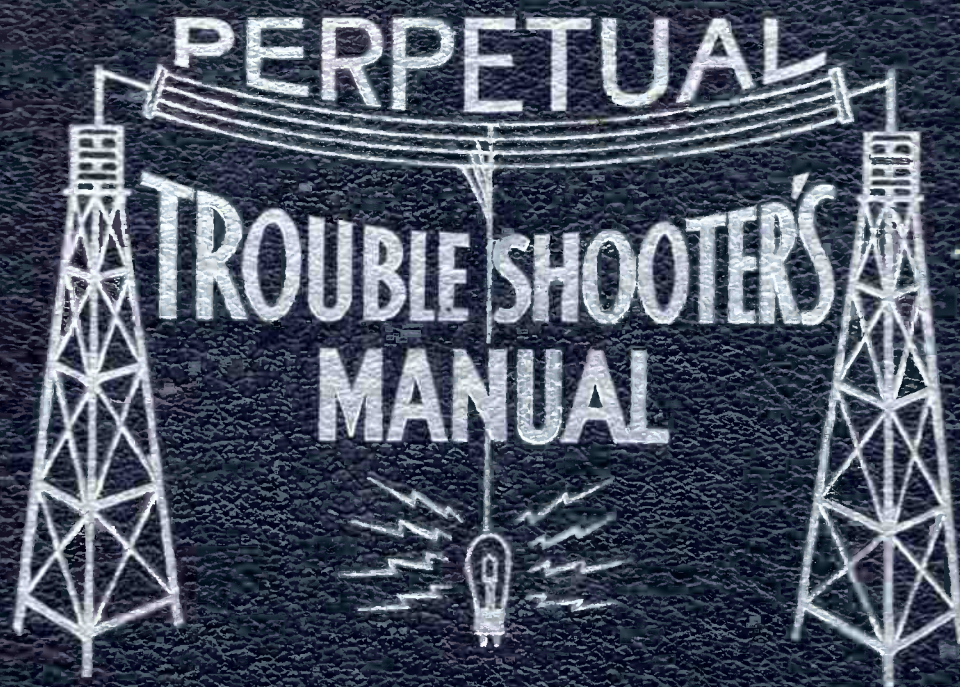


VOLUME II



JOHN F. RIDER

PHILCO RADIO & TELEVISION CORP.

MODEL 4
Alignment
Chassis

The adjustment of the compensating condensers in the Model 4 is done with the aid of a modulated oscillator, accurately calibrated at 3600KC. A high grade crystal controlled oscillator, of this type, Philco Model No. 091, can be obtained on order from the Philco National Service Station. The various harmonics and image frequencies of this signal are used to adjust the compensating condensers at the different short wave dial settings. If the oscillator is off frequency, the harmonics and image frequencies will be off correspondingly.

Remove the converter from its cabinet. Connect the Model 4 to the broadcast receiver in the usual manner, with the ground wire connected and the aerial disconnected. A Model 112 is preferable as this offers greatest sensitivity. It is important that the broadcast receiver be accurately calibrated at 1000KC and that the dial be set exactly at this point.

1. Adjusting at 3.6 megacycles on lower scale—Place the oscillator in operation and couple it with a wire to the antenna connection of the converter. Be sure that the oscillator is grounded. Set the dial at 3.6 megacycles on the lower scale and set the frequency control switch of the converter in its proper position. Carefully adjust the "3.6M" compensator shown in the illustration above, by means of a fibre wrench, Philco part 3164, until maximum signal is heard in the loudspeaker. It may be necessary to reduce the oscillator output by removing the oscillator from the coupling wire in order to obtain a faint input signal, the maximum strength of which can be readily determined by ear.

2. Adjusting at 1.6 megacycles—Set the dial at 1.6 megacycles and adjust the "1.5M" compensating condenser in the same manner as described above.

3. Adjusting at 7.2 megacycles—Set the dial at 7.2 megacycles and set the frequency control switch in its proper position for the middle dial scale. Connect the oscillator output direct to the antenna terminal of the converter. Adjust the "8.5M" compensating condenser for maximum output in the loudspeaker as described above.

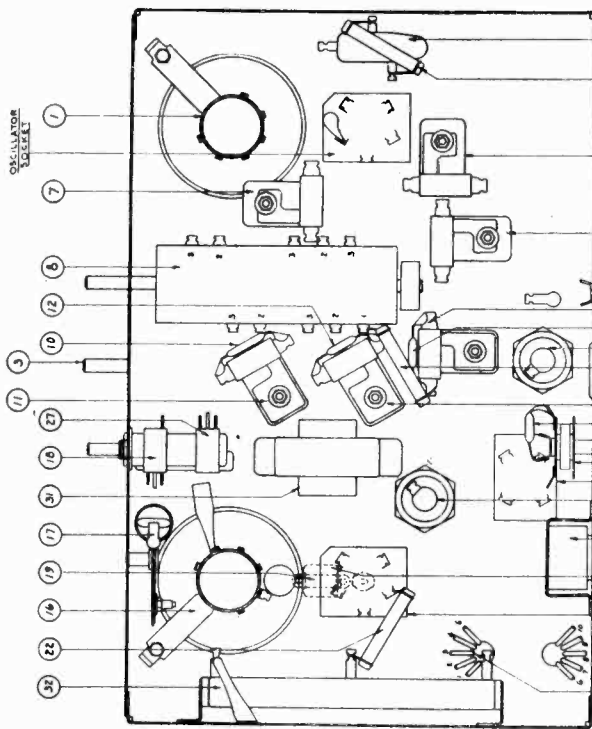
4. Adjusting at 3.6 on middle scale—Turn the dial to 3.6 on the middle scale and adjust the "3.6M" compensator as described above.

5. Adjusting at 18. megacycles—Set the dial at 18 and the frequency control switch in its corresponding position. Adjust the "19" compensator as described above. More than one signal will be heard as the adjustment is being made. Be sure to adjust for the one which is heard second as the compensating condenser capacity is reduced from its maximum (adjusting out all the way in). When this adjustment has been made correctly, the oscillator signal can be heard at 18, 16, 14.4 and 12.4 megacycles. This adjustment is the most critical of any, and will require more care in getting the correct point.

6. Adjusting at 8.8 megacycles—Turn the dial to 8.8. Adjust the "8.5H" compensator in the manner described above.

RE-SETTING 1000KC WAVETRAP

A wavetrap tuned to 1000 kilocycles is connected in the antenna circuit of the converter for the purpose of suppressing any possible interference from nearby stations which might be broadcasting at or near 1000 kilocycles. If it is impossible to find a point between 950 and 1050 KC at which interference is not heard, the wavetrap should be re-adjusted by means of the fibre wrench until the interfering station is tuned out.



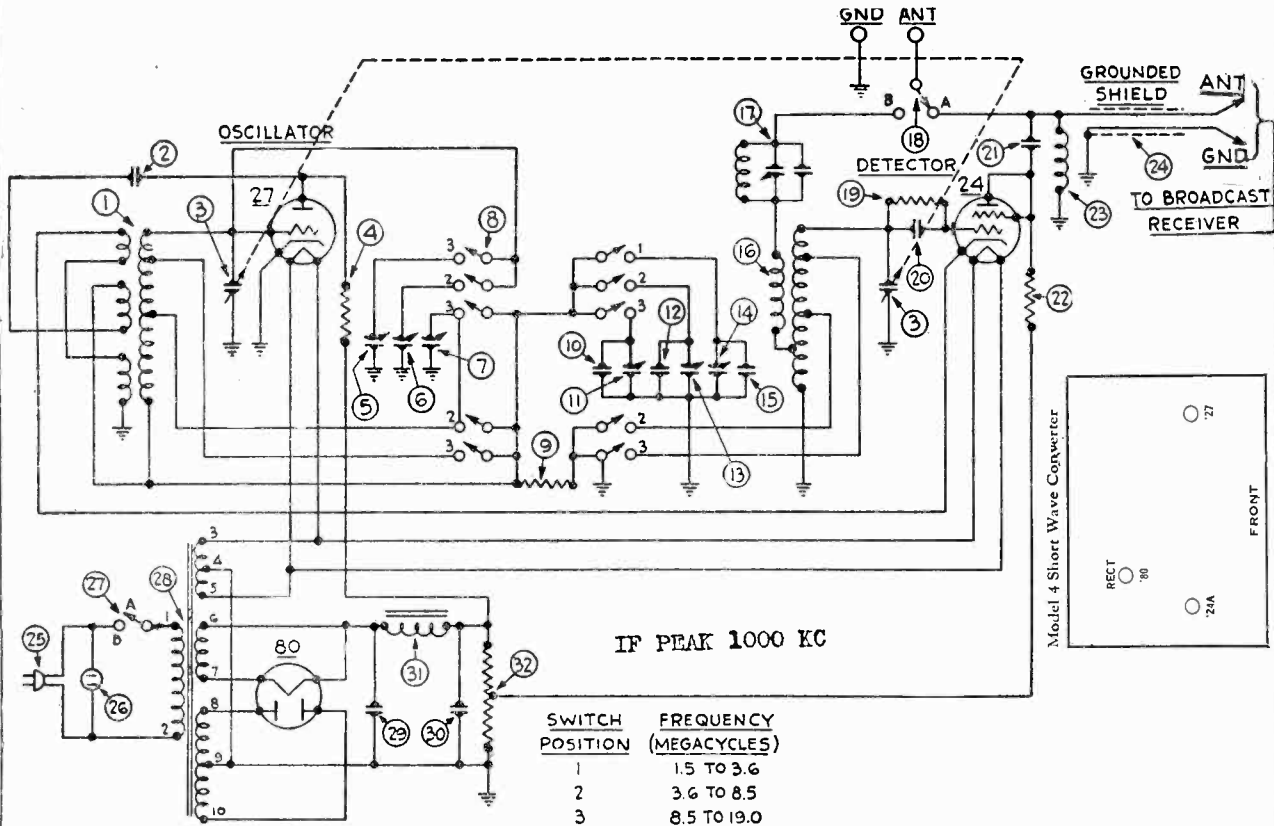
No. on Figs. 1 and 2	Description	Part No.	No. on Figs. 1 and 2	Description	Part No.
1	Oscillator coil	03733*	1	Frequency filter	03462
2	By-pass condenser (1.5 mfd.)	3815-M	2	Antenna switch (assembled with 27)	5796
3	Gang condenser	03692	3	Resistor (2 Megohms) assembled with (20)	03879
4	Resistor (15,000 ohms)	3768	4	Condenser (110 mfd.) assembled with (19)	03879
5	Compensating condenser (19 MC end of top scale)	04000-E	5	Condenser (250 mmf.)	3092
6	Compensating condenser (8.5 MC end of center scale)	01000-E	6	Resistor (98,000 ohms)	3767
7	Compensating condenser (3.6 MC end of bottom scale)	04000-E	7	R. F. choke	03103
8	Frequency control switch	03751	8	Shielded cable	L-1378
9	Resistor (210,000 ohms)	3768	9	Power cord and plug	L-043-A
10	Condenser (1250 mmf.)	3686	10	Outlet receptacle	5429
11	Compensating condenser (8.5 MC end of top scale)	04000-F	11	"On-Off" switch (assembled with 18)	5796
12	Condenser (800 mmf.)	3678	12	Power transformer—50-60 cycles	5785
13	Compensating condenser (3.6 MC end of center scale)	04000-F	13	Electrolytic condenser (6 mfd.)	5786
14	Compensating condenser (1.5 MC end of bottom scale)	01000-F	14	Electrolytic condenser (6 mfd.)	4916
15	Condenser (250 mmf.)	2082	15	Filter choke (50-60 cycles)	4916
16	Detector transformer	03731	16	Filter choke (25-10 cycles)	4951
17			17	50-60 cycles	6930
18			18	Resistor (two 32,000 ohms 25-40 cycles)	3525
19			19	Bracket	5175
20			20	Cabinet	40000

PHILCO recommends that under no circumstances should any attempt be made to adjust the compensating condensers in the field, unless proper equipment is available, and that where such is not the case the unit should be turned over to a Philco Distributors Service Department. The adjustment is extremely critical and requires more time and patience than the ordinary broadcast receiver. All of the compensating condensers are accessible only from the bottom of the chassis. The short wave converter is accurately adjusted at the factory prior to shipment.

*Includes matched oscillator coil and detector transformer.

MODEL 4
Schematic
Voltage
Data

PHILCO RADIO & TELEVISION CORP.



SWITCH POSITION	FREQUENCY (MEGACYCLES)
1	1.5 TO 3.6
2	3.6 TO 8.5
3	8.5 TO 19.0

Table 1—Tube Socket Readings—Line Voltage—115 volts

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
Type	Circuit					
27	Oscillator	2.4	110	..	.1	0
24	Detector	2.4	25	25	.3	0
80	Rectifier	5.0	170/170	..	..	..

NOTE: The above voltage readings were taken from the socket terminals on the underside of the chassis, using a Weston multi-range voltmeter, 1000 ohms per volt. The radio set tester cannot be used either for voltage or plate current readings because of the effect of the long leads through the set tester cord.

Table 2—Power Transformer Voltages

Terminals	A. C. Volts		Color
1—2	105—125	Primary Filament of 24 and 27 Filament of 80 Plates of 80 Center Tap of 3—5 Center Tap of 8—10	White
3—5	2.5		Black
6—7	5.0		Light Blue
8—10	340		Yellow
4	..		Black with Yellow Tracer
9	..		Yellow with Green Tracer

Table 3—Condenser Data

Nos. on Figs. 1 and 2	Capacity Mfd.	Container
20	.00011	Blue and Golden Yellow
12	.0008	Green and Orange
10	.00125	Blue and Orange
2	.05	Black Bakelite Container
20 30	6.	Electrolytic

Table 4—Resistor Data

Nos. on Figs. 1 and 2	Power (Watts)	Resistance (Ohms)	COLOR		
			Body	Tip	Dot
32	1.	4750	Brown	Orange	Orange
4		4750			
4	1.	13000	White	Orange	Orange
22		99000			
9	.5	240,000	Red	Yellow	Yellow
19	.5	2 Megohms	Red	Black	Green

PHILCO RADIO & TELEVISION CORP.

MODEL 20, 20-A
Voltage
Values

Models 20 and 20-A Receivers

Model 20 Receivers are for Operation on 105-125 volt, 50-60 cycle AC Lines.
Model 20-A Receivers are for Operation on 105-125 volt, 25-60 cycle AC Lines.

Bulletin 28 covers the first few weeks' production of Models 20 and 20-A. These Receivers can be identified as having one or two compensating condensers. The later models have three compensating condensers fastened to the tuning condenser housing and are covered by Bulletin 36.

Table 1—Tube Socket Readings Taken with AC Set Tester, AC Line, 115 Volts

Tube		Filament Voltage	Plate Voltage	Grid Voltage	Screen Grid Voltage	Cathode Voltage	Plate Milliamperes
Type	Circuit						
24	1st R. F.	2.3	250	3.0	90.0	12	4.5
24	2d R. F.	2.3	250	3.0	90.0	11	4.5
24	Detector	2.3	35	1.0	2.0	8	....
27	1st Audio	2.3	120	1.0	....	8	3.0
71-A	{ 2d Audio } { Push-Pull }	5.0	215	50.0	....	....	18.0
71-A		5.0	215	50.0	....	....	18.0
80	Rectifier	5.0	....	....	....	....	36/Plate

All readings taken with antenna disconnected and ground on. Volume Control on full.

Table 2—Power Transformer Voltages

Terminals	A. C. Volts	
1—2	2.5	Heaters of 24 and 27 Tubes
3—4	105 to 125	Primary
7—8	5.0	Filament of 71-A Tubes
5	....	Center Tap of 7—8
10—11	5.0	Filament of 80 Tube
9—12	650	Plates of 80 Tube
6	....	Center Tap of 9—12 and 1—2

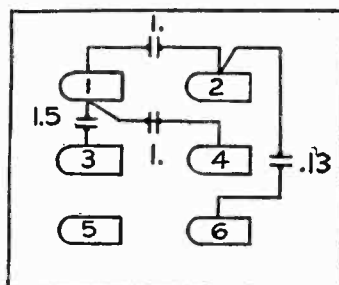
Table 4—Condenser Data
(Other Than Filter Condenser)

No. on Figs. 3 and 4	Capacity MFD
(16)	.00025
(19)	.01
(5) (6) (22)	.05
(8)	.05 with 250-ohm resistor winding
(14)	.25 (two sections)
(13)	.5

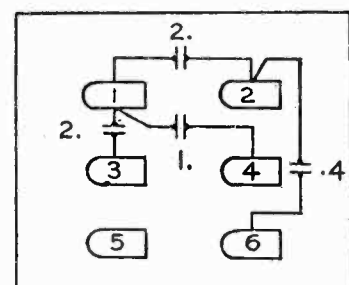
Table 3—Resistor Data

No. on Figs. 3 and 4	Terminal	Resistance	Color
(25)	{ 1—2 } { 2—3 } { 3—4 } { 5—6 } { 6—7 }	{ 1,400 } { 187 } { 75 } { 2,470 } { 975 }	Long Tubular
(12)		50,000	Orange
(18)		100,000	Silver Gray
(15)		250,000	White
(17)—(20)		500,000	Battleship Gray

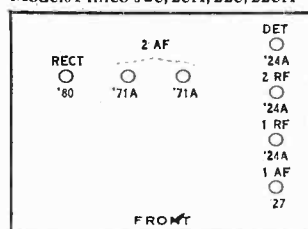
Model 20—Filter Condenser—Part No. 4235



Model 20-A—Filter Condenser—Part No. 4269

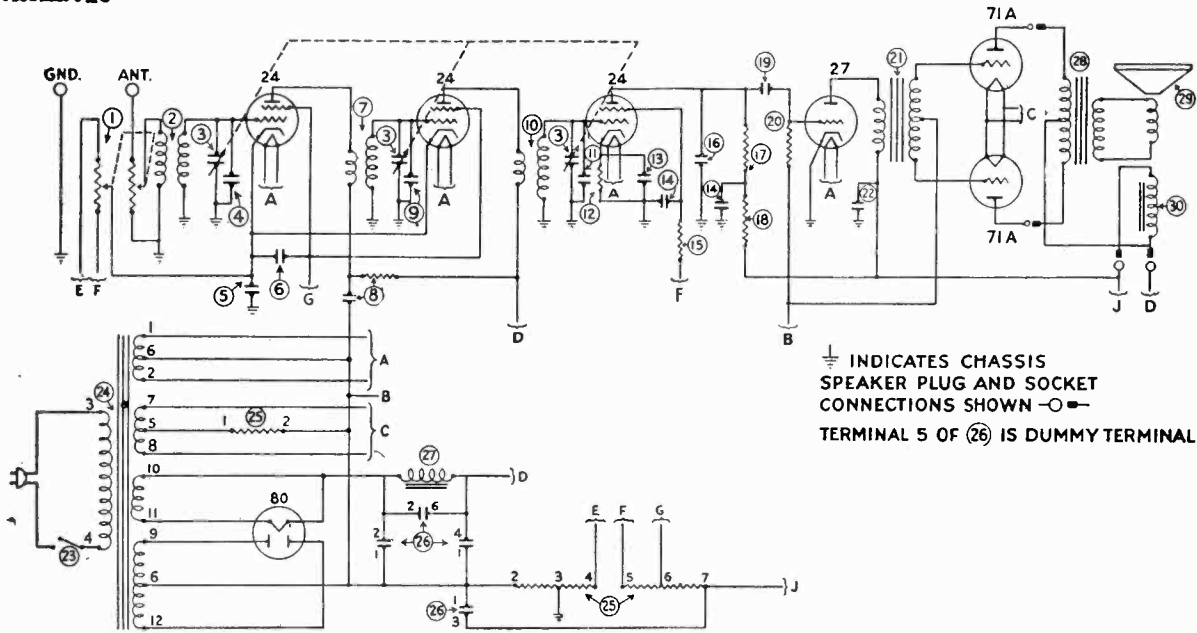


Models Philco's 20, 20A, 220, 220A



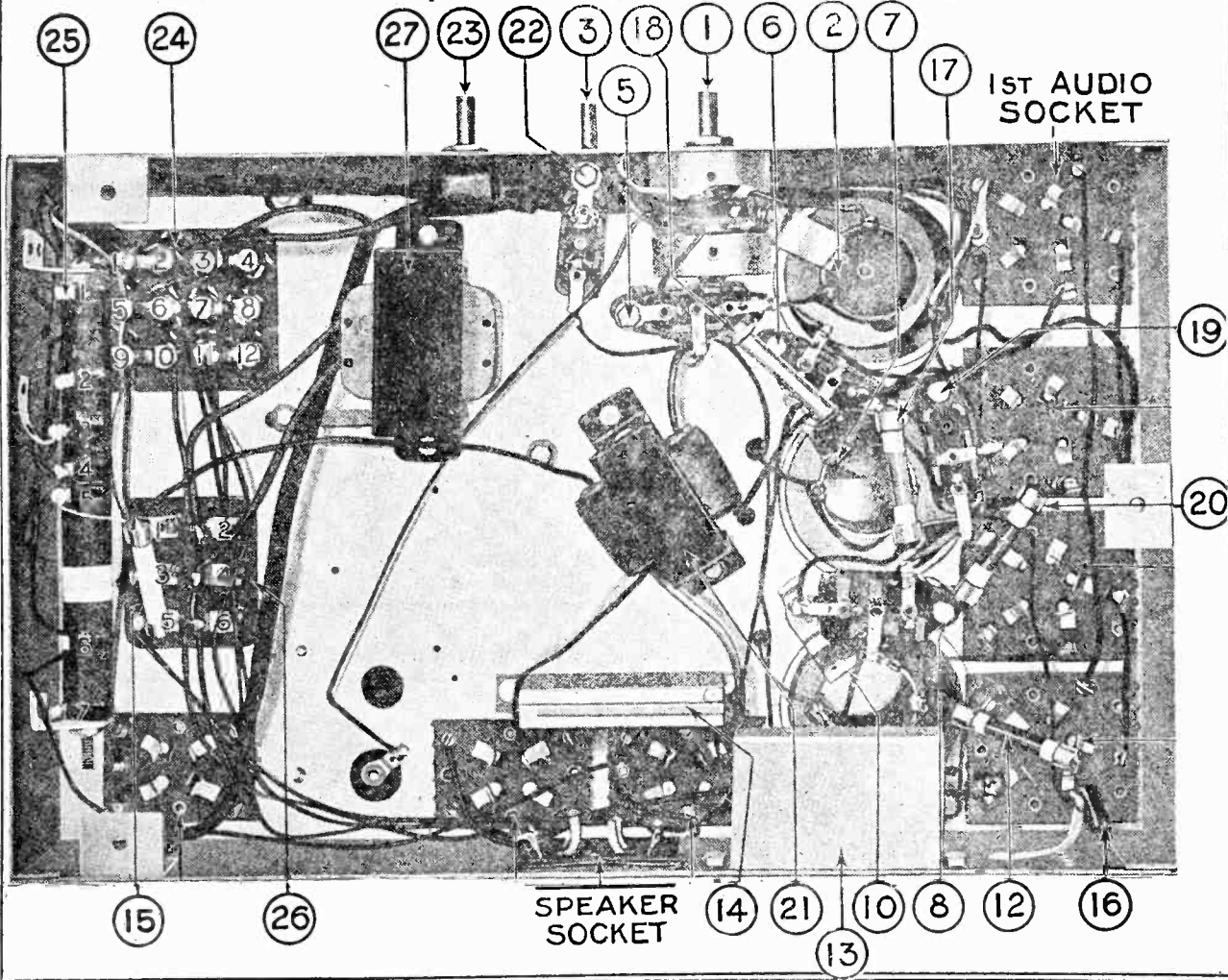
MODEL 20, 20-A
Chassis
Schematic

PHILCO RADIO & TELEVISION CORP.



DIFFERENT CIRCUIT ARRANGEMENT FOR MODEL 20-A

Model 20-A for use on 25-60 cycle lines is wired differently than the Model 20. The plate supply lead for the two 24 R. F. Tubes is taken from the low side of the Speaker field Coil. The lead "D" to the 24 tubes should be changed to "J" for the Model 20-A only. This will change the plate voltage from 250 volts to 115-125 volts. The plate current readings will also be lower than those given in the table.



PHILCO RADIO & TELEVISION CORP.

MODEL 30
Voltage
Values

Table 1—Tube Socket Readings Taken with Average Set Checker

Tube	Circuit	Filament Volts	Plate Volts	Grid Volts	Plate Current Milliamperes	Screen Grid Volts
32	1st R. F.	2.0	150		.0015	60
32	2nd R. F.	2.0	150		.0015	58
32	3rd R. F.	2.0	150		.0015	58
30	Detector Rectifier	2.0			....	..
30	Detector Amplifier	2.0	15		....	..
30	1st Audio	2.0	90	Note 1	.002	..
31	{ 2d Audio }	2.0*	150	24	.008	..
31	{ Push-Pull }	2.0*	150	24	.008	..

*These readings reversed with respect to other Filament Voltage readings.

NOTE 1. With volume control in "Off" position, approximately 4 volts; with volume control full on, less than 1 volt.

Always use high-resistance voltmeter, preferably 1000 ohms per volt, when checking voltages in the Receiver. For reading plate and screen voltages, use a 250- or 300-volt scale. Voltage readings taken with meters having less than 250,000 ohms resistance will be lower than voltages given in the table.

When testing a Model 30 Receiver, all tubes must be in their proper sockets. The speaker must be connected and the tube shield must be fastened in place. The readings in Table 1 were taken using "A," "B" and "C" batteries.

Table 2—Resistor Data

No. on Figs. 1 and 2	Color	Resistance Ohms
①	Golden Yellow	5,000
④⑩	Auto Buff	25,000
⑥	Jade Green	70,000
⑳ ㉓	Silver Gray	100,000
㉔	White	250,000
⑲ ㉒ ㉖	Battleship Gray	500,000
⑳	Tubular (two section)	{ 250 800

Table 3—Condenser Data

No. on Figs. 1 and 2	Capacity—MFD.
㉔	.00005
㉒ ㉓	.000250
㉔	.01
③ ⑨ ⑮	.05
⑪ ⑫ ㉒ ㉖	.05 with 250-ohm resistor winding
㉒	.25 single section
㉓	.25 two sections

Either the ear method or an output meter can be used while adjusting.

With the Receiver set up for operation, adjust the oscillator signal to a frequency between 1200 and 1300 kilocycles. This corresponds to 120 and 130 on the Receiver tuning scale.

Use a weak signal and tune the Receiver sharply to the oscillator note. The volume control should be turned on "full."

Adjust the compensating condensers, starting with the fourth condenser ㉓ in (Fig. 2.) If using the ear method, adjust the condenser to the loudest signal. If using an output meter, adjust for the maximum reading.

Next adjust the third, then the second, and finally the first. It will not be necessary to reduce the oscillator signal as the successive condensers are adjusted. Reduce the volume of the Receiver with the volume control.

In each step, always adjust for the maximum signal or reading.

Numbering of Philco Coils

For the purpose of identification, Philco coils are being code numbered. These numbers are stamped upon the mounting bracket before the part leaves the National Service Station. The following is a list of these coils (Dated Jan. 1932)

KEY NO. IN SERVICE BULLETIN DIAGRAM

CODE NO.	PART NO.	USED IN MODELS
1	3075A	511, 86, 87
2	3075B	511, 86, 87
3	3506B	65
4	3506A	65
5	3744A	95, 96
6	3744B	95, 96
7	3744C	95, 96
8	03545	90 (Pentode Output)
9	3884A	76, 77, 40, 41
10	3884B	76, 77, 40, 41
11	3884C	76, 77, 40, 41
12	3884N	20, 21
13	3884P	20, 21
14	3884S	111, 112
15	3884T	111, 112
16	3884U	111, 112
17	3884V	111, 112
18	3884X	46, 46E
19	3884Y	46, 46E
20	4182A	30
21	4182B	30
22	03014	90 (all Models)
23	03015	90 (all Models)
24	03016	90 (all Models)
25	03082	70, 35
26	03083	70, 35
27	03084	70
28	03283	50
29	03284	50
30	03320	35
31	03321	35
32	03360	90 (Pentode Output)
33	03013	90 (45's Output)
34	03009	90 (all Models), 35
35	03038	111, 112
36	03039	111, 112
37	03040	111, 112
38	03091	70
39	03092	70, 35
40	03143	90 (45's Output)
41	03734	4, 470, 490
42	03880	51
43	03881	51
44	03882	51
45	03887	51
46	03888	51
47	03886	51

Standard Compensating Condensers

The various compensating condensers used in the models 35, 70, 270, 370, 90, 112, and 212 have been changed so as to include a bakelite mounting board on which the code letter of the condenser appears. In the case of the I. F. compensating condensers, which have been used in conjunction with a parallel fixed condenser, the new compensating condensers have been increased in capacity so that the fixed condensers are no longer required. For replacement purposes, if desired, the new compensating condensers can be substituted on earlier sets for the earlier combination of a fixed and an adjustable condenser.

The low frequency compensating condensers have been changed with respect to the bakelite mounting, but their capacity remains unchanged, thereby requiring the parallel fixed condenser as in the past.

All of these new condensers can be identified by the letter which is stamped on the bakelite mounting board. For example part 04000-E has the letter E stamped over the surface of the mounting board; part 04000-F has the letter F stamped on the board.

The following table lists the part numbers of the various new condensers, their identification code letter, capacity range, where used, the superseded part number, and the part number of the parallel fixed condenser when one is still used.

(#98 - Dated Sept. 1931)

Part Number	Identification Letter	Capacity Range Mmf.	Used on Models	Supersedes	Used with Fixed Condenser
04000-B	B	40-250	90 (Early and Late)	03050	4520 (700 mmf.)
04000-D	D	6-50	112, 212	3772-A	—
04000-E	E	5-30	112, 212	3968-A	—
04000-F	F	40-250	112, 212	3772-B	4520 (700 mmf.)
			370 70, 270	03120	5120 (410 mmf.)
			35	03249	5120 (410 mmf.)
04000-H	H	40-180	170*, 270*, 370* 190* early	03051	—
04000-J	J	40-180	170* 270*, 370*, 212* 112*, 90* early	3772-C	—
04000-K	K	30-140	70*, 370*	03061	—
04000-L	L	30-140	270*	03262	—
			112*	3772-D	—
04000-M	M	15-130	35*	03411	—

FIXED PARALLEL CONDENSER NOT REQUIRED

PHILCO RADIO & TELEVISION CORP.

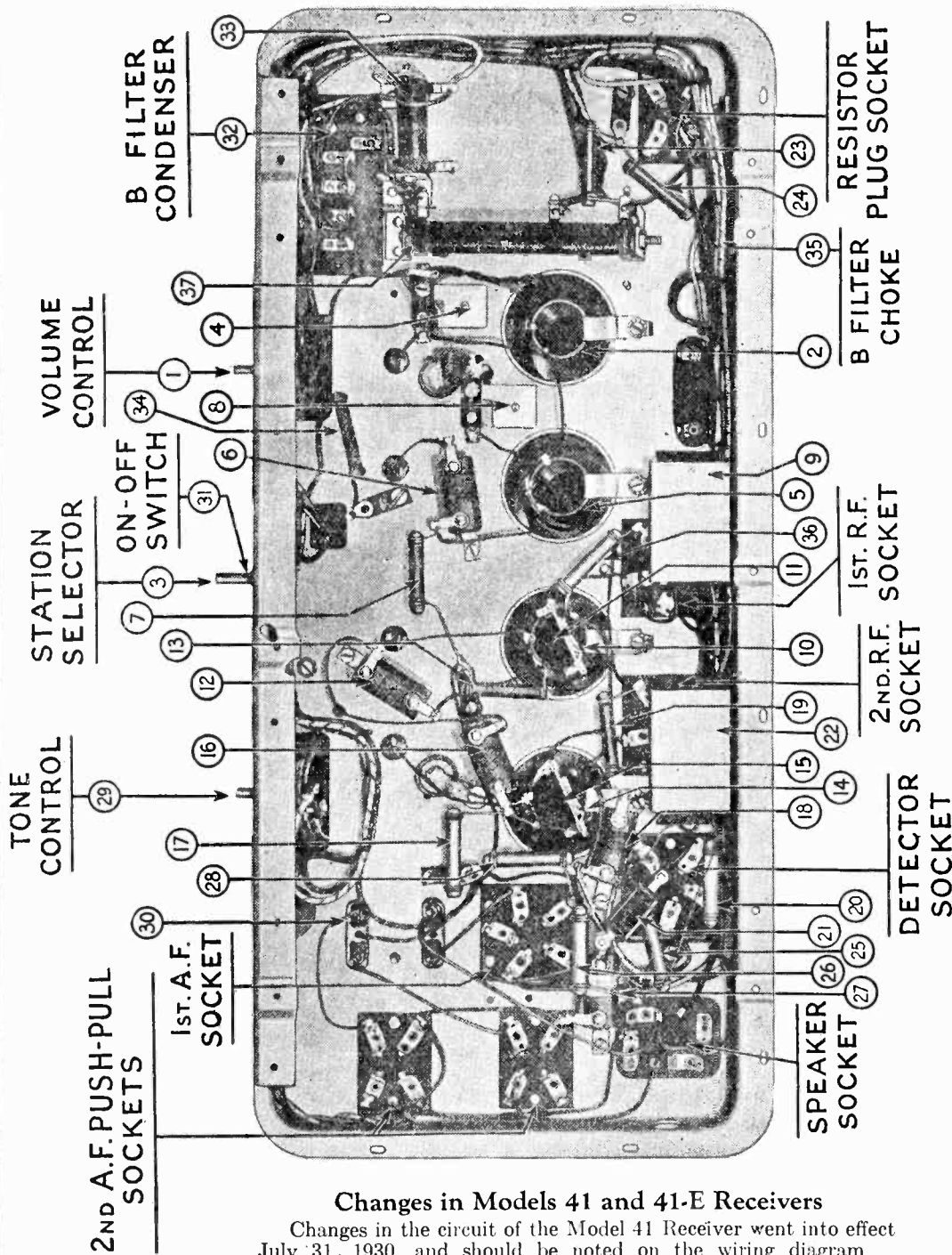
MODEL 35
Test Data

All tubes out of sockets and batteries disconnected. Volume control maximum unless otherwise stated.

From Chassis To	Correct		Incorrect
Aerial	9.3	ohms	
RF Control Grid	251,000	ohms	BC- rf Cg wdg-Y (.09 mfd) TC- rf Cg-Y
RF Control Grid to IF Control Grid	72.5	ohms	TC- IF Tr
RF Screen Grid to 67 $\frac{1}{2}$ post	150	ohms	
RF Screen Grid to Chassis	0	ohm	BC- rf Sg-Y BC- if Sg-Y (2 mfd)
RF Plate to 135 Post	16.4	ohms	
RF Plate to Chassis	0	ohm	BLC- Osc P circuit BC- IF P wdg-Y (09 mfd) BC- D P-Y Tone Control Condenser BLC- D P - 1 AF Cg
1 Detector Control Grid	3,006.6	ohms	TC- 1 D Cg-Y BC- Osc Cplg wdg-Y BC- rf Cg wdg-Y
1 Detector Screen to 67 $\frac{1}{2}$ post	150	ohms	
1 Detector Screen Grid to Chassis	0	ohm	See RF Screen
1 Detector Plate to 135 Post	68	ohms	TC- IF Tr
1 Detector Plate to Chassis	0	ohms	See RF Plate
IF Control Grid	251,065	ohms	TC- IF Tr See RF Control Grid
IF Screen Grid to 67 $\frac{1}{2}$ post	150	ohms	
IF Screen Grid to Chassis	0	ohm	See RF Screen
IF Plate to 135 Post	74	ohms	TC- IF Tr
IF Plate to Chassis	0	ohm	See RF Plate
2 Detector Control Grid	25,000-100,000	ohms	Exact resistance of Cg voltage volume control not known BC- 2 D Cg wdg-Y
2 Detector Control Grid to -22 $\frac{1}{2}$ post	40,000-47,000	ohms	approximate
2 Detector Plate to 135 post	240,013	ohms	2 Detector plate chk is 13.4 ohms
2 Detector Plate to Chassis	0	ohm	See Rf Plate
1 AF Control Grid	493,000	ohms	
1 AF Plate to 67 $\frac{1}{2}$ Post	1,200	ohms	
'47 Control Grid to -22 $\frac{1}{2}$ Post	6,000	ohms	
'47 Screen Grid to 135 Post	0	ohm	
'47 Plate to 135 Post	450	ohms	
Output Transformer Secondary only	.62	ohm	
Oscillator Control Grid to Chassis	54,007	ohms	BC- Osc wdg-Y TC-Osc Cg-Y
Osc Cg to Osc Plate	0	ohm	BLC- Osc P
Oscillator Plate to 135	51,000	ohms	See RF Plate

MODEL 41 DC, 42 DC
Chassis
Changes

PHILCO RADIO & TELEVISION CORP.



Changes in Models 41 and 41-E Receivers

Changes in the circuit of the Model 41 Receiver went into effect July 31, 1930, and should be noted on the wiring diagram

The R. F. by-pass condenser, Part No. 3615-G, or 3584-D, used to by-pass the plate supply of the R. F. tubes should be changed to Part No. 3615-B. In Service Bulletin 16 this condenser is shown as (18) and is connected between the lead "P" and condenser (9).

The new condenser No. 3615-B has the same capacity as the condenser formerly used, but in addition has a 250-ohm resistor section. One end of the condenser will be grounded through the hold-down screw of the condenser. The other terminal of the condenser is the terminal at the other end of the condenser. This terminal is also common to the resistor winding and should be connected to the point "P" shown on the schematic.

The middle terminal on the condenser is the other terminal of the resistor section, and should be connected to the R. F. coils (11) and (15).

With these changes made in the schematic, the plate supply for the first two "24" tubes will come from "P" through the resistor and then through the two R. F. transformers. The end of the resistor nearest "P" is by-passed through the condenser to ground.

PHILCO RADIO & TELEVISION CORP.

MODEL 50, 50-A
Adjustment
Parts List**ADJUSTMENT OF MODELS 50 AND 50-A**

Adjustment of the compensating condensers in the model 50 should be done with the aid of a good oscillator for the R.F. signal. The oscillator lead should be connected to the "ANT" terminal of the receiver. A good ground connection must be made from the receiver to the grounded side of the oscillator and to a water or radiator pipe.

Either the ear method or an output meter, connected across the speaker voice coil terminals can be used while adjusting.

When the Receiver is set up for operation, adjust the oscillator signal to a frequency which is approximately 1400 kilocycles.

With the volume control advanced to maximum, and using a weak oscillator signal, tune the receiver sharply to the oscillator note.

Adjust the third R. F. compensating condenser by means of the Philco fibre wrench, part 3164, for maximum output signal. If an output meter is being used, adjust for maximum reading.

Next adjust the second R. F. compensating condenser and finally the first. In each case, always adjust for maximum signal or reading.

REPLACEMENT PARTS MODELS 50 AND 50-A

No. on Figs. 3 and 4	Description	Part No.	No. on Figs. 3 and 4	Description	Part No.
①	Volume Control	5232	⑳	Resistor—15,000 Ohms	5278
②	First R. F. Transformer	03283	㉑	Bypass Condenser—.05 Mfd.	3615-L
③	Gang Condenser	03293	㉒	Bypass Condenser—(.05 Mfd.) (combined with ⑳)	
④	Compensating Condenser (Part of Gang Condenser Assembly)		㉓	Resistor—25,000 Ohms	3656
⑤	Second R. F. Transformer	03284	㉔	Resistor—99,000 Ohms	4411
⑥	Compensating Condenser (Part of Gang Condenser Assembly)		㉕	Resistor—32,000 Ohms	5279
⑦	Third R. F. Transformer	03284	㉖	Resistor—99,000 Ohms	4411
⑧	Compensating Condenser (Part of Gang Condenser Assembly)		㉗	On-Off Switch	5382
⑨	Condenser—250 Mmf.	3082	㉘	Power Transformer—50-60 cycles	5266
⑩	Condenser—250 Mmf.	3082		Power Transformer—25-40 cycles	5267
⑪	Resistor—10,000 Ohms	4412		Power Transformer—50-60 cycles 210-240 volts	5268
⑫	Condenser—.01 Mfd.	3903-L	㉙	Electrolytic Condenser—6 Mfd.— 50-60 cycles	4916
⑬	Resistor—240,000 Ohms	4410		Electrolytic Condenser—10 Mfd. 25-40 cycles	5142
⑭	Resistor—490,000 Ohms	4517	㉚	Electrolytic Condenser—6 Mfd.— 25-40 cycles and 50-60 cycles	4916
⑮	Bypass Condenser (.15 Mfd., .25 Mfd., 2-.5 Mfd., 1 Mfd.) 50-60 cycles	03459		Tube Shield	03390
	(.15 Mfd., .25 Mfd., 2-.5 Mfd., .05 Mfd.) 25-40 Cycles	03455		Knob (Large)	03064
⑯	Bypass Condenser—.01 Mfd.	3903-N		Knob (Small)	03427
⑰	Output Transformer	2660		Spring (For Dial Knobs) Small	4147
⑱	Voice Coil and Cone Assembly	02970		Spring (For Dial Knobs) Large	5262
	Speaker Field (Assembled with Pot and Frame)	02942		Grid Clip	4897
㉑	Resistor—490,000 Ohms.	4517		Five Prong Socket Assembly	4956
㉒	Resistor—160,000 Ohms.	5331		Four Prong Socket Assembly	5026
㉓	Resistor—150 Ohms and Con- denser—.05 Mfd.	3615-X		Dial Complete	03322
				Bezel	5383

MODEL 50,50-A
Resistance
Test Data

PHILCO RADIO & TELEVISION CORP.

All tubes cut of sockets and AC plug disconnected from power supply
Field Coil disconnected

From Chassis To	Correct	Incorrect
Aerial (V.C. Max)	24 ohms	Aerial V.C. 1800 ohms
1 RF Control Grid	6.5 ohms	TC- rf Cg-Y
1 RF Cathode (V.C.Max)	150 ohms	BC- rf K-Y (.05 mfd)
1 RF Screen Grid	20,150 ohms	V.C. in circuit 5000 ohms See RF Cathode BC- 2 rf Sg-Y FC- 80 F-Y (6 mfd EL)
1 RF Screen Grid to 80 Fil	25,000 ohms	
1 RF Plate	45,215 ohms	BC- rf P-Y See RF Screen
1 RF Plate to '80 Fil	65 ohms	
2 RF Control Grid	6.5 ohms	TC- 2 rf Cg-Y
2 RF Cathode(V.C.Max)	150 ohms	See 1 RF Cathode
2 RF Screen Grid	20,150 ohms	See 1 RF Screen
2 RF Screen Grid to '80 Fil	25,000 ohms	
2 RF Plate	45,215 ohms	See 1 RF Plate
2 RF Plate to 80 Fil	65 ohms	
Detector Control Grid	6.5 ohms	TC- D Cg-Y
Detector Cathode	32,000 ohms	BC- D K-Y
Detector Screen Grid	119,150 ohms	BC- D Sg-Y See RF Screen
Detector Screen Grid to 80 Fil	124,000 ohms	
Detector Plate	394,150 ohms	BC- 99,000 ohms-Y BLC- D P -47 Cg BC- D P-Y FC- 80 Fil-80 P wdg See RF Screen
Detector Plate to '80 Fil	349,000 ohms	
'47 Control Grid	650,000 ohms	BC- 47 Cg leak-Y
'47 Screen Grid to '80 Fil	0 ohm	
'47 Screen Grid to Chassis	45,150 ohms	See RF Screen
'47 Plate	45,516 ohms	See RF Screen
'47 Plate to '80 Fil	366 ohms	
'80 Fil to 80 Plate	695,460 ohms	FC- 80 F-(10 mfd EL)
'80 Plate to Chassis	650,310 ohms	
'80 Plate to 80 Plate	621 ohms	
Across AC plug	7.55 ohms	

A resistor of 10,000 ohms is used in place of an r-f choke in the detector plate circuit. Two bypass condensers, with mid-junction grounded are connected across the resistor.

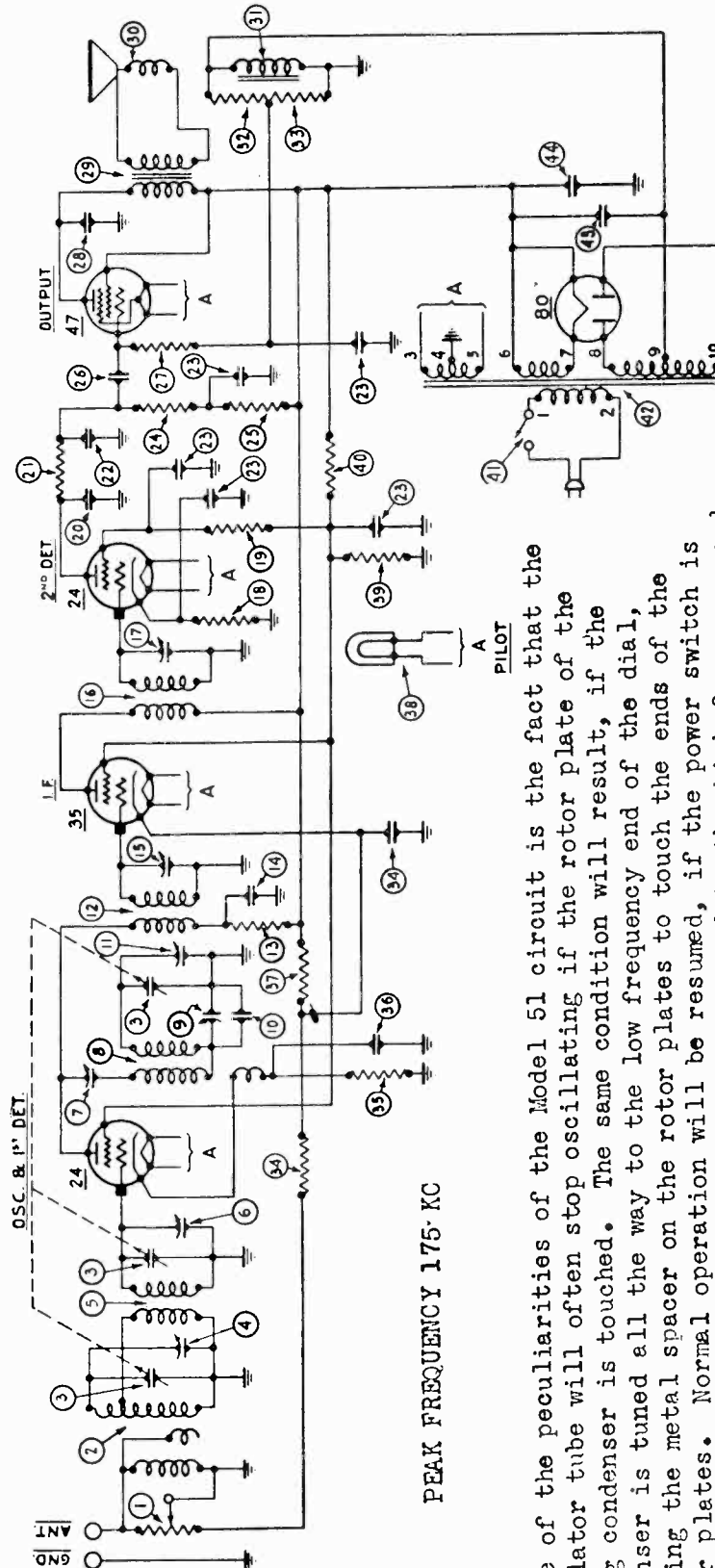
A fixed condenser is connected between the plate of the pentode tube and ground.

PHILCO RADIO & TELEVISION CORP.

MODEL 51, 51-A
Schematic

ARRANGEMENT OF WIRES

The placing of certain wires in the receiver will effect the operation to a marked extent. The red wire from the primary of the first I. F. transformer (2), Figs. 1 and 2, to the .05 mfd. condenser (9), Figs. 1 and 2, must come straight down to the corner of the I. F. tube socket, then straight up to the condenser lug.
The wire from the plate of the detector-oscillator tube to the coupling compensating condenser (7), Figs. 1 and 2, must be away from the chassis at the side.

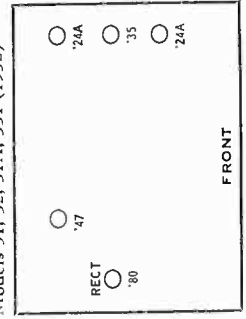


PEAK FREQUENCY 175 KC

One of the peculiarities of the Model 51 circuit is the fact that the oscillator tube will often stop oscillating if the rotor plate of the tuning condenser is touched. The same condition will result, if the condenser is tuned all the way to the low frequency end of the dial, allowing the metal spacer on the rotor plates to touch the ends of the stator plates. Normal operation will be resumed, if the power switch is snapped off and on again, or if the set is tuned to the high frequency end of the dial. An insulated wire is placed around the metal spacer on one set of rotor plates to prevent them from touching the stator. Later model 51s have a small fibre insulator of special design to replace the wire.

The coupling condenser and the two i-f trimmer condensers are located at the rear of the chassis, near the combination 1st detector-oscillator tube. Reading from left to right, facing the rear of the chassis, the condensers are "coupling", "2nd i-f" and "1st i-f".

Models 51, 52, 51A, 551 (1932)



MODEL 51,51-A
Voltage
Electrical
Data

PHILCO RADIO & TELEVISION CORP.

Model 51 Receivers are for operation on 100-130 volt, 50-60 cycle AC line
Model 51-A Receivers are for operation on 100-130 volt, 25-40 cycle AC line

Table 1—Tube Socket Readings Taken with AC Set Tester AC Line—115 volts

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milli-amperes
Type	Circuit						
24	Osc. & 1st Det.	2.2	220*	85*	9.0*	9.0*	
35	I.F.	2.2	210	85	3.0	3.0	6.2
24	2nd Det.	2.2	75	54	5.2	5.2	0
47	Output	2.2	210**	240**	0.2**		28.**
80	Rect.	5.0	240/Plate				30/ Plate

Note—Volume Control on full, Station Selector turned to Low Frequency End.

*These readings must be taken from the underside of the chassis, using a suitable high resistance D.C. voltmeter equipped with test prods and leads.

**These readings must likewise be taken from the underside of the chassis unless the set tester is especially equipped for testing pentode tubes.

Table 2—Power Transformer Voltages

Terminals	A.C. Volts	Connection	Color
1-2	105 to 125	Primary	Black (Small Gauge)
3-5	2.5	Filament of 24, 35 and 47	Black
6-7	5.	Filament of 80	Light Blue
8-10	700.	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black, Yellow Tracer
9	...	Center Tap of 8-10	Yellow, Green Tracer

Table 3—Condenser Data

Nos. on Figs. 1 and 2	Capacity Mfd.	Container
(20) (22)	00025	Yellow
(10) (36)	00011	Blue and Golden Yellow
(26) (28)	.01	Black Bakelite Container
(14)	.05	Black Bakelite Container
(23)	.1, .15, .25, 2-.5 (50-60 cy.)	Metal Container
(43)	.2, .15, .25, 2-.5 (25-10 cy.)	Metal Container
(41)	6 (50-60 cycles)	Electrolytic
	10 (25-40 cycles)	Electrolytic
	6	Electrolytic

Table 4—Resistor Data

Nos. on Figs. 1 and 2	Power (Watts)	Resistance (Ohms)	Color		
			Body	Tip	Dot
(34)	.5	250 and .05 Mfd.	Brown	Black	Red
(13)					
(35)	.5	8,000	Grey	Black	Red
(21)					
(39)	1.	25,000	Brown	Black	Orange
(19)					
(40)	1.	32,000	Orange	Red	Orange
(37)					
(19) (25)	.5	99,000	Green	Brown	Orange
(33)					
(24) (27) (32)	.5	160,000	White	White	Orange
	.5	490,000	Brown	Blue	Yellow
	.5	490,000	Yellow	White	Yellow

PHILCO RADIO & TELEVISION CORP.

MODEL 51, 51-A
Adjustment
Chassis

The adjustment of the Model 51 Receiver requires the use of a 175 K.C. oscillator and a broadcast oscillator such as the Jewell 560.

Set up the receiver for operation with the ground wire attached, but the aerial disconnected. Connect the ground wire of the oscillator to the receiver ground terminal. Connect the output meter (low terminals) across the speaker voice coil terminals.

Intermediate Frequency or I.F. Adjustment—Place the oscillator in operation at 175 K.C. Remove the tube shield and attach the oscillator output lead to the control grid terminal on top of the detector oscillator tube (see illustration above).

With the receiver volume control on full, adjust the oscillator output until the output meter reads about 1/2 scale deflection.

Using a Philco-fibre wrench, part 3164, adjust the 2nd I.F. compensating condenser for maximum reading in the output meter. The illustration above shows the positions of the various compensating condensers. Next adjust the first I.F. compensating condenser, and finally adjust the coupling condenser. Remove the oscillator connection from the grid terminal of the detector oscillator tube, and replace the clip on the tube.

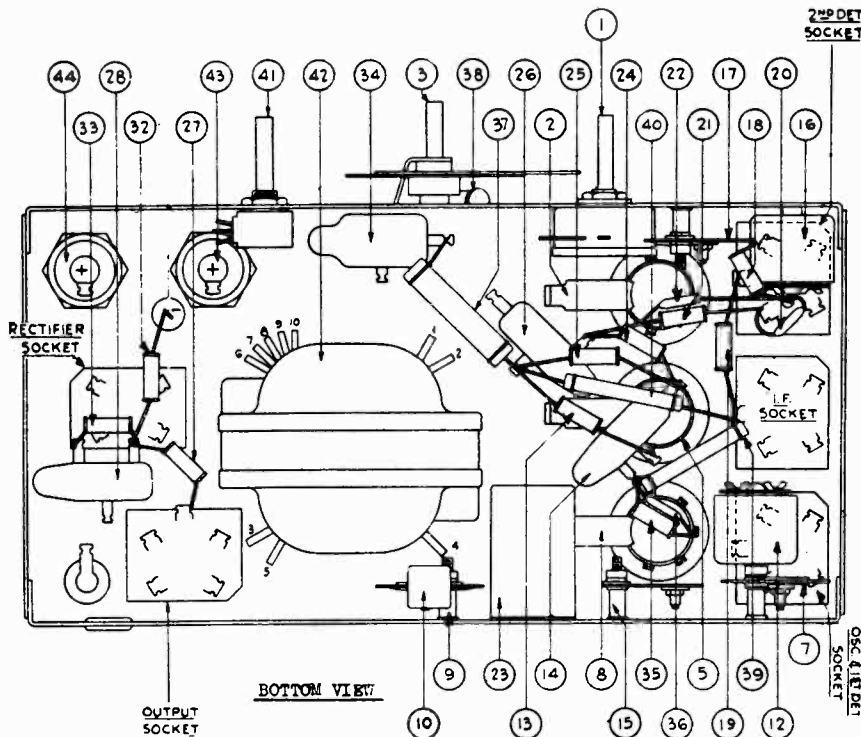
Detector Condenser—Connect the oscillator to the "Ant." terminal of the receiver chassis. Place the oscillator in operation at 175 K.C. Turn the station selector of the receiver to exactly 1400 K.C. Adjust the detector compensating condenser for maximum reading in the output meter.

If the receiver is so far out of adjustment that the signal is not audible, it may be necessary to set the oscillator for 1400 K.C. on the broadcast frequency setting. After making this adjustment, again set the oscillator at 175 K.C. The adjustment of the detector condenser will determine the position on the Philco scale where the eighth harmonic of 175 K.C. (1400 K.C.) will be tuned in. It must be tuned in at exactly 140 on the Philco scale.

Antenna Condensers—With the oscillator still set at 175 K.C. and the tuning dial at 1400 K.C., adjust the second antenna compensating condenser for maximum reading in the output meter, and then adjust the first antenna condenser.

Low Frequency Condenser—Set the broadcast oscillator to exactly 600 K.C. and turn the receiver dial to exactly 60 on th. scale. Adjust the low frequency condenser for maximum reading in the output meter.

After making this adjustment, it will be desirable to check the detector compensating condenser adjustment again. Set the oscillator at 175 K.C. and receiver at 140 on the scale. Adjust again for maximum reading in the output meter.



New Replacement Parts Models 51 and 51-A

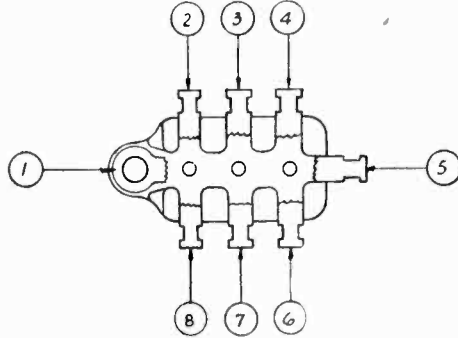
Part No.	Name	List Price	Part No.	Name	List Price
3615-AC	Condenser (.05 Mfd.)	\$.020	03881	Resistor (51,000 Ohms)	.35
3903-K	Condenser (.01 Mfd.)	.16	03882	Resistor	.75
3903-S	Condenser (.01 Mfd. Double)	.20	03886	Oscillator Coil	1.00
5837	Resistor (1,000 Ohms)	.20	03887	Second I. F. Transformer	1.25
5838	Resistor (8,000 Ohms)	.20	03915	First I. F. Transformer	1.25
5839	Volume Control	.75	03945	Condenser (.1, .15, .25, 2-.5) 50-60 Cycles	1.25
5858	Condenser (250 Mmf.)	.16	04011	Condenser (.2, .15, .25, 2-.5) 25-40 Cycles	.25
5863	Condenser (710 Mmf.)	.18	04031	Tube Shield	.40
			14607	Dial Complete	.18
			44613	Turnings (3 used)	.18
				Scroll	
5868	Resistor	.35	03881	Resistor (51,000 Ohms)	.35
5879	Bezel	.20	03882	Resistor	.75
5942	Clock Glass	.30	03886	Oscillator Coil	1.00
5950	Clock Unit (60 Cycles)	5.50	03887	Second I. F. Transformer	1.25
02861	Voice Coil and Cone Assembly (Type P) Small	.60	03915	First I. F. Transformer	1.25
02887	Voice Coil and Cone Assembly (Type S) Large	.75	03945	Condenser (.1, .15, .25, 2-.5) 50-60 Cycles	1.25
02942	Field Coil and Pot Assembly	1.75	04011	Condenser (.2, .15, .25, 2-.5) 25-40 Cycles	1.25
03809	Gang Condenser	4.75	04031	Tube Shield	.40
03814	Pilot Light Bracket Complete	.08	14607	Dial Complete	.18
03860	Antenna Coil	.75	44613	Turnings (3 used)	.18

Standard Bypass
Condenser Data

PHILCO RADIO & TELEVISION CORP.

Standard By-Pass Condenser Data

The tables below list the various Philco standard by-pass condensers in black bakelite containers. The drawing shows all possible lug connections and the tables list the lug numbers.



Condenser 3615 .05 Mfd.

Part No.	Cond. Cap. Mfd.	Lugs Used	Wire Resis. Ohms	Resis. Wiring Lugs	Cond. Wiring Lugs
3615-B	.05	1-3-5	250	3-5	1-5
3615-C	.05	1-5-7	250	5-7	1-5
3615-D	.05	1-3-5	...	...	1-5
3615-E	.05	2-5	...	...	...
3615-F	.05	2-3-5	...	...	3-5
3615-G	.05	5-8	...	...	...
3615-H	.05	3-5-8	...	...	5-8
3615-J	.05	1-5-7	...	...	1-5
3615-K	.05	3-5-8	250	3-5	5-8
3615-L	.05	1-5	...	...	...
3615-M	.05	2-5-7	...	...	2-5
3615-N	.05	1-4-7	...	...	1-4
3615-P	.05	1-4-7	250	4-7	1-4
3615-R	.05	1-5-7	250	5-7	1-5
3615-S	.05	1-4	...	...	...
3615-T	.05	1-5-7	150	1-7	1-5
3615-U	.05	1-5-7	...	...	1-7
3615-W	.05	1-2-5	...	...	1-5
3615-X	.05	1-2-5-7	150	1-7	1-5
3615-Y	.05	1-2-5-7	150	1-5	1-7

Condenser 3793 .015 Mfd.

Part No.	Cond. Cap. Mfd.	Lugs Used	Wire Resis. Ohms	Resis. Wiring Lugs	Cond. Wiring Lugs
3793-B	.015	5-7	...	...	...
3793-C	.015	2-4	...	...	...
3793-D	.015	2-6	...	...	...
3793-E	Twin .015	1-5-7	...	...	1-5 & 1-7
3793-F	.015	5-7-8	...	...	7-8
3793-G	.015	2-3-6	...	...	2-6
3793-H	Twin .015	1-3-5	...	...	1-3 & 1-5

Condenser 3903 .01 Mfd.

Part No.	Cond. Cap. Mfd.	Lugs Used	Wire Resis. Ohms	Resis. Wiring Lugs	Cond. Wiring Lugs
3903-F	.01	3-5	...	...	...
3903-G	.01	2-4-7	...	...	2-4
3903-H	.01	5-8	...	...	...
3903-J	.01	2-5-7	...	...	2-5
3903-K	.01	1-2-4-7	...	...	1-7
3903-L	.01	3-5-8	...	...	3-5
3903-M	.01	4-7-8	...	...	4-8
3903-N	.01	3-5-8	...	...	5-8
3903-P	.01	2-5-7	...	...	2-7

Condenser 4989 .09 Mfd.

Part No.	Cond. Cap. Mfd.	Lugs Used	Wire Resis. Ohms	Resis. Wiring Lugs	Cond. Wiring Lugs
4989-B	Twin .09	1-3-5	...	...	1-3 & 1-5
4989-C	Twin .09	1-5-7	...	...	1-5 & 1-7
4989-D	.09	1-5	...	...	...
4989-E	.09	1-5-7	250	7-5	1-5
4989-F	.09	1-5-7	...	...	1-5
4989-G	Twin .09	1-4-7	...	...	1-4 & 1-7
4989-H	Twin .09	1-5	...	...	1-5 & 1-5

PHILCO RADIO & TELEVISION CORP.

