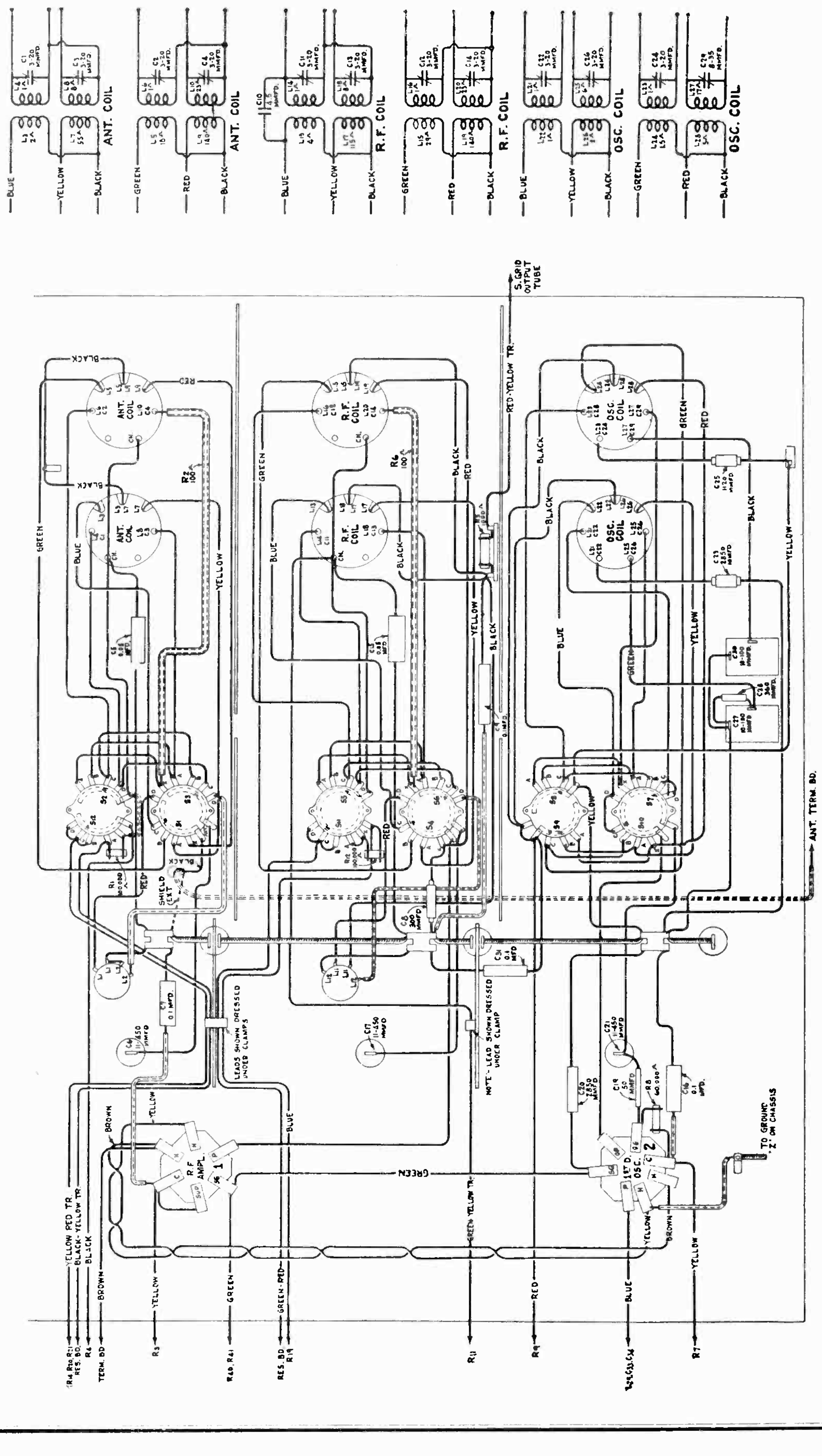


Figure 2—R. F. Assembly Wiring Diagram

RCA-VICTOR CO., INC.

MODEL Duo 381
Chassis Wiring

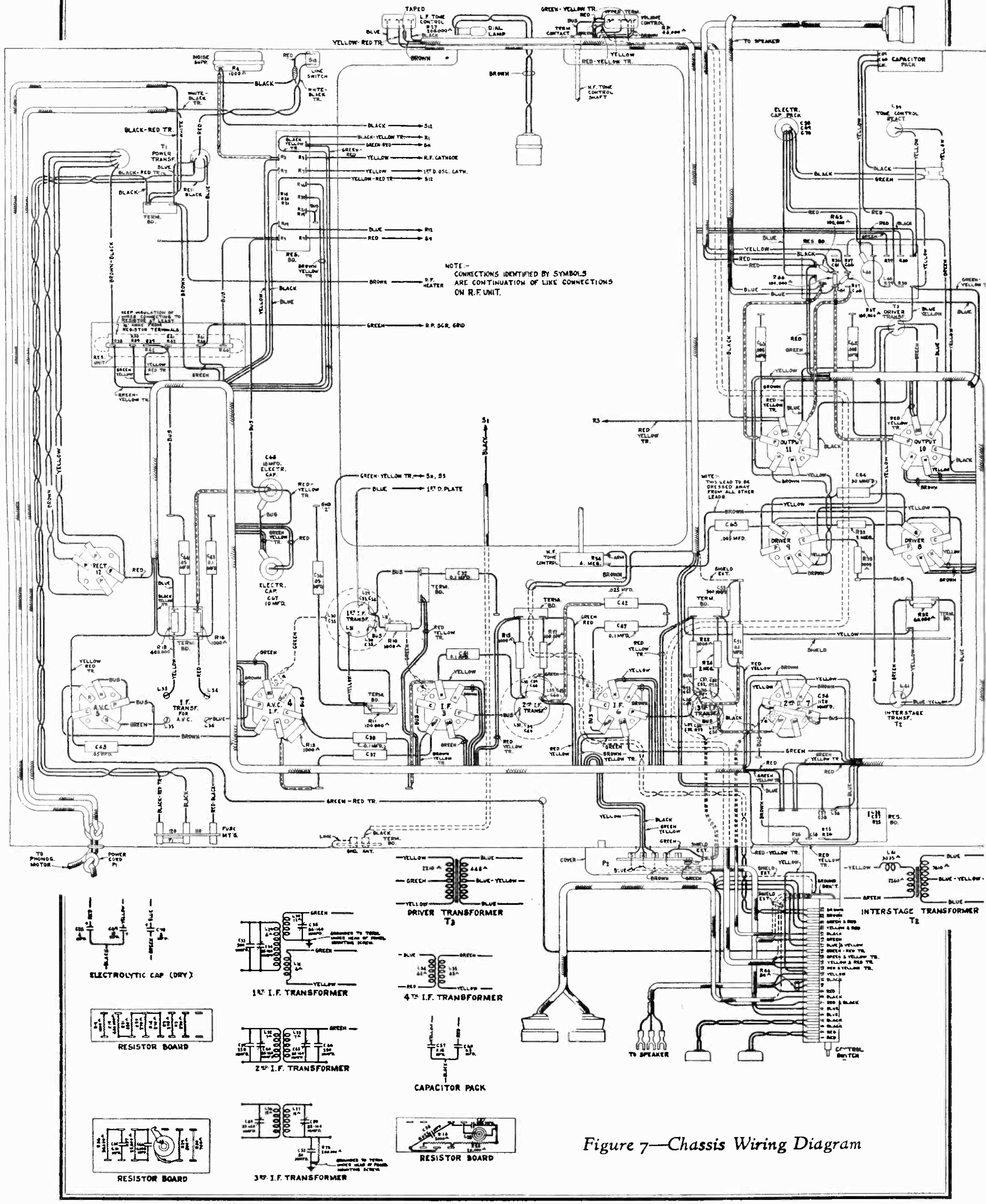
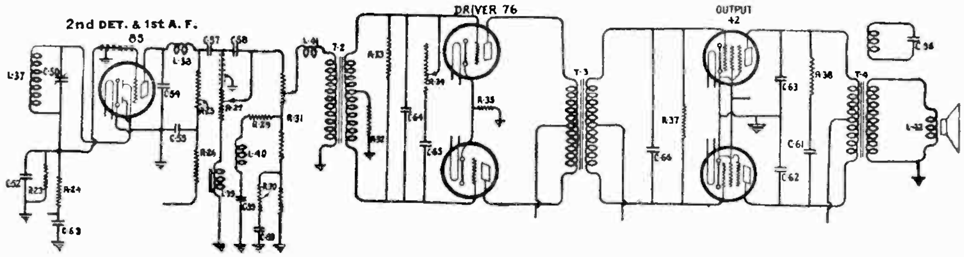


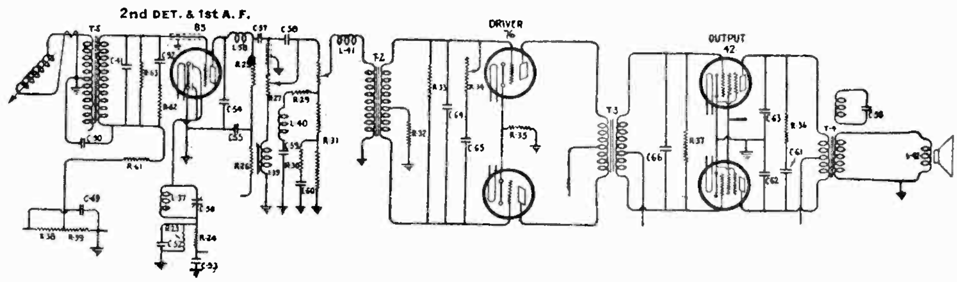
Figure 7—Chassis Wiring Diagram

MODEL Duo 381
A-F. Circuits

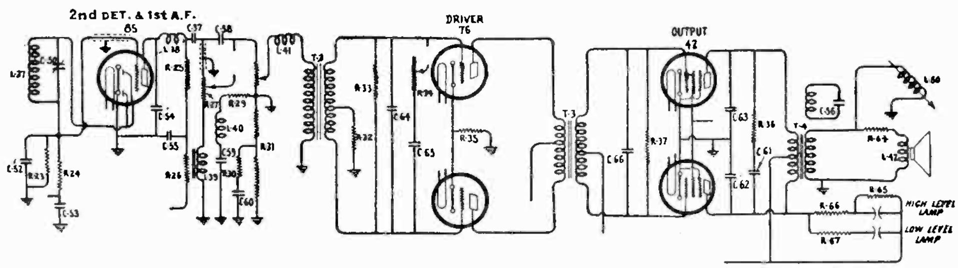
RCA-VICTOR CO., INC.



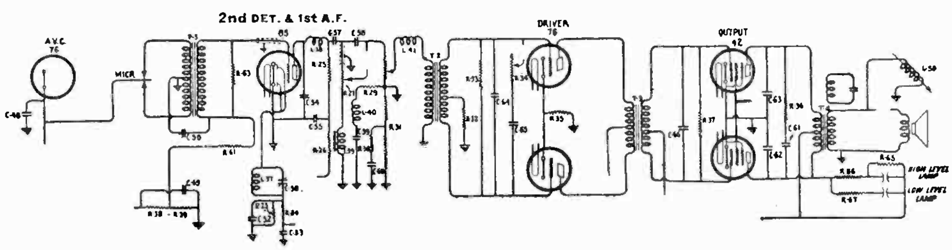
Radio Receiving



Record Reproduction



Radio Recording



Home Recording

Figure 5—Schematic Circuits of Audio Amplifier at each Selector Switch Position

MODEL Duo 381
Assembly Wiring

RCA-VICTOR CO., INC.

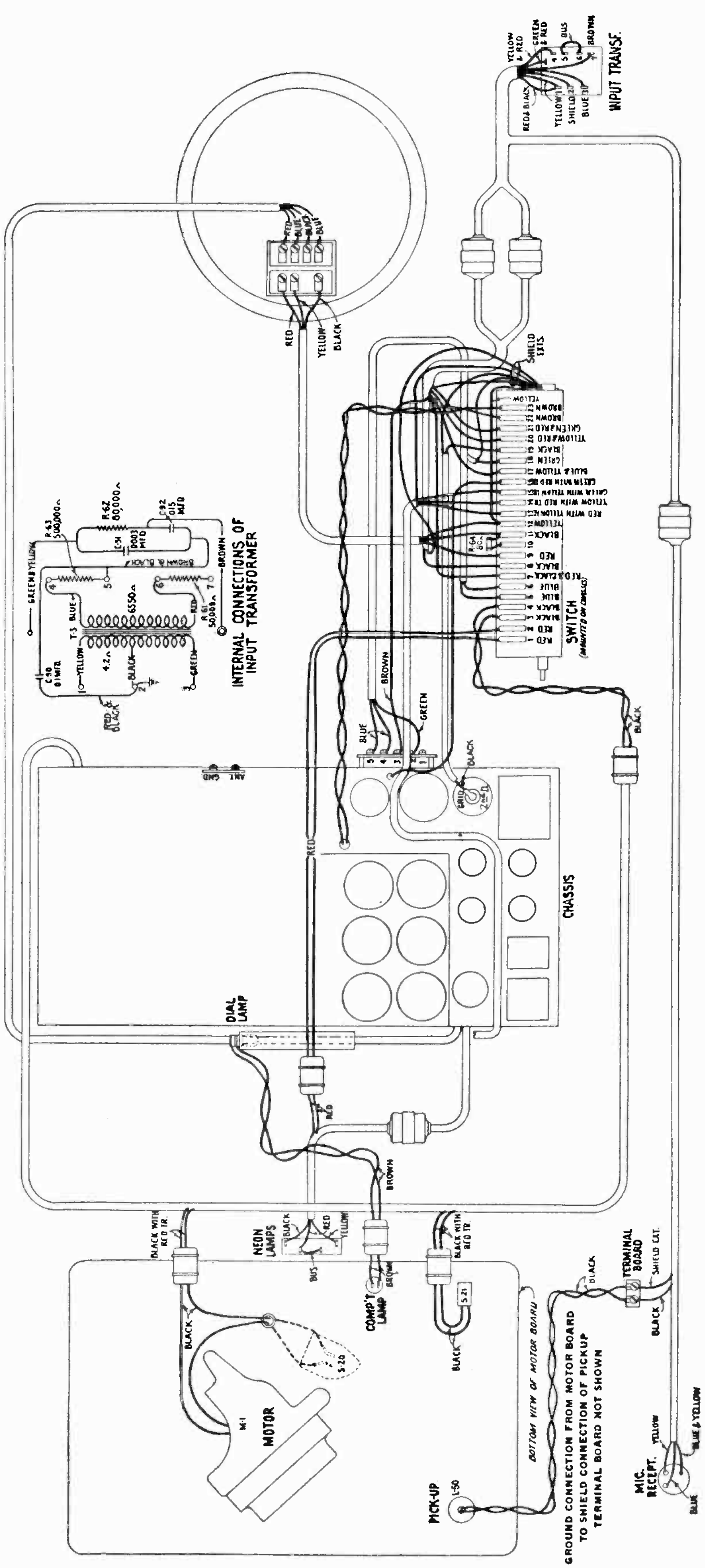


Figure 9—Assembly Wiring Diagram

MODEL Duo 381
Circuit Data
Record Changer Data

RCA-VICTOR CO., INC.

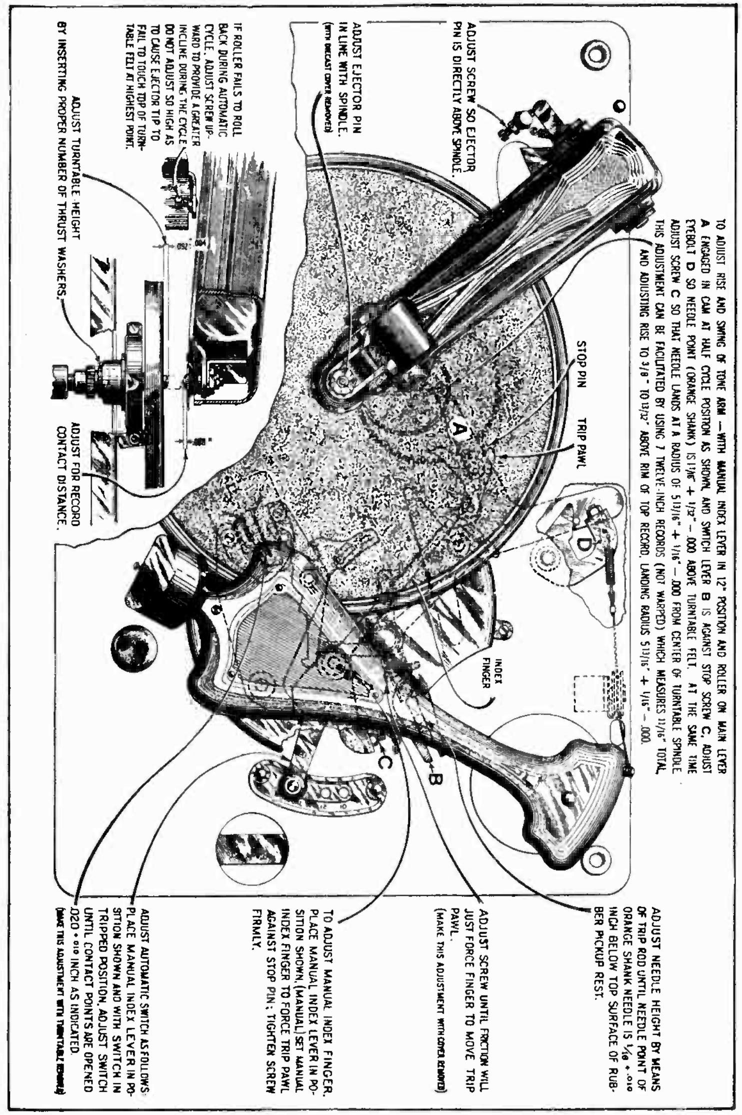


Figure 14—Automatic Record Changer Adjustments

DESCRIPTION OF ELECTRICAL CIRCUIT

RADIO

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector stage, two I. F. stages, a combined second detector, automatic volume control and 1st A. F. amplifier, a push-pull audio driver stage and a push-pull Class A output stage. Plate and grid voltages are supplied by the RCA-5Z3 heavy duty rectifier combined with a suitable filtering system. In addition, a double channel A.V.C. stage is provided which uses two additional tubes. Figure 1 shows the over-all schematic circuit diagram while Figure 2 shows the R. F. assembly wiring.

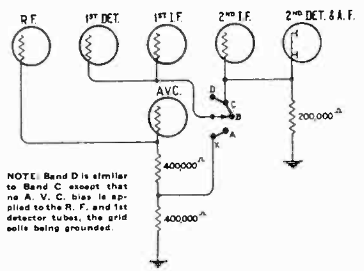


Figure 3—Switching Arrangement of Automatic Volume Control Systems

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator signal, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in the oscillator circuit.

In conjunction with these three tuned circuits it is well to point out that five different groups of tuned circuits are used, one group for each tuning band. A five-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to absorption effects caused by the coils, the natural period of which without the gang-capacitor connected falls in the next higher frequency band. This gang switch also has additional contacts for performing other functions which will be discussed.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the automatic volume control I. F. amplifier stage. A coupling coil adjacent to the secondary of this transformer is connected directly to the signal I. F. stage, which is in effect parallel to the A. V. C., I. F. stage. Examining the signal amplifier further we find that the output of the first signal I. F. stage is applied through a transformer to the second I. F. stage and thence through a second transformer to the second detector. Both circuits of each transformer are accurately tuned to the I. F. signal, which is 460 K. C.

Further examining the A. V. C., I. F. stage it will be seen that the output of this stage is applied to the A. V. C. tube through an untuned I. F. transformer. The A. V. C. stage, which is an RCA-76, is operated as a straight rectifier, its plate being grounded and only the grid being used. This tube is shielded in the usual manner. A small grid voltage, approximately 5.0 volts, is maintained so that rectification does not occur until the signal level exceeds this grid voltage. When this occurs, a portion of the rectified signal produces a voltage drop across resistors R-18 and R-19. The drop across both of these resistors constitutes the automatic bias voltage for the R. F. stage. The drop across R-19 alone gives the automatic bias voltage for the first detector and first I. F. stage on bands X and A.

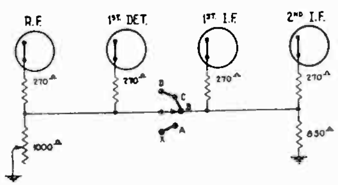


Figure 4—Sensitivity Control Switching Arrangement

Examining the second detector, the diode electrodes provide the detector action while the grid and plate give audio amplification. A portion of the rectified signal also gives a voltage drop across R-23, which is a second automatic volume control system for the receiver. The voltage drop is applied to the second I. F. stage in all bands and to the first detector and first I. F. stage in bands B and C. The change in automatic volume control systems is made by an additional group of contacts on the band selector switch. Figure 3 shows the switching arrangements for changing the A. V. C. system in the various bands.

At this point, an explanation as to why two automatic volume control systems are used and why the sensitivity control is changed in different bands may be in order.

Two automatic volume control systems are used because of the different receiving conditions in the various bands. For example, in the broadcast and long-wave band (X and A) signal levels are very high. Also due to the use of an aurally compensated volume control, a constant input to the second detector must be maintained. From this it is evident that the double channel I. F. automatic volume control is ideal. It maintains a constant input to the second detector and yet does not function on an extremely weak signal. In the short-wave bands, however, conditions are different. Signal strengths are always very low and fluctuate widely. For this reason it is important to have some automatic volume control action below the level at which the double channel system works. This is provided by the tube marked 2nd detector and 1st A. F. which functions on the first detector and two I. F. stages on the short-wave bands. It should be noted that this action is present on the second I. F. stage on all bands. This further flattens the action of the double-channel system in bands X and A.

At this point it is well to examine the sensitivity control, which also changes on different bands. The sensitivity control adjusts the residual bias on the R. F. and first detector stages in bands X and A while it controls the R. F., 1st detector and both I. F. stages on bands B, C, and D. Figure 4 shows the switching arrangement used.

The sensitivity control is changed so that in bands X and A it controls the R. F. and 1st detector while in bands B, C, and D it controls the R. F., 1st detector, 1st I. F. and 2nd I. F. stages. The reason for this is that for a given degree of sensitivity in bands X and A the residual bias will be considerably higher in the R. F. and 1st detector stages than in the bands B, C, and D used. This is to prevent possible overloading of these stages due to the high-signal strengths encountered in bands X and A. Also, in bands B, C, and D, for a given degree of sensitivity the R. F. stage operates at a higher gain, which gives an improved signal to noise ratio. This is caused by the paralleling of the sensitivity control with an 850-ohm resistor in these bands.

Returning to the second detector, we find its output circuit is coupled to the grid circuit of the driver stage through a compensated volume control system, tone control system and transformer. The volume control uses two stages of compensation, which serves to increase the high and low frequencies as the volume is reduced. This compensates for the natural loss in sensitivity of the human ear to the high and low frequencies at low sound levels. A low and a high frequency tone control enables the listener to alter the fidelity of the receiver to his individual taste.

The driver stage, which is a pair of RCA-76 Radiotrons connected in push-pull, is transformer coupled to a pair of RCA-42's which are the output stage. A feature of the output stage is the use of fixed bias, which reduces distortion and increases the available output. This is accomplished by the use of the drop across R-38 and R-39, which carries the entire D. C. output from the rectifier. Naturally the output stage uses but a portion of the total rectified current and current variations in it will have but little effect on the drop across the resistor.

The output of the power stage is coupled through a step-down transformer to the voice coil of the loudspeaker. A separate winding, which is shunted by a capacitor, has been provided in this transformer which gives a very sharp, high-frequency cut-off for the entire

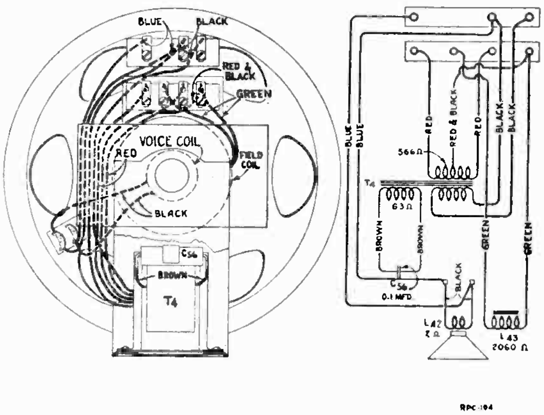


Figure 6—Loudspeaker Wiring

audio system. This greatly reduces the reproduction of any high-frequency interchannel interference or other disturbance of a high-frequency character which is outside of the useful musical range.

The loudspeaker used is of the large-field ten-inch type. It is fully capable of handling the high-power, high-quality output of the receiver and converting it into faithful sound reproduction.

Figure 6 shows the loudspeaker wiring while Figure 7 shows the chassis wiring diagram. Figure 9 shows the assembly wiring diagram.

PHONOGRAPH AND RECORDING

The record reproducing facilities consist of a low impedance magnetic pickup with its associated inertia type tone arm, a compensated volume control, the audio amplifier of the receiver and the loudspeaker of the receiver. The radio receiver is made inoperative by the switch used for changing to record reproduction.

The recording facilities use the audio amplifier of the radio receiver, the output of which is connected to the magnetic pickup instead of the voice coil of the loudspeaker. The input to the amplifier may be either from the microphone or from the radio receiver, depending on whether radio recording or home recording is desired. It should be noted that when radio recording is being used, the loudspeaker is connected across the output through a resistor so that the program being recorded may be monitored at the same time.

Figure 7 shows schematic circuit diagram of the audio circuits at each of the four selection switch positions.

MODEL Duo 381
Alignment Data

RCA-VICTOR CO., INC.

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To properly align this receiver, the following equipment must be used. This is a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool, a tuning wand, and a "dummy" Radiotron RCA-76. These parts, which are shown on page 20, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments. The "dummy" Radiotron, RCA-76, is obtained by removing one heater prong from an otherwise perfect tube.

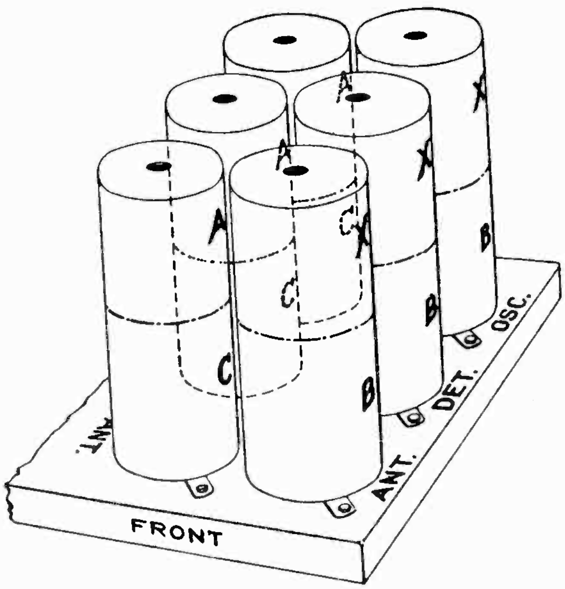


Figure 8—Location of Various Coils in Shields

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 8. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in. The A. V. C. tube would be replaced by the "dummy" RCA-76 and the output indicator connected across the voice coil of the loudspeaker. Then the tuning wand should be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has three I. F. stages, two for the signal and one for the A. V. C., only three transformers having six adjustable capacitors require adjustment. The fourth transformer is in the A. V. C. circuit and is broadly tuned, not requiring adjustments. The transformers are all peaked, being tuned to 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker. Replace the A. V. C. tube in the receiver with the "dummy" RCA-76.

(b) Place the oscillator in operation at 460 K. C.; place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn both the volume and sensitivity controls to their maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 10. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and Oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "X" and "A." Three are required in bands "B" and "C" while none are required in band "D." Band "D" uses the second harmonic of the oscillator while the detector and R. F. coils do not have trimmers.

RCA-VICTOR CO., INC.

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver. The output indicator must be connected across the voice coil of the loudspeaker while the "dummy" RCA-76 must be placed in the A. V. C. socket. The sensitivity and volume controls must be at their maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The Dial Pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64" of the horizontal line at the highest frequency end of band "A."

Figure 10 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "X"

(a) Tune the external oscillator to 410 K. C., set the pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer marked 175 K. C. on Figure 10, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (a).

Band "A"

(a) Tune the external oscillator to 1720 K. C., set the pointer at 1720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 600 K. C. Tune in the 600 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 600 K. C. on Figure 10, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 K. C. as described in (a).

Band "B"

(a) Tune the external oscillator to 5160 K. C., and set the pointer at 5160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(b) Check for the image signal, which should be received at approximately 4240 on the dial. It will be necessary to increase the external oscillator output for this check.

(c) The antenna and detector trimmers should now be peaked for maximum output.

Band "C"

(a) Tune the external oscillator to 18,000 K. C., and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

(b) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

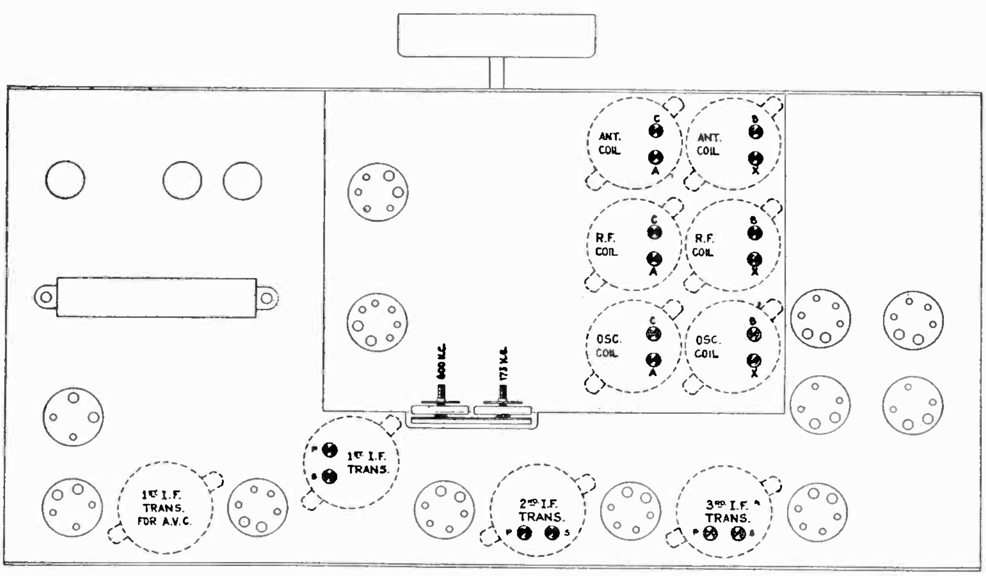


Figure 10—Location of Various Trimmer Capacitors

MODEL Duo 381
Neon Lamp Test
Voltage

RCA-VICTOR CO., INC.

(c) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then at the oscillator frequency and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(d) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "D"

No adjustments are required for Band D.

(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 13 shows the location and voltage at each socket contact.

(6) TESTING NEON LEVEL INDICATING LAMPS

Two Neon Level Indicating Lamps are provided so that a visual indication of the recording level may be obtained at all times. These lamps normally give long service without attention. However, if failure occurs, and all circuits have been checked and eliminated as possible source of failure, the lamps may be easily checked as indicated in the circuit shown in Figure 11. The method for checking involves testing for lighting between certain voltages. The lamps must not light before 52 volts have been applied and must not require a voltage greater than 64 volts to cause them to light. Lamps requiring different voltages from these are defective and must not be used.

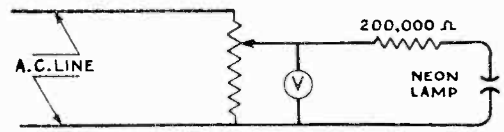


Figure 11—Testing Circuit

RADIOTRON SOCKET VOLTAGES

Maximum Sensitivity—No Signal—120-Volt A. C. Input

Radiotron No.		Cathode to Ground, Volts	Screen Grid to Ground, Volts	Plate to Ground, Volts	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		2.3	100	231	8.8	6.3
RCA-6A7	Osc.	3.0	—	232	10.9	6.3
	Det.		100	238		
RCA-6D6—1st I. F.		7.0	100	236	3.5	6.3
RCA-6D6—2nd I. F.		7.0	100	236	3.5	6.3
RCA-6D6—A. V. C.-I. F.		6.0	100	236	4.0	6.3
RCA-76—A. V. C.		4.7	—	0	0	6.3
RCA-85—2nd Det.		0	—	60	7.2	6.3
RCA-76—A. F.		11.0	—	235	5.5	6.3
RCA-76—A. F.		11.0	—	235	5.5	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-5Z3—Rectifier		—	—	768-384 RMS	104.0	5.0

Power Transformer connected to 120-volt Tap.

(7) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a

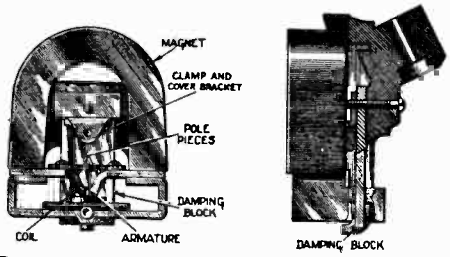


Figure 12—Details of Magnetic Pickup

chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

(8) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective coil or the hardened pivot rubbers (see Figure 15), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

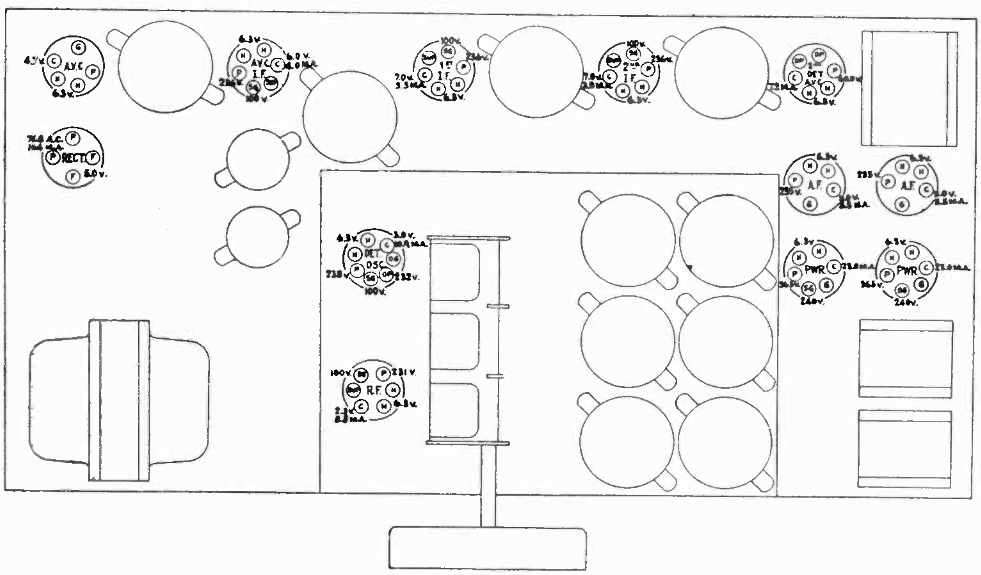
(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 15 and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At



ALL VOLTAGES ARE TO GROUND

Figure 13—Radiotron Socket Voltages

the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have

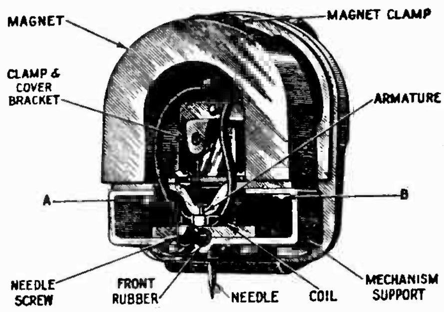


Figure 15—Pickup Nomenclature

the armature centered properly. The adjustment is made by loosening screws A and B (Figure 15), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009″ on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

(9) REPLACING THE DAMPING BLOCK

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 16, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place,

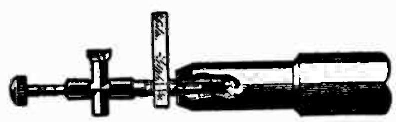


Figure 16—Special Soldering-Iron Tip

as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h), section (8).

(10) AUTOMATIC RECORD CHANGING MECHANISM

The automatic record changer used in this instrument is of simple design and fool-proof construction. Under normal operating conditions service difficulties should be negligible. However, in event adjustments are required, a reference to Figure 14 will disclose the proper method of making all adjustments.

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4372	Bracket—Low frequency tone or volume control mounting bracket	$0.20
4406	Bracket—High frequency tone control mounting bracket	.25
2747	Cap—Contact cap—Package of 5	.50
4407	Capacitor—30 mmfd. (C64)	.25
4405	Capacitor—80 mmfd. (C52)—Package of 5	.85
4376	Capacitor—250 mmfd.—Located on second intermediate frequency transformer (C39, C46)—Package of 5	.80
4404	Capacitor—500 mmfd. (C33, C53)—Package of 5	.85
4409	Capacitor—1120 mmfd. (C54)	.35
4070	Capacitor—.004 mfd. (C66)	.42
3643	Capacitor—.005 mfd. (C62, C63)	.25
6512	Capacitor—.005 mfd. (C65)	.28
3787	Capacitor—.01 mfd. (C61)	.30
3888	Capacitor—.05 mfd. (C36, C44, C48)	.25
3765	Capacitor—.025 mfd. (C42, C58)	.34
4645	Capacitor—.1 mfd. (C32, C41, C43, C51)	.25
3877	Capacitor—.1 mfd. (C37, C38, C47)	.32
4720	Capacitor—.035 mfd. (C57)	.42
7790	Capacitor—10 mfd. (C67)	1.05
7788	Capacitor—18 mfd. (C68)	1.10
7787	Capacitor pack—Comprising one .15 mfd. and one .5 mfd. capacitors (C59, C60)	1.10
7789	Capacitor pack—Comprising one 4., one 8. and one 10. mfd. capacitors (C55, C69, C70)	2.68
4358	Clamp—Electrolytic capacitor clamp	.15
7806	Coil—Second detector plate choke coil (L38)	.30
4371	Cover—Fuse mount cover	.15
4359	Cover—Terminal board cover	.15
10907	Fuse—3-ampere—Package of 5	.40
3376	Mount—Fuse mount 105–125-volt instrument	.40
7784	Reactor—Tone control reactor (L39)	1.30
7483	Reactor—Volume control compensating reactor (L40)	.68
6135	Resistor—270 ohms—Carbon type—¼ watt (R3, R7, R14, R20)—Package of 5	1.00
4240	Resistor—700 ohms—Carbon type—¼ watt (R30)—Package of 5	1.00
4375	Resistor—800 ohms—Carbon type—¼ watt (R29)—Package of 10	2.00
6247	Resistor—850 ohms—Carbon type—¼ watt (R21)—Package of 5	1.00
4687	Resistor—1,000 ohms—Carbon type—¼ watt (R9, R10, R13, R15, R16, R22, R35)—Package of 10	2.00
3110	Resistor—25,000 ohms—Carbon type—¼ watt (R37)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R32)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R11, R17)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt—Located on third I. F. transformer (R23)—Package of 5	1.00
4368	Resistor—400,000 ohms—Carbon type—¼ watt (R18, R19)—Package of 10	2.00

Stock No.	Description	List Price
6242	Resistor—2 megohms—Carbon type—¼ watt (R24, R33)—Package of 5	$1.00
3413	Resistor—5,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R36)	.22
5817	Resistor—20,000 ohms—Carbon type—3 watt (R25)	.25
6997	Resistor—Total resistance 14,470 ohms with 160–60–350–7150 and 6750 ohm sections (R38, R39, R40, R41, R42)	.95
7804	Rheostat—Noise suppressor rheostat (R4)	1.30
4453	Shield—First I. F., AVC—I. F. or second I. F. Radiotron shield	.32
3683	Shield—Radiotron shield top	.20
4452	Shield—Second detector or AVC Radiotron shield	.35
7800	Shield—Shield for intermediate frequency coils	.45
3859	Socket—4-contact rectifier Radiotron socket	.30
7484	Socket—5-contact AVC Radiotron socket	.35
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact driver Radiotron socket	.40
7796	Switch—Operating switch (S13)	.62
7795	Tone control—Low frequency (R27)	1.30
7797	Tone control—High frequency (R34)	1.35
7794	Transformer—AVC intermediate frequency transformer (L34, L35)	.82
7785	Transformer—Driver transformer (T3)	2.40
7791	Transformer—First intermediate frequency transformer (L29, L30, L31, C33, C34, C35)	2.35
9505	Transformer—Power transformer 105–125-volt, 50–60 cycle (T1)	6.35
9506	Transformer — Power transformer 105–125 volts, 25–40 cycles	8.90
7792	Transformer—Second intermediate frequency transformer (L32, L33, C39, C40, C45, C46)	2.22
7793	Transformer—Third intermediate frequency transformer (L36, L37, C49, C50, C52, R23)	2.50
7786	Transformer pack—Comprising one reactor and interstage transformer (L41, T2)	4.25
7798	Volume control—Radio and Phonograph (R31)	2.05
	R. F. UNIT ASSEMBLIES	
4646	Capacitor—4.5 mmfd. (C10)	.20
4416	Capacitor—50 mmfd. (C19)—Package of 5	1.25
3981	Capacitor—300 mmfd. (C8)	.30
4413	Capacitor—360 mmfd. (C28)	.22
4412	Capacitor—1120 mmfd. (C25)	.25
4524	Capacitor—2850 mmfd. (C23)	.35
4615	Capacitor—2850 mmfd. (C20)	.34
4417	Capacitor—0.05 mfd. (C5, C15)	.25
4415	Capacitor—0.1 mfd. (C7, C16)	.30
4645	Capacitor—0.1 mfd. (C9, C31)	.25
3861	Capacitor—Adjustable capacitor (C27, C30)	.78
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4410	Coil—Antenna coil—Band "D" (L1, L2)	.70
7803	Coil—Antenna coil—"B"—"SW" (L3, L4, L7, L8, C1, C3)	1.82

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
7810	Coil—Antenna coil—"PB"—"LW" (L5, L6, L9, L10, C2, C4)	$2.10
7805	Coil—Detector coil—"B-SW" (L13, L14, L17, L18, C11, C13)	2.15
7808	Coil—Detector coil—"PB-LW" (L15, L16, L19, L20, C12, C14)	2.05
4421	Coil—Detector coil—Band "D" (L11, L12)	.70
7807	Coil—Oscillator coil—"B-SW" (L21, L22, L25, L26, C22, C26)	1.62
7809	Coil—Oscillator coil—"PB-LW" (L23, L24, L27, L28, C24, C29)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C17, C21)	4.42
4419	Lead—Shield single-conductor antenna lead	.45
4687	Resistor—1,000 ohms—Carbon type—¼ watt (R5)—Package of 10	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R12)—Package of 5	1.00
4418	Resistor—100 ohms—Flexible type (R2, R6)—Package of 10	1.50
7800	Shield—Antenna, detector or oscillator coil shield	.45
4452	Shield—First detector oscillator coil shield	.35
3683	Shield—Radiotron shield top	.20
4454	Shield—R. F. amplifier Radiotron shield	.44
3529	Socket—Dial lamp socket	.32
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4686	Strip—Terminal strip engraved "ANT-GND"	.20
7802	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12)	4.05
	CABLE AND PLUG ASSEMBLIES	
4547	Cable — 3-conductor — Recording indicator cable—With female section of connector plug—Stock No. 4153—One end connected to resistor board	.85
4548	Cable—3-conductor with spade terminals—Phonograph chassis cable—One end connected to selector switch, other end to terminal board	.50
4553	Cable—3-conductor—Reproducer cable with spade terminals	.45
4549	Cable—Input transformer cable—3 branches—With 2 male and one female section of connector plugs—Stock Nos. 4571, 4574 and 6123	2.30
4576	Cable—Input transformer—One end connected to selector switch—With two female sections of connector plugs—Stock Nos. 4153 and 4571	1.84
4550	Cable—Microphone cable—One end connected to microphone receptacle—3-conductor with male section of connector plug—Stock No. 4574	1.00
4551	Cable—Recording indicator cable—One end connected to indicator with one male and one female section of connector plug—Stock Nos. 4573 and 6123	1.88

Stock No.	Description	List Price
4552	Cable—2-conductor—Motor power cable—With three female sections of connector—Stock No. 4573	$3.36
4554	Cable—Volume control cable—One end connected to selector switch, other end to volume control and low frequency tone control	.50
4153	Plug—Female section of 4-contact connector plug—Used with following cables—Stock No. 4547 and 4576	.48
4573	Plug—Female section of 2-contact connector plug—Used with dial lamp cord and following cables—Stock Nos. 4551 and 4552	.30
4571	Plug—Female section of 6-contact connector plug—Used with cables—Stock Nos. 4549 and 4576	.65
6123	Plug—Male section of 4-prong connector plug—Used with the following cables—Stock Nos. 4549 and 4551	.30
4577	Plug—Male section of 2-prong connector plug—Connected to terminals Nos. 1, 2, 3 and 4 of selector switch	.30
4574	Plug—Male section of 6-prong connector plug—Used with cables Stock Nos. 4550 and 4549	.48
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled	.88
4455	Dial—Station selector dial	.60
7799	Drive—Variable tuning condenser drive assembly complete	2.45
4364	Gear—Spring gear assembly complete with hub pinion, gear cover and spring	.96
4361	Indicator—Band indicator—Celluloid-lettered D-C-B-A-X	.12
4363	Pointer—Station selector main pointer—Large	.18
4367	Pointer—Station selector vernier pointer—Small	.15
3993	Screw—No. 6-32-¼" square head set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4360	Stem—Pointer stem assembly	.35
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	EJECT ARM ASSEMBLIES	
4713	Arm—Eject arm complete	7.74
3658	Ball—Steel ball bearing—Package of 20	.30
3656	Bearing—Ejector tip bearing	.48
4054	Bracket—Eject arm bracket assembly	1.35
4058	Collar—Eject arm shaft collar and set screw	.18
4714	Cover—Eject arm cover	1.38

RCA-VICTOR CO., INC.