MODEL 70, 70-A
Below B-22,000
Parts List

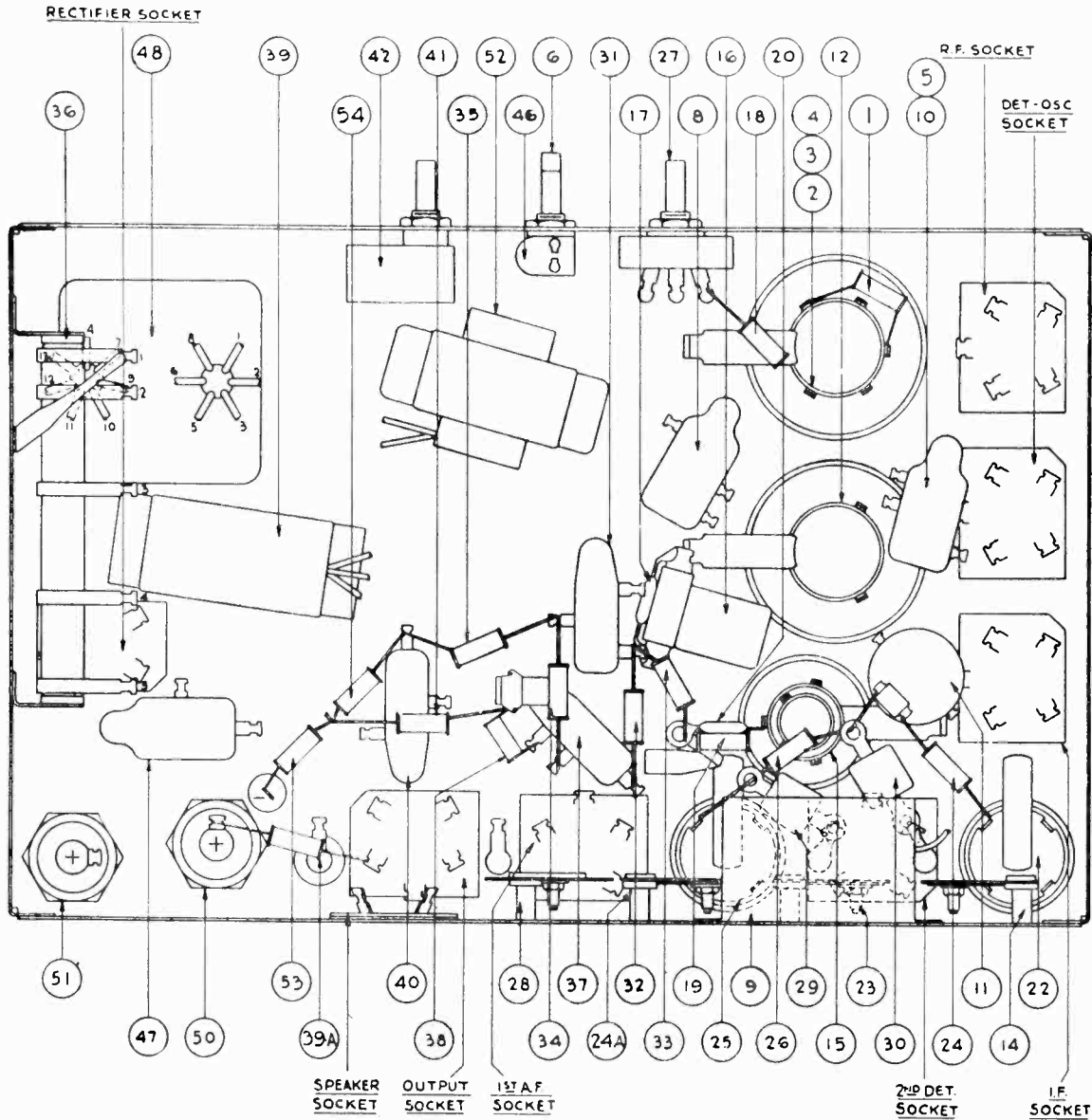
REPLACEMENT PARTS—MODELS 70 AND 70-A
(Service Bulletin No. 57)

No. on Figs. 3 and 4	Description	Part No.	No. on Figs. 3 and 4	Description	Part No.
①	Volume Control	5039	⑩	Condenser (Electrolytic) (50-60 cycles)	4916
②	First R. F. Transformer	03082		Condenser (Electrolytic) (25-40 cycles)	5142
③	Tuning Condenser (25-40 cycles)	03077	⑫	Filter Choke	4951
	Tuning Condenser (50-60 cycles)	03076	⑬	Condenser (Electrolytic) (50-60 cycles)	4916
④	Compensating Condenser (Part of Gang Assembly)			Condenser (Electrolytic) (25-40 cycles)	5142
⑤	Bypass Condenser—.09 M. F. Double	4989-C	⑭	Pilot Lamp	3463
⑥	First Detector Transformer	03083	⑮	Power Transformer—50-60 cycles	5117
⑦	Compensating Condenser (Part of Gang Assembly)			Power Transformer—25-40 cycles	5118
⑧	Oscillator Coil	03084	⑯	Switch	4095
⑨	Fixed Condenser—.00041 M. F.	5120	⑰	Bypass Condenser—.015 M. F. (Double)	3793-H
⑩	Compensating Condenser	03120	⑱	Tone Control	03140
⑪	Resistor—50,000 Ohms	4237		Mica (Compensating Condenser)	3473
⑫	Bypass Condenser—.09 M. F. Double	4989-C		Insulating Washer (Compensating Condenser)	3500
⑬	Compensating Condenser (Part of Gang Assembly)			Rubber Washer (Chassis Mtg.)	5189
⑭	Resistor—5,000 Ohms	3526		Grommet (R. F. Transformer Shield)	3747
⑮	Condenser—.00011 M. F.	4519		Rubber Washer (Tuning Condenser Mtg.)	3914
⑯	Resistor—13,000 Ohms	3766		Rubber Washer (Tuning Condenser Mtg.)	3915
⑰	Condenser—.00011 M. F. }	3772-C		Rubber Washer (Tuning Condenser Mtg.)	3916
⑱	Compensating Condenser }			Spring Switch Knobs	4147
⑲	First I. F. Transformer	03091		Grid Clip	4897
⑳	Compensating Condenser }			Five Prong Socket	4956
㉑	Fixed Condenser—.00011 }	03051		Speaker Socket	4957
㉒	Second I. F. Transformer	03092		Knobs (Dial)	03063
㉓	Bypass Condenser—.05 M. F.	3615-L		Tube Socket (Rectifier Tube)	5026
㉔	Compensating Condenser }			Steel Washer (Chassis Mtg.)	5058
㉕	Condenser—.00005 }	03061		Knob (Switch, Tone, Volume) (Baby Grand)	4290-A
㉖	Bypass Condenser—.5	3583		Volume Control Insulator	4092
㉗	Resistor—50,000 Ohms	4237		Volume Control Insulator	4286
㉘	Condenser—.0005	3910		Knob—Tone, Volume (Highboy)	03064
㉙	Condenser—.00025	3082		Nut—Volume, Tone, Switch	W-434
㉚	Detector R. F. Choke	03086		Complete Drive Bracket	03011
㉛	Resistor—250 Ohms and Condenser—.09 M. F.	4989-E		Dial Disc Assembly	03031
㉜	Resistor—250,000 Ohms	4410		Fahnestock Clip	L-1126
㉝	Resistor—100,000 Ohms	4411		Knob Spring - Tone, Volume, Dial for Lowboy and Highboy	5262
㉞	Condenser—.01 M. F.	3903-J		Knob Spring - Tone, Volume for Baby Grand	5173
㉟	Resistor—250,000 Ohms	4410		Knob Spring - Dial - Baby Grand	5262
㊱	Condenser—.25 M. F.	4264			
㊲	Output Transformer	2673			
㊳	Voice Coil and Cone	02996			
㊴	Speaker Field assembled with Pot and Frame	02966			
㊵	B. C. Resistor	5125			

Several changes in wiring and part numbers have been made in model 70. The filter choke, part 4951 has been changed to part 4819, the same choke as used in the model 21. On the 50-60 cycle models, a .09 mfd. condenser, part 4989-J, is connected across the filter choke, part 4819. On the 25 cycle models, this condenser should be .18 mfd., part 4989-H, ungrounded. The two 240,000 ohm resistors, part 4410, Nos. 32 and 35 Service Bulletin No. 57 and Nos. 25 and 29, Service Bulletin No. 85, should be of the Continental Carbon type. This is the resistor without the metal ends.

MODEL 70, 70-A
 Above B-22,000
 Chassis

PHILCO RADIO & TELEVISION CORP.



MODELS 70 AND 70-A

Above Serial B-22000

Part Numbers on Service Reports

It is highly important that the complete part number including the letter, of defective parts be specified on all of your service reports. Many parts have a letter after the part number as listed in the service bulletins. Other parts—namely, power transformers, audio transformers, filter chokes, field coils, electrolytic condensers, and volume controls are listed in the service bulletins without a letter, but actually have this letter stamped on the part itself after the part number.

Adjusting Superheterodynes

PHILCO RADIO & TELEVISION CORP.

Adjusting Philco Superheterodynes

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

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

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

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

EQUIPMENT. The following equipment is needed:

1. Intermediate frequency oscillator accurately calibrated at 175 K. C. and 260 K. C. The Philco Oscillator Model 095 is recommended.
2. Output meter. The oscillator mentioned above is equipped with an output meter.
3. Philco fibre wrench, part 3164.

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

1. Make the necessary connections between the oscillator and the receiver as shown in the illustration, Fig. 1. The connections consist of (a) the ground wire to the GND. terminal of the radio set and to the G terminal of the oscillator; (b) the A terminal of the oscillator to the grid of the first detector tube (tube shield in place and first detector grid clip removed), (c) output meter terminals to the primary of the output transformer (this connection is obtained at the speaker plug and socket through the Philco plug-in adapter, part 6085), (d) power cord of receiver to the electric power outlet after all other connections have been completed.

2. Turn on the radio set and the oscillator. For Philco models of the 70 and 35 series, the oscillator switch should be placed in the 260 K. C. position. For models of the 111, 112, 90 and 51 series, the switch should be placed in the 175 K. C. position.

When adjusting sets with a NORMAL-MAXIMUM switch, the switch should be placed in the NORMAL position. Turn the radio volume control to Maximum. Set the dial between 80 and 85 on the Philco scale. Adjust the oscillator control (attenuator) until a reading is obtained on the output meter of approximately 1/2 the scale deflection.

3. By means of the Philco fibre wrench, part 3164, adjust the various intermediate frequency condensers, one at a time, to obtain maximum reading in the output meter. Locations of all compensating condensers are shown in the illustrations on pages 3 and 4. It is desirable to start with the last I. F. compensating condenser in the circuit (2nd I. F. secondary in the case of the 112) and progress in the adjustments toward the first. It may be necessary while the adjustments are being made, to lower the setting of the oscillator control from time to time so as to keep the output meter reading within the scale range.

4. After these adjustments have been completed, remove the oscillator connection from the grid terminal of the first detector tube and restore the grid clip connection to this terminal.

COUPLING CONDENSER. Adjust the coupling condenser in the Model 51 at 175 K. C. in the same manner as the I. F. condenser.

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

1. Connect from the A terminal of the oscillator to the ANT terminal of the receiver to exactly 140 K. C. The eighth harmonic of 175 K. C. will be received at this point. Turn on the volume control to maximum. Turn on the oscillator and adjust the control until a 1/2 scale reading is obtained on the output meter. If the receiver is badly out of adjustment, it may not be possible to obtain such a reading, in which case the meter reading must be disregarded temporarily and the adjustments made by ear.

2. Set the switch on the oscillator to 175 K. C. Set the dial of the receiver to exactly 140 (1400 K. C.). The eighth harmonic of 175 K. C. will be received at this point. Turn on the volume control to maximum. Turn on the oscillator and adjust the control until a 1/2 scale reading is obtained on the output meter. If the receiver is badly out of adjustment, it may not be possible to obtain such a reading, in which case the meter reading must be disregarded temporarily and the adjustments made by ear.

3. Carefully adjust the high frequency compensating condenser for maximum reading in the output meter or for maximum volume if the output is not great enough to be read on the meter.

When making this adjustment, it may be found that a given position of the adjusting nut can be obtained at which maximum reading is noted, but that the meter reading decreases when the fibre wrench is lifted from the nut. Allow for this condition by turning slightly beyond the point of maximum reading, then when the wrench is removed the reading will go up instead of down. After making the adjustment, turn the station selector slightly to note if any increase in volume is obtained as the set is being re-tuned. If such an increase is obtained, then the antenna, detector and r. f. condensers should be adjusted as described below. After this adjustment, the high frequency condenser can again be re-adjusted at 1400 K. C.

In some cases, when first starting to make the 1400 K. C. adjustment, it may be found that the signal from the oscillator cannot be heard at 140 because the set is so far out of adjustment. In this case, tune the set to the signal, and then adjust the Antenna Detector and R. F. condenser first. Re-adjust the high frequency condenser at 140 on the dial.

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

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

1. With the receiver and the oscillator in operation, the latter at 175 K. C., set the Philco dial at exactly 70 on the scale.

2. With the volume control at maximum, adjust the oscillator output until the output meter reads approximately 1/2 scale deflection. Adjust the low frequency compensating condenser for maximum reading in the output meter.

3. If the signal comes in stronger at a position off 70 on the Philco scale, adjust for maximum output on the meter at this "Off K. C." position of the dial. Now re-tune the set slightly to obtain any further possible increase, adjusting the compensating condenser and re-tuning the dial each time so as to bring the point of maximum output as near 70 as possible.

4. Re-set the dial to exactly 140, and re-adjust the high frequency condenser. It is possible that the adjustment of the low frequency condenser has affected the high setting of the dial slightly.

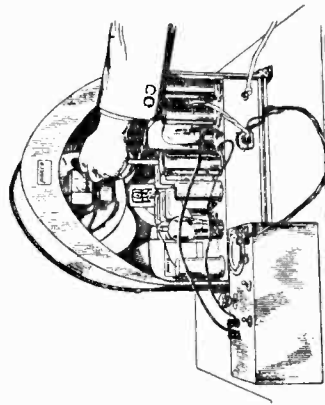


Fig. 2

the output meter or for maximum volume if the output is not great enough to be read on the meter. When making this adjustment, it may be found that a given position of the adjusting nut can be obtained at which maximum reading is noted, but that the meter reading decreases when the fibre wrench is lifted from the nut. Allow for this condition by turning slightly beyond the point of maximum reading, then when the wrench is removed the reading will go up instead of down. After making the adjustment, turn the station selector slightly to note if any increase in volume is obtained as the set is being re-tuned. If such an increase is obtained, then the antenna, detector and r. f. condensers should be adjusted as described below. After this adjustment, the high frequency condenser can again be re-adjusted at 1400 K. C.

In some cases, when first starting to make the 1400 K. C. adjustment, it may be found that the signal from the oscillator cannot be heard at 140 because the set is so far out of adjustment. In this case, tune the set to the signal, and then adjust the Antenna Detector and R. F. condenser first. Re-adjust the high frequency condenser at 140 on the dial.

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

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

1. With the receiver and the oscillator in operation, the latter at 175 K. C., set the Philco dial at exactly 70 on the scale.

2. With the volume control at maximum, adjust the oscillator output until the output meter reads approximately 1/2 scale deflection. Adjust the low frequency compensating condenser for maximum reading in the output meter.

3. If the signal comes in stronger at a position off 70 on the Philco scale, adjust for maximum output on the meter at this "Off K. C." position of the dial. Now re-tune the set slightly to obtain any further possible increase, adjusting the compensating condenser and re-tuning the dial each time so as to bring the point of maximum output as near 70 as possible.

4. Re-set the dial to exactly 140, and re-adjust the high frequency condenser. It is possible that the adjustment of the low frequency condenser has affected the high setting of the dial slightly.

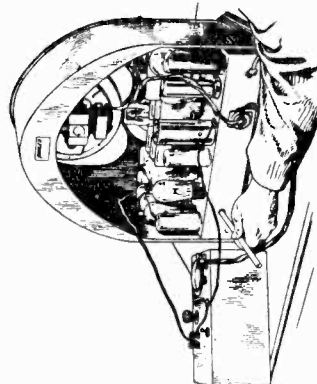


Fig. 1

When adjusting sets with a NORMAL-MAXIMUM switch, the switch should be placed in the NORMAL position. Turn the radio volume control to Maximum. Set the dial between 80 and 85 on the Philco scale. Adjust the oscillator control (attenuator) until a reading is obtained on the output meter of approximately 1/2 the scale deflection.

3. By means of the Philco fibre wrench, part 3164, adjust the various intermediate frequency condensers, one at a time, to obtain maximum reading in the output meter. Locations of all compensating condensers are shown in the illustrations on pages 3 and 4. It is desirable to start with the last I. F. compensating condenser in the circuit (2nd I. F. secondary in the case of the 112) and progress in the adjustments toward the first. It may be necessary while the adjustments are being made, to lower the setting of the oscillator control from time to time so as to keep the output meter reading within the scale range.

4. After these adjustments have been completed, remove the oscillator connection from the grid terminal of the first detector tube and restore the grid clip connection to this terminal.

COUPLING CONDENSER. Adjust the coupling condenser in the Model 51 at 175 K. C. in the same manner as the I. F. condenser.

MODEL 65

PHILCO RADIO & TELEVISION CORP.

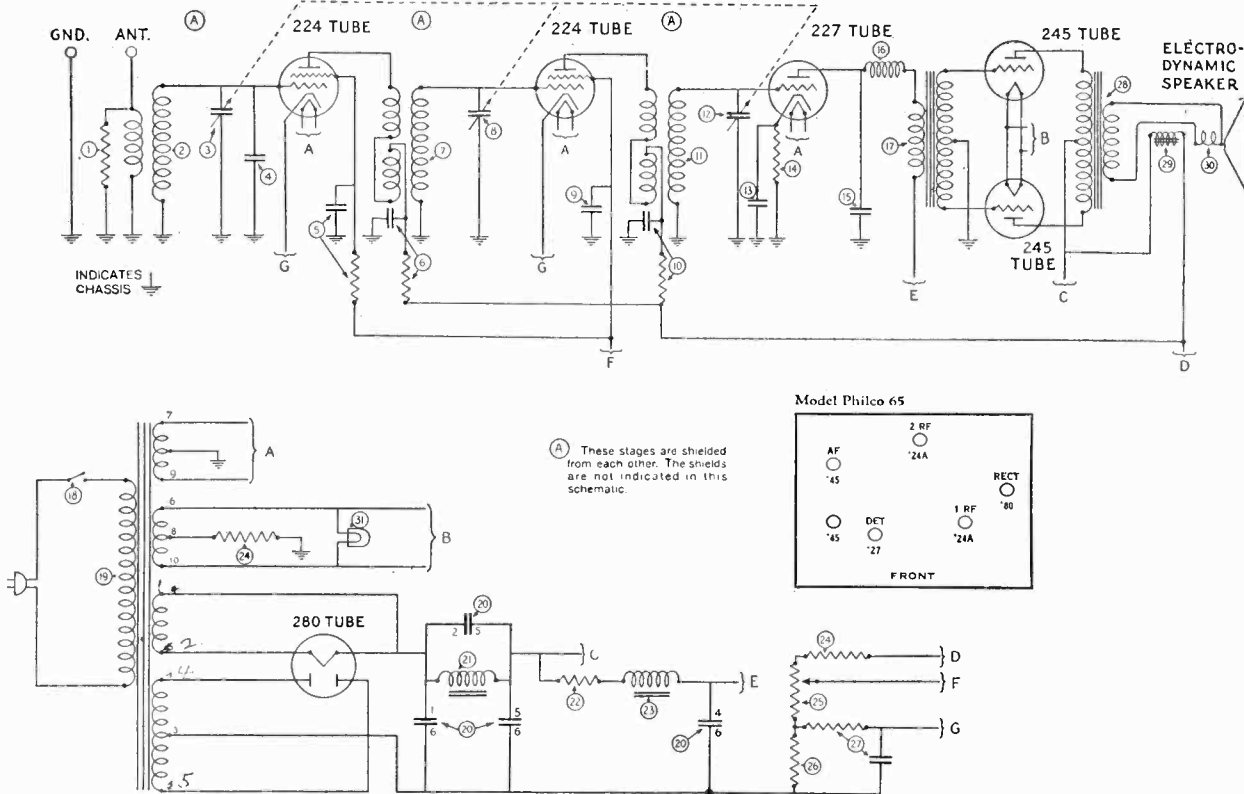


Table 8
Tube Socket Readings

TYPE TUBE	"A" VOLTS	"B" VOLTS	"B" VOLTS (SCREEN GRID)	"C" VOLTS (CONTROL GRID)	MA PLATE	CATHODE
224	2.5	150	*.2 to 75	1.5	1.5	+1.5
227	2.5	250	.....	28	†.8 to 3.5	+28
245	2.5	250	.....	50	32	.....
280	5.0	350-V. A.C.	.....	.....	55	.....

*The voltage varies from 75 volts with the volume control turned for full volume to .2 volts with the control turned for minimum volume.

†When there is no signal being reproduced the detector plate current will be about .8 M.A. Strong signals will cause a rise in current to 3.5 M.A.

Table 9
Power Transformer Voltage [AC]

TERMINALS	A.C. VOLTS	SECONDARY
1-2	700	A.C. Supply to Plates of Rectifier Tube
3		Center Tap of Rectifier Plate Secondary
4-5	5.0	Rectifier Filament
6-10	2.5	Filament 245 Tubes
8		Center Tap of 245 Tube Secondary
7-9	2.5	Heater 224 and 227 Tubes

Green lead - Center Tap for Secondary 7-9
Current Consumption - 125 V. A.C. 95 Watts

Table 10
D. C. Voltage Across Filter Condenser Block

TERMINALS	D.C. VOLTS	CAPACITY	CIRCUIT
1-6	325	2.0 Mfd.	First Filter Section, Ground to 280 Filament
2-5	20	.15 Mfd.	Parallel with First Choke Coil
3			Blank Terminal for Detector Plate Resistor
4-6	280	1.0 Mfd.	Last Filter Section, Gnd. to Det. Plate Lead
5-6	305	2.0 Mfd.	2d Filter Section, Gnd. to End of First Choke

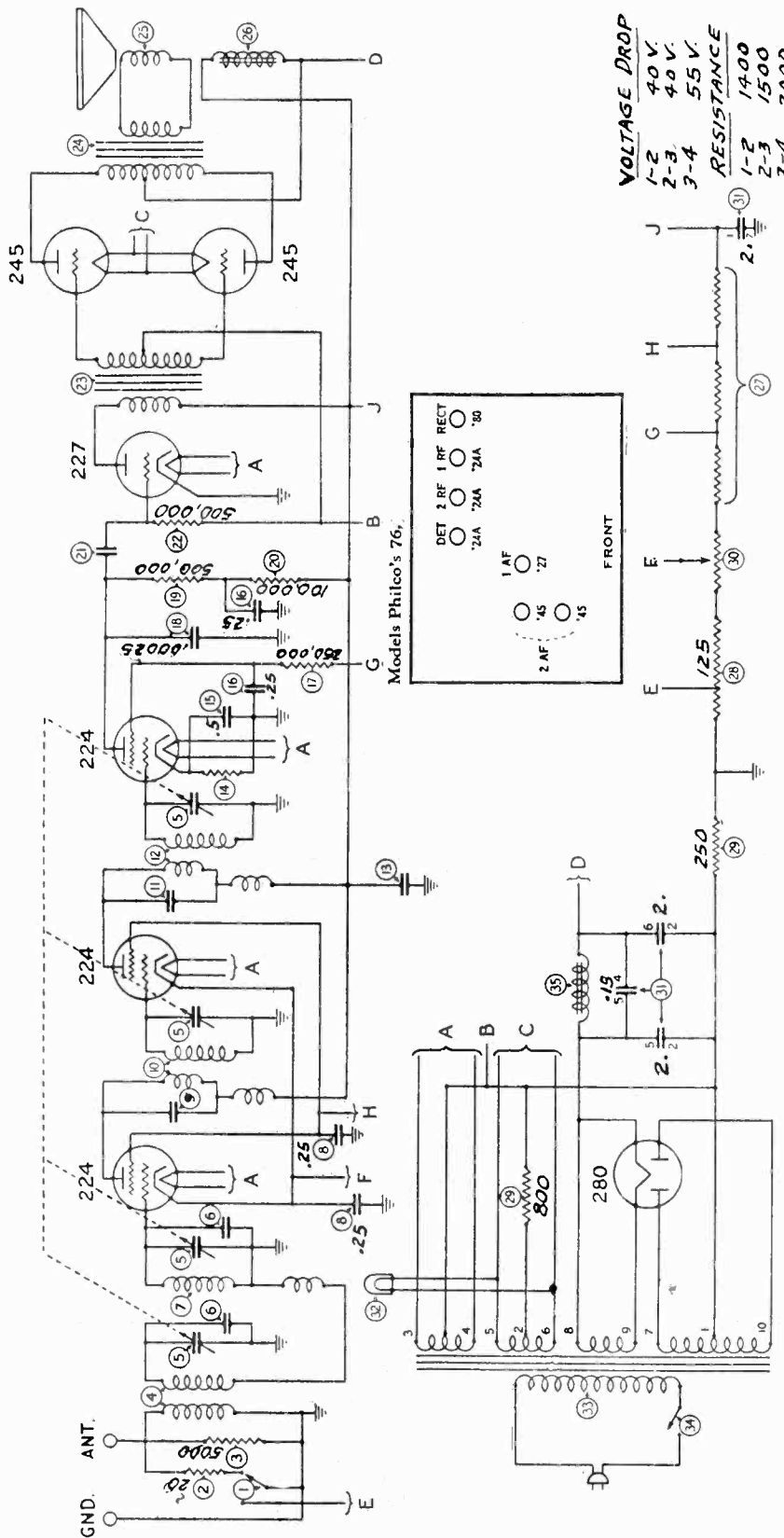
Table 11
Voltage Across Resistors

RESISTOR NUMBER	RESISTOR TERMINAL	VOLTAGE DROP	CIRCUIT
③	1-2	45-50	Grid Bias for the 245 Tubes
	3-4	75-80	Reduces B Voltage for the Screen Grid
②	1-2	4-10	Detector Plate Voltage
④	1-2	28	Detector Grid Bias
Field Coil of Speaker		135-140	Supplies Field Energy of Dynamic Speaker

PHILCO RADIO & TELEVISION CORP.

MODEL 76

Philco Model 76



VOLTAGE DROP

1-2	40 V.
2-3	40 V.
3-4	55 V.

RESISTANCE

1-2	1400
2-3	1500
3-4	2000

Power Transformer Voltages

TERMINALS	A.C. VOLTS	SECONDARY
1	2.67	Center Tap for 280 Plate
2	2.68	Center Tap for 245 Tubes
3-4	5.00	Heaters of 224 and 227 Tubes
5-6	7.50	Filaments of 245 Tubes
8-9		Filament of 280 Tube
7-10		Plate of 280 Tube
Red Wire		Center Tap for 224 and 227 Tubes
Red Wire		Primary } Through panel together
Red Wire		Primary }

Model 76.

Vol. Contr. set to max. - Line Volts: 115

Tube Type	Location	Fil. Volts	Plate Volts	S.G. Volts	Contr. Gr. Volts	Cathode Plate Ma.
24	1 R.F.	2.3	145	90	3.	3.5
24	2 R.F.	2.3	145	90	3.	3.5
24	Det.	2.3	56	30	1.4	0.
27	1 A.F.	2.5	140		1.	3.
45	2 A.F.	2.2	230		46.	30
45	2 A.F.	2.2	230		46.	30
80	Rect.	4.5				50

MODEL 87
Voltage Data
Condenser Data
Neutralization

PHILCO RADIO & TELEVISION CORP.

is very critical, and must be done with extreme care. Remove the neutralizing tube and after taking the insulating material from the filament prong put the tube back into the socket. Repeat the above procedure for the second and then the first R. F. stage. It is important that the neutralizing be done with the volume control on full.

Philco Model 87 Receiver

POWER TRANSFORMER (30)

TERMINAL No.	COLOR OF CABLE WIRE	CONNECTION
1		Plate Rectifier (280) Tube
2		Plate Rectifier (280) Tube
3		Center Tap Grounded
4		Filament 280 Tube
5		Filament 280 Tube
6	Green with Yellow Tracer	Filament 245 Tube and Pilot
7	Black with White Tracer	Filament 226 Tube
8	Yellow	Heater 227 Tube
9	Green with Black Tracer	Terminal 7 of No. (2), Terminal 4 of No. (3)
10	White with Black Tracer	Filament 226 Tube
11	Yellow with Green Tracer	Heater 227 Tube
12	Green	Filament 245 Tubes and Pilot
	Green Rubber-Covered Wire	A.C. Supply
	Black Rubber-Covered Wire	A.C. Supply
	Yellow Rubber-Covered Wire	Terminal 3 of No. (3)

FILTER CONDENSER BLOCK (31)

1	White	Terminal of No. (2)
2-3	Black with Yellow Tracer (Two Wires)	Terminal of No. (2)
4	Blue	Right Lower Lug Electro-Dynamic Speaker Plug Jack
		Terminal of No. (3)
		Left Lower Lug Electro-Dynamic Speaker Plug Jack
5	Yellow with Green Tracer (Two Wires)	Terminal of No. (3)
6	Yellow	Terminal of No. (7)
7	Green with Black Tracer	Terminal of No. (2)
8	Blue with White Tracer	Terminal 9 of No. (3)
9	Black	Terminal of No. (3)
10		Local on Binding Post Strip Grounded

Neutralizing: Use a neutralizing tube as described above and a good oscillator, such as is shown on Page 17, to neutralize the Philco Receiver.

When adjusting the Neutralizing Condensers connect the test lead from the oscillator to the ANT terminal. Have a good ground connection. Turn on the oscillator. With the Receiver turned on, tune it carefully until the oscillator signal is brought in at maximum strength. Have the oscillator coupler plug in for loud volume.

Table 3
Tube Socket Voltag

A.C. LINE VOLTS	1st, 2d, 3d R. F.		DETECTOR		2d A. F.		RECTIFIER	
	F. V.	P. V.	G. V.	F. V.	P. V.	F. V.	P. V.	F. V.
125	1.5	90	6.0	2.5	30	2.5	245	45
								5.0

Table 4
D. C. Voltage Across Filter Condenser Block

TERMINALS	D.C. VOLTS	CAPACITY	CIRCUIT
1-10	310	2.00 Mfd.	First Plate Filter Condenser
1-2	20	0.15 Mfd.	Across First Filter Choke
3-10	290	2.00 Mfd.	Second A. F. to Ground
4-10	155	1.00 Mfd.	Speaker Plate to Ground
6-10	30	2.00 Mfd.	Detector Plate to Ground
5-10	96	1.00 Mfd.	R. F. and 1st A. F. Plates to Ground
7-10	45	0.10 Mfd.	B- of Second A. F. to Ground
8-9	110 A.C.	0.015 Mfd.	LOC Terminal Condenser

Table 5
Voltage Across "B-C" Resistor

TERMINALS	VOLTAGE DROP	TERMINAL	CIRCUIT
1-2	90	1	B+ for 226 Tubes
2-3	6	2	C+ and B- of 226 and 227 Tubes
3-4	45	3	Grounded C- of 226 and 245 Tubes
		4	C+ and B- of 245 Tubes

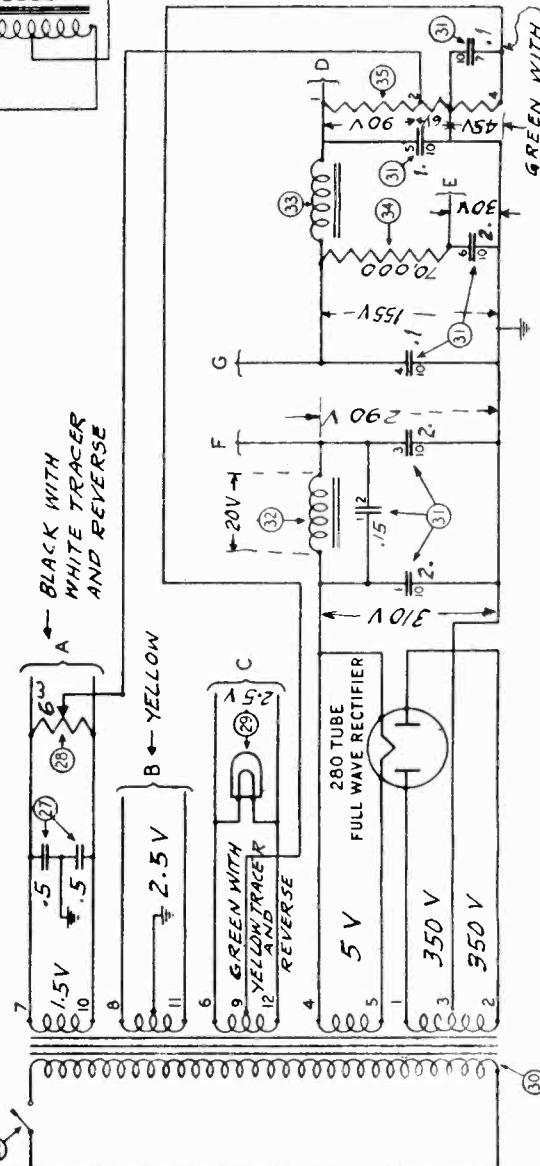
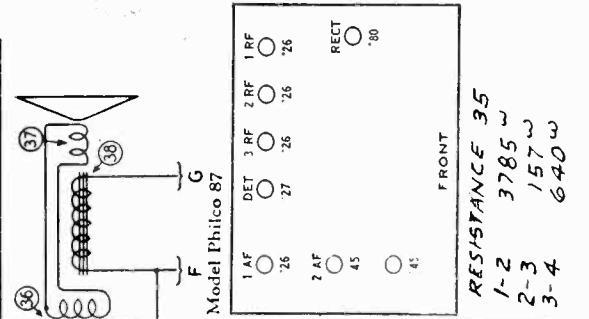
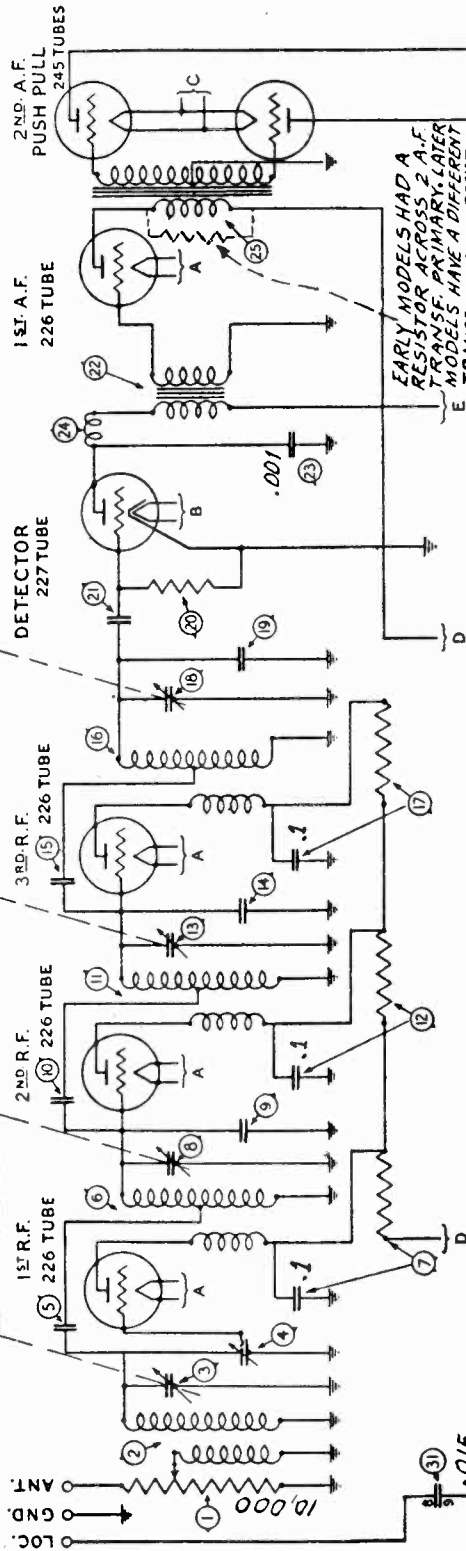
Table 6
Power Transformer Voltages
Current Consumption—125-volt Line—A. C. Watts—95

TERMINALS	A.C. VOLTS	SECONDARY
7-10	1.5	A.C. Filament of 226 Tube
8-11	2.5	A.C. Filament of 227 Tube
6-12	2.5	A.C. Filament of 245 Tubes
9		Center Tap of 245 Filament Secondary
4-5	5.0	A.C. Filament of Rectifier Tube
1-2	700	A.C. Supply to Plate of Rectifier Tube
3		Center Tap of Rectifier Plate Secondary

PHILCO RADIO & TELEVISION CORP.

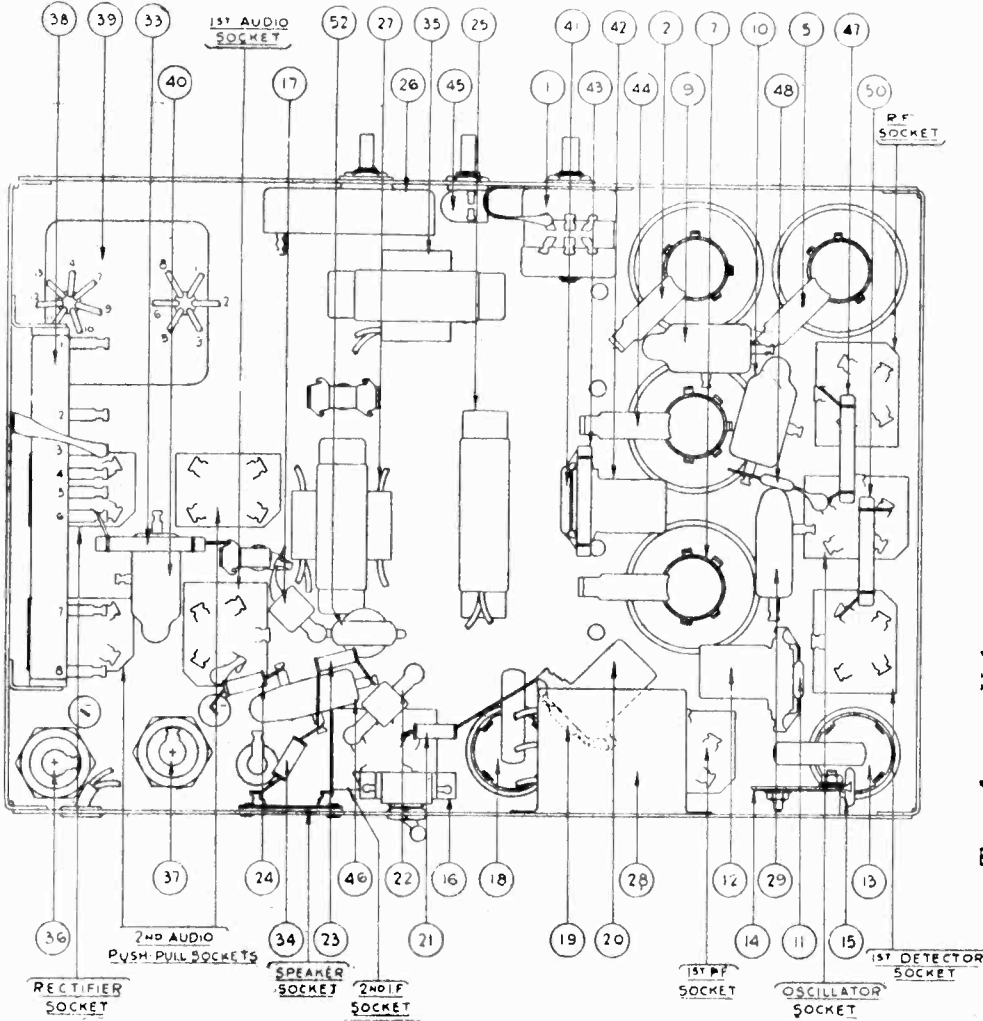
MODEL 87
Schematic
Socket

Philco Model 87



MODEL 90, 90-A
(With 2-'45s)
Chassis-Data

PHILCO RADIO & TELEVISION CORP.



Transformer Voltages

Color	A.C. Volts	Terminals
Black (Small Gauge)	105 to 125	1-2
Black (Heavy Gauge)	2.5	3-5
Black with Yellow	2.5	4
Dark Green	2.5	6-8
Black with Green	2.5	7
Light Blue	5.0	9-10
Yellow	650	11-13
Yellow with Green	...	12

No. on Figs.	Capacity	Color
9	.09 Double	Black Bakelite Container
10	.09 Double	Black Bakelite Container
11, 15, 16, 20, 45	.00011	Blue, Golden Yellow
17, 22	.000035	Yellow and Green
23	.5	Metal Container
24	.25 Double (Black wires to Ground)	Metal Container
25	.5 (White wire to Ground)	Black Bakelite Container
26	.05	Electrolytic Type
27	6.	Electrolytic Type
28	10.	Black Bakelite Container
29	.015 Double	Black Bakelite Container
30	.0007	White, Golden Yellow
31, 32	.001	Green and White
33 (25 to 40 cycles)		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		

Resistor Data

No. on Fig.	Terminal	Power (Watts)	Resistance	Color Body—Tip—Dot
38	1-2	...	800	(Long Tubular)
	2-3	...	263	
	3-4	...	75	
	5-6	...	370	
	6-7	...	1,800	
	7-8	...	1,430	
	1.	...	13,000	
	...	.5	50,000
47	...	1.	50,000	Brown—Orange—Orange
	...	1.	250,000	
495	250,000	Green—Brown—Orange
	...	.5	250,000
505	250,000	Red—Yellow—Yellow
	...	.5	1,000,000
34	Red—Yellow—Yellow
	
24	Brown—Black—Green
	

PHILCO RADIO & TELEVISION CORP.

MODEL 90, 90-A
(With 2-45s)
Schematic
Voltage

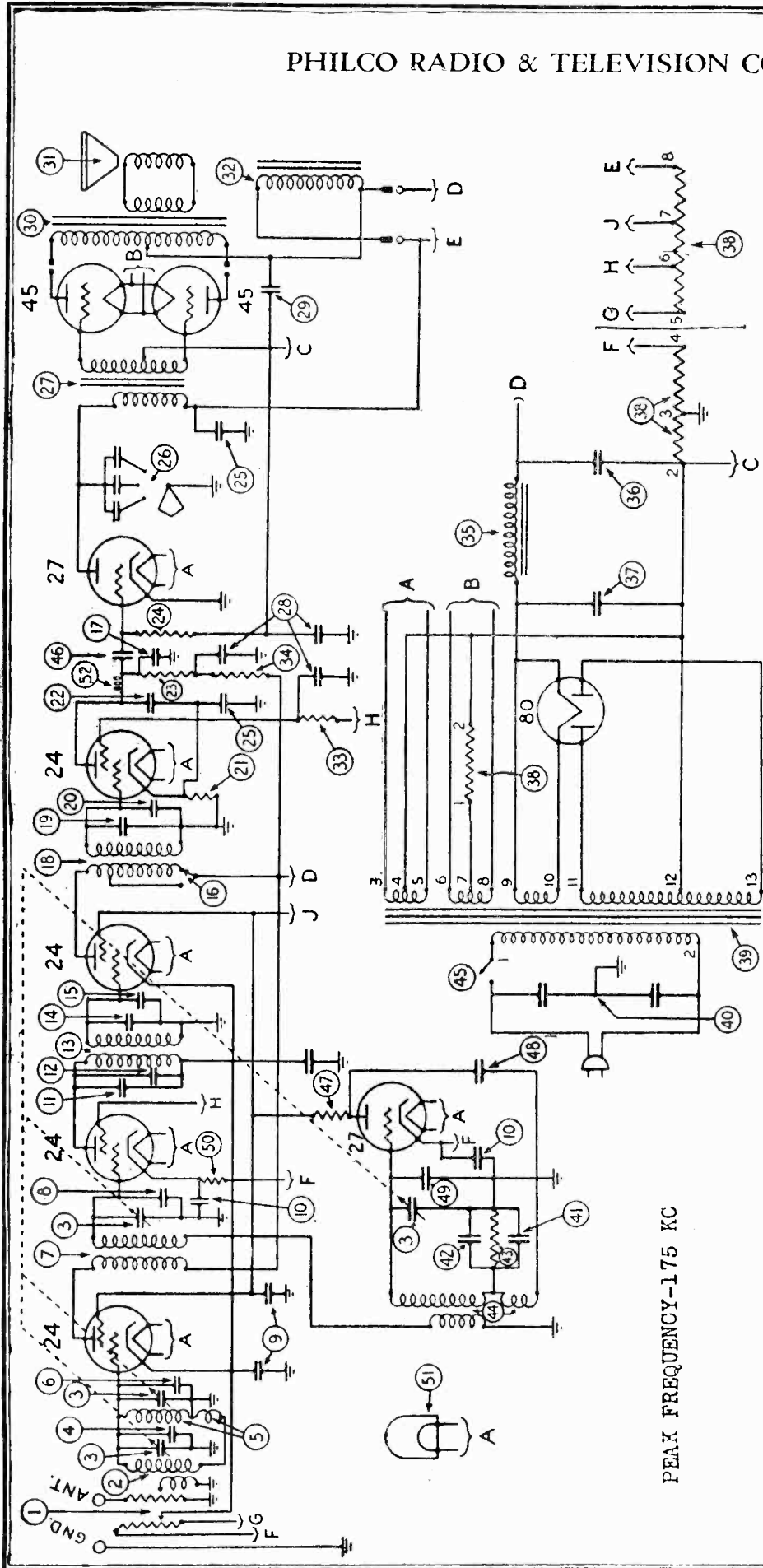
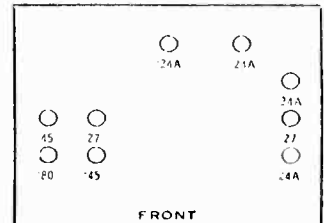


Table 1—Tube Socket Readings Taken with AC Set Tester, AC Line, 115 Volts

Tube Type	Circuit	Filament Voltage	Plate Voltage	Grid Voltage	Screen Grid Voltage	Cathode Voltage	Plate Milliamperes
24	1st R. F.	2.1	250	3.3	83	15	3
27	Osc.	2.1	60	1	23	15	2
24	1st Det.	2.1	250	5.5	80	15	5
24	1st I. F.	2.1	250	3.8	42	15	4.5
24	2nd Det.	2.1	48	3.7	10	10	3
27	1st Audio	2.1	140	25	...	...	30
45	Audio	2.2	243	46	...	...	30
45	Audio	2.2	243	46	...	...	30
80	Rect.	4.5	...	...	...	...	...

All readings taken with antenna disconnected and ground on. Volume Control on full.

Models 90, 90A Early Type



PHILCO RADIO & TELEVISION CORP.

MODEL 90,90-A

(With 2-45s)

Parts List

RANGE SWITCH

The Range Switch, No. ⑩ in Fig. 1, is placed in the NORMAL position when the Receiver is shipped. This gives great distance range and is the setting which will be found most satisfactory in practically all locations. In places far from broadcasting stations, however, the Range Switch may be changed to the MAXIMUM position. This will make the Receiver super-sensitive and will give extreme distance range. Do not use the Range Switch in the MAXIMUM position if there are one or more powerful broadcasting stations near you. In any location there will be less noise between stations with the Range Switch in the NORMAL position.

REPLACEMENT PARTS—MODELS 90 AND 90-A

No. on Figs. 3 and 4	Description	Part No.	No. on Figs. 3 and 4	Description	Part No.
①	Volume Control	5039	⑤⑧	Power Transformer (50 to 60 cycles)	4938
②	1st R. F. Transformer	03013		Power Transformer (25 to 40 cycles)	4939
③	Gang Condenser—50 to 60 cycles	03001	④⑩	Condenser .015 M. F. (Double)	3793-E
④	Gang Condenser—25 to 40 cycles	03078	④①	Condenser .0007 M. F.	Assembled 03050
④	Compensating Condenser (Part of Tuning Condenser Assembly)		④②	Compensating Condenser	
⑤	2nd R. F. Transformer	03014	④③	Resistor—50,000 Ohms	4237
⑥	Compensating Condenser (Part of Tuning Condenser Assembly)		④④	Oscillator Coil	03016
⑦	1st Det. Transformer	03015	④⑤	On-Off Switch	4095
⑧	Compensating Condenser (Part of Tuning Condenser Assembly)		④⑥	Condenser .001 M. F.	5215
⑨	Condenser .09 M. F. (Double)	4989-C	④⑦	Resistor—13,000 Ohms	3766
⑩	Condenser .09 M. F. (Double)	4989-B	④⑧	Condenser .00011 M. F.	4519
⑪	Fixed Condenser .00011	Assembled 3772-C	④⑨	Compensating Condenser (Part of Tuning Condenser Assembly)	
⑫	Compensating Condenser			⑤①	Resistor—5,000 Ohms	3526
⑬	1st I. F. Transformer	03009	⑤②	Pilot Bulb	3463
⑭	Compensating Condenser	Assembled 03051		R. F. Choke	03086
⑮	Fixed Condenser .00011				Line Cord and Plug	L-943
⑯	Normal Maximum Switch	3116		Tube Shield	03002
⑰	Condenser (.000035 mi)	4990		Knob (large) Dial Control	03063
⑱	2nd I. F. Transformer	03143		Spring (Dial Knobs)	4147
⑲	Compensating Condenser	Assembled 03051		Knobs (small) Tone and Volume Control	4959-A
⑳	Fixed Condenser .00011			Knob (switch)	4290-A
㉑	Resistor—50,000 Ohms	4518		Grid Clip	4897
㉒	Condenser .00035	4990		Speaker Plug and Cable	L-1124-A
㉓	Resistor—250,000 Ohms	4410		Grommet for R. F. Transformer Shield	3747
㉔	Resistor—1,000,000 Ohms	4409		Rectifier Tube Socket	5026
㉕	Condenser .5 M. F. (Double)	03024		Four Prong Socket Assembly	4955
㉖	Tone Control	4037-A		Five Prong Socket Assembly	4956
㉗	1st Audio Transformer	4952		Speaker Socket	4957
㉘	Condensers 2—.25 M. F. and 1—.5 M. F.	03029		Volume Control Insulator	4092
㉙	Condenser .05 M. F.	3615-G		Volume Control Insulator	4286
㉚	Output Transformer:			Fahnstock Clip	L-1126
	H ₂ (For Large Cone Assembly)	2848		Mica for Gang Condenser Compensating Condenser	3473
	K ₂ (For Small Cone Assembly)	2766		Insulating Washer for Compensating Condenser	3500
㉛	Voice Coil Assembly and Cone:			Tuning Condenser Mounting Washer	3914
	H ₂ (Large Cone)	02997		Tuning Condenser Mounting Washer	3915
	K ₂ (Small Cone)	02996		Tuning Condenser Mounting Sleeve	3916
㉜	Speaker Field—Assembled with Pot and Frame (H ₂)	02986		Spring for Tuning Condenser	4255
	Speaker Field—Assembled with Pot and Frame (K ₂)	02985		Bezel	5009
㉝	Resistor—250,000 Ohms	3768		Complete Drive Bracket	03011
㉞	Resistor—250,000 Ohms	4410		Disc Dial Assembly	03031
㉟	Filter Choke	4951		Knob Spring—Volume, Tone, Dial	5262
㊱	Condenser 6 M. F. Electrolytic Type (50-60 cycles)	4916		Steel Washer (Chassis Mtg.)	5058
	Condenser 10 M. F. Electrolytic Type (25-40 cycles)	5142		Nut—Volume, Tone Control Switch	W-434
㊲	Condenser 6 M. F. Electrolytic Type (25-40) and (50-60) cycles	4916			
㊳	B. C. Resistor	4953			

Several changes in wiring and part numbers have been made in the Model 90. The filter choke part 4951 has been changed to part 4819, the same choke as used in Model 21. On the 50-60 cycle models, a .09 mfd condenser, part 4989-J, is connected across the filter choke, part 4819. On the 25 cycle models, this condenser should be .18 mfd, part 4989-H ungrounded. The two 240,000 resistors part 4410, numbers (32) and (35) should be of the Continental Carbon type. This is the resistor without metal ends.

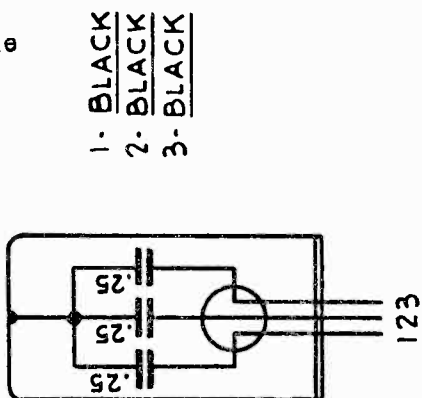
In the Model 90, a metal shield, part 03646, is placed in a bracket between the '47 and '80 tubes.

If electrolysis occurs on the insulation of the wire between the filter choke and one of the electrolytic condensers, unsolder the wire and cover with spaghetti.

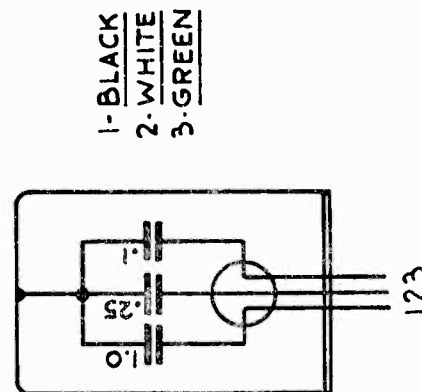
Condenser Bank
Connections
Condenser
Color Code

PHILCO RADIO & TELEVISION CORP.

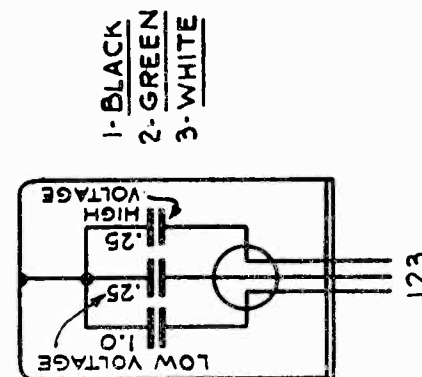
Internal Connections of Condenser Banks



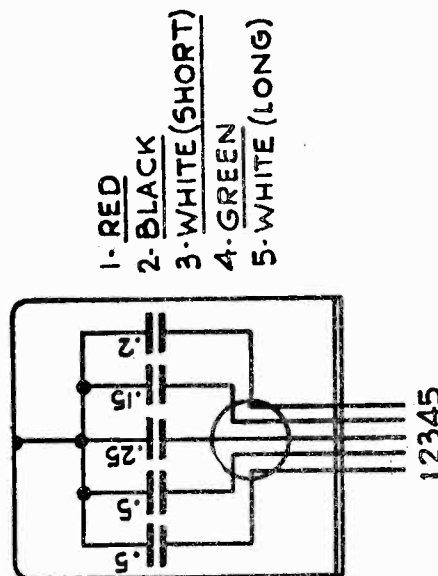
Part 03325
Models 90 - 90-A
Above Serial No. 237,001



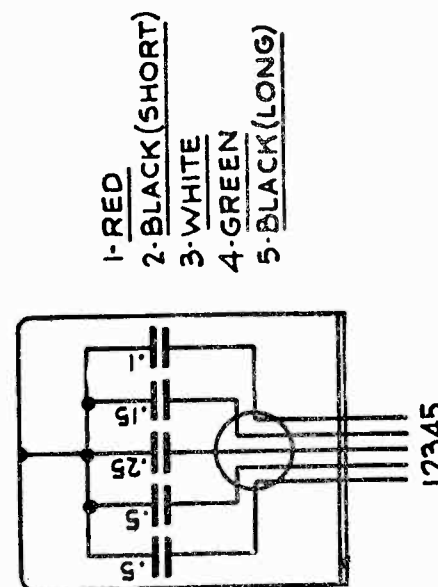
Part 03327
Model 90
Above Serial No. 237,001



Part 03624
Model 90-A
Above Serial No. 112,977



Part 03455
Model 50-A



Part 03459
Model 50

CONDENSER DATA

COLOR CODING USED ON ALL PHILCO RECEIVERS

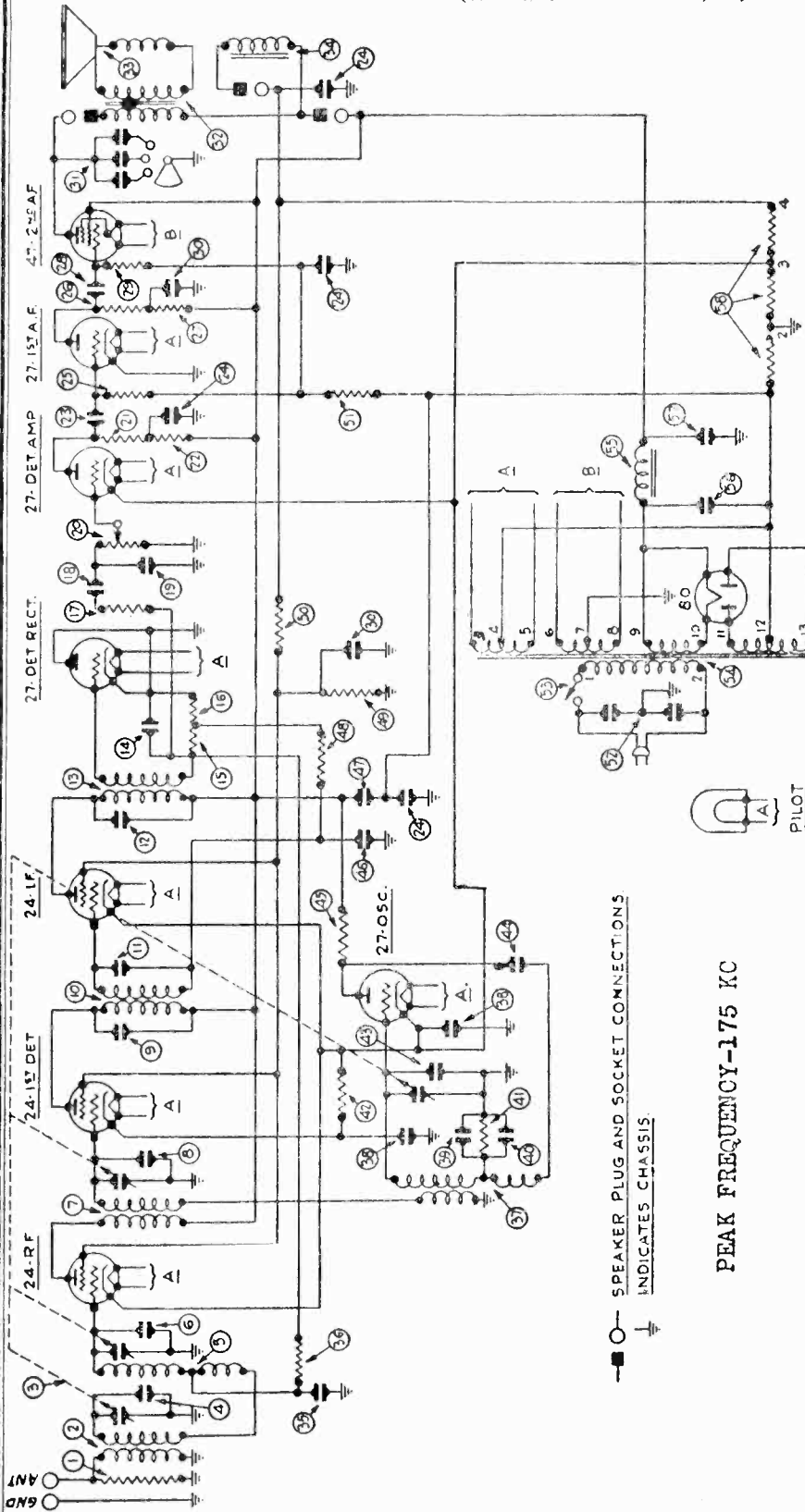
PART NO.	CAPACITY MF.	C O L O R	PART NO.	CAPACITY MF.	C O L O R
3082	.00025	Yellow	4519	.00011	Blue and Golden Yellow
3774	.00005	White	4520	.0007	White and Golden Yellow
3910	.0005	Green	4587*	.00005	Light Blue and White
4059	.002	Light Blue	5120	.00041	Yellow & Orange

*Note: Part No. 4587 is held to closer tolerance limits than Part No. 3774. Do not substitute either of these condensers, use the part numbers given.

MODEL 90, 90-A
(With 1-'47)
Schematic
Voltage

PHILCO RADIO & TELEVISION CORP.

(Above Serial No. 237,001)



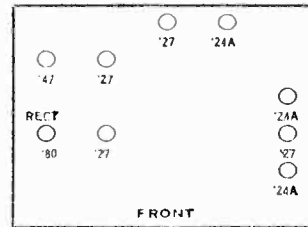
PEAK FREQUENCY-175 KC

Table 1—Tube Socket Readings Taken with AC Set Tester, AC Line, 115 Volts

Tube Type	Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milliamperes
24	R. F.	2.0	255	60	.25	20	2.4
27	Osc.	2.0	65	...	.6	20	3.6
24	1st Det.	2.0	250	64	6.0	24	.25
24	I. F.	2.0	270	76	.25	18	.1
27	Det. Rect.	2.0	0	...	.4	0	2.0
27	Det. Amp.	2.0	140	...	.4	18	1.8
27	1st A. F.	2.0	45	...	.4	20	32.*
47	Output	2.0	220*	240*	1.0*	..	..
80	Rectifier	4.5	..	..	..	..	..

All readings taken with antenna disconnected and ground on. Volume Control on full.
*These readings must be taken from the underside of the chassis using test prods and leads unless the set checker is specially equipped for testing pentode tubes.

Models 90, 90A, 90E Later Type



PHILCO RADIO & TELEVISION CORP.

MODEL 90,90-A
(With 1-'47)
Chassis-Data

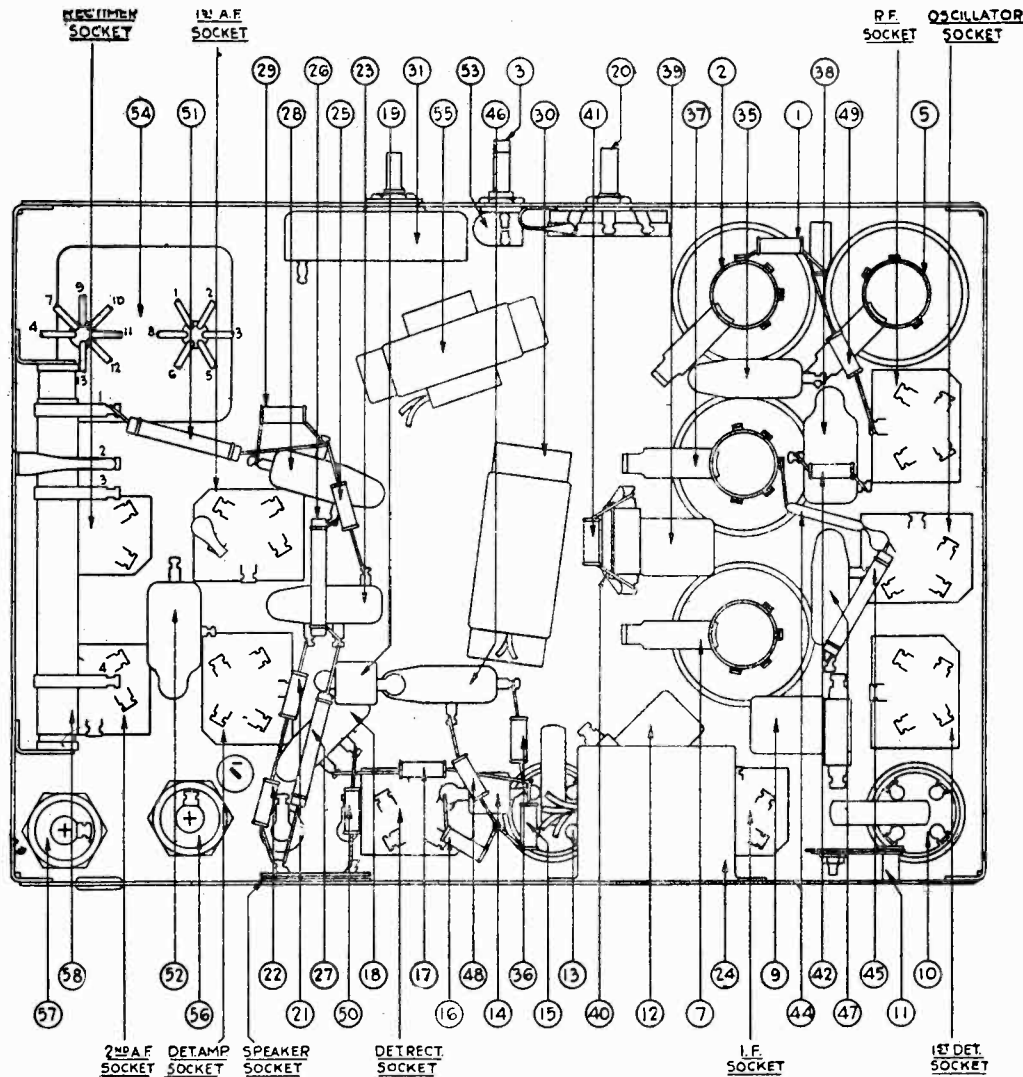


Table 2—Power Transformer Voltages

Terminals	A.C. Volts		Color
1—2	105 to 125	Primary	White
3—5	2.5	Heaters of 24 and 27 Tubes	Black
4	2.5	Center Tap of 3—5	Black with Yellow
6—8	2.5	Filament of 47 Tube	Dark Green
7	2.5	Center Tap of 6—8	Black with Green
9—10	5.0	Filament of 80 Tube	Light Blue
11—13	650.	Plates of 80 Tube	Yellow
12	...	Center Tap of 11—13	Yellow with Green

Table 3—Resistor Data

No. on Figs. 1 and 2	Terminal	Power (Watts)	Resistance (Ohms)	Color		
				Body	Tip	Dot
55	{ 1—2 } 2—3 3—4	1.	180	(Long Tubular)		Red
			60			
10		.5	3,500	Green	Black	Orange
			5,000	Brown	Black	Orange
17		1.0	10,000	Red	Green	Orange
			25,000	Red	Green	Orange
21		.5	25,000	Green	Brown	Orange
			51,000	Green	Brown	Orange
22		1.	51,000	Green	Black	Orange
			70,000	Violet	Black	Orange
23		.5	99,000	White	White	Orange
			240,000	Red	Yellow	Yellow
24		1.	240,000	Red	Yellow	Yellow
			490,000	Yellow	White	Yellow

Table 4—Condenser Data

No. on Figs. 1 and 2	Capacity	Color
55	.00011	Blue, Golden Yellow
	.00025	Yellow
10	.01	Black Bakelite Container
	.015	Black Bakelite Container
17	.05	Black Bakelite Container
	.09	Black Bakelite Container
21	1-13-25-1.	Metal Container
	.25-1.	Metal Container
22	(50-60 Cycles)	Electrolytic Type
	6.	Electrolytic Type
23	(25-40 Cycles)	Electrolytic Type
	10.	Electrolytic Type

MODEL 90, 90-A
(With 1-47)
Test Data

PHILCO RADIO & TELEVISION CORP.