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
3930	Cushion—Counter balance cushion and bracket—Located inside of eject arm	$0.18
3662	Plate—Ejector plate—Package of 5	.95
4055	Post—Vertical adjustment post—Located on eject arm bracket	.30
3655	Retainer—Ball retainer with three balls	.45
3729	Roller—Counterbalance roller — Located inside of eject arm	.45
3665	Screw—Eject arm horizontal adjustment screw and nut—Package of 5	.25
4057	Shaft and collar—For eject arm	.24
4067	Spring—Eject arm bracket spring—Package of 10	.30
4125	Spring—Eject arm horizontal action tension spring—60 cycle operation—Package of 10	.42
4126	Spring—Eject arm—Horizontal action tension spring—For 25 cycle operation—Package of 10	.60
3657	Tip—Ejector tip	.30
4056	Yoke—Eject arm yoke assembly	1.04
	MICROPHONE ASSEMBLIES	
7534	Cord—Microphone cord	.70
6883	Cover—Microphone cover—Two sides	1.96
3216	Cushion—Microphone rubber cushions—Pkg. of 6	.24
6884	Frame—Microphone frame	1.19
7533	Mechanism—Microphone mechanism	6.80
6882	Microphone complete	7.50
4171	Plug—3-contact microphone plug	.30
4158	Socket—Microphone socket	.40
	MOTOR ASSEMBLIES	
9477	Motor—105-125 volts—60 cycles	25.88
9478	Motor—105-125 volts—50 cycles	25.88
9479	Motor—105-125 volts—25 cycles	36.48
4562	Motor mounting spring, washer and stud assembly—Comprising six springs, six cup washers, three spring washers and three studs	.58
	MOTOR BOARD ASSEMBLIES	
4060	Escutcheon — Index escutcheon engraved "Manual 10-21"	.28
3764	Nut—Cap nut for motor board—Package of 4	.40
3672	Pin—Manual index pin	.42
4066	Rest—Pickup rest	.14
3654	Roller—Pickup arm guide roller assembly—Comprising bracket and guide pin	.34
3763	Suspension spring, washer and bolt assembly for motor board—Comprising one bolt, two cup washers, two springs, one "C" washer and one cap nut	.42
	OPERATING MECHANISM ASSEMBLIES	
6502	Cam—Cam and gear assembly	1.18
6808	Clutch—Trip lever friction clutch	.30

Stock No.	Description	List Price
4719	Cover—Metal cover for trip lever and friction finger assembly	$0.28
3670	Finger—Friction finger assembly	.32
6809	Finger—Manual index lever finger assembly	.25
6846	Lever—Main lever and link assembly	1.45
6810	Lever—Main spring lever	.44
6806	Lever—Manual control index lever—Less pin	.55
3677	Lever—Pickup arm cable lever assembly complete—Comprising lever with cable screw spring and nut	.40
6807	Lever—Trip lever and friction clutch assembly	1.16
6503	Pawl—Trip pawl assembly	.40
4124	Plate—Eject arm actuating plate assembly	.50
4563	Screw—Cable lever cable screw and nut—Package of 10	.60
4564	Screw—Manual index lever finger set screw—Package of 10	.20
4567	Screw—Manual index lever assembly—Adjustment screw and nut—Package of 10	.32
4566	Screw—Special screw used to fasten main lever and link assembly bushing—Package of 10	.30
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4127	Spring—Actuating plate tension spring—Package of 10	.24
3666	Spring—Cable lever tension spring—Package of 10	.44
3676	Spring—Cam and gear, pawl carrier tension spring—Package of 10	.52
4061	Spring—Main spring	.38
4565	Spring—Manual index lever finger tension spring—Package of 10	.30
2893	Spring—Trip lever latch plate tension spring—Package of 10	.30
2917	Washer—Spring washer "U" type—Package of 10	.25
	PICKUP AND ARM ASSEMBLIES	
4581	Arm—Pickup arm complete less escutcheon and pickup unit	5.72
4128	Armature—Pickup armature	.96
6813	Back—Pickup housing back	.68
4064	Cable—Pickup arm cable—Package of 5	1.00
4583	Coil—Pickup coil (L50)	.80
4711	Cover—Pickup cover	.34
4709	Cover—Pickup back cover with two mounting screws	.34
3737	Damper—Pickup damper—Package of 5	.65
6815	Escutcheon—Pickup arm escutcheon	.64
4561	Pad—Cork pad—Used when making home recordings	.45
4582	Pickup unit complete	4.30
4062	Rod—Automatic brake trip rod	.20

REPLACEMENT PARTS—(Continued)

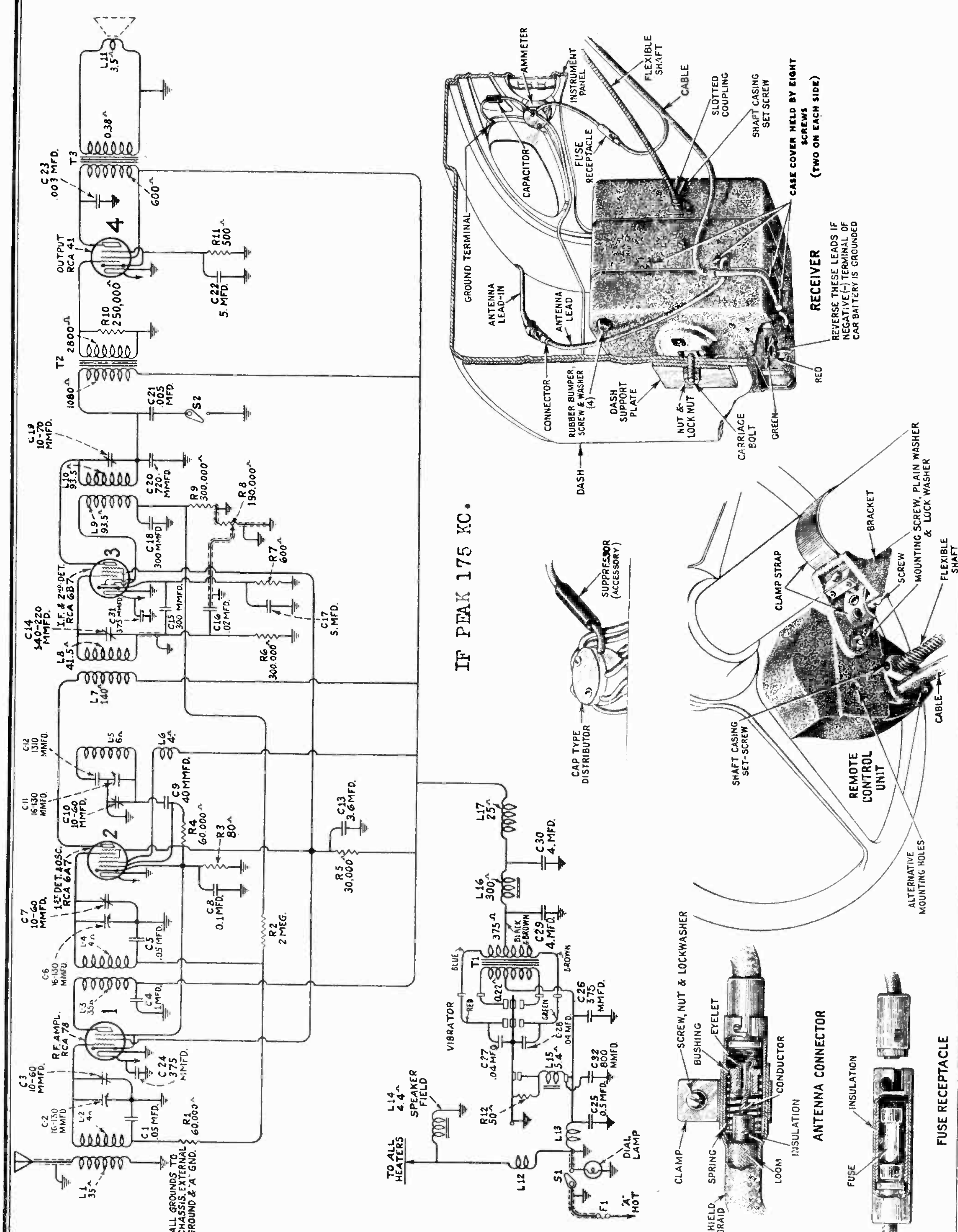
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
4063	Screw assembly—Pickup mounting screw assembly—Comprising one screw, one washer and one nut—Package of 10	$0.54
3388	Screw—Needle holding screw—Package of 10	.60
3419	Screw—Pickup cover holding screw—Package of 10	.40
4157	Weight—Home recording weight	1.72
	RECORDING INDICATOR ASSEMBLIES	
4162	Escutcheon—Recording indicator escutcheon	.34
4161	Lamp—Neon lamp	.56
4164	Screen—Indicator lamp screen	.18
4163	Screw—Screen, escutcheon and terminal board mounting screw assembly—Comprising two screws, two spacers, two nuts and two lockwashers	.20
	REPRODUCER ASSEMBLIES	
4706	Board—Terminal board—Three terminals	.30
4568	Bolt assembly—Reproducer mounting bolt assembly—Comprising one bolt, one lockwasher, one washer and one nut—Package of 10	.55
9542	Coil—Field coil, magnet and cone support (L43)	11.16
7000	Cone—Reproducer cone (L42)—Package of 5	9.45
9541	Reproducer complete	17.32
6999	Screen—Dust screen—Package of 6	.12
7826	Transformer—Output transformer and capacitor (T4, C56)	2.80
	SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	.26
10184	Plate—Automatic brake latch plate—Package of 5	.40
10174	Springs—Automatic brake springs—Package of 4	.50
6805	Switch assembly—Automatic switch complete	1.90
3322	Switch—Motor switch (S20)	.75
	TURNTABLE ASSEMBLIES	
4065	Bushing—Speed shifter lever bushing—Package of 4	.82
3344	Cover—Grease retainer cover—Package of 2	.70
6818	Lever—Speed shifter lever	.38
3341	Pin—Groov pin—Package of 2	.56
6816	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.42
4708	Turntable complete	5.10
6817	Sleeve—Sleeve complete with ball race	2.25
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3347	Spring—Speed shifter lever spring—Package of 2	.30
3340	Washer—Thrust washer—Package of 2	.56

Stock No.	Description	List Price
	MISCELLANEOUS PARTS	
4556	Base—Phonograph compartment lamp base and socket	$0.55
4546	Bearing—Selector flexible shaft bearing and nut and set screw—Fastened to motor board	.50
4677	Bezel—Metal bezel (escutcheon) for station selector dial	.56
4555	Box—Needle box complete with lid	.40
4559	Bracket and bushing—Selector switch flexible shaft bracket and bushing—Fastened to selector switch	.52
4572	Escutcheon—Selector switch escutcheon	.46
6614	Glass—Station selector dial glass	.30
4425	Knob—Station selector or Radio-phonograph—Recording switch knob—Package of 5	.75
3829	Knob—Volume control, tone control, noise suppressor or range switch knob—Package of 5	1.10
4340	Lamp—Dial lamp—Package of 5	.60
4190	Pointer—Selector switch pointer—Package of 5	.72
4710	Receptacle—Needle receptacle	.35
4091	Resistor—80 ohms—Carbon type—¼ watt—Located on selector switch (R64)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R65, R66, R67)—Package of 5	1.00
4678	Ring—Station selector dial glass retaining ring—Package of 5	.34
4119	Screw—8-32-¼" headless set screw for knob—Stock Number 4425—Package of 20	.38
4393	Screw—8-32-⅜" headless set screw for knob—Stock Number 3829—Package of 10	.25
4191	Screw—10-32-¼" dog point fillister head set screw—Used with flexible shaft bearing—Package of 10	.50
3651	Screw—10-32-⅜" self-locking headless set screw—Used with flexible shaft bearing—Package of 10	.32
3652	Screw—10-32-¼" self-locking set screw for selector switch, flexible shaft bracket and bushing—Package of 10	.32
4580	Screw—6-32-3/16 square head set screw for selector switch flexible shaft—Package of 10	.25
4560	Screw assembly—Receiver chassis mounting screw and washer assembly—Package of 10	.30
4557	Shade—Phonograph compartment lamp shade	.35
4558	Shaft—Selector switch flexible shaft	1.10
4544	Switch—Radio-phonograph, or home recording selector switch (S22)	7.10
4579	Switch—Toggle type—Motor starting switch (S21)	1.55
4545	Transformer — Input transformer pack — Comprising one input transformer, one 50,000 ohm, one 500,000 ohm and one 80,000 ohm resistor, one .0003 mfd. and one 0.1 mfd. and one .015 mfd. capacitors (T5, C90, C91, C92, R61, R62, R63)	5.40

RCA-VICTOR CO., INC.

MODEL AR-4229
Schematic
Chassis Details



MODEL AR-4229
Chassis Wiring

RCA-VICTOR CO., INC.

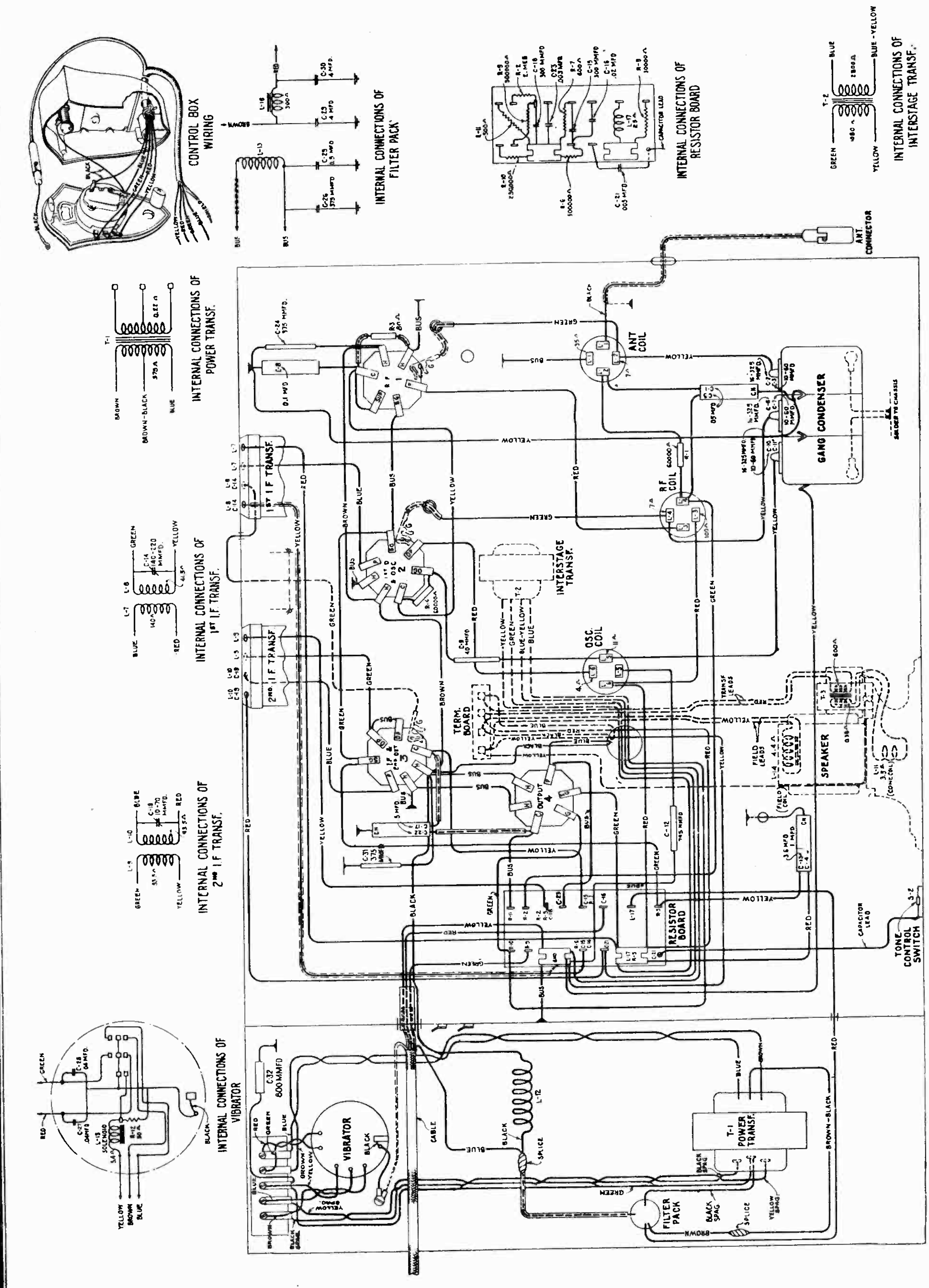


Figure B—Wiring Diagram

MODEL AR-4229
Alignment Data
Voltage

RCA-VICTOR CO., INC.

PART IV—SERVICE DATA

Type and Number of Tubes Used .... 1 RCA-41, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7—Total, 4
Total Battery Current (With 6.3 volts between chassis and A (hot) terminal) 5.35 Amperes
Undistorted Output .... 1.35 Watts
Loudspeaker Field Current .... 1.35 Amperes
Filtered D. C. Voltage from Rectifier .... 227 Volts
Total Plate Current .... 47.5 M. A.

This four tube Superheterodyne Police Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, "B" battery eliminator and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

"B" Battery Eliminator

This receiver uses a vibrator-type Inverter-Rectifier that provides a source of direct current voltage for use as plate and grid supply for all tubes. *This unit is accurately adjusted and sealed at the factory and service adjustments should not be attempted.*

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 2508 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for these adjustments:

R. F. Adjustment

A satisfactorily accurate and rapid adjustment of the three R. F. line-up capacitors can be made by ear, although, for optimum results, the use of an output meter connected across the loudspeaker voice coil is recommended. The latter method however, involves removal of the rear cover to connect the meter, thus in turn eliminating the shielding effect of the case. Temporary shielding for the bottom and tube sides of the chassis and for the transformer therefore must be provided to prevent vibrator interference.

(a) Procure a modulated oscillator giving a signal at 2508 K. C. and a non-metallic screw driver. Stock No. 9050 oscillator and 7065 screw driver are suitable.

(b) Couple the output of the oscillator from antenna to ground, set the dial at 97, and the oscillator at 2508 K. C.

(c) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(d) Then adjust the three line-up capacitors until maximum sound in the speaker or maximum deflection of the output meter is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and tubes as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

Chevrolet 1933—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10" to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

Plymouth 1933—Mount chassis on left side, back against car bulkhead and use 33⅞" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

Ford V-8 1932 or 1933—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

TUBE SOCKET VOLTAGES

6.3 Volt Battery—No Signal

Tube No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.42	83	222	5.25	6.0
RCA-6A7	First Detector	4.42	83	222	11.0	6.0
	Oscillator	4.42	—	223	Total	
RCA-6B7 Second Detector		3.22	84	218	5.25	6.0
RCA-41 Power		13.0	214	200	26.0	6.0

MODEL AR-4229
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

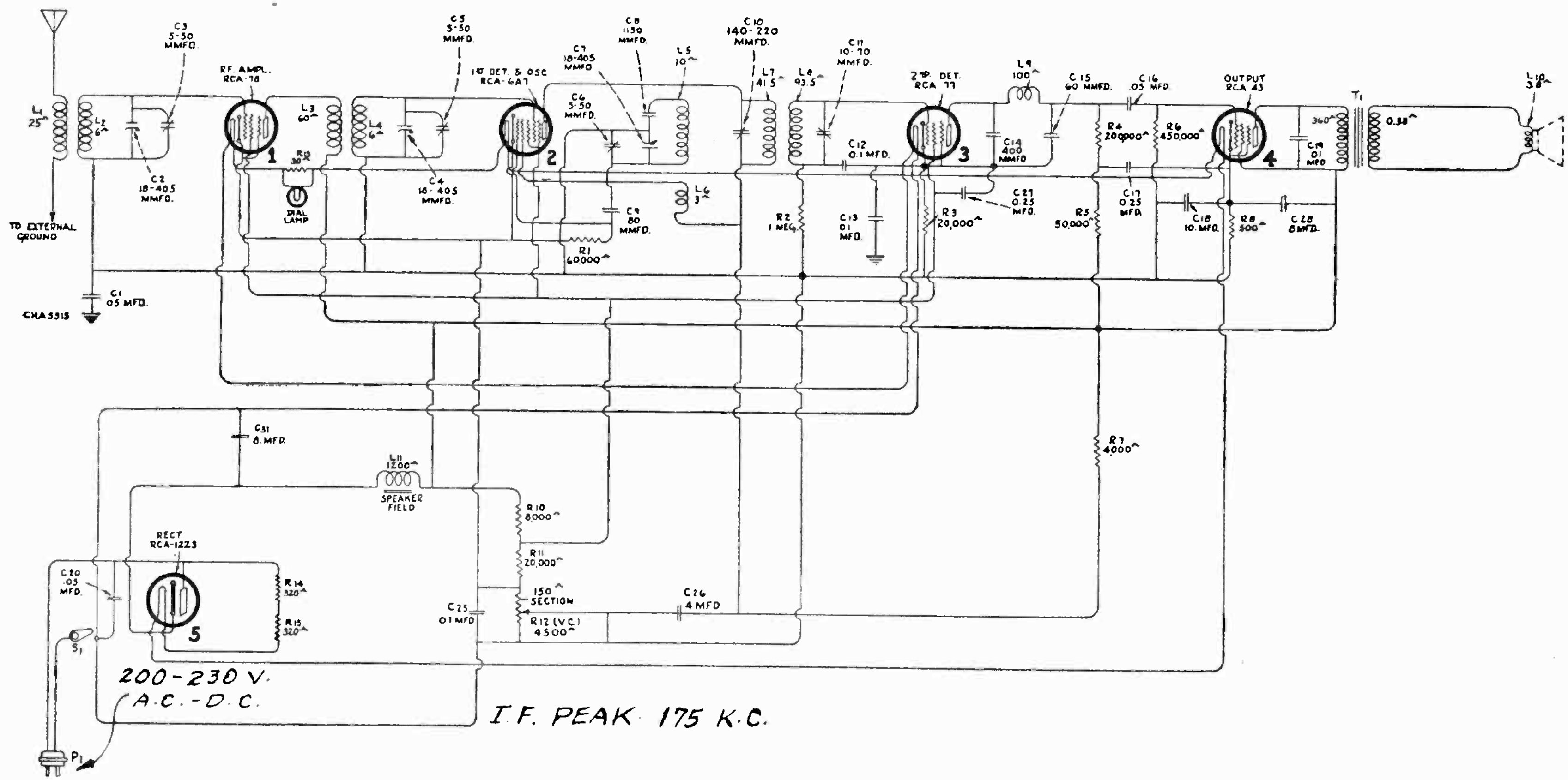
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—1/4 watt (R7)—Package of 5	1.00
3536	Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22)	1.10
3572	Socket—Radiotron 7-contact socket	.38
3584	Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5	.40
3602	Resistor—60,000 ohms—Carbon type—1/4 watt (R1, R4)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C15, C18)	.34
3617	Capacitor—0.005 mfd. (C21)	.38
3618	Capacitor—0.02 mfd. (C16)	.38
3621	Coil—Choke coil—Located on resistor board (L17)	.35
3623	Shield—Antenna R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3636	Transformer—First intermediate frequency transformer (L7, L8, C14)	1.74
3637	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.65
3641	Capacitor—0.1 mfd. (C8)	.35
3645	Knob—Tone control knob—Package of 5	.90
3695	Capacitor—375 mmfd. (C24, C31)	.22
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C20)	.40
3744	Resistor—250,000 ohms—Carbon type—1/4 watt (R10)—Package of 5	1.00
3745	Capacitor—745 mmfd. (C12)	.34
3746	Capacitor—800 mfd. (C-32)	.34
3920	Capacitor—.003 mfd. (C23)	.25
3921	Mounting screws, washer and bushing assembly—For 3-gang variable tuning condenser—Comprising three spacers, three screws, three washers and three lock-washers	.34
3922	Resistor—300,000 ohms—Carbon type—1/4 watt (R6, R9)—Package of 5	1.00
6135	Resistor—270 ohms—Carbon type—1/4 watt (R3)—Package of 5	1.00
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—1/4 watt (R2)—Package of 5	1.00
6298	Cord—Tuning condenser drive cord—Package of 5	.60
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6490	Tone control switch	.35
6492	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitor (C4, C13)	1.08
6493	Drum—Tuning condenser drive drum	.40
6514	Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5)	.28
6515	Cable—Shielded cable with antenna connector	.32
6516	Connector—Fuse connector	.16
6517	Cable—Main cable complete with fuse connector	1.40
6540	Coil—R. F. coil assembly (L3, L4)	.94
6731	Coil—Antenna coil (L1, L2)	.88
6732	Transformer—Interstage audio transformer (T2)	2.00
7485	Socket—Radiotron 6-contact socket	.40
7600	Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30)	4.06
7601	Condenser—3-gang variable tuning condenser	2.84
9049	Transformer—Power transformer (T1)	3.75
	CONTROL BOX ASSEMBLIES	
3649	Key—Volume control and switch key	.18
3650	Screw—Self locking No. 10–32–3/16" fulldog point set screw—Package of 10	.32
3651	Screw—Self locking No. 10–32–3/16" cupped point set screw—Package of 10	.32

Stock No.	DESCRIPTION	List Price
3652	Screw—Self locking No. 10–32–1/4" cupped point set screw—For flexible drive shaft—Package of 10	$0.32
3690	Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
3718	Bracket—Control box dash mounting bracket	.25
3757	Coupling—Slotted coupling for end of flexible drive shaft—Package of 5	.40
3758	Connector—For control box end of flexible drive shaft—Package of 5	.68
G5021	Knob—Station selector knob—Package of 5	.90
6496	Shaft—Flexible drive shaft complete with connectors—Approximately 24 1/8" long	1.60
6497	Shaft—Flexible drive shaft complete with connectors—Standard length—Approximately 33 1/8" long	1.75
6499	Volume control—Combination volume control and switch (R8)	1.36
6500	Nut—Volume control and switch lock nut	.24
6531	Shaft—Flexible drive shaft complete with connectors—Approximately 12 1/8" long	.85
6532	Shaft—Flexible drive shaft—Complete with connectors—Approximately 18 1/8" long	1.24
6784	Scale—Dial scale	.58
G7850	Box—Control box complete	3.70
G7851	Cover—Control box cover	.44
	MISCELLANEOUS PARTS	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
3647	Nut—Cap nut and lock washer—Package of 10	.35
3648	Screw—No. 10–32–5/8" cap screw and lockwasher—Package of 10	.32
3689	Bracket—Receiver mounting bracket, bolt and nut assembly—One set	.30
3791	Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case	.30
3827	Cable—From fuse connector to ammeter	.10
4051	Bumper—Rubber bumper used in mounting receiver chassis—Package of 4	.20
3856	Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10	.30
3884	Clamp—Cable clamp—Package of 10	.20
G5046	Escutcheon—Metal label for central box—Package of 10	.70
G5047	Escutcheon—Metal label for receiver—Package of 10	.50
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor splice-in suppressor	.56
6494	Capacitor—Ammeter capacitor—0.5 mfd.	.46
6495	Capacitor—Generator capacitor—0.5 mfd.	.72
6670	Suppressor—Spark plug suppressor—"Elbow type"	.56
7065	Screwdriver—For R. F. and I. F. adjustments	.80
7621	Antenna—Roof antenna—Paper type (Brown)	1.50
7622	Antenna—Roof antenna—Paper type (Gray)	1.50
7686	Housing—Front section of housing complete with mounting screws	3.48
7689	Vibrator complete	7.84
7699	Housing—Rear section of housing complete with mounting screws	1.92
G9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
3688	Transformer—Output transformer (T3)	1.50
7607	Screen—Metal screen	.44
7608	Coil assembly—Comprising field coil, magnet and cone support (L14)	2.40
9023	Cone—Reproducer cone complete (L11)—Package of 5	5.00

MODEL 23590-2
Schematic
Voltage

RCA-VICTOR CO., INC.



RADIOTRON SOCKET VOLTAGES

*Measured at 220 Volts A. C., 60 cycles (Maximum Volume Control)

Radiotron No.	Cathode to Control Grid, Volts DC	Cathode to Screen Grid, Volts DC	Cathode to Plate, Volts DC	Plate Current M. A.	Heater Volts
RCA-78 R. F.	3.0	100	165	5.5	6.0
RCA-6A7 Oscillator 1st Detector	—	—	145	1.7	6.0
	3.0	100	145	2.5	—
RCA-77 2nd Detector	Plate and Bias Supply 165 Volts			—	6.0
RCA-43 Power	21.0	140	130	35.0	25.0
RCA-12Z3 Rectifier	220 RMS			—	12.0

*Voltages with 220 Volts D. C. supply will be approximately 10 per cent less than tabulated values

MODEL 23590-2
Alignment Data
Parts List

RCA-VICTOR CO., INC.

Electrical Specifications

Voltage Rating .... 200–230 AC or DC
Frequency Rating (AC) .... 50–60 Cycles
Power Consumption .... AC 60 Cycles–105 Watts—DC–85 Watts
Number and Types of Radiotrons .... 1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-12Z3—Total, 5
Undistorted Output .... 1.5 Watts
Frequency Range .... 540 KC–1500 KC

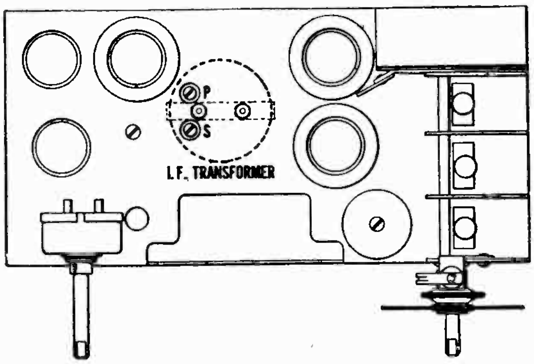


Figure C—Location of Line-Up Capacitors

This receiver is a five-tube Super-Heterodyne designed to operate on AC or DC over the voltage and frequency range indicated. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-12Z3, which is used in a half-wave circuit.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and for the R. F. circuits should be made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 KC and 1400 KC. An output meter and non-metallic screw driver are also necessary. The Stock No. 9050 test oscillator and Stock No. 7065 screw driver are suitable for this purpose. Figure C shows the location of the I. F. capacitors.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 KC, coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the R. F. and oscillator circuits are adjusted at 1400 KC. Prior to making the adjustment, however, the dial should be checked. This is done by making sure the dial indicator reads 530 (indicator in center position) when the tuning capacitor rotor plates are fully meshed with the stator plates. The adjustments are then made in similar manner as that of the I. F. except that the oscillator is set at 1400 KC, its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

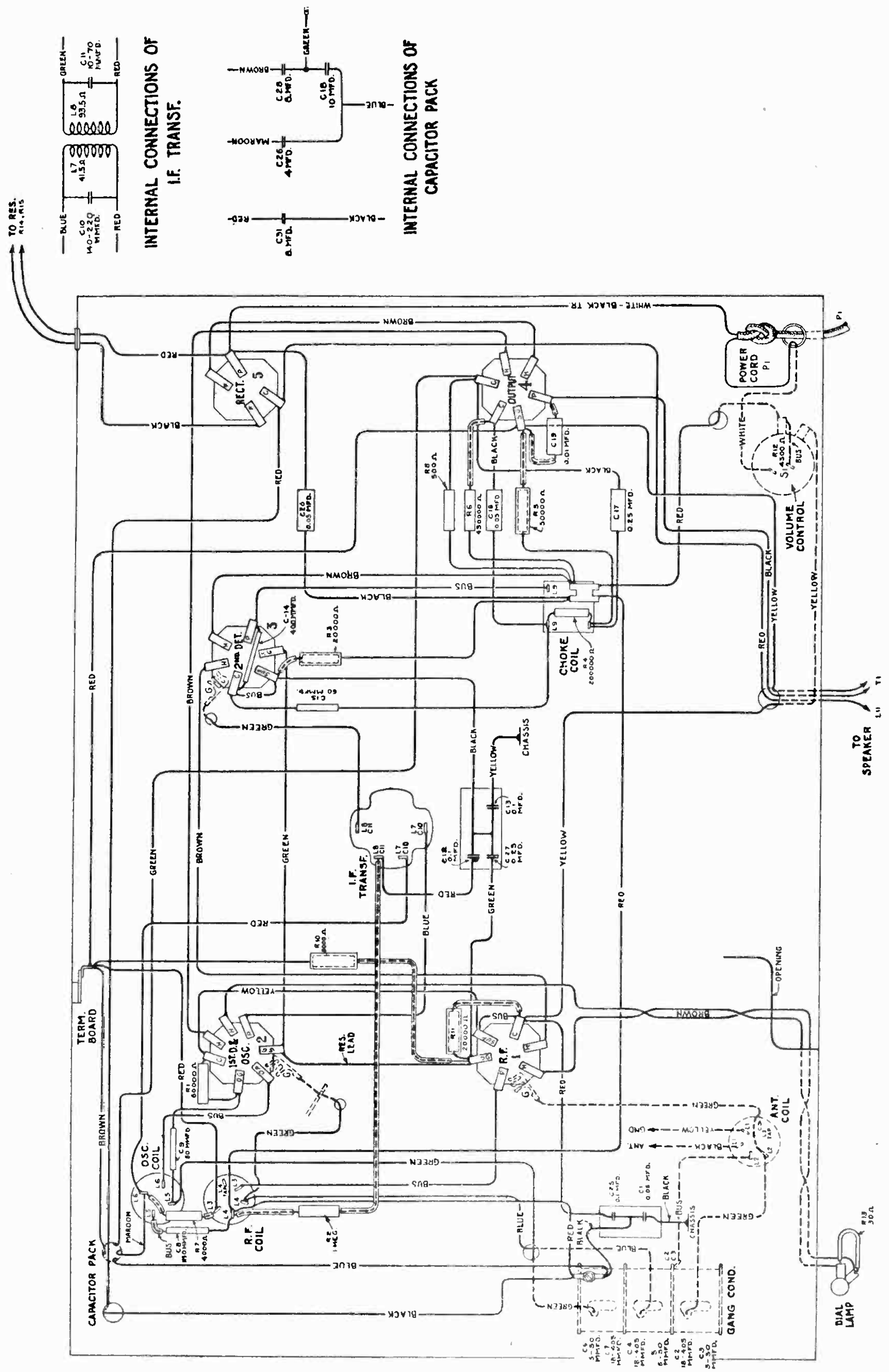
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3710	Capacitor—60 mmfd. (C15)	.36
3711	Capacitor—80 mmfd. (C9)	.40
3712	Capacitor—400 mmfd. (C14)	.40
3754	Capacitor—1150 mmfd. (C8)	.50
3701	Capacitor—0.01 mfd. (C19)	.30
3888	Capacitor—0.05 mfd. (C16)	.25
3916	Capacitor—0.05 mfd. (C20)	.32
3917	Capacitor—0.25 mfd. (C17)	.40
3755	Capacitor—Comprising two 0.1 mfd. and one 0.25 mfd. (C12, C13, C27)	.60
6621	Capacitor—Comprising one 0.05 and one 0.1 mfd. (C1, C25)	.46
6728	Capacitor—Comprising one 4.0 mfd., one 10.0 mfd. and two 8.0 mfd. (C18, C26, C28, C31)	2.94
6726	Coil—Choke coil (L9)	.62
6519	Coil—Antenna coil (L1, L2)	.88
6521	Coil—Oscillator coil (L5, L6)	.60
6520	Coil—R. F. coil (L3, L4)	.94
6723	Condenser—3-gang variable tuning condenser (C2, C3, C4, C5, C6, C7)	4.15
4701	Dial—Tuning condenser dial and drive assembly	1.50
4703	Escutcheon—Station selector escutcheon	.35
4449	Knob—Volume control or station selector knob—Package of 5	.60
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R2)—Package of 5	1.00
6250	Resistor—4000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	$1.00
3700	Resistor—450,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3632	Resistor—500 ohms—Carbon type—1 watt (R8)—Package of 5	1.10
2963	Resistor—8,000 ohms—Carbon type—1 watt (R10)—Package of 5	1.10
6114	Resistor—20,000 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3914	Resistor—30 ohms—Flexible type (R13)	.28
4718	Resistor—205 ohms—Porcelain type—(R15)	.90
3915	Resistor—320 ohms—Porcelain type—(RR14)	.88
3584	Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5	.40
3993	Screw—No. 6-32 square head set screw for condenser dial and drive assembly—Package of 10	.25
7065	Screwdriver—Insulated screwdriver and socket wrench—For I. F., R. F. and oscillator condenser adjustment	1.00
3623	Shield—Antenna R. F. or oscillator coil shield	.30
3950	Shield—Radiotron shield	.26
4700	Socket—Dial lamp socket	.35
3859	Socket—4-contact Radiotron socket	.30
6676	Socket—6-contact Radiotron socket	.40
7485	Socket—6-contact Radiotron socket—Second detector	.40
6727	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.68
4702	Volume control (R12, S1)	1.30
	REPRODUCER ASSEMBLIES	
7845	Coil—Field coil magnet and cone support (L11)	2.50
9492	Cone—Reproducer cone (L10)—Package of 5	3.70
7847	Reproducer complete	6.30
7846	Transformer—Output transformer (T1)	1.65

MODEL 23590-2
Chassis Wiring

RCA-VICTOR CO., INC.



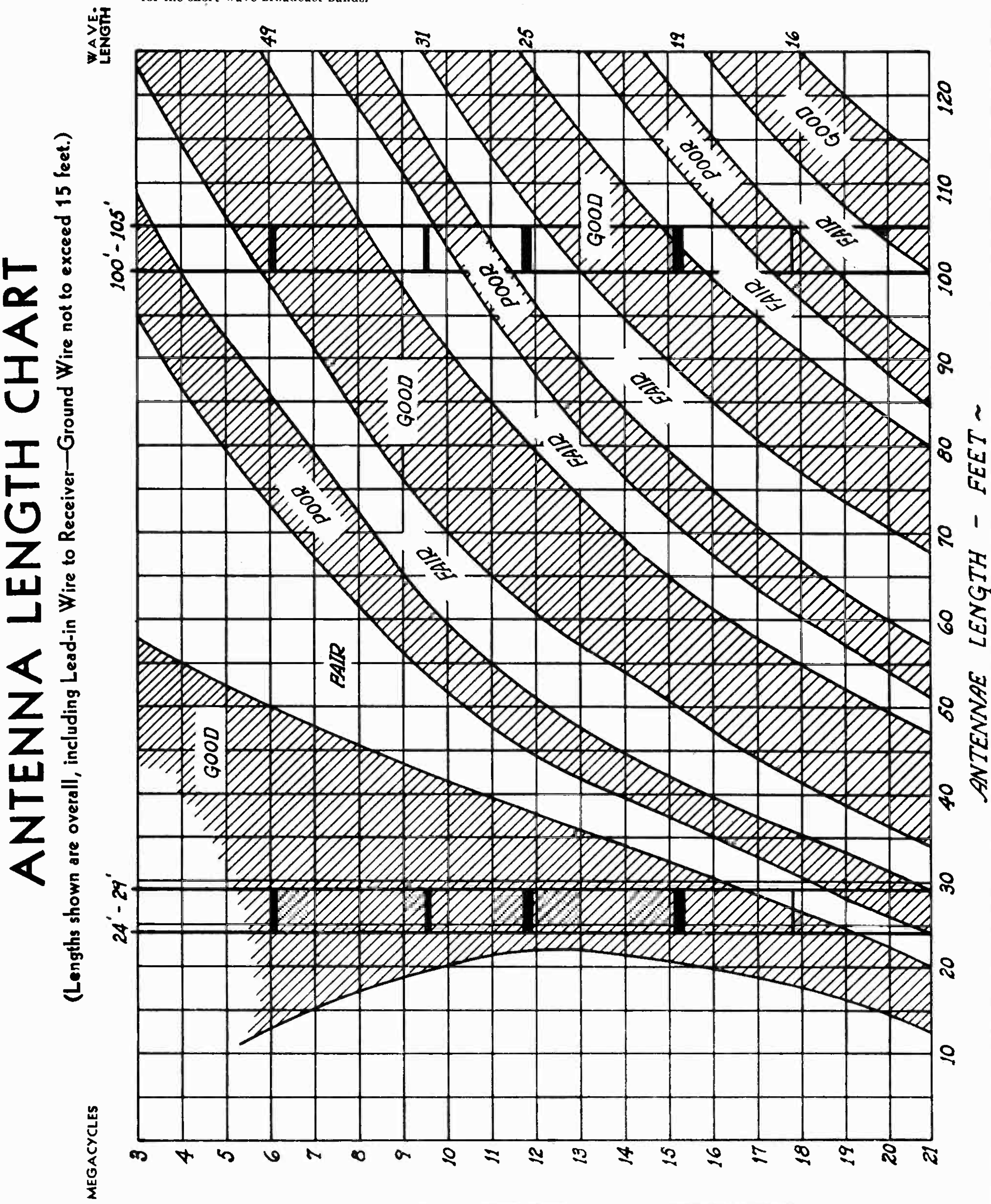
Antenna Length Chart

RCA-VICTOR CO., INC.

From the chart shown, it can be seen that a wide variation in signal strength can be obtained with various length antennas. This data applies particularly to the six-tube receiver and in general to the eight-tube receivers but does not necessarily apply to competitive instruments. The various degrees of reception are approximately equal for various antenna lengths. For example, the "good" sections give about four times as much sensitivity as the "poor" sections. As this is also an equal gain over noise, proper choice of antenna length can often make the difference between satisfactory and unsatisfactory reception.

In conjunction with the question of the relative merits of a short or long antenna for the frequencies that fall in the "good" sections of each, either length will be equally good, assuming that neither is shielded by buildings of metallic construction or other such objects. If, for example, part of the antenna or lead-in is shielded by the building, then the longer antenna will give better results. Also the longer antenna will give better results in the broadcast band.

The solid black rectangular blocks indicate both the frequencies of, and the antenna lengths recommended particularly for the short-wave broadcast bands.



RCA-VICTOR CO., INC.

World Wide Antenna Installation Data

General Considerations

To insure the greatest possible benefits from the RCA "World-Wide" Antenna System, three important considerations should be observed during its installation:

(a) Height above ground.
(b) Distance from local sources of noise interference, such as power lines, street railroads and automobile highways.
(c) Direction of span.

Height above Ground—This consideration probably is the most important since it directly affects the strength at which signals will be received. Ordinarily, the antenna will be erected either upon the roof of a building or suspended between that roof and a nearby tree or pole. For the usual dwelling having a roof and framework of non-metallic materials, the height will be measured with respect to the actual surface of the earth. However, if the opposite condition exists, as in the case of a modern apartment house or hotel, effective ground shall be assumed as at the metal roof. For good results, the horizontal wires of the antenna should be at least 30 feet above the effective ground.

Distance from Sources of Interference—Since the antenna system excludes from the receiver all interference signals "picked-up" by the transmission line, the antenna should be erected as far as possible from sources of interference in the immediate locality. The antenna proper may be located up to 500 feet distant from the receiver, adding one or more lengths of transmission line to the length furnished, as required. To maintain the correct *electrical matching*, any excess length of transmission line should not be removed unless two or more full lengths have been added. Where the required length of line is less than one or two full lengths, the excess line should be coiled up neatly at the end nearest the receiver.

Direction of Span—This antenna system exhibits a slight directional effect—that is, the geographical position of the span may have some effect upon the intensity of incoming signals. Wherever possible, therefore, the antenna should point in a direction at right angles to that of the transmission path from favored broadcasting stations. If the antenna must be located near a street railroad or a much-traveled highway, direct "pick-up" of interference signals on the doublets can be minimized by erecting the span to point toward the source of interference.

Mounting Procedure

The actual set-up of the antenna system is very simple and can be performed by practically anyone. Since the means of supporting the antenna will of necessity be different in almost every case, that portion of the installation will not be discussed herein. General recommendations in this respect, however, are contained in Figure 1. Insofar as possible, the intent of such recommendations should be observed, even for different forms of mounting.

Assembly—As shown in Figure 1, the two doublet antennas which comprise this system are formed by the two stranded wires supplied with the kit. By means of the porcelain crossover insulator, these wires are crossed to produce two horizontal sections, each 29 feet in length, and two angularly-displaced sections, each $16\frac{1}{2}$ feet in length. An extra length of six inches is afforded at each end of both continuous wires for connection to the porcelain strain insulators, both (as noted under "Equipment") being $46\frac{1}{2}$ feet long. In assembling these wires to the crossover insulator, be careful that the actual cross occurs on opposite sides of the insulator.

The transmission line finally should be connected to the antenna wires as indicated by the detail illustration of the crossover insulator in Figure 1. A tinned spot on each wire is provided to identify the points at which the transmission line should be attached. Make certain to insert the piece of cambric tubing at the insulator and to use only rosin-core solder for the connections as recommended. The antenna now may be suspended between the masts or intended points of support.

Connection to Receiver—The opposite end of the transmission line should be led to the receiver, using the porcelain insulator knobs (if required) and the porcelain entrance-tube insulator. Then install the coupling transformer upon the antenna-ground terminal board of the receiver, as shown in Detail A of Figure 1, and attach the transmission line to this transformer. A metal cleat and wood screw are provided to secure the transmission line to the receiver cabinet.

NOTE—For models having no terminal board, it is very important that the transformer be installed as near to the chassis as possible. To insure best noise elimination, this connection should be no longer than one inch. The connection to the antenna also should be kept as short as possible, although it is more important to avoid too close proximity of this wire to grid terminals of the receiver tubes.

Connection to Ground—A ground clamp is supplied for securing a tight and permanent connection of the ground wire from the receiver to a water pipe in the basement or to an external metallic stake driven from five to eight feet into the soil. The ground wire should be No. 14 or larger (rubber-covered) and should follow as short and direct a route as possible. Since the length required will be different for each installation, this wire is not furnished with the kit, but may be obtained locally.

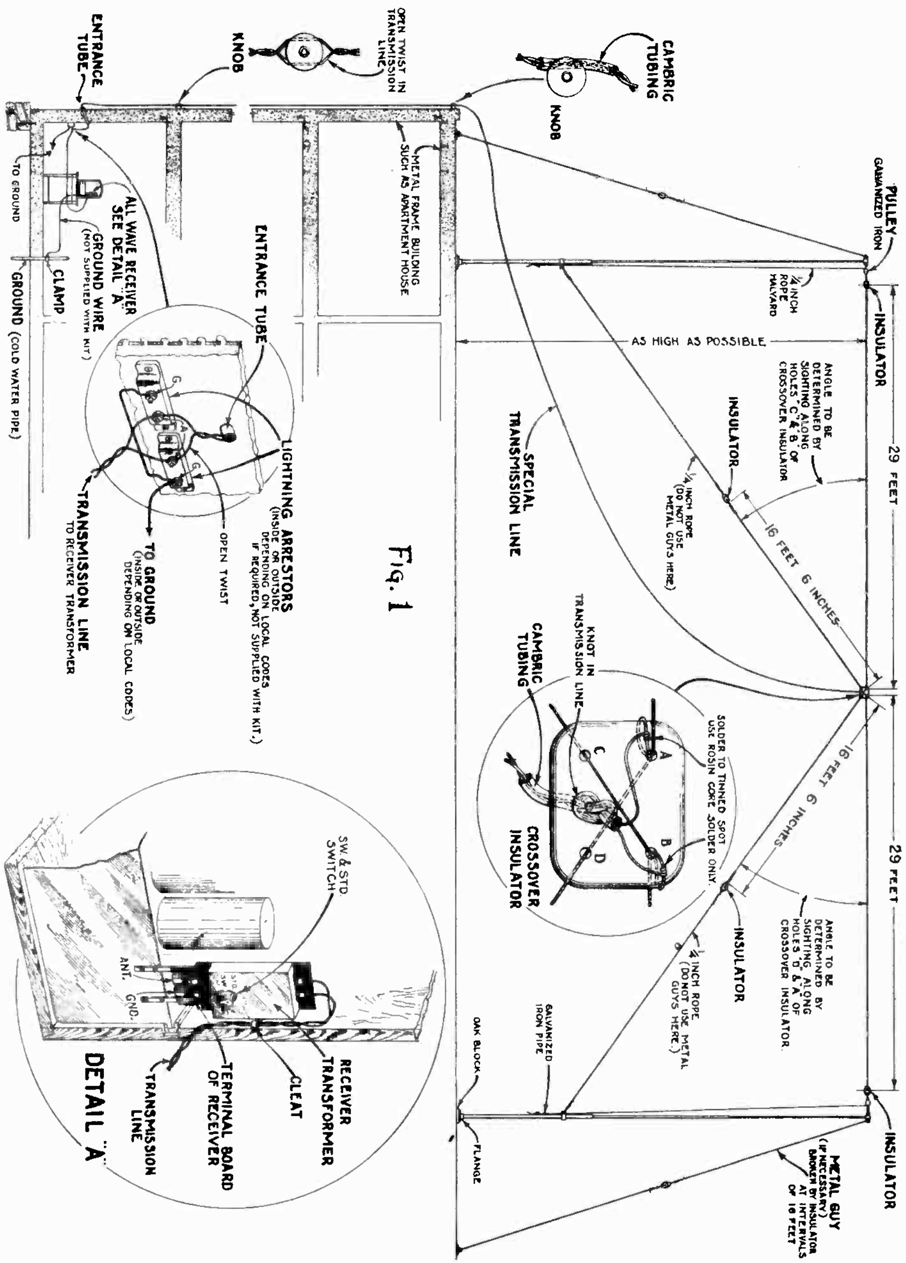


Fig. 1

RCA-VICTOR CO., INC.

ALTERNATIVE ANTENNA ARRANGEMENTS

In certain installations, space limitations may prevent the use of the full antenna span—approximately 60 feet. Three alternative arrangements, listed in order of preference, are possible:

(a) Reduced overall length through the use of loading coils.
(b) Reduction of the horizontal angle from a straight line span (180 degrees) to any other of not less than 90 degrees.
(c) Vertical suspension.

The first arrangement (a), in which loading coils are inserted to replace lengths removed from the horizontal sections of the antenna as illustrated by Figure 2, is recommended as the preferred alternative. In this manner, the overall span is reduced to approximately 34 feet, without impairing the original tuning characteristics of the system except in the region of 31 meters. The loss encountered within the broadcast band at this wavelength, however, will not be serious.

Using the second alternative (b), the length of the antenna span is decreased by reducing the horizontal angle between the halves of the system (as viewed from above), rather than by shortening the lengths of the horizontal sections. While loading coils are not required, a third support for the antenna at the crossover insulator must be provided, the installation therefore being usually more difficult than for either *straight-line* arrangement. The antenna efficiency naturally will be lowered as the angle is decreased, resulting in a signal-strength loss on all bands of approximately 30 percent at an angle of 90 degrees.

If vertical suspension (c) is employed, much less ground space than for any horizontal form of antenna is necessary. Although somewhat inferior in noise ratio to the horizontal type, the vertical system enjoys an additional advantage of being practically non-directional. Such an installation, however, is usually both difficult and expensive, but can be simplified to a large extent through the use of loading coils.

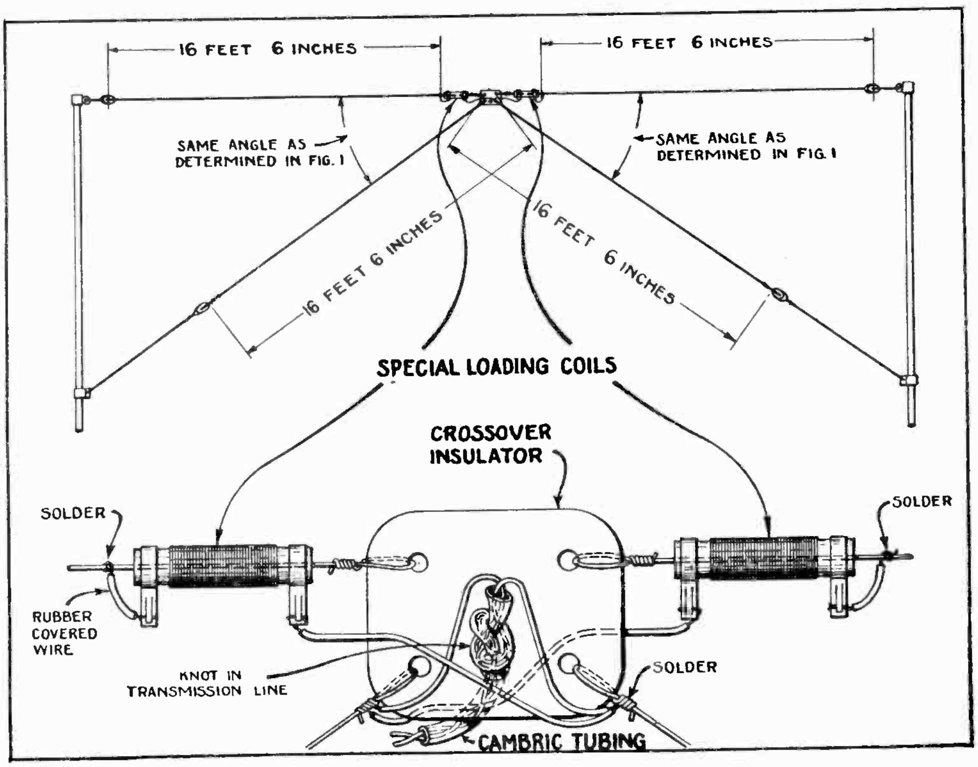


Figure 2

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
4324	Transformer (Coupling transformer and switch assembly)—For replacement purposes only; item to be replaced must be returned with order	$2.50	4327	Insulator (Crossover insulator)—For replacement purposes only; item to be replaced must be returned with order	$0.10
4325	Knob (Switch knob)—Package of 5	1.00	4328	Transmission line (special lead-in—110 feet long)	3.72
4326	Wire (2 rolls stranded wire, each 46 ½ feet long)	1.16	4329	Transmission line (special lead-in—220 feet long)	7.44
			4330	Transmission line (special lead-in—330 feet long)	11.16

MODEL 2-19
Portable Victrola
Notes

RCA-VICTOR CO., INC.

SERVICE DATA

This instrument is a small portable type mechanical phonograph built into a cabinet resembling a small suitcase. Excellent quality, high output and good mechanical construction are features of this instrument.

LUBRICATION

Premature wear, noisy operation and failure of parts are direct results of failure to clean and lubricate the motor at necessary intervals. The various bearings and gears of the motor should be cleaned and lubricated at least once every six months. In addition to the regular lubrication, all motor parts should be covered with a light film of oil to prevent rusting. Use only Stock No. 7226 Motor Oil and Stock No. 7227 Motor Grease when lubricating this instrument.

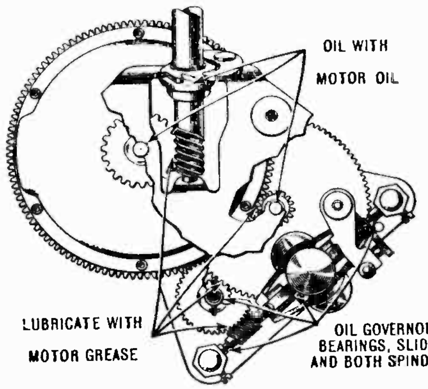


Figure A—Lubrication Diagram

Motor. Figure A shows a view of the motor with the top plate cut away. Before lubricating the parts shown in this illustration, a thorough cleaning with carbon tetrachloride (Carbona) or gasoline is necessary. If necessary disassemble the entire motor for such cleaning.

Tone Arm. The joint between the taper tube and the sound chamber must be free to swing easily without play and be sealed with grease. This bearing is accessible when the three mounting screws are removed. Failure to seal this joint will result in poor quality. Unnecessary friction will cause undue record wear.

MOTOR

The motor used is of simple design and will give excellent performance. If kept clean and properly lubricated, little service attention will be required. The following points may prove useful when it is necessary to effect repairs. *Before doing any work on the motor the machine must be allowed to run down completely.*

Removing Motor from Cabinet. To remove the motor from the cabinet proceed as follows:

(*a*) Unscrew the spindle cap and remove the turntable.

(*b*) Remove the five screws that hold the motor board and lid-support to the cabinet and remove the motor-board assembly.

(*c*) Remove the speed-regulator lever.

(*d*) Remove the three machine screws that hold the motor in place. The motor may then be removed.

Changing Motor Springs. Should a spring break and require replacement the best method to make a repair is to replace the entire spring barrel. While the cost of the spring barrel is greater than that of the spring alone, the saving in labor will usually justify such replacement. Unless the serviceman is experienced in handling springs of this type, the following directions should be followed carefully:

(*a*) Disassemble the motor and remove the spring barrel. Remove the winding gear.

(*b*) Place the gear flat on a piece of metal and file off the ends of the six rivets. Remove the rivets and gear.

(*c*) Place the palm of the right hand over the closed end of the barrel, making sure that the fingers do not protrude beyond the open side. Firmly hold the barrel, open side downward, over a large can or barrel. With the left hand pull the center turns of the spring out. As soon as the spring starts, pull the left hand clear of the can, holding the spring barrel firmly until the spring is entirely clear.

(*d*) *A new coiled spring may prove extremely dangerous if not properly handled. Read these instructions and work very carefully, especially if not experienced in work of this kind.* The new spring is furnished coiled and with a heavy wire clamp holding the spring tightly wound. Pull out about one foot of the spring. Then with the spring flat on a table gently tap the ring until it comes to the edge. Do not push the clamp so close to the edge that it will not hold the spring.

Place the hook end of the spring over the barrel hook. Wind the exposed end into the barrel and then insert the entire spring in the barrel, allowing the clamp to be on the outer edge. Place a block over the entire spring and force the spring into the barrel, thereby releasing the clamp.

(*f*) Place a tablespoonful of spring lubricant between the spring leaves and in the center of the spring.

(*g*) Place the gear in position and rivet it with six rivets to the spring barrel. Use a small punch for flattening the ends of the rivets. Place the gear on a flat surface while re-riveting the barrel to it.

(*h*) Reassemble the motor in the reverse manner of that used to dismantle it.

Winding Shaft Binding. A heavy jar may cause the motor to shift slightly on the motor board and produce binding of the winding shaft against the motor board. Loosening the motor mounting screws and shifting the motor to its proper position (center of slot) will correct this condition.

MODEL 2-19
Portable Victrola
Parts List

RCA-VICTOR CO., INC.

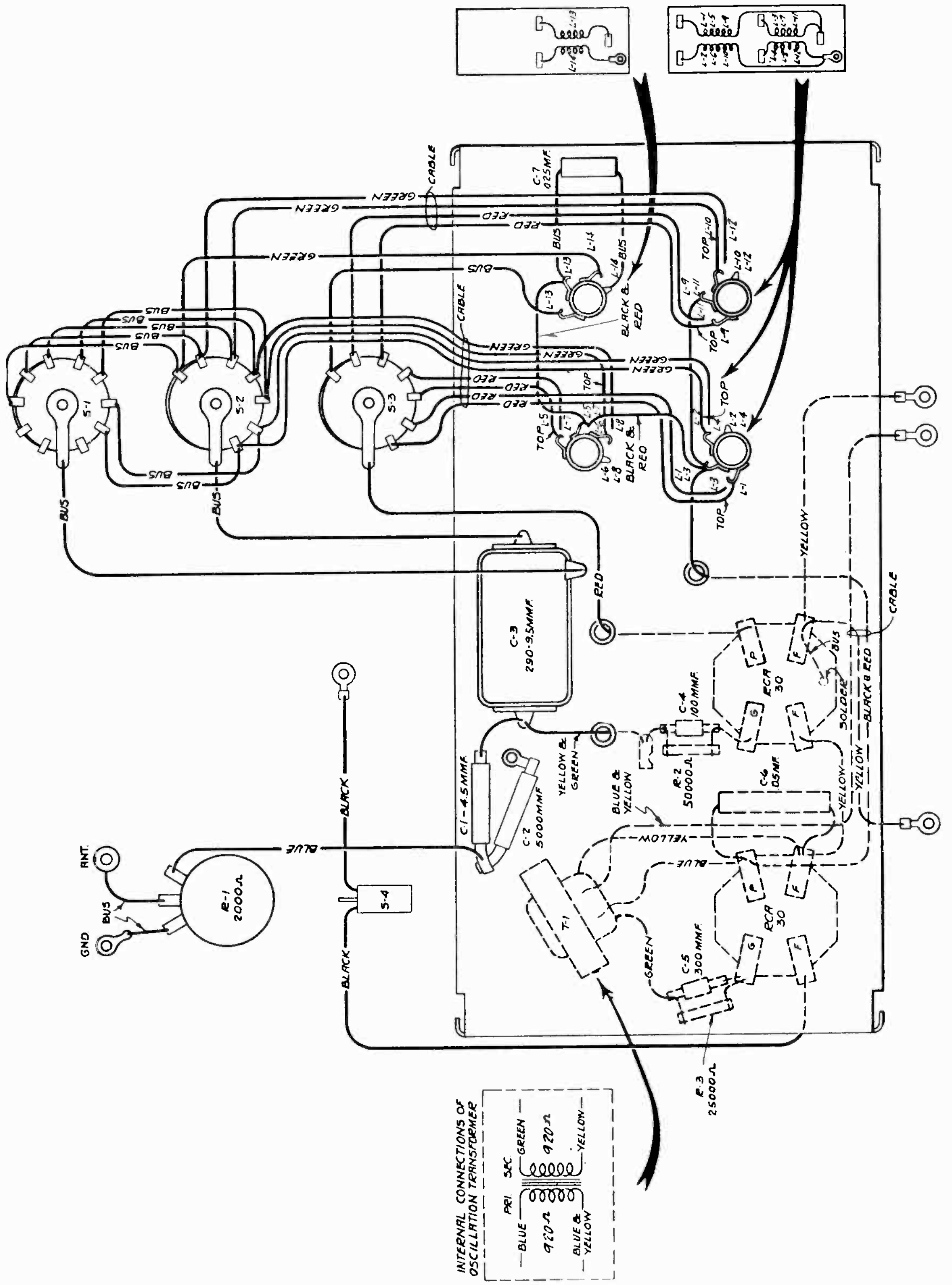
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
2872	Governor ball and spring assembly—Comprising ball, spring mounting screws, and washers—Package of 5	$0.75
2937	Gear—Winding gear and sleeve	.75
2947	Leather—Friction leather for brake—Package of 20	.50
4107	Brake—Turntable brake and bracket	.55
4108	Lever—Speed regulator lever	.45
4109	Cup—Needle cup	.22
4110	Holder—Needle holder	.45
4111	Cap—Turntable spindle cap	.65
4112	Plate—Speed regulator plate	.55
4113	Bracket—Sound box rest bracket	.50
4114	Support—Lid support	.25
4115	Screw and washer—Motor board mounting screw and washer—Package of 3	.25
4116	Catch—Cabinet catch complete with mounting rivets—Package of 2	.40
4117	Strap—Record pocket strap assembly	.16
4118	Screw—Needle holding screw—Package of 10	.65
6837	Key—Winding key	.70
6838	Handle—Carrying handle	.82
6839	Extension—Winding shaft extension	.45
6933	Sound box—Complete with needle screw	1.80
7210	Spindle—Turntable spindle with pins and ball bearing—Less gear	.50
7211	Gear—Turntable spindle gear complete, with set screw	.50
7214	Governor assembly — Comprising governor spindle, disc, sleeve, collar, governor balls and springs	$2.50
7226	RCA Victor motor grease—1 pint can	.40
7227	RCA Victor motor oil—1 pint can	.50
7228	RCA Victor spring lubricant—1 pint can	.65
7719	Board—Motor board with horn—Less hardware and motor—Green	3.90
7720	Arm—Tone arm assembly	3.26
7721	Turntable—Green	1.20
7722	Turntable—Blue	1.20
7723	Board—Motor board and horn—Less hardware and motor—Blue	3.90
7724	Cabinet—Complete with handle and catches—Blue	12.40
7725	Cabinet—Complete with handle and catches—Green	12.70
7726	Pocket—Record pocket—Black	.98
7727	Pocket—Record pocket—Green	.98
7729	Plate—Top plate assembly	3.96
7730	Motor—Motor complete with spindle cap	10.40
8655	Barrel—Spring barrel assembly	2.64
8656	Spring—Mainspring	1.15
8657	Gear—Intermediate gear pinion and shaft	.70
8658	Shaft — Winding shaft — Comprising shaft, collar, pin, ratchet, and washer — Less winding extension	.96
10116	Spring—Brake spring—Package of 10	.60

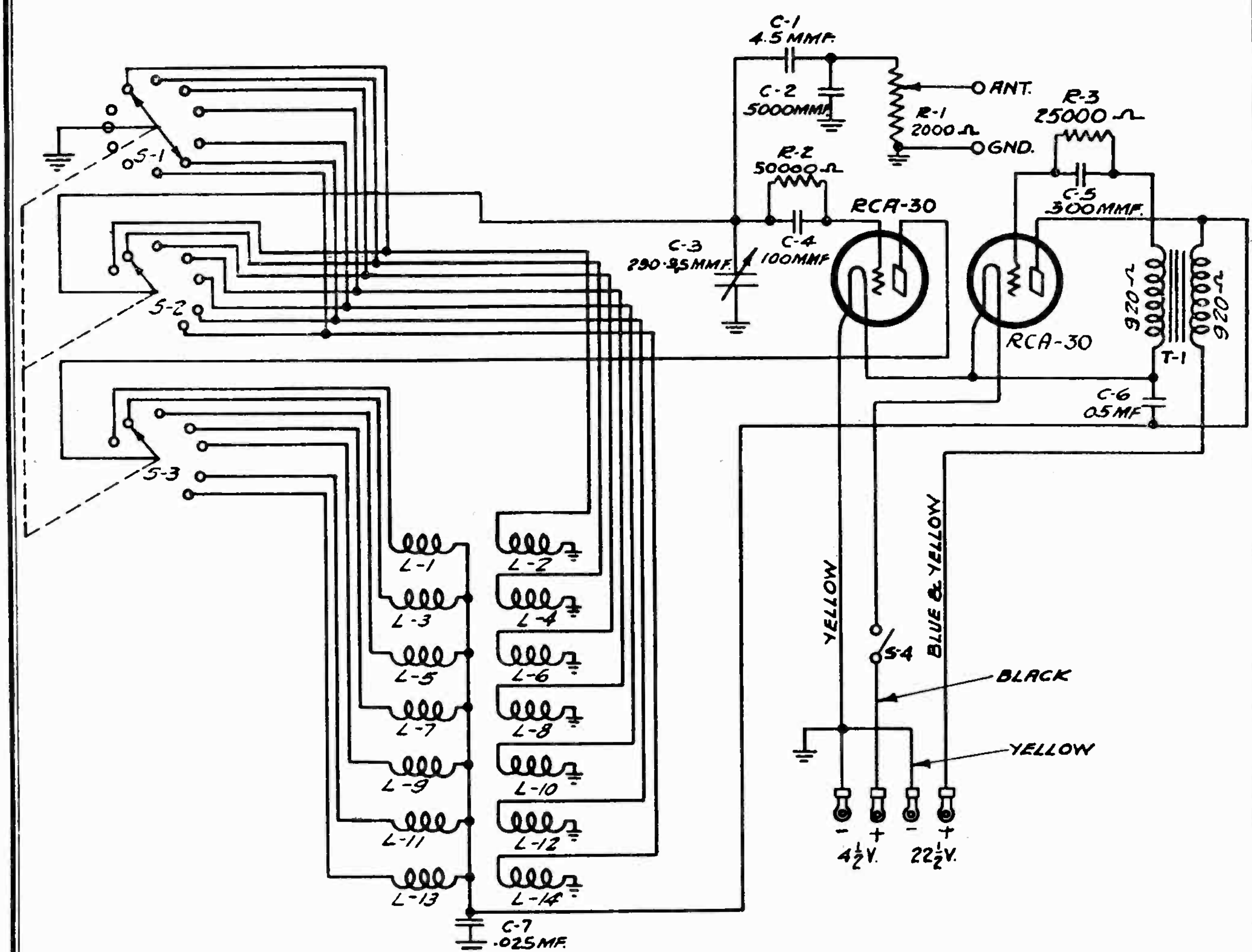
MODEL TMV-97-A
Oscillator
Chassis Wiring

RCA-VICTOR CO., INC.



MODEL TMV-97-A
Schematic
Parts List

RCA-VICTOR CO., INC.



REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
2039	Switch—Single pole, single throw toggle switch	$0.72
2744	Capacitor—4.5 mmfd. capacitor (C1)—Package of 5	1.60
2932	Capacitor—5,000 mmfd. capacitor (C2)	.50
3110	Resistor—25,000 ohm—¼ watt carbon resistor (R3)—Package of 5	1.00
3114	Resistor—50,000 ohm—¼ watt carbon resistor (R2)—Package of 5	1.00
3640	Capacitor—.05 mfd. capacitor (C6)	.25
3765	Capacitor—.025 mfd. capacitor (C7)	.34
3794	Capacitor—100 mmfd. capacitor (C4)	.30
3975	Coil—R. F. oscillation coil (L1, L2, L3, L4)	1.38
3976	Coil—R. F. oscillation coil (L5, L6, L7, L8)	1.38
3977	Coil—R. F. oscillation coil (L9, L10, L11, L12)	1.28
3978	Coil—R. F. oscillation coil (L13, L14)	1.28
3979	Transformer—A. F. oscillation transformer (T1)	$1.94
3980	Condenser—Tuning condenser (C3)	1.40
3981	Capacitor—300 mmfd. capacitor (C5)	.30
3982	Handle—Carrying handle	.60
3983	Switch—Range switch (S1, S2, S3)	3.94
3984	Knob—Moulded knob	.30
3985	Scale—Range switch dial scale	.66
3986	Scale—Attenuator potentiometer dial scale	.66
3987	Potentiometer — Attenuator potentiometer (R1)	1.70
3988	Post—"Antenna-Ground" binding post	.32
3989	Dial—Tuning condenser vernier dial	4.15
3990	Clip—Spring steel clip	.25
6300	Socket—Radiotron socket	.35

MODEL CRD-9
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.

NOTE—If the maximum volume, obtained with the volume control in the extreme clockwise position, is insufficient to meet the requirements of a particular installation, the locking device may be re-adjusted as follows: (1) Remove volume control knob by pulling outward; (2) take off rear panel by removing screws at edges; (3) loosen lock nut holding right angled bracket which serves as stop for metal pointer on shaft; (4) turn shaft clockwise until volume is increased to desired level; (5) lock bracket in new position against pointer, by retightening lock nut; and (6) replace rear panel and knob.

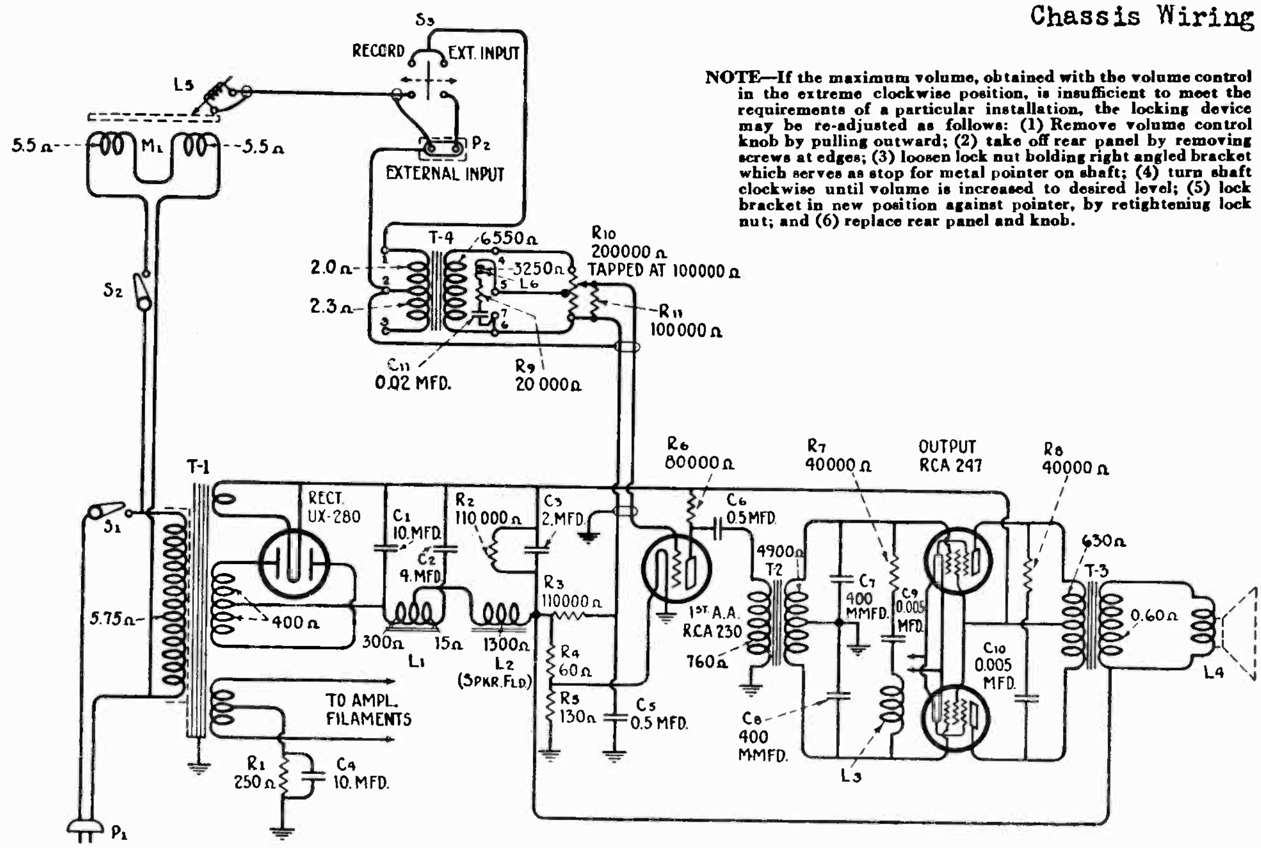


Figure A—Schematic Circuit

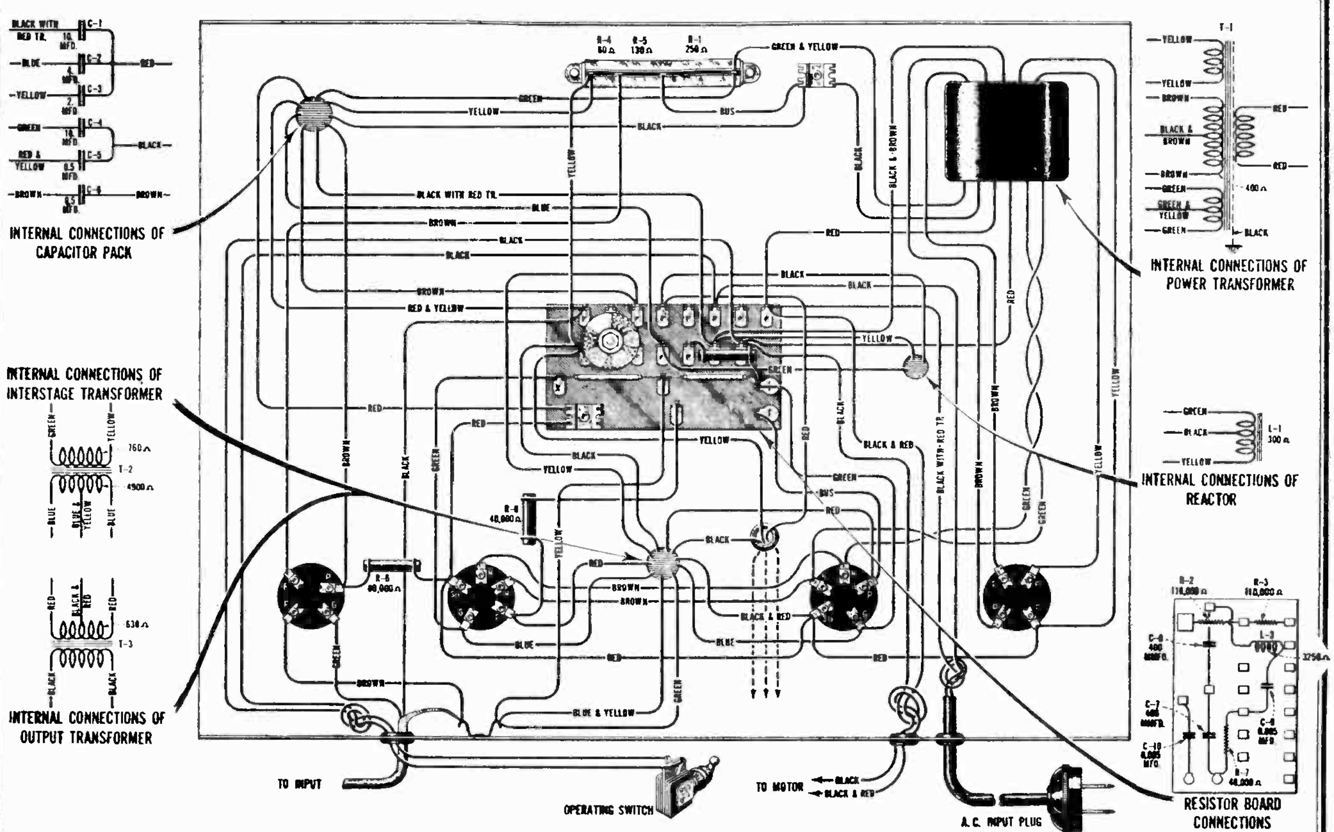
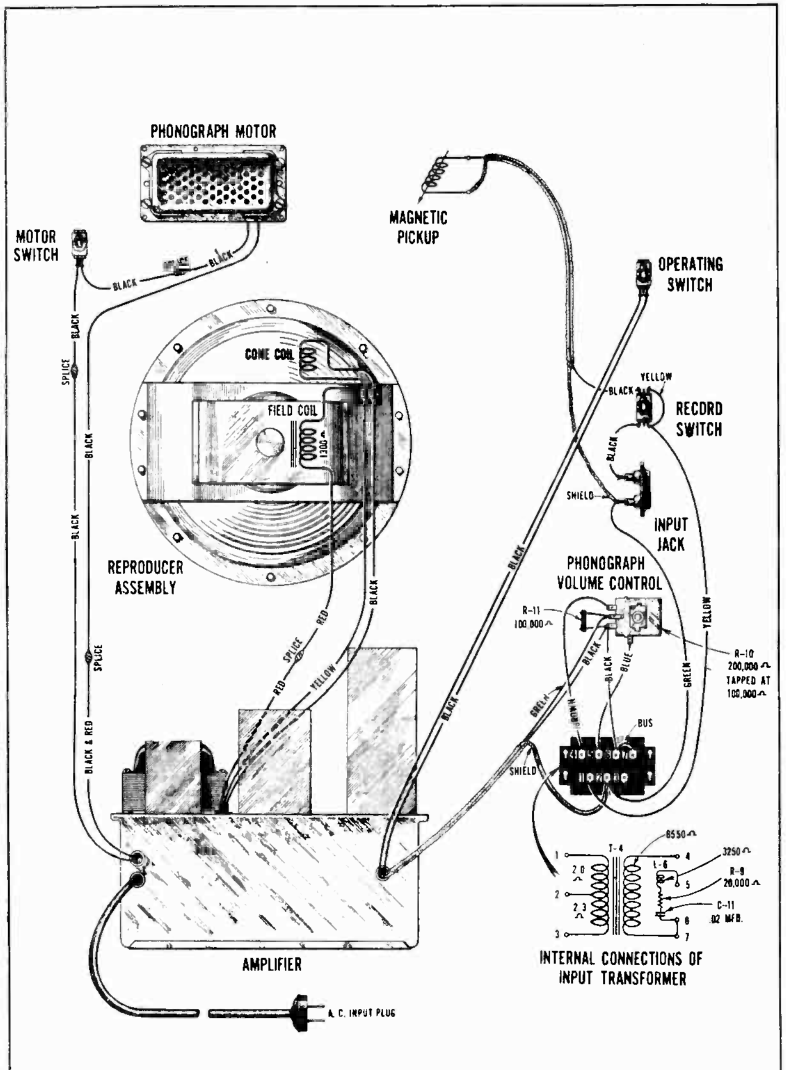


Figure B—Amplifier Wiring

MODEL CRD-9
Assembly Wiring
Parts List

RCA-VICTOR CO., INC.



Radiotrons—*Always set the Power Switch in the "off" position before removing any Radiotron from its socket.*

Figure C—Assembly Wiring

External Input—To use the demonstrator amplifier and loudspeaker for reproduction from an external source of audio frequency input, proceed as follows:

1. Plug the two wires (which should be equipped with pin terminals) from the external source into the pin jacks located below the Transfer Switch.

NOTE—The impedance of the external input circuit should match that of the demonstrator input, which is approximately 10 ohms at 1,000 cycles.

2. Set the Power Switch to the "on" position. The Motor Switch should be in the "off" position.
3. Set the Transfer Switch in the downward position. Signals originating in the external input circuit will now be heard through the demonstrator loudspeaker.
4. Adjust the volume to the desired level by means of the demonstrator Volume Control.
5. When through operating, set the Power Switch to the "off" position.