From Chassis To
Speaker field only
Oscillator Control Grid
Oscillator Winding only
Oscillator Cathode
Oscillator Plate to '47 Screen
'80 Anode to '80 Anode
'80 Anode to Chassis
'80 Anode to '80 Fil

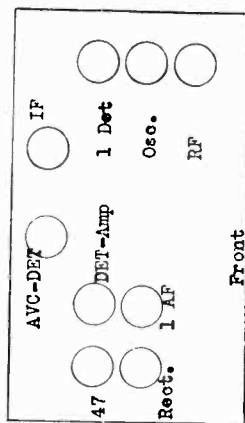
Correct
3,200 ohms
51,006.5ohms
6.5ohms
60 ohms
51,000 ohms
199 ohms
280 ohms
0 ohm

Incorrect
Includes section used in plate circuit BC-Osc K-Y
FC

Note**
Fixed condenser between Det-Amp Plate and 1 AF-CG
Fixed condenser between 1 AF Plate and '47 CG
Resistor of 99,000 between AVCX CG wdg and coupling condenser to Det-Amp volume control
Across AC Plug
AC plug to chassis

Correct
3.26 ohms
0 ohm

BC across primary
BC- across primary



Front

Correct
10.7 ohms
13.4 ohms
592,000 ohms
60 ohms
20,280 ohms
168.7 ohms
18.7 ohms
7.9 ohms
5,060 ohms
20,280 ohms
218 ohms
68 ohms
541,068 ohms
60 ohms
20,280 ohms
70 ohms
110,080 ohms
0 ohm
0 ohm
0 ohm
0 ohm
0 ohm
high resistance - exact value unknown
60 ohms
121,000 ohms
480,180 ohms
0 ohms
60,000 ohms
480,000 ohms
0 ohm
0 ohm
462 ohms
0.106 ohm

Incorrect
Fixed resistor across antenna coil
BC- rf CG wdg-Y
BC- AVCX wdg-Y
BC- 1f CG wdg-Y
TC- rf CG-Y
BC- Osc K-Y
BC- Field coil pocket-Y
TC- 1 D CG-Y
BC- 1 D K-Y
BC- Osc K-Y
See RF Screen
TC- IF Tr
BC- 1f CG wdg-Y
TC- IF Tr
See 1 Detector Cathode
See RF Screen
TC- IF Tr
BC- AVCX CG wdg-Y
See Det-Amp Plate
BC-240,000 ohms-Y
BC-25,000 ohms-Y
BC-'47 CG resistor-Y
Tone control cond

- Tube Socket Readings Taken with AC Set Tester, AC Line, 115 Volts

Type	Circuit	Fluoresc. Value	Plate Value	Screen Value	Control Value	Cathode Value	Plate Millimeter
24	R. F.	2.0	255	60	25	20	24
24	1st Det.	2.0	250	60	6.0	20	24
24	1 F.	2.0	270	64	25	18	25
27	Det. Rect.	2.0	140	78	4	17	0
27	Det. Amp.	2.0	220*	240*	4	18	2.0
47	Output	2.0	220*	240*	1.0*	20	32*
80	Rectifier	4.5					

All readings taken with antenna disconnected and ground on. Volume Control on full.
*The chassis using test prods and leads unless the set checker is specially equipped for testing, probe tubes.

PHILCO RADIO & TELEVISION CORP.

MODEL 90, 90-A
(With 1-'47)
Parts List

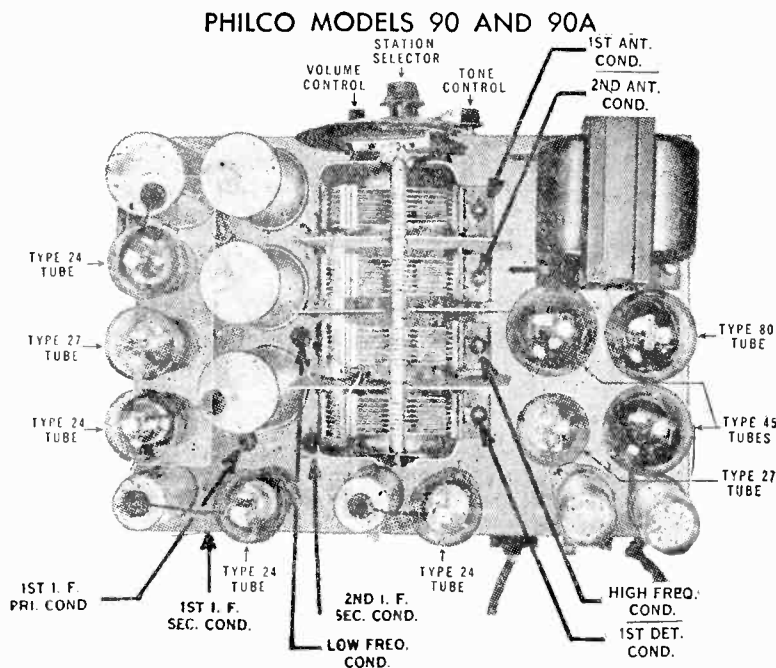
ADJUSTMENT OF MODELS 90 and 90-A

These Receivers are accurately adjusted at the Factory prior to their shipment. Under no circumstances are the adjusting condensers to be changed in the field. This alignment requires special oscillator equipment, which all Philco Distributors have. If for any reason the Receiver needs adjustment it must be returned to the Distributor's Service Department.

REPLACEMENT PARTS—MODELS 90 and 90-A RECEIVERS

(Above Serial No. 237,001)

No. on Figs. 3 and 4	Description	Part No.	No. on Figs. 3 and 4	Description	Part No.
①	Resistor (10,000 ohms)	4412	③⑤	By-Pass Condenser (.09 mfd.) double	4989-G
②	First R. F. Transformer	03360	③⑧	Compensating Condenser	} Assembled 03050
③	Gang Condenser (50-60 cycles)	03001	⑩	Condenser (.0007 mfd.)	
	Gang Condenser (25-40 cycles)	03078	⑪	Resistor (51,000 ohms)	4518
④	Compensating Condenser (part of gang condenser assembly)		⑫	Resistor (5,000 ohms)	5310
⑤	Second R. F. Transformer	03014	⑬	Compensating Condenser (part of tuning condenser assembly)	
⑥	Compensating Condenser (part of gang condenser assembly)		⑭	Condenser (110 mmf.)	4519
⑦	First Detector Transformer	03015	⑮	Resistor (51,000 ohms)	4237
⑧	Compensating Condenser (part of gang condenser assembly)	<i>Changed to 040006</i>	⑯	By-Pass Condenser (.05 mfd.)	3615-U
⑨	Compensating Condenser (First I. F. Primary)	03315	⑰	By-Pass Condenser (.05 mfd.)	3615-E
⑩	First I. F. Transformer	03009	⑱	Resistor (490,000 ohms)	4517
⑪	Compensating Condenser (First I. F. Secondary)	03315	⑲	Resistor (70,000 ohms)	5385
⑫	Compensating Condenser (Second I. F. Primary)	03317	⑳	Resistor (25,000 ohms)	4516
⑬	Second I. F. Transformer	03345	㉑	Resistor (240,000 ohms)	3768
⑭	Condenser (110 mmf.)	4519	㉒	Condenser (.015 mfd.) double	3793-E
⑮	Resistor (51,000 ohms)	4518	㉓	On-Off Switch	4095
⑯	Resistor (51,000 ohms)	4518	㉔	Power Transformer (50-60 cycles)	5362
⑰	Resistor (99,000 ohms)	4411		Power Transformer (25-40 cycles)	5363
⑱	By-Pass Condenser (.01 mfd.)	3903-M		Power Transformer (50-60 cycles, 220 volts)	5364
⑲	Condenser (.00025 mfd.)	3082	㉕	Choke	4951
⑳	Volume Control	5366	㉖	Condenser (6 mfd.) Electrolytic type (50-60 cycles)	4916
㉑	Resistor (51,000 ohms)	4518		Condenser (10 mfd.) Electrolytic type (25-40 cycles)	5142
㉒	Resistor (70,000 ohms)	5385	㉗	Condenser (6 mfd.) Electrolytic type (50-60 cycles)	4916
㉓	By-Pass Condenser (.01 mfd.)	3903-M		Condenser (10 mfd.) Electrolytic type (25-40 cycles)	5142
㉔	Condenser (1-1 mfd., 1-13 mfd., 2-25 mfd.)	03325	㉘	B. C. Resistor	5365
㉕	Resistor (240,000 ohms)	4410		Line Cord and Plug	L-943
㉖	Resistor (25,000 ohms)	3656		Tube Shield (Large)	03373
㉗	Resistor (25,000 ohms)	3656		Tube Shield (27 type)	5387
㉘	By-Pass Condenser (.01 mfd.)	3903-P		Pilot Bulb	3463
㉙	Resistor (240,000 ohms)	4410		Pilot Bracket Complete	03081-A
㉚	Condenser (.25 mfd., 1 mfd.)	03327		Knob (Large)	4958-A
㉛	Tone Control	4037-A		Knob (Small)	4959-A
㉜	Output Transformer	2673		Knob (Switch)	4290-A
㉝	Voice Coil Assembly and Cone: H ₂ (Large Cone)	02997		Spring (For small knobs)	4147
	K ₂ (Small Cone)	02996		Spring (For large knobs)	5262
㉞	Speaker Field (Assembled with pot and frame)			Grid Clip	4897
㉟	By-Pass Condenser (.05 mfd.)	3615-W		Five Prong Socket Assembly	4956
㊱	Resistor (490,000 ohms)	4517		Four Prong Socket Assembly	4955
㊲	Oscillator Coil	03016		Volume Control Insulator	4092
				Dial	5021
				Light Shield Screen	4937
				Bezel	5000

MODEL 90,90-A
Alignment
PHILCO RADIO & TELEVISION CORP.


Adjusting the Model 90 Using a Jewell 560 Oscillator

Set up the Receiver for operation using standard tubes. Set the Normal-Maximum switch in the Normal position.

Intermediate Frequency Adjustment—Remove the tube shield. Remove the control grid clip of the first detector tube (Type 24 tube nearest back of the Receiver Chassis under the tube shield). Connect the "A" terminal of the oscillator to the control grid of the first detector tube. The "G" terminal must be connected to the Receiver Chassis. Turn the filament control of the oscillator on about $\frac{1}{2}$ the total movement. The middle switch must be turned to the intermediate position. The tuning control of the oscillator must be set for exactly 175 K.C., as indicated in the calibration data sent with the instrument.

Turn the volume control of the Receiver on full. Set the attenuator control so that an audible signal is received in the speaker. Connect the \pm and the low terminals of the output meter to the voice coil terminals of the speaker. Adjust the attenuator control for not more than $\frac{1}{2}$ full scale reading of the meter.

Using a Philco part No. 3164 fibre wrench, adjust the second I. F. secondary condenser for maximum reading in the output meter. Adjust the first I. F. secondary and then the first I. F. primary condensers for maximum reading in the output meter. Reduce the oscillator signal to prevent any damage to

the meter mechanism. Replace the grid clip on the first detector tube and replace the tube shield.

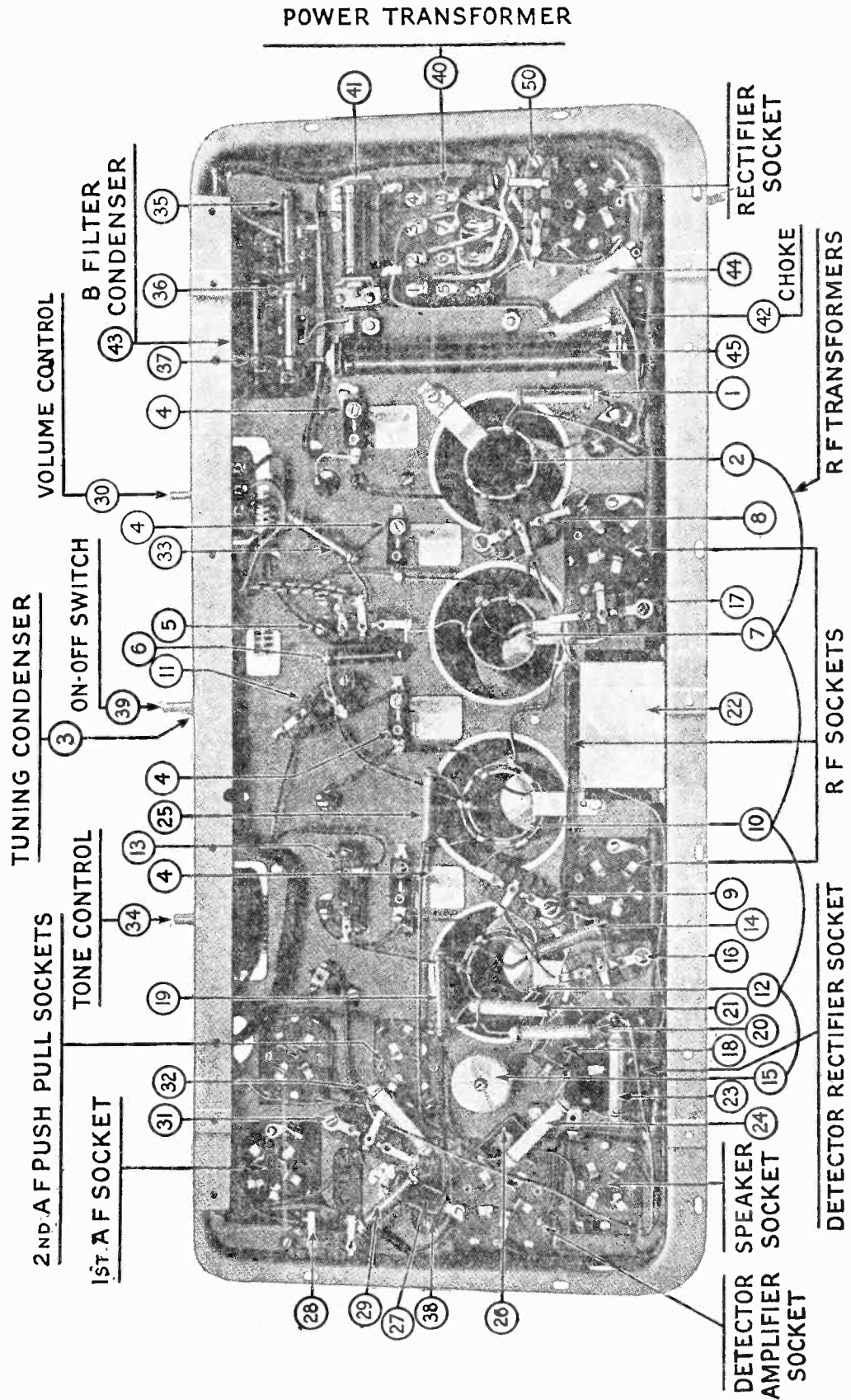
High Frequency Compensator—Connect the "A" and "G" terminals of the oscillator to the ANT and GND terminals of the Receiver. Do not change the oscillator setting. Tune the Receiver to exactly 140 and adjust the high frequency compensator for maximum reading in the output meter.

Antenna and Detector Condensers—With the Receiver and oscillator in the same setting, set the detector and antenna condensers for maximum reading in the output meter. If the Receiver is so far out of adjustment that the signal is extremely weak when adjusting the high frequency condenser it is advisable to temporarily check the adjustment of the detector and antenna condensers. Final adjustment of these condensers must be made as described.

Low Frequency Condenser—With the oscillator turned to broadcast frequency set the Philco scale at 60 and adjust the low frequency compensating condenser for maximum signal in the output meter. If the signal comes in off the 60 position on the Philco scale, set the Receiver slightly off the signal towards 60 and adjust the signal for maximum strength in this position. By repeating this, you will be able to bring the signal up to the 60 setting on the Philco scale.

PHILCO RADIO & TELEVISION CORP.

MODEL 96,96-A
Chassis



MODEL 111,111-A
Voltage
Electrical Values

PHILCO RADIO & TELEVISION CORP

Table 1—Tube Socket Readings Taken with AC Set Tester AC Line—115 volts

Tube		Filament Volts	Plate Volts	Screen Grid Volts*	Control Grid Volts	Cathode Volts	Plate Milli-Amperes	Screen-Grid Milli-Amperes †
Type	Circuit							
24	1st R. F.	2.1	190	60	.2	5	1.7	1.75
27	Osc.	2.1	45	..	.7	7	1.6	..
24	1st Det.	2.1	180	62	4.6	8	.5†	.15
24	1st I. F.	2.1	185	65	..	5	1.5	1.7
24	2nd I. F.	2.1	190	82	2.2	5	3	1.85
27	Det. Rect.	2.2	..	..	.4	.5	..	..
27	Det. Amp.	2.2	35	..	.4	5	.20‡	..
27	1st A. F.	2.1	95	..	1.2	5	4.	..
45	2nd A. F.	2.2	255	..	50	..	32.5	..
45	2nd A. F.	2.2	255	..	50	..	32.5	..
80	Rect.	4.9	..	..	..	..	50/Plate	..

*Read with C 100 Scale.
†Read with 20 Mil. Scale.
‡Read with 2 Mil. Scale.

Note—Volume Control Off; Station Selector turned to Low Frequency End; Range Switch set in "Normal" Position.

Table 2—Power Transformer Voltages

Terminals	A.C. Volts	
1—2		Primary
3		Center Tap 80 Tube
4		Center Tap 45 Tubes
5—6	2.67	Heaters for 24 and 27 Tubes
7—8	2.68	Filaments for 45 Tubes
9—12	750.	Plates 80 Tube
10—11	5.0	Filament 80 Tube
Rubber Covered Lead		Center Tap for 24 and 27 Tubes

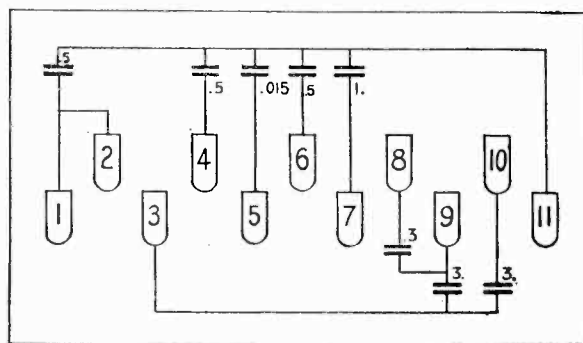
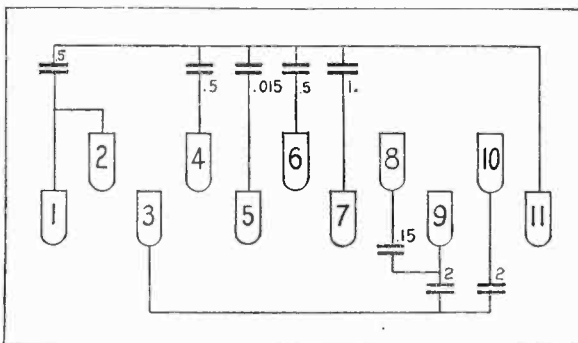
Condenser Data
(Other than Filter Condenser)

Resistor Data

No. on Diagram	Capacity	No. on Diagram	Resistance	Color
6	.05	1	10,000	Black
10 11	.05 and 250 Ohm Resistor	8 39 41 66 68	100,000	Silver Gray—Yellow Tip
17	.25 (two sections)	16	50,000	Orange
19 23 27 33 38	.00011	18	13,000	Belgium Blue
21	.0007	20	1,000	Brown Body—Black Tip—Red Dot
28	.05	34	500,000	Battleship Gray
29	.05 and 250 Ohm Resistor	44	500,000	Battleship Gray
35	.00005	46	250,000	White
40	.5	48—64	70,000	Jade Green
42	.00025	51—52	25,000	Auto Brown—Yellow Tip
43	.015	57	10,000	Long Tubular
45	.05	58	70	Flat Wire Wound (two sections)
61	.015 (two sections)	59	800	Short Tubular
67	.05			

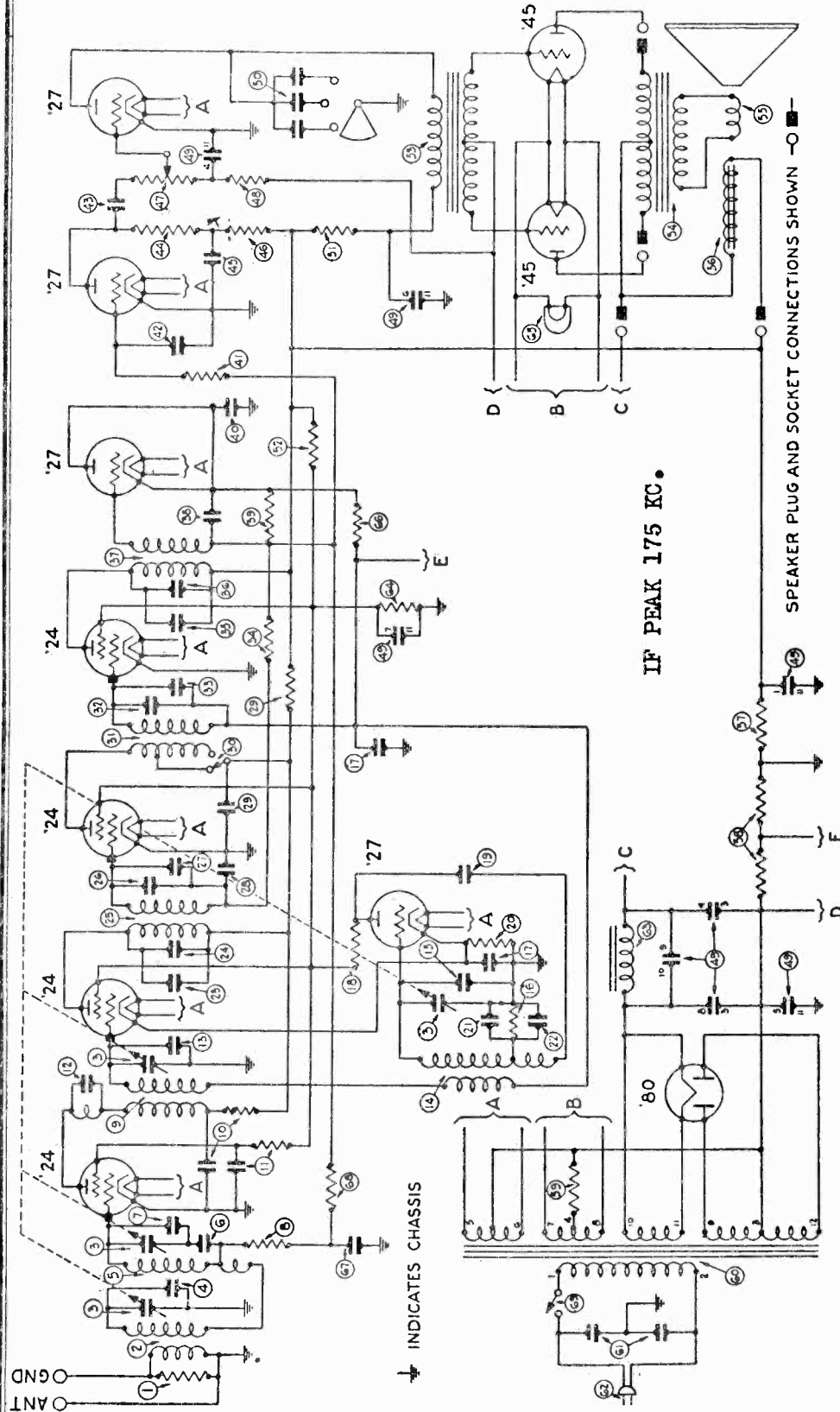
Model 211 Condenser Block Part No. 3754

Model 211-A Condenser Block Part No. 3755



PHILCO RADIO & TELEVISION CORP.

MODEL 111, 111-A
Schematic
Socket

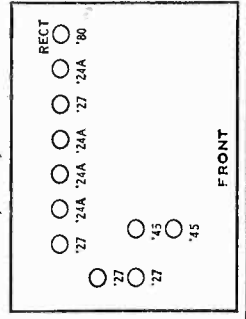


NOTE: The connection shown between Condenser No. ② and Condenser No. ③ should also be connected to ground.
Models 111, 111A.

See Parts List for changes upon Models 111 and 111-A

D-C Resistance Data.

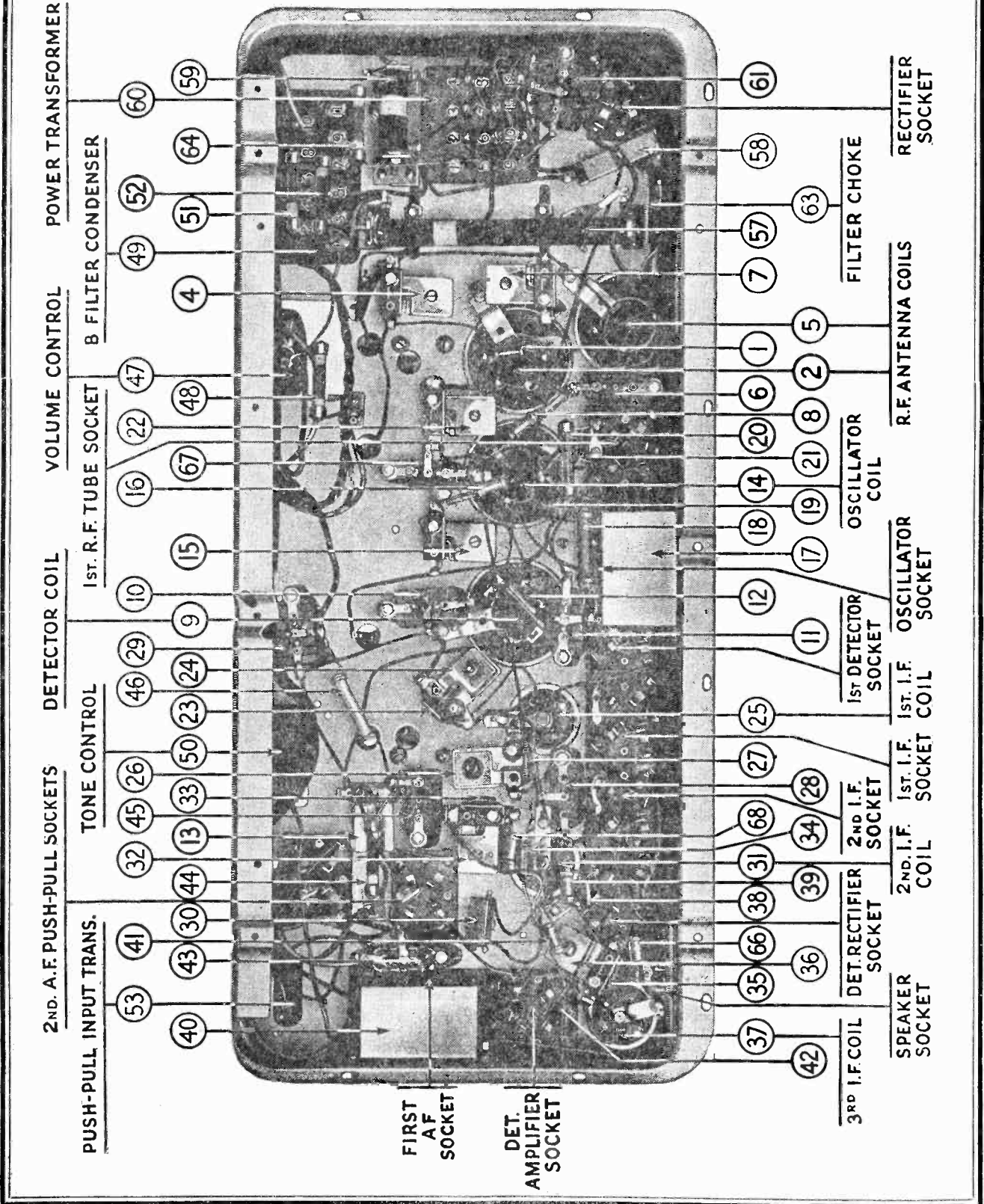
1st I-F Transformer Primary	68 ohms	(25)
2nd I-F Transformer Primary	6.2 ohms	(31)
3rd I-F Transformer Primary	95 ohms	(37)
Secondary	68 ohms	(25)
Secondary	70 ohms	(31)
Secondary	65 ohms	(37)



PHILCO RADIO & TELEVISION CORP.

MODEL 111,111-A
Chassis

PHILCO MODELS 111 & 111-A SUPERHETERODYNE



PHILCO RADIO & TELEVISION CORP.

MODEL 112,112-A
Below # 174,001
Parts List

MODELS 112 AND 112-A

This parts list for models 112,112-A is applicable to the phonograph combination models 212,212-A. However, the following changes and additions must be recorded.

Resistor (70) in models 112,112-A is changed to resistor (76) in models 212,212-A. In addition the following are also added to the list in connection with models 212,212-A

70	Motor (50 cycles).....	5333	70	Radio-Phono Switch.....	4514
	Motor (60 cycles).....	4784	71	Cord Connector Plug.....	4091
	Motor (25 cycles).....	4785	75	Cord Connector Socket...	4124
71	Phonograph On-Off Switch	4748		Turn Table.....	4735
72	Pick-up Head.....	4853			

RANGE SWITCH

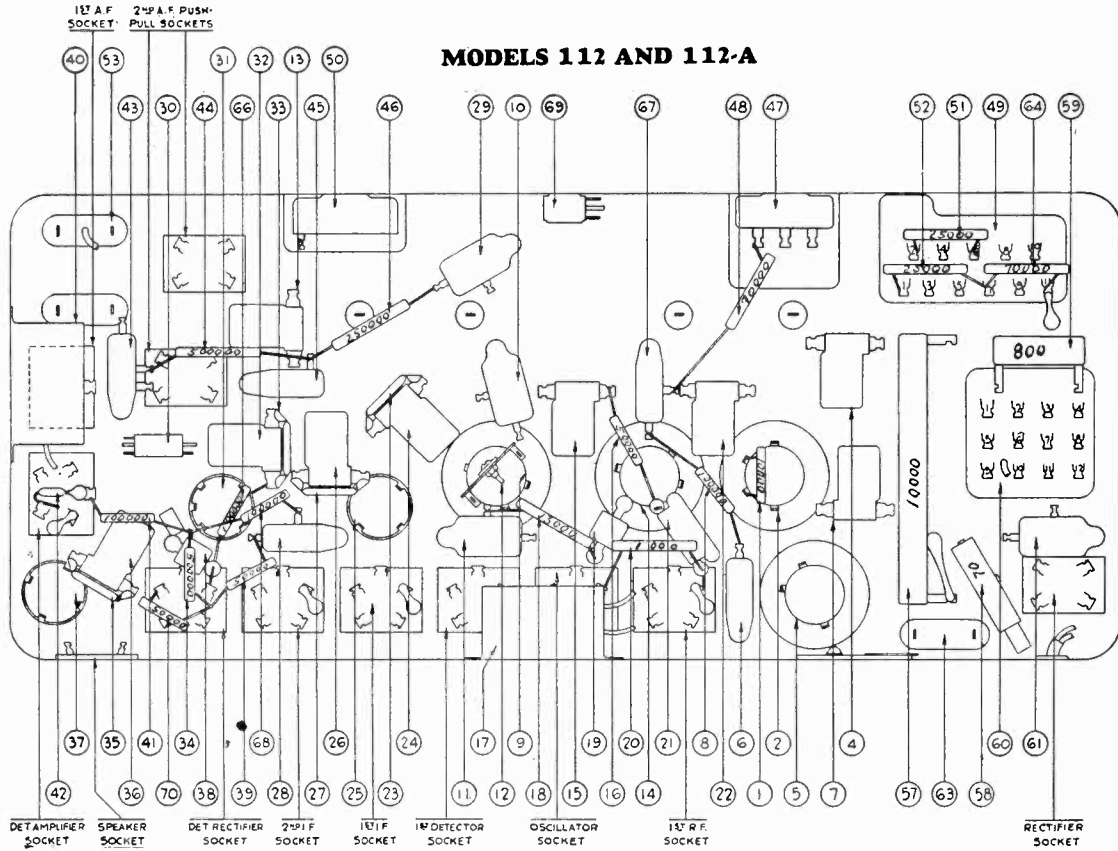
The Range Switch, No. 30 in Fig. 3, is placed in the NORMAL position when the Receiver is shipped. This gives great distance range and is the setting which will be found most satisfactory in practically all locations. In places far from broadcasting stations, however, the Range Switch may be changed to the MAXIMUM position. This will make the Receiver super-sensitive and will give extreme distance range. Do not use the Range Switch in the MAXIMUM position if there are one or more powerful broadcasting stations near you. In any location there will be less noise between stations with the Range Switch in the NORMAL position.

REPLACEMENT PARTS

No. on Figs. 3 and 4	Description	Part No.	No. on Figs. 3 and 4	Description	Part No.
1	Resistor—10,000 Ohms	4412	40	Condenser—.5	3583
2	1st R. F. Coil	3884-J	41	Resistor—100,000 Ohms	4411
3	Tuning Condenser	4000-D	42	Condenser—.00025	3082
4	Compensating Condenser	3772-A	43	Condenser—.015	3793-B
5	2nd R. F. Coil	3884-T	44	Resistor—500,000 Ohms	3769
6	Condenser—.05	3615-L	45	Condenser—.05	3615-S
7	Compensating Condenser	3968-A	46	Resistor—250,000 Ohms	3768
8	Resistor—100,000 Ohms	4411	47	Volume Control	4093
9	1st Detector Coil	3884-V	48	Resistor—70,000 Ohms	3542
10	Condenser—.05 and 250 Ohms	3615-C	49	B Filter Condenser Block—60 cycles	3754
11	Condenser—.05 and 250 Ohms	3615-C		B Filter Condenser Block—25 cycles	3755
12	Coupling Condenser	3892-A	50	Tone Control	4037-A
13	Compensating Condenser	3968-A	51	Resistor—25,000 Ohms	3656
14	Oscillator Coil	3884-U	52	Resistor—25,000 Ohms	3656
15	Compensating Condenser	3968-A	53	Push-pull Input Transformer	3537
16	Resistor—50,000 Ohms	4518	54	Push-pull Output Transformer	2848
17	Condenser—.25 double	3557	55	Voice Coil and Cone Assembly	2794-B
18	Resistor—13,000 Ohms	3766	56	Field Coil	2850
19	Condenser—.00011	4519	57	B Resistor—10,000 Ohms	4532
20	Resistor—1,000 Ohms	4590	58	C Resistor	3764
21	Condenser—.0007	4520	59	C Resistor—800 Ohms	3763
22	Compensating Condenser	3772-B	60	Power Transformer—60 cycles	4446
23	Condenser—.00011	4519		Power Transformer—25 cycles	4447
24	Compensating Condenser	3772-C	61	Condenser—.015 double	3793-E
25	1st I. F. Coil	4501-B	62	A C Cord and Plug	L-943-A
26	Compensating Condenser	3772-C	63	Filter Choke	3422
27	Condenser—.0001	4519	64	Resistor—70,000 Ohms	3542
28	Condenser—.05	3615-J	65	Pilot Lamp	3463
29	Condenser—.05 and 250 Ohms	3615-B	66	Resistor—100,000 Ohms	4411
30	Range Switch	3116	67	Condenser—.05	3615-D
31	2nd I. F. Coil	4501-C	68	Resistor—100,000 Ohms	4411
32	Compensating Condenser	3772-C	69	On-Off Switch	4095
33	Condenser—.00011	4519	70	Resistor 50,000 Ohms	4518
34	Resistor—500,000 Ohms	4517		Insulator for Part Nos. 3557-3583	4105
35	Condenser—.00005	4587		Pilot Bracket Assembly	4027-A
36	Compensating Condenser	3772-D		Bolt for Pilot Bracket Assembly	W-439
37	3rd I. F. Coil	4501-D		Tone Control Nut	W-434
38	Condenser—.00011	4519		By-pass Condenser Mounting Bolt	W-443
39	Resistor—50,000 Ohms	4518		Bottom Shield Bolt	W-453
				Chassis Mounting Bolt	W-468

MODEL 112,112-A
 Below # 174,001
 MODEL 112,112-A
 Above # 174,001
 Chassis

PHILCO RADIO & TELEVISION CORP.



MODELS 112 AND 112-A
 (Above Serial No. 174,001)

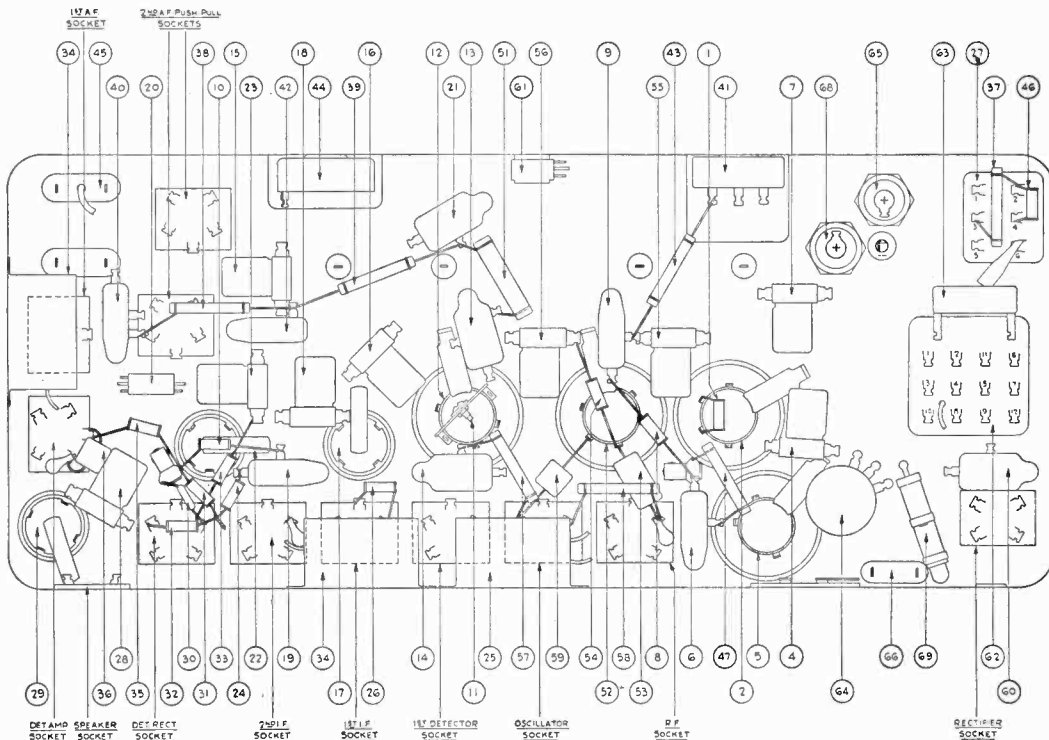


Fig. 4

PHILCO RADIO & TELEVISION CORP.

MODEL 112,112-A
Alignment Notes

PHILCO MODEL 112 SUPERHETERODYNE

Using a Philco fibre wrench, part No. 3164, adjust the third I. F. condenser until the maximum reading is obtained in the output meter. Next, adjust the second I. F. condenser and then the secondary and primary condensers of the first I. F. stage for maximum reading on the meter. During these adjustments it may be necessary to reduce the signal strength by turning down the volume control of the receiver so that the needle will not be deflected beyond the end of the scale.

HIGH FREQUENCY CONDENSER - Remove the "A" terminal lead from the control grid of the first detector tube and replace the grid clip. Replace the tube shield. Connect the "A" terminal of the oscillator to the antenna post of the Receiver and the "G" terminal of the oscillator to the ground terminal of the chassis. Do not change the oscillator setting. Turn up the attenuator of the oscillator until it is all the way on. Set the Philco scale to approximately 140 (1400 K. C.); set the NORMAL - MAXIMUM switch in the Maximum Position provided the Receiver is not too far out of adjustment the eighth harmonic of the 175 note will be heard at or near the 140 position of the scale. Set the station selector knob at exactly 140 and tune the high frequency condenser until the oscillator note is peaked at exactly 140 on the Receiver scale. Next adjust the detector condenser for maximum reading on the output meter.

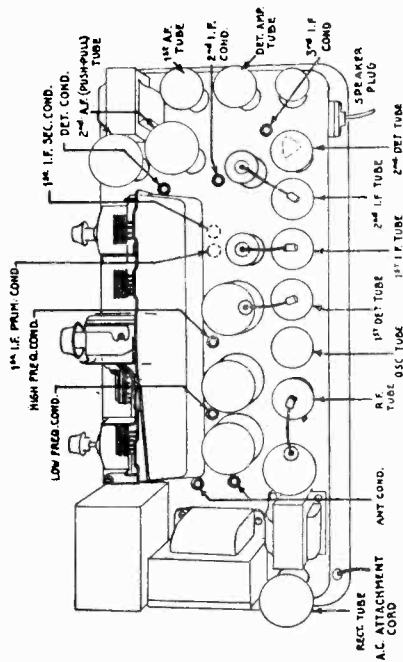
If the Receiver is so far out of adjustment that the eighth harmonic of 175 K. C. is not audible, it will be necessary to set the oscillator for broadcast frequencies. Set the tuning control of the oscillator at approximately 1400 K. C. (as indicated in the data furnished with the instrument), then adjust the high frequency condenser for maximum signal in the output meter. Set the first and second antenna condensers for maximum signal in the output meter reducing the attenuator setting as the signal increases to prevent damage to the meter mechanism. Turn the center control of the oscillator to intermediate frequency and reset the tuning control of the oscillator to the 175 K. C. position and proceed as outlined above. Final adjustment must be made when the oscillator is set at exactly 175 K. C. in the intermediate position.

ANTENNA CONDENSERS - With the oscillator set at the original 175 K. C. position adjust the first and then the second antenna condenser for maximum reading in the output meter.

LOW FREQUENCY CONDENSER - Set the oscillator on broadcast position and tune to exactly 600 K. C. The oscillator signal should be received at 60 on the Receiver scale. Adjust the low frequency condenser until the maximum reading is obtained in the output meter with the Receiver set at 60.

Where it is necessary to replace the tuning scale on the Model 112 Superheterodyne, put a mark opposite 55 on the tuning condenser drum. Remove the old scale and place the new one in position so that 55 is exactly opposite the above mark.

ADJUSTING THE MODEL 112 SUPERHETERODYNE PLUS USING A JEWELL 560 OSCILLATOR



Set up the Receiver for operation using standard tubes, which you know are in good condition. Set the Normal - Maximum switch in the Normal position for the intermediate frequency adjustment. Connect the Jewell pattern 560 oscillator to the Receiver.

INTERMEDIATE FREQUENCY OR I. F. STAGES - Remove the tube shield, replace the control grid clip of the detector tube with the lead from the "A" terminal of the oscillator. The "G" terminal of the oscillator must be connected to the Receiver Chassis. Replace the tube shield on the chassis.

Turn on the filament control of the oscillator about one-half the total movement. The "A" Battery of the oscillator must be replaced when it is necessary to turn this control all the way on in order to obtain a signal. Turn the center switch to the intermediate position. The tuning control of the oscillator must be set so that the oscillator signal is exactly 175 K. C. This setting can be determined from calibration data furnished with the instrument.

Turn the volume control of the receiver on full. Set the attenuator control so that an audible signal is received in the speaker. Connect the \pm and low terminals of the output meter to the voice coils of the speaker. Adjust the attenuator control so that not more than one-half full scale reading is obtained on the meter.

MODEL 112,112-A
Above # 174,001
Electrical Values
Voltage

PHILCO RADIO & TELEVISION CORP.

Models 112 and 112-A Receivers

(Above Serial No. 174,001)

Model 112 Receivers are for operation on 115 volt, 50-60 cycle AC lines
Model 112-A Receivers are for operation on 115 volt, 25-60 cycle AC lines

Table 1—Tube Socket Readings taken with A.C. Set Tester A.C. Line—115 volts

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milli-amperes	Screen-Grid Milli-amperes
Type	Circuit							
24	1st R. F.	2.25	100	75	.2	5.0	4.0	1.
27	Osc.	2.25	55	...	.6	7.5	1.8	...
24	1st Det.	2.25	100	75	2.5	8.0	.8	1.
24	1st I. F.	2.25	100	75	.2	5.0	4.0	1.
24	2nd I. F.	2.25	100	75	6.*	4.0	4.0	1.
27	Det. Rect.	2.25	...	...	...	...	...	...
27	Det. Amp.	2.25	20	...	...	4.0	...	...
27	1st A. F.	2.30	150	...	...	4.0	3.0	...
47	2nd A. F.	2.30	245	255	16.5	...	31**	9.
47	2nd A. F. Rect.	2.30	245	255	16.5	...	31**	9.
80	Rect.	5.0	...	...	...	...	54/54	...

*60 Volt scale.

**Special adapter must be used for this test.

Note—Volume control off; station selector turned to low frequency end; range switch set in "Normal" position.

Table 2—Power Transformer Voltages

Terminals	A.C. Volts	
1—2	115.	Primary Heater for 24 and 27 Tubes Not used Filaments for 47 Tubes Plates 80 Tube Center Tap 80 Tube Filament 80 Tube Center Tap for 24 and 27 Tubes
3—4	2.67	
6		
5—7	2.68	
10—12	750.	
11		
8—9	5.0	
Rubber Covered Lead		

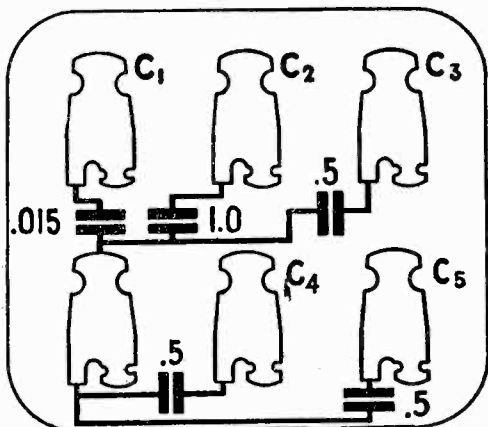
Table 3—Condenser Data

No. on Figs.	CAPACITY	COLOR
8 (9) (19) (42)	.05	Bakelite Container
13 (14) (21)	.05 and 250 Ohms	Bakelite Container
25	.25	Metal Container
30 (39)	.00011	Blue, Golden Yellow
36	.00025	Yellow
40	.015	Bakelite Container
53	.0007	White, Golden Yellow
60	.015 Double	Bakelite Container
65 (68)	6 Mfd.	Electrolytic

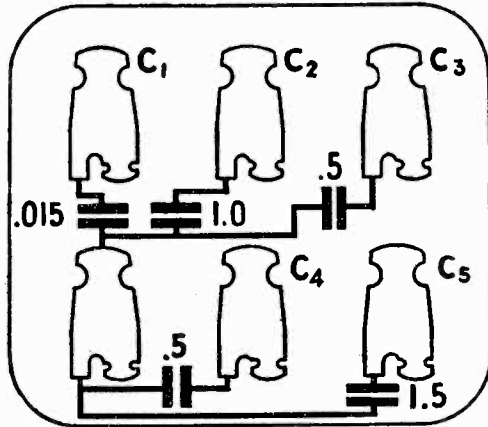
Table 4—Resistor Data

No. on Figs.	Resistance (Ohms)	Power (Watts)	COLOR		
			Body	Tip	Dot
69	2 Sections 70 ohms ea.		Flat	Wire Wound	
63	205			Tubular	
66	1,000	1	Brown	Black	Red
1	10,000	1/2	Brown	Black	Orange
17 (67)	13,000	1	Brown	Orange	Orange
61	15,000	2	Red	Orange	Black
67	25,000	1	Red	Green	Orange
46	25,000	1/2	Red	Green	Orange
11 (12) (51)	51,000	1/2	Green	Brown	Orange
26	70,000	1/2	Violet	Black	Orange
41	70,000	1	Violet	Black	Orange
9 (10) (31) (35)	99,000	1/2	White	White	Orange
38	99,000	1	White	White	Orange
24	490,000	1/2	Yellow	White	Yellow
39	490,000	1	Yellow	White	Yellow

Model 112 Condenser Block Part No. 3754



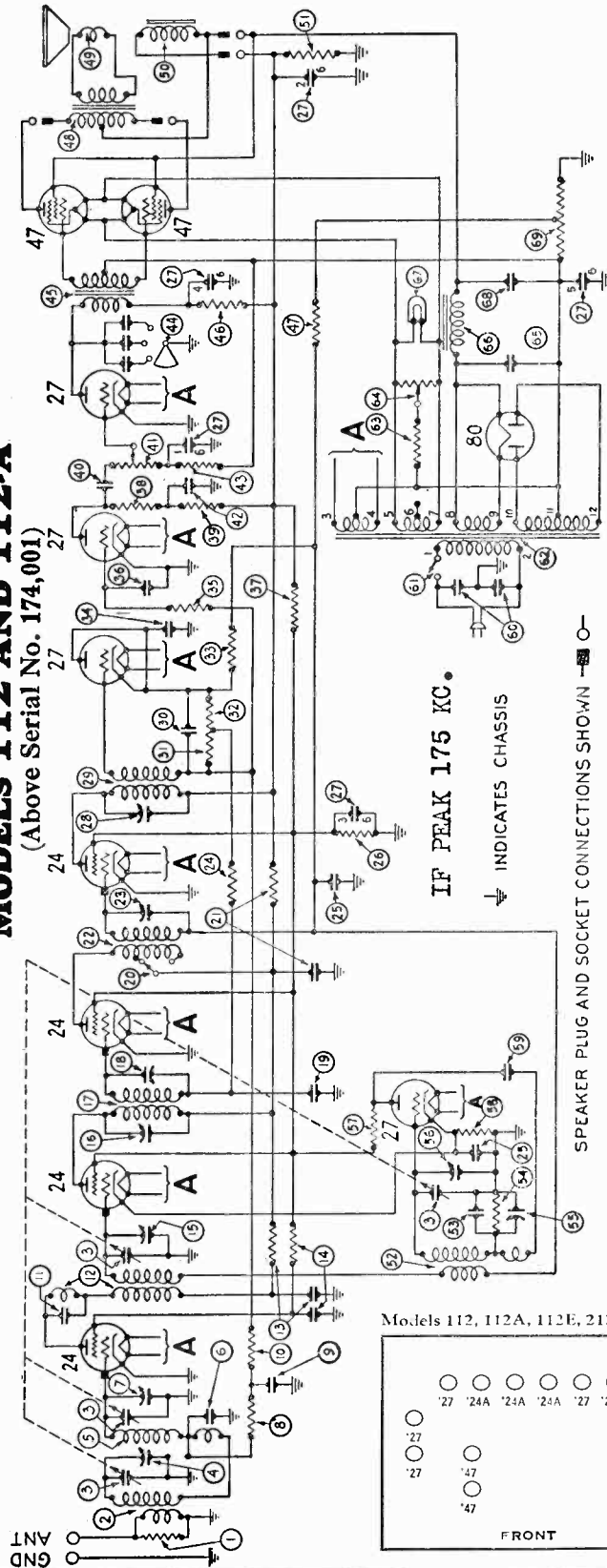
Model 112-A Condenser Block Part No. 3755



MODEL 112, 112-A
Above #174,001
Parts List
Schematic

PHILCO RADIO & TELEVISION CORP.

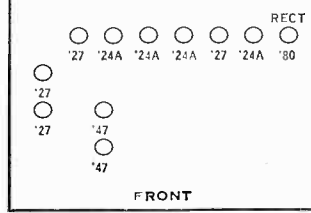
MODELS 112 AND 112-A
(Above Serial No. 174,001)



REPLACEMENT PARTS—MODELS 112, 112-A AND 112-E
(Above Serial No. 174,001)

1	Resistor (10,000 ohms)	4517	Resistor (13,000 ohms)
2	First R. F. Coil	3557	Push-pull Output Transformer
3	Tuning Condenser	5385	Voice Coil and Cone Assembly
4	Compensating Condenser	03489	Speaker Field (assembled with pot and frame)
5	Second R. F. Coil	03589	Resistor (15,000 ohms)
6	By-pass Condenser (.05 mfd.)	04000-L	Oscillator Coil
7	Compensating Condenser	03040	Condenser (700 mmf.)
8	Resistor (99,000 ohms)	4519	Resistor (50,000 ohms)
9	By-pass Condenser (.05 mfd.)	4518	Compensating Condenser
10	Resistor (99,000 ohms)	4518	Compensating Condenser
11	Condenser	4411	Resistor (13,000 ohms)
12	First Detector Coil	3583	Resistor (1,000 ohms)
13	By-pass Condenser & Resistor (.05 mfd. and 250 ohms)	4411	Condenser (110 mmf.)
14	By-pass Condenser & Resistor (.05 mfd. and 250 ohms)	3082	By-pass Condenser (.015 mfd. double)
15	Compensating Condenser	3656	On-Off Switch
16	Compensating Condenser	3769	Power Transformer (115 volts 50-60 cycles)
17	First I. F. Transformer	3768	Power Transformer (115 volts 25-10 cycles)
18	Compensating Condenser	3793-F	Power Transformer (230 volts 50-60 cycles)
19	By-pass Condenser (.05 mfd.)	4093	Resistor (205 ohms)
20	Range Switch	3615-S	Hum Control Potentiometer
21	By-pass Condenser & Resistor (.05 mfd. and 250 ohms)	3542	Electrolytic Condenser (6 mfd.)
22	Second I. F. Transformer	03137	Filter Choke
23	Compensating Condenser	5662	Pilot Light
24	Rectifier	4516	Electrolytic Condenser (6 mfd.)
25	Resistor (2,000 ohms)		Resistor (2 sections 70 ohms each)
26	Resistor (25,000 ohms)		
27	Resistor (70,000 ohms)		
28	Filter Condenser Block (50-60 cycles)		
29	Filter Condenser Block (25-40 cycles)		
30	Compensating Condenser		
31	Third I. F. Transformer		
32	Resistor (51,000 ohms)		
33	Resistor (51,000 ohms)		
34	Resistor (99,000 ohms)		
35	By-pass Condenser (.5 mfd.) 2 used		
36	Resistor (99,000 ohms)		
37	Condenser (250 mmf.)		
38	Resistor (25,000 ohms)		
39	Resistor (99,000 ohms)		
40	Resistor (490,000 ohms)		
41	Condenser (.015 mfd.)		
42	Volume Control		
43	By-pass Condenser (.05 mfd.)		
44	Resistor (70,000 ohms)		
45	Tone Control		
46	Push-pull Input Transformer		
47	Resistor (25,000 ohms)		
48	Resistor (490,000 ohms)		
49	Volume Control		
50	By-pass Condenser (.05 mfd.)		
51	Resistor (13,000 ohms)		
52	Push-pull Output Transformer		
53	Voice Coil and Cone Assembly		
54	Speaker Field (assembled with pot and frame)		
55	Resistor (15,000 ohms)		
56	Oscillator Coil		
57	Condenser (700 mmf.)		
58	Resistor (50,000 ohms)		
59	Compensating Condenser		
60	Compensating Condenser		
61	Resistor (13,000 ohms)		
62	Resistor (1,000 ohms)		
63	Condenser (110 mmf.)		
64	By-pass Condenser (.015 mfd. double)		
65	On-Off Switch		
66	Power Transformer (115 volts 50-60 cycles)		
67	Power Transformer (115 volts 25-10 cycles)		
68	Power Transformer (230 volts 50-60 cycles)		
69	Resistor (205 ohms)		
70	Hum Control Potentiometer		
71	Electrolytic Condenser (6 mfd.)		
72	Filter Choke		
73	Pilot Light		
74	Electrolytic Condenser (6 mfd.)		
75	Resistor (2 sections 70 ohms each)		

Models 112, 112A, 112E, 212, 212E



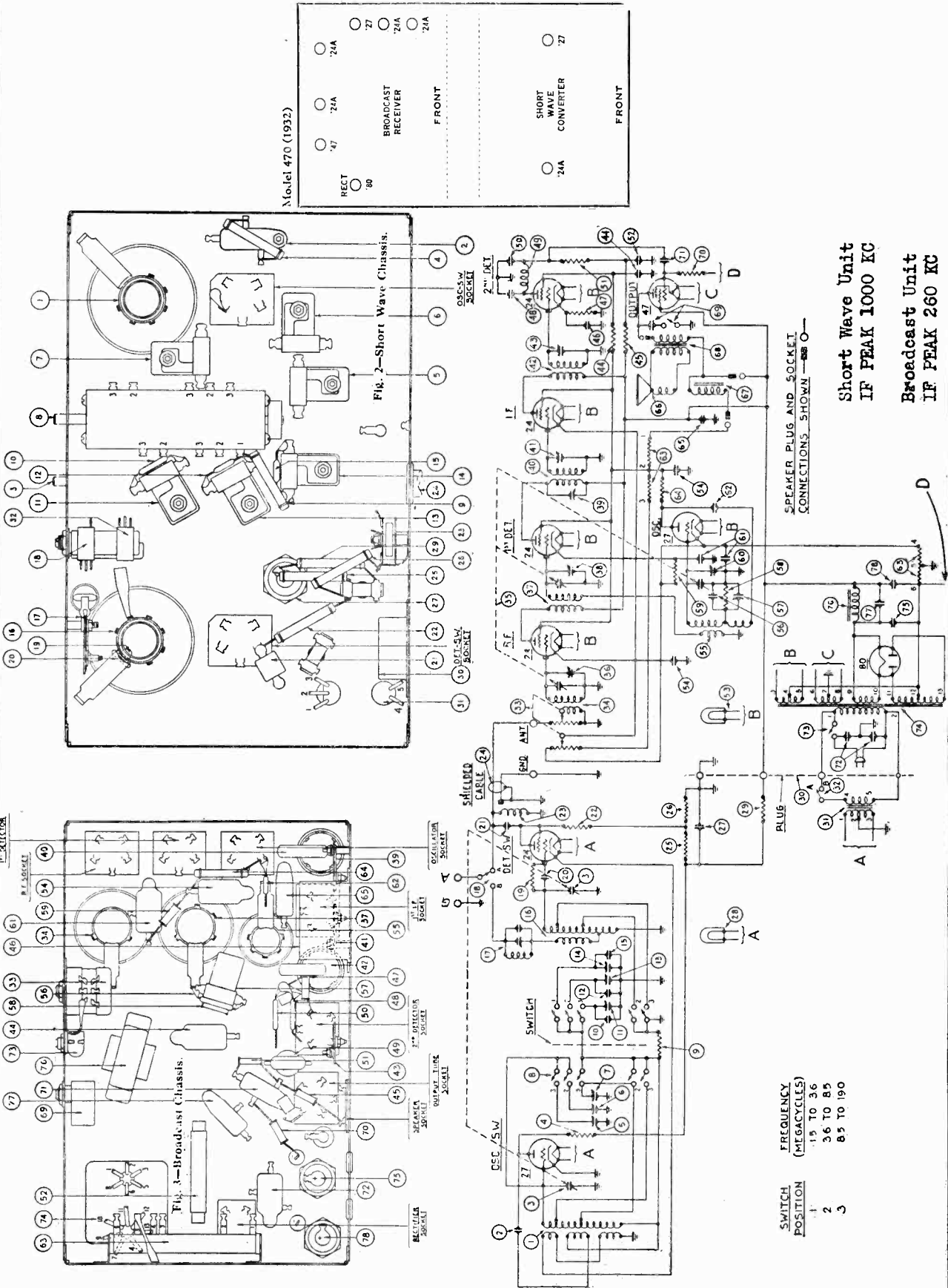
IF PEAK 175 KC.

INDICATES CHASSIS

SPEAKER PLUG AND SOCKET CONNECTIONS SHOWN

MODEL 470, 470-A
Schematic
Chassis

PHILCO RADIO & TELEVISION CORP.



Model 470 (1932)

RECT	27	24A	27	24A	27
27	24A	24A	27	24A	27

BROADCAST RECEIVER FRONT

SHORT WAVE CONVERTER FRONT

Short Wave Unit
IF PEAK 1000 KC

Broadcast Unit
IF PEAK 260 KC

SPEAKER PLUG AND SOCKET
CONNECTIONS SHOWN

SWITCH POSITION	FREQUENCY (MEGACYCLES)
1	15 TO 36
2	36 TO 85
3	85 TO 190

PHILCO RADIO & TELEVISION CORP.

MODEL 470, 470-A
Voltage
Electrical Values

Models 470 and 470-A Receivers

Table 1—Tube Socket Data taken with AC Set Tester—AC Line 115 Volts

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milli-amperes
Type	Circuit						
SHORT WAVE UNIT*							
27	Osc.	2.2	110	...	3.3	0	...
24	Det.	2.2	24	24	5.	0	...
BROADCAST UNIT							
24	R. F.	2.4	255	50	3.5	25	7.5
24	1st. Det.	2.4	260	60	9	38	...
27	Osc.	2.4	60	...	3.5	25	2.
24	I. F.	2.4	265	50	3	22	3.5
24	2nd Det.	2.4	116	40	7	25	...
47	Output	2.5**	205**	220**	.7**	..	28**
80	Rectifier	4.5	260/Plate				

*The voltage readings of the short wave unit were taken from the under side of the chassis, using a Weston multi-range voltmeter, 1000 Ohms per volt. The radio set tester cannot be used, either for voltage or plate current readings because of the effect of the long leads through the set tester cord.

**These readings must likewise be taken from the socket terminals on the under side of the chassis unless the set tester is especially equipped with an adapter for testing pentode tubes.

All the above readings were taken with volume control at maximum.

Table 2—Power Transformer Voltage

Terminals	A. C. Volts	Circuit	Color
SHORT WAVE UNIT			
4-5	105 to 125	Primary	Black
1-3	2.5	Secondary	Yellow
2	...	Center Tap 1-3	Green
BROADCAST UNIT			
1-2	105 to 125	Primary	White (Small Gauge)
3-5	2.5	Filament of 47	Dark Green
6-8	2.5	Filament of 24	Black (Heavy Gauge)
9-10	5.	Filament of 80	Light Blue
11-13	700	Plate of 80	Yellow
4	...	Center Tap of 3-5	Black, Green Tracer
7	...	Center Tap of 6-8	Black, Yellow Tracer
12	...	Center Tap of 11-13	Yellow, Green Tracer

Table 3—Resistor Data

No. on Figs. 1, 2 and 3	Terminal	Power (Watts)	Resistance (Ohms)	Color		
				Body	Tip	Dot
(44)	250	.....	Black Bakelite	.....
(48)	{ 1-2 } { 2-3 } { 4-5 } { 5-6 }	.....	{ 1060 } { 2300 } { 70 } { 240 }	.....	Long Tubular	.....
(29)	1	5,000	Green	Black	Red
(59)5	5,000	Green	Black	Red
(4) (64)	1	13,000	Brown	Orange	Orange
(25) (26)	1	32,000	Orange	Red	Orange
(45)	(50-60 cycles)	.5	45,000	Yellow	Green	Orange
(47) (58)5	51,000	Green	Brown	Orange
(22)	1	99,000	White	White	Orange
(45)5	99,000	White	White	Orange
(9)	1	240,000	Red	Yellow	Yellow
(51) (70)5	240,000	Red	Yellow	Yellow
(19)5	2,000,000	Red	Black	Green

PHILCO RADIO & TELEVISION CORP.