SERVICE DATA

Radiotron No.	Filament to Control Grid	Filament to Screen Grid	Filament to Plate	Plate Current M. A.	Filament Volts
RCA-230—A. F.	4.5	—	260	2.0	2.0
RCA-247—Pwr.	17.0	260	250	30.0	2.5
RCA-247—Pwr.	17	260	250	30.0	2.5
UX-280—Rect.	375 volts each plate—80 M. A. total current				

Stock No.	DESCRIPTION	List Price
	PICKUP, ARM AND TURNTABLE ASSEMBLIES	
3385	Coil—Pickup coil	$0.50
3386	Cover—Pickup cover	.75
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut, and one washer—Package of 10	.60
3388	Screw—Pickup needle holding screw—Package of 10	.80
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.50
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.65
3417	Armature—Pickup armature	.75
3418	Cushions—Pickup rubber cushions—Comprising one damper, two spacer cushions and one damper bushing—Package of 5 sets	1.25
3419	Screw—Pickup cover mounting screw—Package of 10	.50
6335	Pickup—Pickup unit complete	12.00
6346	Back—Pickup housing back	.65
7084	Cover—Suede cover for turntable	.50
7530	Arm—Pickup arm complete—Less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
8968	Turntable complete	2.58
	AMPLIFIER ASSEMBLIES	
2882	Socket—5 contact Radiotron socket complete with insulator	.50
2968	Socket—4 contact Radiotron socket complete with insulator—For Radiotron UX-280	.50
3032	Socket—4 contact Radiotron socket complete with insulator—For Radiotron RCA-230	.50
3045	Resistor—40,000 ohms—Carbon type—1 watt—Package of 5	2.50
3085	Capacitor—400 mmfd.—Located on resistor board	.60
3099	Capacitor—0.005 mfd.—Located on resistor board	.75
3295	Resistor—110,000 ohms—Carbon type—½ watt—Package of 5	2.50
3297	Resistor—80,000 ohms—Carbon type—1 watt—Package of 5	2.50
3475	Switch—Phonograph and amplifier switch—Single pole, single throw—Toggle type	1.28
3476	Cable—Shielded two conductor cable—Approximately 13½ inches long	$0.36
3479	Capacitor — 0.005 mfd. — Located nearest choke coil on resistor board	.80
3481	Coil—Choke coil—Located on resistor board	.70
7270	Reactor—Filter reactor	4.00
7458	Resistor—Flat type—440 ohms—Tapped at 60, 130 and 250 ohms—Complete with mounting rivets	1.10
7568	Transformer assembly—Comprising interstage and output transformer in metal container	4.18
7569	Capacitor pack—Comprising two 10.0 mfd., one 4.0 mfd., one 2.0 mfd. and two 0.5 mfd.	4.68
8900	Transformer—Power transformer	9.00
	MOTOR ASSEMBLIES	
3398	Motor mounting assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer—One set	.75
7389	Rotor and shaft for 105–125 volts—60 cycle motor	9.00
8966	Motor—Motor complete—105–125 volts—60 cycles	18.26
8967	Spindle—Turntable spindle with fibre gear for 60 cycle motor	8.00
	MISCELLANEOUS PARTS	
2761	Jack—Twin jack with mounting screws	5.00
3101	Switch—Phonograph switch—Double pole, single throw—Toggle type—Located on upper left side of cabinet	1.25
3118	Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5	2.00
6288	Knob—Volume control knob—Package of 5	1.50
6292	Switch—Motor switch—Single pole, single throw—Toggle type	1.25
6384	Volume control—Complete with mounting washer and nut	1.60
7054	Cord—Power cord	1.00
	REPRODUCER ASSEMBLIES	
3483	Bolt—Reproducer mounting bolt assembly—Comprising 2 hook bolts, 2 washers, 2 lock washers and 2 nuts	.78
6382	Transformer—Input transformer	3.88
8016	Cone—Reproducer cone—Package of 5	15.00
9423	Coil assembly—Comprising field coil, magnet and cone support	12.15

MODEL PT-16-A1
PT-16-A2
Schematic
Assembly Wiring

RCA-VICTOR CO., INC.

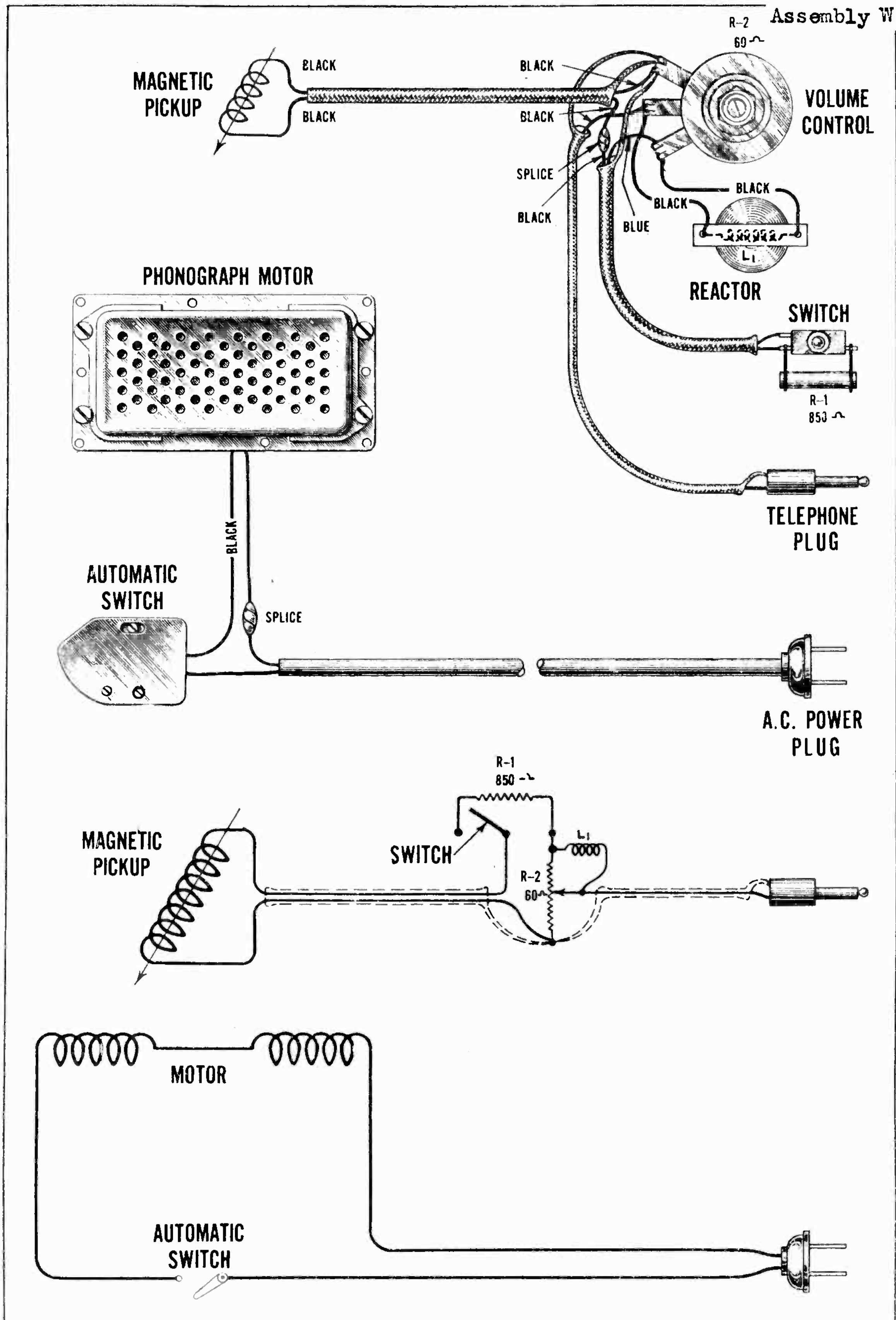


Figure C—Wiring and Schematic Diagrams (*PT16A1,A2*)

MODEL PT-16-A1
PT-16-A2
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	TURNTABLE—MODEL PT-16A1 AND PT-16A2	
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing for turntable spindle—Package of 5	$0.40
3338	Ring—Clamp ring assembly	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov pin—Package of 2	.56
3342	Spring—Latch spring on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3838	Lever—Speed shifter lever	.70
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Turntable complete	5.50
	PICKUP AND PICKUP ARM ASSEMBLIES	
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw, nut and washer	.40
3388	Screw—Pickup needle holding screw	.60
3389	Rod—Automatic brake trip rod	.40
3390	Escutcheon—Pickup arm escutcheon	.46
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions	1.10
3419	Screw—Pickup cover mounting screw	.40
3516	Damper—Damper and bushing for pickup arm base	.14
6335	Pickup—Pickup unit complete	4.00
6346	Back—Pickup housing back	.45
7593	Arm—Pickup arm less pickup	6.00
	MOTOR ASSEMBLIES	
3599	Screw—Motor mounting screw and lock-washer—Package of 3 sets	$.30
8989	Motor—105–125 volt—60 cycle motor	18.52
8990	Motor—105–125 volt—50 cycle motor	18.52
8993	Rotor—Rotor and shaft for motor 105–125 volt—60 cycle	7.00
8994	Spindle—Spindle and gear for motor 105–125 volt—60 cycle	4.75
8995	Rotor—Rotor and shaft for motor 105–125 volt—50 cycle	7.00
8996	Spindle—Spindle and gear for motor 105–125 volt—50 cycle	4.75
	MOTOR BOARD ASSEMBLIES	
2779	Pointer—Volume control pointer—Package of 10	.50
2947	Shoe—Leather brake shoe—Package of 20	.50
3322	Switch—Automatic brake switch	.75
4098	Cord—Power cord and plug	1.00
4099	Cable—Shielded signal cable and plug	1.25
4100	Volume control—Turntable volume control	2.50
4101	Switch—Single pole—double throw—toggle switch	.75
6247	Resistor—850 ohm—¼ watt—Carbon type resistor—Package of 5	1.00
6288	Knob—Volume control knob—Package of 5	1.00
7387	Reactor—Tone compensating reactor	.85
7691	Support—Pickup support	4.28
10174	Springs—Automatic brake springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate—Package of 5	.40
10241	Box—Needle box with lid—Package of 2	.60

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating........................105–125 Volts A. C.
Frequency Rating........................50 and 60 Cycles
Power Consumption.......... {30 Watts Single Turntable / 60 Watts Double Turntable}

WIRING

The schematic and assembly wiring diagrams are shown in Figure C.

MAGNETIC PICKUP

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

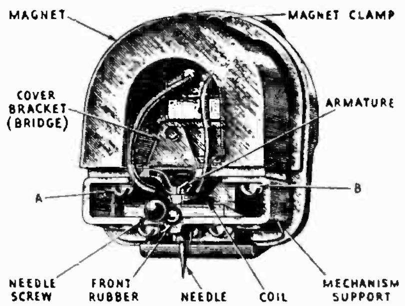


Figure A

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled except for the magnet, which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B, Figure A, and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover now may be replaced over the entire assembly, and the pickup returned to the tone arm.

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

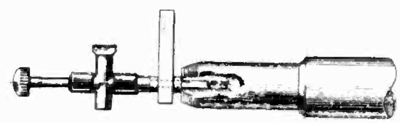


Figure B

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure B, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be assembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h) above.

MODEL PT-17-A1
PT-17-A2
Schematic
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	TURNTABLE—MODEL PT-17A1 AND PT-17A2	
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing for turntable spindle—Package of 5	$0.40
3338	Ring—Clamp ring assembly	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov pin—Package of 2	.56
3342	Spring—Latch spring on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3838	Lever—Speed shifter lever	.70
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Turntable complete	5.50
	PICKUP AND PICKUP ARM ASSEMBLIES	
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw, nut and washer	.40
3388	Screw—Pickup needle holding screw	.60
3389	Rod—Automatic brake trip rod	.40
3390	Escutcheon—Pickup arm escutcheon	.46
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions	1.10
3419	Screw—Pickup cover mounting screw	.40
3516	Damper—Damper and bushing for pickup arm base	.14
6335	Pickup—Pickup unit complete	4.00
6346	Back—Pickup housing back	.45
7593	Arm—Pickup arm less pickup	6.00
	MOTOR ASSEMBLIES	
3599	Screw—Motor mounting screw and lock-washer—Package of 3 sets	$0.30
8989	Motor—105–125 volt—60 cycle motor	18.52
8990	Motor—105–125 volt—50 cycle motor	18.52
8993	Rotor—Rotor and shaft for motor 105–125 volt—60 cycle	7.00
8994	Spindle—Spindle and gear for motor 105–125 volt—60 cycle	4.75
8995	Rotor—Rotor and shaft for motor 105–125 volt—50 cycle	7.00
8996	Spindle—Spindle and gear for motor 105–125 volt—50 cycle	4.75
	MOTOR BOARD ASSEMBLIES	
2779	Pointer—Volume control pointer—Package of 10	.50
2947	Shoe—Leather brake shoe—Package of 20	.50
3322	Switch—Automatic brake switch	.75
4098	Cord—Power cord and plug	1.00
4099	Cable—Shielded signal cable and plug	1.25
4100	Volume control—Turntable volume control	2.50
4101	Switch—Single pole—double throw—toggle switch	.75
6247	Resistor—850 ohm—¼ watt—Carbon type resistor—Package of 5	1.00
6288	Knob—Volume control knob—Package of 5	1.00
7387	Reactor—Tone compensating reactor	.85
7691	Support—Pickup support	4.28
10174	Springs—Automatic brake springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate—Package of 5	.40
10241	Box—Needle box with lid—Package of 2	.60

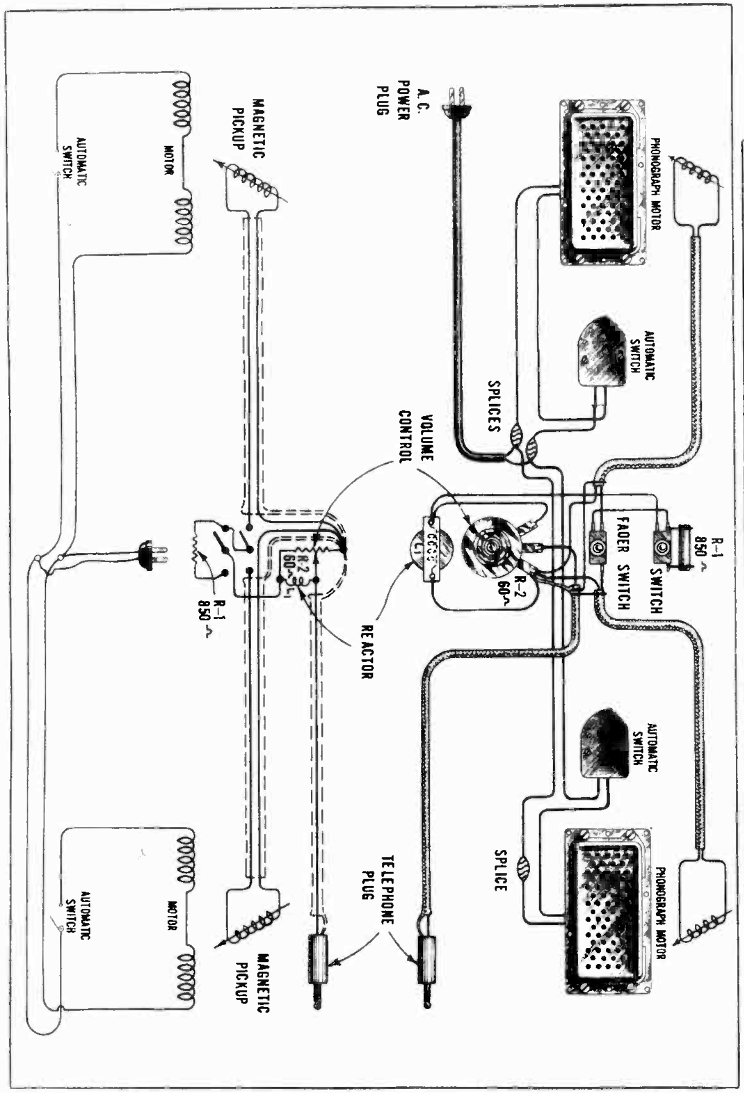


Figure C—Wiring and Schematic Diagrams (PT17A1, A2)

MODEL PT-17-B1
PT-17-B2
Schematic

RCA-VICTOR CO., INC.

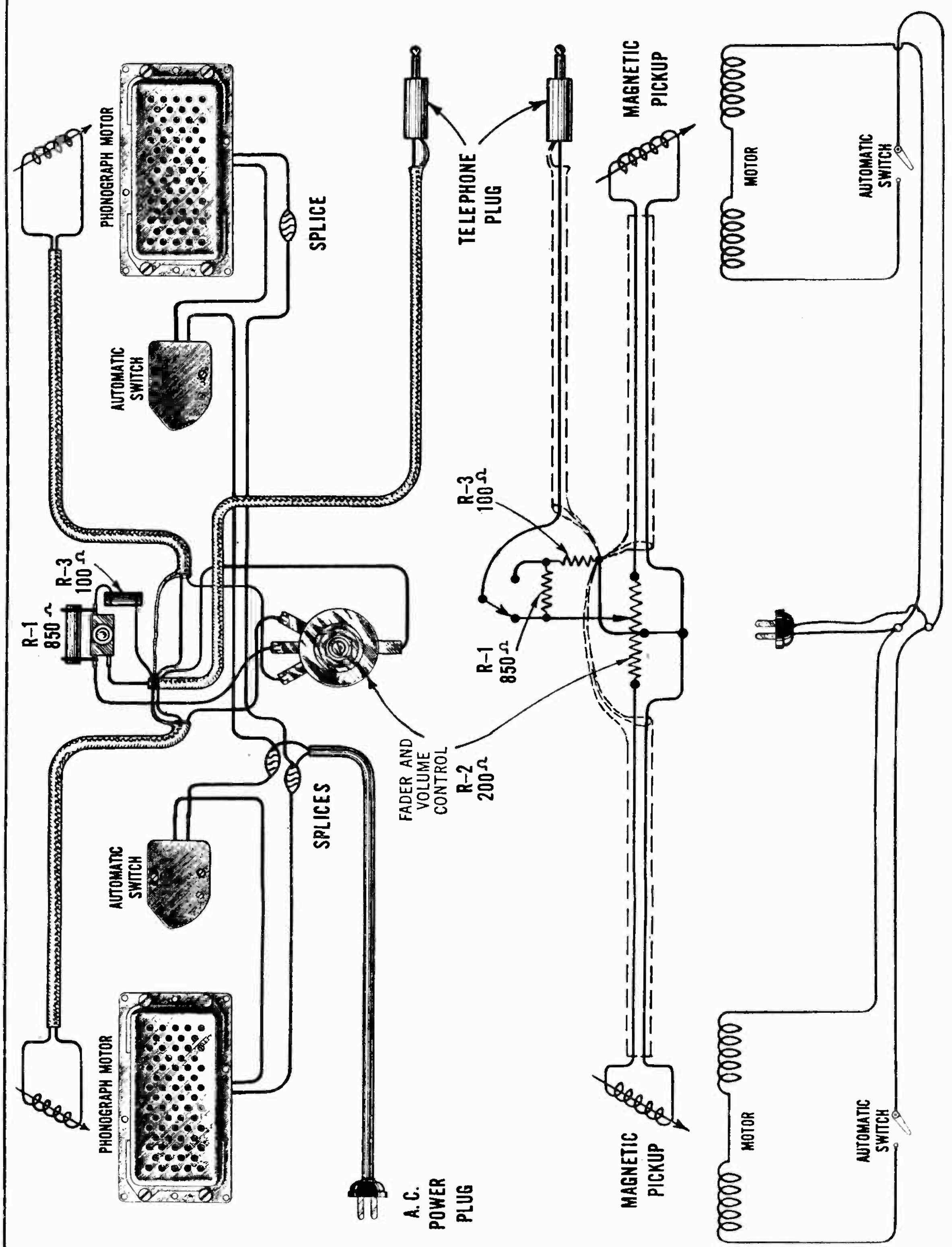


Figure 1—Wiring and Schematic Diagrams (PT17B1, B2)

MODEL PT-17-B1
PT-17-B2
Pickup Data, Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating........................105–125 Volts A. C.
Frequency Rating........................50 and 60 Cycles
Power Consumption.......... { 30 Watts Single Turntable / 60 Watts Double Turntable

WIRING

The schematic and assembly wiring diagrams are shown in Figure 1.

MAGNETIC PICKUP

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

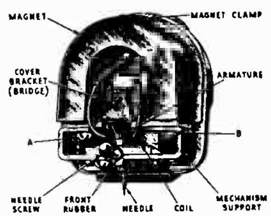


Figure 2

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 2, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled except for the magnet, which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B, Figure 2, and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover now may be replaced over the entire assembly, and the pickup returned to the tone arm.

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

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(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

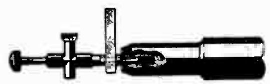


Figure 3

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 3, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be assembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h) above.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	TURNTABLE—MODEL PT-17A1 AND PT-17A2	
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing for turntable spindle—Package of 5	$0.40
3338	Ring—Clamp ring assembly	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groove pin—Package of 2	.56
3342	Spring—Latch spring on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3838	Lever—Speed shifter lever	.70
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Turntable complete	5.50
	PICKUP AND PICKUP ARM ASSEMBLIES	
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw, nut and washer	.40
3388	Screw—Pickup needle holding screw	.60
3389	Rod—Automatic brake trip rod	.40
3390	Escutcheon—Pickup arm escutcheon	.46
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions	1.10
3419	Screw—Pickup cover mounting screw	.40
3516	Damper—Damper and bushing for pickup arm base	.14
6335	Pickup—Pickup unit complete	4.00
6346	Back—Pickup housing back	.45
7593	Arm—Pickup arm less pickup	6.00

Stock No.	DESCRIPTION	List Price
	MOTOR ASSEMBLIES	
3599	Screw—Motor mounting screw and lock-washer—Package of 3 sets	$0.30
8989	Motor—105-125 volt—60 cycle motor	18.52
8990	Motor—105-125 volt—50 cycle motor	18.52
8993	Rotor—Rotor and shaft for motor 105-125 volt—60 cycle	7.00
8994	Spindle—Spindle and gear for motor 105-125 volt—60 cycle	4.75
8995	Rotor—Rotor and shaft for motor 105-125 volt—50 cycle	7.00
8996	Spindle—Spindle and gear for motor 105-125 volt—50 cycle	4.75
	MOTOR BOARD ASSEMBLIES	
2779	Pointer—Volume control pointer—Package of 10	.50
2947	Shoe—Leather brake shoe—Package of 20	.50
3322	Switch—Automatic brake switch	.75
3442	Resistor—100 ohm—¼ watt—Carbon type resistor—Package of 5	1.00
4098	Cord—Power cord and plug	1.00
4099	Cable—Shielded signal cable and plug	1.25
4101	Switch—Single pole—double throw—toggle switch	.75
4715	Volume control—Turntable volume control	3.00
6247	Resistor—850 ohm—¼ watt—Carbon type resistor—Package of 5	1.00
6288	Knob—Volume control knob—Package of 5	1.00
7691	Support—Pickup support	4.28
10174	Springs—Automatic brake springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate—Package of 5	.40
10241	Box—Needle box with lid—Package of 2	.60

MODEL PB-23-M1
Voltage, Data
Parts List

RCA-VICTOR CO., INC.

VOLTAGE AMPLIFIER PB23M1

REPLACEMENT OF INPUT TRANSFORMER

Should it become necessary to replace the input transformer in the first stage of the voltage amplifier, care must be used to replace it in such a position that maximum shielding is obtained. The position of the transformer with respect to the amplifier panel which gives minimum hum is the correct position for maximum shielding.

FIDELITY CHARACTERISTICS

In this voltage amplifier the low-frequency booster circuit is located in the plate circuit of the UY-224A, and the voice frequency filter in the cathode circuit of the RCA-56. The voltage amplifier is connected at the factory to operate with 50-inch baffles. The response at 60 cycles is approximately 90% of the 1000-cycle response and at 100 cycles the response is approximately 60 per cent. If it is desired to shift the low-frequency peak either to a lower frequency or higher frequency, or to change the value of the frequency response, proceed as follows:

(a) To shift the peak to 50 cycles, remove the .02 mfd capacitor C-41 from the low-frequency booster circuit by disconnecting the jumper wire between terminals No. 16 and No. 18 on the capacitor pack. Place the .03 mfd capacitor C-40 in the circuit by connecting a jumper between terminals No. 16 and No. 17.

(b) To shift the peak to 40 cycles, connect the capacitors C-40 (.03 mfd) and C-41 (.02 mfd) in parallel by connecting jumpers between terminals No. 16, No. 17 and No. 18.

(c) If 27-inch baffles or doublet baffles are used on the stage, it will be necessary to shift the low-frequency peak to 80 cycles. To do this, disconnect the jumper wires between terminals No. 16, No. 17 and No. 18 on the capacitor pack. Connect a .02 mfd capacitor (Catalog No. 3639) externally between terminals No. 16 and No. 17 on the capacitor pack. This will connect the .02 mfd capacitor in series with the .03 mfd capacitor C-40 to give .012 mfd across L-30.

(d) To increase the value of response at any of the peak values used in the foregoing, remove the 100,000 ohm resistor R-81 connected across reactor L-30, between terminals on the tube shelf connected to terminals No. 7 and No. 16 on the capacitor pack. If a still further increase, to a maximum of approximately 400 per cent, is desired, shunt the plate resistor R-18 (125,000 ohm) with the 100,000 ohm resistor.

(e) To increase the response at 100 cycles, decrease the value of the shunt resistor R-80, and if a decrease in response is desired increase the value of the shunt resistor R-80. If male voices sound boomy it will be necessary to increase the value of the shunt resistor.

RADIOTRON SOCKET VOLTAGES

120-Volt A. C. Line

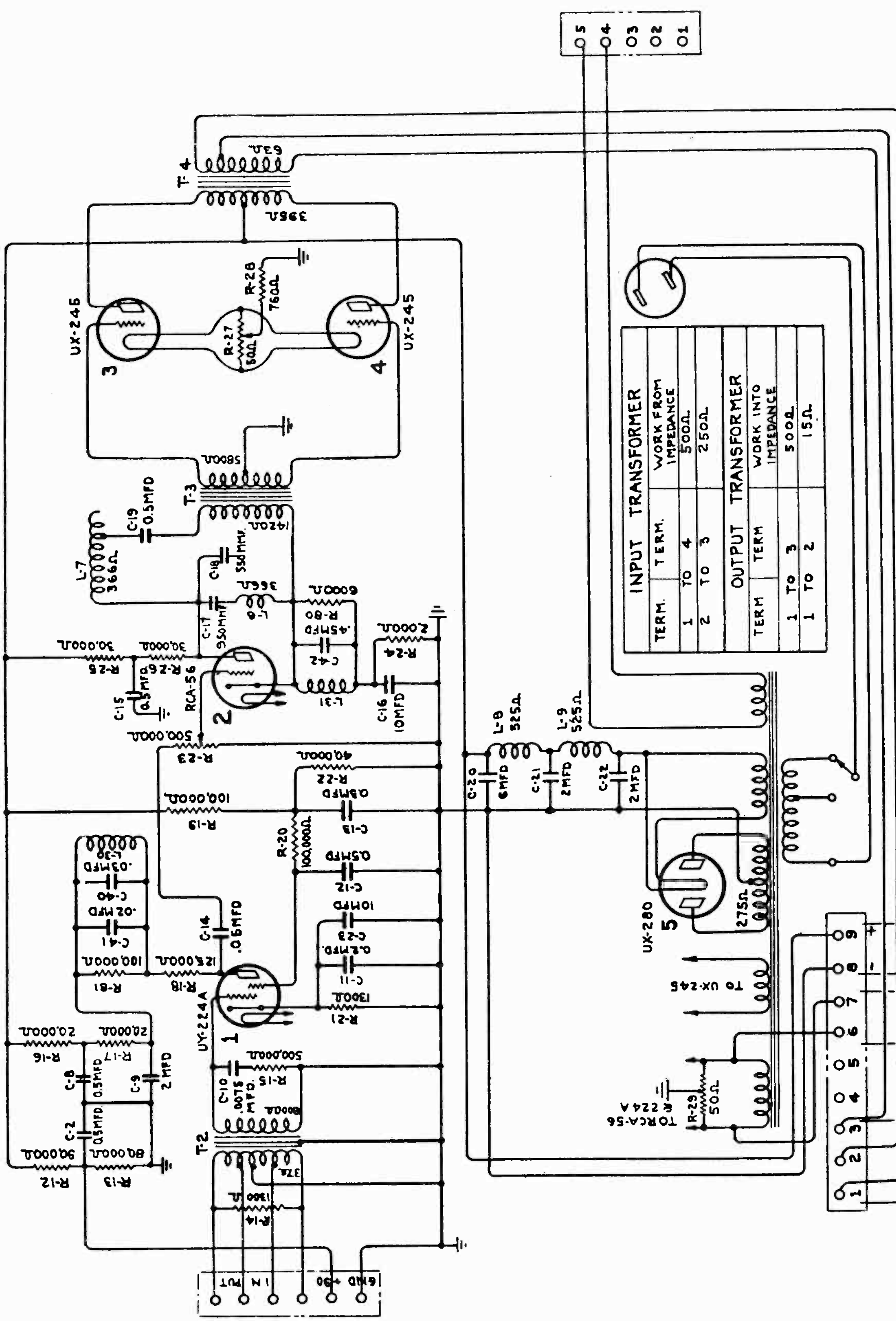
Radiotron	Control Grid Volts	Screen Grid Volts	Plate Volts	Plate Current M. A.	Filament or Heater Volts
UY-224A	1.3	45	185	.7	2.5
RCA-56	6.0	—	130	2.3	2.5
UX-245	48.0	—	250	30.0	2.5
UX-245	48.0	—	250	30.0	2.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
20058	Screws—One set of two special thumb-screws for securing perforated panel	$0.60
20096	Screws—One set of two thumb-screws for fastening input shields	1.00
21630	Switch—Single pole, double throw toggle-type switch—mounted on tube shelf	2.00
21632	Cap—First stage Radiotron control grid cap	.75
22178	Connector—2-contact male connector	.26
22186	Resistor—760 ohm porcelain-type resistor	.90
22195	Resistor—500,000 ohm carbon type resistor—½ watt	.50
22868	Resistor—80,000 ohm carbon type resistor—½ watt	.50
22932	Socket—UX type socket complete with two mounting screws, two lockwashers and two nuts	.60
23000	Capacitor—550 mmfd. fixed capacitor	1.20
23001	Resistor—90,000 ohm carbon type resistor—½ watt	.50
23002	Capacitor—950 mmfd. fixed capacitor	1.20
23003	Resistor—30,000 ohm carbon type resistor—½ watt	.50
23004	Resistor—40,000 ohm carbon type resistor—½ watt	.50
23005	Resistor—20,000 ohm carbon type resistor—½ watt	.50
23006	Resistor—100,000 ohm carbon type resistor—½ watt	.50
23007	Resistor—120,000 ohm carbon type resistor—½ watt	.50
23009	Resistor—1,300 ohm carbon type resistor—½ watt	.50
23014	Potentiometer—50 ohm hum control potentiometer complete with mounting nut	2.50
23015	Capacitor—.0075 mfd. fixed capacitor complete with two mounting screws (CX 43)	2.50
23016	Capacitor—.05 mfd. fixed capacitor (CX 45)	2.00
23017	Socket—UY type socket complete with insulator, two mounting screws, two lockwashers, and two nuts	.65
23018	Knob—Volume control potentiometer push-on-type knob	1.10
23019	Cable—Remote volume control contact switch cable	3.00
23118	Capacitor—.2 mfd. fixed capacitor (CX 75)	1.75
23122	Resistor—2,000 ohm, ¼ watt, carbon resistor	.20
23123	Resistor—1,300 ohm, ¼ watt, carbon resistor	.20
25065	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers, and four nuts (RT 77)	25.00
25376	Transformer—Output transformer in metal container complete with four mounting screws, four lockwashers, and four nuts (RT 165)	35.00
25377	Transformer—Interstage transformer in metal container complete with four mounting screws, four lockwashers, and four nuts (RT 166)	25.00
25381	Cushion—One set of two sponge rubber cushions for input transformer (¼" x 1" x 3⅛")	2.25
25382	Cushion—One set of three rubber cushions for input transformers (located in metal container)	5.00
25383	Board—Terminal board engraved "1, 2, 3, 4, 5," complete with five terminals, two mounting screws, two lockwashers, two washers, and two spacers (located under power transformer)	$4.50
25553	Resistor—200 ohm porcelain type resistor	1.40
25587	Transformer—Voltage amplifier input transformer—less container (RT 188)	12.95
27328	Capacitor pack—Capacitor pack comprising three 2 mfd. condensers and one 4 mfd. condenser in metal container complete with four mounting screws, four lockwashers, and four nuts (CP 31)	24.00
27459	Transformer—Power transformer (50-60 cycle) complete with four mounting screws, four lockwashers, and four nuts (RT 168)	50.00
27514	Board—Terminal board complete with nine terminals, two mounting screws, two lockwashers, two washers, and two spacers (located under capacitor pack)	3.95
27515	Board—Terminal board complete with six terminals, two mounting screws, two lockwashers, two washers, and two spacers	3.65
27576	Capacitor pack—Comprising four reactors, two 10 mfd. electrolytic condensers, one 2 mfd. capacitor, five ½ mfd., one .45 mfd., one .03 mfd., and one .02 mfd. capacitors in metal container complete with four mounting screws, four lockwashers, and four nuts	45.00
	VOLUME CONTROL POTENTIOMETER	
22869	Resistor—120,000 ohm, ¼ watt carbon type	.50
23123	Resistor—1,300 ohm, ¼ watt carbon type	.20
23124	Resistor—700 ohm, ¼ watt, carbon type	.20
23125	Resistor—900 ohm, ¼ watt, carbon type	.20
23126	Resistor—1,700 ohm, ¼ watt, carbon type	.20
23127	Resistor—2,200 ohm, ¼ watt, carbon type	.20
23128	Resistor—2,900 ohm, ¼ watt, carbon type	.20
23129	Resistor—4,000 ohm, ¼ watt, carbon type	.20
23130	Resistor—5,300 ohm, ¼ watt, carbon type	.20
23131	Resistor—7,000 ohm, ¼ watt, carbon type	.20
23132	Resistor—9,400 ohm, ¼ watt, carbon type	.20
23133	Resistor—13,000 ohm, ¼ watt, carbon type	.20
23134	Resistor—17,000 ohm, ¼ watt, carbon type	.20
23135	Resistor—22,000 ohm, ¼ watt, carbon type	.20
23136	Resistor—30,000 ohm, ¼ watt, carbon type	.20
23137	Resistor—40,000 ohm, ¼ watt, carbon type	.20
23138	Resistor—53,000 ohm, ¼ watt, carbon type	.20
23139	Resistor—70,000 ohm, ¼ watt, carbon type	.20
23140	Resistor—94,000 ohm, ¼ watt, carbon type	.20
23141	Resistor—2,100 ohm, ¼ watt, carbon type	.20
27534	Potentiometer—Volume control potentiometer complete	16.25

MODEL PB-23-M1
Schematic

RCA-VICTOR CO., INC.

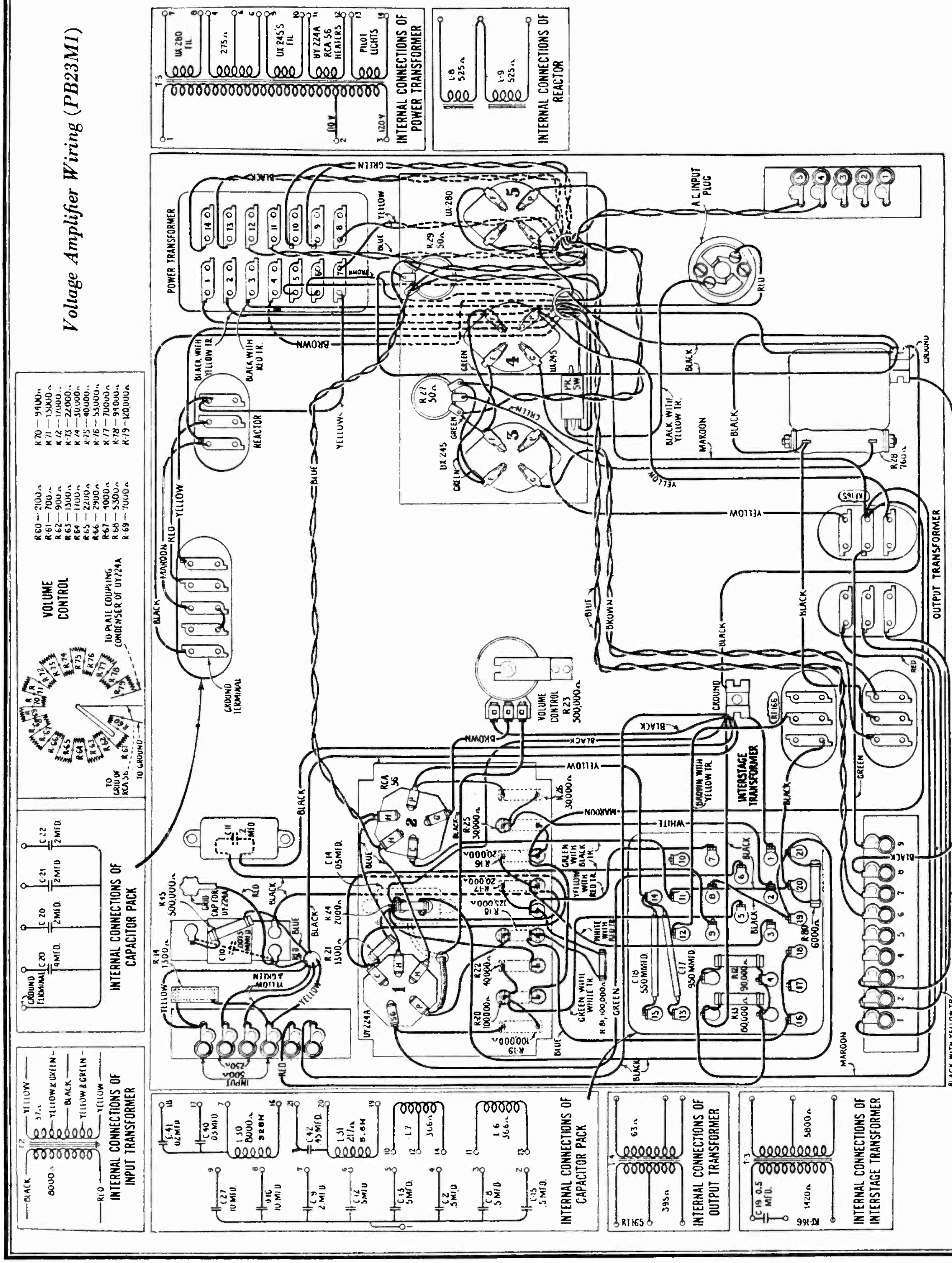


Schematic Circuit Diagram (PB23M1)

MODEL PB-23-M1
Chassis Wiring

RCA-VICTOR CO., INC.

Voltage Amplifier Wiring (PB23M1)



RCA-VICTOR CO., INC.

Supplement No. 3 to
RCA Victor Photophone
Theatre Reproducing Equipment
Type PG-59

(High Fidelity)

(1) PA83C1 AMPLIFIER RACK

The PA83C1 Amplifier rack is similar electrically to the PA83B2. The PA83C1 has heavier front panels than previous models of this amplifier type.

(2) PA83C3 AMPLIFIER RACK—PB82C1 AMPLIFIER UNIT

The frequency response characteristic is a modification of that obtained on previous models. The amplifier is connected at the factory so that more pronounced low frequency response is obtained with the 27-inch baffles. The response is such that no loudspeaker filter is required in the loudspeaker voice coil circuit.

A fuse is connected in series with capacitor C-11 in the PK22 exciter lamp supply unit as a protection to the rectox rectifier and transformer.

Figure 1 shows the rack wiring and schematic diagram of the PA83C3 rack.

(3) FIDELITY CHARACTERISTICS—PB82C1

For 27-inch Baffle

The amplifier unit is connected at the factory so that the response is approximately 160 per cent at 80 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles and then drops off to approximately 40 per cent at 10,000 cycles.

To modify the frequency response characteristic, proceed as follows: See Figure 2.

(a) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(b) Should the operation performed in (a) reduce the extreme low frequency response too much, remove the resistors R-32 and R33 (2 megohms each).

(c) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which is shunted across C-3. Open up by-pass circuit on R-9.

(d) To reduce extreme low frequency response disconnect the resistors R-32 and R-33 (2 megohms each) and connect R-41 and R-42 (½ megohm each) in place of those removed.

For 50-inch Baffle

(a) If 50-inch Baffles are used with the PG-59 equipment, disconnect the resistors R-32 and R-33 (2 megohms each) and also replace C-25 and C-26 (.04 mfd each) by C-19 and C-20 (.07 mfd each). The frequency response characteristic will then be approximately 160 per cent at 60 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles, and 40 per cent at 10,000 cycles.

(b) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(c) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which parallels C-3. Open up the by-pass circuit on R-9.

(d) To reduce the extreme low frequency response, connect resistors R-32 and R-33 (2 megohms each) across the reactors in the grid circuit of the Radiotrons RCA-2A3.

(4) LOUDSPEAKER—PL52C2

The Model PL52C2 Loudspeaker mechanism has a new type of terminal board for the voice coil circuit as shown in Figure 3. The design of these terminals is such that they are more easily accessible for installation and service work.

MODEL PG-59
Chassis Wiring

RCA-VICTOR CO., INC.

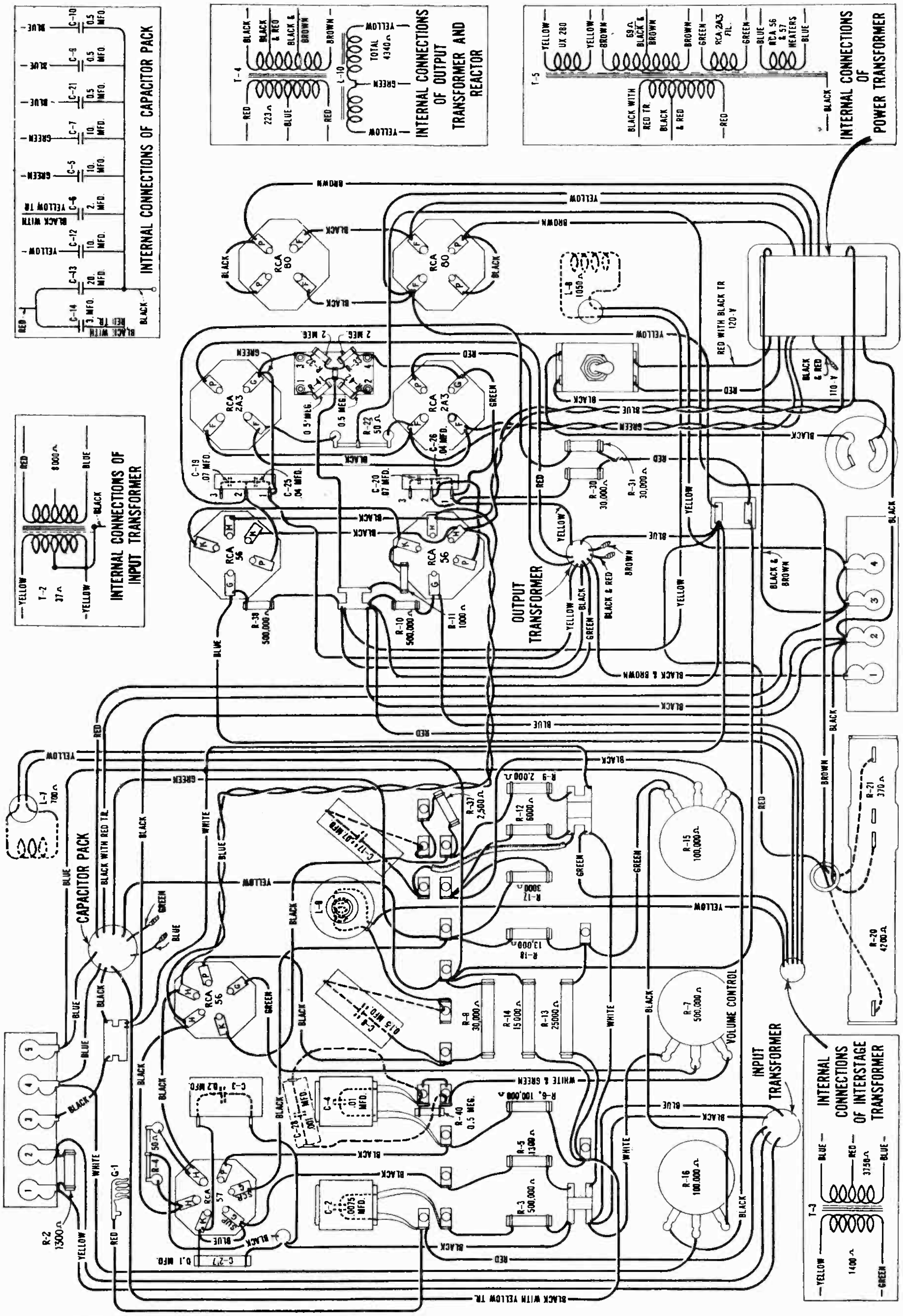


Figure 2—Amplifier Panel Wiring (PB82C1)—Connected for use with 27 inch baffles

MODEL PG-59
Schematic

RCA-VICTOR CO., INC.