MODEL 470, 470-A
Parts List

Table 4—Condenser Data

Nos. on Fig. 1, 2 and 3	Capacity (Mfd.)	Container	Nos. on Fig. 1, 2 and 3	Capacity (Mfd.)	Container
(20) (62)	.00011	Blue and Golden Yellow	(54) (61)	.09 (Double)	Black Bakelite
(14) (21) (50)	.00025	Yellow	(77)	.09 (50-60 cycles)	Black Bakelite
(66)	.00041	Yellow and Orange	(77)	.18 (25-40 cycles)	Black Bakelite
(48)	.0005	Green	(52)	.25	Metal
(12)	.0008	Green and Orange	(46)	.5	Metal
(10)	.00125	Blue and Orange	(75)	6 (50-60 cycles)	Electrolytic
(71)	.01	Black Bakelite	(75)	10 (25-40 cycles)	Electrolytic
(72)	.015 (Double)	Black Bakelite	(78)	6 (50-60 cycles)	Electrolytic
(2) (65)	.05	Black Bakelite	(78)	10 (25-40 cycles)	Electrolytic

No. on Figs. 1 and 2	Description	Part No.
(1)	Oscillator Coil*	03734
(2)	By-pass Condenser (.05 mfd.)	3615-M
(3)	Gang Condenser Assembly	03692
(4)	Resistor (13,000 ohms)	3766
(5)	Compensating Condenser (19 MC End of Top Scale)	04000-E
(6)	Compensating Condenser (8.5 MC End of Center Scale)	04000-E
(7)	Compensating Condenser (3.6 MC End of Bottom Scale)	04000-E
(8)	Frequency Control Switch	03751
(9)	Resistor (240,000 ohms)	3768
(10)	Condenser (1,250 mmf.)**	5886
(11)	Compensating Condenser (8.5 MC End of Top Scale)**	04000-F
(12)	Condenser (800 mmf.)	5878
(13)	Compensating Condenser (3.6 MC End of Center Scale)	04000-F
(14)	Condenser (250 mmf.)	3082
(15)	Compensating Condenser (1.5 MC End of Bottom Scale)	04000-F
(16)	Detector Transformer*	03734
(17)	Frequency Filter	03662
(18)	Antenna Switch Assembled with (22)	5796
(19)	Resistor (2 megohms) Assembled with (20)	03879
(20)	Condenser (110 mmf.) Assembled with (19)	03879
(21)	Condenser (250 mmf.)	3082
(22)	Resistor (99,000 ohms)	3767
(23)	R. F. Choke	03893
(24)	Shielded Cable	L-1278
(25)	Resistor (32,000 ohms)	3525
(26)	Resistor (32,000 ohms)	3525
(27)	Electrolytic Condenser (6 mfd.)	4916
(28)	Pilot Light (Short Wave Unit)	3463
(29)	Resistor (5,000 ohms)	3526
(30)	Plug	03913
(31)	Filament Transformer	5906 5923
(32)	On-off Switch (Assembled with (19))	5924
(33)	Volume Control	5796
(34)	First R. F. Transformer	5039
(35)	Tuning Condenser (50-60 cycles)	03082
(36)	Tuning Condenser (25-40 cycles)	03076
(37)	Compensating Condenser — Antenna — Part of Gang Condenser Assembly	03077
(38)	First Detector Transformer	03083
(39)	Compensating Condenser — Detector — Part of Gang Condenser Assembly	03083
(40)	Compensating Condenser — First I. F. Primary	04000-J
(41)	First I. F. Transformer	03091
(42)	Compensating Condenser — First I. F. Secondary	04000-H
(43)	Second I. F. Transformer	03092
(44)	Compensating Condenser—Second I. F. Resistor (250 ohms Combined with .09 mfd. Condenser)	04000-K 4989-E

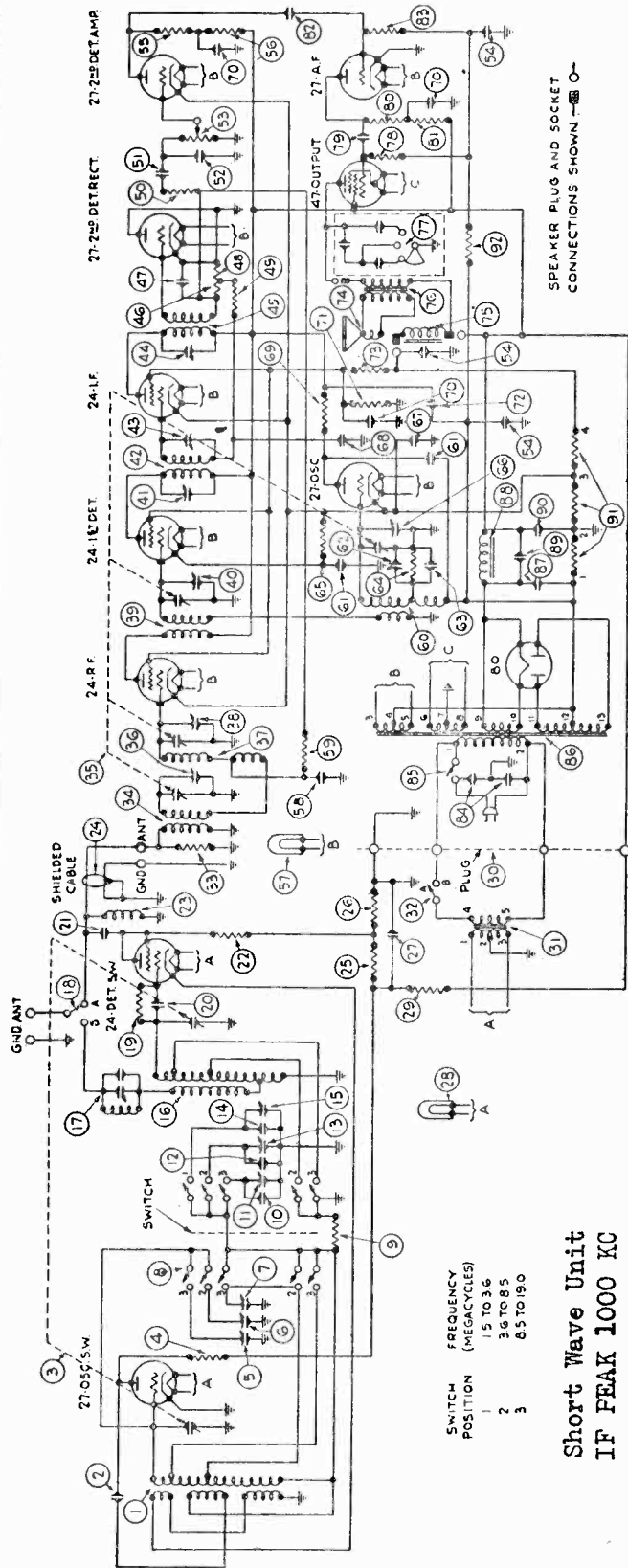
No. on Figs. 1 and 2	Description	Part No.
(45)	Resistor (45,000 ohms) 50-60 cycles	5256
(46)	Resistor (99,000 ohms) 25-40 cycles	4411
(47)	Condenser (.5 mfd.)	3583
(48)	Resistor (51,000 ohms)	4518
(49)	Condenser (500 mmf.)	3910
(50)	R. F. Choke	03086
(51)	Condenser (250 mmf.)	3082
(52)	Resistor (240,000 ohms)	4410
(53)	Condenser (.25 mfd.)	4264
(54)	Pilot Light (Broadcast Unit)	3463
(55)	Condenser (.09 mfd. double)	4989-C
(56)	Oscillator Coil	03084
(57)	Condenser (410 mmf.)	5120
(58)	Compensating Condenser—Low Frequency	04000-F
(59)	Resistor (51,000 ohms)	4518
(60)	Resistor (5,000 ohms)	5310
(61)	Compensating Condenser—High Frequency —Part of Gang Condenser Assembly	4989-C
(62)	Condenser (.09 mfd. double)	4989-C
(63)	Condenser (110 mmf.)	4519
(64)	B. C. Resistor	03079
(65)	Resistor (13,000 ohms)	3766
(66)	Condenser (.05 mfd.)	3615-L
(67)	Voice Coil and Cone Assembly	02996
(68)	Field Coil Assembled with Pot.	02966
(69)	Output Transformer	2673
(70)	Tone Control	03140
(71)	Resistor (240,000 ohms)	4410
(72)	Condenser (.01 mfd.)	3903-L
(73)	Condenser (.015 mfd. double)	3793-K
(74)	"On-off" Switch	4095
(75)	Power Transformer (50-60 cycles)	5117
(76)	Power Transformer (25-40 cycles)	5118
(77)	Power Transformer (50-60, 230 volts)	5119
(78)	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
(79)	Electrolytic Condenser (10 mfd.) 25-40 cycles	5142
(80)	Choke	4819
(81)	Condenser (.09 mfd.) 50-60 cycles	4989-J
(82)	Condenser (.18 mfd.) 25-40 cycles	4989-K
(83)	Electrolytic Condenser (8 mfd.) 50-60 cycles	4916
(84)	Electrolytic Condenser (10 mfd.) 25-40 cycles	5142
(85)	Line Cord and Plug	L-943
(86)	Tube Shield	03987
(87)	Bezel (Broadcast)	5008
(88)	Bezel (Short Wave)	5178
(89)	Knob (Large)	03063
(90)	Knob (Small)	03064
(91)	Knob (On-Off Switch—Broadcast)	03437
(92)	Knob (Control Switch—Short Wave)	5811
(93)	Spring (For Small Knobs)	4147
(94)	Spring (For Large Knobs)	5262
(95)	Grid Clip	4897
(96)	Five Prong Socket Assembly	4956
(97)	Four Prong Socket Assembly	4955
(98)	Dial Complete (Broadcast)	03031
(99)	Dial Complete (Short Wave)	03890

*Includes matched oscillator coil and detector transformer.

**These parts replaced on later production by .0018 mfd. condenser, part 6018.

PHILCO RADIO & TELEVISION CORP.

MODEL 490
Schematic
Voltage



Short Wave Unit
IF PEAK 1000 KC

Broadcast Unit
IF PEAK 175 KC

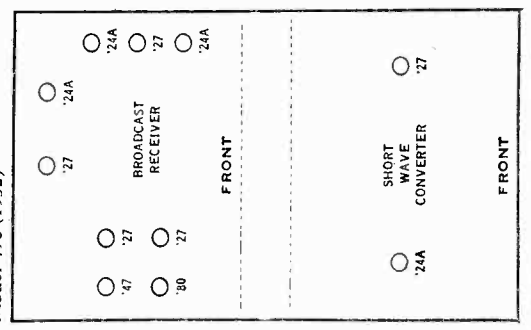
Model 490 Receiver

Table 1—Tube Socket Readings—Line Voltage 115 volts

Tube	Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milli-amperes
SHORT WAVE UNIT*							
27	Osc.	2.2	110	24	3.3	0	
24	1st Det.	2.2	21	24	5.	0	
BROADCAST UNIT*							
24	R. F.	2.1	220	50	6.	15	2.
27	Osc.	2.1	80		6	15	2.3
24	1st Det.	2.1	210	55	5	15	.5
24	I. F.	2.1	220	60	8	15	0
27	Rect. Det.	2.1	150		0	14	1.3
27	1st Audio	2.1	150		2	15	1.5
47	Output	2.4**	205**	220**	7**	15	28.**
80	Rectifier	4.5	220/Plate				

*The voltage readings of the short wave unit were taken from the under side of the chassis, using a Weston Multi-range voltmeter, 1000 ohms per volt. The radio set tester cannot be used, either for voltage or plate current readings because of the effect of the long leads through the set tester cord. **These readings must likewise be taken from the socket terminals on the under side of the chassis unless the set tester is especially equipped with an adapter for testing pentode tubes.

Model 490 (1932)



MODEL 490
Chassis
Transformer Data

PHILCO RADIO & TELEVISION CORP.

MODEL 490

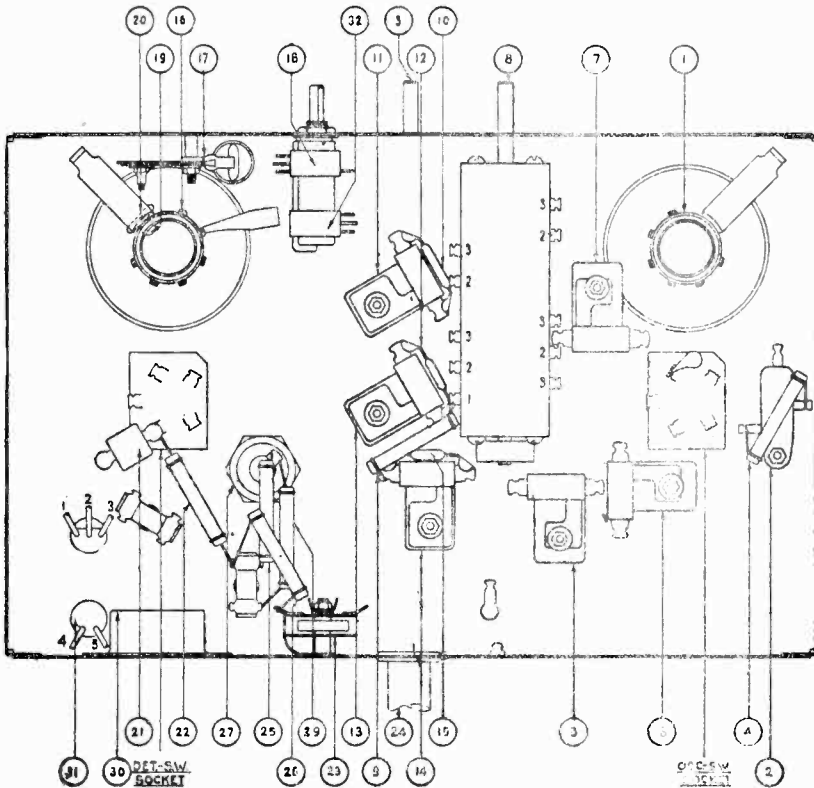


Fig. 2—Short Wave Chassis.

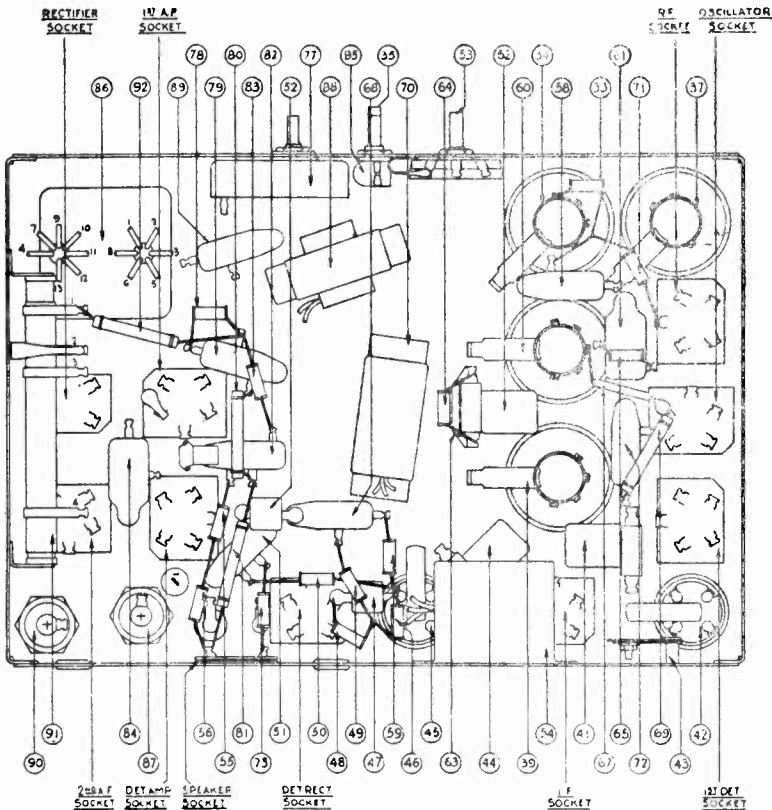


Fig. 3—Broadcast Chassis.

Table 2—Power Transformer Voltages

Terminals	A.C. Volts	Circuit	Color
SHORT WAVE UNIT			
4-5	105 to 125	Primary	Black
1-3	2.5	Secondary	Yellow
2		Center Tap 1-3	Green
BROADCAST UNIT			
1-2	105 to 125	Primary	White
3-5	2.5	Heaters of 24 and 27 Tubes	Black
4		Center Tap of 3-5	Black with Yellow
6-8	2.5	Filament of 47 Tube	Dark Green
7		Center Tap of 6-8	Black with Green
9-10	5.0	Filament of 80 Tube	Light Blue
11-13	6.50	Plates of 80 Tube	Yellow
12		Center Tap of 11-13	Yellow with Green

PHILCO RADIO & TELEVISION CORP.

MODEL 490 Electrical Values

Main table with columns: No. on Figs. 1 and 2, Description, Part No., No. on Figs. 1 and 2, Description, Part No., Nos. on Figs. 1, 2 and 3, Capacity Mfd., Container, Resistor Data, and Condenser Data.

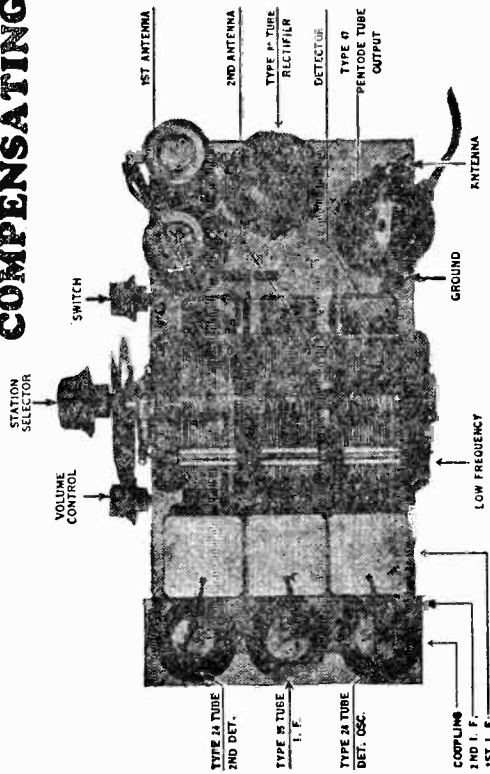
*Includes matched oscillator coil and detector transformer. **These parts replaced on later production by .0018 mfd. condenser, part 6018.

PHILCO RADIO & TELEVISION CORP.

SPECIAL NOTICE*****

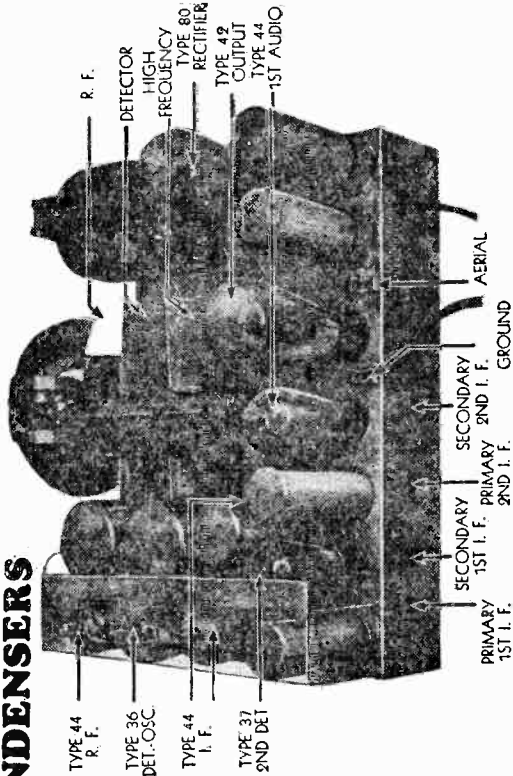
Cut up this page and paste the respective chassis layouts upon the pages in the Perpetual Trouble Shooter's Manual which carry the models shown upon this page.

COMPENSATING CONDENSERS



MODELS 51 and 52

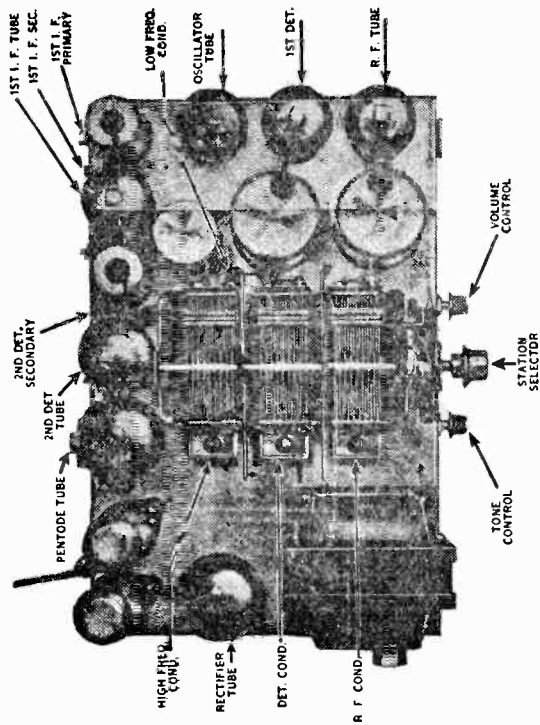
Adjust I. F. at 175 K.C.



MODEL 71

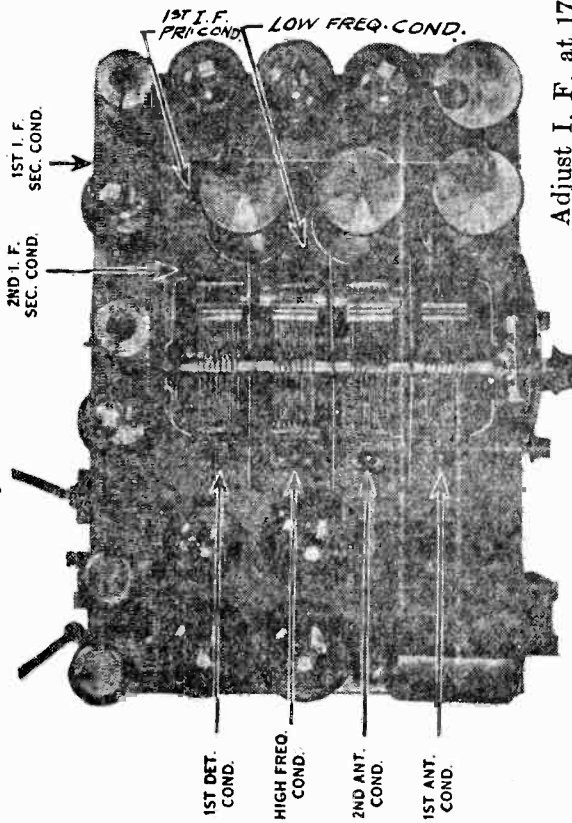
MODEL 70 with Automatic Volume Control---Same Compensating Condenser Locations.

Adjust I. F. at 260 K.C.



MODEL 70 without Automatic Volume Control.

Adjust I. F. at 260 K.C.



Adjust I. F. at 175 K.C.

MODEL 90 with Push-Pull 45's Output

MODEL 90 with Single Pentode Output---Same Compensating Condenser Locations.

PHILCO RADIO & TELEVISION CORP.

SPECIAL NOTICE*****

Cut up this page and paste the respective chassis layouts upon the pages in the Perpetual Trouble Shooter's Manual which carry the models shown upon this page.

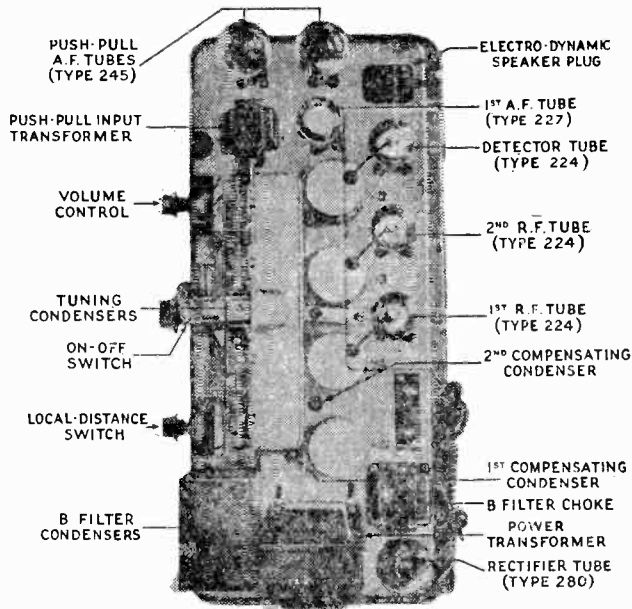
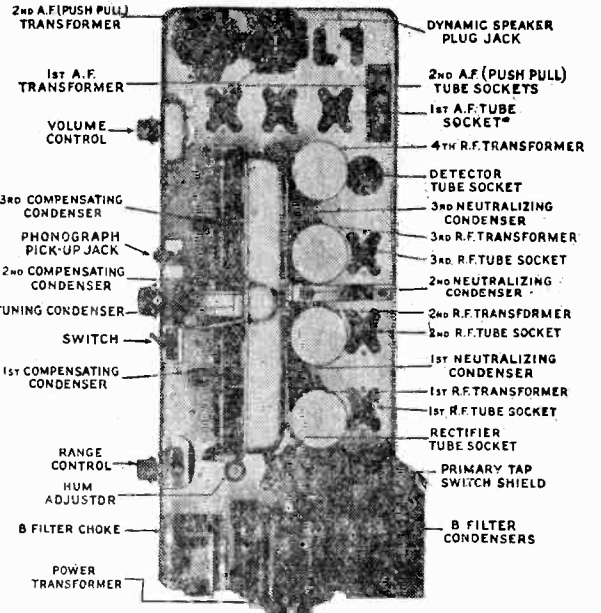


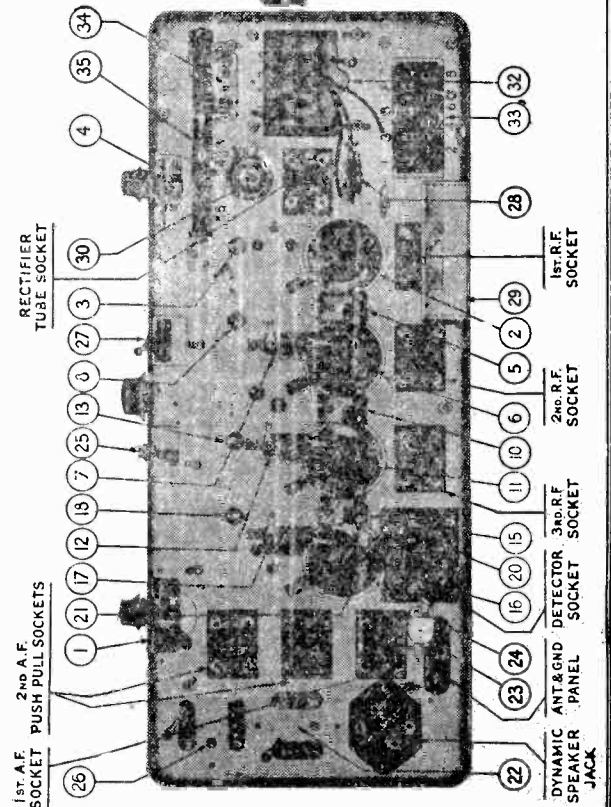
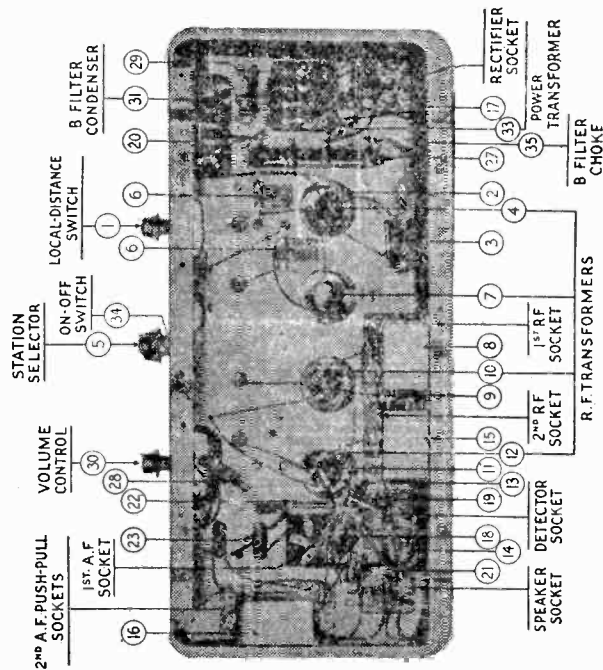
FIG. 1

The Model 76 is for use on 100 to 135 volts, 50 or 60 cycle alternating current.



Models 85 and 82

Model 76

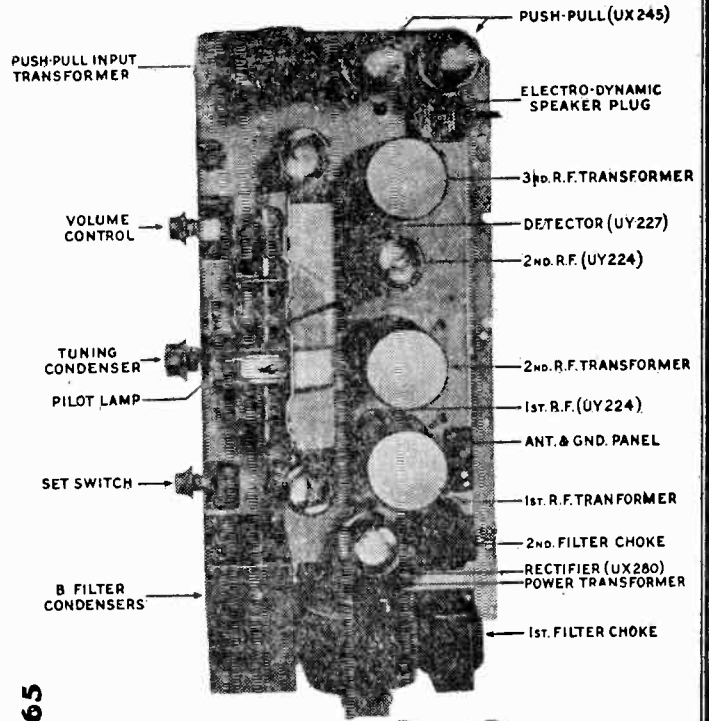
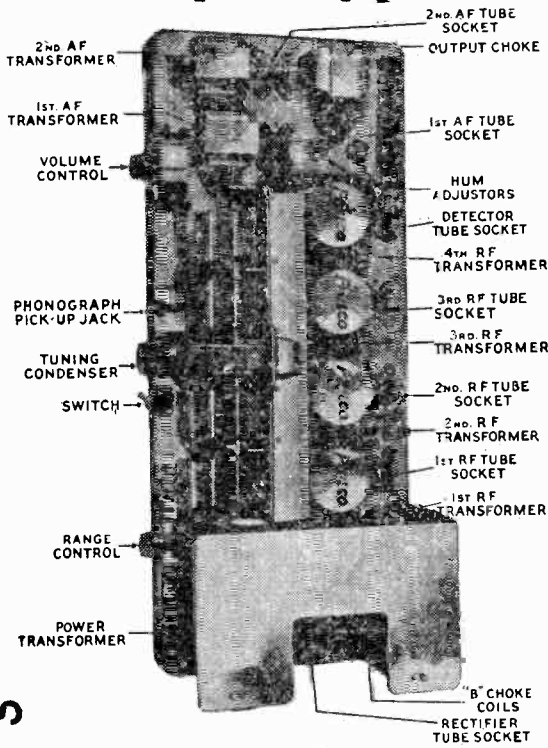




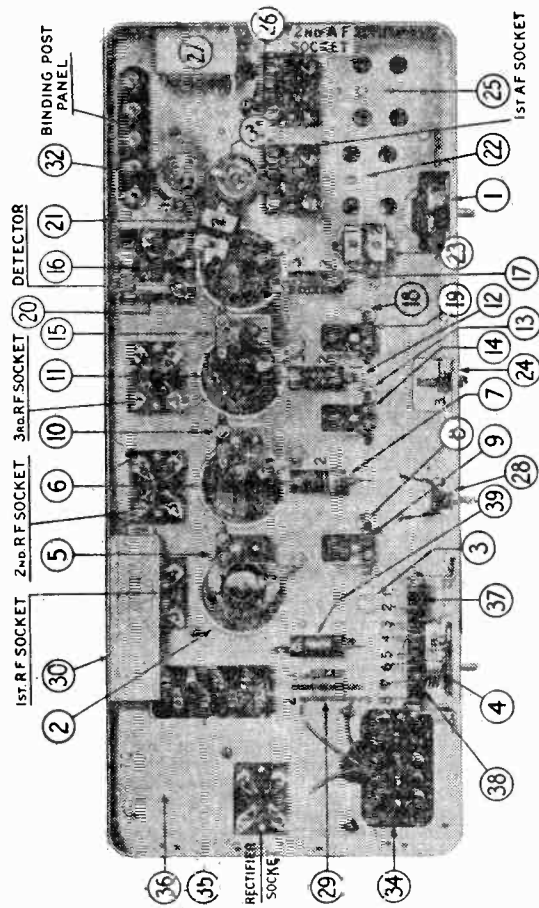
PHILCO RADIO & TELEVISION CORP.

SPECIAL NOTICE *****

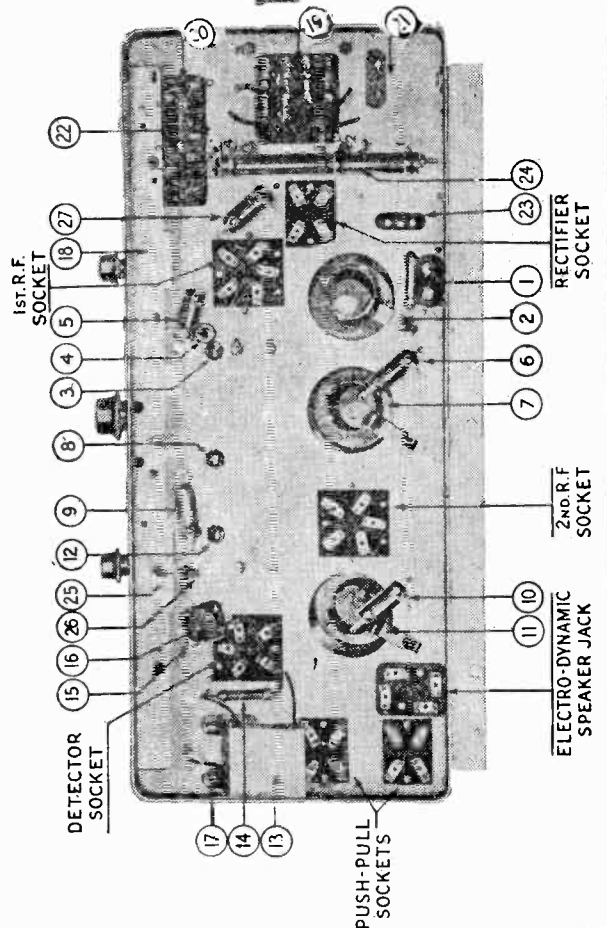
Cut up this page and paste the respective chassis layouts upon the pages in the Perpetual Trouble Shooter's Manual which carry the models shown upon this page.



SERIES 5



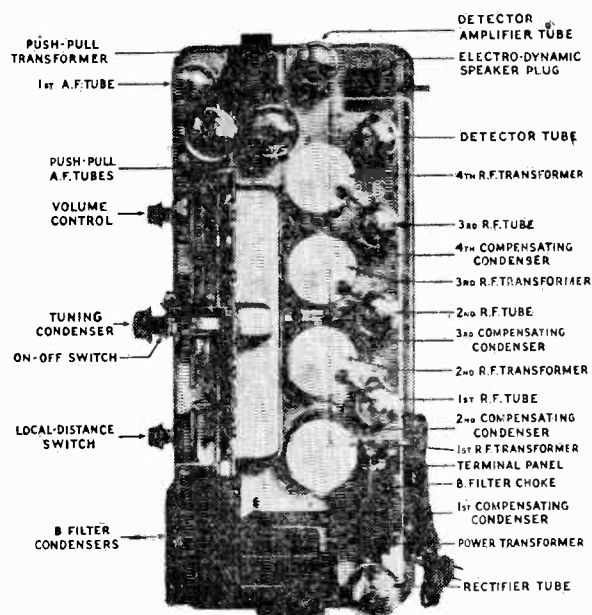
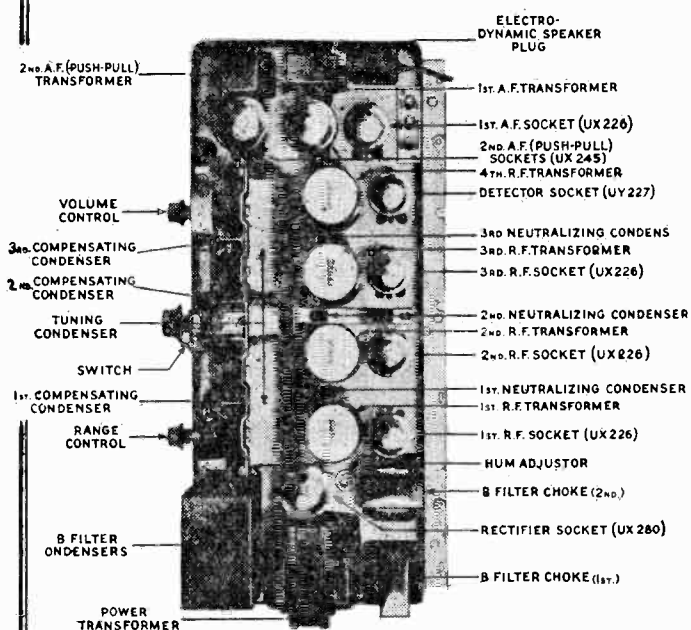
Model 65



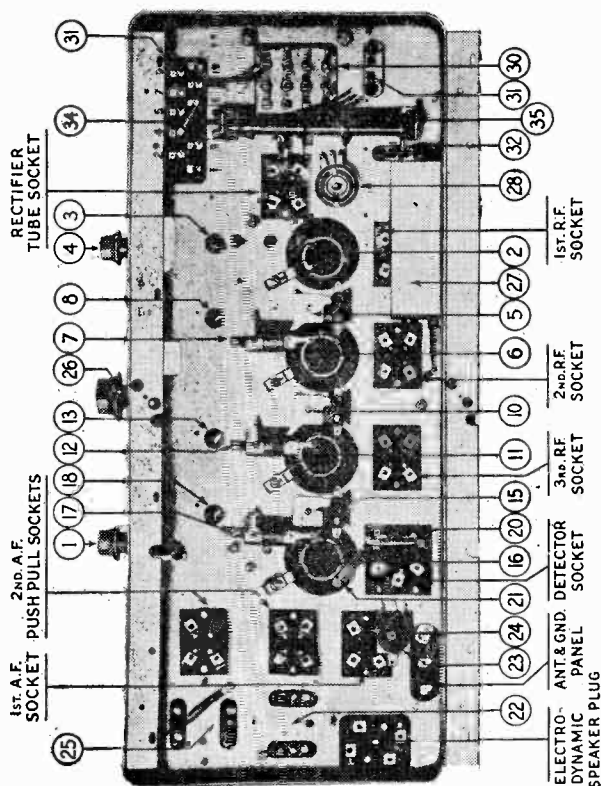
PHILCO RADIO & TELEVISION CORP.

SPECIAL NOTICE*****

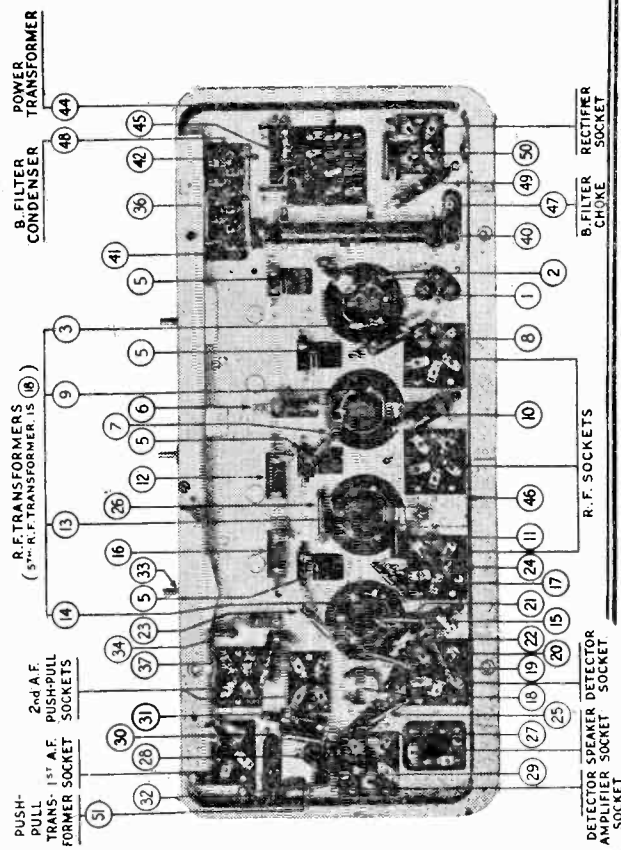
Cut up this page and paste the respective chassis layouts upon the pages in the Perpetual Trouble Shooter's Manual which carry the models shown upon this page.



Model 87

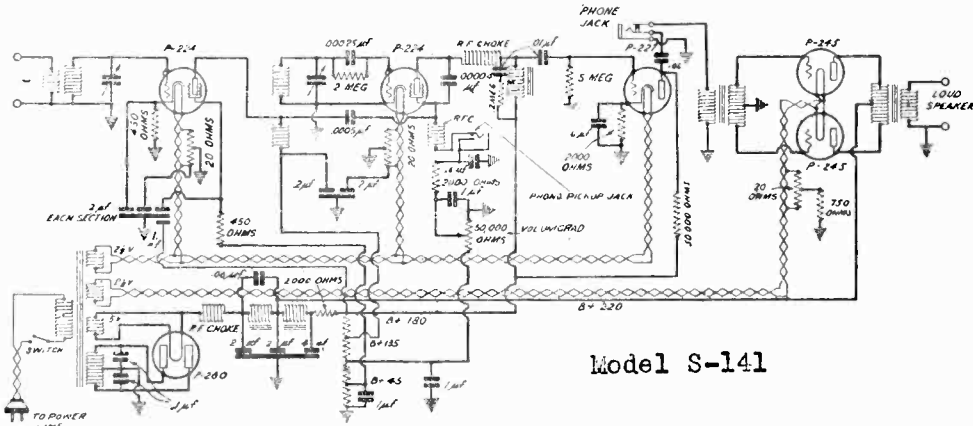


Model 95



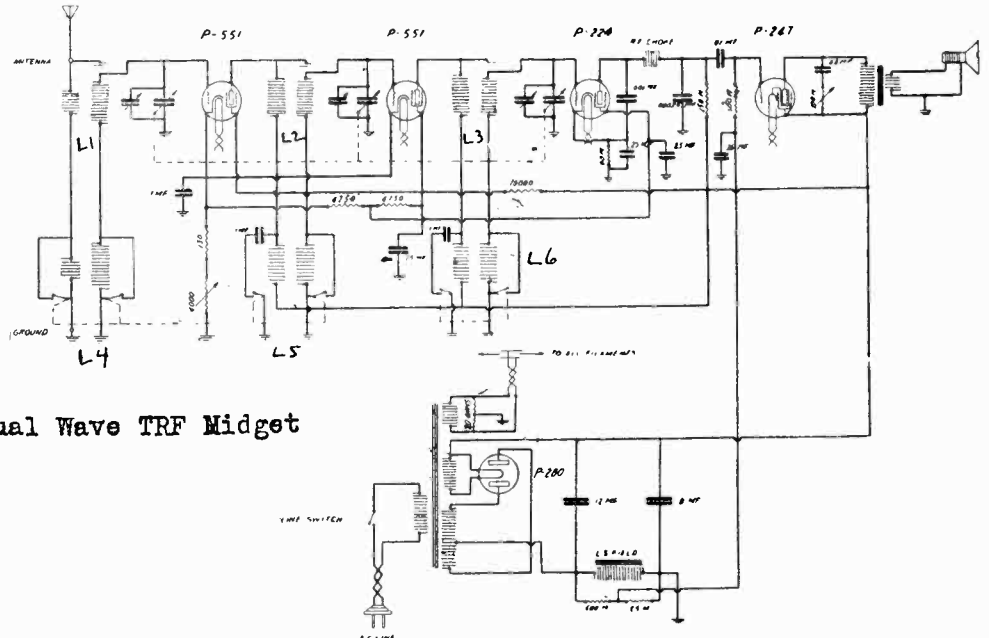
PILOT RADIO & TUBE CORP.

MODEL Dual Wave Midget
200-2000 meters
MODEL S-141
MODEL K-139

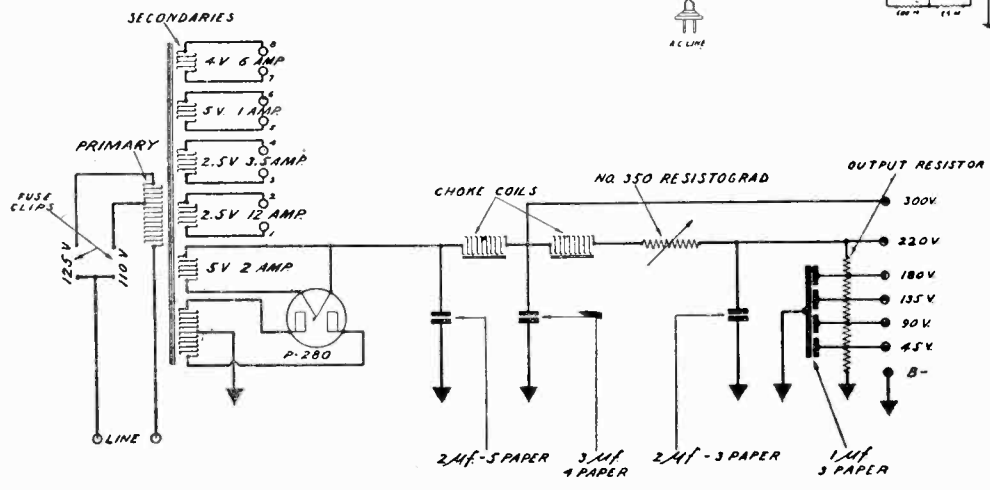


Model S-141

This schematic diagram of the Universal is a functional hook-up, and does not show the actual connections to the cam switches.



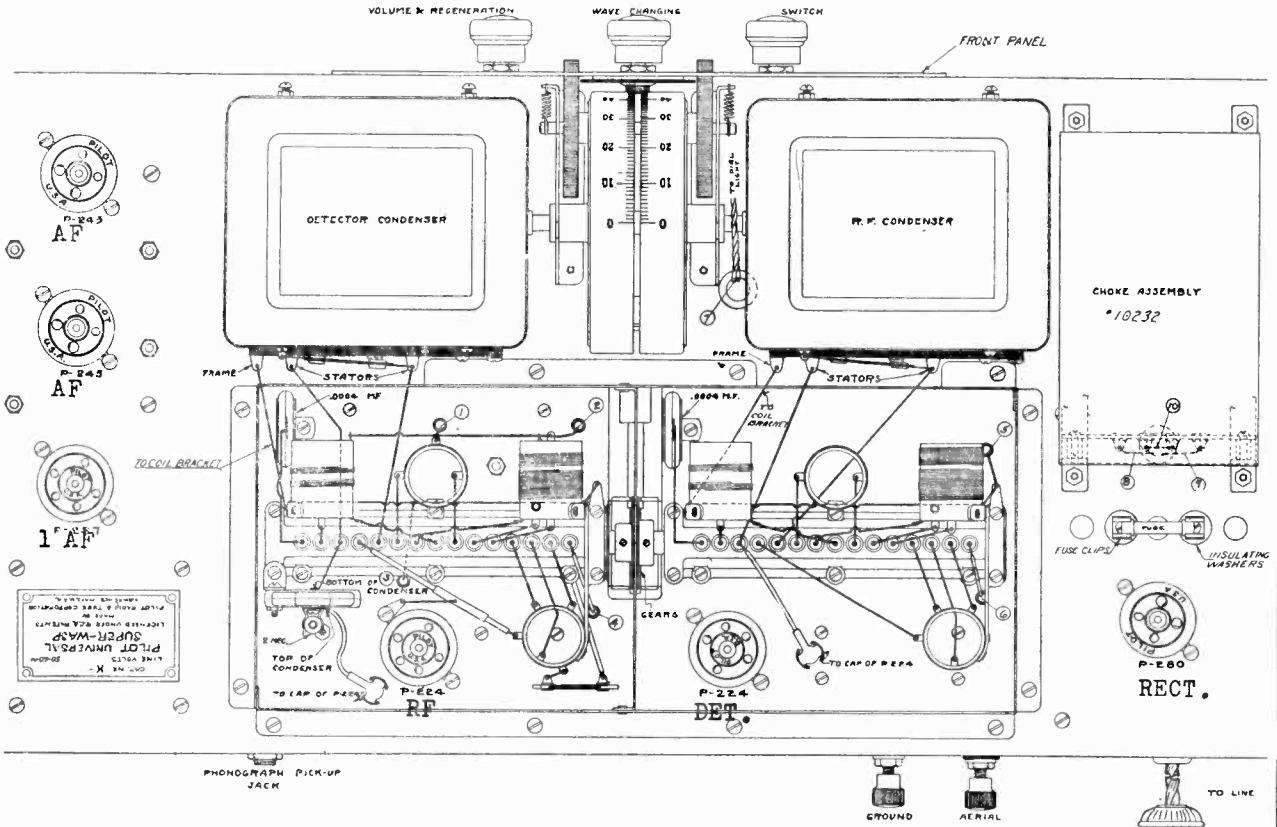
Model Dual Wave TRF Midget



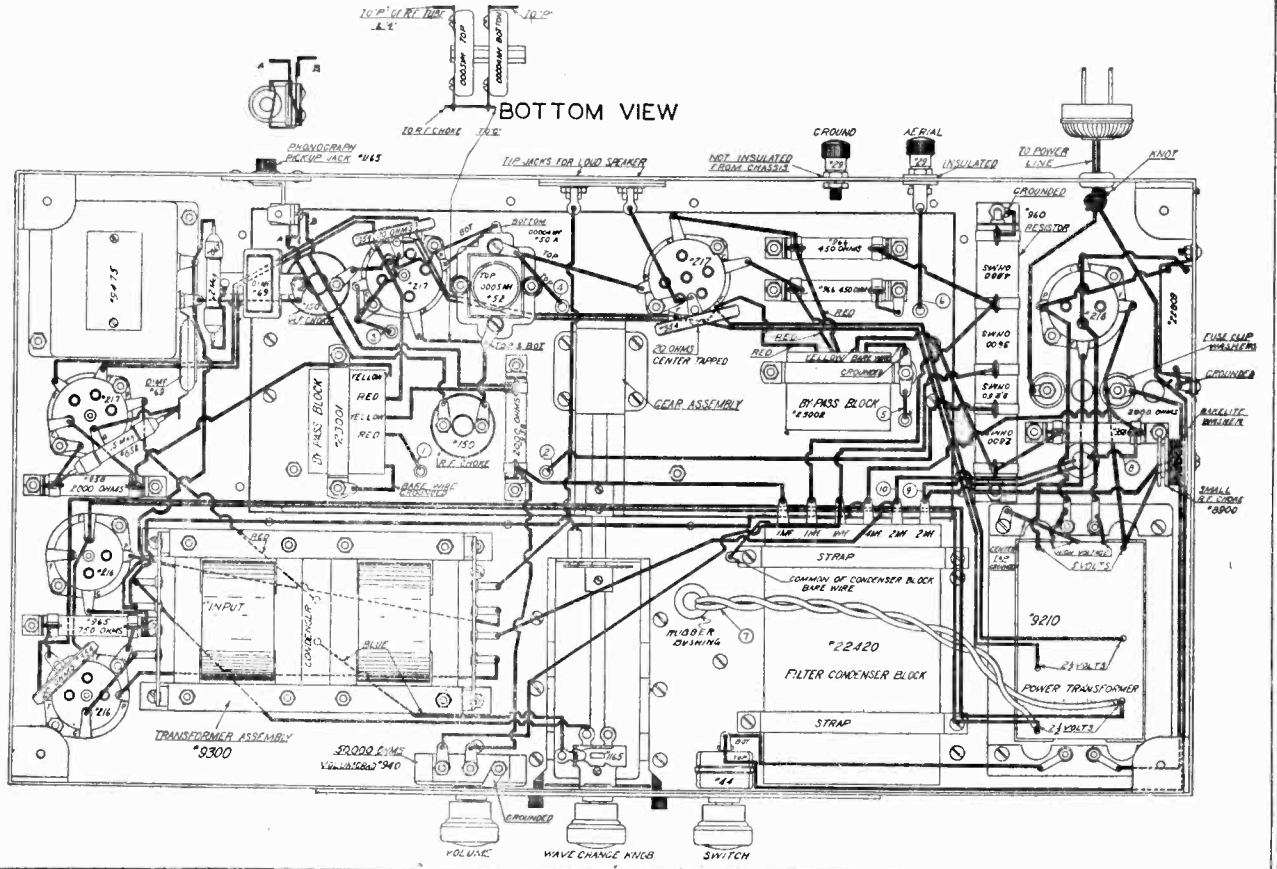
Model K-139 Pack

MODEL K-136
AC Universal
Wasp
Chassis

PILOT RADIO & TUBE CORP.

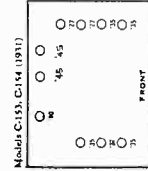
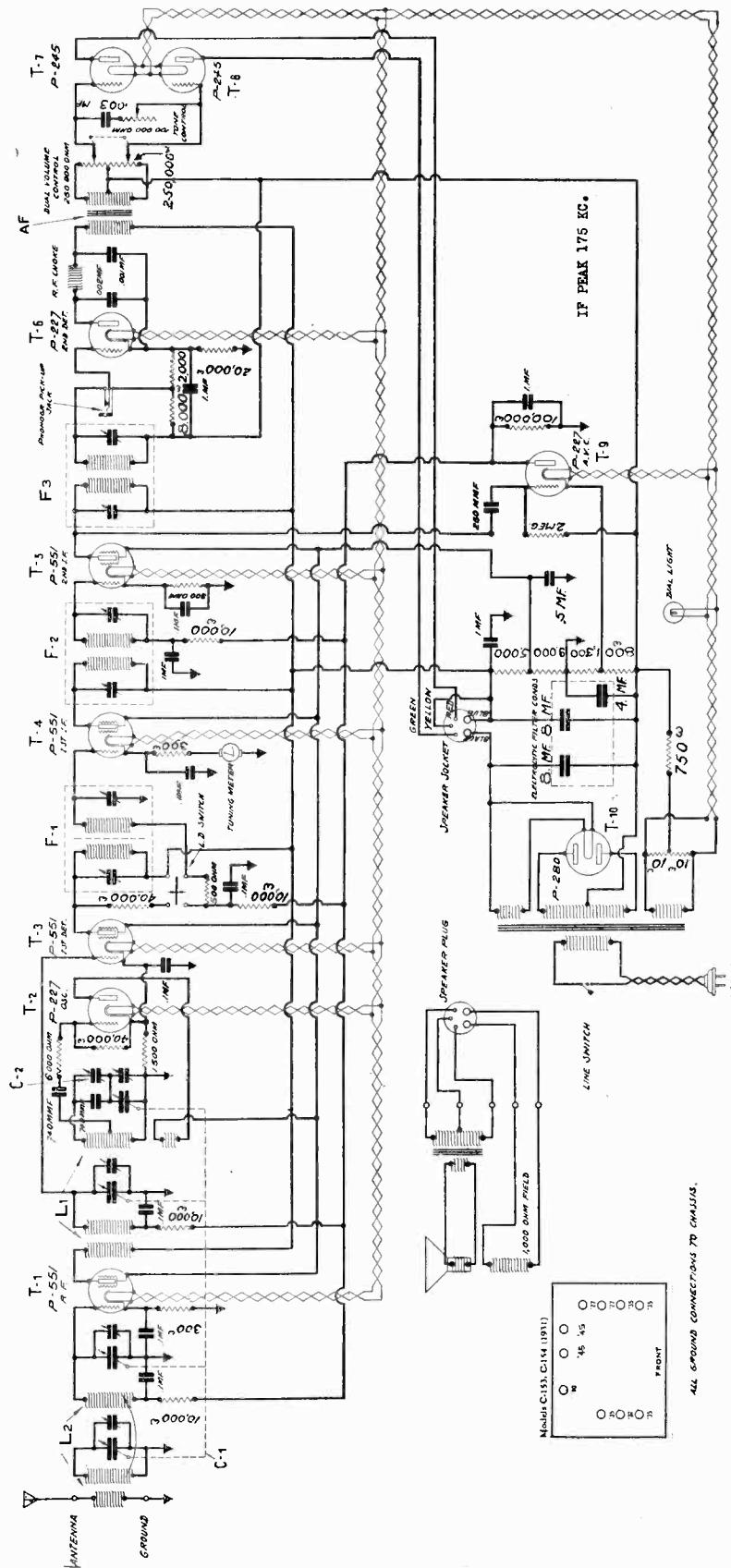


Top view of the Universal, showing the wiring.



PILOT RADIO & TUBE CORP.

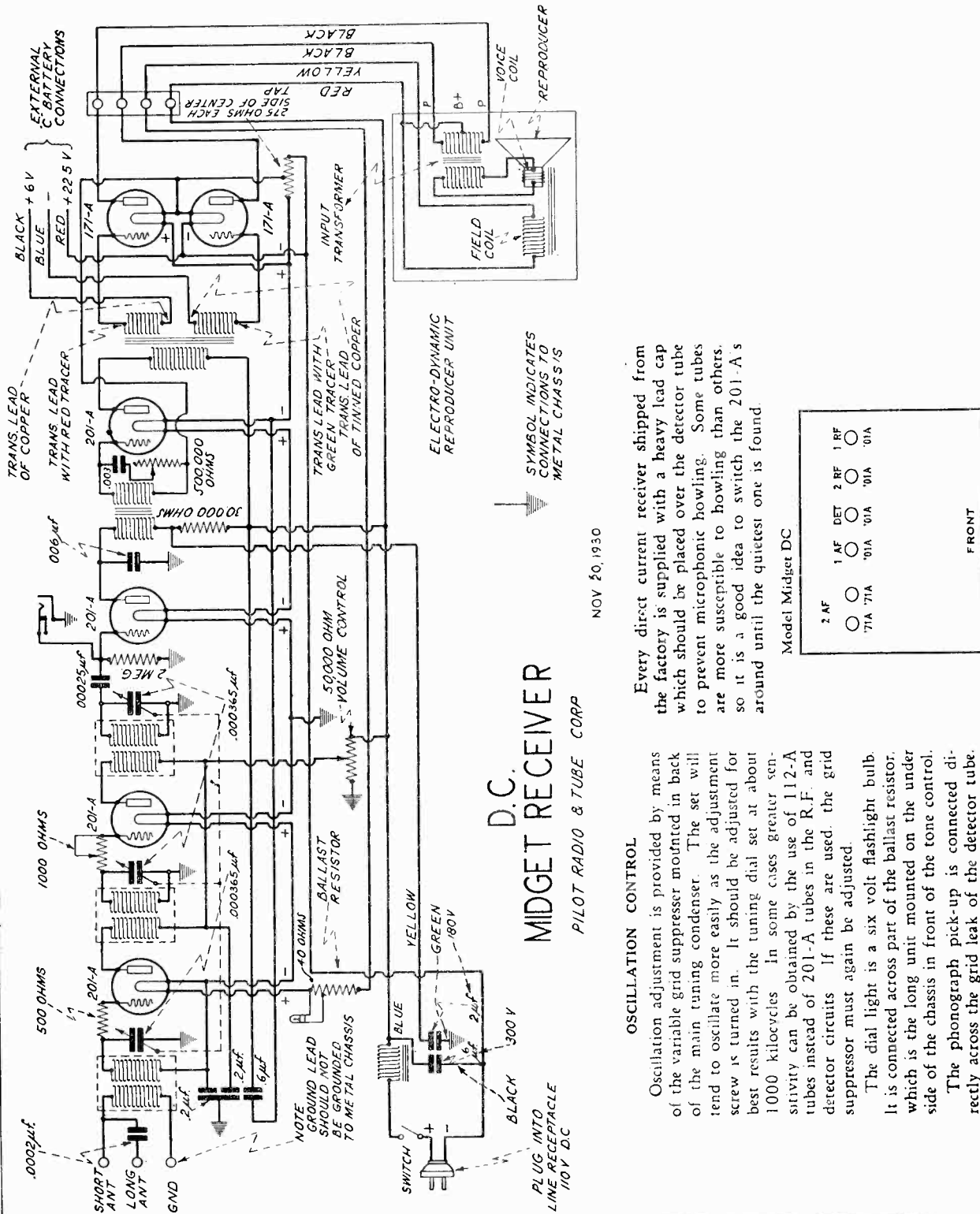
MODEL C-153, C-154
 (With 2-'45s)
 10 Tube Super



ALL GROUND CONNECTIONS TO CHASSIS.

MODEL DC Midget
S-156, S-158

PILOT RADIO & TUBE CORP.



NOV 20, 1930

D.C.
MIDGET RECEIVER
PILOT RADIO & TUBE CORP

SPECIAL NOTE
A slight change was made in the D.C. set. The ground binding post has been replaced by a red flexible wire 3 1/2 feet long, to which the ground wire should be spliced. This arrangement will prevent accidental contact of the ground wire with the chassis, which always results in one or more blown out tubes. The receiver otherwise is exactly the same as before.

Every direct current receiver shipped from the factory is supplied with a heavy lead cap which should be placed over the detector tube to prevent microphonic howling. Some tubes are more susceptible to howling than others, so it is a good idea to switch the 201-A's around until the quietest one is found.

OSCILLATION CONTROL
Oscillation adjustment is provided by means of the variable grid suppressor mounted in back of the main tuning condenser. The set will tend to oscillate more easily as the adjustment screw is turned in. It should be adjusted for best results with the tuning dial set at about 1000 kilocycles. In some cases greater sensitivity can be obtained by the use of 112-A tubes instead of 201-A tubes in the R.F. and detector circuits. If these are used, the grid suppressor must again be adjusted.

The dial light is a six volt flashlight bulb. It is connected across part of the ballast resistor, which is the long unit mounted on the under side of the chassis in front of the tone control. The phonograph pick-up is connected directly across the grid leak of the detector tube.

Model Midget DC

2 AF	1 AF	DET	2 RF	1 RF
○	○	○	○	○
71A	71A	01A	01A	01A

FRONT

R. C. A. VICTOR CO., INC.

MODEL R-4, R-6 AC
Chassis
Voltage

Service work in conjunction with this receiver will be very similar to that of other table type receivers. However, there are several new features of this model which require some consideration.

The second I.F. transformer in this receiver is of the untuned variety, making the set slightly less sensitive and selective than the R-7. This decreased selectivity permits the omission of the 600 K.C. adjustable capacitor used on the R-7, R-10 and other Super-Heterodyne receivers. When aligning adjustments are necessary, it is therefore only necessary to tune one I.F. transformer and the three tuning capacitors. The I.F. transformer is adjusted at 175 K.C. and the tuning capacitors at 1400 K.C. In the case of the latter, the dial should be set at 1400 as well as the oscillator and the three screws adjusted for maximum output. This will permit the dial to read very accurately.