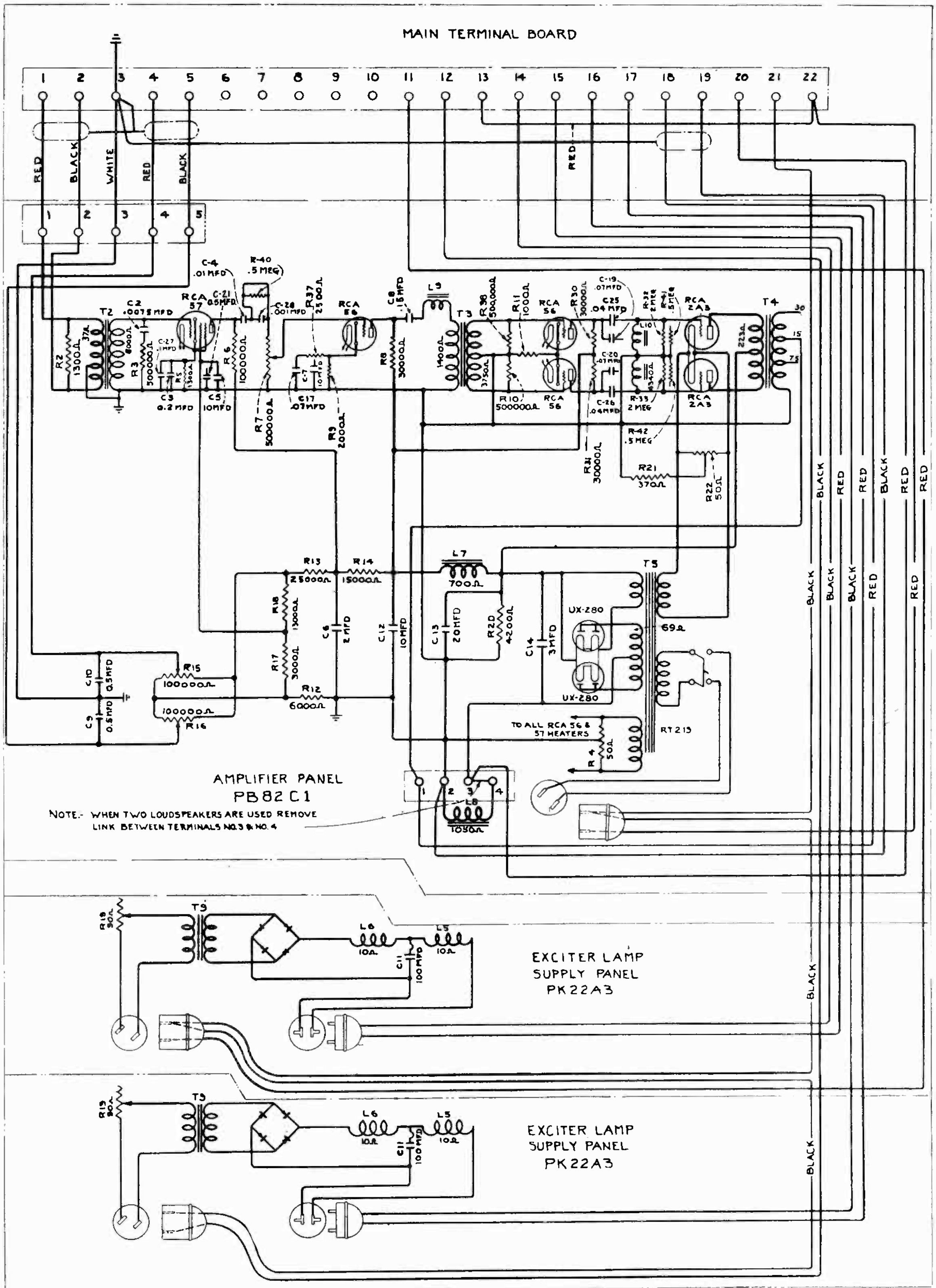
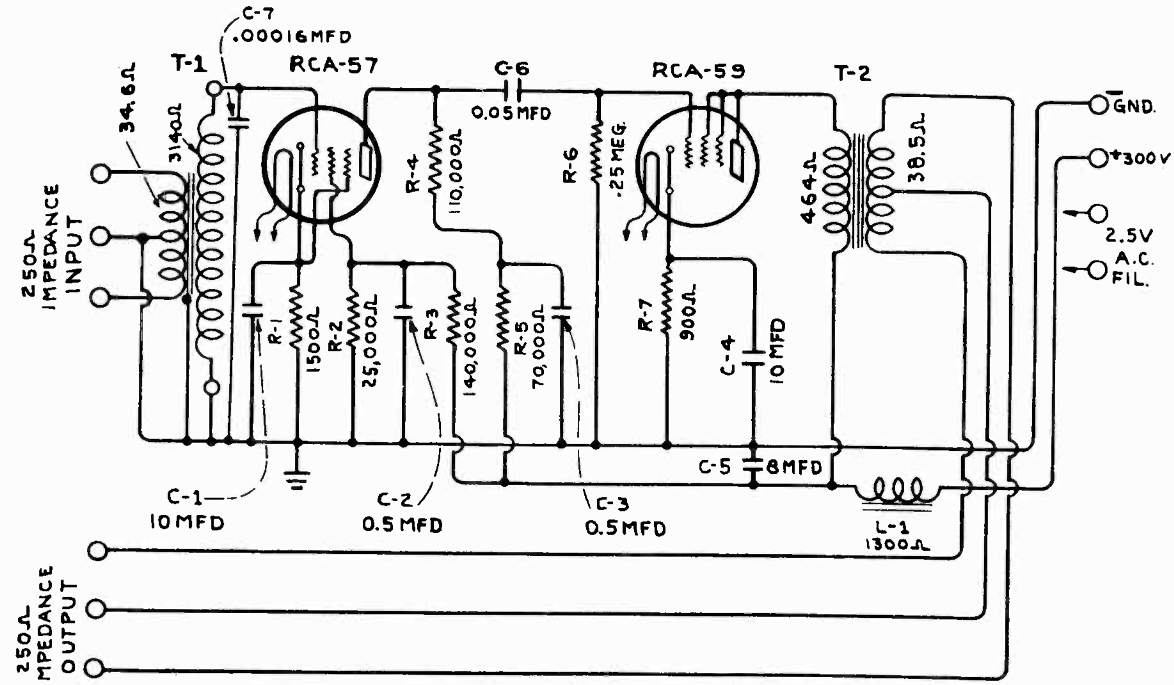


Figure 1—Pack Assembly Wiring (PA83C3)

MODEL PA-103-A1
Schematic
Voltage
Parts List

RCA-VICTOR CO., INC.

PRE-AMPLIFIER PA103A1



Schematic Wiring Diagram

PRE-AMPLIFIER

For program pickup, or where the velocity microphone is used for any purpose except close talking, a pre-amplifier is required for each microphone. The overall gain of this pre-amplifier is 58 DB. The Radiotron voltages for this pre-amplifier are obtained from a PK24B1 power supply unit.

The pre-amplifier is designed to work from a 250-ohm source and into a 250-ohm line.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C. Line

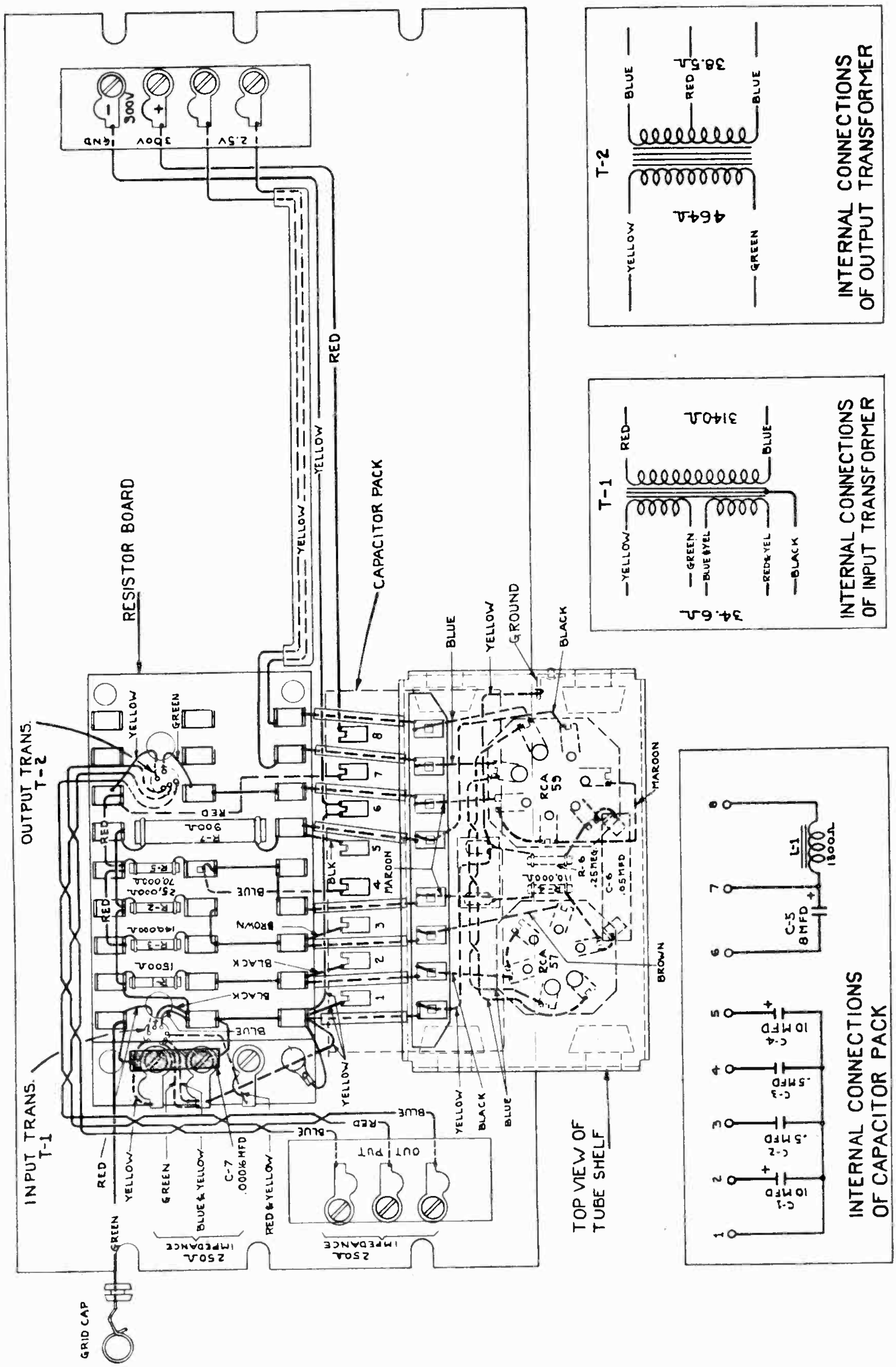
Radiotron	Control Grid Volts	Screen Grid Volts	Plate Volts	Plate Current M. A.	Heater Volts
RCA-57	1.1	40	110	.63	2.5
RCA-59	22.5		245	25.5	2.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	MICROPHONE PRE-AMPLIFIER Model PA103A1	
2747	Cap—Control grid cap	$0.10
3110	Resistor—25,000 ohm, ¼ watt carbon resistor (R2)	.20
3634	Capacitor—160 mmfd. fixed capacitor (C7)	.34
3713	Capacitor—.05 mfd. fixed capacitor (C6)	.32
3744	Resistor—250,000 ohm, ¼ watt carbon resistor (R6)	.20
3853	Resistor—1,500 ohm, ¼ watt carbon resistor (R1)	.20
6241	Resistor—140,000 ohm, ¼ watt carbon resistor (R3)	.20
23094	Latch—Male section of shield cover latch	.35
23176	Resistor—70,000 ohm, ¼ watt carbon resistor (R5)	.20
23177	Resistor—900 ohm, 1 watt carbon resistor (R7)	$0.22
23178	Resistor—110,000 ohm, ¼ watt carbon resistor (R4)	.20
25532	Socket—6-contact Radiotron socket	.40
25626	Socket—7-contact Radiotron socket	.45
25840	Board—Input terminal board complete with three terminals	1.62
25841	Board—Voltage supply terminal board with four terminals	2.00
25842	Board—Output terminal board complete with three terminals	1.56
27586	Transformer—Input transformer complete with three rubber cushions (RT-231)	9.34
27587	Transformer—Output transformer (RT-232)	30.00
27588	Capacitor pack—Comprising two 10 mfd., one 8 mfd., two .5 mfd. capacitors, and one filter reactor in container (C1, C2, C3, C4, C5, L1)	11.76

MODEL PA-103-A1
Panel Wiring

RCA-VICTOR CO., INC.



Pre-Amplifier Panel Wiring (PA103A1)

The RCA Victor Portable Public Address System, Type PG-62 is a complete amplifying system consisting of an amplifier, a microphone, and two loudspeakers. It is designed for use as a sound reinforcing system in auditoriums, theatres and churches or for outdoor gatherings. The equipment is entirely A. C. operated, power for its operation being obtained from any 50 or 60 cycle, 110 volt house lighting receptacle. The maximum undistorted power output of this equipment is 20 watts which is sufficient to meet the average requirements of sound reinforcement in auditoriums with a capacity up to 2,500 seats.

The amplifier consists of two units; the voltage and power amplifier units both mounted in a carrying case. The loudspeakers, two of which are supplied with the equipment, are each mounted in a wooden housing. A special carrying case is provided for the loudspeakers when they are to be transported.

A velocity type microphone, the latest type developed by the RCA Victor engineers, is also furnished as a standard part of the equipment. Provision is made for placing microphone and stand together with the microphone interconnecting cables in the amplifier carrying case when the equipment is to be transported. Figure 1 shows the equipment set up for operation.

All the controls except the power control switch are mounted on the voltage amplifier base and are easily accessible to the operator. The controls consist of the power control switch mounted on the power amplifier base, the microphone volume control, amplifier volume control, the speech clarifying switch and the tone switch. Figure 2 shows the location of the various controls.

Facilities are provided for operating the equipment with a phonograph turntable. If it is desired, phonograph music may be played as a background for the microphone pick-up, the volume of each being controlled independently of each other. In the Universal Amplifier Assembly a microphone selector switch is mounted on the voltage amplifier to permit the use of a carbon type microphone with the equipment.

MODEL PG62C1 EQUIPMENT

Amplifier (Model PA97A2)

Model	*Amplifier*	*Number of Stages*
PB88A3	Voltage	3
PB89A1	Power	2

Loudspeakers

Model	*Field Resistance*
PL71A1	1,350 Ohms
PL71B1	1,950 Ohms

Microphone

Model	*Type*
PB90A1	Velocity

UNIVERSAL AMPLIFIER ASSEMBLY

Voltage Amplifier

Model	*Number of Stages*
PB88A2	3

Power Amplifier

Model	*Number of Stages*
PB89B1	2

PART I—SETTING UP THE EQUIPMENT

(1) TYPE PG-62 EQUIPMENT

The equipment is set up for operation in the following manner:

1. Open the amplifier carrying case and lay the two halves on the floor or a table so that the Radiotrons will be in an upright position. Remove the microphone and microphone stand and support.

2. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place. See Figure 2.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.

3. Open the loudspeaker carrying case and remove the two loudspeakers. Place the loudspeakers in a position so that the loudspeaker grilles face in the direction in which the sound beams are desired. Interconnect the two loudspeakers with the cable and plug provided. Connect the loudspeakers to the amplifier by means of the four-pole plug provided on the other loudspeaker cord.

4. Assemble the microphone and the microphone stand and support. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.

5. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the Rectifier Tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

(2) UNIVERSAL AMPLIFIER

Before the equipment may be set up for operation, certain accessories must be obtained. They are as follows:

1. Microphone, such as the Type PB-90.

2. Microphone stand, such as the table stand, Type PB-96 or the floor stand, Type AZ-4090.

3. One, two, or four loudspeakers having a voice coil impedance of 7½ ohms or 15 ohms each. Each loudspeaker should have its own source of supply for field current. The dry disc rectifier type or the vacuum tube rectifier type is suitable for this purpose.

4. A two conductor loudspeaker cable.

The equipment is set up for operation in the following manner:

1. Insert the Radiotrons in the sockets as shown in Figure 2.

2. Place both the voltage and power amplifiers on a table or on the floor so that the Radiotrons will be in an upright position. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instruments unless all Radiotrons are in place. Figure 2 shows the proper Radiotron locations.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.

3. Connect the voltage and power amplifiers together by means of the interconnecting cable as shown in Figure 10.

4. Make connections between the loudspeakers and the four pole loudspeaker plug, furnished with the amplifier, as indicated in Figure 3. Insert the loudspeaker plug into the corresponding receptacle on the side of the power amplifier base.

NOTE: If a loudspeaker having a voice coil of 7½ ohms impedance is used, the link between the output transformer and the loudspeaker receptacle should remain connected between terminals 1 and 2, as indicated in Figure 10. If the voice coil impedance is 15 ohms, shift the link so that it connects terminals 2 and 3 on the link terminal board.

5. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.

6. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the rectifier tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

PART II—OPERATION

After the equipment has been properly located and connected, it may be operated in the following manner. (Refer to Figure 2.) This operating procedure applies to both the PG-62 equipment and the Universal Amplifier.

1. Apply power by turning the power control switch "on," located on the base of the power amplifier.

2. The microphone should be located adjacent to the person talking and to one side of the loudspeaker. It should preferably not be located either directly in front or at the rear of the loudspeaker as acoustic feedback will result. Turning the microphone, with both volume controls at maximum, until the position where the least sound is produced in the loudspeakers due to feedback, will allow best operation.

NOTE: The Universal Amplifier Assembly is equipped with a microphone selector switch located on one end of the voltage amplifier. Set this switch in the "Velocity" position when a Velocity Type Microphone is used. When a carbon type microphone is used, set the switch at the "Carbon" position.

Set the Microphone Volume Control, located on the voltage amplifier, at its mid-position. Talk into the microphone at a distance of ten to twenty inches and gradually rotate the Amplifier Volume Control until the desired volume is obtained from the loudspeakers.

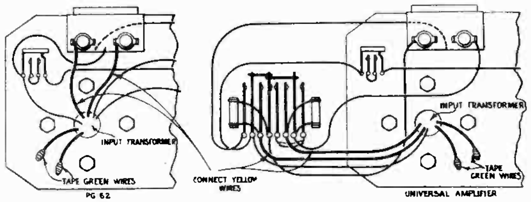


Figure 4—Wiring changes for two microphone operation

3. If voice only is to be picked up by the microphone, set the speech clarifying switch in the "speech" position. For musical pickup, the "music" position will give better reproduction. In either case, the "tone" dial, located on the base of the voltage amplifier, should be adjusted for most pleasing reproduction.

PART III—SPECIAL OPERATION

In some instances, it may be desirable or necessary to use two velocity microphones or more than one power amplifier operated from one voltage amplifier. The following sections cover these special uses of the equipment.

(1) TWO MICROPHONE OPERATION

In general, the use of more than one velocity microphone with either the PG-62 Equipment or Universal Amplifier is not recommended. This would presume a microphone mixer which is undesirable as the overall gain is insufficient to overcome the attenuation in the mixer.

If it is necessary to use two microphones (not more than two) and keep both in the circuit at the same time, using no fading or mixing arrangement, other than the volume controls on the voltage amplifier, the connections and changes in the amplifier wiring are as follows:

PG-62 Equipment

(a) Disconnect and tape the two green leads between the microphone receptacle on the voltage amplifier and input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone receptacle. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

Universal Amplifier

(a) Disconnect and tape the two green leads between the microphone selector switch on the voltage amplifier and the input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone selector switch at the points from which the two green leads were removed. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

(2) MULTIPLE OPERATION OF POWER AMPLIFIERS

The Type PB-88 Voltage Amplifier may be used to operate as many as three Type PB-89 Power Amplifiers. The requirements for such operation are as follows:

(a) In each power amplifier, remove the resistor R-18 (50,000 ohms) and replace with a 100,000 ohm, one-watt resistor, Catalog No. 3058.

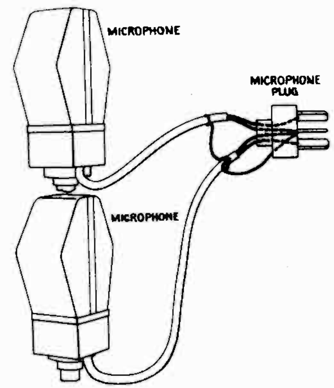


Figure 5—Two microphones wired to one plug

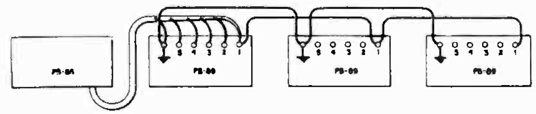


Figure 6—Multiple Operation of Power Amplifier

(b) Connect the power amplifiers to the voltage amplifier as shown in Figure 6.

(c) If the Model PB89A1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 8. If the Model PB89B1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 3.

(d) Each power amplifier must be connected to a source of A. C. 110 volt, 60 cycle power.

PART IV—SERVICE DATA ON AMPLIFIER EQUIPMENT

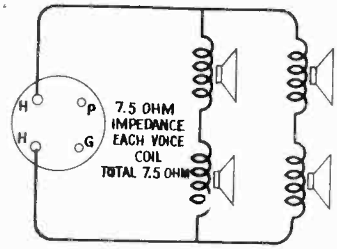
(1) ELECTRICAL DESCRIPTION OF CIRCUIT

The velocity microphone is coupled to the first stage of the voltage amplifier (RCA-57) by means of an input transformer located on the amplifier base. The link circuit between the microphone transformer and the input transformer is of 250 ohms impedance. A potentiometer is provided in the grid circuit of the RCA-57 to vary the input voltage applied to the grid.

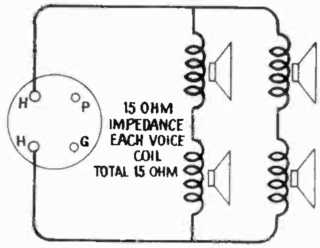
The RCA-57 is resistance coupled to the RCA-56 in the second stage. Another potentiometer is provided in the grid circuit of this RCA-56 to control the output volume of the entire equipment. The RCA-56 is in turn resistance coupled to the RCA-56 in the third stage of the voltage amplifier. The last stage of the voltage amplifier is coupled to the single RCA-59 which is the driver for two Radiotrons RCA-59 in the Class "B" output stage. The output stage supplies power to two loudspeakers through a step-down transformer. This transformer has an output impedance of 15 ohms with a tap at 7½ ohms.

RCA-VICTOR CO., INC.

MODEL PG-62-C
Operating Notes
Chassis Views
Loud Speaker Data



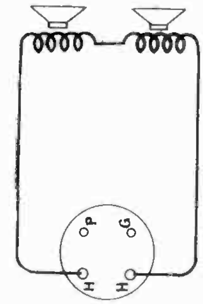
USE 7.5 OHM TAP ON OUTPUT TRANSFORMER (LINK ON TERMINALS 1 AND 2)



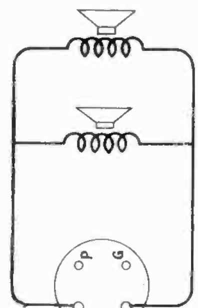
USE 15 OHM TAP ON OUTPUT TRANSFORMER (LINK ON TERMINALS 2 AND 3)

FIG. 3

LOUD SPEAKER WIRING FOR VARIOUS VOICE COIL IMPEDANCES.



7.5 OHM IMPEDANCE EACH VOICE COIL TOTAL 15 OHM



15 OHM IMPEDANCE EACH VOICE COIL TOTAL 7.5 OHM

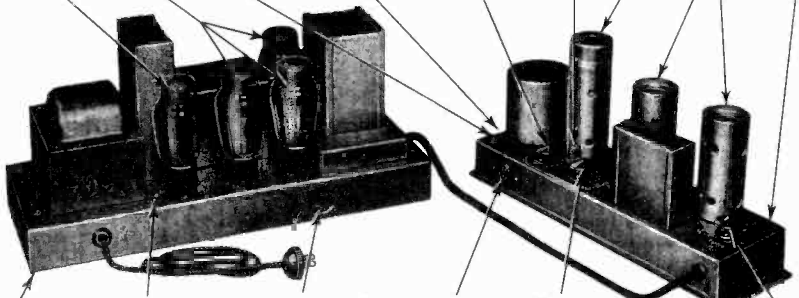


Figure 2—View of Voltage and Power Amplifiers Showing Parts

(6) PHASING LOUDSPEAKERS (PG-62 Equipment)

If either of the loudspeaker cones are replaced, the two loudspeakers must be properly phased after the replacement work is done. That is, the motion of both cones must be in the same direction at a given instant when a signal is impressed on them. The following procedure may be used to phase the loudspeakers.

1. Place the two loudspeakers side by side and connect them together by means of the cord and plug provided.

2. Turn the equipment on so that field coils are energized. Apply 6 volts D. C. intermittently to the voice coil terminals at one loudspeaker (black lead and yellow lead on PL71A1 or white lead and red lead on PL71B1). If both cones do not move in the same direction, reverse the voice coil leads to the terminal board of one loudspeaker only.

CAUTION: The loudspeaker fields are at approximately 400 volts above ground. Therefore care must be observed in making tests on the loudspeakers.

(7) DIRECTIONAL BAFFLE LOUDSPEAKER

It is sometimes desirable to use a directional baffle type of loudspeaker with this amplifying equipment. In this case it is necessary to compensate for the difference between the response frequency characteristic of the flat baffle and the directional baffle. The compensation should consist of a .0005 MFD capacitor (Catalog No. 21648) connected in series with the .005 MFD capacitor C-1, and a 250,000 ohm resistor (Catalog No. 23114) shunted across the speech clarifying switch.

The power supply for both the voltage and power amplifiers is obtained from the RCA-83 and a filter system located on the power amplifier base. The field coil of one loudspeaker in the PG-62 Equipment is used as a filter reactor in the power supply system in the power amplifier. In the Universal Amplifier an additional reactor is used in the filter circuit in place of the loudspeaker field mentioned above.

(2) CARBON MICROPHONE CONNECTIONS (Universal Amplifier Only)

The Universal Amplifier Equipment is designed so that it will operate with a double button carbon microphone of 250 ohms impedance. A three-pole plug, similar to that employed with the velocity microphone, should be used. Each button on the microphone should be connected to each of the symmetrical poles on the plug. The remaining pole on the plug should be used to connect to the mid-point of the microphone. When using the carbon microphone, the microphone selector switch should be placed at the "Carbon" position.

(3) PHONOGRAPH CONNECTIONS

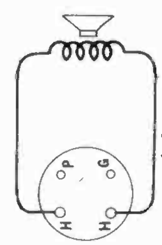
An input jack is provided in the grid circuit of the RCA-57 which permits the use of a phonograph turntable RCA Victor Type PT-14, Type PT-15, Type PT-16 or Type PT-17. The instructions for operation of the turntables are included with the phonograph equipment.

(4) WIRING

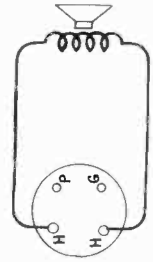
The schematic wiring diagram for the PG-62 Equipment is shown in Figure 7. The wiring diagram for the complete PG-62 Equipment is shown in Figure 8. Figures 9 and 10 show the schematic and wiring diagrams respectively for the Universal Amplifier.

(5) RADIOTRON SOCKET VOLTAGES

The Radiotron socket voltages given in the following tabulation are the actual values at which each Radiotron should operate. In circuits containing high resistance, voltages read on a set analyzer will not agree with the values in the table, due to the relatively low resistance of the meter employed. Therefore, a correction must be applied to the meter reading to obtain the correct voltage at each socket. Usually, an application of Ohms Law will give an approximate value of the voltages at which each Radiotron is operating, assuming that the resistance of the meter is known.



15 OHM IMPEDANCE VOICE COIL



7.5 OHM IMPEDANCE VOICE COIL

MODEL PG-62-C
Voltage
Parts List

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES

115 VOLT A. C. LINE—NO INPUT SIGNAL VOLTAGE

Radiotron No.	Control Grid to Cathode or Filament Volts	Screen Grid to Cathode or Filament Volts	Plate to Cathode or Filament Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-57	1.0	80	145	.25	2.5
2. RCA-56	3.5	—	120	1.2	2.5
3. RCA-56	4.0	—	165	1.6	2.5
4. RCA-59	2.8	—	242	23.0	2.5
5. RCA-59	0	—	390	13.0	2.5
6. RCA-59	0	—	390	13.0	2.5

CAUTION: Whenever the Radiotron RCA-83 rectifier is removed from or installed in its socket, the A. C. power control switch should be in the "off" position.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	PORTABLE AMPLIFIER ASSEMBLY MODEL PA97A2	
	Power Amplifier	
	Models PB89A1 and PB89B1	
2725	Fuse—1½ ampere cartridge fuse—Package of 5	$0.40
21581	Resistor—50,000 ohms—Carbon type—1 watt	.50
21623	Resistor—15,000 ohms—Carbon type—1 watt	.50
22451	Switch—Single pole, single throw—Toggle type	.50
22853	Plug—Four-contact male connector plug (for PB89B1)	.50
23113	Resistor—1,200 ohms—Carbon type—1 watt	.65
23119	Resistor—75 ohms—Carbon type—1 watt	.50
23120	Resistor—5,000 ohms porcelain resistor	2.00
25536	Socket—Four-contact Radiotron socket	.35
25626	Socket—Seven-contact Radiotron socket	.45
25627	Capacitor—4.0 mfd. filter capacitor	1.00
25628	Board—Terminal board complete with five terminals	1.50
25629	Capacitor—0.003 mfd. capacitor	1.30
25630	Capacitor pack—Comprising two 10.0 mfd. capacitors in container	9.30
25631	Reactor—Filter reactor (for PB89A1)	6.15
25633	Cord—Two-conductor power cord and plug	6.70
25634	Reactor—Double filter reactor (RT-200) (for PB89B1)	8.00
27526	Transformer—Power transformer (RT-189)	12.30
27527	Transformer—Audio transformer pack—Interstage and output transformers (RT-190)	15.30
	Voltage Amplifier	
	Models PB88A3 and PB88A4	
3294	Resistor—15 ohms—Flexible type resistor (for PB88A4)	.20
3471	Capacitor—0.025 mfd. capacitor	.32
3555	Capacitor—0.1 mfd. capacitor	.36
7487	Shield—Metal shield for Radiotrons	.25
7488	Cap—Radiotron shield cap for RCA-57 Radiotron	.20
21581	Resistor—50,000 ohms—Carbon type—1 watt	.50
21632	Cap—Control grid cap	.75
22197	Resistor—2,500 ohms—Carbon type—1 watt	.50
22621	Resistor—200,000 ohms—Carbon type—½ watt	.50
22859	Switch—Single pole, single throw—Toggle switch	.65
23004	Resistor—40,000 ohms—Carbon type—½ watt	.50
23006	Resistor—100,000 ohms—Carbon type—½ watt	.50
23007	Resistor—120,000 ohms—Carbon type—½ watt	.50
23008	Resistor—3,000 ohms—Carbon type—½ watt	.50
23011	Resistor—50,000 ohms—Carbon type—½ watt	.50
23115	Resistor—60,000 ohms—Carbon type—½ watt	$ .50
23116	Resistor—4,000 ohms—Carbon type—½ watt	.50
23117	Resistor—100 ohms—Carbon type—½ watt	.50
25531	Socket—Five-contact Radiotron socket	.35
25615	Transformer—Core and coil for input transformer	10.60
25617	Capacitor—0.05 mfd. capacitor	1.25
25618	Capacitor—0.005 mfd. capacitor	1.40
25619	Rheostat—100,000 ohms—Tone control rheostat	3.70
25620	Switch—Triple pole, double throw—Key type switch	2.60
25621	Receptacle—Three-contact female receptacle	3.60
25622	Jack—Phonograph input jack	1.05
25623	Knob—Moulded knob and pointer	.30
25624	Cushion—One set of four rubber cushions for input transformer	3.00
25625	Cable—Six-conductor braid covered interconnecting cable	5.80
25778	Potentiometer—75,000 ohms—Microphone volume control potentiometer	1.35
25779	Potentiometer—150,000 ohms—Amplifier volume control potentiometer	1.75
25827	Socket—Six-contact Radiotron socket	.60
25828	Cushion—One set of two rubber cushions for socket	.90
27529	Capacitor pack—Comprising four 4.0 mfd. capacitors in container	8.35
	VELOCITY MICROPHONE MODEL PB90A1	
25782	Guard—Front and rear guard for microphone	11.00
25783	Transformer—Microphone transformer	18.00
25784	Cable—30 foot, two-conductor, rubber covered, shielded cable	7.30
25785	Plug—Two-conductor male connector plug	1.75
	LOUDSPEAKER—MODEL PL71A1	
6184	Board—Terminal board complete with three terminals	.10
8969	Cone—Loudspeaker cone with voice coil	1.27
9421	Coil—Field coil—Comprising coil, cone housing and magnet	4.32
25780	Cable—30 foot, four-conductor, rubber covered cable—Complete with four-contact plug	7.30
	LOUDSPEAKER—MODEL PL71B1	
6184	Board—Terminal board complete with three terminals	.10
8969	Cone—Loudspeaker cone with voice coil	1.27
9416	Coil—Field coil comprising coil, cone housing and magnet	4.00
25781	Cable—50 foot, three-conductor, rubber covered, cable—Complete with three-contact plug	11.00

MODEL PG-62-C
Schematic

RCA-VICTOR CO., INC.

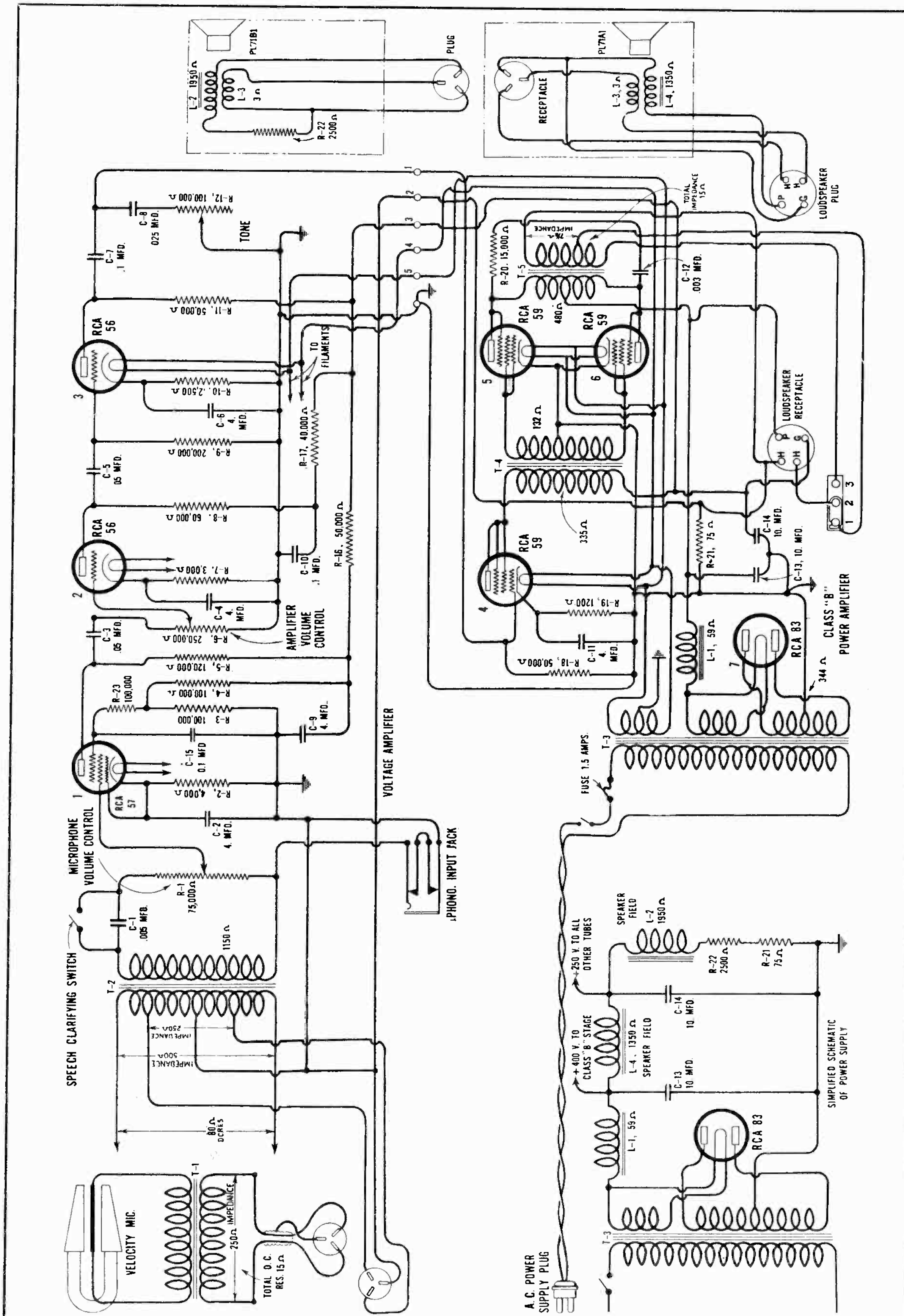


Figure 7—Schematic Circuit Diagram—PG-62 Equipment

MODEL PG-62-C
Chassis Wiring

RCA-VICTOR CO., INC.

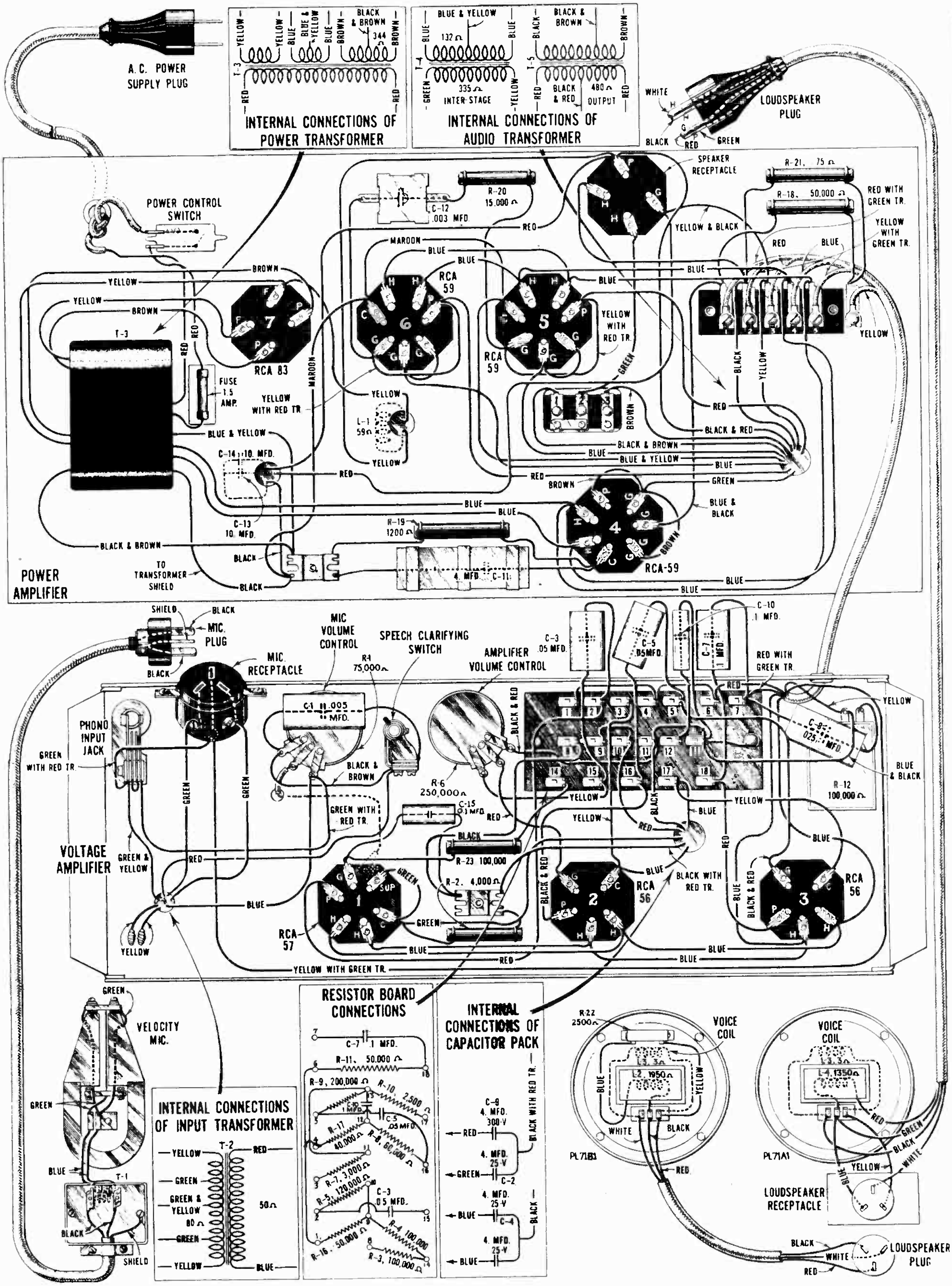


Figure 8—Wiring Diagram—PG-62 Equipment

RCA-VICTOR CO., INC.

MODEL PG-62-C Universal Amplifier Schematic

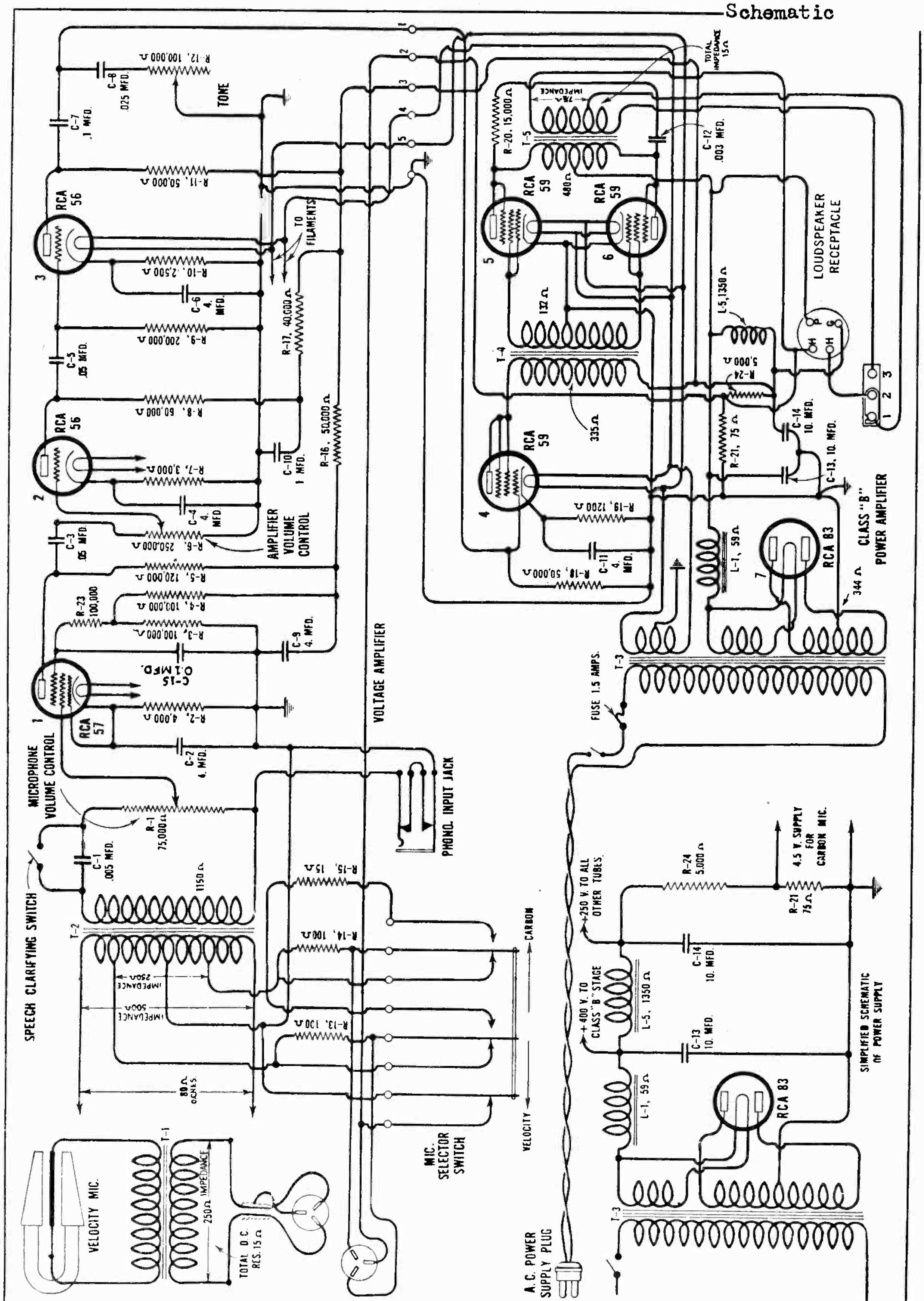


Figure 9—Schematic Circuit Diagram—Universal Amplifier

MODEL PG-62-C
Universal Amplifier
Chassis Wiring

RCA-VICTOR CO., INC.

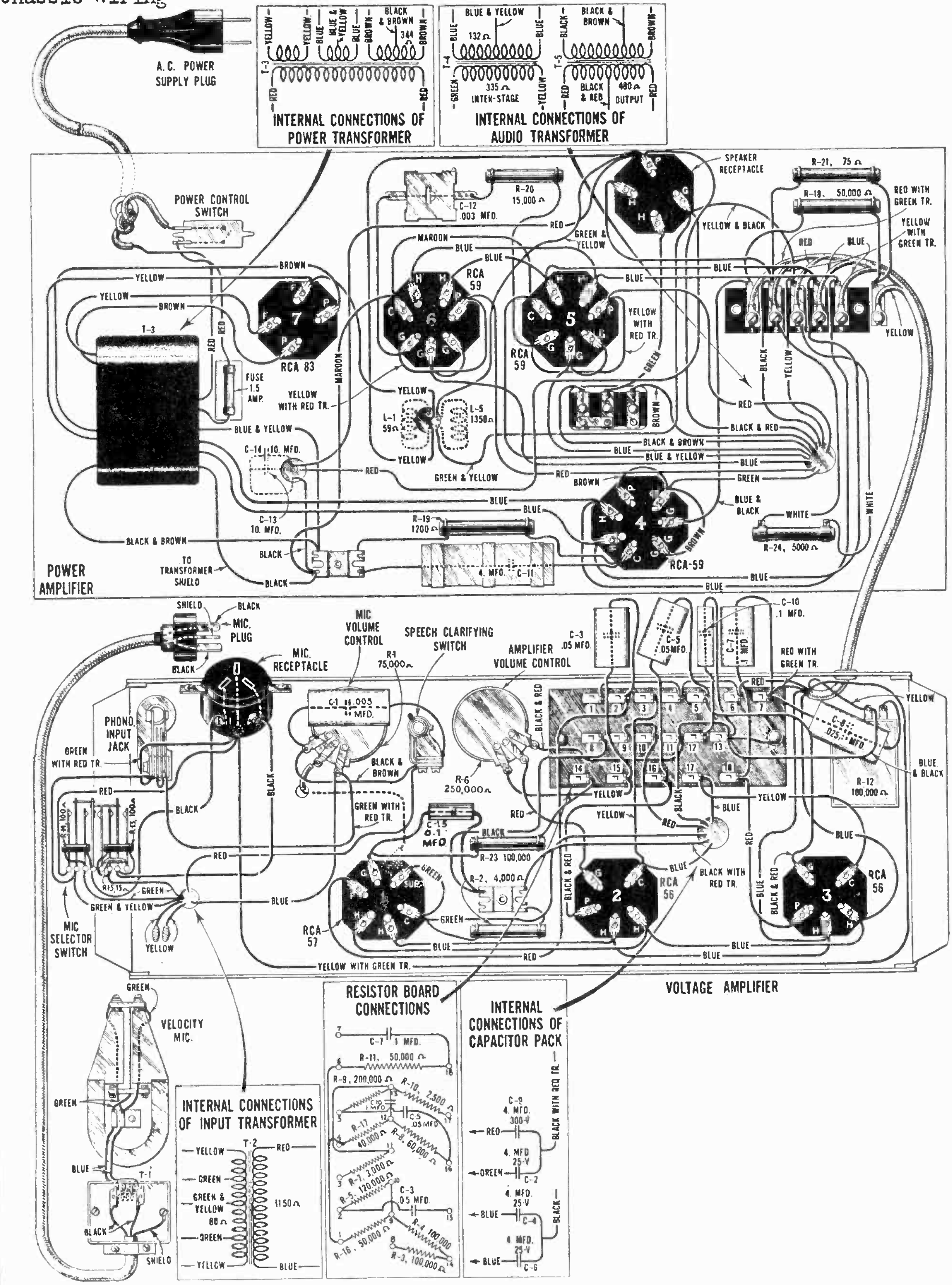


Figure 10—Wiring Diagram—Universal Amplifier

Supplement No. 1 to
RCA Victor Photophone Theatre Reproducing Equipment Type PG-65
(High Fidelity)
SERVICE NOTES

(1) PA96B1 AMPLIFIER RACK

The PA96B1 Amplifier rack is similar electrically to the PA96A1 rack. The PA96B1 rack has heavier front panels than previous models of this amplifier rack.

(2) PA96C1 AMPLIFIER RACK—PB82C1 AMPLIFIER UNIT

The frequency response characteristic is a modification of that obtained on previous models. The amplifier is connected at the factory so that more pronounced low frequency response is obtained with the 50-inch baffles. The response is such that no loudspeaker filter is required in the loudspeaker voice coil circuit.

A fuse is connected in series with capacitor C-11 in the PK23 exciter lamp supply unit as a protection to the rectox rectifier and transformer.

Figure 1 shows the rack wiring and schematic diagram of the PA96C1 rack.

(3) FIDELITY CHARACTERISTIC—PB82C1

For 50-inch Baffle

The amplifier is connected at the factory so that the response is approximately 160 per cent at 60 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles and then drops off to approximately 40 per cent at 10,000 cycles.

To modify the frequency response characteristic, proceed as follows: See Figure 2.

(a) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(b) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which is shunted across C-3. Open up by-pass circuit on R-9.

(c) To reduce extreme low frequency response, connect the resistors R-32 and R-33 (2 megohms each) across the reactors in the grid circuit of the Radiotrons RCA-2A3.

For 27-inch Baffle

(a) If 27-inch baffles are used with the PG-65 equipment, connect resistors R-32 and R-33 (2 megohms each) across the reactors in the grid circuit of the Radiotrons RCA-2A3, and also replace C-19 and C-20 (.07 mfd each) by C-25 and C-26 (.04 mfd each). The frequency response characteristic will then be approximately 160 per cent at 80 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles and then will drop off to approximately 40 per cent at 10,000 cycles.

(b) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(c) Should the operation performed in (b) reduce the extreme low frequency response too much, remove the resistors R-32 and R-33 (2 megohms each).

(d) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which is shunted across C-3. Open up by-pass circuit connected across R-9.

(e) To reduce extreme low frequency response, disconnect the resistors R-32 and R-33 (2 megohms each) and connect R-41 and R-42 (½ megohm each) in place of those removed.

(4) LOUDSPEAKER—PL52C2

The Model PL52C2 Loudspeaker mechanism has a new type of terminal board for the voice coil circuit as shown in Figure 3. The design of these terminals is such that they are more easily accessible for installation and service work.

MODEL PG-65
Rack Assembly Wiring

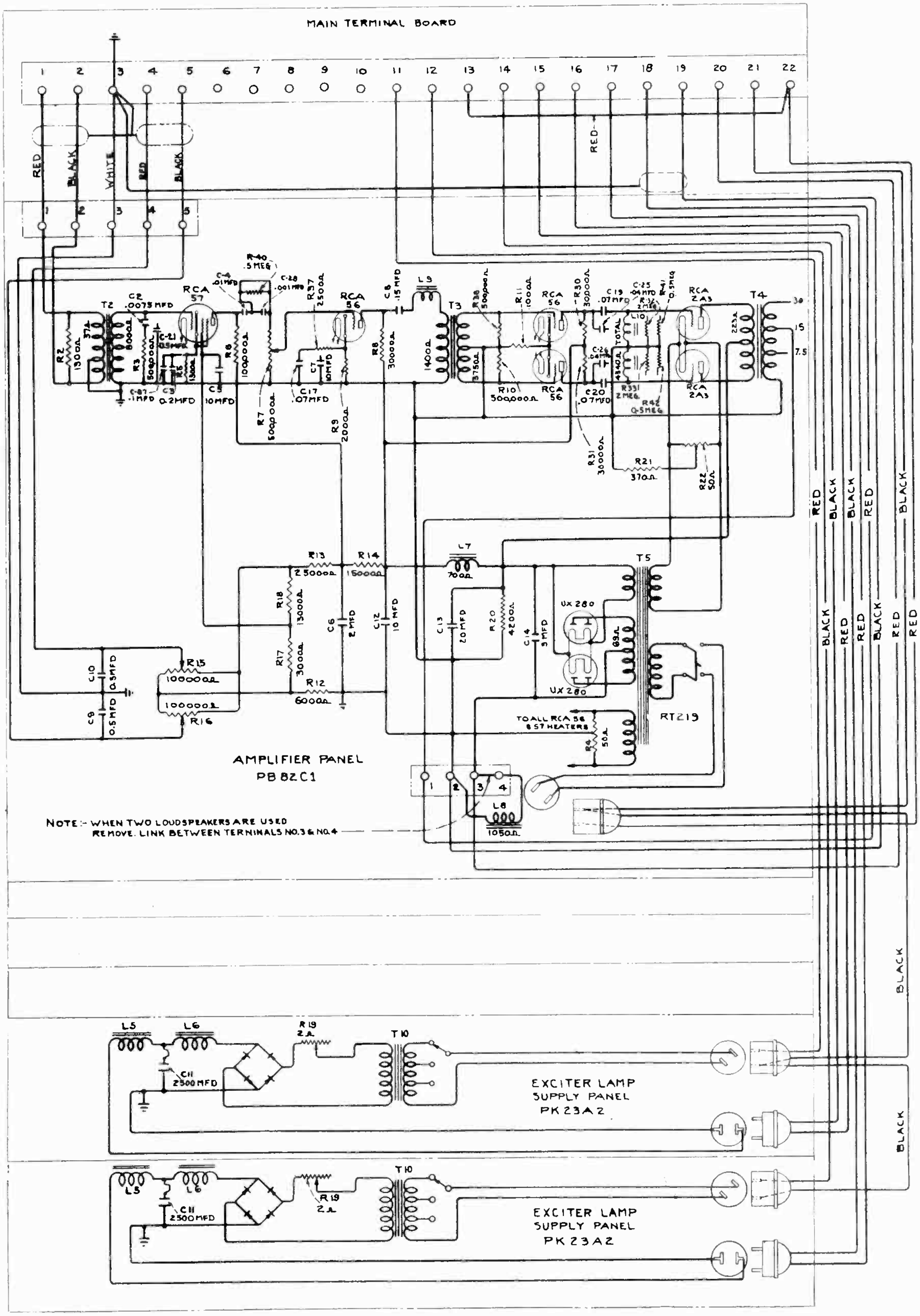


Figure 1—Rack Assembly Wiring (PA96C1)

MODEL PG-65
Panel Wiring

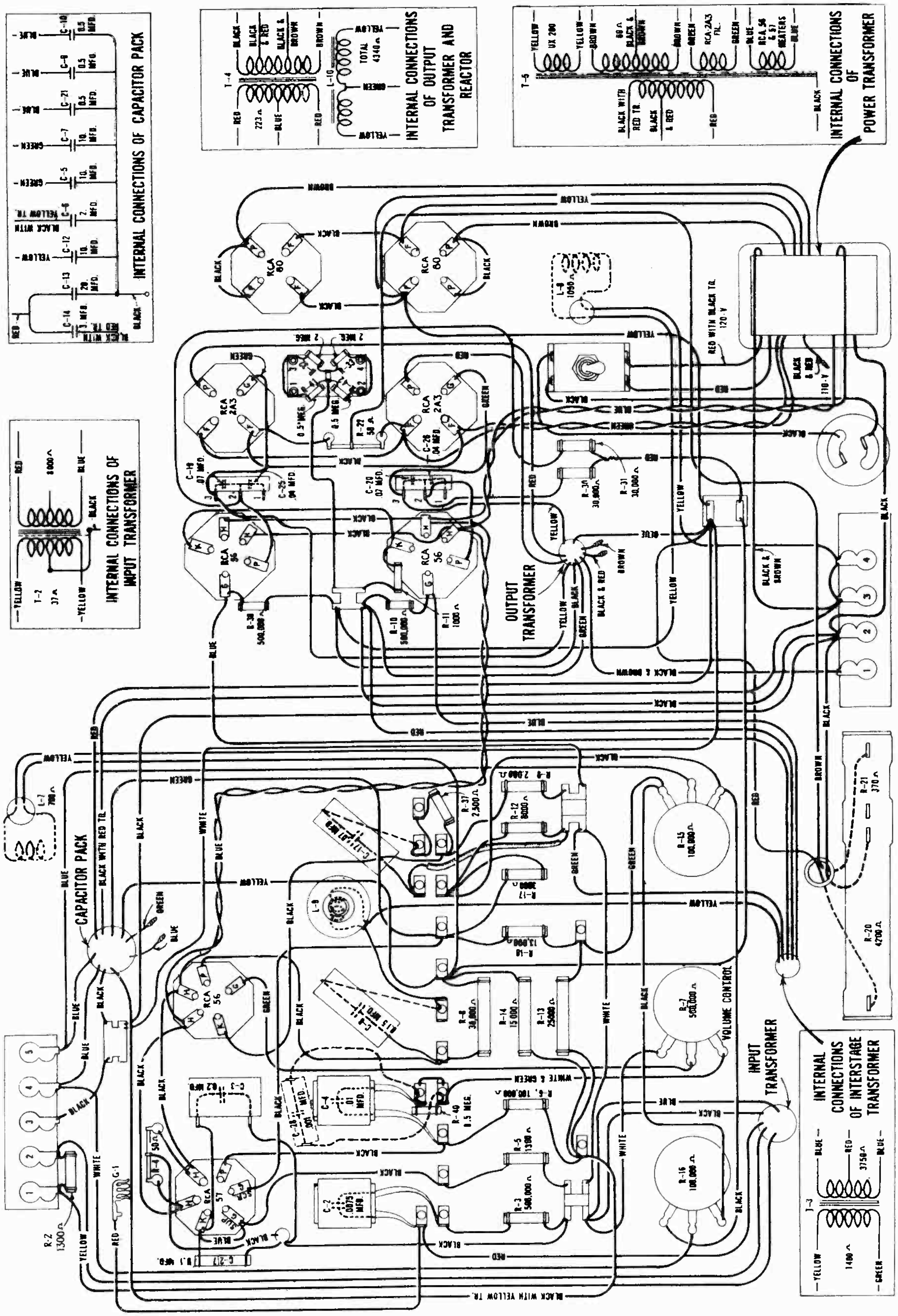


Figure 2—Amplifier Panel Wiring (PB82C1)—Connected for use with 50 inch baffles

RCA-VICTOR CO., INC.

Sealed-Vibrator Test

In order to properly test the new sealed type vibrators, it is essential that certain test specifications be made. The following bench layout and test information will permit proper tests of vibrators for all important qualities except R.F. interference. R.F. interference must be tested by installing the vibrator in the instrument in which it is to be used and making an operating test. No other test for R.F. interference is conclusive.

The bench test set-up shown uses the following material: —

- 2 Six-volt storage batteries
- 3 Transformers, Stock Nos. 9457, 9049, 9430
- 1 Ammeter 0-20 (Low Resistance)
- 1 Voltmeter 0-10
- 1 Voltmeter 0-500 (1000 Ohm per volt)
- 1 7000 Ohm 75-Watt Resistor tapped at 5000 Ohms (10,000 Ohms standard stock size)
- 1 Capacitor, Stock No. 6738
- 1 Bracket

The following tabulation gives the proper transformer, load, resistance and other information for tests:

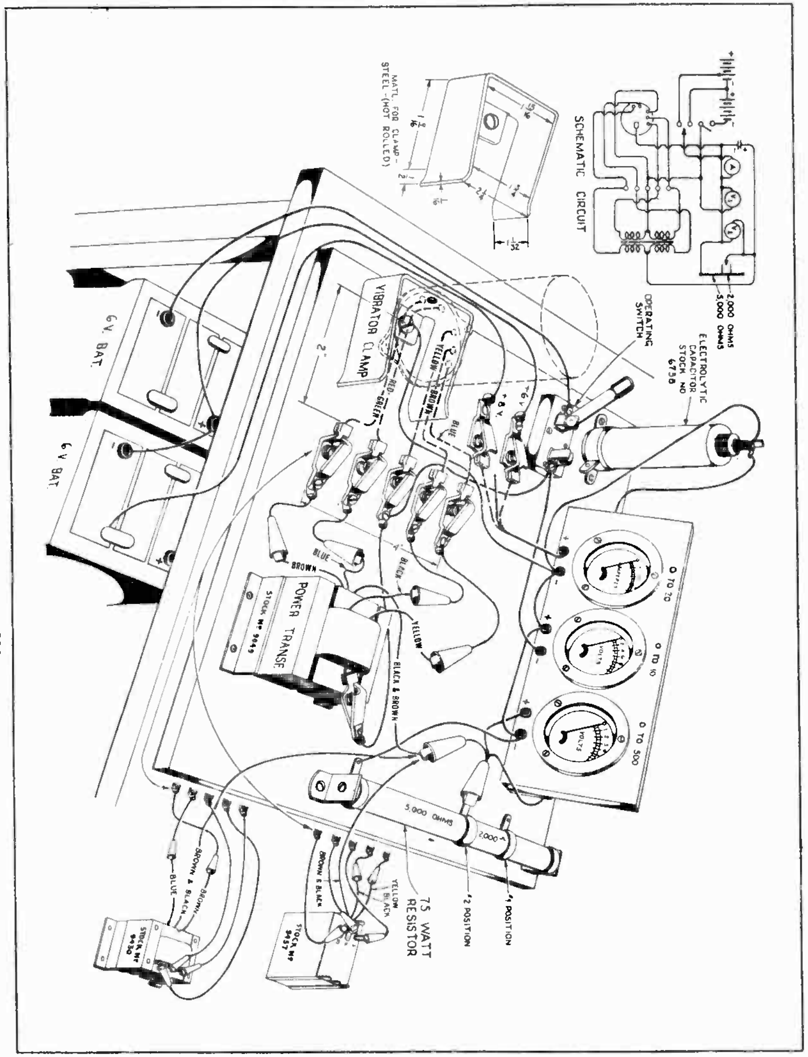
Vibrator Under Test	Transformer To Be Used	Load Resistance (ohms)	Minimum Output Voltage At 6 Volts Input	Maximum Input Current (amperes) 8 Volts
M-34 (7604)	9430	5000	210*	6.25
M-105 (7689)	9049	5000	180*	5.0
M-116 (7694)	9457	7000	240*	5.0

*In event reading is reversed, interchange either green and red or brown and blue vibrator leads.

Using the test set-up shown, proceed as follows: —

1. The vibrator should start every time the circuit is properly connected across the 6-volt section of battery. Check starting by feeling for a slight vibration or listening for vibrator noise.
2. The output voltage should be above the values given in the table.
3. The input current should be below the values given in the table.

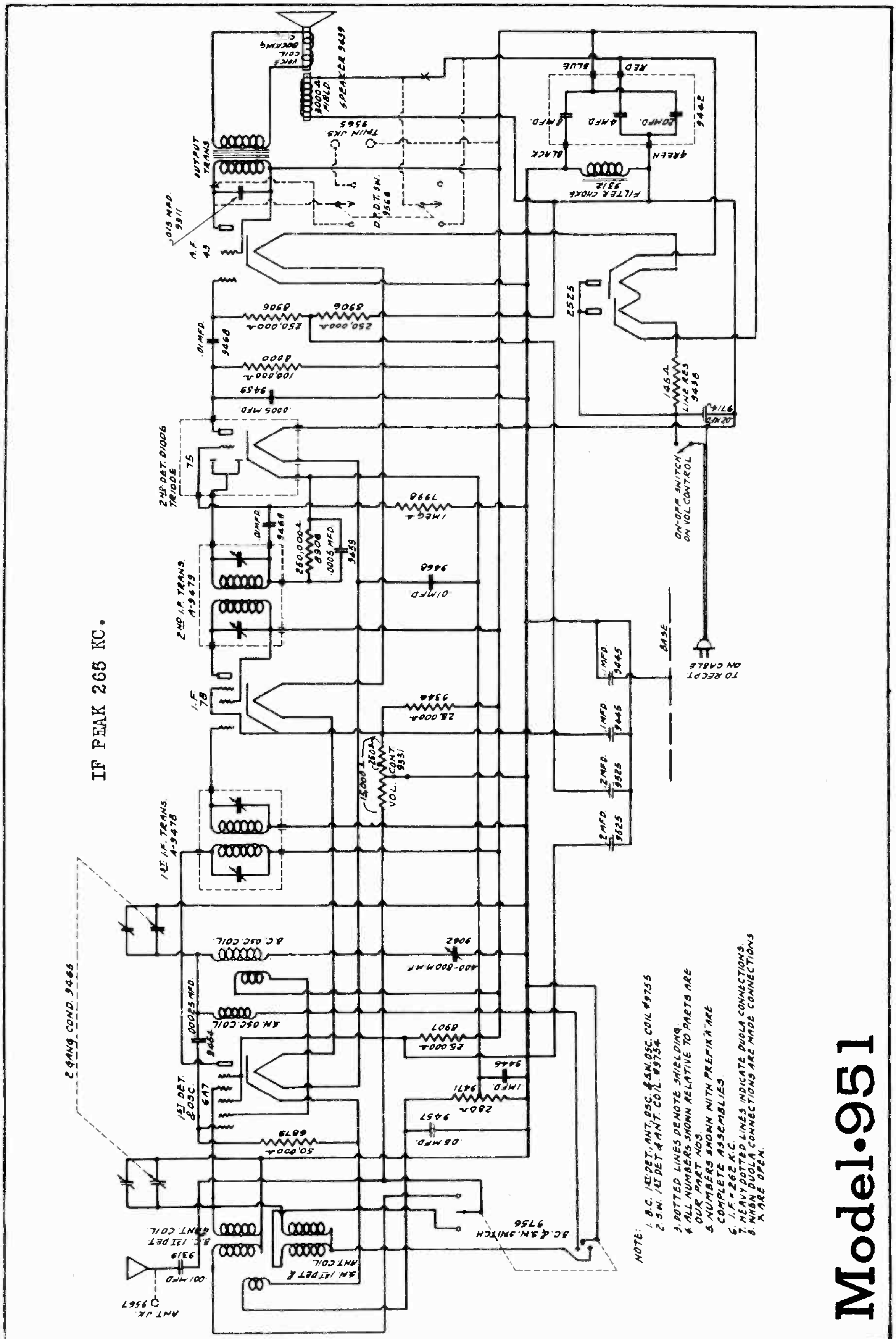
Failure to meet any of these three conditions is sufficient cause for rejection of a unit as defective.



Typical Bench Set-Up for Testing Vibrators

MODEL 951
Schematic

RADOLEK CO.



MODEL 951
Alignment
Voltage

RADOLEK CO.

These service notes pertain to two receivers which are identical with the exception that one model had Duola connections incorporated in it. These connections are shown in the schematic drawing by the dotted lines. Where Duola provisions are provided connections marked "X" on the diagram are open. Receivers with Duola connections may be identified by the Duola switch and two tip jacks located on the back of the chassis. Receivers which do not have the Duola connections do not have the switch (Part #9566) or the tip jacks (Part #9565).

ALIGNMENT: Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE TRANSFORMER ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the grid clip disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. The ground side of the test oscillator should be connected to the gang condenser frame and must not be otherwise grounded.

2. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer trimmer shields.

4. The second IF transformer should next be adjusted in the same manner as the first intermediate transformer.

TO ALIGN THE VARIABLE CONDENSER:

1. Place the band selector switch for operation on the 1500-540 kilocycle band (right hand position) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Next, adjust the trimmer screws of the oscillator and antenna section of the variable condenser to obtain maximum output reading. These trimmers are mounted on the top of the variable condenser.

2. Tune the receiver and set the oscillator frequency to approximately 600 kilocycles. Adjust the 600 kilocycle padding condenser which is located on the rear of and accessible through the small hole in the chassis for maximum output. Be sure to rock the variable condenser slightly to the right and left so as to obtain the position of greatest output.

NOTE: There is no short wave adjustment. After alignment has been properly made in accordance with the instructions given, the dial calibration will be correct and the receiver will properly track on short wave band.

VOLTAGE TABLE

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	OSC. GRID NO.1	ANODE GRID NO.2	SCREEN GRID NO.3 & 5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76
78	Intermediate Frequency	5.1	128	128	2.25			
75	2nd Detector Diode & AVC	5.0	82.5*		2.00			
43	Output	25	115	128	20**			
25Z5	Rectifier	25						

* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

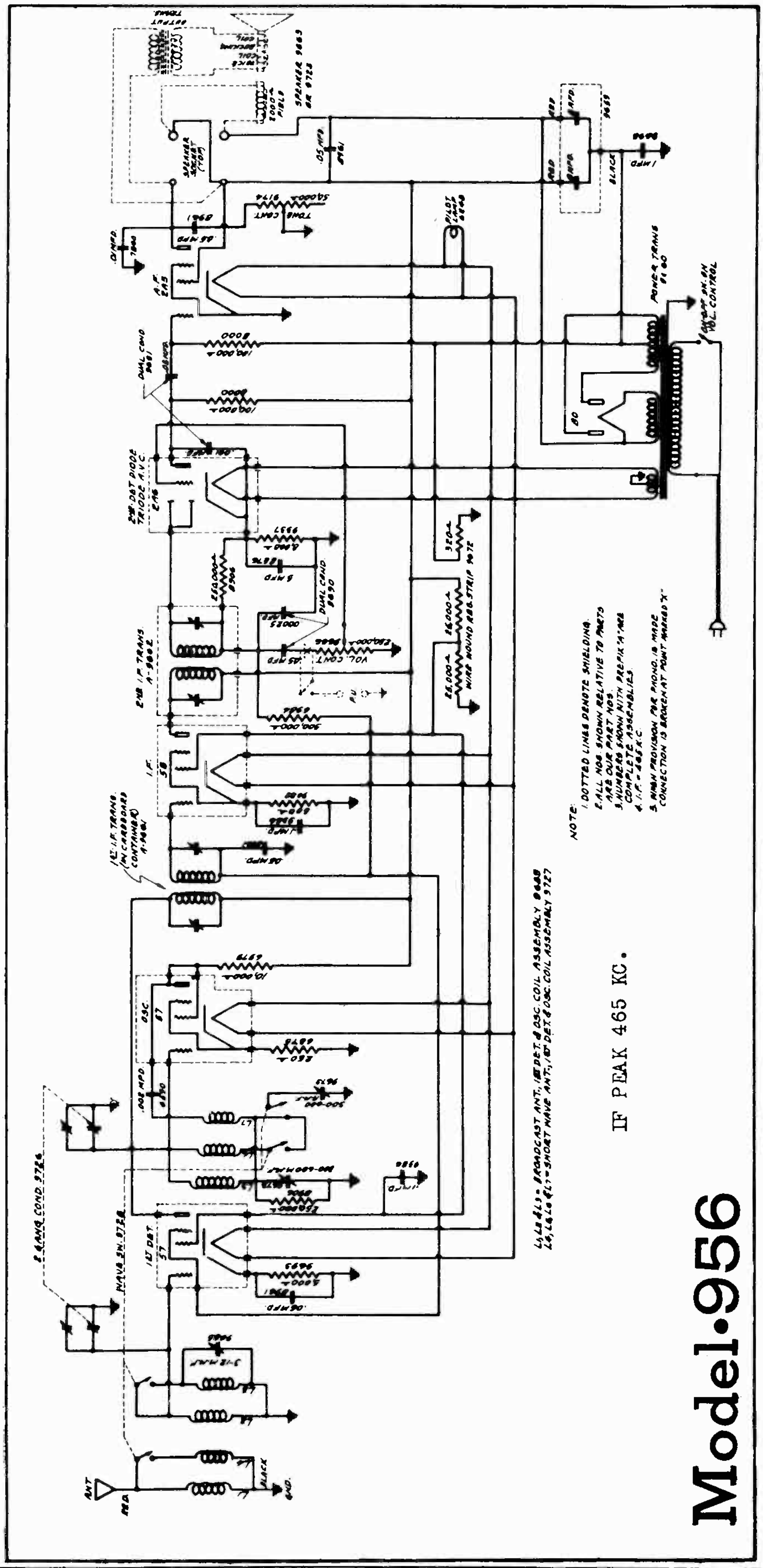
** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

PARTS AND PRICE LIST

PART NUMBER		LIST PRICE
9755	BC Antenna, First Detector, Oscillator & SW Oscillator Coil	$2.14
9754	SW Antenna and First Detector Coil	.74
9478	First IF Transformer	1.38
9479	Second IF Transformer	1.38
9756	Band Selector Switch	.88
9465	Gang Condenser	2.69
9331	Volume Control	1.32
9062	Padding Condenser	.50
9442	Dry Electrolytic Condenser	2.85
9438	Wire Wound Resistor Strip 145 Ohms	.60

MODEL 956
Schematic

RADOLEK CO.



MODEL 956
Alignment
Voltage

RADOLEK CO.

VOLTAGE TABLE:

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I. F.	2.4	230	90	4
2A6 2nd Detector	2.45	160*		3
2A5 A. F.	2.4	218	230	7**
80 Rectifier	4.8	340 ea.plate		

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

Only when the antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the type 57 modulator tube (1st detector) leaving the grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

NOTE: Some of the IF intermediate transformers used do not have the brass hex nut and the trimmer screw inside of the brass hex nut, but have two parallel trimmers which are likewise accessible through two holes provided in the top of the I. F. shield can.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

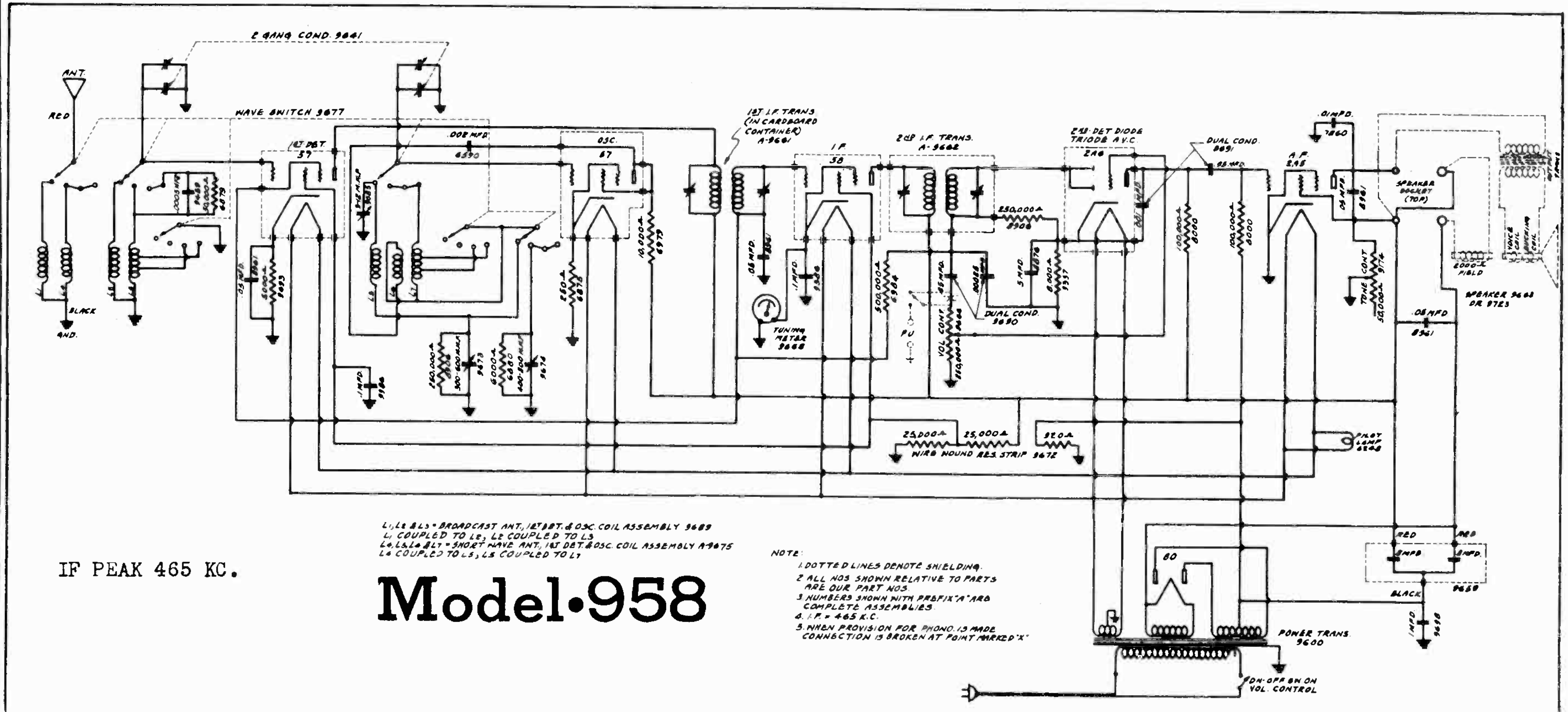
2. Tune the receiver to exactly 1400 kilocycles on the dial, adjust the band selector switch for operation on the broadcast band (1500-540 kilocycles) and set the oscillator to 1400 kilocycles. Then adjust the oscillator variable condenser section trimmer condenser TO BRING THIS SIGNAL IN (maximum output). The oscillator and antenna variable condenser trimmers are mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band, set the oscillator at 600 kilocycles and tune the receiver to approximately 600 kilocycles on the dial. Then adjust the 600 kilocycle padding condenser which is the one located towards the front on the right hand side of the chassis and accessible through the small hole in the chassis for maximum output. It is necessary to rock the condenser slightly to the right and left to obtain the correct position. After aligning the 600 kilocycle padding condenser be sure to recheck the 1400 kilocycle adjustment as the 600 kilocycle alignment may have changed the alignment at 1400 kilocycles.

4. Adjust the short wave switch for operation on 1500 kilocycle to 4500 kilocycle band. Set the oscillator at 4 megacycles and the receiver to 4 megacycles on the dial. Turn the receiver on end and BRING THE 4 MEGACYCLE SIGNAL IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 4 MEGACYCLE TRIMMER located underneath the chassis and adjacent to the band selector switch. Next, tune the receiver to 1600 kilocycles on the dial and set the oscillator frequency to 1600 kilocycles after which adjust the 1600 kilocycle padding condenser which is located on the rear right hand side and accessible through the hole in the chassis for maximum output. It is imperative that after making this adjustment at 1600 kilocycles that the alignment at 4 megacycles be rechecked, as the 1600 kilocycle adjustment may throw the receiver out at 4 megacycles.

RADOLEK CO.

MODEL 958
Schematic
Voltage



IF PEAK 465 KC.

Model•958

TUBE		FIL.	PLATE	SCREEN	CATHODE VOLTS
57	1st Detector	2.4	230	90	4.5
57	Oscillator	2.4	175	175	1.7
58	I.F.	2.4	230	90	4
2A6	Second Detector	2.45	160*		3
2A5	A.F.	2.4	218	230	7**
80	Rectifier	4.8	340 each plate		

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

** Read from grid to chassis.

* Comparative voltage only. The voltmeter when readings are taken at this point is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

MODEL 958
Alignment Data

RADOLEK CO.

TUBE EQUIPMENT: The receiver uses the following tubes:

One (1) type 57 First Detector
One (1) type 57 Oscillator
One (1) type 58 I.F. Amplifier
One (1) type 2A6 Second Detector Diode Triode, AVC.
One (1) type 2A5 Output.

Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the #57 Modulator tube (1st detector), leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the 1st intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second I.F. transformer should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 4 megacycles on the dial and adjust the band selector switch for operation on this band.

   Set the short wave trimmer about one-half the distance between maximum clockwise and counter-clockwise rotation.

   Next set the test oscillator to exactly four megacycles and tune the signal in by adjustingthe oscillator variable condenser trimmer mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band and tune the receiver to 1.6 megacycles on the dial.

   Set the oscillator to exactly 1.6 megacycles.

   Adjust the padding condenser accessible through the hole in the right hand side of the chassis and the closest to the rear of the chassis to obtain maximum output reading. After making this adjustment recheck the alignment at 4 megacycles. It is advisable to recheck the 1.6 and 4 megacycle adjustment several times.

4. Adjust the band selector switch for operation on the broadcast band.

   Tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency.

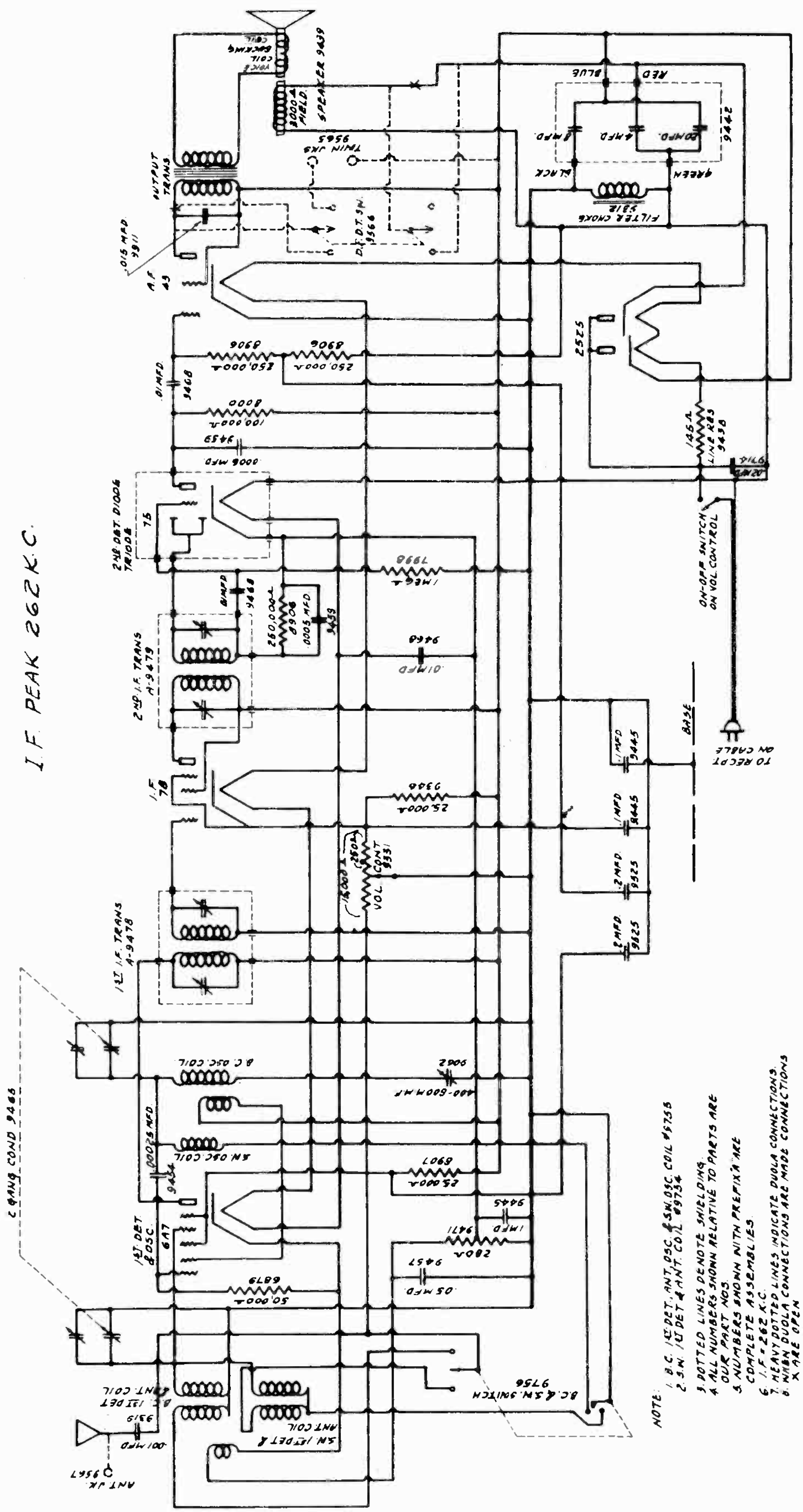
   Turn the receiver on end and adjust the trimmer screw on the small trimmer located adjacent to the short-wave switch underneath the chassis for maximum signal after which adjust the antenna variable condenser trimmer mounted on top of the variable condenser for maximum signal strength.