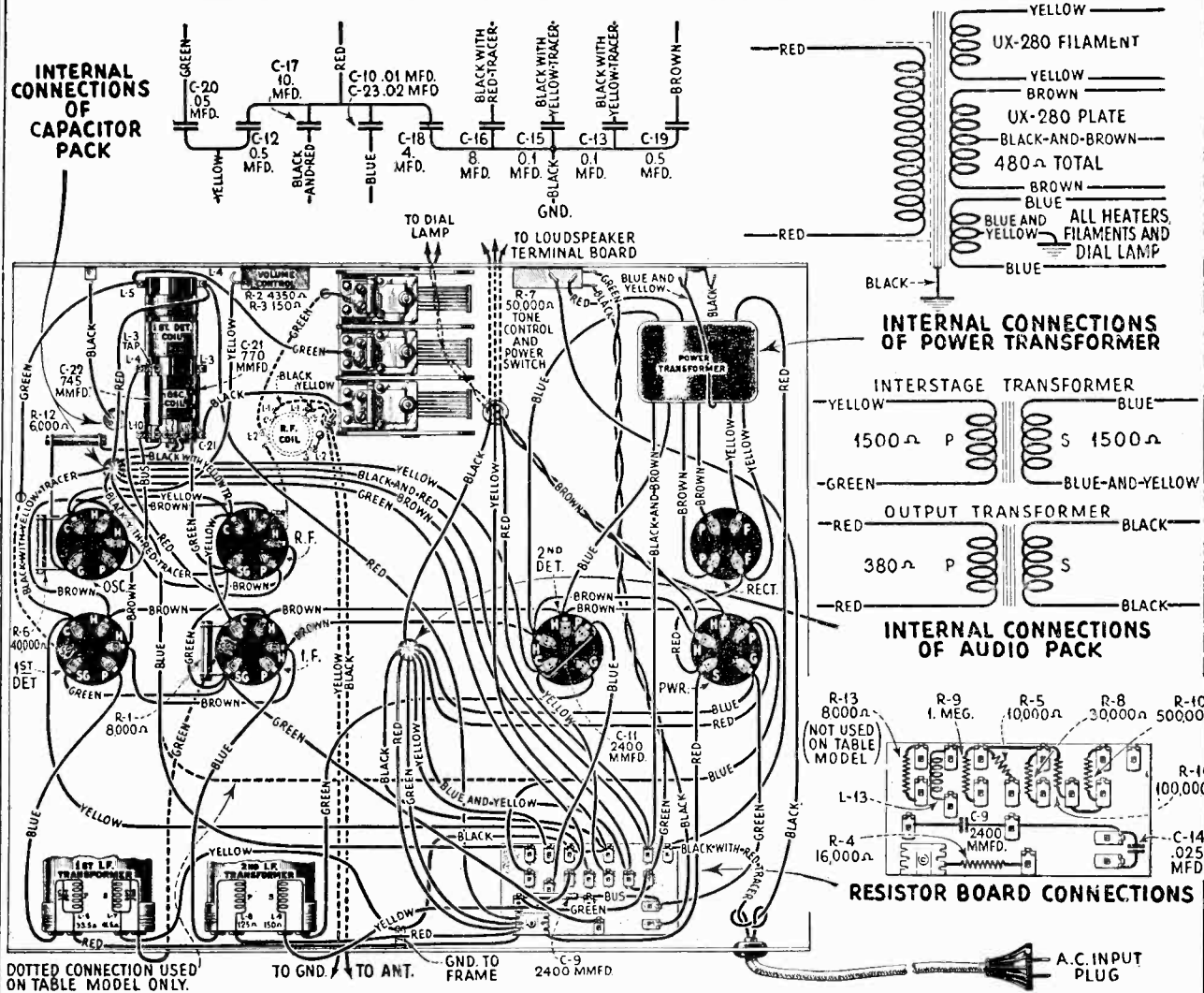
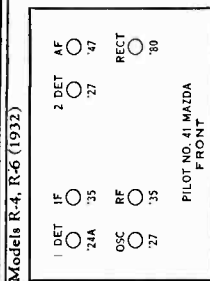
RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

VOLUME CONTROL AT MINIMUM

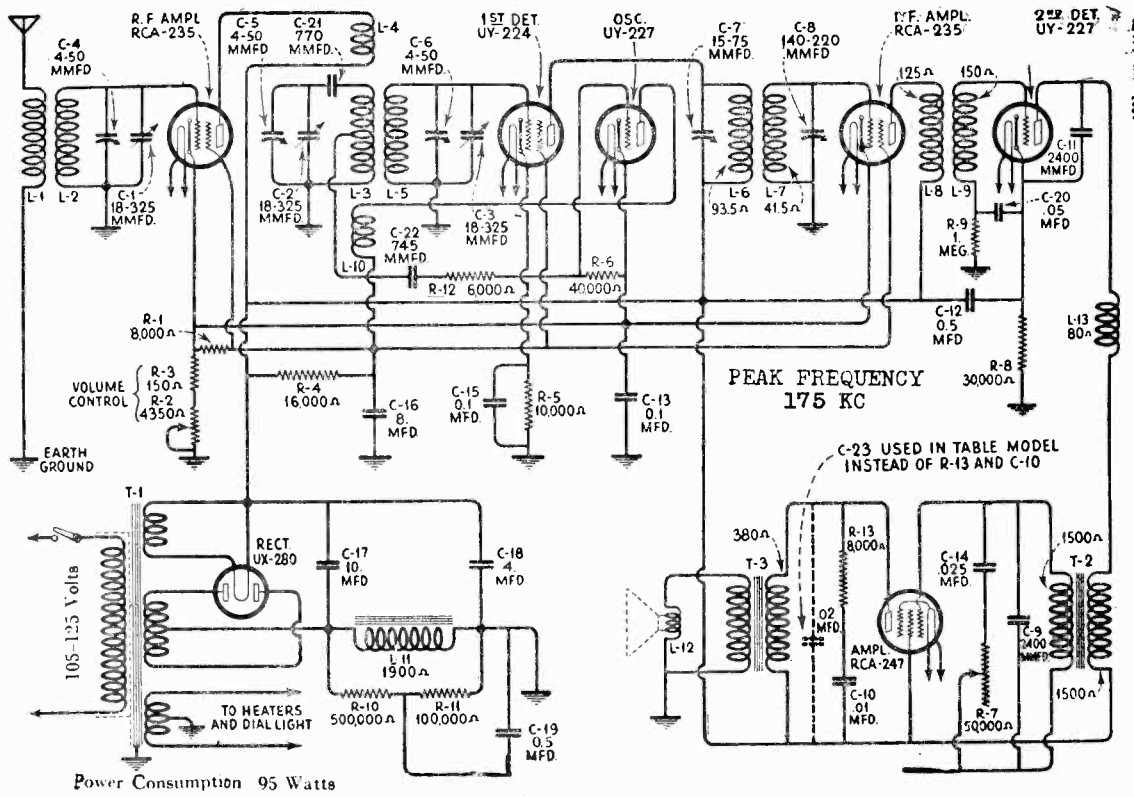
VOLUME CONTROL AT MAXIMUM

Radiotron No.	VOLUME CONTROL AT MINIMUM			VOLUME CONTROL AT MAXIMUM			
	Cathode to Heater Volts, D. C.	Cathode or Filament to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current M. A.	Screen Current M. A.	Heater or Filament Volts, A. C.
1. R. F.	50	50	60	235	0	0	2.66
2. Osc.	50	0	—	55	4.5	—	2.66
3. 1st Det.	10	9	100	260	1.0	0.25	2.66
4. I. F.	50	50	60	235	0	0	2.66
5. 2d Det.	25	10	—	250	1.0	—	2.66
6. Pwr.	—	10	290	280	35	—	2.66



MODEL R-4, R-6
Schematic
Parts List

R. C. A. VICTOR CO., INC.



9731 100-1400
L-1 40 ohms L-2 5 ohms L-3 6 ohms L-4 58 ohms L-10 1 ohm

REPLACEMENT PARTS

Stock No.	Description	Stock No.	Description	List Price	List Price
2565	PARTS COMMON TO R-4 AND R-6	8839	RECEIVER PARTS SPECIAL FOR R-4	\$3.00	\$9.95
2746	Resistor—6000 ohms—Carbon type—1 watt—Package of 5.	8840	Capacitor—Comprising one 0.05 mfd., two 0.5 mfd., one 10.0 mfd., one 0.025 mfd., one 1.0 mfd. and two 0.1 mfd. capacitors in metal container and output transformer—Complete with interstage and output transformer.	.50	4.50
2747	Cap—Grid condenser cap—Package of 5.	6183	RECEIVER PARTS SPECIAL FOR R-6	1.50	2.00
2749	Capacitor—2400 mmfd.	7343	Resistor—8,000 ohms—Carbon type—1/2 watt—Package of 5.	.50	3.85
2875	Knob—Tuning control, volume control or tone control knob—Package of 5.	8846	Transformer—Audio transformer assembly—Comprising interstage and output transformer.	2.50	3.85
2881	Bracket—Dial lamp bracket—Package of 5.	2995	Resistor—40,000 ohms—Carbon type—1 watt—Package of 5.	.50	8.95
2882	Socket—Five contact Radiotron socket—Complete with insulator—6 used.	2997	Resistor—10,000 ohms—Carbon type—1/2 watt—Package of 5.	.50	.50
2943	Resistor—8000 ohms—Carbon type—1 watt—Package of 5.	3000	Resistor—30,000 ohms—Carbon type—1/2 watt—Package of 5.	.50	.50
2946	Socket—Four contact Radiotron socket—Complete with insulator—1 used.	3003	Resistor—16,000 ohms—Carbon type—1/2 watt—Package of 5.	.50	.50
2991	Transformer—1st intermediate transformer.	3006	Resistor—500,000 ohms—Carbon type—1/2 watt—Package of 5.	2.50	.80
2994	Coil—R.F. choke coil.	3056	Shield—Radiotron shield—3 used—Package of 2.	.50	.50
2995	Volume control—Volume control complete with mounting nut—Package of 5.	3060	Resistor—40,000 ohms—Carbon type—1 watt—Package of 5.	2.50	4.50
2997	Coil—R.F. coil.	3076	Resistor—1 megohm—Carbon type—1/2 watt—Package of 5.	2.50	.50
2999	Shaft—Tuning condenser drive shaft complete.	3077	Resistor—30,000 ohms—Carbon type—1/2 watt—Package of 5.	2.50	.50
3000	Scale—Dial drum and scale with set screws.	3078	Resistor—10,000 ohms—Carbon type—1/2 watt—Package of 5.	2.50	.50
3003	Cushion—Receiver chassis sponge rubber cushion—Package of 4.	3081	Resistor—16,000 ohms—Carbon type—1/2 watt—Package of 5.	.06	5.00
3043	Resistor—500,000 ohms—Carbon type—1/2 watt—Package of 5.	3082	Board—Resistor board complete—Less resistors, capacitors and coil.	1.00	.80
3056	Shield—Radiotron shield—3 used—Package of 2.	3234	Tone control—Tone control complete with mounting nut.	1.90	15.00
3060	Resistor—40,000 ohms—Carbon type—1 watt—Package of 5.	3252	Resistor—100,000 ohms—Carbon type—1/2 watt—Package of 5.	1.90	.85
3076	Resistor—1 megohm—Carbon type—1/2 watt—Package of 5.	6179	Terminal—Single ground terminal—Complete with mounting rivet—Package of 5.	2.75	.50
3077	Resistor—30,000 ohms—Carbon type—1/2 watt—Package of 5.	6180	Capacitor—0.025 mfd.—Package of 5.	.50	13.00
3078	Resistor—10,000 ohms—Carbon type—1/2 watt—Package of 5.	6181	Capacitor—70 mmfd.—Package of 5.	.75	.50
3081	Resistor—16,000 ohms—Carbon type—1/2 watt—Package of 5.	6193	Rubber strip—Rubber clamping strip located inside of chassis shield—Package of 4.	1.30	.50
3082	Board—Resistor board complete—Less resistors, capacitors and coil.	7054	Coil—Power coil.	.50	2.85
3234	Tone control—Tone control complete with mounting nut.	7241	Capacitor—3 gang tuning capacitor.	8.00	2.55
3252	Resistor—100,000 ohms—Carbon type—1/2 watt—Package of 5.	7299	Capacitor—45 mfd.	.70	2.55
6179	Terminal—Single ground terminal—Complete with mounting rivet—Package of 5.	7436	Coil—1st detector and oscillator coil.	3.20	4.60
6180	Capacitor—0.025 mfd.—Package of 5.	8837	Support—Receiver chassis metal mounting support—Package of 4.	.70	1.60
6181	Capacitor—70 mmfd.—Package of 5.	8841	Transformer—2d intermediate transformer.	2.50	4.85
6193	Rubber strip—Rubber clamping strip located inside of chassis shield—Package of 4.	8842	Transformer—Power transformer—105-125 volts, 50-60 cycles.	6.25	1.10
7054	Coil—Power coil.	8843	Transformer—Power transformer—105-125 volts, 25-50 cycles.	9.55	1.55
7241	Capacitor—3 gang tuning capacitor.	8844	Transformer—Power transformer—220 volts, 60 cycles.	6.45	43.15
7299	Capacitor—45 mfd.				
7436	Coil—1st detector and oscillator coil.				
8837	Support—Receiver chassis metal mounting support—Package of 4.				
8841	Transformer—2d intermediate transformer.				
8842	Transformer—Power transformer—105-125 volts, 50-60 cycles.				
8843	Transformer—Power transformer—105-125 volts, 25-50 cycles.				
8844	Transformer—Power transformer—220 volts, 60 cycles.				

MODEL R-4, R-6 AC
Resistance Test Data

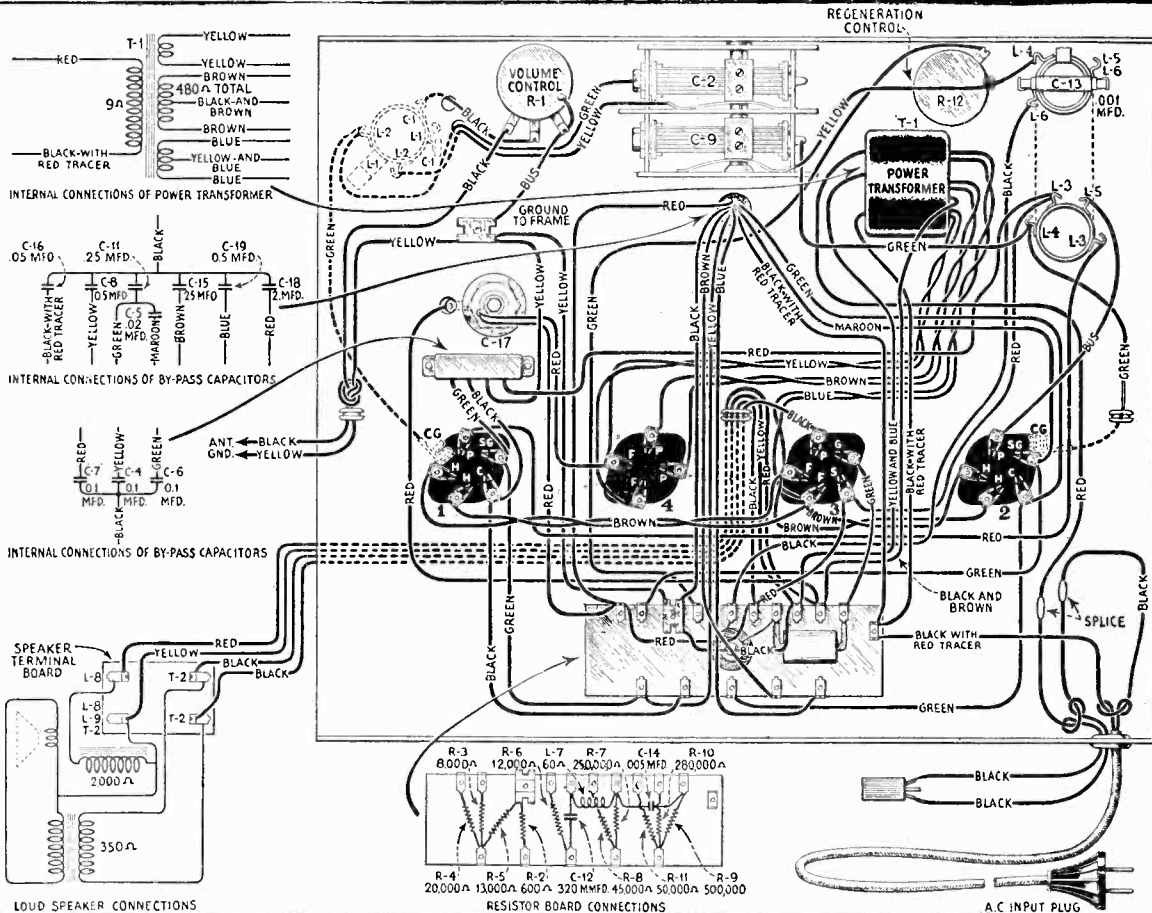
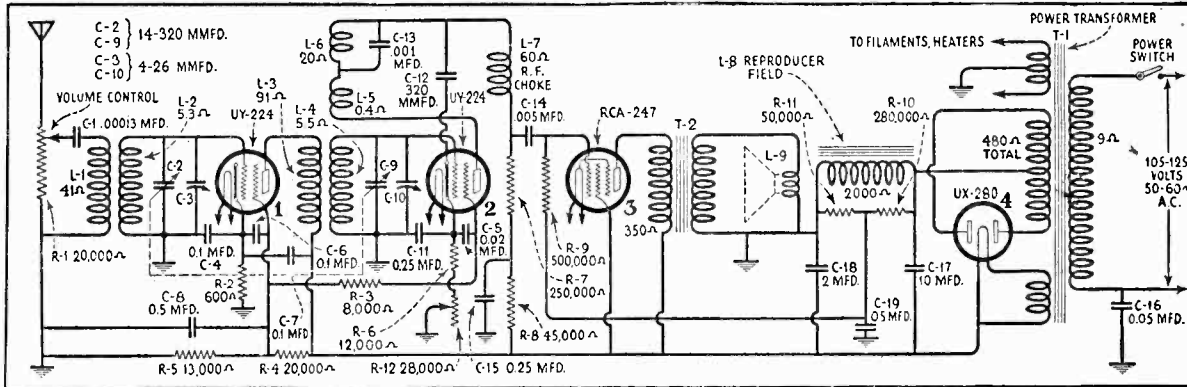
R. C. A. VICTOR CO., INC.

All tubes removed from sockets. AC plug removed from power supply line.
Field coil disconnected. Volume Control maximum unless otherwise stated

From Chassis To	Correct		Incorrect
Aerial to Ground	40	ohms	
Chassis to			
RF Control Grid	1	ohm	TC- rf Cg-Y
RF Cathode (V.C.Min)	4,500	ohms	FC- rf K-Y (8 mfd)
RF Cathode (V.C.Max)	150	ohms	FC- rf K-Y (8 mfd)
RF Screen Grid	8,150	ohms	FC- rf Sg-Y (8 mfd)
RF Plate	24,208	ohms	FC-'80 F-Y (4 mfd)
			See RF Screen
RF Plate to '80 Fil	58	ohms	
1 Detector Control Grid	4.5 or 5	ohms	TC - 1 D Cg-Y
1 Detector Cathode	10,000	ohms	BC- 1 DK-Y (.1 mfd)
1 Detector Screen	8,150	ohms	See RF Screen
1 Detector Plate	24,243.5	ohms	FC-'80 F-Y (4.mfd)
			See RF Plate
1 Detector Plate to '80 Fil	93.5	ohms	TC- IF Tr
Oscillator Control Grid	40,150	ohms	Osc Grid Condenser
Oscillator Cathode	150	ohms	BC- Osc K-Y (.1 mfd)
Oscillator Plate	24,151	ohms	See RF Plate
Oscillator Plate - RF Sg	1	ohm	
IF Control Grid	41.5	ohms	TC-IF Cg-Y
IF Cathode	150	ohms	See RF Cathode
IF Plate	24,275	ohms	See RF Plate
IF Plate to '80 Fil	125	ohms	TC- IF Tr
2 Detector Control Grid	1,000,150	ohms	BC- 2 DK-Y (.5 mfd)
2 Detector Cathode	30,000	ohms	BC- 2 DK-'80F (.5 mfd)
			BC- 2 DK- 2 DP (.0024 mfd)
2 Detector plate	25,730	ohms	BC- 2 DP- 2 DK (.0024 mfd)
			FC- 80F-Y (4.mfd)
			FC- rf Sg-Y (8 mfd)
2 Detector Plate to '80 Fil	1,580	ohms	
'47 Control Grid	101,500	ohms	BC- AF Tr-Y (.5 mfd)
			Tone Control Condenser
'47 Screen Grid	24,150	ohms	See RF Plate
'47 Screen to '80 Fil	0	ohms	
'47 Plate	4,530	ohms	BC Across AF Tr in R 4.
			Harmonic condenser
'47 Plate to 80 Fil	380	ohms	
'80 Anode	600,240	ohms	
'80 Anode to 80 Anode	480	ohms	
'80 Fil to '80 Anode	624,390	ohms	FC- 80 Fil (10 mfd)
Across field coil only	1,900	ohms	
Across oscillator winding only	6	ohms	

R. C. A. VICTOR CO., INC.

MODEL R-5-X AC
Schematic
Chassis
Voltage



These are readings obtained with the usual Set Analyzers and are not true readings of the voltages at which the Radiotrons operate.

Radiotron No.	Heater to Cathode Volts	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 Volts
1	3.0	3.0	85	225	4.0	2.2
2	7.0	7.0	65	100	0.25	2.2
3	—	2.0	225	215	30.0	2.2

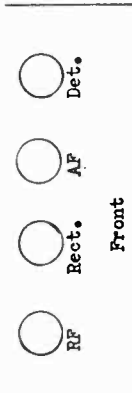
R. C. A. VICTOR CO., INC.

MODEL R-5
Resistance Data
MODEL R-5-X
Resistance Data

Model R-5-X

All tubes removed and AC plug disconnected - Speaker field red and yellow leads opened

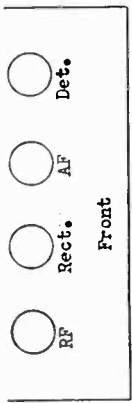
From Chassis To	Correct	Incorrect
Aerial (V.C.Max)	20,000 ohms	Antenna BLC
RF Control Grid	5.3 ohms	TC-Y
RF Cathode	600 ohms	BC-Y
RF Screen Grid	13,000 ohms	BC-Y
RF Plate	33,091 ohms	BC- rf Sg - rf K BC- D Sg - D K BC- rf P - rf K FC - Y (2 mfd)
RF Plate - '80 F	91 ohms	
Detector Control Grid	5.5 ohms	TC-Y
Detector Cathode	12,000 ohms	BC-Y
Detector Screen Grid	40,000 ohms	
Detector Plate	328,080 ohms	BC-Y (.25mfd-45000 ohm) FC-Y (2. mfd) BLC- 47 Cg BC-DK 1.00032 mfd See Detector Plate
Detector Plate - '80 Fil	295,080 ohms	
'47 Control Grid	560,000 ohms	BC-Y (.5 mfd)
'47 Screen Grid	33,000 ohms	FC-Y (2. mfd)
'47 Plate	33,350 ohms	See '47 Sg
'47 Plate to '80 Fil	350 ohms	
'80 Plate to Plate	330,240 ohms	FC- (10 ,mfd)
AC Plug	480 ohms	
Across AC Plug	0 ohms	BC-Y (.05 mfd)
Across Speaker field	9 ohms	
Across Input RF Transformer Primary	2,000 ohms	
Input RF Transformer Primary	41 ohms	



Model R-6

All tubes removed from receiver and AC plug disconnected from power supply line - Red and Yellow speaker field leads disconnected

From Chassis To	Correct	Incorrect
Aerial (V.C.Max)	20,000 ohms	Antenna BLC
RF Control Grid	5.3 ohms	TC-Y
RF Cathode	600 ohms	BC-Y
RF Screen Grid	13,000 ohms	BC-Y
RF Plate	91 ohms	BC- rf Sg - r f K BC-D Sg - D K
RF Plate - '80 F	33,091 ohms	
Detector Control Grid	5.5 ohms	TC-Y
Detector Cathode	28,000 ohms	BC-Y
Detector Screen Grid	21,000 ohms	
Detector Plate	328,080 ohms	BC-Y (.25 mfd .45000ohms) FC-Y, (2. mfd) BLC- 47 Cg BC- DK (.00032 mfd) See Detector Plate
Detector Plate - '80 Fil	295,080 ohms	
'47 Control Grid	560,000 ohms	BC-Y (.5 mfd)
'47 Screen Grid	33,000 ohms	FC-Y (2. mfd)
'47 Plate	33,350 ohms	See '47 Sg
'47 Plate to '80 Fil	350 ohms	
'80 Plate to Plate	330,240 ohms	FC- (10 mfd)
AC Plug	480 ohms	
Across AC Plug	0 ohms	BC-Y (.05 mfd)
Across Speaker Field	9 ohms	
Input RF Transf Prim	2,000 ohms	
Input RF Transf Prim	41 ohms	



These are readings obtained with the usual Set Analyzers and are not true readings of the voltages at which the Radiotrons operate.

Radiotron No.	Heater to Cathode Volts	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 Volts
1	3.0	3.0	85	225	4.0	2.2
2	7.0	7.0	65	100	0.25	2.2
3	—	2.0	225	215	30.0	2.2

These are readings obtained with the usual Set Analyzers and are not true readings of the voltages at which the Radiotrons operate.

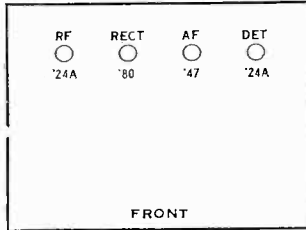
Radiotron No.	Heater to Cathode Volts	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Heater Volts
1	3.0	3.0	85	225	4.0	2.2
2	7.0	7.0	65	100	0.25	2.2
3	—	2.0	225	215	30.0	2.2

MODEL R-5-X
Parts List
Notes

R. C. A. VICTOR CO., INC.

Model R-5-X

Models R-5, R-5X (1931)



The antenna and ground are connected to each side of a 20,000 Ohm potentiometer. The moving contact of the potentiometer is connected to the primary of the first R.F. transformer through a .00013 MFD. condenser, the other side of the transformer being connected to ground. The action of the potentiometer, reducing the voltage applied to the grid of the first R.F. tube, constitutes that of a volume control. The secondary of the R.F. transformer is connected to the grid circuit of the R.F. Radiotron UY-224, which is tuned by one unit of the gang condenser. The plate circuit of this tube works into the primary coil of the 2nd R.F. transformer.

The detector is of the regenerative, grid bias type and its output is coupled by means of resistance coupling to the output Radiotron RCA-247. The regenerative feature of the detector is un-

usual in that it uses two regeneration coils. One of these resonates at a low frequency and improves the sensitivity at that end, while the other has but few turns and brings up the sensitivity at the high frequency end.

The output stage uses the RCA-247 Output Pentode which gives a high undistorted output—2.5 watts—together with a high gain in the stage.

The grid bias for this tube is obtained by using a portion of the drop across the reproducer field. Due to the fact that the plate current of the RCA-247 represents the greatest portion of the total plate current, using the drop across the field acts as a semi-self biasing arrangement.

Plate and grid supply to all tubes is supplied through the use of Radiotron UX-230. The filter is of the "brute force" type. The reproducer unit field coil functions as the reactor. One electrolytic 10 MFD. capacitor and one paper 2 MFD. capacitor act as filter capacitors.

LINE-UP CAPACITOR ADJUSTMENTS

Two adjustable capacitors are provided for aligning the two tuned circuits at the high frequency end of the scale. The following procedure may be used for making any readjustments that may be necessary.

A. Procure an Oscillator giving a modulated signal at exactly 1400 K.C. Also procure a special socket wrench such as RCA Victor Stock No. 3007.

B. An output indicator is necessary. This may be a current squared thermogalvanometer connected to the secondary of the output transformer in place of the cone coil or other types of output indicators.

C. Turn the station selector until the knob reads exactly 0. Then remove the chassis from the cabinet being careful not to disturb the setting of the dial. The gang condenser rotor plates should be fully meshed with the stator plates. If not, then the dial drum must be adjusted until such a condition exists. Replace the chassis in the cabinet.

D. Place the oscillator in operation at exactly 1400 K.C. and couple its output to the antenna lead. Set the dial scale at 85 and place the Radiolite in operation. Place a soft pad on the bench and turn the instrument on its side. Now with the special wrench, adjust each line-up capacitor until maximum output is obtained in the output meter. Be careful to adjust the volume control or oscillator output so that an excessive reading is not obtained. Go over each adjustment a second time to compensate for any interlocking of adjustments.

REPLACEMENT PARTS

Part No.	DESCRIPTION	List Price	Part No.	DESCRIPTION	List Price
2549	Resistor—250,000 Ohms—Carbon type—Package of 5	\$3.00	3066	Resistor—12,000 Ohms—Carbon type—Package of 5	\$2.50
2747	Cap—Control grid contactor cap—Package of 5	.50	3067	Variable Resistor—Regeneration Control Variable Resistor complete with mounting washer and nut	1.50
2954	Capacitor—By-pass capacitor pack containing three 0.1 Mfd. capacitors	.75	5817	Resistor—20,000 Ohms—Carbon type	.90
2955	Transformer—First R.F. transformer complete with mounting washer and nut	1.50	7054	Cord—Power cord complete with male connector plug	1.00
2956	Transformer—Second R.F. transformer complete with mounting washer and nut	2.00	7229	Socket—Five prong Radiotron socket complete with insulating shield—3 used—Package of 2	.50
2957	Capacitor 10 Mfd. electrolytic type Complete with terminal, insulating washer, mounting nut and lock washer	3.00	7230	Socket—Four prong Radiotron socket complete with insulating shield—1 used—Package of 2	.50
3069	Switch—Operating switch complete	.60	7231	Capacitor—Filter and by-pass capacitor pack—Comprising one 0.05 mfd., two 0.5 mfd., two 0.25 mfd. and one 2.0 mfd. condensers	2.50
2959	Volume control—20,000 Ohm Volume control complete with mounting washers and nut	1.50	7232	Capacitor—2 gang variable tuning capacitor	5.00
2960	Dial—Dial scale complete with set screws—Package of 2	.50	7234	Transformer—Output transformer—With fibre terminal board	1.50
2961	Coil—Detector plate R.F. choke coil	.50	7236	Cone—Reproducer cone complete with voice coil and paper ring	1.50
2962	Capacitor—0.005 Mfd. audio coupling capacitor	.75	8669	Transformer—Power transformer—105-125 volt, 50-60 cycle—Complete with mounting washers and nuts	6.00
2963	Resistor—8000 Ohms—Carbon type—Package of 5	2.50	8670	Transformer—Power transformer—105-125 volt, 25-40 cycle—Complete with mounting washers and nuts	9.00
2964	Resistor—13000 Ohms—Carbon type—Package of 5	2.50	8671	Transformer—Power transformer—220 volts, 50-60 cycles—Complete with mounting washers and nuts	8.00
2965	Resistor—600 Ohms—Carbon type—Package of 5	2.50	10434	Resistor—Mil-tapped filament resistor—Use on early models only	.50
2967	Resistor—35,000 Ohms—Carbon type—Package of 5	2.50	SPECIAL PARTS SUPPLIED ON ORDER ONLY (Not to be stocked)		
2969	Resistor—50,000 Ohms—Carbon type—Package of 5	2.50	2979	Board—Baffle board complete with grille cloth	.75
2970	Resistor—500,000 Ohms—Carbon type—Package of 5	2.50	2980	Escutcheon—Station selector escutcheon complete with mounting screws	.75
2971	Resistor—280,000 Ohms—Carbon type—Package of 5	2.50	3058	Board—Resistor mounting board—Less all resistors, capacitors and coils	1.00
2972	Shield—Radiotron shield complete with mounting screw, washer and nut	.50	7235	Coil—Field coil complete with bracket and cone ring	2.00
2975	Rivet—Eyelet rivet for mounting cone—Package of 100	.50	9321	Cabinet—Cabinet complete—Less all equipment	7.25
2976	Knob—Volume control or Regeneration control knob—Package of 5	1.50	9339	Chassis—Receiver chassis complete—Less reproducer unit, knobs and Radiotrons	27.50
2977	Knob—Station selector knob—Package of 5	2.50	9340	Reproducer unit—Reproducer unit complete	4.75
2978	Screw assembly—Loudspeaker mounting screw assembly comprising four screws, four washers, four lock washers, eight nuts and four eyelets	.60			
2981	Capacitor—320 Mmfd. detector plate R.F. by-pass capacitor	.50			
3006	Capacitor—.001 Mfd. Used across low frequency tucker coil	.50			
3007	Wrench—Special wrench for R.F. line-up condenser adjustments	1.00			

R. C. A. VICTOR CO., INC.

MODEL R-7, R-9 AC
Superette
Resistance Data

All tubes removed from receiver and AC plug disconnected from power supply socket. Speaker field disconnected. Volume control adjusted to maximum, unless otherwise stated

From Chassis To
Aerial to Ground
Chassis (Y) to
RF Control Grid
RF Cathode (V.E.Min)
RF Cathode (V.C.Max)
RF Screen Grid
RF Plate
1 Detector Control Grid
1 Detector Cathode
1 Detector Screen Grid
1 Detector Plate
1 Detector Plate-'80 F
Oscillator Control Grid
Oscillator Cathode
Oscillator Plate
Osc. Plate-1 Det Screen
IF Control Grid
IF Cathode
IF Screen Grid
IF Plate
IF Plate-'80 Fil
2 Detector Control Grid
2 Detector Control Grid-Ter 2
2 Detector Cathode
2 Detector Plate
2 Det Plate-'80 F

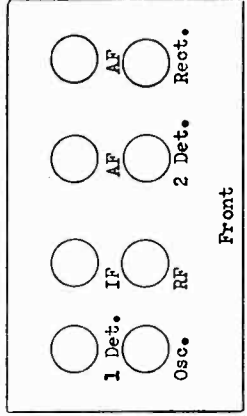
Correct
40 ohms
5 ohms
3,950 ohms
150 ohms
8,150 ohms
22,508 ohms
6 ohms
10,000 ohms
8,150 ohms
22,545.5 ohms
93.5 ohms
40,150 ohms
150 ohms
8,151 ohms
1 ohm
41.5 ohms
150 ohms
8,150 ohms
22,491 ohms
41.5 ohms

Incorrect
TC-Y
BC-Y
See Min. Adj.
FC-Y (4.mfd)
BC-'80 F-Y (.5 mfd)
TC-Y
BC-1 D K-Y
See R-F SG
See R-F Plate
TC-1 IF Tr
TC-1 IF Tr
Osc. Grid Cond.
See R-F Cathode
See R-F Cathode
See R-F Screen
TC-Y
See R-F Cathode
See R-F Screen Grid
See R-F Plate
BC-if P = 2 DK
TC-2 IF Tr
TC-2 IF Tr

Output Tube Control Grid
Output Tube Grid to Grid
Output Tube Plate (2 tubes)
Output Tube Plate to Plate
'80 Filament
'80 Filament to Anode
'80 Anode to Anode
'80 Anode to Chassis
Across Speaker field

102,850 ohms
5,700 ohms
22,630 ohms
22,360 ohms
22,450 ohms
222,575 ohms
250 ohms
200,125 ohms
1,330 ohms

Tone Control condenser
Tone Control condenser
Tone Control resistance
See R-F Plate
See R-F Plate
FC-'80F -80 P (10 mfd)



Tube	Cathode-Heater	Cathode-Grid	Cathode-Screen	Cathode-Plate	Plate Current	Fil.
PF	2.5	2.5	65	225	4.0 ma	2.4
Osc.	2.5	0.	55	55	5.0	2.4
1Det	5.0	5.0	60	215	0.5	2.4
IF	2.5	2.5	65	225	4.0	2.4
2Det	60.	*10.	200	200	0.5	2.4
AF		*20.	215	215	20.	2.4
AF		*20.	215	215	20.	2.4

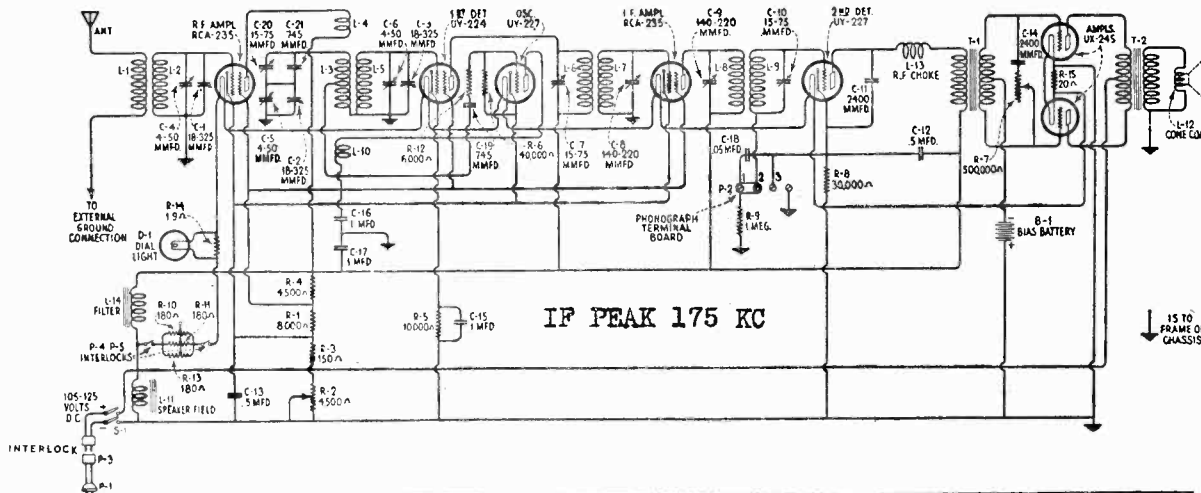
* Not true reading because of resistance in circuit.

Magnetic Pickup Terminal Board 1-2 Closed

1,000,093.5 ohms
93.5 ohms
50,000 ohms
23,250 ohms
800 ohms

MODEL R-7, R-9 DC
Superette
Schematic
Voltage

R. C. A. VICTOR CO., INC.



IF PEAK 175 KC

RADIOTRON SOCKET VOLTAGES—115 or 230 Volt Line
(Separate Resistance Unit Used with 230 Volt Line)

Tube No.	Cathode to Heater Volts, D.C.	Cathode or Filament to Control Grid Volts, D.C.	Cathode to Screen Grid Volts, D.C.	Cathode or Filament to Plate Volts, D.C.	Plate Current M. A.	Screen Grid Current M. A.	Heater or Filament Volts, A.C.
VOLUME CONTROL AT MINIMUM							
1	40	50	40	75	0	0	2.3
2	20	0	—	40	2.0	—	2.3
3	6.0	3.5	65	100	.25	—	2.3
4	17.0	26	40	75	.0	0	2.3
5	2.0	*2.0	—	90	.23	—	2.3
6	—	25.0	—	100	4.0	—	2.3
7	—	*25.0	—	100	4.0	—	2.3
VOLUME CONTROL AT MAXIMUM							
1	10.0	2.0	50	100	3.5	**0.5	2.3
2	6.0	0	—	50	3.0	—	2.3
3	8.0	5.0	50	100	0.5	.0	2.3
4	10.0	2.0	50	100	2.5	**1.0	2.3
5	2.0	*2.0	—	90	.25	0	2.3
6	—	*25.0	—	100	4.0	—	2.3
7	—	*25.0	—	100	4.0	—	2.3

* Not true reading due to Resistance in circuit

**This may be plus or minus depending on age of tubes

The RCA Victor Superette, R-7 D.C. and the Console, R-9 D.C. are similar to the A.C. Models with the exception that the necessary changes for D.C. operation have been made. The Service Notes on the A.C. Models, therefore, apply to the D.C. Models with the exception of voltage readings and circuit diagrams.

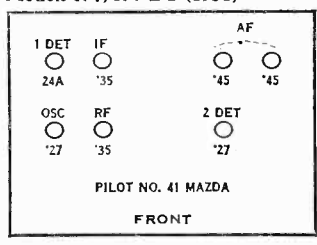
Provision for operation at 220 volts is made by the use of a separate resistance unit which drops the voltage to 110. This unit should be located in a place that is well ventilated and it should not come in contact with any wood or cloth material other than that upon which it is resting.

An interlock is provided on the cabinet back so that access to the parts cannot be made without opening the power supply. However, when service work is being performed, it may be necessary to run jumpers from the back to the connection block so that operation of the receiver may be secured. *Never make these interlocks inoperative except under these conditions. They are designed for protection of the customer.*

SPECIAL PARTS FOR R-9 D.C.

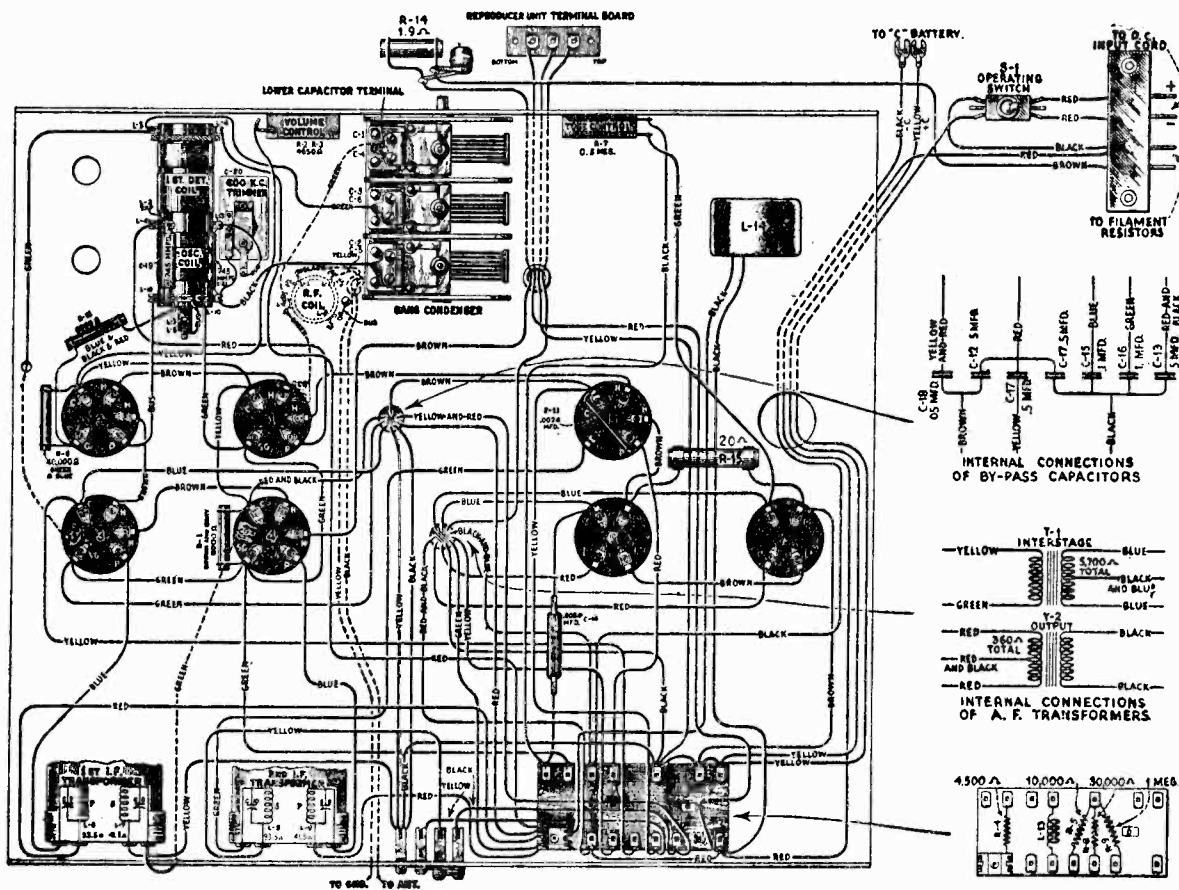
3070	Bolts—Speaker mounting bolts, nuts and washers—Package of 3	.50
7223	Foot	.50
8664	Control panel	7.50
8665	Board—Baffle board complete with grille cloth	1.00
9329	Stretchers	4.50
9331	Top	3.25
9332	Post—Front post R. H.	2.50
9333	Post—Back post R. H.	2.50
9334	Post—Front post L. H.	1.50
9335	Post—Back post L. H.	2.50
9350	Cabinet—R-9 D.C. cabinet complete—Less all equipment	55.00
9357	Door—Rear cabinet door	5.00

Models R-7, R-9 DC (1931)



R. C. A. VICTOR CO., INC.

MODEL R-7, R-9 DC
Superette
Chassis



Part No.	DESCRIPTION	List Price
PARTS COMMON TO R-7 D.C. AND R-9 D.C.		
2240	Resistor—30,000 Ohms—Carbon type.....	\$0.70
2546	Resistor—1 Megohm—Carbon type—Package of 5.....	3.00
2731	Resistor—10,000 Ohms—Carbon type—Package of 5.....	2.00
2746	Socket—Dial lamp socket.....	.50
2749	Capacitor—2,400 Mmfd.—Used as 2nd Detector R.F. by-pass capacitor.....	1.50
2875	Knob—Station Selector, Tone Control or Volume Control Knob—Package of 5.....	1.50
2881	Bracket—Dial lamp bracket—Package of 5.....	.50
2882	Socket—Five prong Radiotron Socket complete with insulating shield—Five used.....	.50
2946	Escutcheon—Station Selector Escutcheon.....	.60
2968	Socket—Four prong Radiotron Socket complete with insulating shield—Two used.....	.50
2973	Board—Magnetic Pickup terminal board complete with terminals and screws—Package of 2.....	.50
2990	Resistor—4,500 ohms—Carbon type—Package of 5.....	2.50
2991	Transformer—1st I. F. Transformer complete with shield and mounting screws.....	3.00
2992	Transformer—2nd I. F. Transformer complete with shield and mounting screws.....	3.00
2993	Board—Resistor mounting board complete with terminals and mounting brackets—less resistors.....	1.00
2994	Coil—2nd Detector R.F. Choke Coil complete with rivet.....	.60
2995	Volume Control—complete less knob—Package of 5.....	6.00
2996	Tone Control—Complete less knob—Package of 5.....	6.00
2997	Coil—R.F. coil complete with mounting washer and nut.....	1.90
2998	Coil—1st Detector and Oscillator Coil assembly complete with mounting washers and nuts.....	2.40

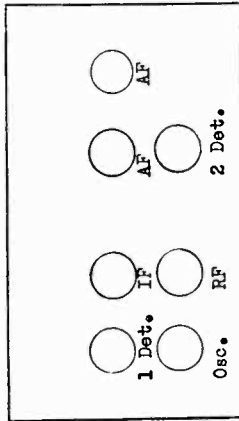
Part No.	DESCRIPTION	List Price
2999	Shaft—Dial Scale drive shaft complete with mounting screws and lock washers.....	.50
3000	Scale—Dial drum and scale complete with set screws.....	.60
3001	Resistor—1.9 Ohms—Porcelain resistor used in parallel with dial lamp.....	.60
3002	Resistor—20 Ohms—Porcelain resistor used across UX-245 filaments.....	.60
3003	Cushion—Sponge Rubber Cushions—Package of 4.....	.50
3004	Resistor—Porcelain type—180 Ohms—used as heater supply resistor—Three used.....	1.80
3005	Screw Assembly—Loudspeaker Screws, Nuts, Eyelets and Washers—Package of 1 set of four each (for R-7).....	\$ 1.50
3045	Resistor—40,000 ohms—Carbon type—Package of 5.....	2.50
3071	Plug—Male and Female power plug—used as interlock—Set of 2 Complete plugs.....	1.60
3072	Resistor Unit—Resistor Unit complete for use on 220 volt D.C. lines.....	19.00
3073	Switch—Operating switch.....	.80
7054	Cord—Power Cord and Plug.....	1.00
7062	Condenser—Adjustable Oscillator trimming condenser.....	1.00
7238	Capacitor Pack—R.F. by-pass capacitor pack in metal container.....	3.50
7239	Transformer—A.F. transformer assembly in metal container.....	6.00
7240	Reactor—Filter reactor.....	5.50
7241	Condenser—3-gang tuning condenser complete with mounting washers and screws.....	8.00
8559	Ring—Cone retaining ring.....	.80
8601	Cone—Cone complete—Package of 5.....	15.00
8639	Coil—Loudspeaker field coil complete with cone support.....	5.00
9323	Loudspeaker—Loudspeaker unit complete.....	8.70
9338	Receiver Assembly—Receiver Assembly complete—less loudspeaker and Radiotrons.....	40.00

MODEL R-7,R-9 DC
Superette
Resistance Data

R. C. A. VICTOR CO., INC.

60 ohms
13.30 ohms
58+ ohms* *Resistance of filter
choke not known

Across Filament interlocks
Across Speaker field
RF Plate to + DC Switch



All tubes removed and speaker field disconnected - Interlocks closed - DC plug removed from line socket - Dial light out of socket - Volume control max unless otherwise stated - C Battery removed

From Chassis To
Correct
Incorrect

Aerial to Ground 40 ohms

Chassis to

RF Control Grid 5 ohms
RF Cathode (V.C. Max) 150 ohms
RF Cathode (V.C. Min) 4,650 ohms
RF Screen Grid 8,150 ohms
RF Plate 12,708 ohms

TC-Y
BC-Y (.5 mfd)
BC-Y (.5 mfd)
BC-Y (1. mfd)
BC-Y (1. mfd)
BC-2D P-2DK (0024 mfd)
BC-2D P-2DK (.5 mfd)

RF Plate to 1 Detector Plate 151.5 ohms

1 Det Control Grid 6 ohms
1 Detector Cathode 10,000 ohms
1 Detector Screen Grid 8,150 ohms
1 Detector Plate 12,743.5 ohms

TC-Y
BC-1DK-Y
See R-F Sg
TC-1 IF Tr
See R-F Plate

Oscillator Control Grid 40,150 ohms
Oscillator Cathode 150 ohms
Oscillator Plate 8,151 ohms
Oscillator Plate to RF Screen 1 ohm

Osc Grid Condenser
See R.F. Cathode
See R.F. Screen

IF Control Grid 41.5 ohms
IF Cathode 150 ohms
IF Screen Grid 8,150 ohms
IF Screen to 1 Det Screen 0 ohms
IF Plate 12,691.5 ohms
IF Plate to RF Plate 99.5 ohms

TC-1F Tr-Y
See RF Cathode
See RF Screen
See RF Plate

Pickup Terminal Broad Terminals 1 and 2 joined

2 Detector Control Grid 1,000,093.5 ohms
2 Detector Control Grid to Test#2 93.5 ohms
2 Detector Cathode 30,000 ohms

BC-Tor#1-2DK
TC-1F Tr-
BC-2DP-2DK(0024 mfd)
BC-2DP-2DK (.5 mfd)
See RF Plate

2 Detector Plate 13,300 ohms

Output Control Grid to Black Bias Lead 3,850 ohms
Output Grid to Grid 5,700 ohms
Output Grid to chassis (bias leads shorted) 3,850 ohms
Output Plate to +D.C. Switch 180 ohms
Output Plate to Plate 360 ohms

Tone Control Condenser

1 Output filament terminal and chassis 20 ohms
Across dial light socket 1.9 ohms

RADIOTRON SOCKET VOLTAGES—115 or 230 Volt Line
(Separate Resistance Unit Used with 230 Volt Line)

Tube No.	Cathode to Heater, D.C. Volts, D.C.	Cathode to Control, D.C. Volts, D.C.	Cathode or Filament to Control, D.C. Volts, D.C.	Cathode to Plate, D.C. Volts, D.C.	Plate to Control, M.A.	Screen Grid Control, M.A.	Heater or Filament, Volts, A.C.
VOLUME CONTROL AT MINIMUM							
1	40	30	40	15	0	0	2.3
2	20	0	10	10	2.0	—	2.3
3	6.0	3.5	65	100	.25	—	2.3
4	17.0	26	40	—	0	—	2.3
5	2.0	*2.0	—	90	.23	—	2.3
6	—	25.0	—	100	4.0	—	2.3
7	—	*25.0	—	100	4.0	—	2.3
VOLUME CONTROL AT MAXIMUM							
1	10.0	2.0	50	100	3.5	*90.5	2.3
2	6.0	0	—	50	3.0	—	2.3
3	8.0	5.0	50	100	0.5	—	2.3
4	10.0	2.0	50	100	2.5	*11.0	2.3
5	2.0	*2.0	—	90	.25	0	2.3
6	—	*25.0	—	100	4.0	—	2.3
7	—	*25.0	—	100	4.0	—	2.3

* Not true reading due to Resistance in circuit
** This may be plus or minus depending on age of tube

R. C. A. VICTOR CO., INC.

MODEL R-7A AC
Supernote
Schematic

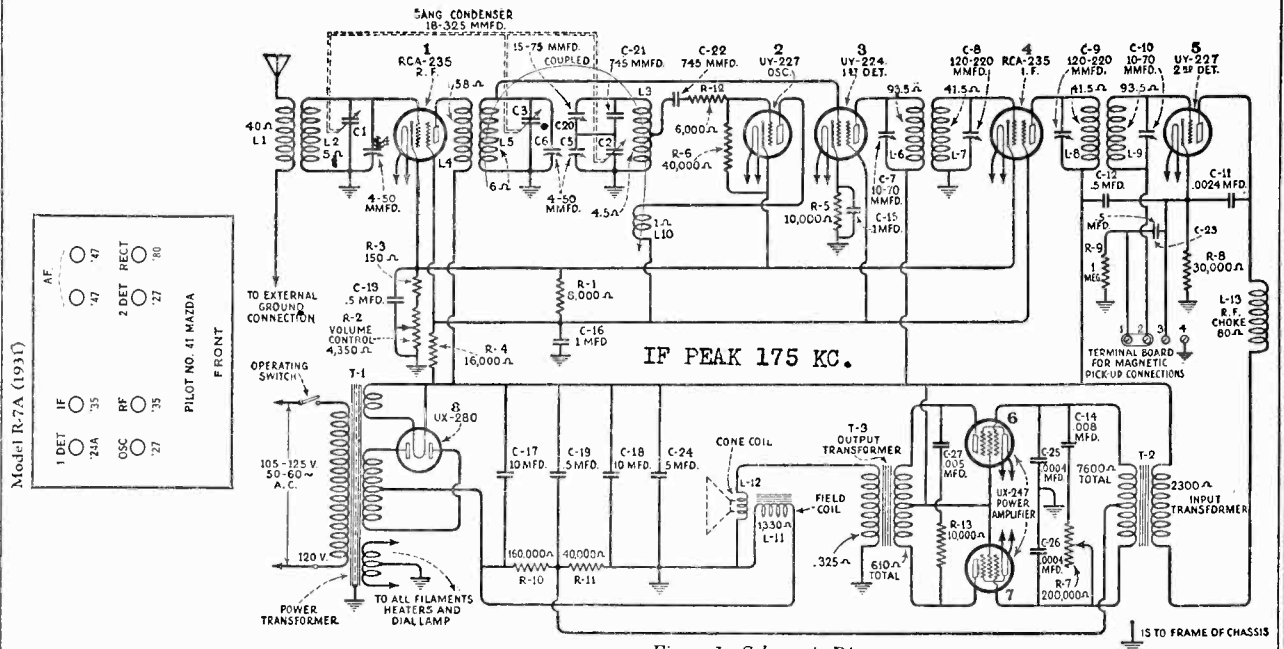


Figure 1—Schematic Diagram

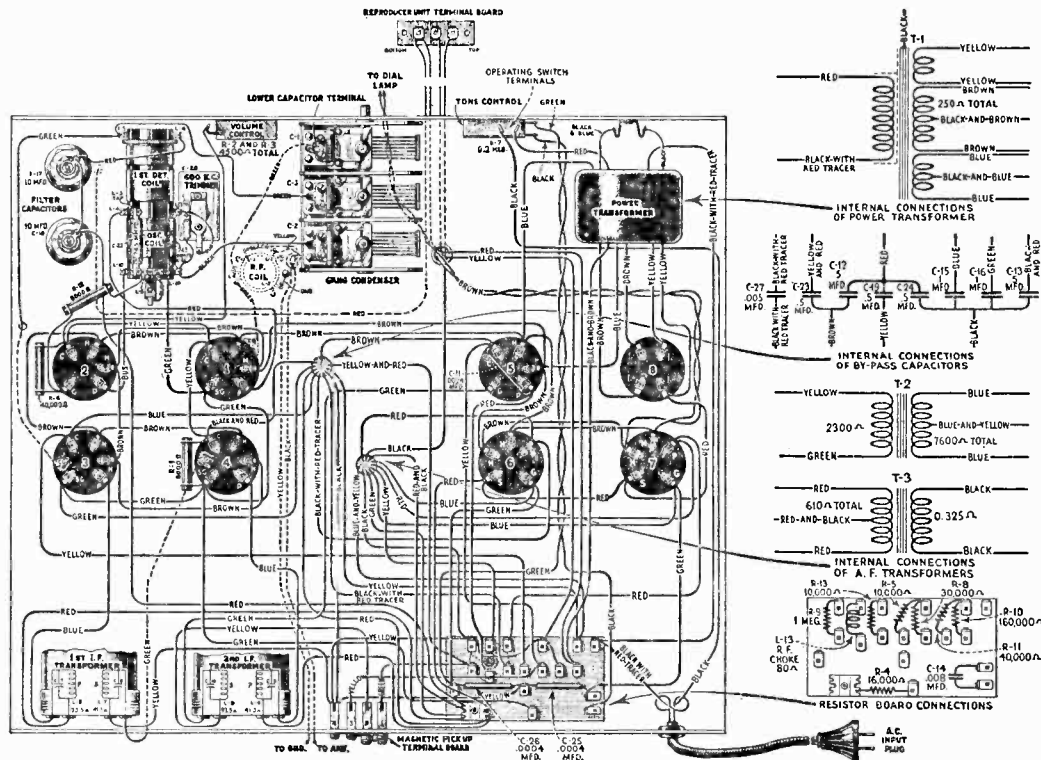


Figure 2—Wiring Diagram

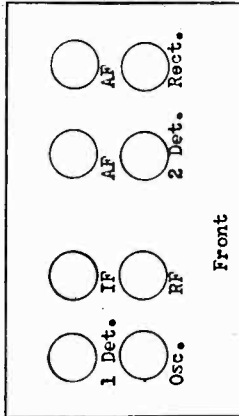
RADIOTRON SOCKET VOLTAGES—110 VOLT A. C. LINE

Radiotron No.	Cathode to Heater Volts D. C.	Cathode or Filament to Control Grid Volts D. C.	Cathode to Screen Grid Volts D. C.	Cathode or Filament to Plate Volts D. C.	Plate Current M. A.	Heater or Filament Volts A. C.	Radiotron No.	Cathode to Heater Volts D. C.	Cathode or Filament to Control Grid Volts D. C.	Cathode to Screen Grid Volts D. C.	Cathode or Filament to Plate Volts D. C.	Plate Current M. A.	Heater or Filament Volts A. C.
VOLUME CONTROL AT MINIMUM							VOLUME CONTROL AT MAXIMUM						
1	38	35	50	200	.0	2.2	1	2.0	2.5	60	235	3.5	2.2
2	38	0	—	50	3.5	2.2	2	2.0	.0	—	50	4.5	2.2
3	7	6	80	235	0.5	2.2	3	4.0	4.0	55	230	0.5	2.2
4	38	35	50	200	.0	2.2	4	2.0	2.5	58	235	3.5	2.2
5	2.2	8	—	210	0.7	2.2	5	2.2	8	—	210	0.7	2.2
6	—	12	225	220	30	2.2	6	—	12	225	220	30	2.2
7	—	12	225	220	30	2.2	7	—	12	225	220	30	2.2

MODEL R-7A AC
Superette
Resistance Data

R. C. A. VICTOR CO., INC.

'47 Plate to '80 Fil 306 ohms Harmonic condenser
'47 Plate to '47 Plate 610 ohms
'80 Anode 200,125 ohms
'80 Anode to '80 Anode 250 ohms
Across Speaker field only 1,330 ohms
Across output transformer secondary only .325 ohm
Across Oscillator coil 4.5 ohms



All tubes out of sockets and AC plug removed from power supply line. Field coil disconnected. Volume control maximum unless otherwise stated

Correct Incorrect

40 ohms

Chassis to

RF Control Grid
RF Cathode (V.C.Min)
RF Cathode (V.C.Max)
RF Screen Grid
RF Plate

5 ohms
4,500 ohms
150 ohms
8,150 ohms
24,208 ohms

RF Plate to '80 Fil

58 ohms

1 Detector Control Grid
1 Detector Cathode
1 Detector Screen Grid
1 Detector Plate
1 Detector Plate to '80 Fil

6 ohms
10,000 ohms
8,150 ohms
24,301.5 ohms
93.5 ohms

Oscillator Control Grid
Oscillator Cathode
Oscillator Plate
Osc. Plate to '80 Fil

40,150 ohms
150 ohms
24,151 ohms
1 ohm

IF Control Grid
IF Cathode
IF Screen Grid
IF Plate

41.5 ohms
150 ohms
24,150 ohms
24,191.5 ohms

IF Plate -'80 Fil

41.5 ohms

2 Detector Control Grid
2 Det Control Grid- Ter #2
2 Detector Cathode
2 Detector Plate

1,000,093.5 ohms
30,000 ohms
26,530 ohms

2 Detector Plate to '80 Fil
'47 Control Grid

2,380 ohms
43,800 ohms

'47 Screen Grid
'47 Cg to '47 CG
'47 Screen to '80 Fil
'47 Plate

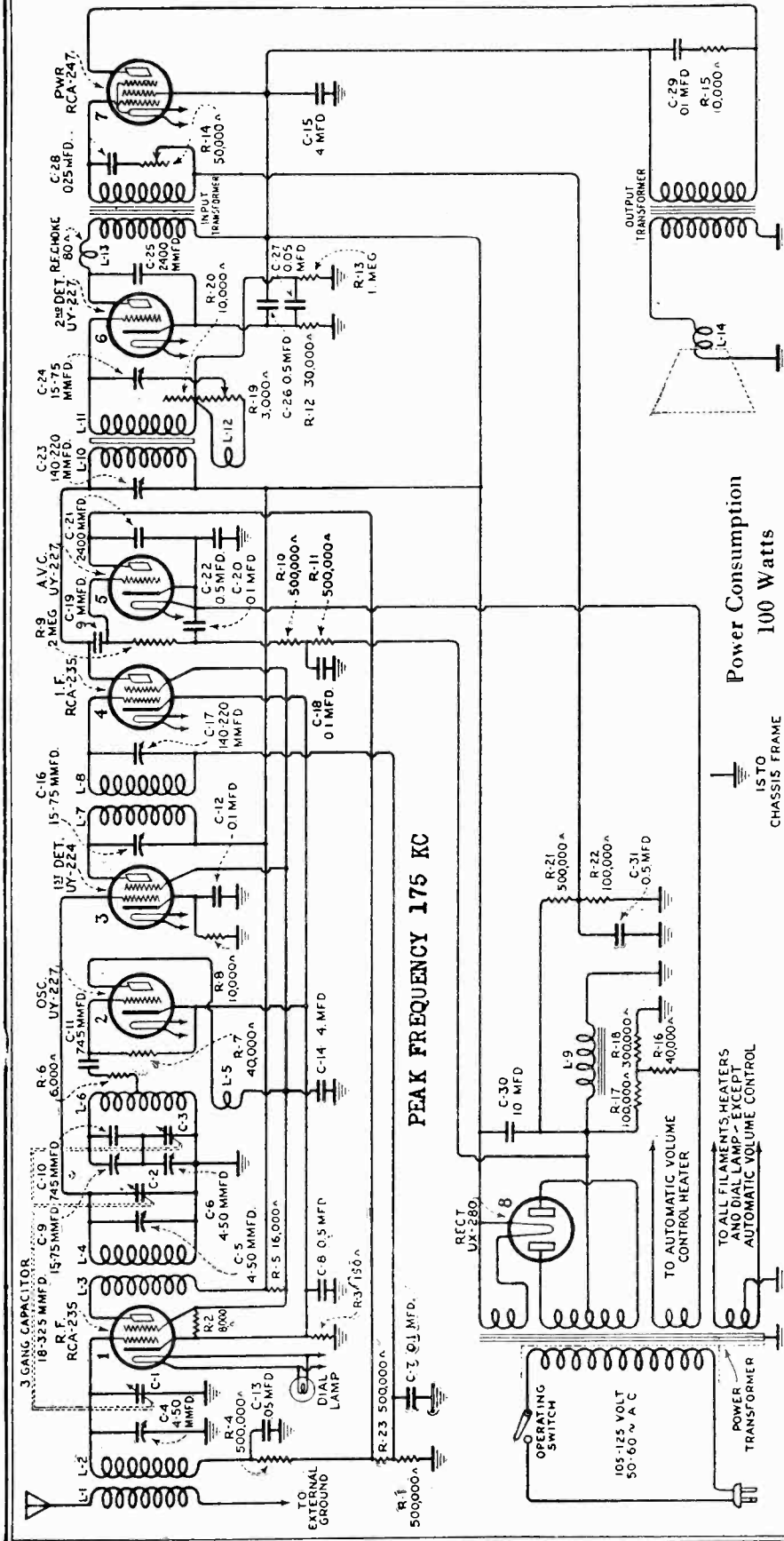
24,150 ohms
7,600 ohms
0 ohm
24,455 ohms

RADIATION SOCKET VOLTAGES-110 VOLT A. C. LINE

Radiation No.	VOLUME CONTROL AT MINIMUM				VOLUME CONTROL AT MAXIMUM				Heater Filament A.C.
	Cathode to Heater D.C.	Grids to Screen D.C.	Cathode to Filament D.C.	Plate to Filament D.C.	Cathode to Heater D.C.	Grids to Screen D.C.	Cathode to Filament D.C.	Plate to Filament D.C.	
1	34	37	51	200	2	2	2	2	2.2
2	34	37	51	200	2	2	2	2	2.2
3	34	37	51	200	2	2	2	2	2.2
4	34	37	51	200	2	2	2	2	2.2
5	34	37	51	200	2	2	2	2	2.2
6	34	37	51	200	2	2	2	2	2.2
7	34	37	51	200	2	2	2	2	2.2
8	34	37	51	200	2	2	2	2	2.2
9	34	37	51	200	2	2	2	2	2.2
10	34	37	51	200	2	2	2	2	2.2
11	34	37	51	200	2	2	2	2	2.2
12	34	37	51	200	2	2	2	2	2.2

R. C. A. VICTOR CO., INC.

MODEL R-8, R-12 AC Schematic Voltage



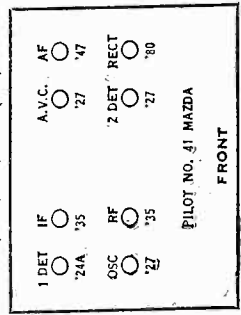
Power Consumption 100 Watts
IS TO CHASSIS FRAME

VOLUME CONTROL DOES NOT AFFECT VOLTAGES

Radioelectron No.	Cathode to Heater Volts, D. C.	Cathode or Filament to Heater Volts, D. C.	Plate or Filament to Heater Volts, A. C.	Current M. A.	Heater or Filament Volts, A. C.
1. R. F.	4.0	0.5	50.0	4.0	2.66
2. Osc.	4.0	0	65	6.0	2.66
3. 1st Det.	7.0	6.0	70	0.75	2.66
4. I. F.	4.0	4.0	70	4.0	2.66
5. 2nd Det.	28.0	10.0	250	1.0	2.66
6. A. V. C.	0	0	25	0	2.66
7. Power	—	10.0	290	35.0	2.66

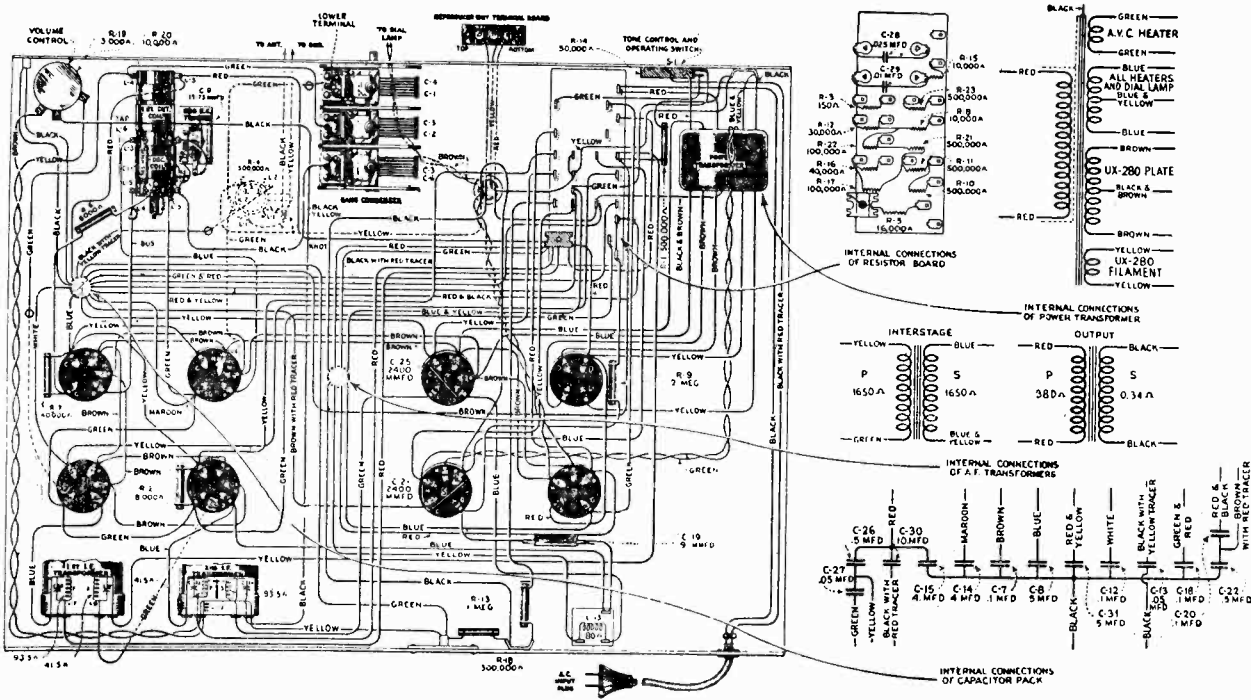
RCA Victor Models R-8 and R-12 are eight tube Super-heterodyne radio receivers incorporating such features as Super-Control, Screen Grid Radiotrons, Automatic Volume Control, Pentode output tube and the inherent sensitivity, selectivity and tone quality of the RCA Victor Super-Heterodyne Model R-8 is a table type receiver and the R-12 is of the Console type. Except for the Dial Scale, both models use the same chassis, which is also identical with that of the R-10.
A reference to the Service Notes already published on the R-11 and R-7 will give details of any service information required on these receivers.