5. Leave the band selector switch for operation on the broadcast band and tune the receiver to approximately 600 kilocycles and adjust the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser which is located on the righthand side next to the 1.6 megacycle padding condenser for maximum output reading. As this adjustment is quite critical it is necessary to rock the condenser slightly to obtain maximum sensitivity.

   NOTE: Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles and the 600 kilocycle adjustment after aligning at 1400 kilocycles. All short-wave bands are properly aligned after correctly aligning at 4 megacycles.

MODEL 10951
Schematic

RADOLEK CO.



MODEL 10951
Alignment, Voltage

RADOLEK CO.

These service notes pertain to two receivers which are identical with the exception that one model had Duola connections incorporated in it. These connections are shown in the schematic drawing by the dotted lines. Where Duola provisions are provided connections marked "X" on the diagram are open. Receivers with Duola connections may be identified by the Duola switch and two tip jacks located on the back of the chassis. Receivers which do not have the Duola connections do not have the switch (Part #9566) or the tip jacks (Part #9565).

ALIGNMENT: Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE TRANSFORMER ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the grid clip disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. The ground side of the test oscillator should be connected to the gang condenser frame and must not be otherwise grounded.

2. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer trimmer shields.

4. The second IF transformer should next be adjusted in the same manner as the first intermediate transformer.

TO ALIGN THE VARIABLE CONDENSER:

1. Place the band selector switch for operation on the 1500-540 kilocycle band (right hand position) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Next, adjust the trimmer screws of the oscillator and antenna section of the variable condenser to obtain maximum output reading. These trimmers are mounted on the top of the variable condenser.

2. Tune the receiver and set the oscillator frequency to approximately 600 kilocycles. Adjust the 600 kilocycle padding condenser which is located on the rear of and accessible through the small hole in the chassis for maximum output. Be sure to rock the variable condenser slightly to the right and left so as to obtain the position of greatest output.

NOTE: There is no short wave adjustment. After alignment has been properly made in accordance with the instructions given, the dial calibration will be correct and the receiver will properly track on short wave band.

VOLTAGE TABLE

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	OSC. GRID NO.1	ANODE GRID NO.2	SCREEN GRID NO.3 & 5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76
78	Intermediate Frequency	5.1	128	128	2.25			
75	2nd Detector Diode & AVC	5.0	82.5*		2.00			
43	Output	25	115	128	20**			
25Z5	Rectifier	25						

* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

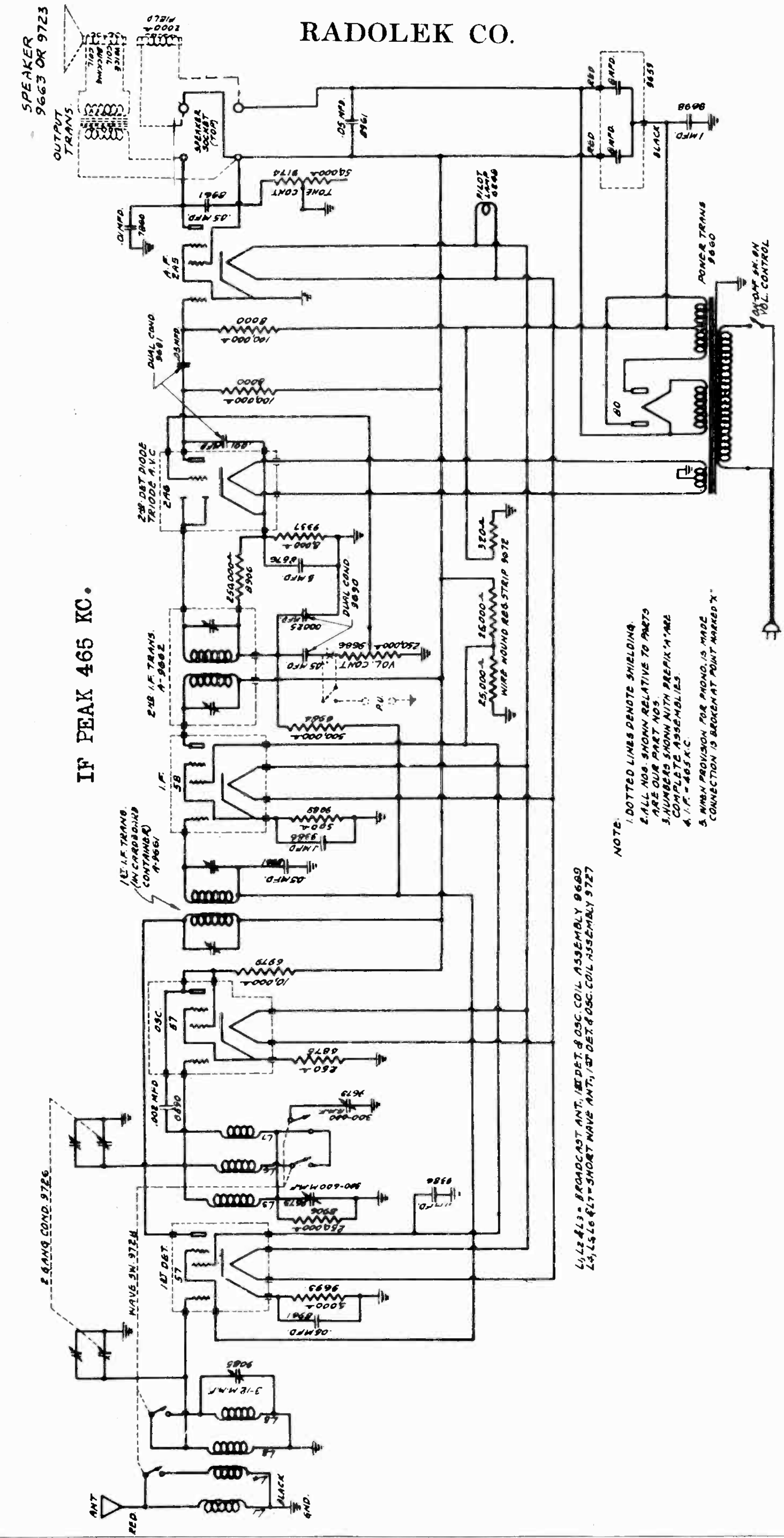
** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

PARTS AND PRICE LIST

PART NUMBER	
9755	BC Antenna, First Detector, Oscillator & SW Oscillator Coil
9754	SW Antenna and First Detector Coil
9478	First IF Transformer
9479	Second IF Transformer
9658	Power Transformer (110 Volt A.C. only)
9465	Gang Condenser
9331	Volume Control
9062	Padding Condenser
9442	Dry Electrolytic Condenser
9023	6 Volt Pilot Light (110 Volt D.C. only)
9083	.01 Mfd. Condenser (110 Volt D.C. only)
9569	8 Mfd. Condenser (110 Volt A.C. only)
9196	25 Mfd. Condenser
9459	.0005 Mfd. Moulded Condenser
9319	.001 Mfd. Moulded Condenser
9454	.00025 Mfd. Moulded Condenser
9465	.01 Mfd. 400 Volt Condenser
9445	.1 Mfd. 200 Volt Condenser
9525	.2 Mfd. 200 Volt Condenser
9417	.02 Mfd. 400 Volt Condenser
9457	.05 Mfd. 400 Volt Condenser
9911	.015 Mfd. 400 Volt Condenser
8906	200,000 Ohm 1/3 Watt Resistor
8000	100,000 Ohm 1/3 Watt Resistor
8907	25,000 Ohm 1/3 Watt Resistor
7998	1 Meg Ohm 1/3 Watt Resistor
6879	50,000 Ohm 1/3 Watt Resistor
9346	25,000 Ohm 1/2 Watt Resistor

MODEL 10956
Schematic

RADOLEK CO.



MODEL 10956
Alignment, Voltage

RADOLEK CO.

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I. F.	2.4	230	90	4
2A6 2nd Detector	2.45	160*		3
2A5 A. F.	2.4	218	230	7**
80 Rectifier	4.8	340 ea.plate		

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

Only when the antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the type 57 modulator tube (1st detector) leaving the grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

NOTE: Some of the IF intermediate transformers used do not have the brass hex nut and the trimmer screw inside of the brass hex nut, but have two parallel trimmers which are likewise accessible through two holes provided in the top of the I. F. shield can.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 1400 kilocycles on the dial, adjust the band selector switch for operation on the broadcast band (1500-540 kilocycles) and set the oscillator to 1400 kilocycles. Then adjust the oscillator variable condenser section trimmer condenser TO BRING THIS SIGNAL IN (maximum output). The oscillator and antenna variable condenser trimmers are mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band, set the oscillator at 600 kilocycles and tune the receiver to approximately 600 kilocycles on the dial. Then adjust the 600 kilocycle padding condenser which is the one located towards the front on the right hand side of the chassis and accessible through the small hole in the chassis for maximum output. It is necessary to rock the condenser slightly to the right and left to obtain the correct position. After aligning the 600 kilocycle padding condenser be sure to recheck the 1400 kilocycle adjustment as the 600 kilocycle alignment may have changed the alignment at 1400 kilocycles.

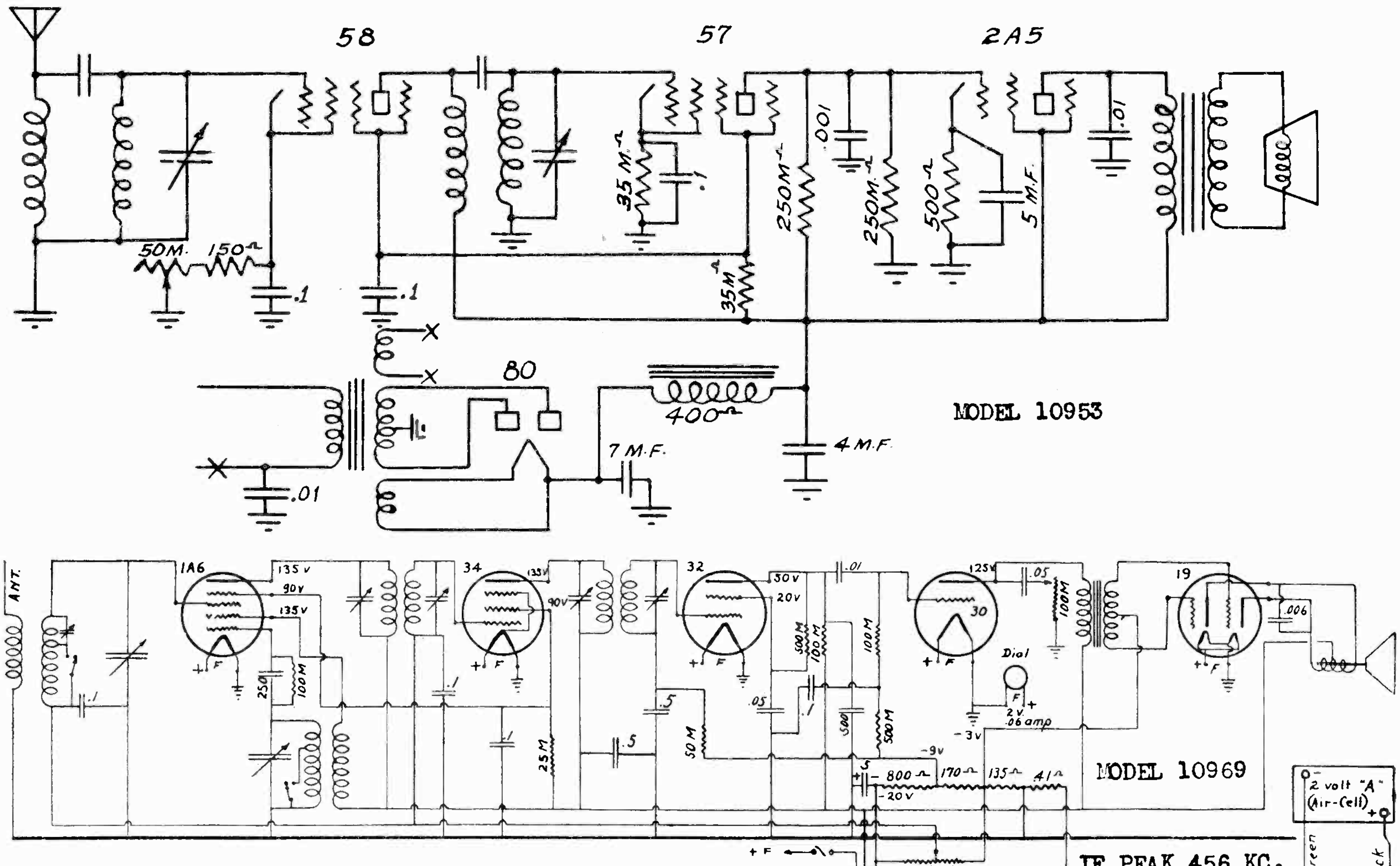
4. Adjust the short wave switch for operation on 1500 kilocycle to 4500 kilocycle band. Set the oscillator at 4 megacycles and the receiver to 4 megacycles on the dial. Turn the receiver on end and BRING THE 4 MEGACYCLE SIGNAL IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 4 MEGACYCLE TRIMMER located underneath the chassis and adjacent to the band selector switch.

Next, tune the receiver to 1600 kilocycles on the dial and set the oscillator frequency to 1600 kilocycles after which adjust the 1600 kilocycle padding condenser which is located on the rear right hand side and accessible through the hole in the chassis for maximum output. It is imperative that after making this adjustment at 1600 kilocycles that the alignment at 4 megacycles be rechecked, as the 1600 kilocycle adjustment may throw the receiver out at 4 megacycles.

9666	Volume Control	8980	Tube Shield
9174	Tone Control	9083	Tube Shield Caps
9767	Dial	9386	.1 Mfd. 200 Volt Condenser
9726	Two Gang Condenser	8961	.05 Mfd. 400 Volt Condenser
9671	Pilot Light Socket	6590	.002 Mfd. 400 Volt Condenser
9660	Power Transformer	7860	.01 Mfd. 400 Volt Condenser
9659	2-8 Mfd. Electrolytic Cond	9690	.00025 Mfd. & .05 Mfd. Dual 400 Volt Cond
8876	5 Mfd. Electrolytic Cond	9691	.05 Mfd. & .001 Mfd. Dual 400 Volt Cond
9673	Padding Condenser	9698	1 Mfd. 100 Volt Condenser
9799	Trimmer Condenser	6976	10,000 Ohm 1/3 Watt Resistor
9672	Wire Wound Resistance Strip	9693	5,000 Ohm 1/3 Watt Resistor
9642	No. 80 Tube Socket	8000	100,000 Ohm 1/3 Watt Resistor
9643	Speaker Socket	8906	250,000 Ohm 1/3 Watt Resistor
9644	2A5 Socket	6875	250 Ohm 1/3 Watt Resistor
9645	2A6 Socket	6984	500,000 Ohm 1/3 Watt Resistor
9646	58 Socket	9337	8,000 Ohm 1/3 Watt Resistor
9647	57 Socket	9089	500 Ohm 1/3 Watt Resistor
9063	Tube Shield Base		

MODEL 10953
Schematic
MODEL 10969
Schematic,
Service Data

RADOLEK CO.



CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

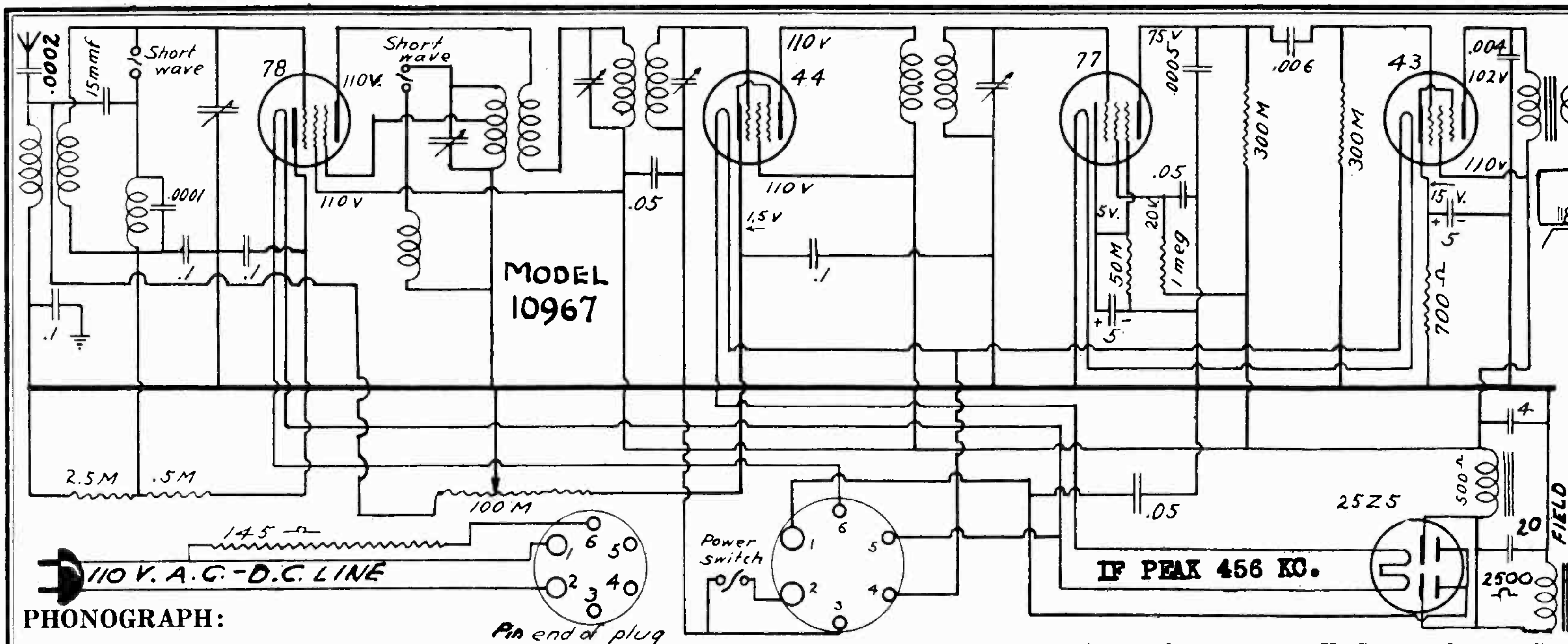
INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.

SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

MODEL 10962
Schematic, Voltage
MODEL 10967
Schematic, Alignment
Voltage

RADOLEK CO.



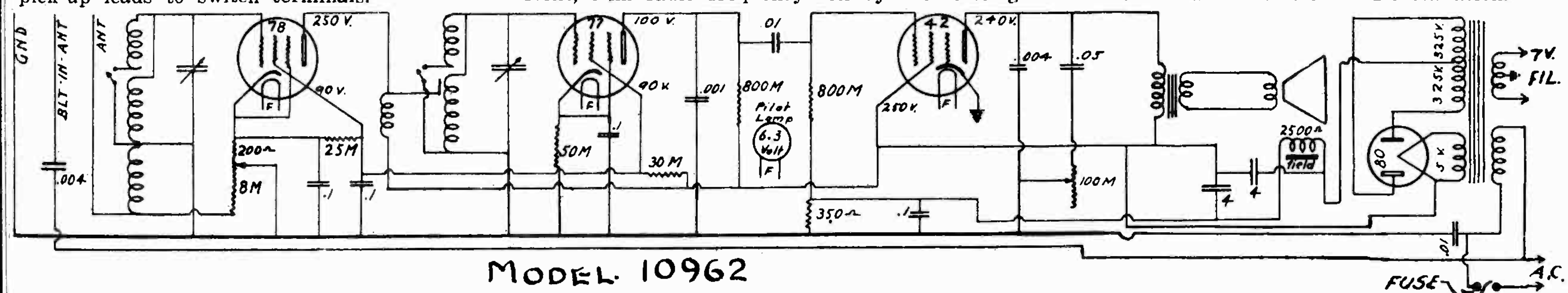
PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

SERVICE NOTES:

To balance set remove from cabinet. Intermediates are first balanced. Feed a 456 K. C. signal into grid of 78 tube. Adjust double and single trimmers through rear flange of chassis. Next, trim radio frequency coil by first setting tuning condenser to 1400 K. C. on dial, carefully remove from cabinet and attach test oscillator to antenna lead and feed 1400 K. C. signal to antenna coil. Adjust trimmers on tuning condenser to loudest signal.

If used in automobile, antenna stage should be trimmed to car antenna at time of installation.

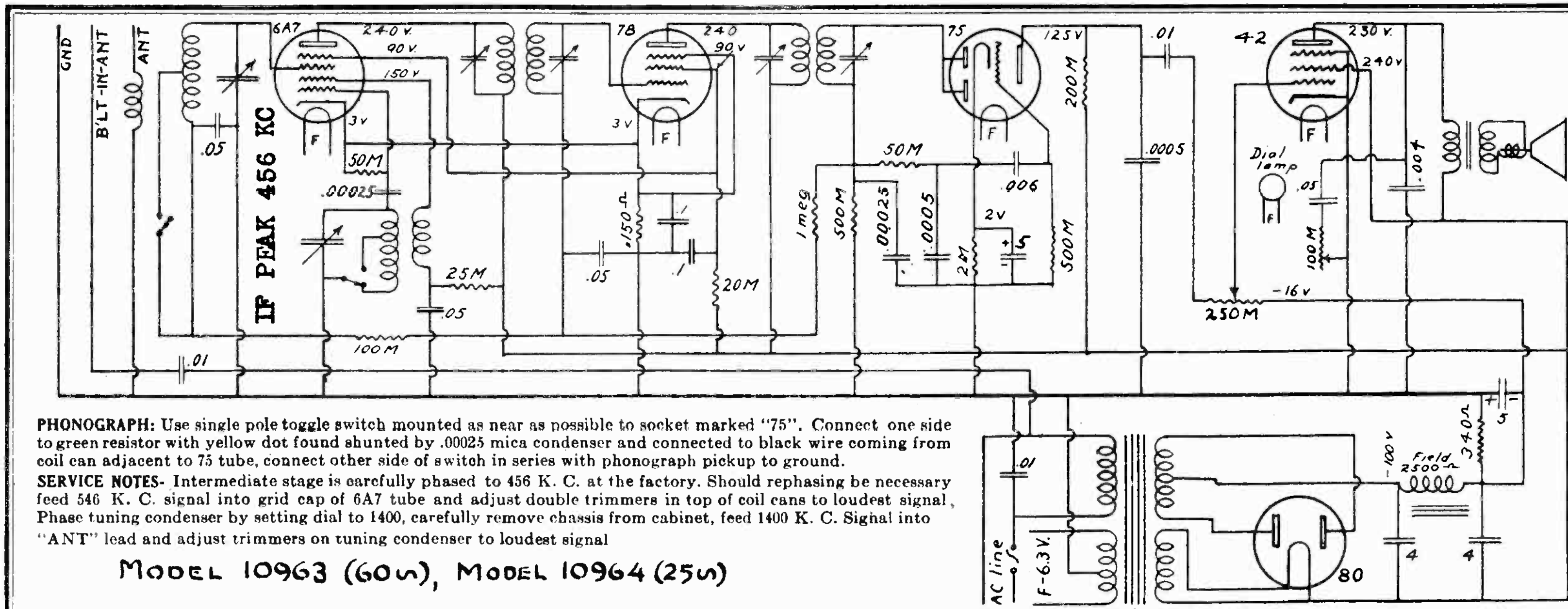


PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SERVICE NOTES: To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.

RADOLEK CO.

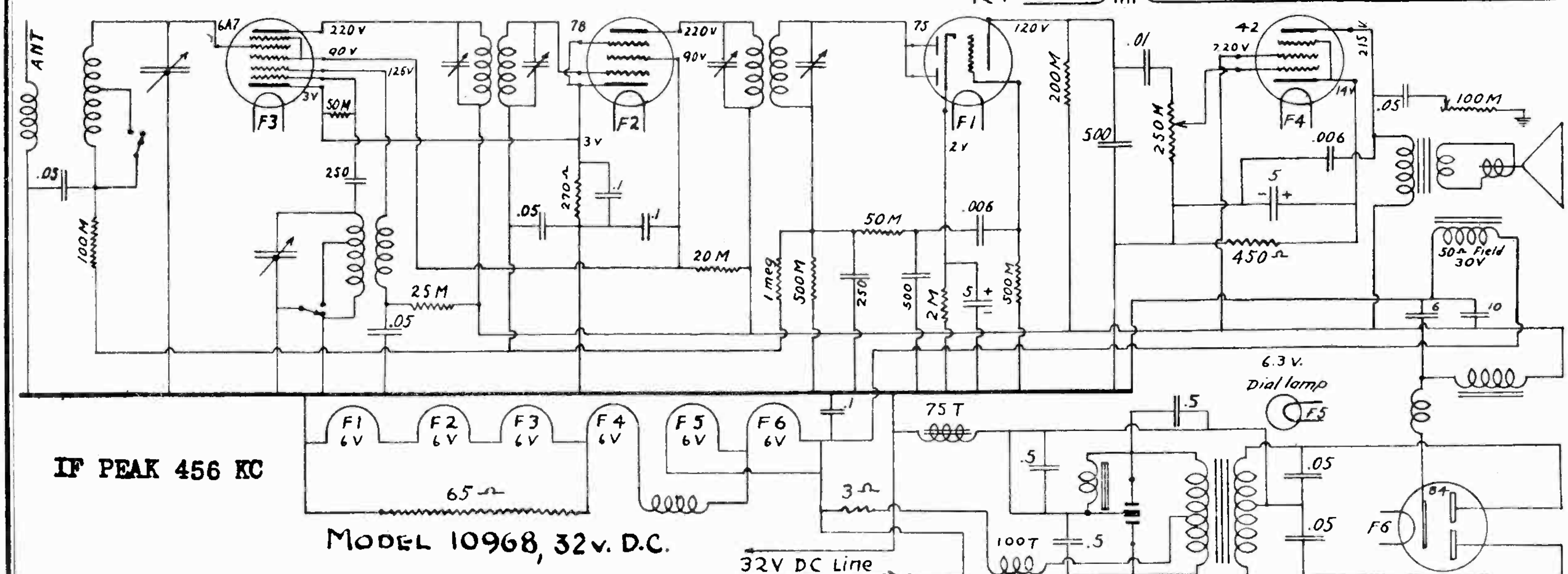
MODEL 10963 (60 Cycles)
MODEL 10964 (25 Cycles)
MODEL 10968 (32 v. DC.)
Schematic, Voltage Alignment Data



PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal, Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

MODEL 10963 (60~), MODEL 10964 (25~)



IF PEAK 456 KC

MODEL 10968, 32v. D.C.

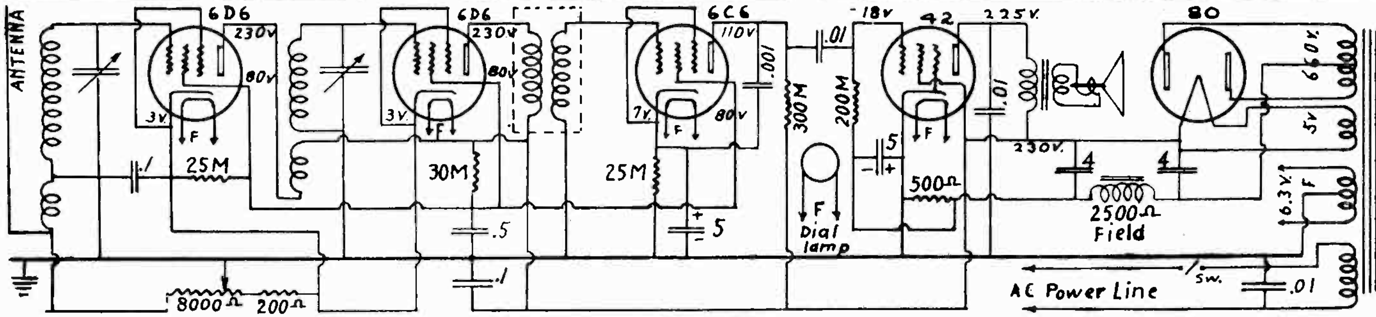
PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

MODEL 10966
Schematic, Voltage
MODEL 10970
Schematic, Voltage
Alignment Data

RADOLEK CO.

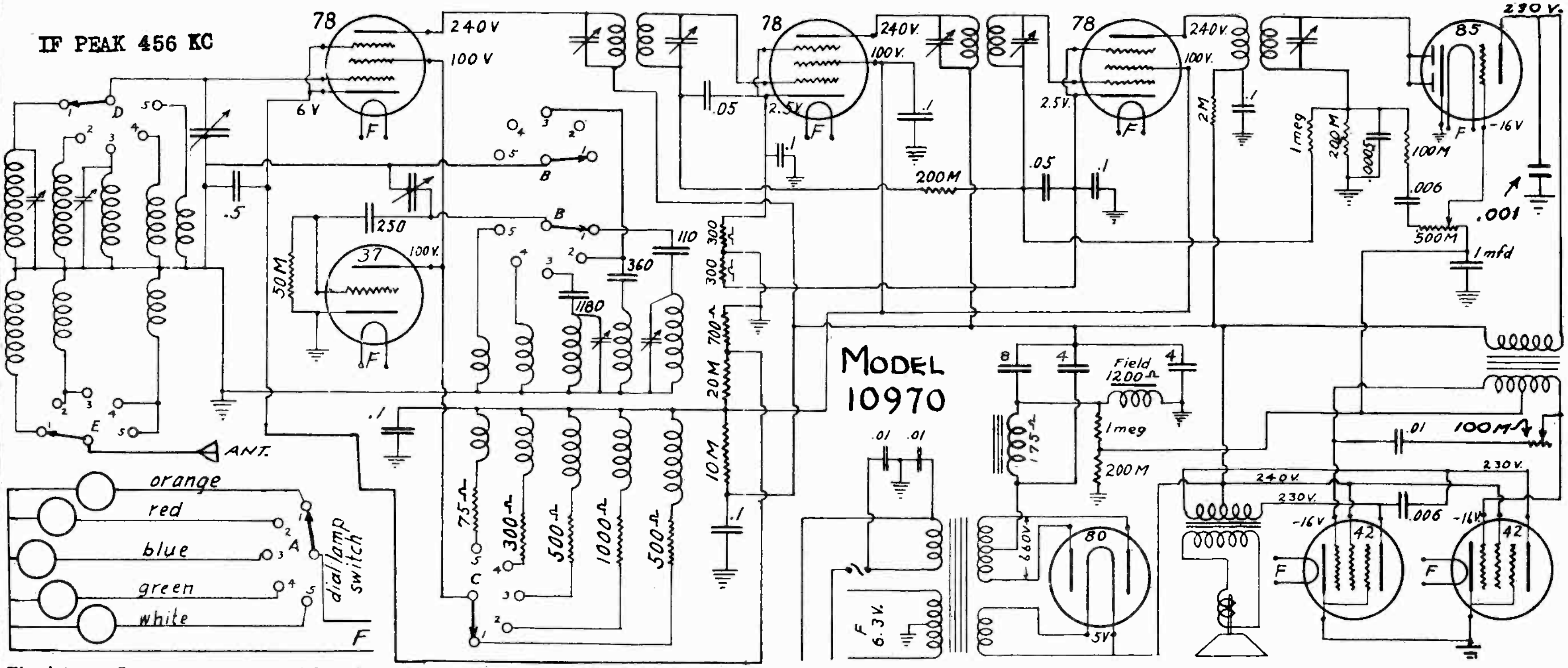
MODEL 10966



PHONOGRAPH: Mount single pole toggle switch at any convenient point on rear flange of chassis, disconnect 5 mfd. condenser from "cathode" of 6C6 socket and connect it to one side of switch, connect other side of switch to "cathode" of socket and connect phonograph across switch.

IF PEAK 456 KC

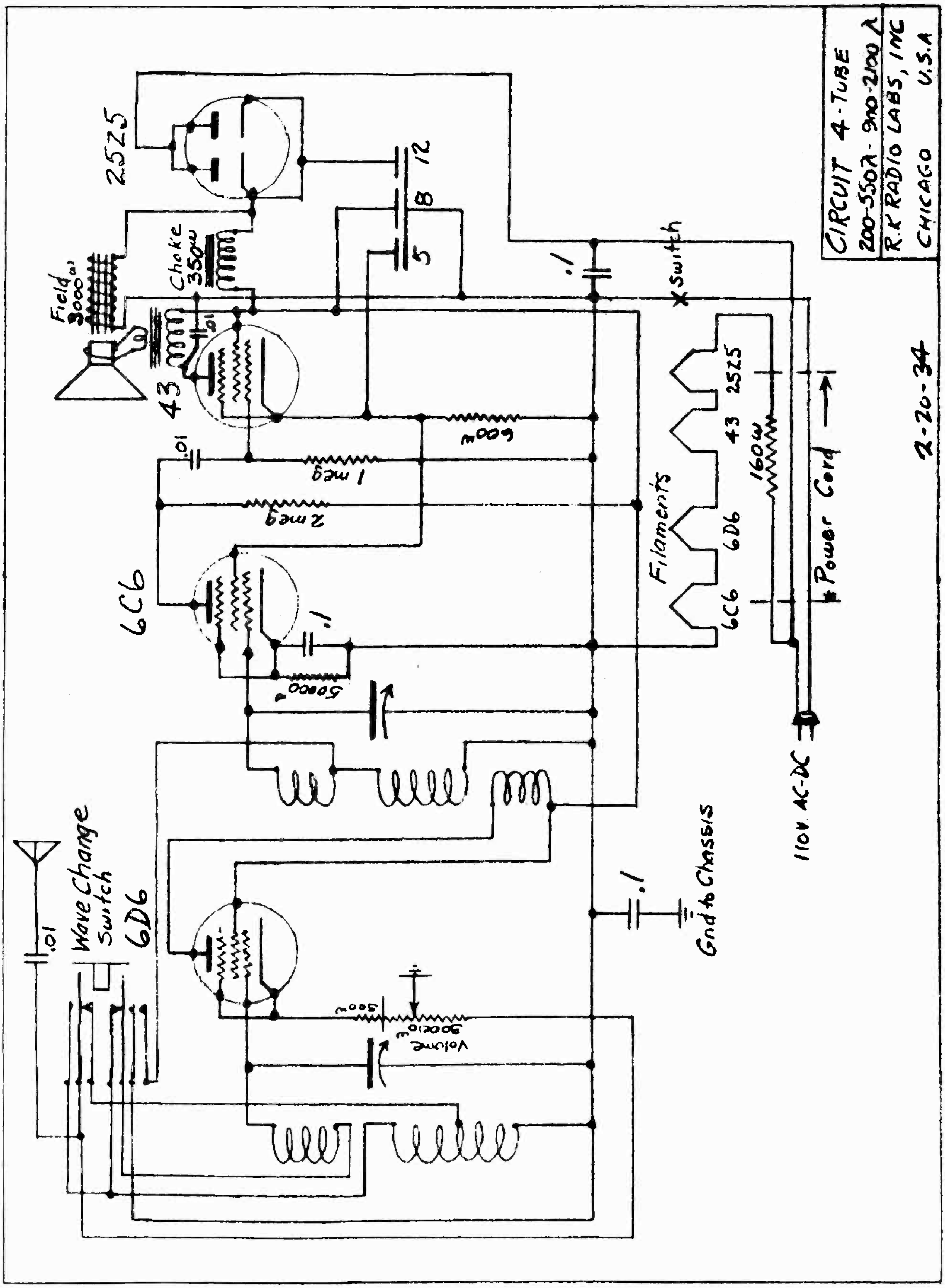
MODEL 10970



The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

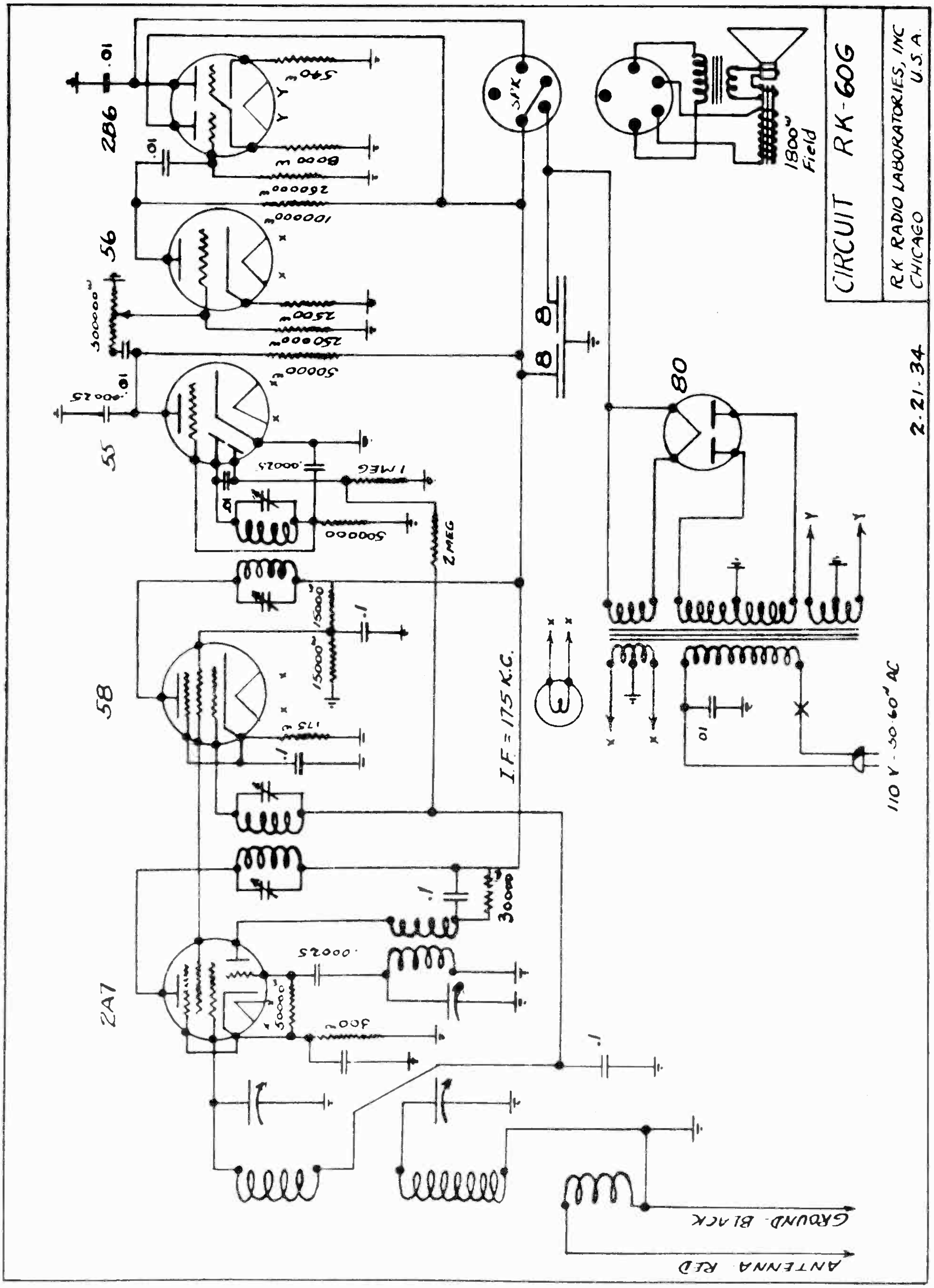
MODEL 4-Tube
Schematic

RK RADIO LABORATORIES, INC.



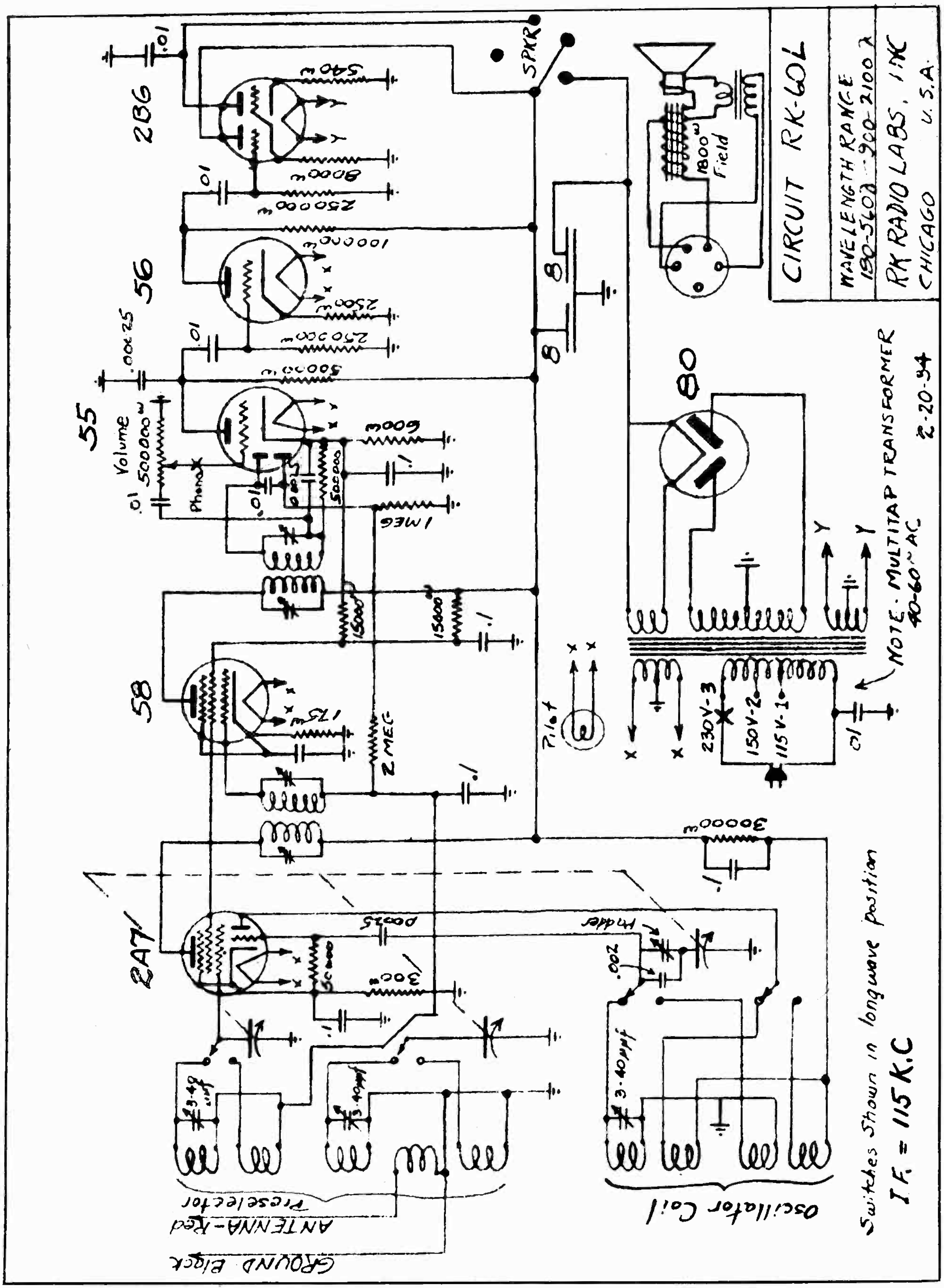
MODEL RK-60 G
Schematic

RK RADIO LABORATORIES, INC.