Models R-8, R-10, R-12, RE-19 (1932)



MODEL R-8, R-12 AC
Chassis
Parts List

R. C. A. - VICTOR CO., INC.



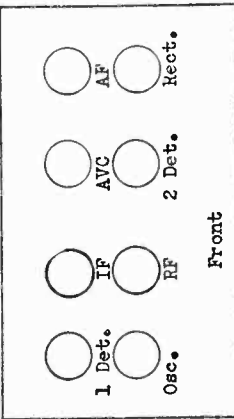
Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
7343	Transformer—Audio transformer.	\$3.85	7343	Transformer—Audio transformer.	\$3.85
7344	Transformer—Power transformer.	8.00	7344	Transformer—Power transformer.	8.00
7348	Board—Resistor board complete less resistors and capacitors.	2.30	7348	Board—Resistor board complete less resistors and capacitors.	2.30
7362	Capacitor—0.025 mfd.	1.00	7362	Capacitor—0.025 mfd.	1.00
8770	Transformer—Power transformer—105-125 volts, 23-40 cycles.	12.00	8770	Transformer—Power transformer—105-125 volts, 23-40 cycles.	12.00
8771	Transformer—Power transformer—220 volts, 60 cycles.	9.00	8771	Transformer—Power transformer—220 volts, 60 cycles.	9.00
8837	Support—Receiver chassis metal mounting bracket—Package of 4.	.70	8837	Support—Receiver chassis metal mounting bracket—Package of 4.	.70
2999	Shaft—Tuning condenser drive shaft complete.	.50	2999	Shaft—Tuning condenser drive shaft complete.	.50
3029	Bracket—Dial lamp bracket and indicator.	.50	3029	Bracket—Dial lamp bracket and indicator.	.50
3097	Scale—Dial drum and scale with set screws—Package of 2.	.80	3097	Scale—Dial drum and scale with set screws—Package of 2.	.80
7241	Capacitor—3 ang tuning capacitor.	.50	7241	Capacitor—3 ang tuning capacitor.	.50
6189	RECEIVER PARTS SPECIAL TO R-12	.65	6189	RECEIVER PARTS SPECIAL TO R-12	.65
6190	Bracket—Dial lamp bracket and indicator—Pkg. of 2	.85	6190	Bracket—Dial lamp bracket and indicator—Pkg. of 2	.85
6191	Shaft—Tuning condenser drive shaft complete with 3 washers—Package of 5.	.55	6191	Shaft—Tuning condenser drive shaft complete with 3 washers—Package of 5.	.55
6192	Coil—Tuning condenser drive coil—Package of 5.	.50	6192	Coil—Tuning condenser drive coil—Package of 5.	.50
7438	Capacitor—Variable tuning capacitor.	5.20	7438	Capacitor—Variable tuning capacitor.	5.20
7439	Drum—Dial drum with set screw.	.50	7439	Drum—Dial drum with set screw.	.50
7440	Scale—Dial and dial scale.	.75	7440	Scale—Dial and dial scale.	.75
6174	LOUDSPEAKER	.50	6174	LOUDSPEAKER	.50
3237	Screw assembly—Speaker mounting screw assembly—Comprising 4 screws, 8 nuts, 4 washers and 4 eyelets—Package of 1 set—For R-8.	.50	3237	Screw assembly—Speaker mounting screw assembly—Comprising 4 screws, 8 nuts, 4 washers and 4 eyelets—Package of 1 set—For R-8.	.50
6184	Screw assembly—Speaker mounting screw assembly—Comprising 4 screws, 8 nuts, 4 washers and 4 eyelets—Package of 1 set—For R-12.	.50	6184	Screw assembly—Speaker mounting screw assembly—Comprising 4 screws, 8 nuts, 4 washers and 4 eyelets—Package of 1 set—For R-12.	.50
7345	Board—Terminal board complete with 3 terminals and mounting rivets—Package of 5.	.50	7345	Board—Terminal board complete with 3 terminals and mounting rivets—Package of 5.	.50
8559	Coil—Speaker field coil assembly—Comprising coil, cone bousing and magnet.	5.00	8559	Coil—Speaker field coil assembly—Comprising coil, cone bousing and magnet.	5.00
8601	Ring—Cone retaining ring.	.80	8601	Ring—Cone retaining ring.	.80
X-32	Cone—Speaker paper cone—Package of 5.	13.00	X-32	Cone—Speaker paper cone—Package of 5.	13.00
X-33	Baffle board and grille cloth.	.90	X-33	Baffle board and grille cloth.	.90
6113	Foot—Cabinet felt foot—Package of 15.	.50	6113	Foot—Cabinet felt foot—Package of 15.	.50
7435	Escutcheon—Tuning dial escutcheon complete with mounting screws.	.90	7435	Escutcheon—Tuning dial escutcheon complete with mounting screws.	.90
9402	Cabinet—Cabinet complete less equipment.	16.00	9402	Cabinet—Cabinet complete less equipment.	16.00
X-44	Top.	4.65	X-44	Top.	4.65
X-45	Front.	2.00	X-45	Front.	2.00
X-46	Side.	1.10	X-46	Side.	1.10
X-47	Stretch.	1.50	X-47	Stretch.	1.50
X-48	Baffle board and grille cloth.	.95	X-48	Baffle board and grille cloth.	.95
X-19	Mouldings—Control panel mouldings—Comprising 1 bottom moulding, 4 vertical mouldings, 1 top moulding and 2 center ornaments—Package of 1 set.	3.95	X-19	Mouldings—Control panel mouldings—Comprising 1 bottom moulding, 4 vertical mouldings, 1 top moulding and 2 center ornaments—Package of 1 set.	3.95
7441	Escutcheon—Tuning dial escutcheon complete with mounting screws.	1.05	7441	Escutcheon—Tuning dial escutcheon complete with mounting screws.	1.05
9105	Cabinet—Cabinet complete less equipment.	47.50	9105	Cabinet—Cabinet complete less equipment.	47.50

R. C. A. VICTOR CO., INC.

MODEL R-8, R-12 AC
Resistance Data

All tubes removed from sockets and AC plug removed from power supply
Field coil disconnected

From Chassis To	Correct	Incorrect	See RF Plate
Aerial to Ground	40 ohms		See RF Plate
Chassis to			BC-2 DP-2 DK
RF Control Grid	1,000,005 ohms		FC-47 Sg-Y (4 mfd)
RF Cathode	150 ohms		Tone Control Condenser
RF Screen	8,150 ohms		See RF Control Grid
RF Plate	24,208 ohms		
1 Detector Control Grid	5 ohms		
1 Detector Cathode	10,000 ohms		
1 Detector Screen Grid	8,150 ohms		
1 Detector Plate	24,301.5 ohms		
1 Det Plate to '80 Fil	93.5 ohms		
Oscillator Control Grid	40,150 ohms		
Osc Control Grid to Osc Cathode	40,000 ohms		
Oscillator Cathode	150 ohms		
Oscillator Plate	24,151 ohms		
Osc Plate to RF Screen	1 ohm		
IF Control Grid	500,041.5 ohms*		
IF Cathode	150 ohms		
IF Screen Grid	8,150 ohms		
IF Plate to '80 Fil	41.5 ohms		
AVC Control Grid	3,240,000 ohms		
AVC Control Grid-'80 Anode	3,000,175 ohms		
AVC Cathode	250,000 ohms		
AVC Plate	1,000,000 ohms		
2 Detector Control Grid	1,000,093.5 ohms*		
2 Det Cg to Volume Control	843-93.5-10,093.5 ohms		
2 Detector Cathode	30,000 ohms		



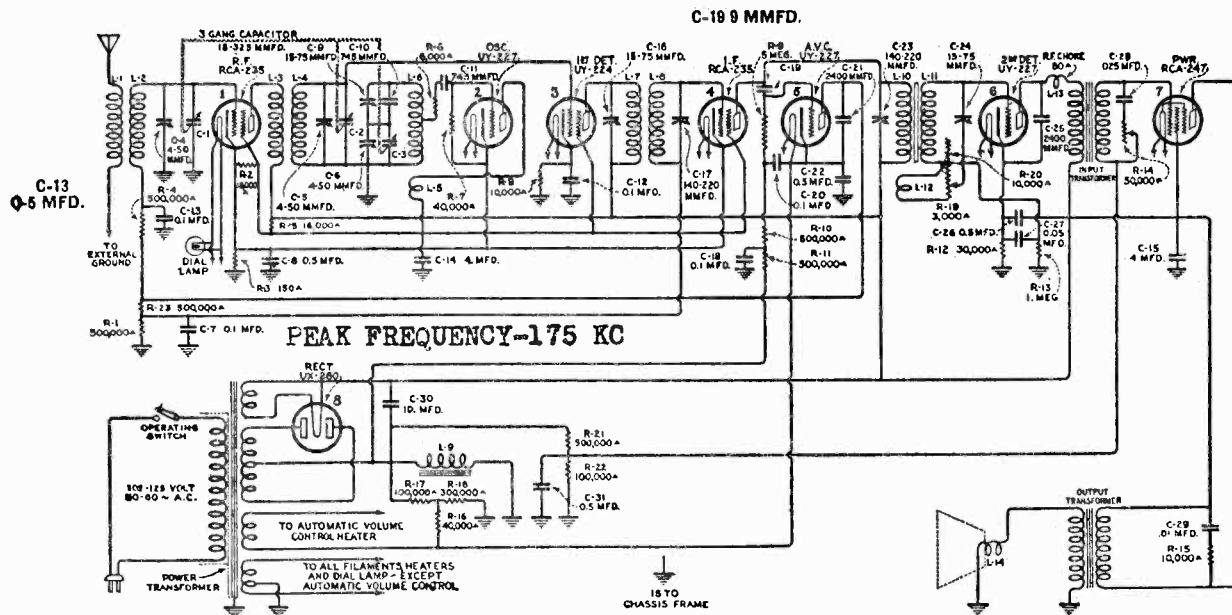
120 VOLT LINE

VOLUME CONTROL OHMS NOT ADJUST VOLTAGES

Regulation No.	Capacitors to Volume to C.	Capacitors to Volume to C. (Value in U.S.)	Capacitors to Volume to C. (Value in U.S.)	Capacitors to Volume to C. (Value in U.S.)	Capacitors to Volume to C. (Value in U.S.)	Capacitors to Volume to C. (Value in U.S.)
1 R F	4.0	0.5	70	300	1.0	2.06
2 Det	1.0	0.5	15	6.0	0.5	2.06
3-1st 1st	7.0	0.5	25	300	0.5	2.06
1 I F	1.0	1.0	70	200	1.0	2.06
5-2nd 1st	20.0	10.0	—	250	1.0	2.06
6. A.V.C.	0	0	—	25	0	2.06
7 Power	0	10.0	200	200	35.0	2.06

MODEL R-10 AC
Schematic
Voltage - Chassis

R. C. A. VICTOR CO., INC.

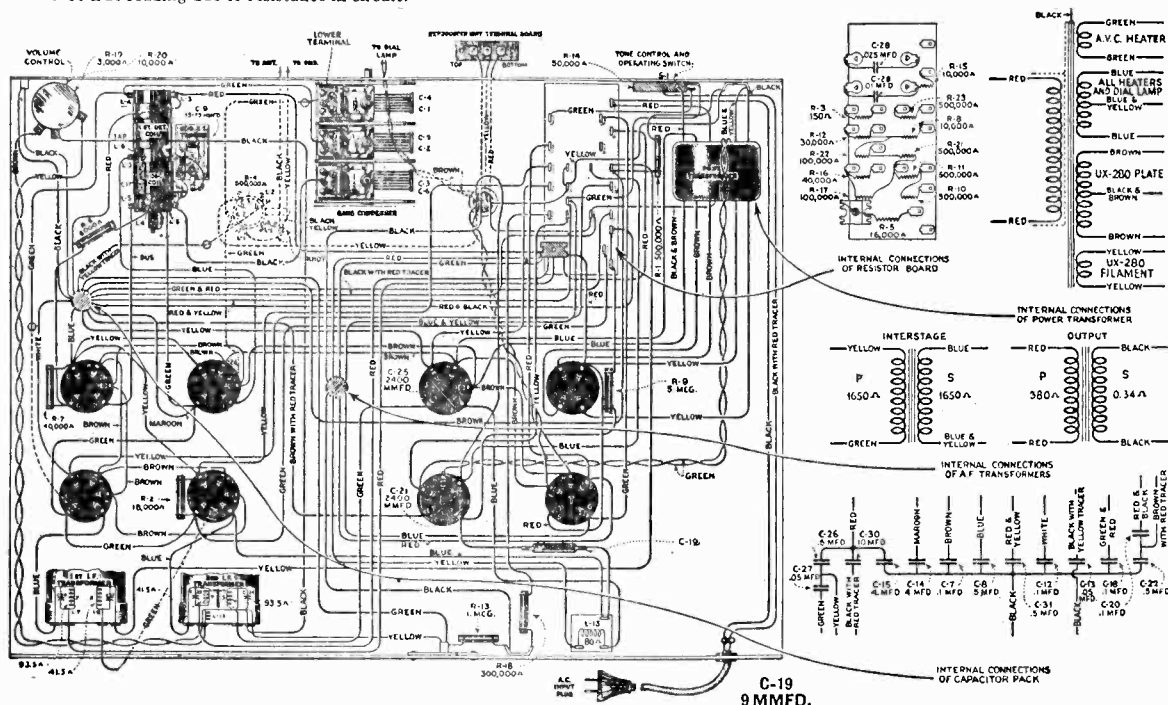


110 VOLT A. C. LINE

(Volume Control Setting Does Not Affect Voltages)

Radiotron No.	Cathode to Heater Volts, D. C.	Cathode or Filament to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current M. A.	Screen Current M. A.	Heater or Filament Volts, A. C.
1	2	*0.1	75	210	5.0	0.5	2.2
2	8	0	—	60	5.0	—	2.2
3	7	7.0	70	205	0.5	0.1	2.2
4	2	*0.1	75	210	5.0	0.5	2.2
5	0	0	—	30	0	—	2.2
6	20	*8.0	—	185	0.5	—	2.2
7	—	10	210	210	25	—	2.2

*Not true reading due to resistance in circuit.



R. C. A. VICTOR CO., INC.

MODEL R-10 AC
Resistance Data

All tubes out of sockets and AC plug removed from power supply lines
Speaker field disconnected

From Chassis To
Aerial to Ground
Chassis to
RF Control Grid
RF Cathode
RF Screen Grid
RF Plate
RF Plate to '80 Fil
1 Detector Control Grid
1 Detector Cathode
1 Detector Screen Grid
1 Detector Plate
1 Detector Plate - '80 Fil
Oscillator Control Grid
Oscillator Cathode
Osc Screen Grid
Osc Plate
Osc Plate - RF Screen
IF Control Grid
IF Cathode
IF Screen Grid
IF Plate
IF Plate to '80 Fil
AVC Control Grid
AVC Cathode
2 Detector Control Grid
2 Det Cg to Vol Control
2 Detector Cathode
2 Detector Plate
2 Detector Plate to '80 Fil

Correct
40 ohms
1,500,005 ohms
150 ohms
18,150 ohms
34,208 ohms
58 ohms
5 ohms
10,000 ohms
18,150 ohms
34,301.5 ohms
93.5 ohms
40,150 ohms
150 ohms
18,150 ohms
18,151 ohms
1
500,041.5 ohms
150 ohms
18,150 ohms
34,191.5 ohms
41.5 ohms
6,240,000 ohms
250,000 ohms
1,000,098 ohms
93.5-10,098 ohms
30,000 ohms
35,880 ohms
1,730 ohms

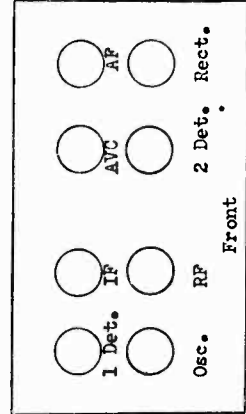
Incorrect
TC-Y
BLC in tuned circuit
BC-Y
BC-AVC P-AVC K
BC-Y (.5 mfd)
BC- rf K-Y (.5 mfd)
BC-2 D P-Y (0024 mfd)
BC-AFT. Pr = 2 D K (.5 mf.)
FC-'47 SG-Y (4. mfd)
TC-Y
BC- 1 D K-Y (.1 mfd)
See RF Screen Grid
See RF Plate
TC- IF Tr Pri
Osc Grid Condenser
Sec RF Cathode
See RF Screen
See RF Screen
BC-Y (.5 mfd)
TC-IF Tr Sec
See RF Cathode
See RF Screen Grid
See RF Plate
BLC-AVC Cg-if P
BC-5 meg res. = AVC H
FC-'80 F = '80 P wdg(10mf)
BC-'47 Cgwdg = Y
BC-AVC K-Y
BC-AVC K- AVC P
BC- 2 D K (.5 mfd)
BC- 2DK-2DP
BC- 2DP-2DK

91,650 ohms
0 ohms
34,150 ohms
34,530 ohms
380 ohms
34,150 ohms
274,150 ohms
350 ohms
1,330 ohms
0.34 ohms

From Chassis To
'47 Plate -'47 Screen
'80 Fil
'80 Fil to '80 Anode
'80 Anode to '80 Anode
Across Field Coil only
Across Output Transformer Secondary only

Correct
Incorrect

BC-Y
Tone Control Condenser
See IF Plate
FC-'47 Sg-Y (4.mfd)



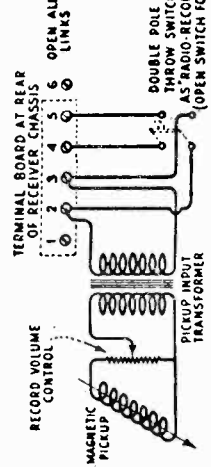
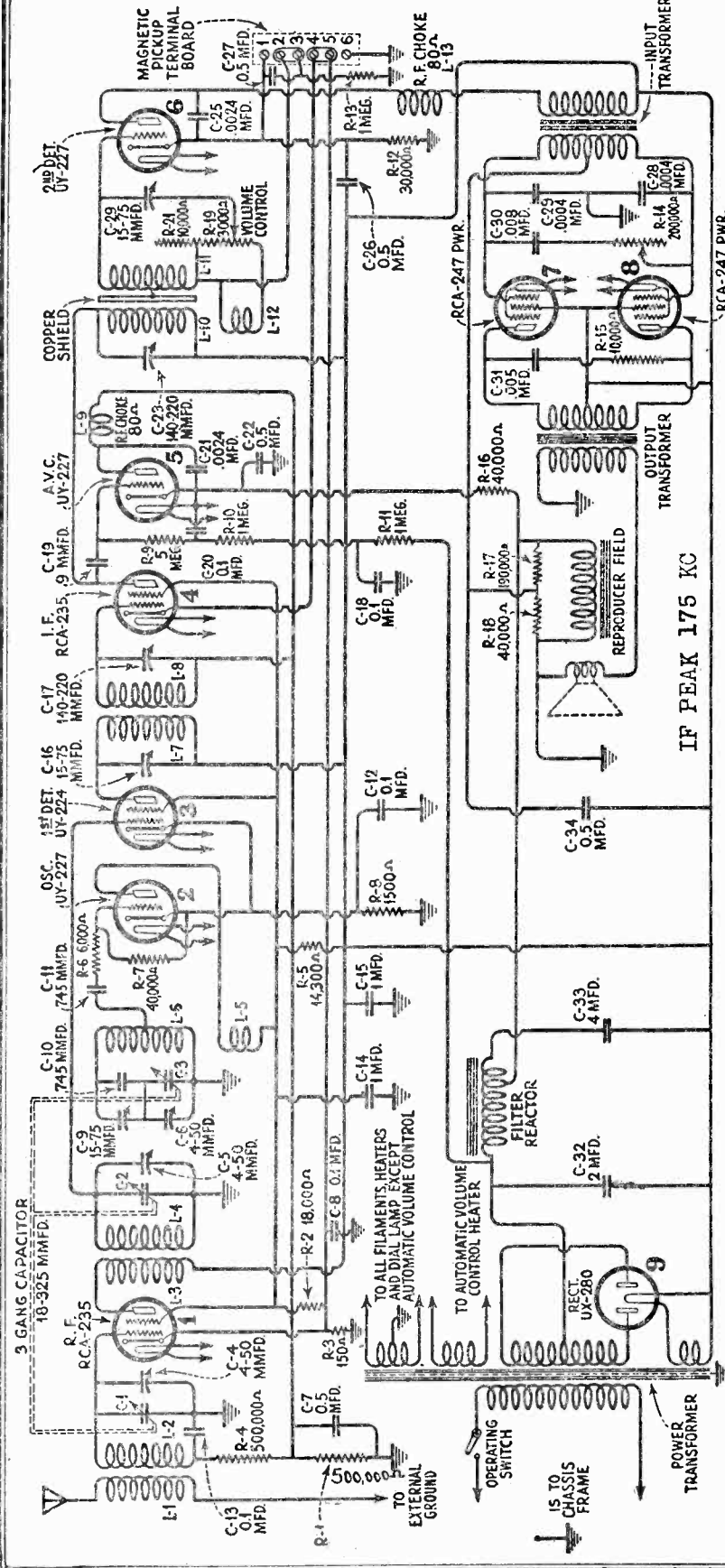
110 VOLT A. C. LINE
(Volume Control Setting Does Not Affect Voltages)

Radioelectron No.	Cathode to Heater Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current M. A.	Screen Current M. A.	Heater or Filament Volts, A. C.
1	2	*0.1	210	5.0	0.5	2.2
2	8	0	60	5.0	—	2.2
3	7	7.0	205	0.5	0.1	2.2
4	2	*0.1	210	5.0	0.5	2.2
5	0	0	30	0	—	2.2
6	20	*8.0	185	0.5	—	2.2
7	—	10	210	25	—	2.2

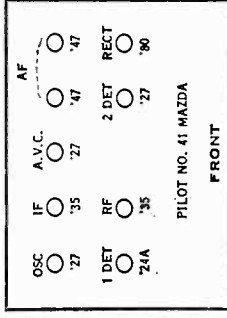
*Not true reading due to resistance in circuit

MODEL R-11 AC
Schematic
Early
Voltage

R. C. A. VICTOR CO., INC.



Magnetic Pickup Connections



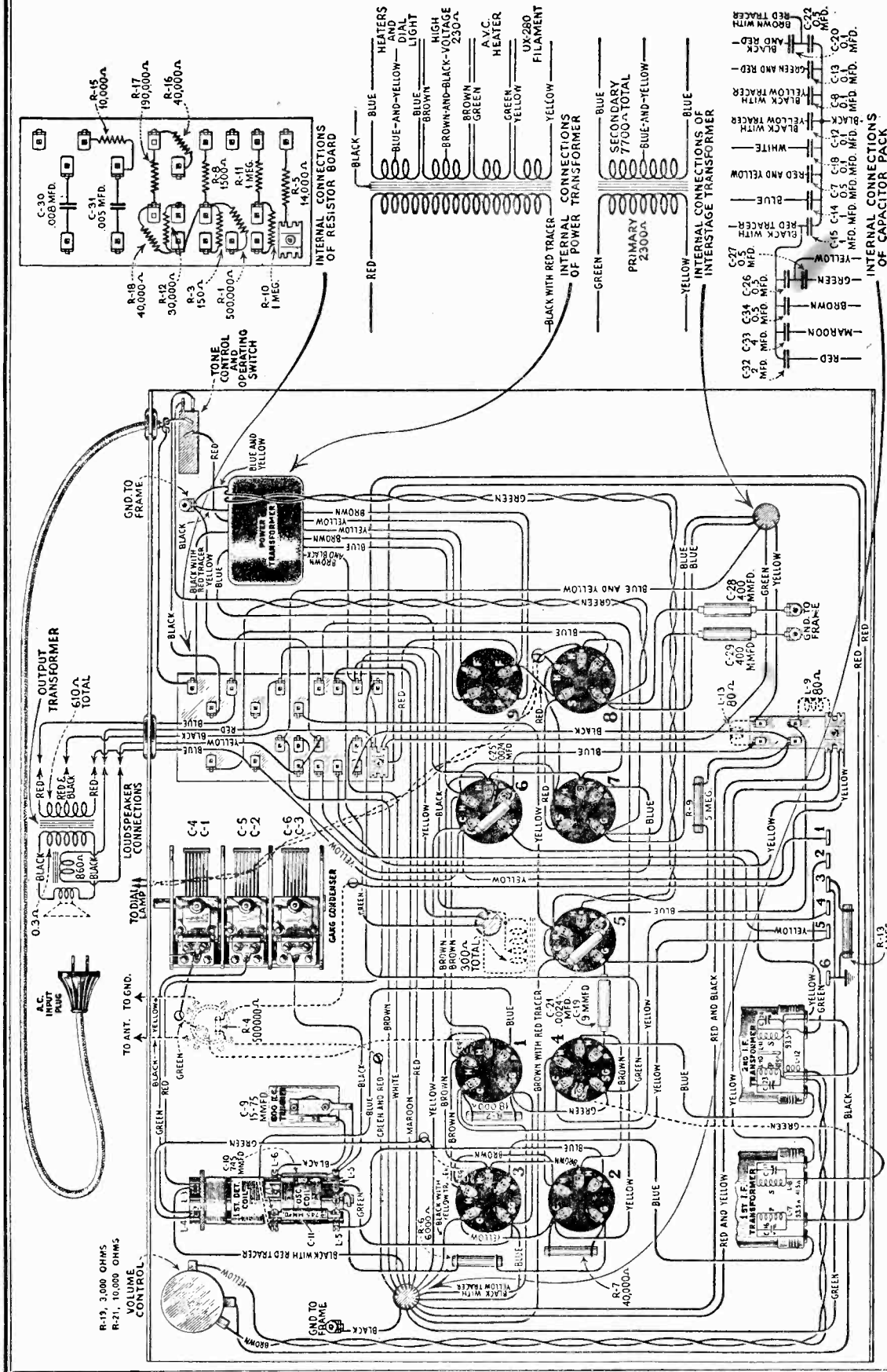
110 VOLT A. C. LINE (Volume Control Setting Does Not Affect Voltages)

Radioelectron No.	Cathode to Heater Volts D. C.	Cathode or Filament to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current M. A.	Screen Current M. A.	Heater or Filament Volts, A. C.
1	2	*0.1	75	205	5.0	0.5	2.2
2	8	0	—	60	5.0	—	2.2
3	7	7.0	70	200	0.5	0.1	2.2
4	2	*0.1	75	205	5.0	0.5	2.2
5	0	0	—	25	0	—	2.2
6	20	*8.0	—	180	0.5	—	2.2
7	—	10	210	205	25	—	2.2
8	—	10	210	205	25	—	2.2

* Not true reading due to resistance in circuit.

R. C. A. VICTOR CO., INC.

MODEL R-11 AC Chassis Early

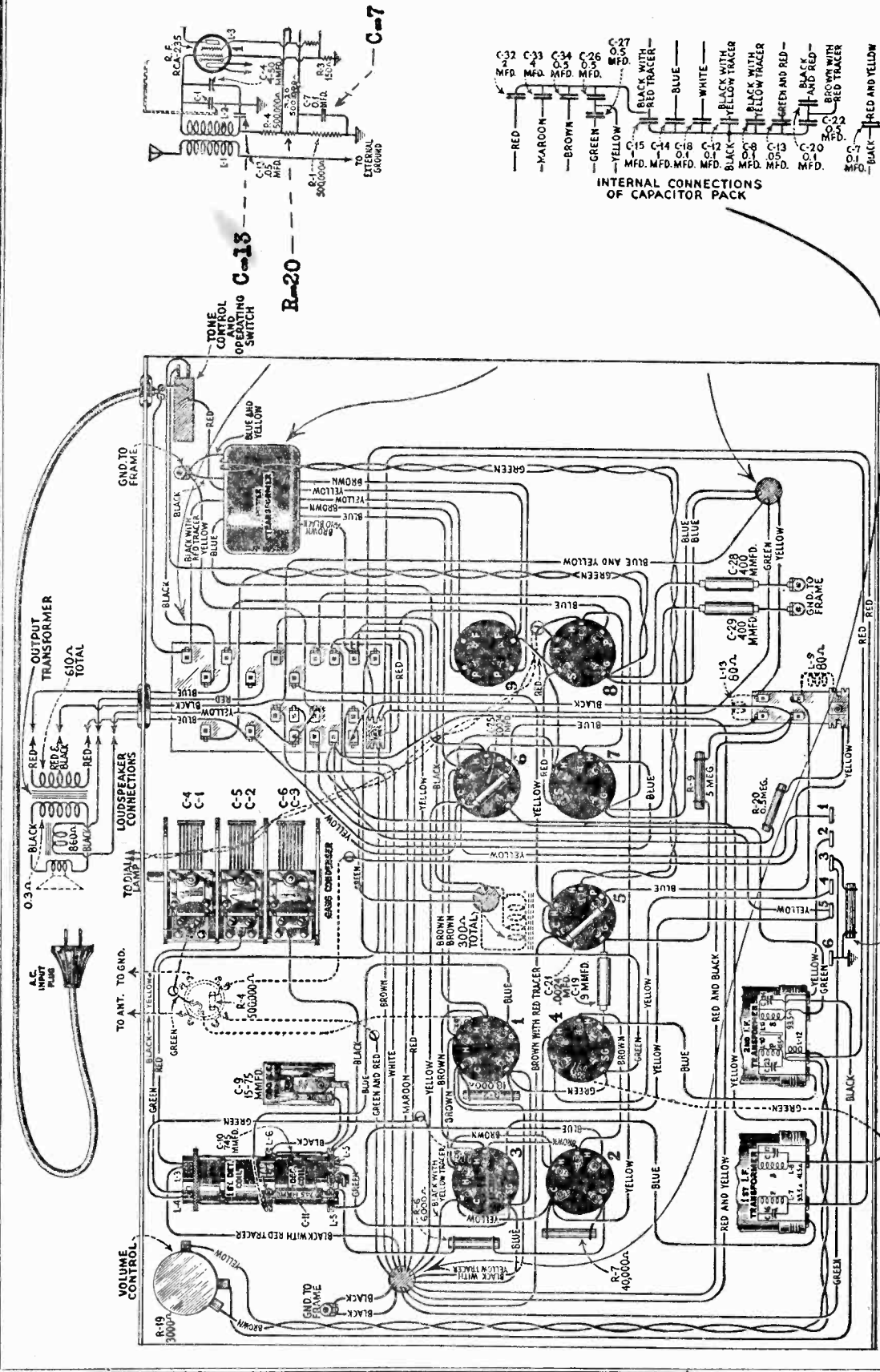


R. F. OSCILLATOR AND I. F. ADJUSTMENTS

A reference to the RCA Victor Radiola Superette Service Notes will give the details for making correct R. F., I. F. and Oscillator adjustments. However, due to the use of an automatic volume control tube, its action will defeat the use of an output meter. To overcome this, a "dummy" Radiotron UY-227 (one that has one heater prong removed but is otherwise O.K.) should be substituted for the tube in the automatic volume control socket. Do not make any adjustments with this tube removed from the socket. While apparently everything functions in the normal manner, the lack of tube capacity in the circuits will cause an incorrect alignment to be made.

MODEL R-11 AC
Chassis
Late

R. C. A. VICTOR CO., INC.



Wiring diagram of late production R-11

Late production of the RCA Victor Radiola R-11 has a slight change in the wiring, two changes in capacitor values and the addition of a 0.5 megohm resistor (R-20). Capacitor C-7 has been changed from 0.5 mfd. to 0.1 mfd. and C-13 from 0.1 mfd. to 0.05 mfd. Resistor R-20 has been added.

R. C. A. VICTOR CO., INC.

MODEL R-11 AC
Parts List
Notes

RCA Victor Console, R-11

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
2563	Resistor—6,000 ohms—Carbon type—Package of 5	\$3.00	3097	Scale—Dial drum scale with set screws—Pkg. of 2	\$0.50
2730	Resistor—18,000 ohms—Carbon type—Package of 5	2.00	3098	Capacitor—0.008 mfd.	.50
2734	Capacitor—745 mmfd.—Package of 5	2.20	3099	Capacitor—0.005 mfd.	.75
2746	Socket—Dial lamp socket	.50	7054	Cord—Power cord	1.00
2747	Contact cap—Package of 5	.50	7062	Capacitor—Adjustable oscillator trimmer capacitor	1.00
2749	Capacitor—2400 mmfd.	1.50	7241	Capacitor—3 gang tuning capacitor with mounting screws and washers	8.00
2875	Knobs—Package of 5	1.50	7266	Transformer—1st intermediate transformer	3.00
2882	Socket—UY Radiotron socket—Complete with insulating shield—8 used	.50	7267	Transformer—2d intermediate transformer	3.00
2968	Socket—UX Radiotron socket—Complete with insulating shield—1 used	.50	7268	Coil—Detector or A.V.C. R.F. choke coil—Complete with mounting rivet	.60
2999	Shaft—Dial drum drive shaft	.50	7269	Capacitor pack—In metal container—60 cycle	7.25
3029	Indicator—Tuning dial indicator—Complete with bracket	.50	7270	Reactor—Filter reactor	4.00
3046	Resistor—190,000 ohms—Carbon type—Package of 5	2.50	7271	Transformer—Interstage transformer	4.25
3047	Resistor—1500 ohms—Carbon type—Package of 5	2.50	7272	Transformer—Power transformer—105-125 volt, 50-60 cycles	12.00
3048	Resistor—500,000 ohms—Carbon type—Package of 5	2.50	7273	Capacitor pack—By-pass capacitor pack—25-40 cv.	10.00
3049	Resistor—150 ohms—Carbon type—Package of 5	2.50	7274	Transformer—Power transformer—105-125 volts, 25-40 cycles	15.00
3050	Resistor—14,000 ohms—Carbon type—Package of 1	.60	7275	Transformer—Power transformer—220 volts, 50-60 cycles	10.00
3051	Resistor—5 megohm—Carbon type—Package of 5	2.00			
3053	Capacitor—9 mmfd.—Package of 2	.50			
3054	Escutcheon—Station selector escutcheon—With 4 mounting screws	.60			
3055	Cushion—Chassis support cushion—Package of 4	.50			
3056	Shield—Radiotron shield—6 used—Package of 2	.50	7257	Coil—Cone support with retaining ring, magnet and field coil	6.00
3076	Resistor—1 megohm—Carbon type—Package of 5	2.50	7258	Transformer—Output transformer	1.70
3077	Resistor—30,000 ohms—Carbon type—Package of 5	2.50	8359	Ring—Cone retaining ring	.80
3078	Resistor—10,000 ohms—Carbon type—Package of 5	2.50	8601	Cone—Cone with voice coil—Package of 5	15.00
3079	Resistor—40,000 ohms—Carbon type—Package of 5	2.50			
3085	Capacitor—400 mmfd.	.60			
3089	Terminal board—Magnetic pickup terminal board	1.50			
3090	Board—A. V. C. and 2nd detector R. F. choke mounting board—Less choke coils	.50			
3091	Board—Resistor board—Less resistor and capacitors	1.00	8691	Panel—Control panel	8.50
3092	Volume control—Complete with mounting nut	1.50	8692	Grille cloth and baffle board	1.25
3093	Tone control—Complete with mounting nut	1.90	8693	Leg—Front—Right or left	.90
3094	Shield—Radiotron shield—1 used—Package of 2	.50	8694	Leg—Back—Right hand	1.00
3095	Coil—R.F. coil—Complete with mounting bracket	1.90	8695	Leg—Back—Left hand	1.00
3096	Coil—1st detector and oscillator coil—Complete with mounting bracket	3.55	8696	Stretcher	2.50
			8697	Foot	.75
			8698	Top	5.50
			8699	Ornament—Control panel ornament	2.25
			9358	Cabinet—Complete less all equipment	62.50

LOUDSPEAKER ASSEMBLY

CABINET ASSEMBLY

In previous automatic volume control receivers, the volume control was placed in the grid circuit of the automatic volume control tube, its action being to vary the control grid voltage of this tube. When operating sets of this character, the receiver jumped to full sensitivity when not tuned to a signal and if in a noisy location, this noise was very objectionable.

In this instrument, however, the volume control is not in the automatic volume control tube circuit, but in the grid circuit of the second detector. By means of it the signal voltage applied to the second detector is controlled and under no conditions can noise or other signals exceed the level for which it has been set. Electrically, the primary and secondary of the second I. F. transformer are shielded from each other so that there is no transference of energy except by means of a small pickup coil. The volume control is a potentiometer shunted across this coil which determines the amount of pickup that will be used. As a further means of controlling a strong signal, a second section is provided which places up to 10,000 ohms (R-21) in series with the tuned circuit of second detector grid. This effectively reduces even the most powerful signals received.

A 0.005 mfd. condenser connected in series with a 10,000-ohm resistor is

placed across the primary of the output transformer. This functions to reduce the third harmonic distortion, an inherent characteristic of the Pentode output tube. The direct plate and grid voltages are supplied from high voltage alternating current which is rectified by means of Radiotron UX-280. The filter is of the tapped reactor type which gives an output of well filtered D. C. The bias voltage for the Radiotrons RCA-247 is obtained by using a portion of the drop across the reproducer field. One 190,000 ohm and one 40,000 ohm resistors act as the voltage dividing resistors.

A tone control, consisting of a 0.008 mfd. condenser in series with a 200,000 ohm variable resistor connected across the two grids of Radiotrons RCA-247 is incorporated in this stage. The tone control functions to reduce the high frequency output as the resistance is reduced. At the extreme low position, the condenser and secondary of the A. F. transformer resonate at a low frequency and thereby further accentuate the bass response. The two 0.0004 mfd. condensers, connected in series with their mid-point grounded are connected across the secondary of the input transformer. The purpose of these condensers is to prevent audio oscillations and provide a high frequency audio cut-off.

The next circuit to examine is the first detector. The circuit is tuned by means of one of the gang condensers to the frequency of the incoming signal. Radiotron UY-224 is used in this stage. In the grid circuit there is present the incoming signal and the oscillator signal, the latter being at a 175 K. C. difference from the former. The first detector is biased so as to operate as a plate rectification detector and its purpose is to extract the difference or beat frequency, produced by combining the signal and oscillator frequencies. The beat frequency—175 K. C.—appears in the plate circuit of the first detector which is accurately tuned to 175 K. C.

The next stage is that of the I. F. amplifier. A single stage is used, requiring two I. F. transformers, consisting of four tuned circuits. The plate circuit of the first detector, the grid and plate circuit of the I. F. amplifier and the grid circuit of the second detector are all tuned to 175 K. C. Radiotron RCA-235 is used in this stage and its control grid voltage is also varied by means of the automatic volume control tube.

SERVICE DATA

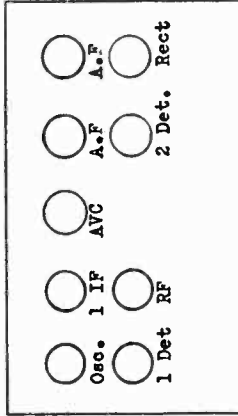
Information pertaining to general service data for this type receiver may be obtained from the Service Notes already issued on the RCA Victor Radiola Superette.

MODEL R-11 AC
Resistance Data

R. C. A. VICTOR CO., INC.

2 Det Control Grid(Pickup Board Test#2) 93.5 ohms
 2 Det Control Grid to V.C. Arm 3,093.5-10,093.5 ohms
 2 Det Cathode 30,000 ohms

From Chassis To	Correct	Incorrect
Pickup Board Terminal 2	1,000,000 ohms	BC-Ter#1- Ter#3 See RF Plate
2 Detector Plate	34,830 ohms	
2 Detector Plate-'80 Fil	2,380 ohms	
'47 Control Grid	43,850 ohms	BC- 47 Cg-Y See AVC Cathode
'47 Control Grid to Control Grid	7,700 ohms	Tone Control Cond Tone Control Resist See 2 Detector Plate
'47 Screen	32,450 ohms	
'47 Screen - '80 Fil	0 ohms	
'47 Plate	32,755 ohms	
'47 Plate to Plate	510 ohms	See 2 Detector Plate
80 Anode to chassis	230,400 ohms	Harmonic condenser
80 Anode to Anode	230 ohms	See AVC Control Grid
80 Fil to chassis	32,450 ohms	
Across Speaker field	860 ohms	See RF Plate See RF Screen Grid



Line Voltage 110. Volume Control does not change voltages.

Tube	Cathode-Heater	Control Grid-Cathode	Screen Grid-Cathode	Plate-Cathode	Filament Current Voltage
RF	2.	0.1*	75.	205.	5.0 ma 2+2
Osc.	8.	0.	-	60.	5.0 2+2
1 Det.	7.	7.0	70.	200.	0.5 2+2
IF	2.	0.1*	75.	205.	5.0 2+2
AVC	0.	0.	-	25.	- 2+2
2 Det.	20.	8.0*	-	180.	0.5 2+2
Pwer	-	10.	210.	205.	25. 2+2
Pwer	-	10.	210.	205.	25. 2+2

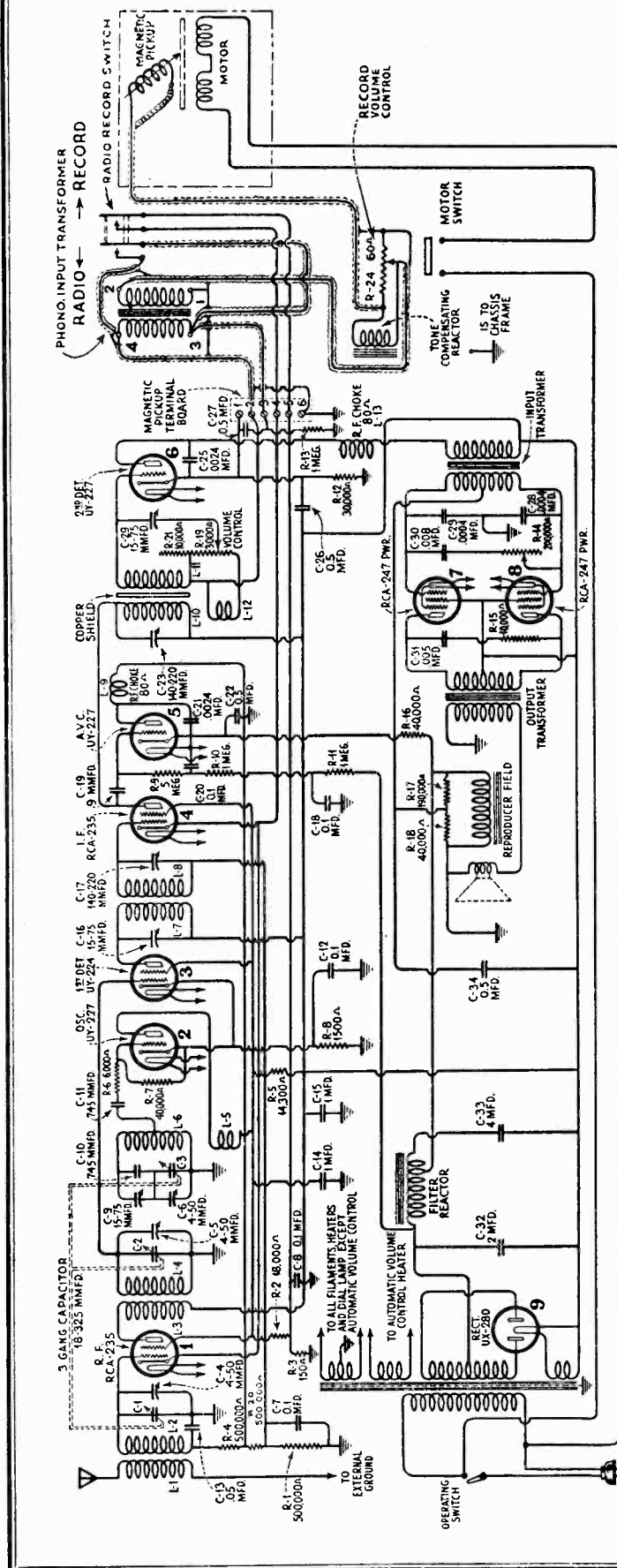
* Not true reading due to resistance in the circuit.

All tubes removed from sockets and AC plug removed from power supply.
 Field coil disconnected

From Chassis To	Correct	Incorrect
Aerial to Ground post	40 ohms	
Chassis to		
RF Control Grid(early model)	1,000,005 ohms	TC-Y in tuned circuit (.1 mfd)
RF Control Grid(late model)	1,500,005 ohms	BC-AVC ohk-Y in tuned circuit (.06 mfd)
RF Cathode	150 ohms	BC- 1 IF Tr. Seo -Y
RF Screen Grid	18,150 ohms	BC- rf K-Y (.1 mfd) BC- rf Sg- Y (1. mfd) BC-47 Sg- Y (.5 mfd)
RF Plate	\$2,508 ohms	BC-'80 F- Spkr div. tap BC- rf P-Y (1. mfd) See RF Screen Grid
RF Plate to '80 Fil	58 ohms	
Oscillator Control Grid	5 ohms	TC-Y
Oscillator Cathode	1,500 ohms	BC-Y (.1 mfd)
Oscillator Plate	18,151 ohms	See R-F Screen
Osc Plate and Det Screen	1 ohm	See R-F Plate
IF Control Grid (all models)	500,041.5 ohms	TC- 1 IF Tr.
IF Control Grid-AVC Plate (early)	121.5 ohms	BLC-Osc.Grid Cir.(.0074)
IF Plate	18,150 ohms	BC-Oso K-Y (.1 mfd)
IF Screen Grid	\$2,491.5 ohms	See R-F Screen
IF Plate -'80 Fil	41.5 ohms	
AVC Control Grid (early)	7,230,286 ohms	BC-Y (.5 mfd) TC-1 IF Tr Seo See RF Screen TC- 2 IF Tr.Pri.
AVC Control Grid (late)	4,230,285 ohms	BLC- if P- AVC Cg(9mmfd) BC-5 meg - AVC H (.1 mfd)
AVC Cathode	270,000 ohms	BC-1 meg- Y (.1 mfd) FC filter chk-80 F(2mfd) BC-AVC K-Y (.5 mfd)
AVC Plate	1,000,085 ohms	BC-Sprk divides tap -Y BC-AVC K-AVC P(.0024 mfd) See early model BC-AVC K-AVC P BC-AVC K-Y BC-AVC P-AVC K See RF Control Grid

R. C. A. VICTOR CO., INC.

MODEL RE-18
Schematic

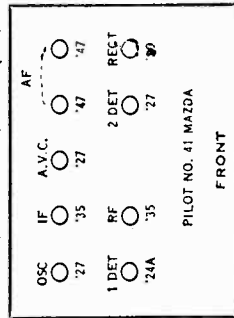


IF PEAK 175 KC.

This is a combination radio and electrola incorporating a new type automatic volume control that is quiet between stations. The new motor - board equipment has a synchronous motor using the R. C. A. - Victor Inertia tone arm. The motor is fitted with a speed reducing gear that allows for the playing of both standard and Program Transcription Records.

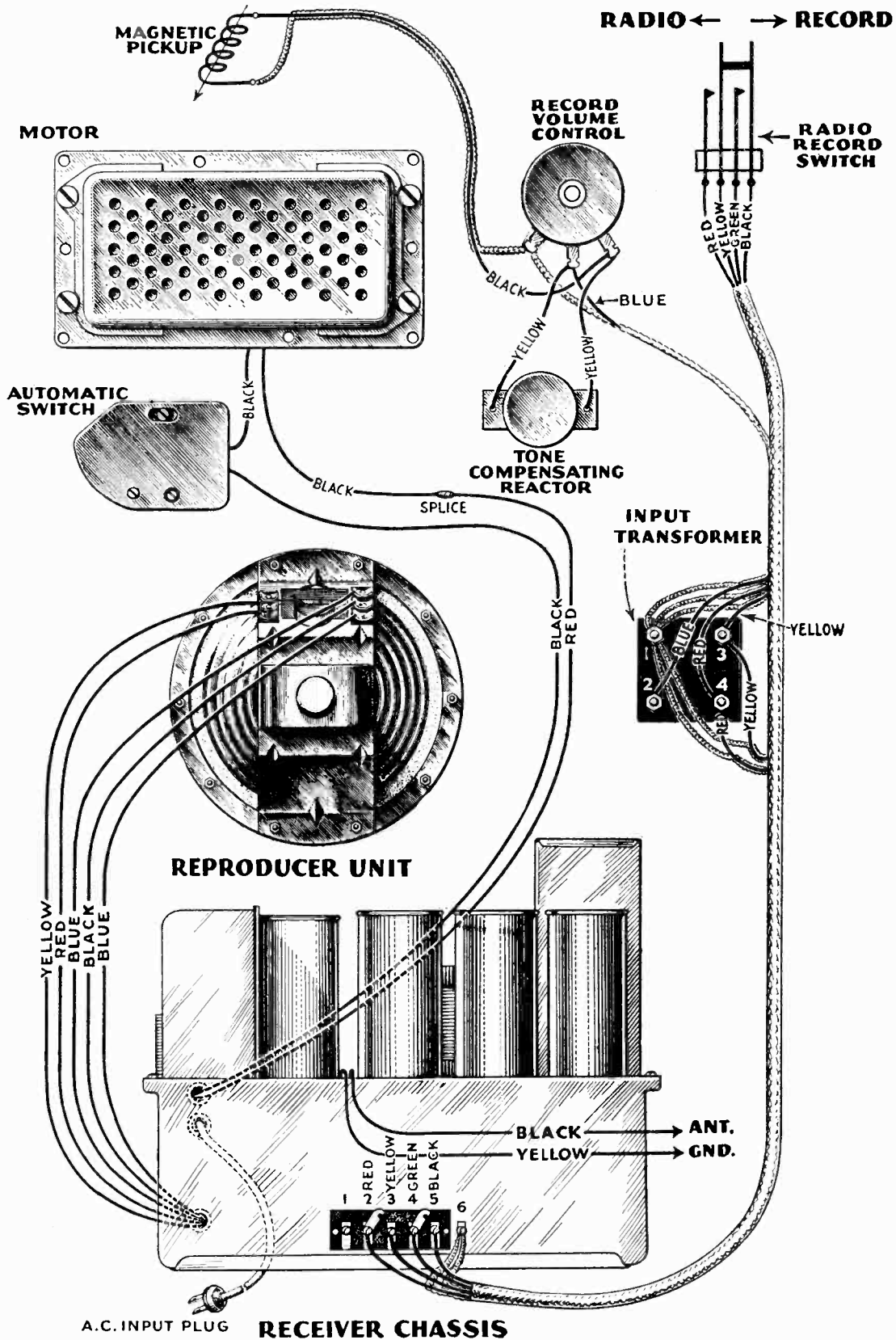
In many respects this receiver is similar to the R. C. A. - Victor Model R-11 and methods similar to those used in servicing the R-11 can be applied to this Model, noting, of course, that there are some differences.

Models R-11, RE-18, RE-18A, RAE-26 (1931)



MODEL RE-13
Assembly Wiring

R. C. A. VICTOR CO., INC.

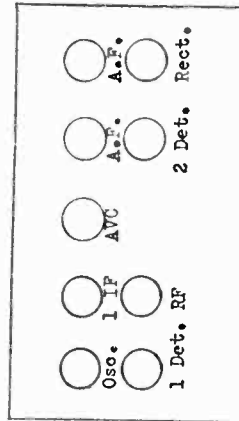


R. C. A. VICTOR CO., INC.

MODEL RE-18
Resistance Data

See Rf control grid
2 Det Control Grid(Pickup Board Ter#2) 93.5 ohms
2 Det Control Grid to V.C. Arm 3,093.5-10,093.5 ohms TU-2D Cg- VC Arm

2 Det Cathode 30,000 ohms BC-Ter#1-Ter#3
Pickup Board Terminal 2 1,000,000 ohms BC-2 DK-'80 Fil
2 Detector Plate 34,830 ohms BC-Ter#1-Ter#3
2 Detector Plate-'80 Fil 2,380 ohms See RF Plate
'47 Control Grid 43,860 ohms BC-47 Cg-Y
'47 Control Grid to Control Grid 7,700 ohms See AVC Cathode
'47 Screen - '30 Fil 32,450 ohms Tone Control Cond
'47 Plate 0 ohm Tone Control Resist
80 Anode to Plate 32,755 ohms See 2 Detector Plate
80 Anode to chassis 610 ohms Harmonic condenser
80 Fil to chassis 330,400 ohms See AVC Control Grid
Across Speaker field 230 ohms
80 Fil to chassis 32,450 ohms See RF Plate
860 ohms See RF Screen Grid



All Tubes removed from sockets and AC plug disconnected from power supply line. All phonograph equipment disconnected from pickup terminal board and terminals 2 and 3 inter-connected. Also terminals 4 and 5 inter-connected. Field Coil disconnected

From Chassis To Correct Incorrect

Aerial to Ground post 40 ohms

Chassis to

RF Control Grid(early model) 1,000,005 ohms BLC- in tuned circuit (.1 mfd)
RF Control Grid(late model) 1,500,005 ohms BLC- in tuned circuit (.06 mfd)

RF Cathode 150 ohms BC-1 IF Tr. See -Y
RF Screen Grid 18,150 ohms BC- rf K-Y (.1 mfd)
RF Plate 32,508 ohms BC- rf SG-Y (1. mfd)
BC-47 SG-Y (.5 mfd)
BC-'80 P- Spkr div. tap
BC- rf P-Y (1. mfd)
See RF Screen Grid

RF Plate to '80 Fil 58 ohms TC-Y
1 Detector Control Grid 5 ohms BC-Y (.1 mfd)
1 Detector Cathode 1,500 ohms BC-Y (.1 mfd)
1 Detector Screen 18,150 ohms See R-F Screen
1 Detector Plate 32,541.5 ohms See R-F Plate
1 Detector Plate to '80 Fil 93.5 ohms TC-1 IF Tr.
Oscillator Control Grid 41,500 ohms BLC-Osc. Grid Cir. (0074)

Oscillator Cathode 1,500 ohms BC-Osc K-Y (.1 mfd)
Oscillator Plate 18,151 ohms BC-Osc K-Y (.1 mfd)
Osc Plate and Det Screen 1 ohm See R-F Screen

IF Control Grid (all models) 500,041.5 ohms BC-Y (.5 mfd)
IF Control Grid- AVC Plate (early) 121.5 ohms TC-1 IF Tr See
IF Screen Grid 18,150 ohms See RF Screen
IF Plate 32,491.5 ohms See 1 Detector Plate
IF Plate - '80 Fil 41.5 ohms TC-2 IF Tr. Pri
AVC Control Grid (early) 7,230,285 ohms BLC- 1 P- AVC Cg(9 mmfd)
BC-5 meg - AVC H (.1 mfd)
BC-1 meg- Y (.1 mfd)
FC-'80 Anode -80 F(2 mfd)
FC Filter chk-80 F(4 mfd)
BC-AVC K-Y (.5 mfd)
BC-Spkr divides tap- Y
BC-AVC K-AVC P(.0024 mfd)
See early model
AVC Control Grid (late) 4,230,285 ohms BC-AVC K-AVC P
AVC Cathode 270,000 ohms BC-AVC K-Y

Peak Frequency = 175 KC

110 VOLT A. C. LINE	(Values Control Setting Phase Not Affect Voltages)							
Medium No.	Cathode to Heater Volts D. C.	Cathode or Filament to Control Grid Volts. D. C.	Cathode or Filament to Screen Grid Volts. D. C.	Cathode or Filament to Plate Grid Volts. D. C.	Plate Current M. A.	Screen Current M. A.	Heater or Filament Volts. A. C.	
1	2	*0.1	275	205	5.0	0.5	2.2	
2	8	0	60	60	5.0	—	2.2	
3	7	7.0	200	200	0.5	0.1	2.2	
4	2	*0.1	75	205	5.0	0.5	2.2	
5	0	0	—	25	0	—	2.2	
6	20	*0.1	—	180	0.5	—	2.2	
7	—	10	210	205	25	—	2.2	
8	—	10	210	205	25	—	2.2	

* Not for reading due to resistance in circuit.

MODEL RE-18-A
Parts List

R. C. A. VICTOR CO., INC.

RCA Victor Radiola Electrola RE-18A is a nine-tube combination super-heterodyne radio receiver and electric phonograph. Except for the cabinet and tuning dial, the RE-18A is similar to the RE-18. A reference to the RE-18 service notes should be made for information relative the circuits and similar data. The replacement parts are listed below.