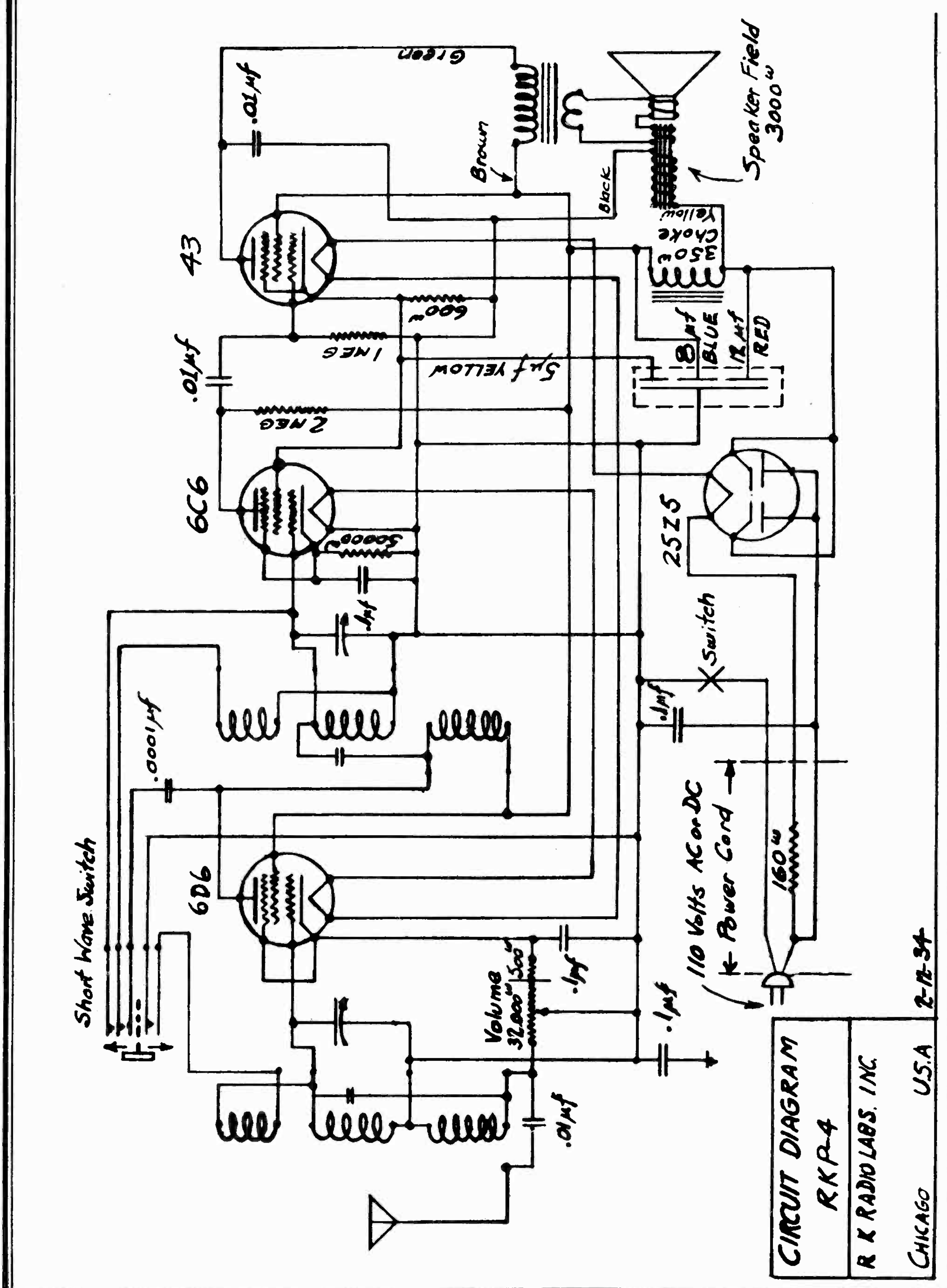
MODEL RK-60 L
Schematic

RK RADIO LABORATORIES, INC.



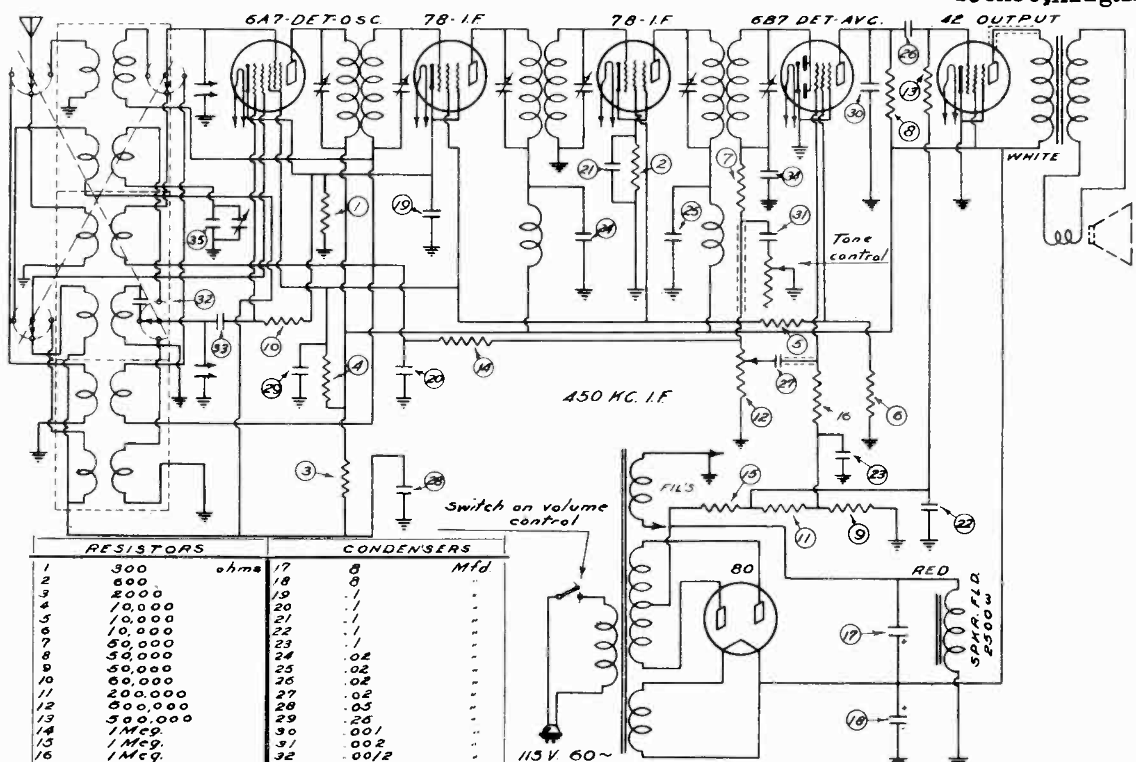
MODEL RKP-4
Schematic

RK RADIO LABORATORIES, INC.



MODEL 10-4
Schematic, Voltage Socket, Alignment

REMLER COMPANY, LTD.



RESISTORS			CONDENSERS		
1	300	ohms	17	8	Mfd
2	600		18	8	"
3	2000		19	.1	"
4	10,000		20	.1	"
5	10,000		21	.1	"
6	10,000		22	.1	"
7	50,000		23	.1	"
8	50,000		24	.02	"
9	50,000		25	.02	"
10	60,000		26	.02	"
11	200.000		27	.02	"
12	500,000		28	.05	"
13	500.000		29	.25	"
14	1 Meg.		30	.001	"
15	1 Meg.		31	.002	"
16	1 Meg.		32	.0012	"
			33	.00008	"
			34	.0003	"
			35	.0003	"

INSTALLATION:

This set is designed to operate from a 110 to 125 volt, 50 or 60 cycle alternating current supply.

An outdoor antenna should be used, having a length of from 60 to 100 feet. The antenna should be kept clear of all metal objects, such as pipes and electric circuits. This also applies to the lead-in wire. Shielded wire should not be used for the lead-in. Connect the lead-in to the red wire extending from the back of the set. The ground connection should be made to the black wire. This lead should be as short as possible and preferably connected to a cold water pipe, scraped clean, and a ground clamp used.

Loosen the chassis hold-down screws one turn when installing the set.

The knob on the left controls the volume and also operates the ON and OFF switch.

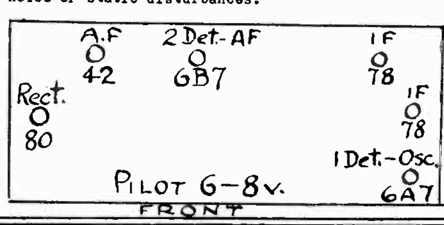
The center knob controls the station selector, or tuning. This knob operates through a DUAL-RATIO reducing mechanism. When pressed in, the ratio is three and a half to one. This position may be used on the broadcast band, or when it is desired to turn quickly from one band to another. When the knob is pulled out, a ratio of seventeen to one is obtained. This position should be used for tuning on the short wave bands.

The dial is divided into three ranges. The outer range is from 540 to 1900 kilocycles, and is calibrated in tens of kilocycles, or broadcast channels. The bands included in this range are: the regular broadcast band from 540 to 1500 K.C., the police band from 1534 to 1712 K.C., and amateurs from 1715 to 1900 K.C. The middle range covers from 1900 to 6400 K.C. This range includes: amateurs 1900 to 2000 K.C., police stations 2308 to 2490 K.C., aviation 2608 to 3485 and 4110 to 5700 K.C., amateurs 3500 to 4000 K.C., and short wave broadcast 6010 to 6150 K.C. This range is calibrated in hundreds of kilocycles.

The inner range covers the higher frequency bands, extending from 6 to 18 megacycles (6000 to 18,000 kilocycles).

The principal short wave broadcast ranges included are: 6 to 6.15 megacycles, 9.5 to 9.6 megacycles, 11.7 to 11.9 megacycles, 15.1 to 15.35 megacycles, and 17.7 to 17.8 megacycles. Amateur phone transmissions may be tuned in from 14 to 14.4 megacycles. This range on the dial is marked in megacycles, which are thousands of kilocycles. The knob on the right controls the range switch and the pointer, which automatically indicates the range position on the dial.

A continuous type tone control is adjustable from the back of the receiver. This may be adjusted to modify the tone or to reduce noise or static disturbances.



SERVICE DATA:

This is a six tube superheterodyne receiver with automatic volume control. The following tubes are used:

- 6A7 Converter (mixer-oscillator)
- 78 Super-control amplifier, 1st I.F. stage
- 78 Super-control amplifier, 2nd I.F. stage
- 6B7 Diode detector - AF amplifier, Av.C.
- 42 Power amplifier
- 80 Full wave rectifier
- Dial light 6-8 volt Mazda 50

The oscillator, antenna, and mixer coils are wound on the same form for each band. The short wave coils are mounted directly on the switch together with the trimmer capacities. A variable series trimmer is provided for the broadcast band oscillator circuit. This is accessible from the bottom of the chassis, and is mounted near the broadcast oscillator coil. The I.F. transformers are in the aluminum shields mounted on top of the chassis. The trimmers for these coils may be adjusted from the tops of the shields. The intermediate frequency is 450 kilocycles. Use a weak signal or oscillator input when adjusting the trimmers.

In removing the chassis from the cabinet, take the set screw, spring and brass pin from the tuning knob so that it may be removed from the shaft. The switch and volume knobs may be removed by prying with a wooden screw driver with a piece of cardboard against the cabinet.

Voltage readings for servicing purposes follow:

A. C. VOLTAGES:

Line	120 volts
Filaments - 6A7, 78s, 6B7 and 42	6.3 "
Filaments - 80	5.2 "

D. C. VOLTAGES: (No signal)

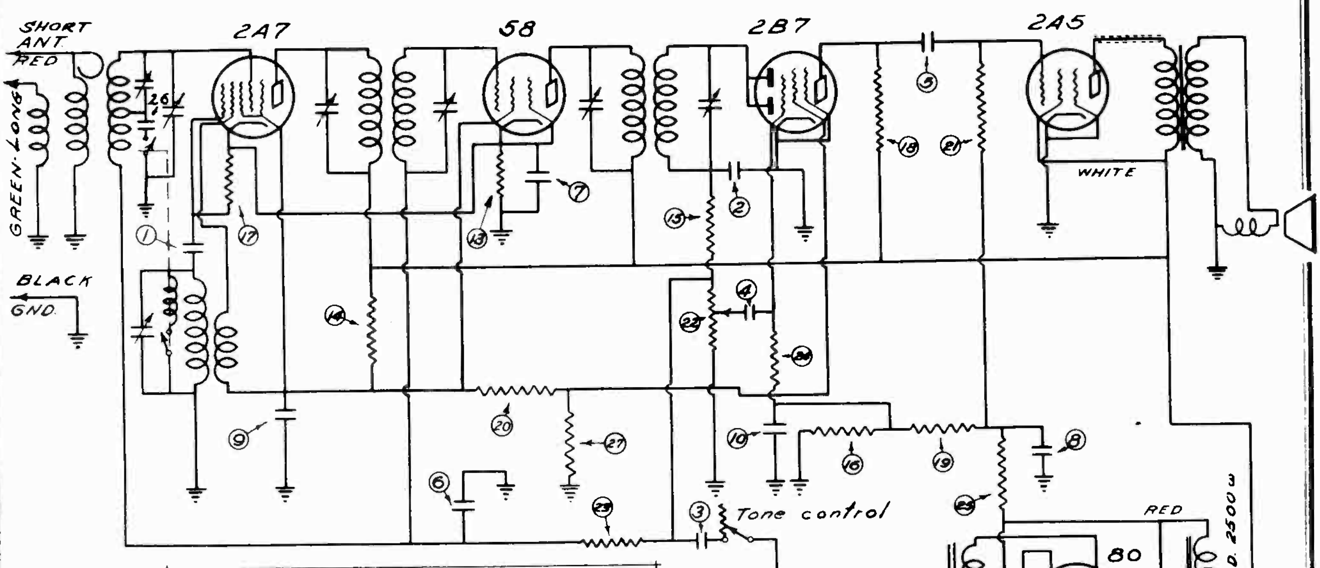
From ground to:

80 Rectifier filament	240 volts
42 Plate	230 "
42 Screen grid	240 "
42 Grid	17 "
6B7 Plate	165 "
6B7 Screen grid	70 "
6B7 Grid	4 "
78 2nd I.F. plate	240 "
78 2nd I.F. screen grid	125 "
78 2nd I.F. cathode	4.5 "
78 1st I.F. plate	240 "
78 1st I.F. screen grid	125 "
78 1st I.F. cathode	6 "
6A7 Plate (mixer)	240 "
6A7 Screen grid	125 "
6A7 Cathode	6 "
6A7 Plate (oscillator)	220 "
Speaker field (red lead)	115 "

Due to current taken by voltmeter used, readings of 6B7 and 42 grid voltages will be less than those above.

MODEL 21-4
Schematic
Voltage, Alignment

REMLER COMPANY, LTD.



CONDENSERS		RESISTORS	
1	.00008 MF	13	300 ohms
2	.0003	14	15,000
3	.002	15	50,000
4	.02	16	50,000
5	.02	17	60,000
6	.1	18	50,000
7	.1	19	200,000
8	.1	20	50,000
9	.25	21	500,000
10	.1	22	500,000
11	8.	23	1,000,000
12	8.	24	1,000,000
26	.002	25	1,000,000
		27	50,000

REMLER MODEL #21-4

This radio receiver is of the superheterodyne type with automatic volume control.

TUBES:

- 2A7 - Converter (mixer - oscillator)
- 58 - I. F. amplifier
- 2B7 - Diode detector - audio amplifier
- 2A5 - Power amplifier
- 80 - Rectifier
- Dial light, 3.8 volt

INSTALLATION:

This set is designed to operate from a power supply of 110 to 125 volts, 50 or 60 cycle alternating current.

Two antenna connections are provided. The red wire should be connected when the antenna is less than 100 feet in length, and the green wire should be used when the antenna is longer. A good ground connection to the black lead is necessary for best results.

CONTROLS:

The knob at left controls the volume and also operates the ON and OFF switch.

The knob in the center is the station selector. The dial is calibrated in kilocycles for both broadcast and short wave bands. The tone control is operated by the knob on the right. The short wave switch is located on the back of the chassis. In the long wave or broadcast position the receiver covers a band from 540 to 1750 kilocycles. When the switch is moved to the right, or short wave position, the receiver covers from 1700 to 4500 kilocycles. This band includes police, amateur and airport stations as indicated on the dial. The lower frequency band for police calls is from 1714 to 1500 kilocycles. This range is covered with the switch moved to the left or normal broadcast position.

SERVICE DATA:

The antenna and mixer coils are in the aluminum shield nearest the back of the chassis. The trimmer condenser, adjustable through the top of the shield, is for trimming the high frequency end of the short wave position. Trimmers for the broadcast band are located on the variable condenser.

The shield nearest the **front** of the chassis contains the oscillator coil and first I.F. transformer. The trimmers for this transformer are at the top of this shield.

The second I.F. transformer is within the chassis and is trimmed by the condensers mounted thereon. The intermediate frequency is 450 kilocycles.

A. C. VOLTAGES:

Line	- 120 volts
Filaments - 2A7, 58, 2B7 and 2A5	2.5 "
" - 80	5.2 "

D. C. VOLTAGES:

From ground to:

80 Rectifier filament	- 250 volts
2A5 Plate	235 "
2A5 Screen grid	250 "
2A5 Grid	19 "
2B7 Plate	175 "
2B7 Screen grid	45 "
2B7 Grid	5 "
58 Plate	250 "
58 Screen grid	95 "
58 Cathode	5 "
2A7 Plate	250 "
2A7 Screen grid	95 "
2A7 Cathode	5 "
2A7 Triode plate	95 "
Speaker field (red lead)	105 "

Due to current taken by voltmeter used, readings of 2B7 and 2A5 grid voltages will be less than values shown above.

REMLER COMPANY, LTD.

MODEL 35 Auto Schematic, Socket Voltage, Installation

INSTALLATION:

The receiver unit is intended to be mounted on the bulkhead of the car by the single mounting stud which requires the drilling of one 1/2 inch hole through the bulkhead. When locating the position of this hole consideration should be given to possible interference of the set with the position of control cables and other apparatus between the dash and the bulkhead and also of the mounting stud with apparatus on the motor side of the bulkhead. Preferably the receiver should be mounted so as to allow long easy curves of the flexible control cables and a short lead connection to the antenna.

The location of antenna leads from factory installed antennas depends on the make and model of the car. Usually this lead is brought down one of the front body pillar posts and will be found coiled up at the end of the dash. Connect this lead to the shielded lead from the receiver and tape the joint. Where the car is not factory equipped with antenna, a roof type or plate type may be installed with lead brought to a convenient place for connection to the set. The lead and antenna should be kept as far as possible from wiring circuits and the metal body.

The flexible control cables for the tuning and volume control are fitted with special ends to lock in the control head. Insert the cable with the slotted end into the left or volume control bushing, and the cable with keyed end into the right, or tuning control bushing. Be sure the cable housing extends into the head at least three-eighths of an inch, then tighten the set screws on the bushings. Next insert the cables into the brackets and couplings on the set. The volume control cable in the lower coupling and the tuning cable in the upper coupling, but do not tighten the set screws on the shafts. Next clamp the control head to the steering column, tape the control cables to the column bracket or some solid object under the dash and tighten the clamps on the cable housings at the set. Now turn the volume knob to the position where it is removable from the key slot, and turn the tuning knob to the left till the pointer is on the white line at the low frequency end of the dial. Rotate the couplings projecting from the set to the left till the condenser is against the stop and the switch on the volume control is in the off position. Now the set screws on the shaft couplings may be tightened.

Plug the dial light into the opening at the rear of the control head. Connect the battery wire, the shielded wire with fuse holder and terminal, to the battery side of the ammeter. This terminal on the ammeter usually has only one wire attached.

IGNITION NOISE SUPPRESSION:

The spark plug suppressors should be connected in series with the plugs at each plug and the distributor suppressor should be plugged into the central distributor connection in series with the lead running to this point. The generator condenser should be mounted on the generator and the flexible lead connected to the terminal at the cutout where the wire from the generator is attached. Some cars require special work to further reduce noises due to peculiarities of the wiring systems.

OPERATION:

The left hand knob on the control head operates both the power switch and the volume control. Turn the knob clockwise to increase volume. The dial should become illuminated when the power is on.

Rotate the station selector, or tuning knob until the desired program is heard, reduce the volume, and readjust the selector to the position where quality is the best. The volume control may now be advanced to the desired volume level. The knob on the right side of the set is the tone control. This may be adjusted to modify the tone or to reduce noise and static disturbances.

SHORT WAVE:

The short wave switch is on the left of the speaker. When this knob is turned to the left the regular broadcast band is covered by the station selector dial as well as the lower frequency police band as noted on the dial. When the switch is turned to the right the selector dial covers from 2200 to 6500 K. C. The positions of the higher frequency police band, the 49 meter short wave broadcast band and the major airport and amateur bands are noted on the inner portion of the dial. Many automobile antenna installations are not suitable for receiving these short wave stations from any great distance. When better results or increased range is desired with the car parked, a fifty or sixty foot portable antenna wire, with the far end raised at least fifteen feet from the ground, may be used.

SERVICE DATA:

Tubes:

- 6A7 Converter (mixer-oscillator)
- 78 Super-control amplifier, 1st I.F. stage
- 78 Super-control amplifier, 2nd I.F. stage
- 75 Diode-detector-A F amplifier, A.V.C.
- 41 Power amplifier
- 84 Full wave rectifier
- T-40 Dial light 6.3 v.

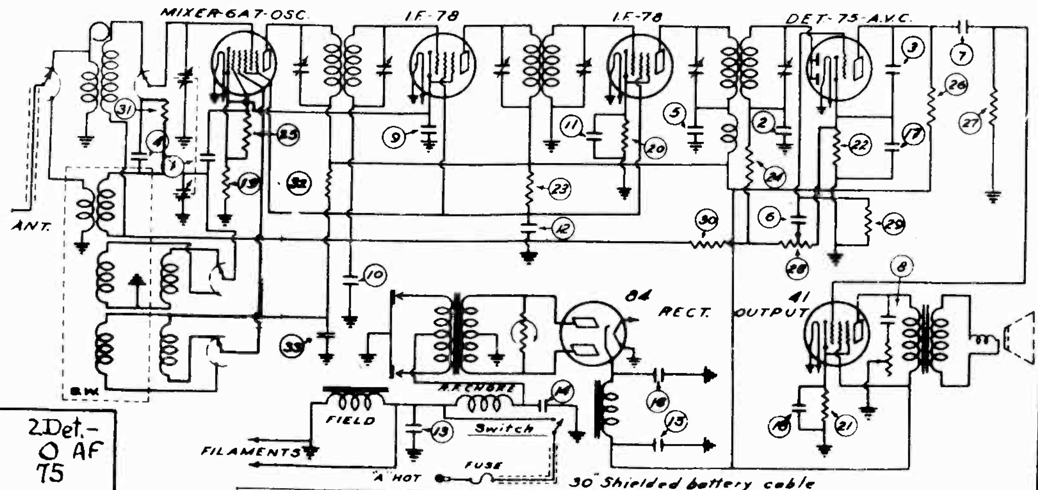
The antenna and mixer coils for the broadcast band are in the shield at the left side of the set. The short wave coils are mounted directly on the short wave switch with the oscillator coil for the broadcast band at the end of the switch. The I.F. transformers are in the aluminum shields adjacent to the antenna-mixer shield. These transformers are peaked at 450 K.C. by the trimmers located at the tops of the shields. Use a weak signal, or oscillator input, and an output meter when aligning the set.

The vibrator type interrupter and transformer are enclosed in the metal box at the right of the receiver. After several hundred hours use the vibrator contacts may require a slight adjustment due to wear. The necessity of this adjustment will be indicated by a marked reduction in plate supply voltage. Vibrator servicing should be done only by a service man with instructions and experience in this work.

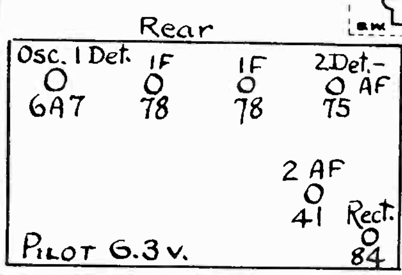
Voltages: To chassis - No signal.

Battery, hot side		6 volts
84 Rectifier cathode		250 "
41 Power	screen grid	230 "
41 "	plate	220 "
41 "	cathode	18 "
75 Detector amplifier	plate	125 "
75 " "	cathode	1.5 "
78 2nd I.F. "	plate	230 "
78 2nd I.F. "	screen grid	100 "
78 2nd I.F. "	cathode	3.5 "
78 1st I.F. "	plate	230 "
78 1st I.F. "	screen grid	100 "
78 1st I.F. "	cathode	5 "
6A7 Mixer plate		230 "
6A7 Mixer screen grid		100 "
6A7 Oscillator plate		200 "
6A7 Mixer-oscillator cathode		5 "

Battery current - 6 amperes



IF PEAK 450 KC.

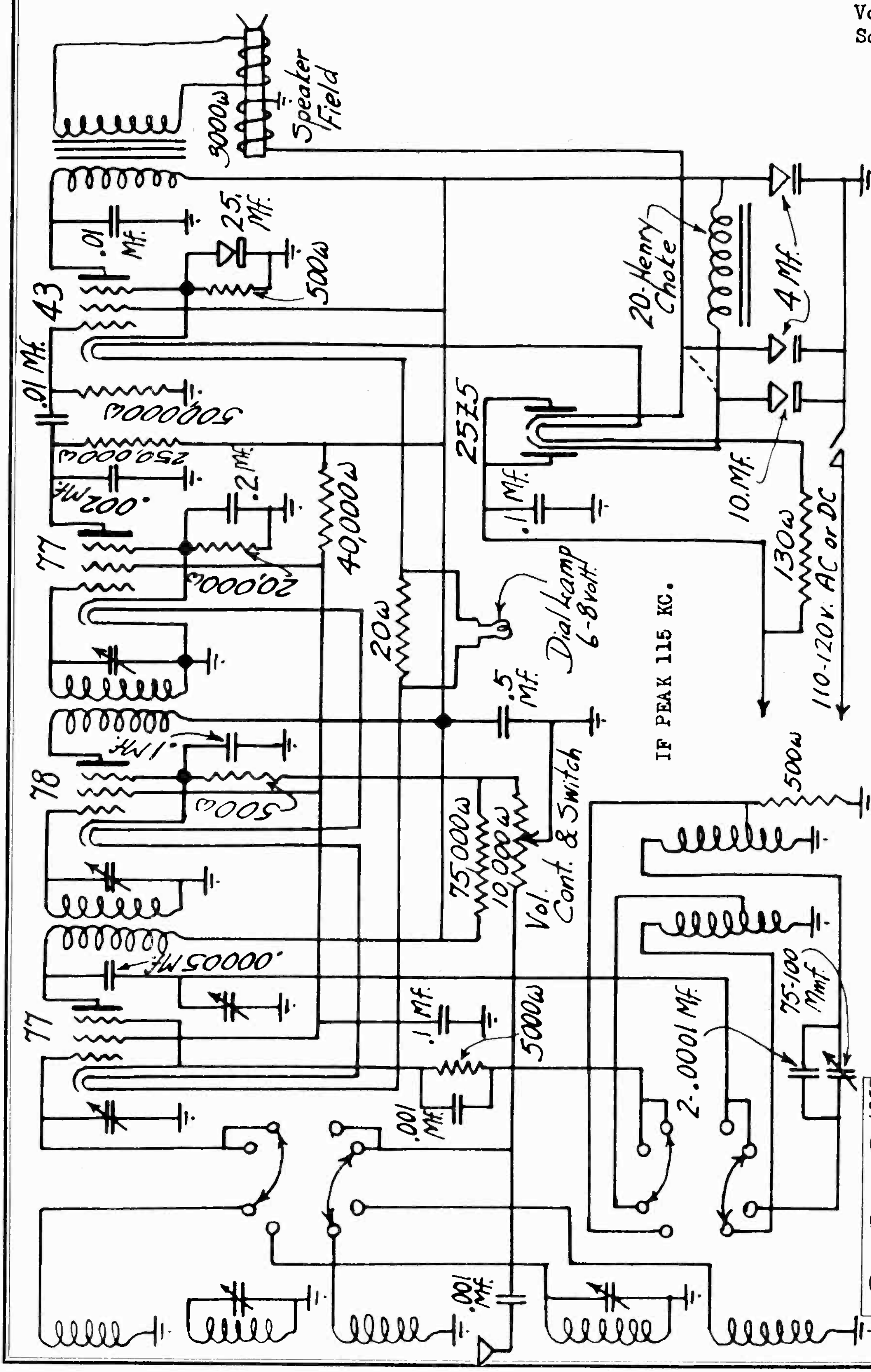


CONDENSERS				RESISTORS			
1	.00008	10	.1 mfd.	19	300 ohm	28	500,000
2	.0003	11	.1	20	600	29	500,000
3	.001	12	.25	21	800	30	1 Meg.
4	.002	13	.5	22	5000	31	25,000
5	.02	14	.5	23	12,000	32	2000
6	.02	15	4.	24	50,000		
7	.02	16	8.	25	60,000		
8	.02	17	10	26	200,000		
9	.1	18	10	27	300,000		
		33	.02				

1934

REPUBLIC INDUSTRIES

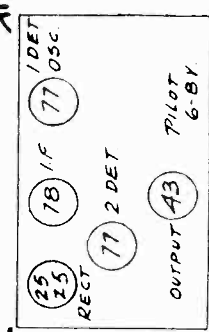
MODEL BP-5E
Schematic
Voltage
Socket Layout



IF PEAK 115 KC.

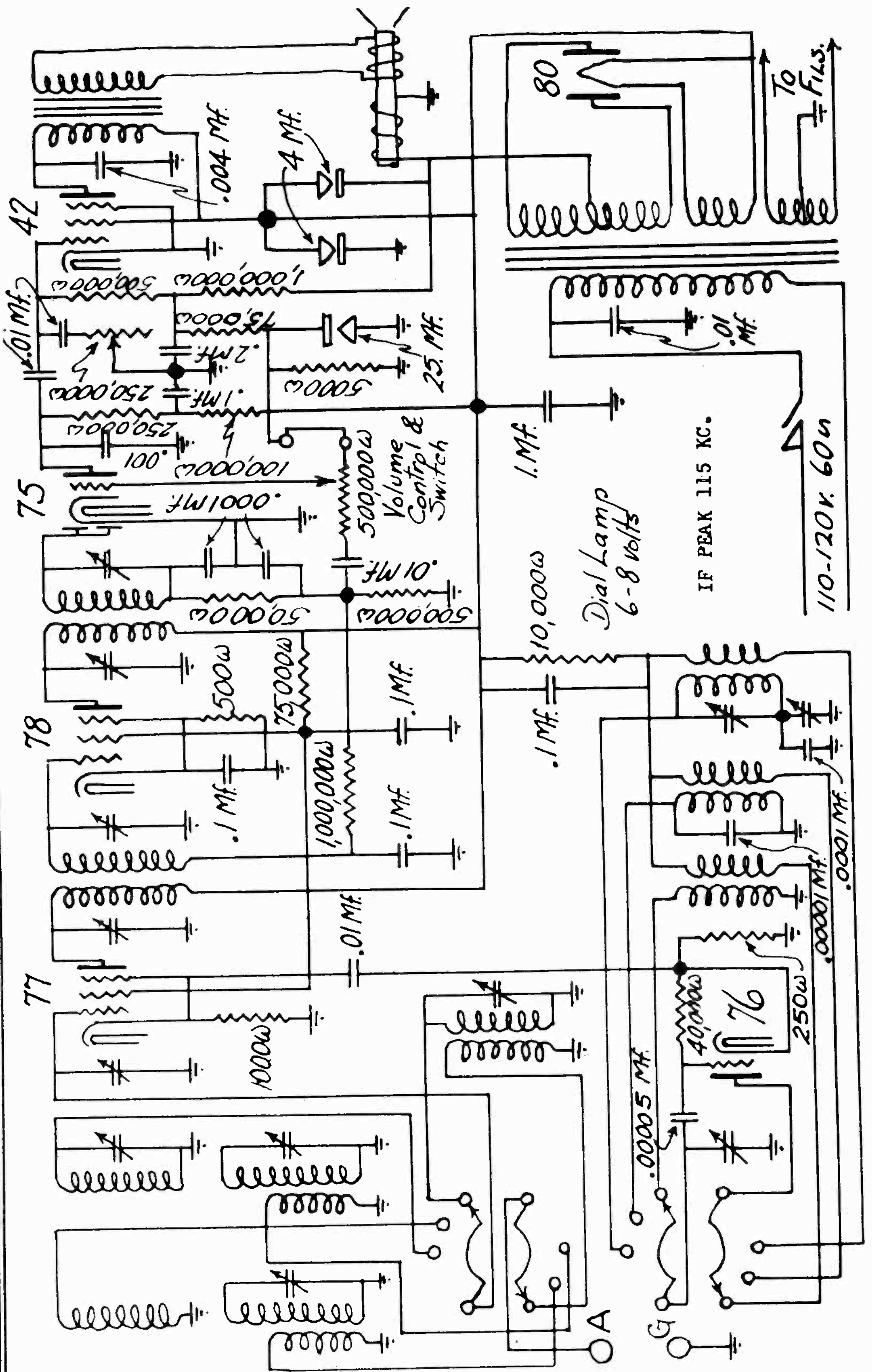
TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
77	Det.-Osc.	118	65	3.6
78	IF	118	65	2.2
77	2nd Det.	52	65	3.2
43	Output	111	118	17

Speaker Field Voltage 135 v.



MODEL CS-6
Schematic
Voltage
Socket Layout

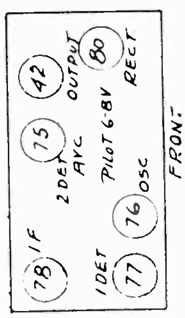
REPUBLIC INDUSTRIES



IF PEAK 115 KC.

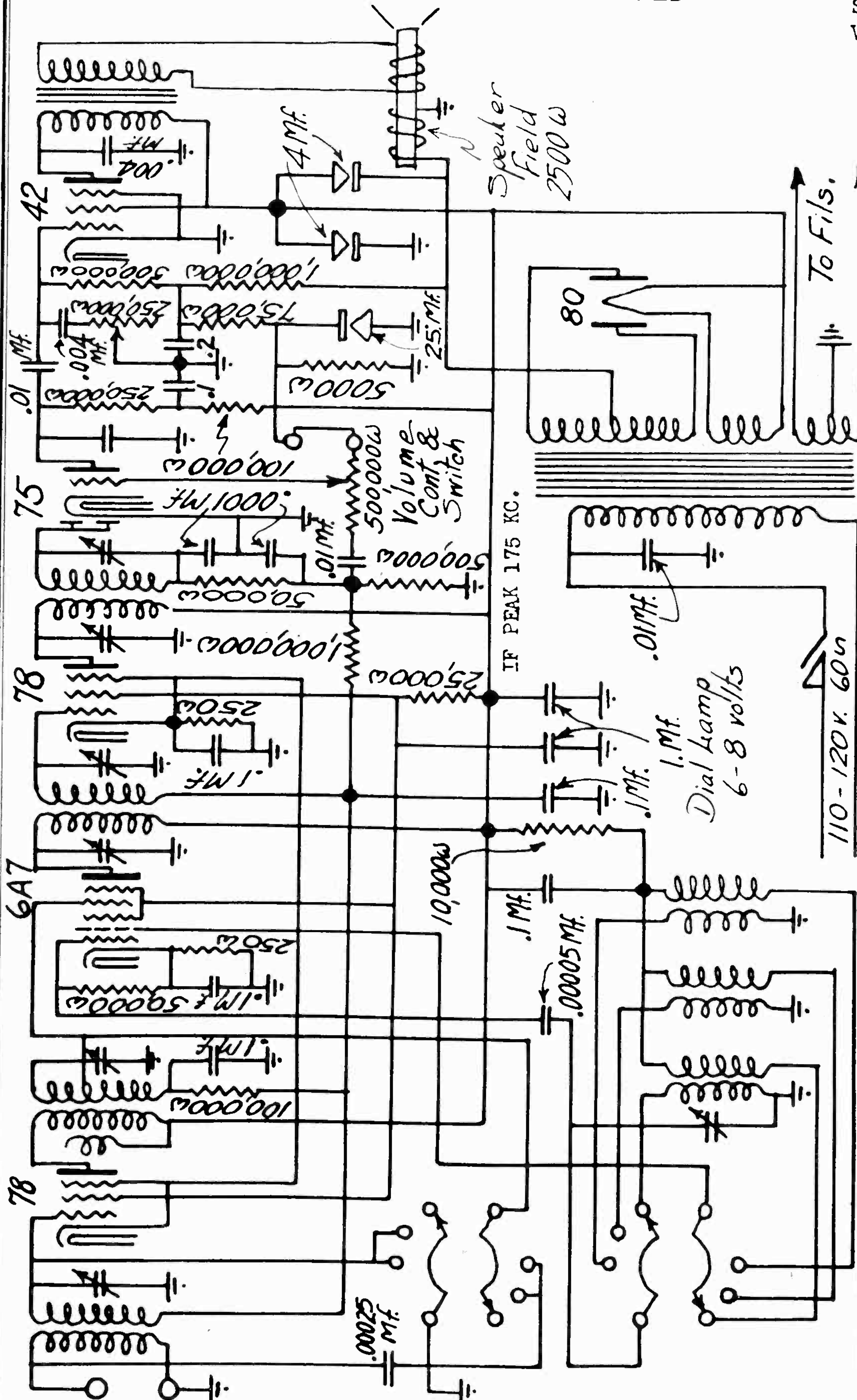
76 Grid to Ground -10 v.
Speaker Field Voltage
147 volts

TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
77	1st Det.	195	80	2
76	Oscill.	127		2
78	IF	195	80	2
75	2nd Det.	55	0	0
42	Output	170	195	-5



REPUBLIC INDUSTRIES

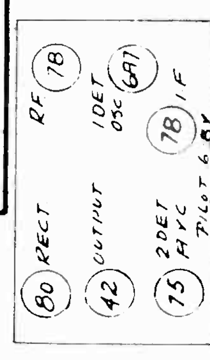
MODEL TL-6C
Schematic
Voltage, Socket



42 Cathode to Grid 4 volts

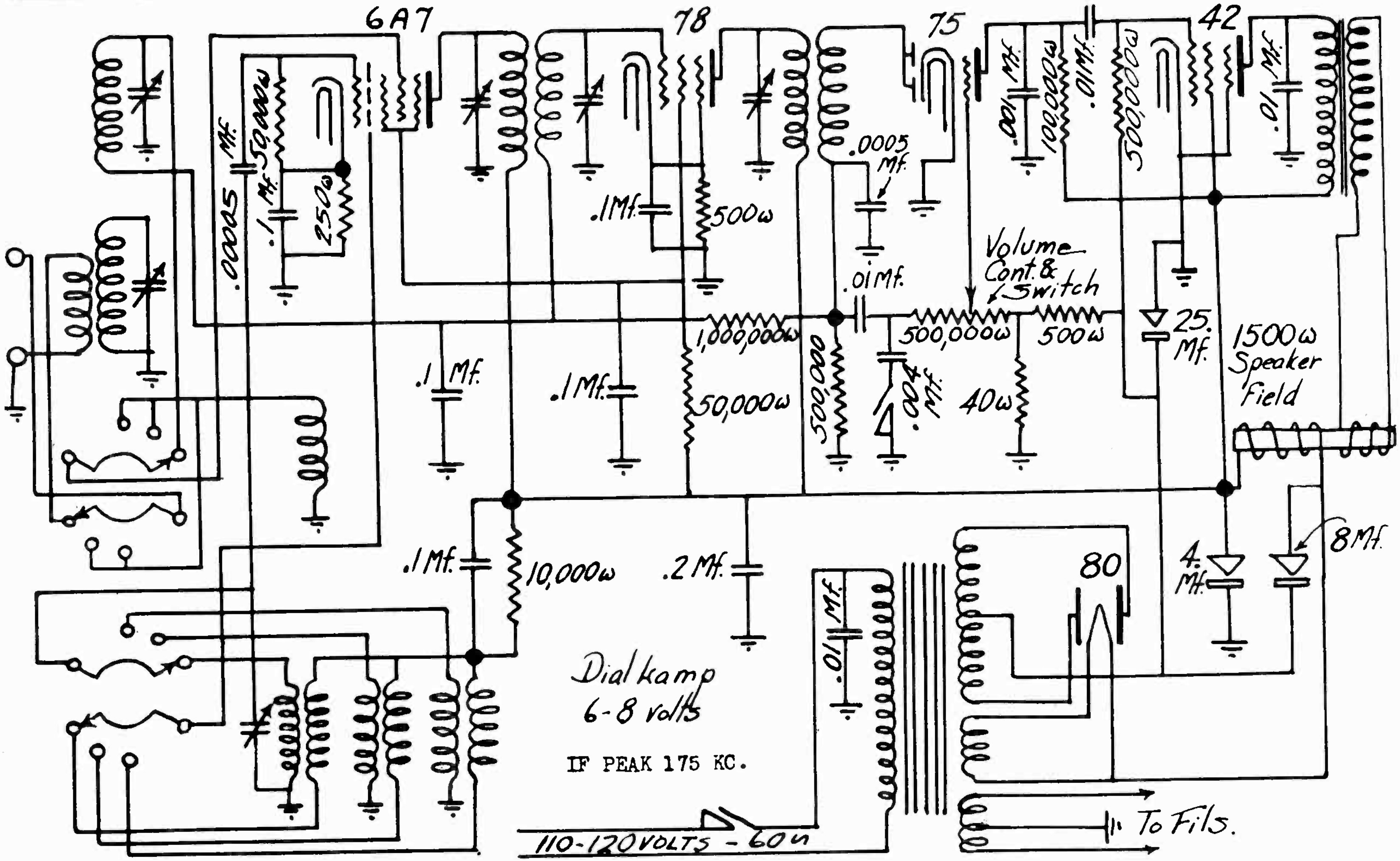
Speaker Field Voltage 150 v

TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
78	RF	200	100	3
6A7	Det-Osc.	200	100	2.25
78	IF	200	100	4
75	2nd Det.	55		0
42	Output	180	200	



MODEL TR-5B
Schematic
Voltage, Socket

REPUBLIC INDUSTRIES



IF PEAK 175 KC.

TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
6A7	Det-Osc.	220	90	2.25
78	IF	220	90	3
75	2nd Det.	140	-	0
42	Output	216	220	0

42 Grid to Cathode 11 v.
Speaker Field Voltage
50 volts.