ELECTRICAL SPECIFICATIONS

Voltage Rating.....105-125 Volts
 Frequency Rating.....25, 30, 50 and 60 Cycles
 Power Consumption.....25, 30 and 50 Cycles
 170 Watts, 60 Cycles 160 Watts
 Type of Circuit.....Super-Heterodyne using
 Super-Control Radiotrons and Push-pull Pen-
 tode output stage.
 Type and Number of Radiotrons...2 RCA-935,
 3 UY-227, 1 UY-224, 1 UX-280, 2 RCA-247—
 Total, 9
 Number of Radio Frequency Stages.....1
 Type of First Detector...Tuned Input Grid Bias
 Number of Intermediate Stages.....1
 Type of Second Detector.....Power Grid Bias
 Type of Automatic Volume Control...UY-227
 Controlled by signal voltage in turn controlling
 bias on R. F. and I. F. tubes

Type of Manual Volume Control.....Potenti-
 ometer used to regulate input to second de-
 tector
 Type of Tone Control...Variable resistance in
 series with capacitor connected across grids of
 output stage. Capacitor tunes transformer at
 "low" position
 Number of Audio Stages (Radio).....1
 Number of Audio Stages (Phonograph).....2
 Type of Magnetic Pick-up.....Low Impedance
 Type of Tone Arm.....Inertia
 Diameter of Turntable.....12 inches
 Type of Rectifier.....Full Wave
 Type of Loudspeaker.....8" Electro-Dynamic
 Undistorted Output.....4.0 Watts

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
RECEIVER ASSEMBLY					
2563	Resistor—6,000 ohms—Carbon type—1 watt—Pack- age of 5.....	\$3.00	3056	Shield—Radiotron shield—6 used—Package of 2.....	\$0.50
2730	Resistor—18,000 ohms—Carbon type—1 watt— Package of 5.....	2.00	3076	Resistor—1 megohm—Carbon type—½ watt— Package of 5.....	2.50
2734	Capacitor—745 mmfd.—Package of 5.....	2.20	3077	Resistor—30,000 ohms—Carbon type—½ watt— Package of 5.....	2.50
2746	Socket—Dial lamp socket.....	.50	3078	Resistor—10,000 ohms—Carbon type—½ watt— Package of 5.....	2.50
2747	Cap—Grid contactor cap—Package of 5.....	.50	3079	Resistor—40,000 ohms—Carbon type—½ watt— Package of 5.....	2.50
2749	Capacitor—2400 mmfd.....	1.50	3085	Capacitor—400 mmfd.....	.60
2875	Knob—Tuning control, volume control or tone con- trol knob—Package of 5.....	1.50	3089	Board—Terminal board complete with 5 terminals.....	.50
2882	Socket—Five contact Radiotron socket complete with insulator—8 used.....	.50	3091	Board—Resistor board complete less resistors and capacitors.....	1.00
2963	Resistor—8,000 ohms—Carbon type—1 watt— Package of 5.....	2.50	3092	Volume control—Volume control complete with mounting nut.....	1.50
2968	Socket—Four contact Radiotron socket complete with insulator—1 used.....	.50	3093	Tone control—Tone control complete with mounting nut.....	1.90
3024	Capacitor—9 mmfd.—Package of 2.....	.50	3095	Coil—R. F. coil.....	1.90
3046	Resistor—190,000 ohms—Carbon type—½ watt— Package of 5.....	2.50	3096	Coil—1st detector and oscillator coil complete with mounting bracket.....	3.55
3047	Resistor—1,500 ohms—Carbon type—½ watt— Package of 5.....	2.50	3098	Capacitor—0.008 mfd.....	.50
3048	Resistor—500,000 ohms—Carbon type—½ watt— Package of 5.....	2.50	3099	Capacitor—0.005 mfd.....	.75
3049	Resistor—150 ohms—Carbon type—½ watt—Pack- age of 5.....	2.50	6179	Terminal—Single ground terminal with screw com- plete with mounting rivet—Package of 5.....	.50
3050	Resistor—14,000 ohms—Carbon type—3 watt.....	.60	6188	Resistor—2 megohm—Carbon type—½ watt— Package of 5.....	2.00
3055	Cushion—Receiver chassis sponge rubber cushion— Package of 4.....	.50	6189	Bracket—Dial lamp bracket and indicator—Package of 2.....	.65
			6190	Shaft—Tuning dial shaft complete with 3 washers— —Package of 5.....	.85

R. C. A. VICTOR CO., INC.

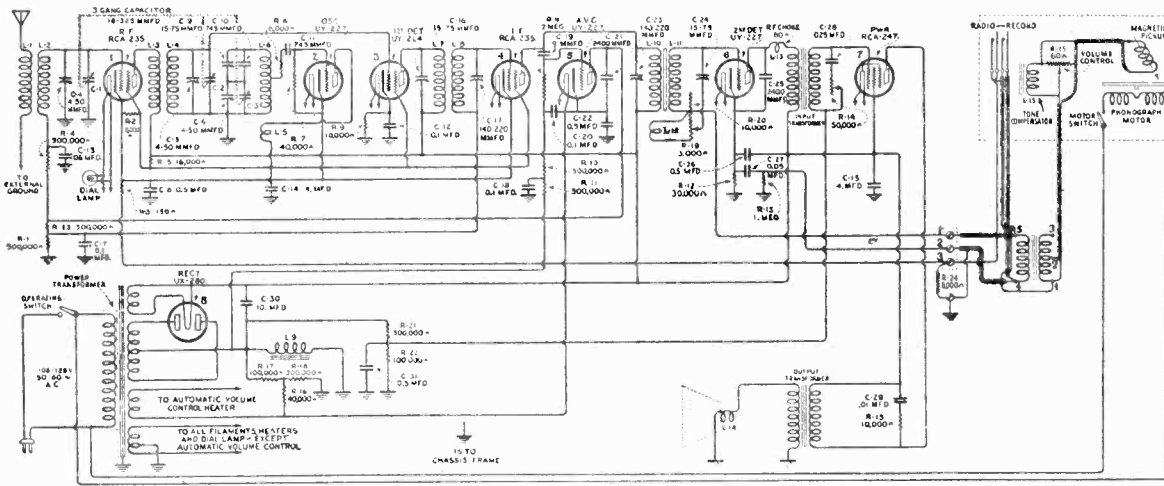
MODEL RE-13-A
Parts List

REPLACEMENT PARTS—Continued

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
RECEIVER ASSEMBLY—Continued					
6191	Cord—Condenser drum drive cord—Package of 5	\$0.55	6119	Stud—Motor hanging stud—Package of 6	\$0.50
6192	Spring—Condenser drum drive cord tension spring—Package of 10	.50	6120	Screw—For holding turntable spindle bearing and grease cap—Package of 10	.50
7054	Cord—Power cord	1.00	6121	Bearing—Turntable spindle bearing and grease cap	1.10
7062	Capacitor—Adjustable capacitor—15-70 mfd.	1.00	6215	Escutcheon—Shift lever speed escutcheon plate with mounting screws—Package of 2	.70
7266	Transformer—1st intermediate transformer	3.00	6216	Rod—Automatic brake trip rod with nut—Package of 5	.50
7267	Transformer—2nd intermediate transformer	3.00	6221	Cover—Pickup cover	.75
7268	Coil—Detector choke coil complete with mounting rivet	.60	6222	Pickup—Pickup unit complete	12.50
7269	Capacitor—Comprising one 2.0 mfd., one 4.0 mfd., four 0.5 mfd., two 1.0 mfd., five 0.1 mfd. and one 0.05 mfd. capacitor in metal container	7.25	6224	Receptacle—Tungstone needle box holder	.75
7270	Reactor—Filter reactor	4.00	6232	Box—Needle box with lid—Package of 2	.90
7271	Transformer—Interstage transformer	4.25	6237	Holder—Twin needle holder with mounting screws	.75
7272	Transformer—Power transformer—105-125 volts, 50-60 cycles	12.00	6238	Transformer—Input transformer	3.10
7273	Capacitor—Comprising one 4.0 mfd., one 6.0 mfd., four 0.5 mfd., two 1.0 mfd., five 0.1 mfd., and one 0.05 mfd. capacitors in metal container	10.00	7084	Cover—Turntable cover	.50
7274	Transformer—Power transformer—105-125 volts—25-40 cycles	15.00	7151	Back—Pickup housing back	.50
7275	Transformer—Power transformer—220 volts—50-60 cycles	10.00	7305	Gear—Gear reducing unit complete	4.50
7438	Capacitor—Variable tuning capacitor	5.20	7332	Cable—Main cable from receiver to input transformer, volume control and radio record switch	2.30
7439	Drum—Tuning condenser drive drum with set screw—Complete with 3 dial scale mounting nuts	.50	7387	Reactor—Tone compensating reactor with bracket	.85
7440	Scale—Dial and dial scale	.75	7388	Spindle—Turntable spindle with fibre gear—110 volts or 220 volts—60 cycles	6.00
8871	Support—Receiver chassis metal mounting support—Package of 4	.75	7389	Rotor and shaft—110 volts or 220 volts—60 cycles	9.00
LOUDSPEAKER ASSEMBLY					
3237	Speaker mounting screw assembly—Comprising 4 screws, 8 washers, 8 nuts and 4 eyelets—Package of 1 set	.50	7390	Motor mounting washer and springs—Comprising 3 "C" washers, 9 cup washers and 6 springs—Package of 1 set	.75
7257	Coil assembly—Comprising field coil, cone bracket and magnet	6.00	7391	Volume control—Record volume control complete with mounting nut and washer	1.35
8559	Ring—Cone retaining ring	.80	7393	Block—Pickup connector block and wire	.90
8601	Cone—Speaker paper cone—Package of 5	15.00	7400	Spindle—Turntable spindle with fibre gear—25 cycles	8.00
MOTOR BOARD ASSEMBLY					
X-13	Board—Motor board less equipment	5.85	7401	Rotor and shaft—25 cycles	10.00
2614	Switch—Automatic brake switch	1.40	7402	Spindle—Turntable spindle with fibre gear—30 cycles	8.00
2620	Cushion—Pickup rubber cushions—Comprising 1 damper and two pivot cushions—Package of 5 sets	1.25	7403	Rotor and shaft—30 cycles	10.00
2767	Spring—Pickup magnet retaining spring—Package of 10	.50	7443	Rotor and shaft—110 volts or 220 volts—50 cycles	9.00
2768	Armature—Pickup armature	.50	7444	Spindle—Turntable spindle with fibre gear—110 volts or 220 volts—50 cycles	6.00
2770	Plate—Pickup damper plate—Package of 5	.50	8795	Motor—Motor complete—110 volts—60 cycles	19.85
2771	Screw—Pickup damper plate mounting screw—Package of 10	.50	8800	Motor—Motor complete—110 volts—25 cycles	24.65
2875	Knob—Volume control and record-radio switch knob—Package of 5	1.50	8801	Motor—Motor complete—110 volts—30 cycles	24.65
2908	Spring—Pawl carrier spring—Package of 10	.50	8856	Motor—Motor complete—110 volts—50 cycles	19.85
3052	Screw assembly—Pickup pole shoe mounting screw assembly—Comprising screw, nut and washer—Package of 10 sets	.50	8872	Lever—Shift lever complete with mounting screws	1.60
3157	Gear—Driving gear—Located on turntable spindle above top plate	1.00	8873	Brake—Automatic brake complete with mounting screws and washers	3.50
3159	Friction brake—Gear reducing friction brake spring with pad—Complete with mounting rivet—Package of 4	2.00	8876	Support—Lid support	2.00
3161	Spring—Shift lever spring—Package of 5	1.20	8877	Turntable—Turntable with cover	4.60
3167	Magnet—Pickup magnet	2.60	8880	Arm—Pickup arm complete less pickup unit	6.00
3169	Pole shoe—Pickup pole shoe—R. H.	1.45	8887	Motor—Motor complete—220 volts—60 cycles	19.85
3170	Pole shoe—Pickup pole shoe—L. H.	1.45	8888	Motor—Motor complete—220 volts—50 cycles	19.85
3205	Screw—Pickup needle holding screw—Package of 10	.80	10174	Springs—Automatic brake springs—Set of 4 springs—Package of 2 sets	.50
3207	Screw—Pickup cover mounting screw—Package of 10	.50	10184	Plate—Automatic brake trip plate complete with screws—Package of 5	.60
3208	Screw assembly—Pickup mounting screw assembly—Comprising screw, nut and washer—Package of 10	.60	CABINET ASSEMBLY		
3211	Washer—Turntable spindle leather washer—Package of 10	.50	X-14	Board—Baffle board and grille cloth	1.30
3224	Switch—Record-Radio switch complete with mounting nut and washer	1.35	X-16	Stretcher	4.70
3278	Bearing—Rotor shaft fibre thrust bearing and cork button—Package of 10	.50	X-17	Foot	1.00
3279	Screw and nut—Rotor shaft thrust bearing adjusting screw and nut—Package of 10	.50	X-18	Leg	3.55
3280	Washer—Metal washer—Located on turntable spindle underneath gear reducing unit—Package of 20	.50	X-19	Lid	12.00
3281	Pawl—Gear reducing pawl with mounting stud	.50	X-21	Overlay—Front top rail end overlay—R. H. or L. H.	1.25
			X-22	Overlay—Front top rail center overlay	2.65
			X-23	Mouldings—Control panel mouldings—Package of 1 set	1.60
			X-85	Escutcheon—Tuning dial escutcheon	1.15
			X-86	Panel—Control panel	6.90
			X-87	Doors—R. H. and L. H. doors complete less door pulls and hinges—Package of 1 set	8.00
			X-88	Mouldings—Door mouldings for R. H. and L. H. doors—Package of 1 set	3.00
			2776	Catch—Door catch and strike with nail—Package of 2 sets	.50
			3156	Label—Metal trade mark label—Package of 5	2.50
			6210	Hinge assembly—Door hinge assembly—Comprising 4 hinges and 16 mounting screws—Package of 1 set	.90
			6211	Pull—Door pull with mounting screw—Package of 4	1.20
			6219	Hinge—Cabinet lid hinge complete with mounting screws—Package of 2	.50
			6236	Support—Metal screen support	.50
			9:10	Cabinet—Cabinet complete less equipment	83.00
			10901	Spring—Lid support spring—Package of 2	.50

MODEL RE-19 AC (AVC)
Schematic
Chassis

R. C. A. VICTOR CO., INC.



Schematic Circuit

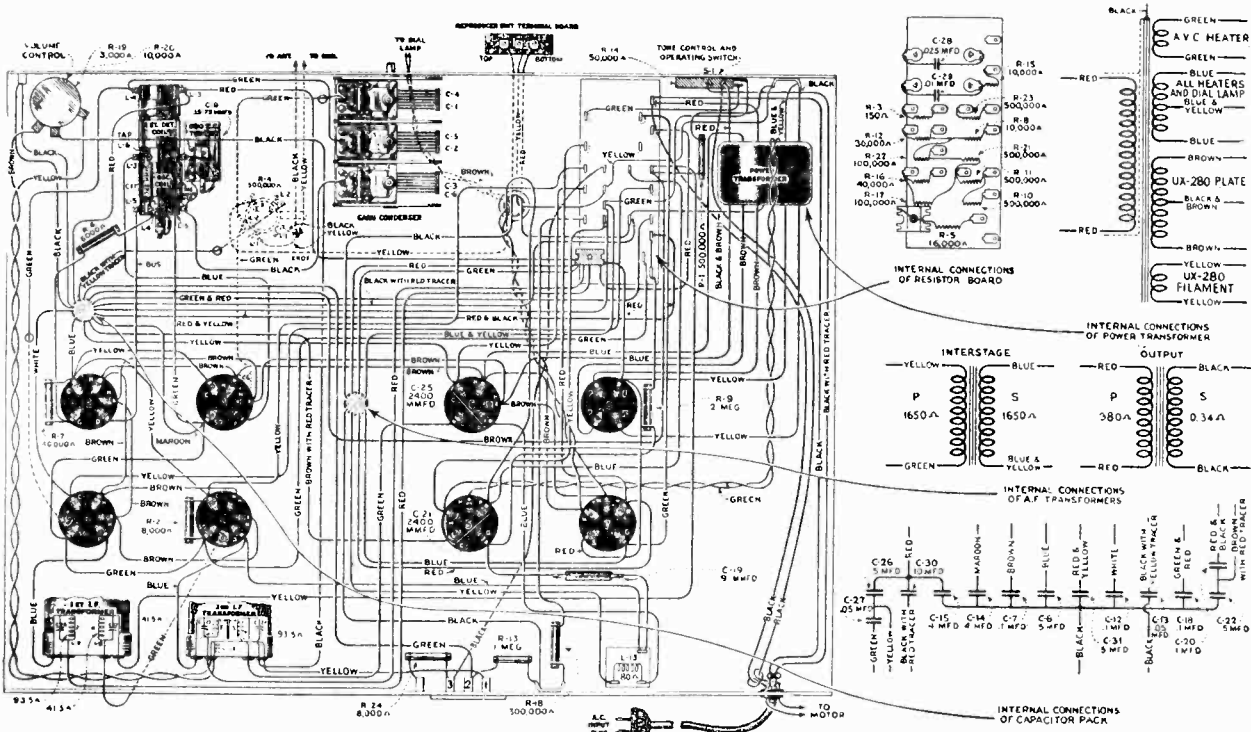
Models RE-19 (1932)

IF PEAK 175 KC. Voltage Rating..... 105-125 Volts
Frequency Rating..... 25, 30, 50 or 60 Cycles
Power Consumption..... 25 ~ 135 Watts, 30 ~ 140 Watts, 50 ~ 135 Watts, 60 ~ 130 Watts

1 DET	IF	A.V.C.	AF
24A	35	27	47
OSC	RF	2 DET	RECT
27	35	27	80

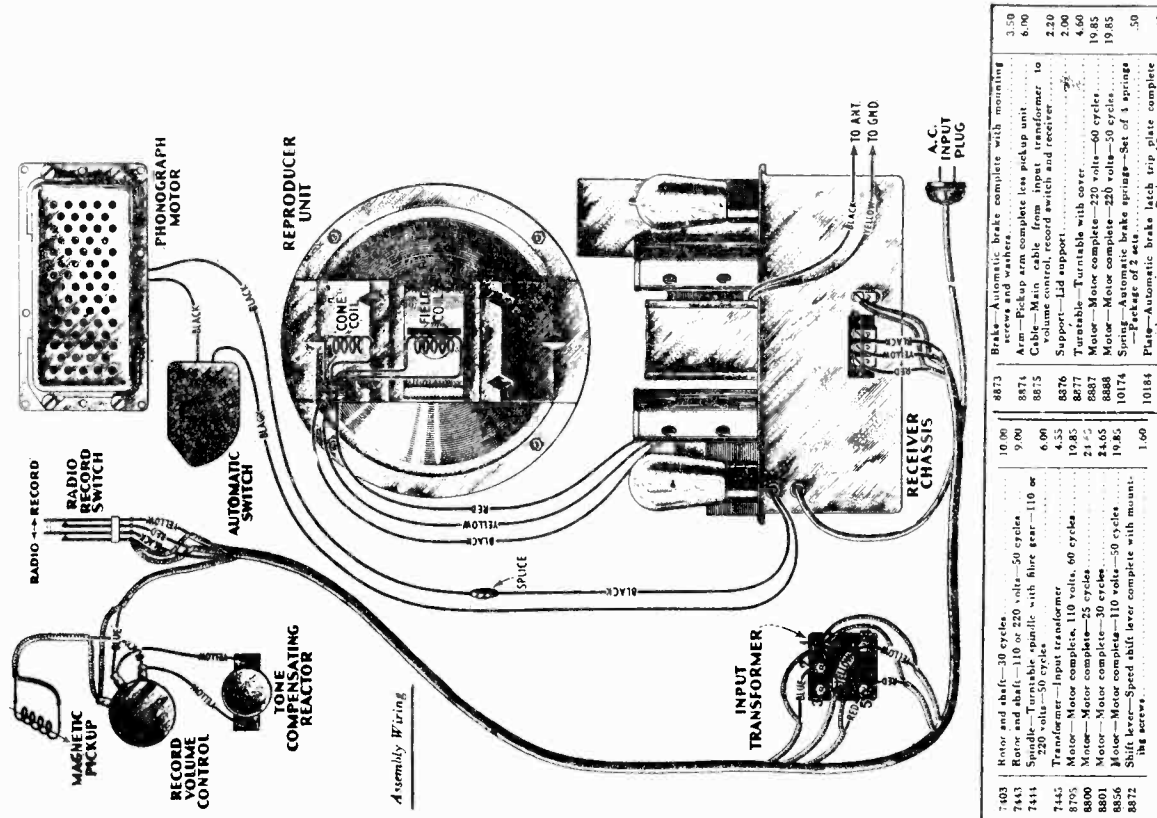
FRONT

RCA Victor RE-19 is an eight tube Super-Heterodyne combination radio receiver and electric phonograph. The chassis used is similar to the R-12 with the exception that terminals for attaching a magnetic pickup are provided. The motor board assembly is similar to the RE-18. Reference to previous RCA Victor Service Notes should be made for service information relative to these assemblies. The replacement parts are given below and the diagrams on the following pages.



R. C. A. - VICTOR CO., INC.

MODEL RE-19 AC (AVC)
Assembly Wiring
Parts List

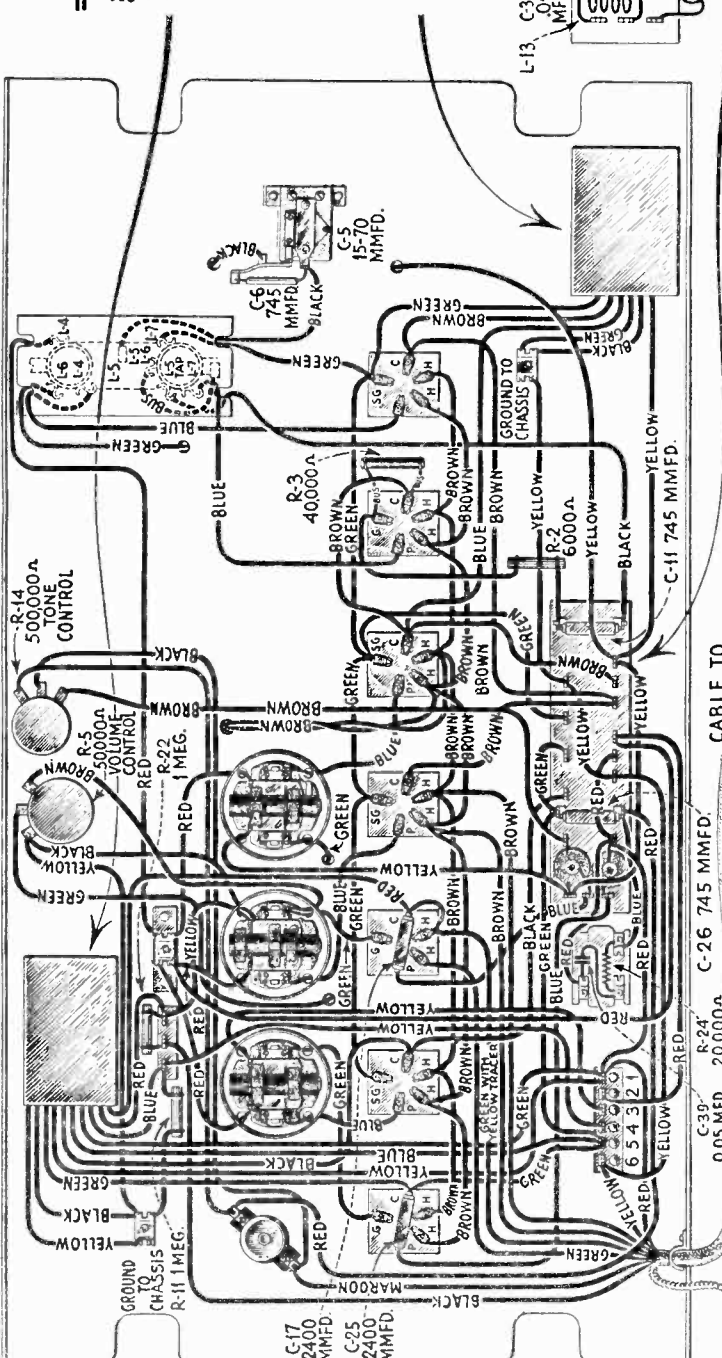
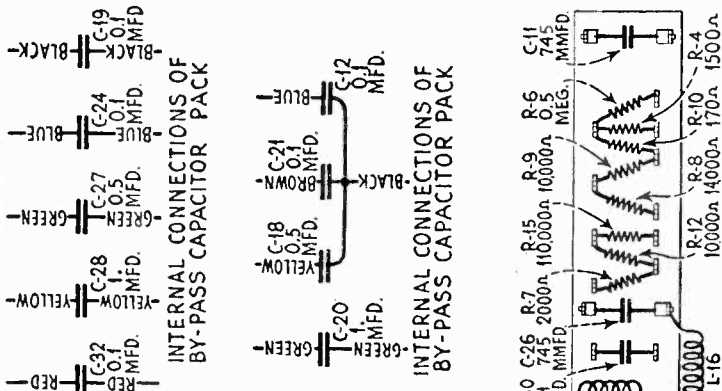


Part No.	Description	Quantity	Notes
2163	Resistor—6,000 ohms—Carbon type—1 watt—	1	
2214	Capacitor—745 mfd.—Package of 5	5	
2216	Socket—Dial lamp socket—	1	
2217	Cap—Grid condenser cap—Package of 5	5	
2219	Capacitor—2,400 mfd.—	1	
2275	Knob—Tuning control, volume control or tone control knob—Package of 5	5	
2282	Shield—Control grid shield—Complete with insulator—	1	
2963	Resistor—8,000 ohms—Carbon type—1 watt—Package of 5	5	
2968	Socket—Four contact Radatron socket complete	1	
2970	Resistor—500,000 ohms—Carbon type—1 watt—Package of 5	5	
3003	Cushion—Receiver strong rubber cushion—Package of 5	5	
3024	Capacitor—10,000 ohms—Carbon type—1 watt—Package of 5	5	
3048	Resistor—500,000 ohms—Carbon type—1/2 watt—Package of 5	5	
3049	Shield—Radatron shield—4 mfd.—Package of 2	2	
3076	Resistor—1 megohm—Carbon type—1/2 watt—Package of 5	5	
3077	Resistor—30,000 ohms—Carbon type—1/2 watt—Package of 5	5	
3078	Resistor—10,000 ohms—Carbon type—1/2 watt—Package of 5	5	
3079	Resistor—40,000 ohms—Carbon type—1/2 watt—Package of 5	5	
3081	Resistor—10,000 ohms—Carbon type—3 watts—	1	
3092	Volume control—Volume control complete with mounting nut	1	
3095	Coil—R. F. coil complete with mounting bracket	1	
3234	Tone control—Tone control complete with mounting nut	1	
3235	Cut-off First detector and oscillator coil	1	
3237	Coil—R. F. coil with volume control—Complete with mounting rivet—Package of 5	5	
6179	Terminal—Slide terminal—Complete with mounting rivet—Package of 5	5	
6185	Resistor—100,000 ohms—Carbon type—1/2 watt—Package of 5	5	
6186	Resistor—300,000 ohms—Carbon type—1/2 watt—Package of 5	5	
6187	Resistor—300,000 ohms—Carbon type—1/2 watt—Package of 5	5	
6188	Resistor—2 megohm—Carbon type—1/2 watt—Package of 5	5	
6189	Bracket—Dial lamp bracket and indicator—	1	
6191	Cord—Tuning condenser drive cord—Package of 5	5	
6192	Spring—Dial drum drive cord tension spring—	1	
6214	Board—Magnetic pickup terminal board—Package of 2	2	
7054	Cord—Power cord	1	
7062	Capacitor—Adjustable capacitor—15-70 mfd.—	1	
7208	Transformer—0.01 mfd.	1	
7310	Transformer—First intermediate transformer—	1	
7312	Capacitor—100,000 ohms—Carbon type—1/2 watt—One 10.0 mfd., two 4.0 mfd., and four 0.1 mfd. capacitors in metal container.	1	
7343	Transformer—Audio transformer—	1	
7344	Transformer—Power transformer—105-125 volts, 50-60 cycle—	1	
7348	Board—Receiver board complete less resistors and capacitors	1	
7362	Capacitor—0.025 mfd.	1	
7338	Capacitor—Variable tuning capacitor	1	
7339	Drum—Dial drive drum with set screws complete	1	
7440	Scale—Dial and dial scale	1	
8770	Transformer—Power transformer—105-125 volts, 25-40 cycle	1	
8771	Transformer—Power transformer—220 volts, 60 cycle	1	
8837	Support—Receiver mesh mounting support—Package of 4	4	
3095	LOUISPICKER ASSEMBLY Screw assembly—Speaker mounting screw assembly—Comprising 4 screws, 4 washers, and 8 nuts—Package of 1 set—	1	
7345	Capacitor—10,000 ohms—Carbon type—1 watt—	1	
8601	Capacitor—2,400 mfd.—	1	
8559	Ring—Speaker cone retaining ring—	1	
X 68	Board—Motor board	1	
2614	Switch—Automatic brake switch	1	
2620	Cushion—Pickup rubber cushion—Comprising 5 screws, 5 washers, and 5 nuts—Package of 1 set—	1	
2767	Spring—Pickup magnet retaining spring—Package of 10	10	
2768	Armature—Pickup armature	1	
2770	Plate—Pickup damper plate—Package of 5	5	
2771	Spring—Pickup spring—Package of 5	5	
2875	Knob—Record switching knob—Package of 5	5	
2908	Spring—Gear reducing pawl spring—Package of 10	10	
3052	Spring—Pickup pole shoe mounting screw—Package of 10	10	
3157	Gear—Driving gear with set screw—Located on turntable spindle above top plate	1	
3159	Friction brake—Gear reducing brake spring and nut—Complete with mounting rivet—Package of 4	4	
3161	Spring—Shift lever spring—Package of 5	5	
3167	Magnet—Pickup magnet	1	
3168	Coil—Pickup coil	1	
3169	Pole shoe—Pickup pole shoe—R.H.	1	
3170	Pole shoe—Pickup pole shoe—L.H.	1	
3172	Receptacle—Functioning needle box receptacle	1	
3205	Screw—Pick box hole holding screw—Package of 10	10	
3207	Screw—Pickup cover mounting screw—Package of 10	10	
3208	Screw assembly—Pickup mounting screw assembly—Comprising one screw, one nut, and one washer—Package of 10	10	
3211	Washer—10 turntable spindle leather washer—Package of 10	10	
3214	Switch—Record switch complete with mounting washer and nut	1	
3218	Bearing—Ignition shield fiber thrust bearing and cork	1	
3279	Screw and nut—Rotor shaft thrust bearing adjusting screw and lock nut—Package of 10	10	
3280	Washer—Metal washer—Located on turntable spindle—Undermain gear reducing unit—Package of 20	20	
3281	Pawl—Gear reducing pawl complete with mounting stud	1	
6119	Stud—Motor hanging stud—Package of 6	6	
6120	Screw—For holding turntable spindle bearing and bearing—Package of 10	10	
6121	Bearing—Turntable spindle bearing and grease cap	1	
6215	Bracket—Shift lever speed escutcheon plate—	1	
6216	Block—Spline with mounting screw—Package of 2—	2	
6217	Package of 5	5	
6218	Screw and washer—Motor board mounting screw and washer—Package of 10	10	
7084	Cover—Turntable	1	
7085	Bracket—Pickup housing bracket	1	
7305	Resistor—Compensating reactor with mounting bracket	1	
7388	Spindle—Turntable spindle with fiber gear—110 or 110 or 220 volt—50 cycles	1	
7389	Rotor and shaft—110 or 220 volt—60 cycles	1	
7390	Spring and washer—Motor mounting spring and washers—Comprising 9 cup washers, 3 screws, and 6 springs—Package of 1 set	1	
7393	Block—Spline with mounting screw and wire	1	
7409	Spindle—Turntable spindle with fiber gear—55 cycle	1	
7401	Rotor and shaft—25 cycles	1	
7402	Spindle—Turntable spindle with fiber gear—30 cycle	1	

10.00	Motor and shaft—30 cycles	7.03	Motor and shaft—110 or 220 volt—50 cycles
9.90	Spindle—Turntable spindle with fiber gear—110 or 220 volt—50 cycles	7.414	Spindle—Turntable spindle with fiber gear—110 or 220 volt—50 cycles
6.35	Turntable—Input transformer	19.85	Motor—Motor complete—25 cycles
4.60	Motor—Motor complete—40 cycles	24.65	Motor—Motor complete—50 cycles
19.85	Motor—Motor complete—60 cycles	10.85	Motor—Motor complete—110 volt—50 cycles
19.85	Motor—Motor complete—110 volt—50 cycles	10.14	Spring—Automatic brake spring—Set of 4 springs—Package of 2
1.60	Plate—Automatic brake latch trip plate—Complete with mounting screws—Package of 5	10.184	Plate—Automatic brake latch trip plate—Complete with mounting screws—Package of 5

MODEL RE-20 Electrola
Chassis - Parts List

R. C. A. - VICTOR CO. INC.



INTERNAL CONNECTIONS OF BY-PASS CAPACITOR PACK

INTERNAL CONNECTIONS OF BY-PASS CAPACITOR PACK

RESISTOR BOARD CONNECTIONS

CABLE TO AMPLIFIER

GROUND TO SHIELD

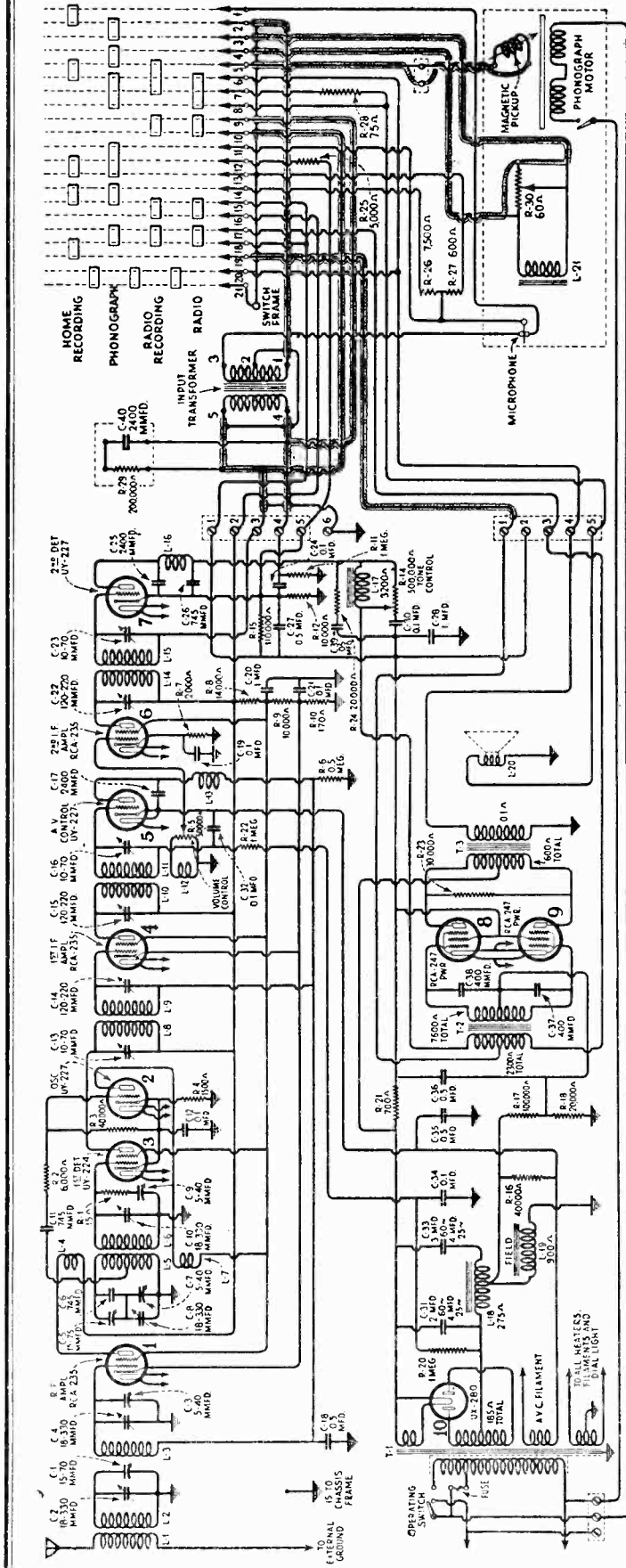
GROUND TO CHASSIS

Receiver Assembly Wiring Diagram

Stock No.	DESCRIPTION	List Price	Part No.	DESCRIPTION	List Price
2563	RECEIVER ASSEMBLY		3153	Resistor—1500 ohms—Carbon type—1 watt—Package of 5.	2.75
2726	Resistor—6,000 ohms—Carbon type—1 watt—Package of 5.	\$3.00	3154	Resistor—2,000 ohms—Carbon type—1 watt—Package of 5.	2.75
2731	Socket—Five contact Radiotron socket—Complete with insulator—7 used.	.70	3220	Resistor—15 ohms—Flexible wire type—Package of 5.	2.75
2732	Resistor—10,000 ohms—Carbon type—1 watt—Package of 5.	2.00	6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5.	2.00
2736	Resistor—110,000 ohms—Carbon type—1 watt—Package of 5.	2.00	6220	Capacitor—0.05 mfd.—Package of 5.	1.10
2749	Resistor—170 ohms—Carbon type—1 watt—Package of 5.	2.00	7062	Capacitor—Adjustable capacitor—15-70 mmfd.—2 used.	1.00
2970	Capacitor—2,400 mmfd.	1.50	7063	Capacitor—Adjustable capacitor 5-40 mmfd.—3 used.	1.00
3031	Resistor—500,000 ohms—Carbon type—1 watt—Three terminals.	2.50	7278	Coil—R. F. and link circuit coil.	2.50
3033	Board—Terminal board complete with insulator—Three terminals.	.50	7285	Capacitor pack—Comprising one 1.0 mfd., one 0.5 mfd., and two 0.1 mfd. capacitors in metal container—6 leads.	3.50
3045	Resistor—1 megohm—Carbon type—1/4 watt—Package of 5.	2.00	7286	Capacitor pack—Comprising one 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—10 leads.	4.50
3050	Resistor—10,000 ohms—Carbon type—1 watt—Package of 5.	2.50	7298	Capacitor—0.01 mfd.	.80
	Resistor—14,000 ohms—Carbon type—3 watt.	.60	7299	Capacitor—745 mfd.	.70

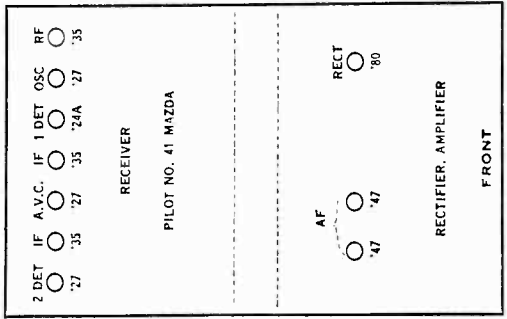
R. C. A. VICTOR CO., INC.

MODEL RE-20 Electrola Schematic



IF PEAK 175 KC.

Model RE-20, (1932)



Schematic Circuit

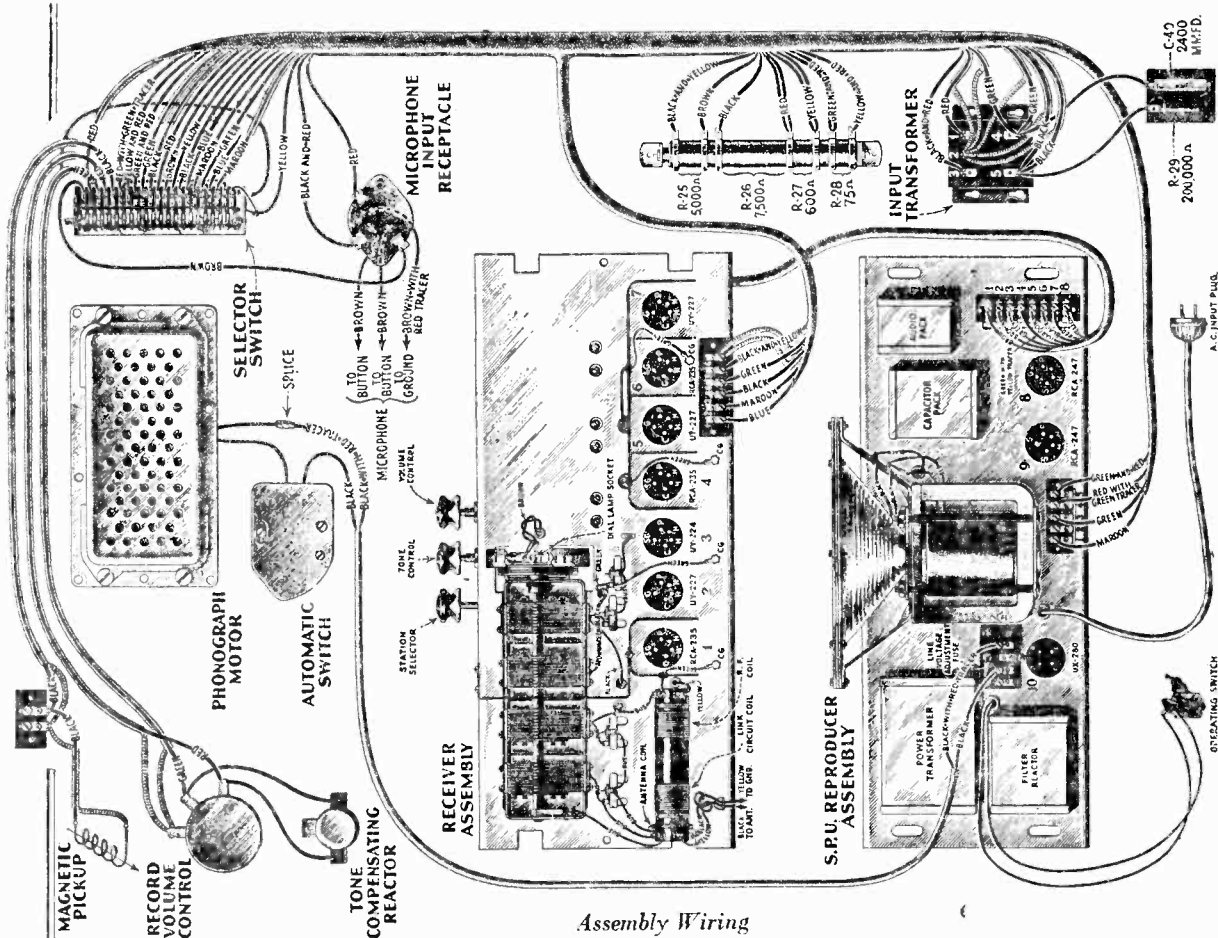
RCA Victor RE-20 is a ten tube De Luxe Super-Heterodyne combination radio receiver and electric phonograph. Except for the differences in cabinet and omission of the automatic record changing mechanism, the RE-20 is similar to the RAE-59.

Service work in conjunction with this model is similar to that of the R-50, R-55 and RAE-59. Reference to these Service Notes should therefore be made when such information is necessary. The replacement parts and the diagrams are given on the following pages.

Voltage Rating.....	105-125 Volts
Frequency Rating.....	25, 30, 50 and 60 Cycles
Power Consumption (Radio only).....	145 Watts
Power Consumption (Phonograph).....	160 Watts (Approximately)
Type of Circuit.....	A. V. C. Super-Heterodyne with Push-pull Pentode Output Stage
Type and Number of Radiotrons.....	3 RCA-235, 1 UY-224, 3 UY-227, 2 RCA-247, 1 UX-280—Total 10
Wattage Dissipation in Loudspeaker Field.....	10 Watts
Undistorted Output.....	4.0 Watts

MODEL RE-20 Electrola
Assembly Wiring

R. C. A. VICTOR CO., INC.



Assembly Wiring

Type of Magnetic Pickup..... Low Impedance
 Type of Tone Arm..... Inertia
 Diameter of Turntable..... 12 inches
 Type of Phonograph Motor..... Induction, running at synchronous speed
 Turntable Speed..... 78 and 33½ R. P. M.

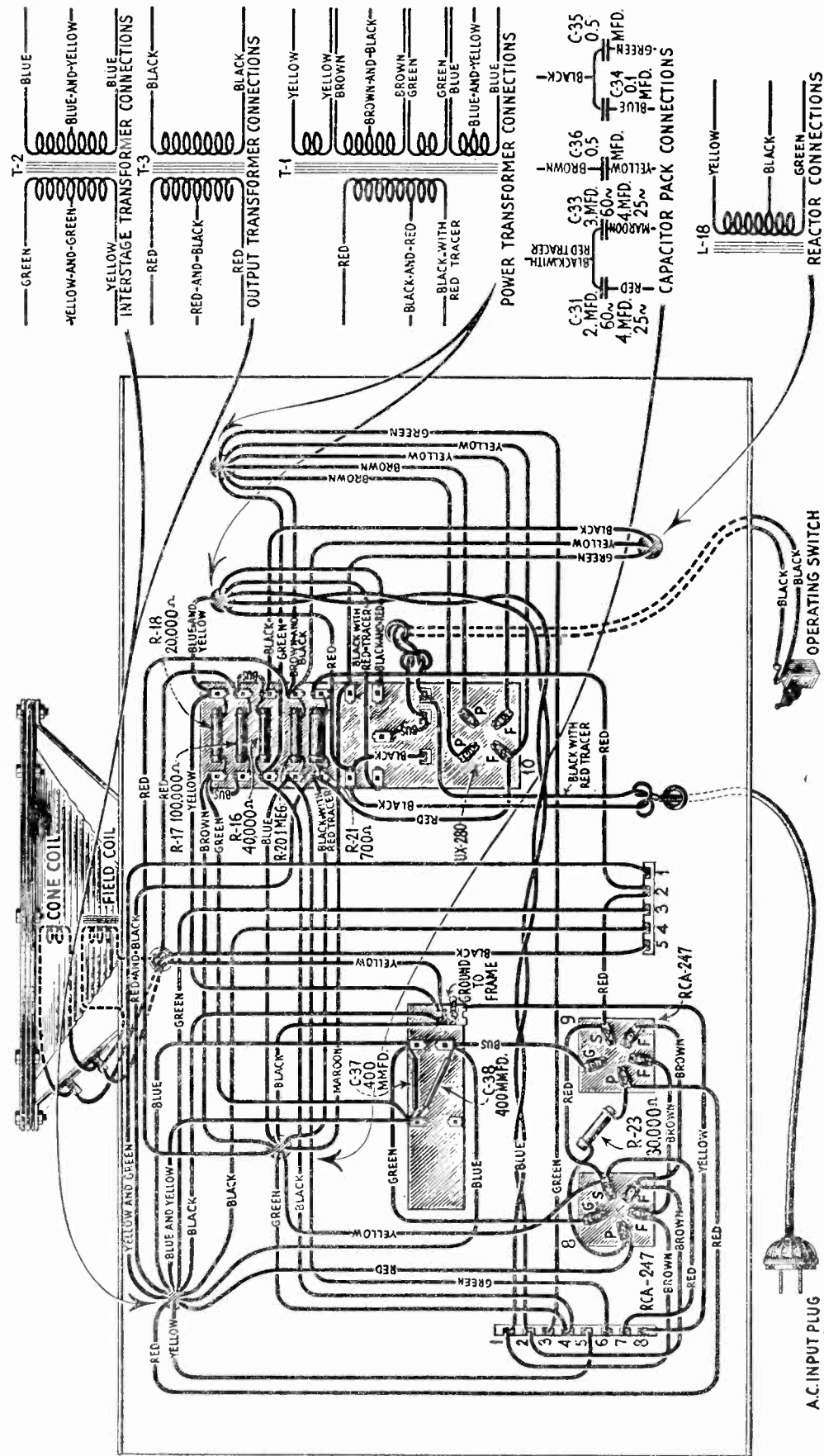
LOUDSPEAKER ASSEMBLY	
7292	Screw assembly—Speaker mounting screw assembly—Comprising two screws, two nuts, two washers and one plate—Package of 1 set..... .95
8558	Cone—Speaker paper cone..... 4.00
8559	Ring—Cone retaining ring..... .80
8713	Coil—Speaker field coil..... 5.00
MOTOR BOARD AND MISCELLANEOUS ASSEMBLIES	
2749	Capacitor—2400 mmfd..... 1.50
7327	Mechanism—Microphone mechanism complete with cord..... 14.95
7375	Resistor—13175 ohms tapped porcelain resistor..... 2.10
7387	Reactor—Tone compensating reactor complete with mounting bracket..... .85
7388	Spindle—Turntable spindle with fibre gear—110 volts or 220 volts—60 cycles..... 6.00
7389	Rotor and shaft—110 volts or 220 volts—60 cycles..... 9.00
6226	Transformer—Phono input transformer..... 3.75
6223	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5..... 2.50

6227	Resistor board assembly—Comprising one 200,000 ohms—Carbon type—½ watt resistor and one 2400 mmfd. tooth pick capacitor on board..... 1.35
6229	Cable—30" shielded red cable from selector switch to volume control—Package of 2..... .70
6230	Cable—30" shielded green cable from selector switch to volume control—Package of 2..... .70
6231	Cable—18" shielded black cable from selector switch to pickup terminal board—Package of 2..... .60
7400	Spindle—Turntable spindle with fibre gear—25 cycles..... 8.00
7401	Rotor and shaft—25 cycles..... 10.00
7443	Rotor and shaft—110 volts or 220 volts—50 cycles..... 9.00
7444	Spindle—Turntable spindle with fibre gear—110 volts or 220 volts—50 cycles..... 6.00
8795	Motor—Motor complete—110 volts—60 cycles..... 19.85
8800	Motor—Motor complete—110 volts—25 cycles..... 24.65
8856	Motor—Motor complete—110 volts—50 cycles..... 19.85
8887	Motor—Motor complete—220 volts—60 cycles..... 19.85
8888	Motor—Motor complete—220 volts—50 cycles..... 19.85

R. C. A. VICTOR CO., INC.

MODEL RE-20 Electrola
SPU Chassis

S. P. U. REPRODUCER ASSEMBLY		S. P. U. REPRODUCER ASSEMBLY	
2240	Resistor—30,000 ohms—Carbon type—1 watt.	3145	Resistor—700 ohms—Carbon type—3 watt.
2546	Fuse—Glass type—1.5 amperes—Package of 5.	6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5.
3015	Resistor—40,000 ohms—Carbon type—1 watt—Package of 5.	7290	Reactor—Filter reactor.
3038	Resistor—100,000 ohms—Carbon type—1 watt—Package of 5.	8710	Transformer—Power transformer—105-125 volts, 50-60 cycles.
3085	Capacitor—400 mmfd.	8711	Transformer—Audio transformer.
3099	Capacitor—0.005 mfd.	8712	Capacitor pack—Comprising one 2.0 mfd., one 3.0 mfd., one 0.1 mfd., and two 0.5 mfd. capacitors in metal container—50-60 cycles.
		8719	Transformer—Power transformer—105-125 volts, 25-40 cycles.
		8750	Transformer—Power transformer—220 volts, 50-60 cycles.
		8751	Capacitor pack—Comprising two 4.0 mfd., two 0.5 mfd. and one 0.1 mfd. capacitors in metal container.
		10907	Fuse—Glass type—3 amperes—Package of 5.



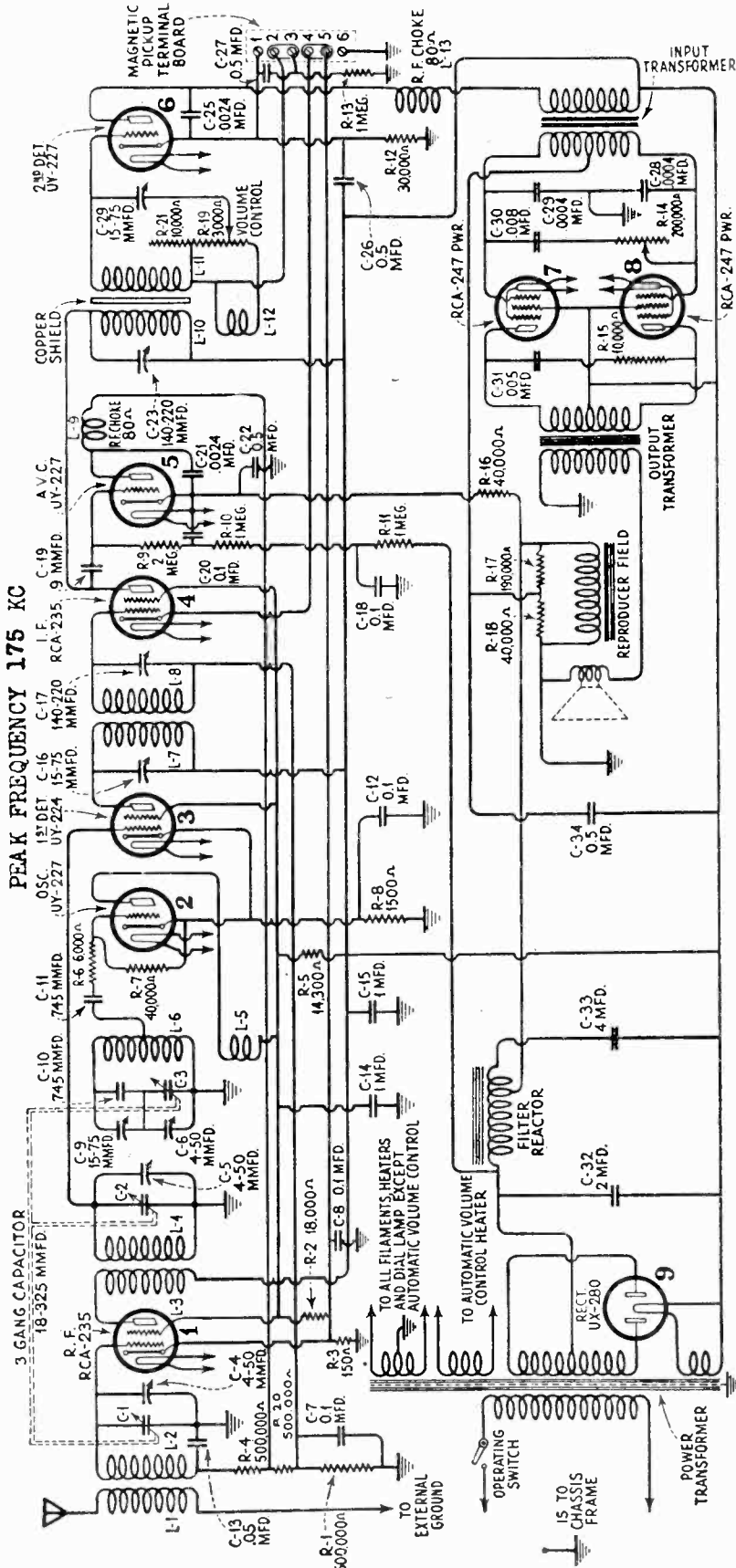
S. P. U. Reproducer Wiring Diagram

MODEL R-21
Schematic
Changes

R. C. A. - VICTOR CO., INC.

Voltage Rating 105-125 Volts
Frequency Rating 50-60 Cycles and
25-40 Cycles
Power Consumption 25-40 Cycles 140 Watts,
50-60 Cycles 135 Watts

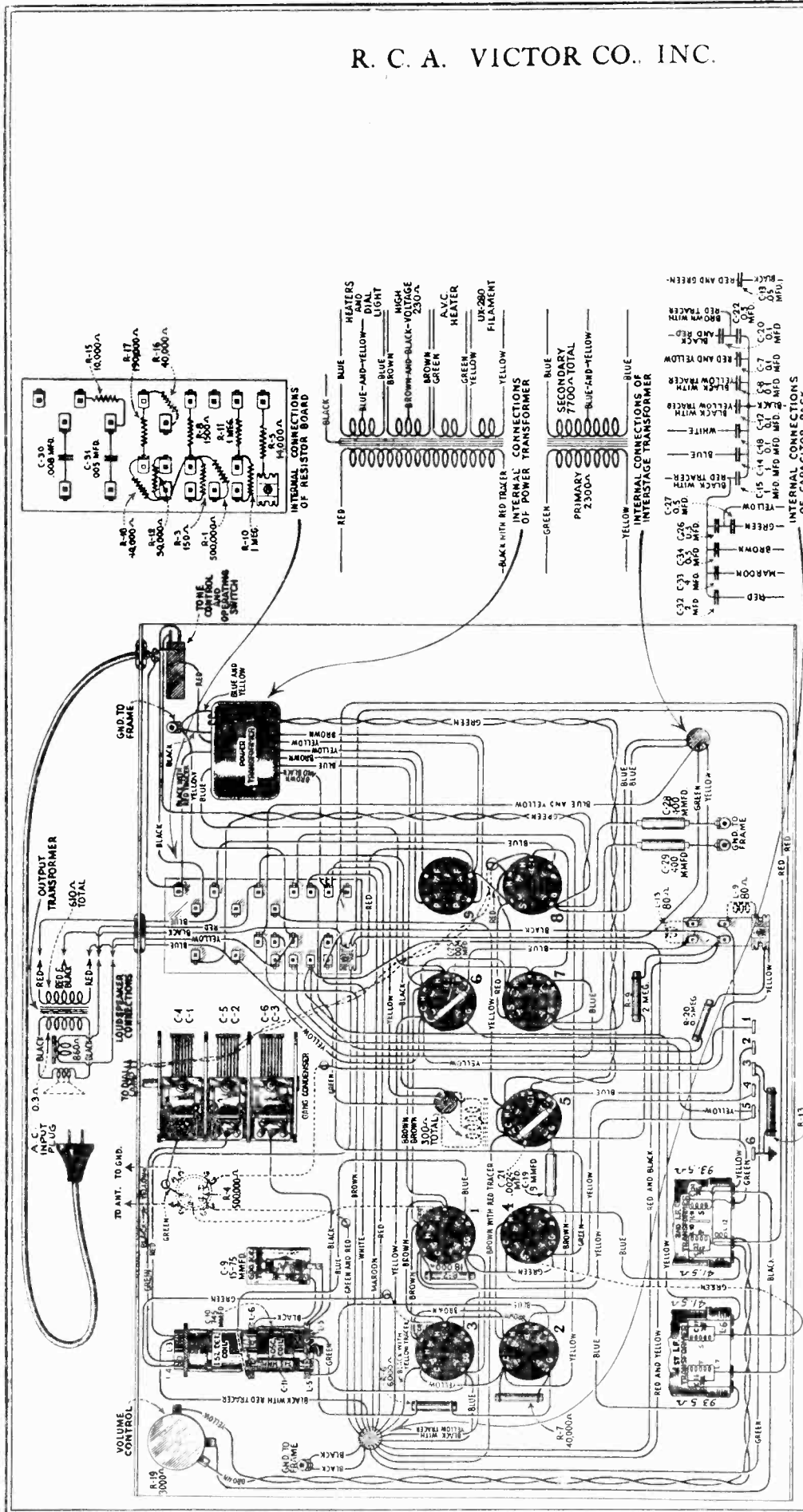
REPLACEMENT PARTS (Continued)	
3099	Capacitor—0.005 mfd.
3137	Knob—Tuning control, volume control and tone control knob—Package of 5.
6179	Terminal—Single ground terminal with set screw—Package of 5.
6186	Resistor—500,000 Ohms—Carbon type—Package of 5.
6188	Resistor—100,000 Ohms—Carbon type—Package of 5.
6189	Bracket—Dial lamp bracket and indicator—Package of 2.
6190	Shaft—Tuning condenser drive shaft complete with 3 washers—Package of 5.
6191	Core—Tuning condenser drive cord—Package of 5.
6192	Spring—Tuning condenser drive cord tension spring—Package of 10.
7054	Core—Power cord
7062	Capacitor—Adjustable capacitor—15-70 mmfd.
7266	Transformer—2nd intermediate transformer
7267	Transformer—1st intermediate transformer
7268	Coil—Choke coil
7269	Capacitor—Compensating caps 2.0 mfd., 1.0 mfd., 0.5 mfd., and one 0.05 mfd. capacitors in metal container.
7270	Reactor—Filter reactor
7271	Transformer—Interstage transformer—105-125 volts, 50-60 cycles.
7272	Transformer—Power transformer—105-125 volts, 25-40 cycles.
7273	Capacitor—Compensating caps 4.0 mfd., one 6.0 mfd., four 16.5 mfd., two 1.0 mfd., five 0.1 mfd., and one 0.05 mfd. capacitors in metal container—105-125 volts, 25-40 cycles.
7274	Transformer—Power transformer—105-125 volts, 25-40 cycles.
7275	Transformer—Power transformer—220 volts, 60 cycles.
7438	Capacitor—Variable tuning capacitor.



The chassis and loudspeaker used in Model R-21 is identical with that used in the R-11 except for the dial and scale. A reference to the R-11 Service Notes will therefore give any information necessary in reference to circuit diagram, voltage reading and other service information. One change should be noted in later production of R-11s and all R-21s and that is the change in value of Resistor R-9 from 5 Megohms to 2 Megohms.

R. C. A. VICTOR CO., INC.

MODEL RE-21
Chassis



REPLACEMENT PARTS

2563	Resistor—6,000 ohms—Carbon type—1 Watt—Package of 5	\$3.70
2730	Resistor—10,000 ohms—Carbon type—1 Watt—Package of 5	2.66
2731	Capacitor—715 pfd—Carbon type—50 V.Watt—Package of 5	2.50
2717	Cap—Grid capacitor cap.—Package of 5	.90
2719	Capacitor—2,100 mfd.—Package of 5	1.50
2882	Socket—5 pinaxet Radiotron socket—Complete with insulator—8 used	.50
2968	Socket—4 pinaxet Radiotron socket—Complete with insulator—5 used	.50
3046	Resistor—1,500 ohms—Carbon type—1/2 Watt—Package of 5	\$2.50
3017	Resistor—1,500 ohms—Carbon type—1/2 Watt—Package of 5	2.50
3048	Resistor—10,000 Ohms—Carbon type—1/2 Watt—Package of 5	2.50
3050	Resistor—150 Ohms—Carbon type—1/2 Watt—Package of 5	2.50
3050	Resistor—15,000 Ohms—Carbon type—1/2 Watt—Package of 5	.60
3053	Capacitor—9 mfd.—Package of 2	.50
3055	Quadron—Receiver class—single rib—let cushion—Package of 4	.50
3056	Shield—Radiotron shield—6 used—Package of 2	\$0.50
3076	Resistor—1 Megohm—Carbon type—1/2 Watt—Package of 5	2.50
3077	Resistor—30,000 Ohms—Carbon type—1/2 Watt—Package of 5	2.50
3078	Resistor—10,000 Ohms—Carbon type—1/2 Watt—Package of 5	2.50
3079	Resistor—10,000 Ohms—Carbon type—1/2 Watt—Package of 5	2.50
3085	Capacitor—400 mfd.	.40
3089	Internal Mfg. pickup mounting board—Complete with rivets	.30
3090	Board—A.V.C. and 2nd detector R.F. choke board—Less choke coils	.50
3091	Board—Resistor board complete less resistors and capacitors	1.00
3092	Volume Control—Volume control complete with mounting nut	1.50
3093	Tone Control—Tone control complete with mounting nut	1.90
3095	Coil—R.F. coil	1.00
3096	Coil—1st detector and oscillator coil	3.55
3098	Capacitor—0.001 mfd.	.50

MODEL R-21
Resistance Data

R. C. A. - VICTOR CO., INC.

All tubes removed from sockets and AG plug removed from power supply.
Pick up and field coil disconnected

From Chassis To
Aerial to ground post
Chassis to

Correct
40 ohms

Incorrect

2 Det Control Grid(Pickup Board Ter #2) 93.5 ohms
2 Det Control Grid to V.C. Arm 3,093.5-10,093.5 ohms
2 Det Cathode 30,000 ohms

Pickup Board Terminal 2 1,000,000 ohms
2 Detector Plate 34,830 ohms

From Chassis To
Correct
Incorrect

2 Detector Plate-'80 Fil 2,390 ohms
'47 Control Grid 43,850 ohms

'47 Control Grid to Control Grid 7,700 ohms

'47 Screen 32,450 ohms
'47 Screen - '80 Fil 0 ohm
'47 Plate 32,765 ohms
'80 Anode to Plate 610 ohms
'80 Anode to Anode 230,400 ohms
'80 Fil to chassis 230 ohms
'80 Fil to chassis 32,450 ohms

Across Speaker field 860 ohms

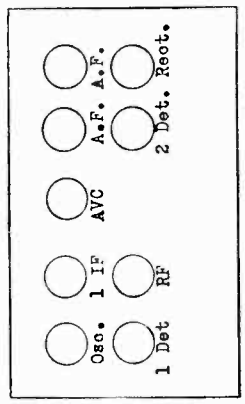
TC-Y
BC-Y (.1 mfd)
See R-F Screen
See R-F Plate
TC-1 If Tr.
BLC-Osc Grid.Cir.(.0074)
BC-Osc K-Y (.1 mfd)
BC-Osc K-Y (.1 mfd)
See R-F Screen
BC-Y (.5 mfd)
TC-1 IP Tr Sec
See RF Screen
TC-2 IF Tr. Pri.
BLC-1 P-AVC Cg(9mmfd)
BC-5 meg - AVC H(.1 mfd)
BC-1 meg-Y (.1 mfd)
FC filter ohk-80 F(4mfd)
BC-AVC K-Y (.5 mfd)
BC-Spkr div-tap -Y
BC-AVC K-AVC P(.0024mfd)
See early model
BC-AVC K-AVC P
BC-AVC K-Y
BC-AVC P-AVC K
See RF Control Grid

RF Cathode 150 ohms
RF Screen Grid 18,150 ohms
RF Plate 32,508 ohms

RF Plate to '80 Fil 58 ohms
1 Detector Control Grid 5 ohms
1 Detector Cathode 1,500 ohms
1 Detector Screen 18,150 ohms
1 Detector Plate 32,541.5 ohms
1 Detector Plate to '80 Fil 93.5 ohms
Oscillator Control Grid 41,500 ohms

Oscillator Cathode 1,500 ohms
Oscillator Plate 18,151 ohms
Osc Plate and Det Screen 1 ohm
IF Control Grid (all models) 500,041.5 ohms
IF Screen Grid 121.5 ohms
IF Plate 18,160 ohms
IF Plate - '80 Fil 32,491.5 ohms
AVC Control Grid (early) 41.5 ohms
AVC Control Grid (early) 7,230,285 ohms

AVC Control Grid (late) 4,230,285 ohms
AVC Cathode 270,000 ohms
AVC Plate 1,000,085 ohms



Line Voltage 110. Volume Control does not change voltages.

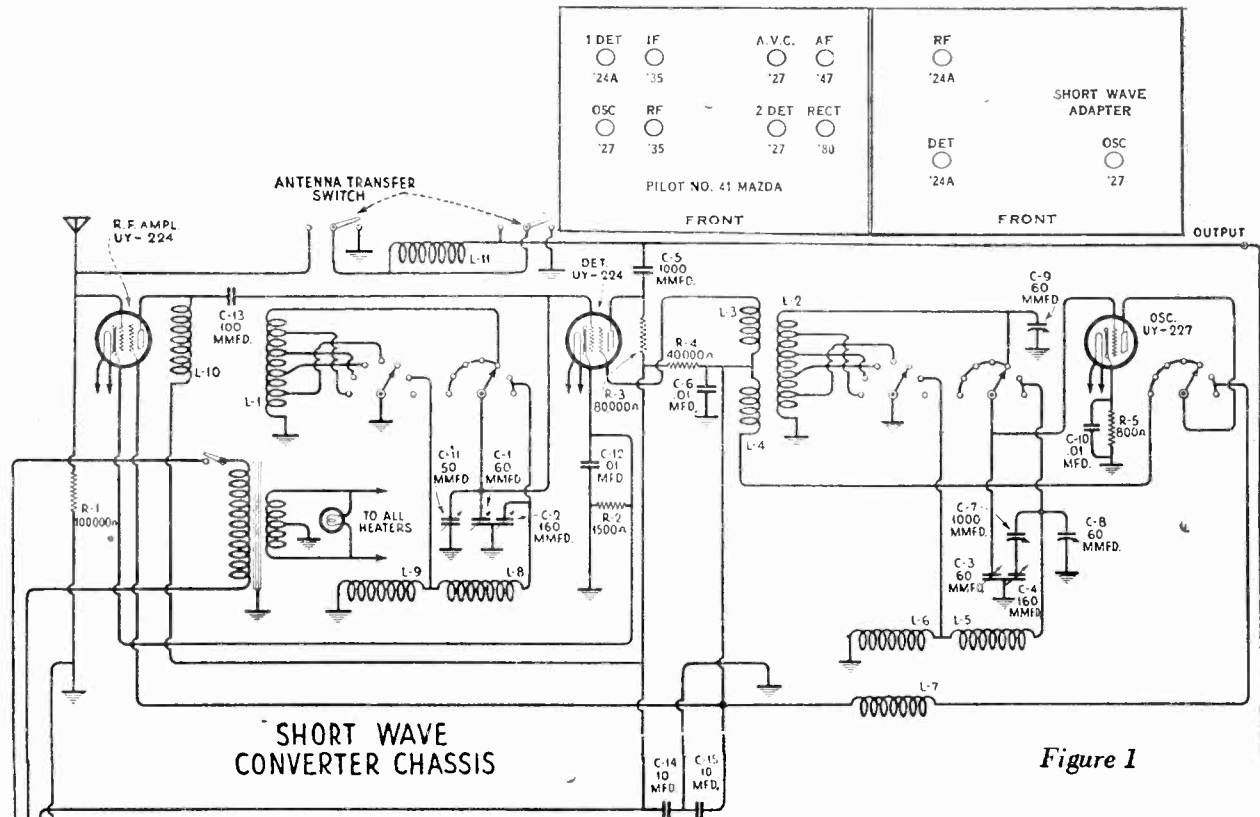
Tube	Cathode-Heater	Control Grid-Cathode	Screen Grid-Cathode	Plate-Cathode	Filement-Voltage
RF	2*	0.1*	75*	205*	5.0 ma; 2.2
Osc.	8.	0.	-	60	5.0 2.2
1 Det.	7.	7.0	70	200.	0.5 2.2
IF	2.	0.1*	75	205.	5.0 2.2
AVC	0.	0.	-	25.	- 2.2
2 Det.	20.	8.C*	-	180.	0.5 2.2
Fwer	-	10.	210	205.	25. 2.2
Fwer	-	10.	210	205.	25. 2.2

* Not true reading due to resistance in the circuit

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MODEL RO-23
Schematic

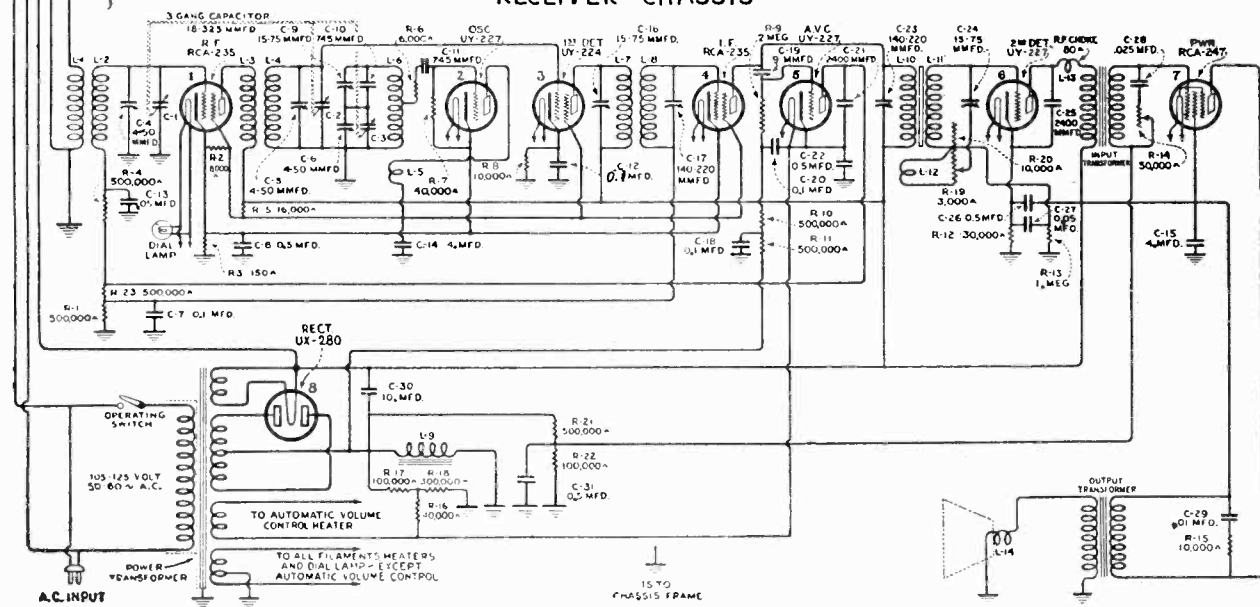
Models R-23, RO-23 (1931)



BROADCAST RECEIVER INTERMEDIATE FREQUENCY 175 KC
CONVERTER INTERMEDIATE FREQUENCY 1075 KC

Note—On some models operating switch for broadcast receiver is in circuit to Converter.

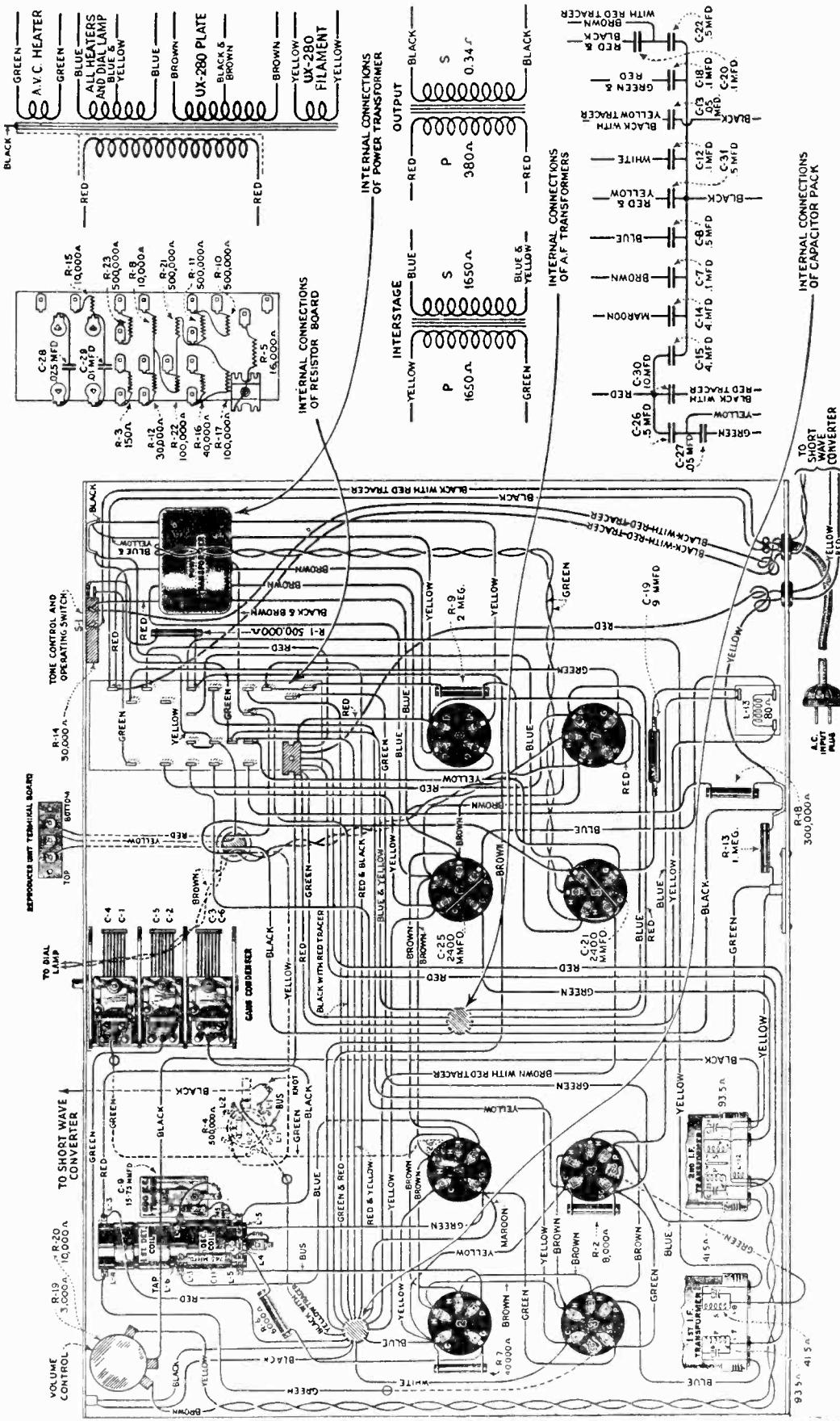
BROADCAST RECEIVER CHASSIS



Voltage Rating 105-125 Volts and 200-250 Volts
Frequency Rating 50-60 cycles and 25-40 cycles
Power Consumption 120 Watts

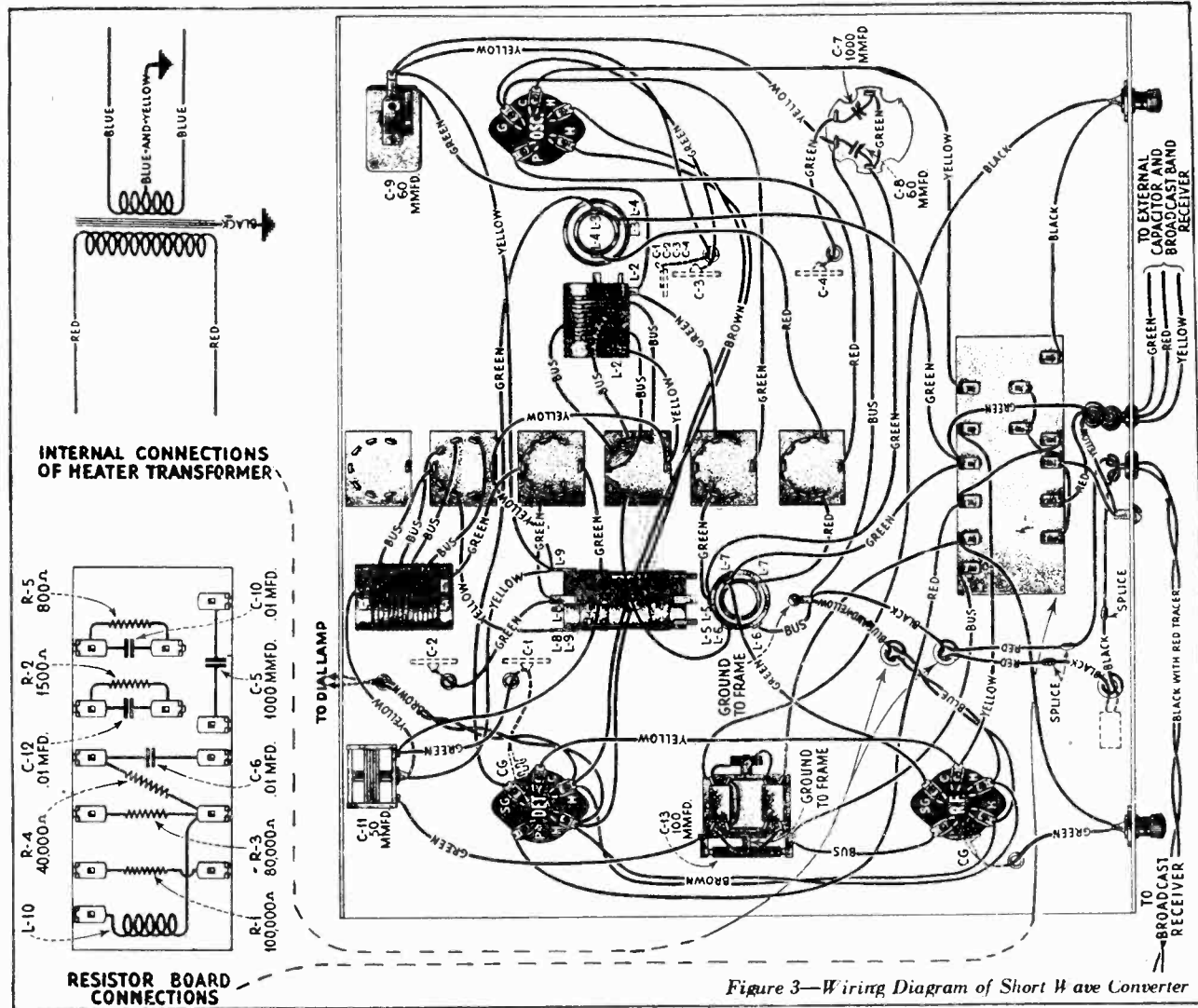
MODEL RO-23
Broadcast Chassis

R. C. A. - VICTOR CO., INC.



R. C. A. VICTOR CO., INC.

MODEL RO-23
Converter Chassis



SERVICE DATA

Service information in conjunction with the broadcast receiver is covered in the Service Notes already issued on RCA-Victor Models R-8, R-10 or R-12. The Short Wave Converter is however somewhat different from the usual broadcast receiver and a discussion of its service problems will help the service man in the performance of his work.

ELECTRICAL DESCRIPTION OF CONVERTER CIRCUIT

The RCA Victor Short Wave Converter uses three Radiotrons, one UY-224 as an R. F. Amplifier, one UY-224 as a Detector and one UY-227 as an Oscillator. The purpose of the Converter is to amplify the incoming high frequency signal by means of the R. F. stage, beat it with a local Oscillator signal and produce a modulated beat frequency by means of the Detector, extract the beat frequency so that it may be amplified by means of the broadcast receiver. A special tuning Capacitor, for tuning the Oscillator and Detector stages simultaneously, is incorporated in this unit. A series of tapped coils in conjunction with a range switch provides for the shifting to various bands without interchanging coils as with the older style Converters. Also this switch changes the capacity used by the tuning capacitor so that the frequency range of each band is approximately the same. A small trimmer capacitor, known as the Resonator, is used to re-align the detector circuit with the Oscillator whenever the band is changed or the I. F. frequency is shifted. The shaft that controls the Resonator capacitor is also mechanically connected to the operating switch and the antenna switch. It is so made that when the power is turned "off," the antenna is shifted to the broadcast receiver so that broadcast reception may be obtained.

MODEL RO-23 Alignment Data

R. C. A. VICTOR CO., INC.

Alignment at each end of the 51.3-98.5 meter band are also for the 98.5-200 meter band. The other alignment is for the five high frequency ranges. When these alignments are properly made, and an intermediate frequency between 1050 and 1100 K. C. is used, the Resonator control will function properly and the various short wave broadcasting services will fall within the bands indicated on the dial.

Special Notes on Effects of Aligning and I. F. Frequency Changes

Unless the line-up adjustments are carefully and properly made, the dial markings will be found to be incorrect. If it is necessary to replace the oscillator coil, the leads on the new coil should be made as short as possible and the alignment of the set checked. Also during operation it is preferable that the I. F. frequency of 1075 be used although any frequency between 1050 and 1100 will be satisfactory.

In unusual cases where local conditions preclude the use of a frequency between 1050 and 1100 K. C., considerably more variation in I. F. frequency without the loss of sensitivity will be permissible. However, the calibration will be shifted considerably, especially at the lower frequencies.

(2) DIAL INDICATOR

The indicator on the dial lamp should be so adjusted that the dial will read 100 when the tuning capacitor is at its maximum capacity position. It is important that this be checked before any alignment adjustments are made.

(3) BROADCASTING STATION HARMONICS

When tuning on the 98.5-200 meter band, the second and third harmonics of broadcasting stations will be heard and as there is no regular short wave broadcasting service on this band such signals may be discounted as better results will be obtained by listening to such programs on their regular wave band.

On the lower length bands, the short wave broadcasting stations will be received in the bands indicated for each position of the range switch with but few exceptions. Broadcasting received at other positions of the dial should therefore be viewed with skepticism unless it is definitely proved to be a short wave station and not a higher harmonic of a broadcast station.

(4) LOCAL STATION INTERFERENCE

When the receiver is located very close to a powerful transmitter, either broadcasting or code it is recommended that an antenna not exceeding 30 feet in length be used. However, if a longer antenna is necessary in order to obtain satisfactory reception, cross modulation from the local station may occur. Such a condition is evidenced by the local station coming in on unmodulated carriers on top of some short wave stations.

Under such conditions, it is advisable to use a tuned input circuit to the short Wave Converter. Such an input circuit can readily be made by winding 3 turns of No. 20 wire on a 1/4 inch tube, spacing the turns 1/8 inch apart. The coil is tuned by means of a .0005 mfd. variable capacitor and should be connected from the antenna input to ground. Such a combination will tune broadly from 13.8 to 51 meters.

(5) ACOUSTIC FEEDBACK

If acoustic feedback is experienced, it is an indication that the two chassis are not entirely supported on rubber. While with the usual broadcast receiver, such a condition is not so vitally necessary, with high frequency reception, unless each chassis is entirely floating in its rubber mounting and its shafts and knobs not touching the cabinet, howling will result.

(6) BROADCAST RECEIVER HARMONICS

When tuning through the various bands, at various points a slight breathing tone can be heard that is not a C. W. signal, but a harmonic of the broadcast receiver oscillator, being received. If an intermediate frequency of between 1050 and 1100 is used, these will not fall on any of the short wave broadcasting services. However, if they should and thereby cause a whistle, a slight shift—5 kilocycles of the intermediate frequency—will eliminate the interference. Returning the Short Wave Converter will be necessary to restore the signal to its normal intensity. Identification of these harmonics can be made by this means, a slight shift in the intermediate frequency causing them to disappear while an incoming signal will slowly diminish in volume.

(1) ALIGNMENT OF CONVERTER CIRCUITS

If the Converter does not cover the bands indicated on the range switch, refer to Figure 2 and make the following adjustments. A calibrated oscillator or frequency meter is desirable although if the service man is familiar with the stations in the high frequency spectrum, the location of these stations on the scale can be used as a guide for making the adjustments. Also a calibrated short-wave receiver that has an oscillating detector may be used to check the Converter oscillator frequency.

Adjust the broadcast receiver so that it is accurately set at 1075 K. C.—the short wave I. F. frequency. Set the "Range" switch at the 51.3-98.5 meter position.

Set the tuning capacitor at its minimum position. (Plates fully out of mesh.)

Place the external oscillator in operation at 5950 K. C.

Adjust the oscillator shunt capacitor C-8 so that the external oscillator will be heard in the loudspeaker or noted on an output meter.

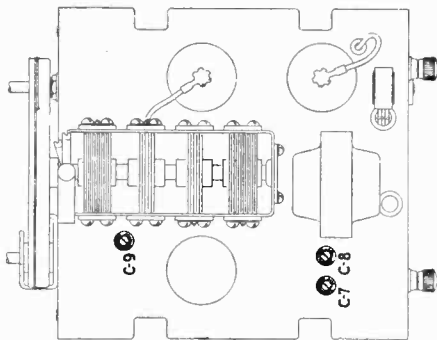


Figure 2—Location of Adjusting Capacitors

If the calibrated oscillator is not available then a calibrated receiver may be used to receive and check the frequency of the converter oscillator. The capacitor C-8 should be adjusted until the oscillator frequency is 7035 K. C.

If a wave meter is the only standard available, then a second receiver should be calibrated from it by means of one of the several methods for doing this accurately.

If no standards are available a satisfactory adjustment can be made by increasing capacitor C-8 slightly more than the point at which the 49 meter broadcasting stations are heard when the tuning capacitor is at its minimum position on the 51.3-98.5 meter band. (With C-8 set at minimum the 49 meter band should be received.)

Now shift the tuning capacitor to its maximum position. The Converter oscillator frequency, as picked up on a calibrated receiver, should be adjusted for 4130 K. C. by the oscillator series capacitor C-7. So adjusted, the receiver will receive a 3055 K. C. signal with an intermediate frequency of 1075.

Again, if no standards are available, an adjustment of C-7 that will give a definite point of resonance near the center range of the Resonator control with the tuning dial at 50 will be satisfactory.

After checking each end of the 51.3 to 98.5 meter band, shift the range switch to the 38-51.3 meter position. Set the tuning capacitor at its minimum position (plates fully out of mesh) and the I. F. frequency at 1075. Adjust the oscillator shunt capacitor C-9 until the oscillator frequency is 9100 K. C. or the receiver will respond to a signal of 8025 K. C. If no standards are available, adjust C-9 until the 49 meter stations all fall within and near the center of the 49 meter markings on the dial. Unless this adjustment is properly made the short wave broadcasting will not fall within the bands marked on the dial.

R. C. A. VICTOR CO., INC.

MODEL RO-23
Assembly Wiring
Notes

(7) C. W. RECEPTION

Normally C. W. transmitters will not be heard unless they are modulated. However, such reception can be obtained by coupling an external oscillator loosely to the second detector of the broadcast receiver. This oscillator should be at about 174 or 176 K. C. so that a pleasing beat note will be obtained. Also a beat note may be obtained by means of an oscillator, the frequency of which is at the 1st I. F. frequency—1150 K. C.—and loosely coupled to the input of the Broadcast receiver chassis.

(8) HUM

In addition to the usual causes of hum in the broadcast receiver, the following points should be checked in relation to hum in the Short Wave Converter.

- (a) A. C. input cord near antenna wire. Keep these two leads separate as much as possible.
- (b) Slack in A. C. cord has been placed close to Converter chassis. Take up the slack near the outlet, not near the Converter.
- (c) Filament transformer center tap not connected.
- (d) One side of filament transformer grounded, thereby shorting one section of the secondary.

(9) RANGE SWITCH

A defective "Range" switch may cause any of the following conditions:

- (a) Noise. A corroded or loose wire or contact may cause excessive noise even when the switch is not being shifted. Check by removing the antenna to see if the noise decreases.
- (b) Resonator control not effective. Check the detector sections—1 and 3 from the front—for faulty contacts.
- (c) Oscillator not functioning. Check the oscillator sections—2, 4 and 5 from the front.
- (d) Shift of dial readings. Check for corroded or loose connections.

(10) ANTENNA RESONANCE COIL

An open antenna resonance coil will lower the sensitivity of short wave reception. Its purpose is to match the output of the Converter to the input of the broadcast receiver.

(11) ANTENNA TRANSFER SWITCH

The Resonator Control shaft also is used to shift the antenna from the Short Wave Converter to the broadcast receiver. Also the power switch to the converter is operated simultaneously. A failure of these switches will usually be due to the failure of the engaging lever to throw the switch, if such a condition develops, the switch may be raised so that it properly engages with the operating arm on the shaft. See that no oil or grease prevents proper connection to the shaft at the friction bearing or noise will result when the Resonator is adjusted.

(12) FLUTTER

Fluttering may be caused by either of the following:

- (a) Open capacitor C-14 or C-15. The purpose of these capacitors is to prevent flutter that may be encountered in a single Pentode receiver.
- (b) Antenna lead close to detector Radiotron. See that this lead is in its proper position and removed from the detector Radiotron in the Converter.

(13) VOLTAGE READINGS

The following voltages are obtained at the Converter Radiotron sockets when measured with the usual set analyzers.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode Volts D. C.	Screen Grid to Cathode Volts D. C.	Plate to Cathode Volts D. C.	Plate M. A.	Heater Volts A. C.
R. F. Detector	-3	50	260	1.0	2.66
Detector	-3	50	180	1.0	2.66
Oscillator	-5	—	50	5.0	2.66

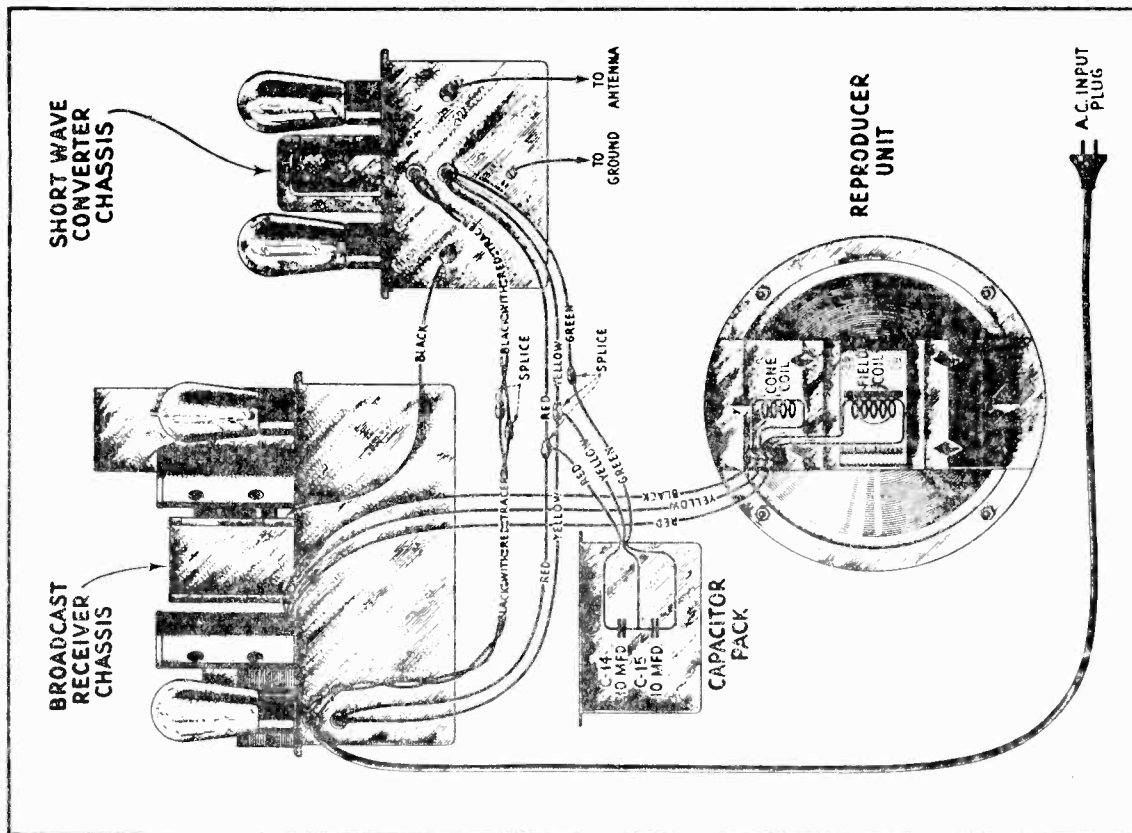


Figure 5—A Assembly Wiring

MODEL RO-23
Parts List

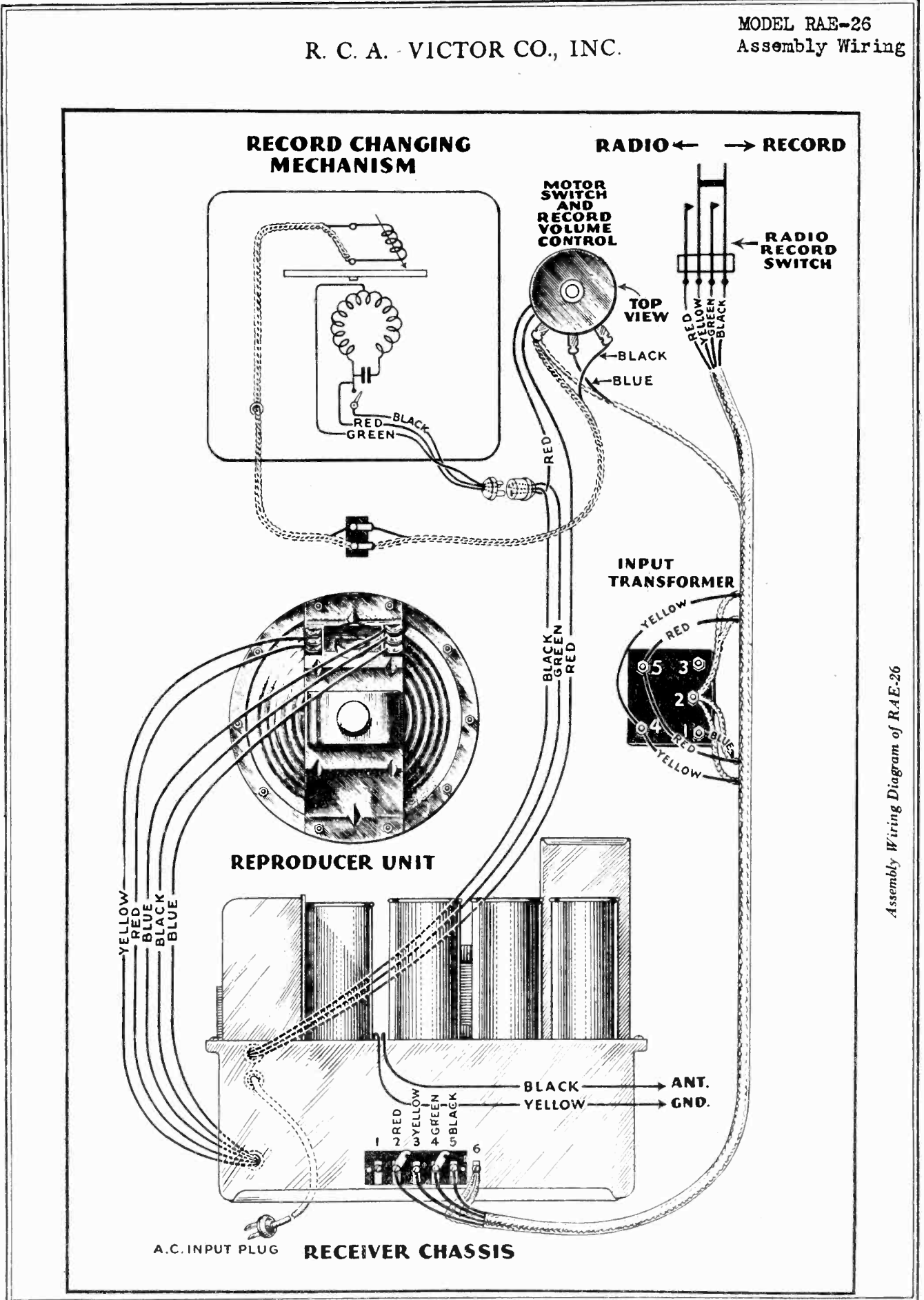
R. C. A. VICTOR CO., INC.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
2563	LONG WAVE RECEIVER Resistor—6,000 ohms—Carbon type—1 watt—Package of 5	\$3.00	6187	Resistor—300,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5	\$2.00	7497	Coil—High frequency detector coil	\$1.05
2730	Resistor—18,000 ohms—Carbon type—1 watt—Package of 5	2.00	6188	Resistor—2 megohm—Carbon type— $\frac{1}{2}$ watt—Package of 5	2.00	7498	Coil—Low frequency detector and oscillator coil	1.45
2746	Socket—Dial lamp socket	.50	7054	Cord—Power cord	1.00	7499	Coil—High frequency oscillator coil	1.85
2747	Cap—Grid condenser caps—Package of 5	.50	7062	Capacitor—Adjustable capacitor 15-70 mmfd.	.80	7410	Capacitor—Variable capacitor 7 plate—Complete with mounting nut and washer	1.75
2749	Capacitor—2,400 mmfd.	1.50	7298	Capacitor—0.01 mfd.	.70	8896	Transformer—Filament power transformer	3.25
2882	Socket—UY Radiotron socket complete with insulation strip	.50	7340	Transformer—475 mmfd.	3.00	8807	Transformer—Filament power transformer—105-120 volts, 25-cycles	5.75
2968	Socket—UX Radiotron socket complete with insulation strip	.50	7341	Transformer—2nd Intermediate transformer	3.00	8808	Transformer—Filament power transformer—220 volts, 60 cycles	3.40
2970	Resistor—500,000 ohms—Carbon type—1 watt—Package of 5	2.50	7342	Capacitor—Comprising two 0.05 mfd., four 0.5 mfd., one 10.0 mfd., two 4.0 mfd. and four 0.1 mfd. capacitors in metal container	7.85	8809	Board—Resistor board less resistors, capacitors and coil	1.00
2977	Knob—Tuning control, volume control or tone control knob—Package of 5	2.50	7343	Transformer—Audio transformer	3.85	8810	Lever—Switch lever assembly—Comprising shaft, 3 switch levers and coupling bubbling	.70
3003	Cushion—Receiver chassis rubber cushion—Package of 4	.50	7344	Transformer—Power transformer—110 volts—60 cycles	8.00	8811	Switch—Band selector switch complete with mounting washer and nut	6.60
3024	Bracket—Dial lamp bracket and indicator	.50	7348	Board—Resistor board complete less resistors and capacitor	2.30	8812	Capacitor—Tuning capacitor assembly	5.10
3029	Resistor—40,000 ohms—Carbon type—1 watt—Package of 5	2.50	7362	Drum—Dial drum and scale	1.20	8813	Dial drum and scale	1.20
3046	Resistor—500,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5	2.50	7404	Capacitor—20 mfd. electrolytic capacitor—in metal container	5.00	8837	Support—Chassis metal mounting support—Package of 4	.70
3048	Resistor—150 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5	2.50	8770	Transformer—Power transformer—25 cycles	12.00	10820	Capacitor—100 mmfd.	.50
3049	Resistor—150 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5	2.50	8771	Transformer—Power transformer—220 volts—60 cycles	9.00			
3056	Shield—Radiotron shield—Package of 2	.50	8805	Capacitor—Variable tuning capacitor	6.00			
3076	Resistor—1 megohm—Carbon type— $\frac{1}{2}$ watt—Package of 5	2.50	8837	Support—Receiver chassis metal mounting support—Package of 4	.70			
3077	Resistor—30,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5	2.50		LOUDSPEAKER ASSEMBLY		X-24	Top	7.00
3078	Resistor—10,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5	2.50	3237	Loudspeaker mounting screw assembly—Comprising 4 screws, 8 nuts, 8 washers and 4 cyclotols—Package of 1 set.	5.00	X-25	Stretchor rails—Comprising R.H. and L.H. cond rails and center rail	4.10
3079	Resistor—40,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5	2.50	7345	Coil assembly—Comprising field coil, cone bracket and magnet	.60	X-26	Leg	4.15
3081	Resistor—16,000 ohms—Carbon type—3 watt	1.90	8559	Ring—Cone retaining ring	1.50	X-27	Foot assembly—Comprising foot, hanger bolt, packing nut and ferrule—Assembled	1.45
3092	Volume control—Volume control complete with mounting nut	1.50	8601	Cone—Speaker cone—Package of 5	15.00	X-28	Baffle board and grille cloth	1.35
3093	Tone control—Tone control complete	1.90		SHORT WAVE RECEIVER		X-29	Excutechtoon—Tuning dial excutechtoon for long wave	1.60
3095	Coil—R.F. coil	1.90	2747	Cap—Grid condenser cap—Package of 5	.50	X-30	Excutechtoon—Tuning dial excutechtoon for short wave	1.60
3235	Coil—1st detector and oscillator coil	2.85	2977	Knob—Station selector or Resonator knob—Package of 5	2.50	3223	Excutechtoon—Metal bezel for dial	.50
3251	Coil—Choke coil	.90	3058	Resistor—100,000 ohms—Carbon type—1 watt—Package of 5	2.50	3287	Label—Metal trade mark label—Package of 5	.75
3284	Board—Terminal board with 1 soldering terminal—Package of 5	1.00	3153	Spring—Drive cord tension spring—Package of 5	2.75	9398	Cabinet—Cabinet complete less equipment	77.25
3285	Cord—Drive cord—Package of 5	1.00	3285	Cord—Drive cord—Package of 5	1.00			
3286	Spring—Drive cord tension spring—Package of 5	2.00	3286	Spring—Drive cord tension spring—Package of 5	2.00			
6185	Resistor—100,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5	2.75						
6186	Resistor—500,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5	1.00						

R. C. A. VICTOR CO., INC.

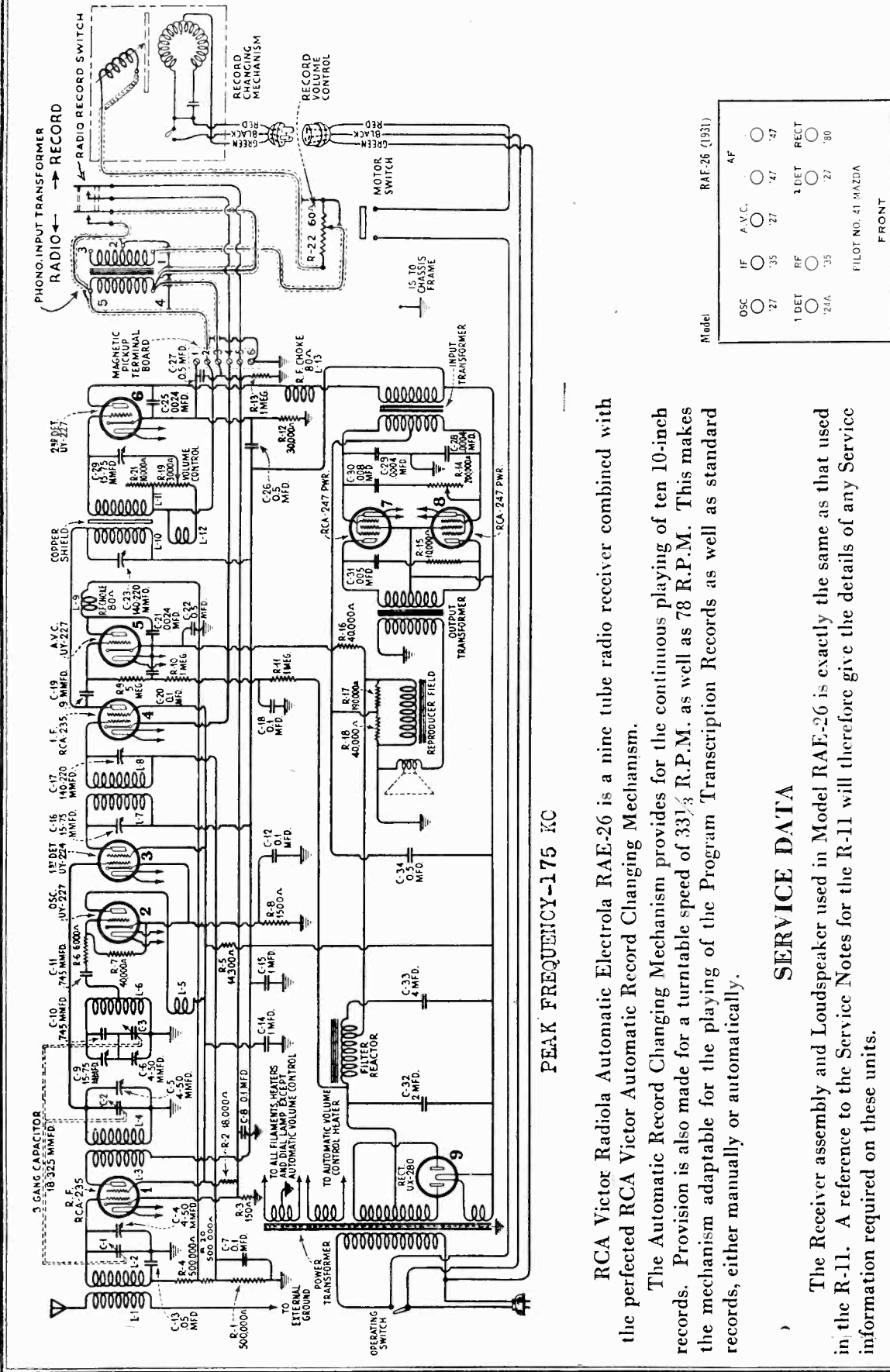
MODEL RAE-26
Assembly Wiring



Assembly Wiring Diagram of RAE-26

MODEL RAE-26
Schematic

R. C. A. VICTOR CO., INC.



Model	RAE-26 (1931)			
OSC	27	35	27A	27
1 DET	27	35	27A	27
RF	27	35	27A	27
A.V.C.	27	35	27A	27
AF	27	35	27A	27
RECT	27	35	27A	27

PILOT NO. 41-MAZDA
FRONT

RCA Victor Radiola Automatic Electrola RAE-26 is a nine tube radio receiver combined with the perfected RCA Victor Automatic Record Changing Mechanism.

The Automatic Record Changing Mechanism provides for the continuous playing of ten 10-inch records. Provision is also made for a turntable speed of 33 1/3 R.P.M. as well as 78 R.P.M. This makes the mechanism adaptable for the playing of the Program Transcription Records as well as standard records, either manually or automatically.

SERVICE DATA

The Receiver assembly and Loudspeaker used in Model RAE-26 is exactly the same as that used in the R-11. A reference to the Service Notes for the R-11 will therefore give the details of any Service information required on these units.

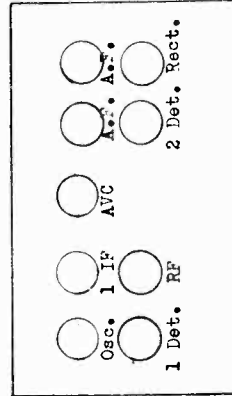
A reference to the Service Notes on the RCA Victor Automatic Record Changing Mechanism gives details of any service work that may be required on this unit. It will also be found useful in identifying the replacement parts listed below. Figure 1 shows the schematic circuit diagram and Figure 2 the assembly wiring diagram.

PEAK FREQUENCY-175 KC

MODEL RAE-26
Resistance Data

R. C. A. VICTOR CO., INC.

<p>All tubes removed from socket and AC plug disconnected from power supply line. Field coil disconnected. All pickup equipment disconnected from terminal board and terminals 2 and 3 should be joined. Also terminals 4 and 5 should be interconnected.</p>			
From Chassis To	Correct	Incorrect	
Aerial to Ground Post	40 ohms		
Chassis to			
RF Control Grid(early model)	1,000,005 ohms	BLC- in tuned circuit (.1 mfd)	TC-Y
RF Control Grid(late model)	1,500,005 ohms	BLC- in tuned circuit (.05 mfd)	BC-AVC ohk-Y
RF Cathode	150 ohms	BC- 1 IF Tr. See -Y	BC- 1 IF Tr. See -Y
RF Screen Grid	18,150 ohms	BC- rf K-Y (.1 mfd)	BC- rf K-Y (.1 mfd)
		BC- rf Sg-Y (1. mfd)	BC-47 Sg- Y (.5 mfd)
RF Plate	32,508 ohms	BC-130 F- Spkr div. tap	BC-130 F- Spkr div. tap
		BC- rf P-Y (1. mfd)	BC- rf P-Y (1. mfd)
		See RF Screen Grid	See RF Screen Grid
RF Plate to '80 Fil	58 ohms		
1 Detector Control Grid	5 ohms		
1 Detector Cathode	1,500 ohms	TC-Y	TC-Y
1 Detector Screen	18,150 ohms	BC-Y (.1 mfd)	BC-Y (.1 mfd)
1 Detector Plate	32,541.5 ohms	See R-F Screen	See R-F Screen
1 Detector Plate to '80 Fil	93.5 ohms	See R-F Plate	See R-F Plate
Oscillator Control Grid	41,500 ohms	TC- 1 IF Tr.	TC- 1 IF Tr.
		BLC-Osc.Grid Cir.(.0074	BLC-Osc.Grid Cir.(.0074
Oscillator Cathode	1,500 ohms	BC-Osc K-Y (.1 mfd)	BC-Osc K-Y (.1 mfd)
Oscillator Plate	18,151 ohms	BC-Osc K-Y (.1 mfd)	BC-Osc K-Y (.1 mfd)
Osc Plate and Det Screen	1 ohm	See R-F Screen	See R-F Screen
IF Control Grid (all models)	500,041.5 ohms	BC-Y (.5 mfd)	BC-Y (.5 mfd)
IF Control Grid- AVC Plate (early)	121.5 ohms	TC-1 IF Tr Sec	TC-1 IF Tr Sec
IF Plate	18,150 ohms	See 1 Detector Plate	See 1 Detector Plate
IF Plate -'80 Fil	32,491.5 ohms	To- 2 IF Tr. Pri.	To- 2 IF Tr. Pri.
AVC Control Grid (early)	7,230,285 ohms	BLC- if P- AVC GE (9 mmfd)	BLC- if P- AVC GE (9 mmfd)
		BC-5 meg - AVC H (.1 mfd)	BC-5 meg - AVC H (.1 mfd)
		BC-1 meg- Y (.1 mfd)	BC-1 meg- Y (.1 mfd)
		FC-'30 Anode - 80 F(2 mfd)	FC-'30 Anode - 80 F(2 mfd)
		FC filter chk-80 F(4 mfd)	FC filter chk-80 F(4 mfd)
		BC-AVC K-Y (.5 mfd)	BC-AVC K-Y (.5 mfd)
		BC-Spkr divides tap - Y	BC-Spkr divides tap - Y
		BC-AVC K-AVC P (.0024 mfd)	BC-AVC K-AVC P (.0024 mfd)
AVC Control Grid (late)	4,230,285 ohms	See early model	See early model
AVC Cathode	270,000 ohms	BC-AVC K-AVC P	BC-AVC K-AVC P
AVC Plate	1,000,085 ohms	BC-AVC K-Y	BC-AVC K-Y
		BC-AVC P-AVC K	BC-AVC P-AVC K
		See RF Control Grid	See RF Control Grid



Line Voltage 110. Volume Control does not change voltages.

Tube	Cathode- Heater	Control Grid- Cathode	Screen Grid- Cathode	Plate- Filament	Cathode Current Voltage
RF	2.	0.1*	75.	205.	5.0 ma 2-2
Osc.	8.	0.	-	60.	5.0 2-2
1 Det.	7.	7.0	70.	200.	0.5 2-2
IF	2.	0.1*	75.	205.	5.0 2-2
AVC	0.	0.	-	25.	- 2-2
Pwr -	10.	8.0*	210.	180.	0.5 2-2
Pwr -	10.	10.	210.	205.	25. 2-2
				205.	25. 2-2

* Not true reading because of resistance in the circuit.

MODEL M-30
Auto Radio
Schematic

R. C. A. VICTOR CO INC.

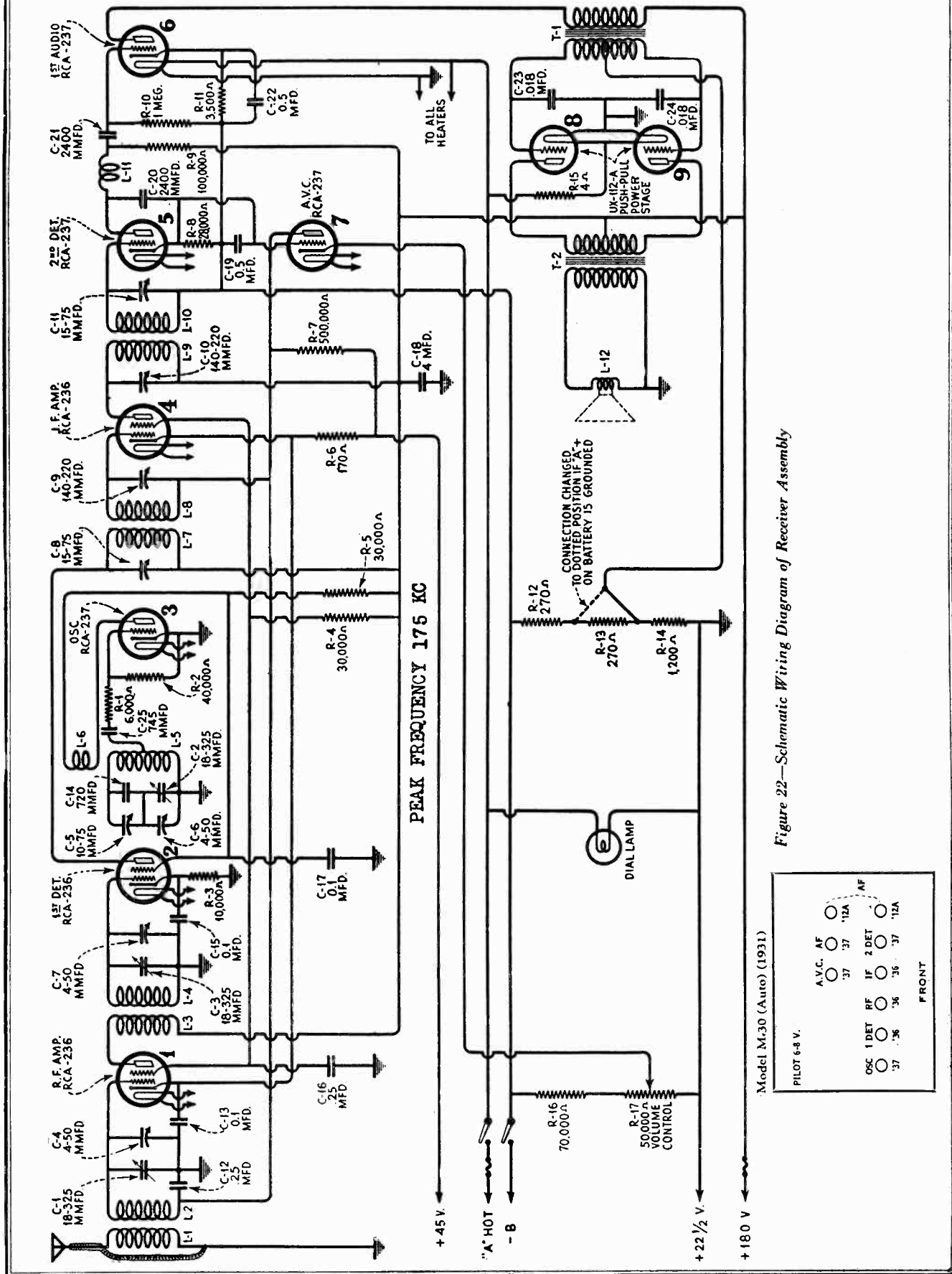
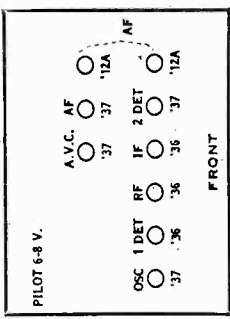


Figure 22—Schematic Wiring Diagram of Receiver Assembly

Model M-30 (Auto) (1931)



R. C. A. VICTOR CO., INC.

MODEL M-30
Auto Radio
Chassis

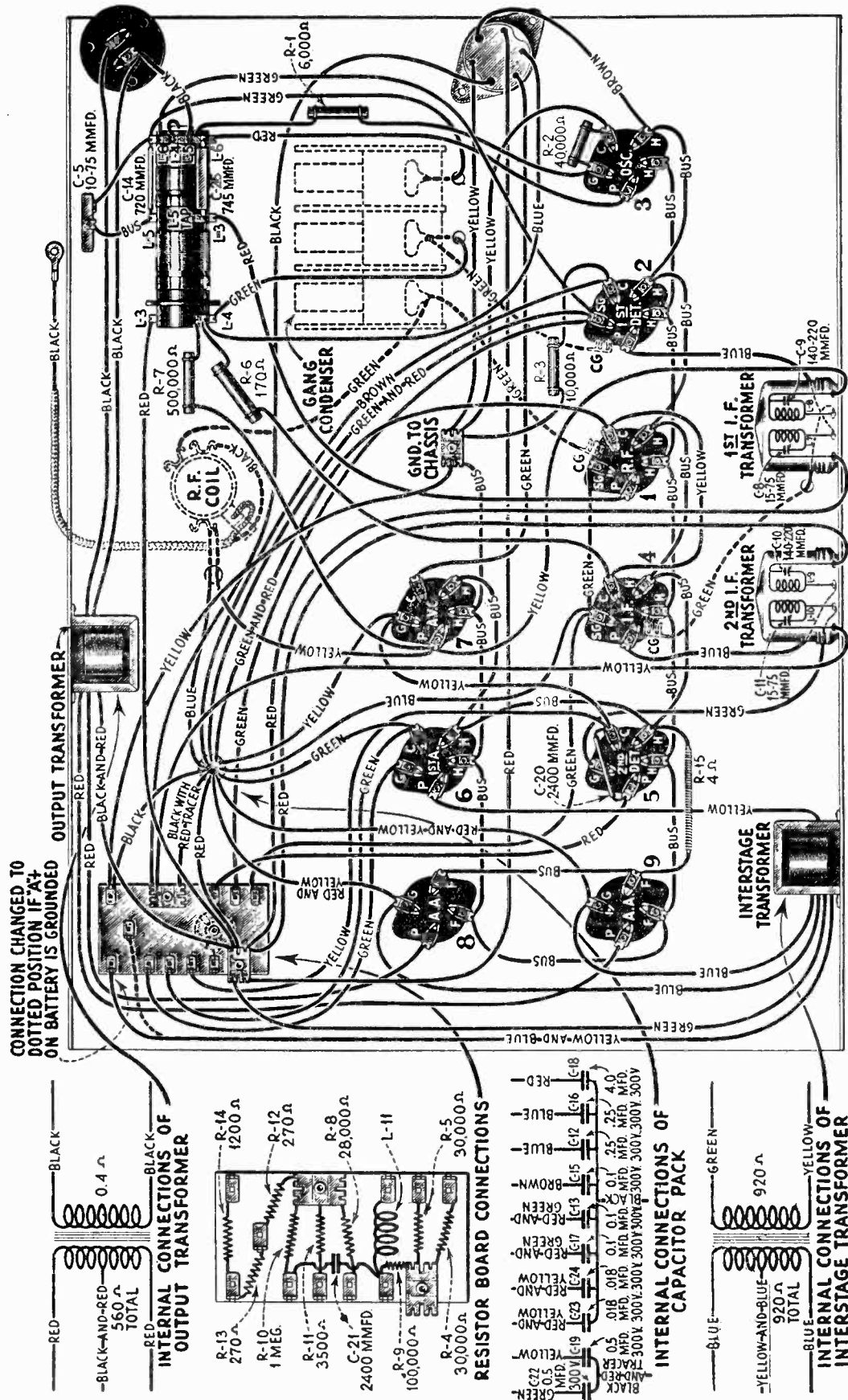


Figure 26—Wiring Diagram of Receiver Unit

MODEL M-30
Auto Radio
Notes Part 1.

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CONTROL BOX

The control box, Figure 2, contains the station selector knob, the dial scale, the volume control and the key switch. It is provided with a felt strip and mounting clamp for attaching to the steering column of the car. The dial scale is marked in channels (multiply by 10 for kilocycles) and is of the non-glare type. The switch is provided with a key, which when removed, locks the radio at the "off" position.

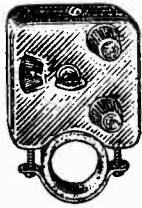


Figure 2—Control Box



Figure 3—Loudspeaker

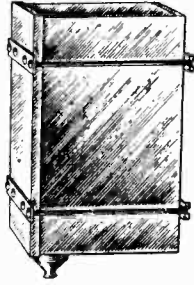


Figure 4—Battery Box

LOUDSPEAKER

The loudspeaker, Figure 3, used in the automobile equipment is of the permanent magnet, dynamic type. It is housed in a smooth black finished metal container which also acts as an effective baffle. Due to the presence of the strong magnetic field, even when the set is turned off, special provision has been made to prevent metallic substances from being drawn into the air gap of the speaker and thereby cause rattles. The speaker edge and center is entirely closed, thus preventing such entry from the front. A fine gauze covering is placed over the back, thus eliminating any such matter from entering from that side. The cord outlet is provided with a rubber bushing that closes up its opening. The speaker has excellent frequency characteristics and is of extremely rugged construction.

BATTERY BOX

A special heavy steel battery box, Figure 4, is furnished as optional equipment when it is either undesirable or impossible to install the batteries behind or under the seats or in the rear compartment of the car. This box is so constructed that the batteries may be mounted and connected therein and then lifted into position beneath the car. Four carriage bolts, each provided with two lock nuts, hold it in place.



Figure 5—Antenna Plate

ANTENNA PLATE

The antenna plate, Figure 5, is provided for use when a roof antenna is not already installed in the car. It is provided with special bolts and clamps that allow easy mounting to the frame of the car. Due to the high sensitivity of this receiver, satisfactory results may be obtained with the undercar antenna except in districts where the signal intensity of all stations is extremely low. In such cases a roof antenna must be erected in accordance with the instructions given in Part I, Section 3.

SERVICE AND INSTALLATION NOTES

for

RCA Victor Automobile Radiola
Model M-30

INTRODUCTION

The RCA Victor Automobile Radiola, Model M-30, is a nine tube Super-Heterodyne radio receiver designed for automobile or motor boat use. Features of this receiver are: sensitivity and selectivity equal to that of high quality home receivers, high output Class B amplifier giving a large undistorted output with a small plate battery drain, permanent magnet dynamic loudspeaker requiring no external field supply, automatic volume control using entirely new principles of operation and extremely low battery consumption for both heater and plate supply. This feature allows the use of the automobile battery as "A" supply without imposing an additional load upon it that cannot be readily compensated for by a slight generator charging readjustment. The low plate current drain allows excellent "B" battery life. Use of the new automobile type Radiotrons eliminates the possibility of Radiotron failure due to vibration or varying heater voltage such as is encountered in automobile driving.

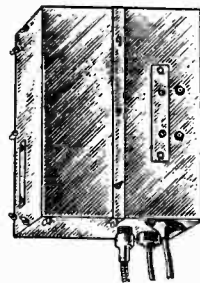


Figure 1—Receiver Assembly

In the design of this receiver, special attention has been given to the ease with which the installation may be made, and the elimination of interference originating in the ignition system. Thorough shielding of all parts together with proper design of the receiver makes it possible to reduce ignition interference to a negligible degree. This is done without any sacrifice in the sensitivity of the receiver.

A description of the various units follows.

RECEIVER ASSEMBLY

The receiver assembly, Figure 1, is housed in a metal case that acts as an effective mechanical and electrical shield. A bracket is provided for mounting so that dismounting is a comparatively simple operation, requiring the removal of but one screw.

The top section of this container is fastened by means of wing nuts. This provides for easy removal for checking or replacing Radiotrons. The battery and control box cable, the loudspeaker cable and the flexible tuning cable are all held in place by means of fittings which allow their easy removal in case the box is to be removed from its mounting. The case is finished in a dull smooth black that is not easily scratched and harmonizes with the usual car finishes.

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MODEL M-30
Auto Radio
Notes Part 2

IGNITION EQUIPMENT

Six spark plug type suppressors, one distributor type suppressor and two 0.75 mfd. capacitors. Figure 6, are provided for the suppression of ignition interference so that it does not materially affect radio reception. The details of installing this equipment are covered in Part I and varies somewhat in different cars.

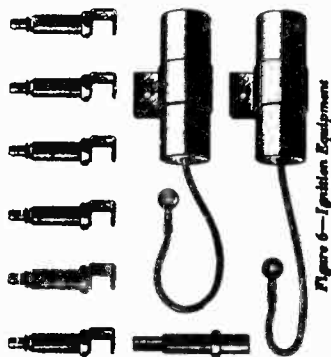


Figure 6—Ignition Equipment

PART I—INSTALLATION

Due to the nature of the installation it is advisable that the RCA Victor Automobile Radiola be installed by a competent radio service man in conjunction with an automobile mechanic. The usual automobile repair shop has the necessary tools and lifts that are desirable in making the installation. If it is necessary to erect a roof antenna, this work must be done by a competent "trim" shop working under direction of the service man. However, after making several installations the service man may feel confident enough to attempt all the installation work himself, with the exception of the roof antenna. For such work the following list of equipment is provided which will be found useful when performing such work.

- 1 Pair Gas Pliers
- 1 Pair Diagonal Pliers
- 1 Pair Long Nose Pliers
- 1 Small Crescent Wrench
- 1 No. 4 Spiritite Wrench
- 1 Thin Shank 6" Screw Driver
- 1 Small Screw Driver
- 1 Large Screw Driver
- 1 Pair Tin Shears
- 1 Heavy Duty Soldering Iron
- 1 Medium Soldering Iron
- Supply of Rosin Core Solder
- Supply of Acid Core Solder
- Supply of 3/8" Belden Braid
- Supply of Sheet Copper
- 1 Electric Drill with Set of Drills Up to 1/2"
- 1 Set Seat and Door Protectors
- 1 Reamer—3/4" maximum
- 1 Set Analyzer or Miscellaneous Voltmeters

(1) LOCATION AND MOUNTING OF UNITS

The proper method of installing the equipment of the RCA Victor Automobile Radiola is covered in the Installation Instructions packed with each equipment. However, as there are many different types of installations, this information will be repeated together with a discussion of its numerous variations.

RECEIVER UNIT

Location The usual location for the receiver unit is on the right side of the engine compartment bulkhead directly under the dash. Figure 7 shows a typical installation. In some cars this will have to be on the opposite side directly over the steering column, Figure 8. It is important that the space selected have at least four inches clearance directly over the receiver, otherwise it cannot be removed from the mounting bracket. Interference with other equipment under the dash, and

interference of the mounting bolts with equipment on the engine side of the bulkhead must be avoided. Figure 8A shows an installation where the receiver is in the usual location, but the loud-speaker is in the center.

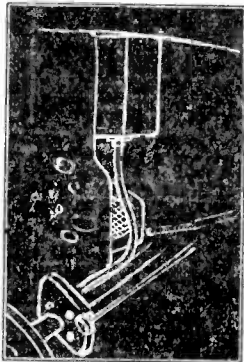


Figure 7—Usual Location of Receiver

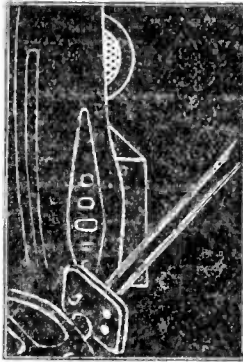


Figure 8—Receiver Over Steering Column

In some cars, the ignition coil is on the compartment side of the bulkhead or under the dash. If there is a choice of places available, the one at the greatest distance from the coil should be chosen. This is important as it reduces the ignition noise considerably.

Mounting Using the card inside of the Receiver Carton as a template, determine the proper location on the bulkhead and mark the location of the three holes with a center punch. A space at least four inches high must be left above the receiver. Extra holes are provided in the bracket to be used in case the regular holes are not satisfactory. If the bulkhead is curved, the template must be used flat and not follow the contour of the curved surface. In some cases, the receiver unit bracket must be mounted away from the bulkhead to clear obstructions. The center punch must be held perpendicular to the template when marking the holes to insure proper alignment. Next drill three 3/8 inch holes as marked. Then attach the bracket to the bulkhead by means of nuts and lock-washers furnished as shown in Figure 9.

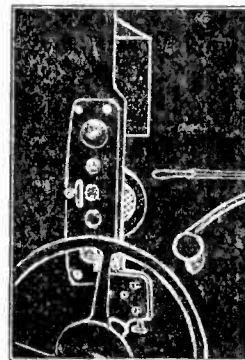


Figure 8A—Receiver on Right with Loudspeaker in Center

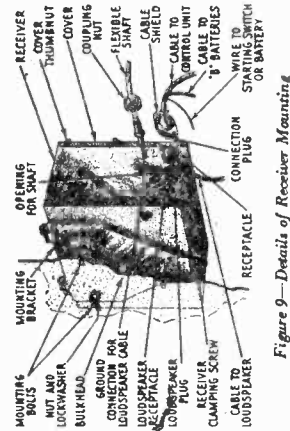


Figure 9—Details of Receiver Mounting

Remove the thumb-nuts from the top, front and sides of the receiver. Remove the packing material from around the Radiotrons and make certain that they are in the proper sockets. (See Figure 10).

Press the grid contact caps firmly over the contacts on top of all RCA-236 Radiotrons. Also make sure that the tuning capacitor rotor plates are fully meshed with the stator plates so that the flexible shaft may be easily mounted. If the positive terminal of the storage battery is grounded to the frame of the car, it will be necessary to remove the bottom of the receiver and change the yellow and blue wire from its normal position on the resistor board to that indicated by the dotted line in Figure 11. Replace the bottom, the cover and thumb-nuts making sure the nuts are tight. Hang the receiver on the bracket hooks, insert the clamp screw and washer at the bottom and tighten with a screw driver.

**MODEL M-30
Auto Radio
Notes Part 3**

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ANTENNA PLATE

Location The antenna plate, if used, should be mounted under the car and as far to the rear as possible. Also it must be as low (close to the road) as possible and still maintain the clearance of the lowest point of the car from the road.

Usually, it is mounted on the opposite side from the Muffler and exhaust pipe to prevent rattling. See Figure 13. In some cases, it is desirable to mount the plate crosswise to the car chassis. Avoid any location that will place the plate in a position that will impede the free motion of the chassis parts such as springs, drive shaft, or axles, as damage to the antenna will result.

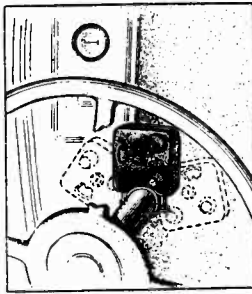


Figure 12—Position for Control Box in Order to Make Adjustments

Mounting After determining the proper location, fasten the plates together with the screws provided. Adjust the length so that the plate is as long as possible and still fulfill the foregoing conditions. Assemble the mounting bolts onto the plate as shown in Figure 5 and fasten the clamps to the car frame. Then tighten the bolt that holds the antenna plate to the bracket and the screw and lock nut that holds the bracket to the car frame. *Too much attention to the proper tightening of these screws is impossible, as any loosening of this plate that results in one end dropping while the car is driven at high speed may result in an accident.*

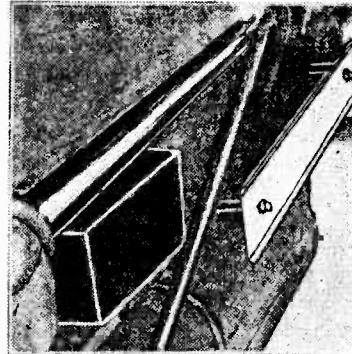


Figure 13—Typical Location of Antenna Plate and Battery Box

"B" BATTERIES

Location If possible, the "B" batteries should be mounted under one of the seats or behind the back of the rear seat. In cars having a rear compartment or trunk, the batteries may be located therein.

However, if such a place is not possible, then a battery box must be used. This box can usually be mounted under the car by fastening to the floor boards. Its location should be as far from the muffler and exhaust pipe as possible, as the heat from these parts will have a detrimental effect on the life of the batteries.

LOUDSPEAKER

Location The loudspeaker may be mounted at several locations, in most automobiles. However, the preferable location is on the bulkhead facing the rear of the car and on the opposite side from that of the receiver. If several locations are available, choose the one that gives the best acoustical results. This can easily be determined by experiment by not mounting the speaker until the rest of the equipment is in place and the receiver operating.

Mounting The instructions for mounting the receiver assembly apply equally well to the loud speaker, with the exception that the loudspeaker is mounted direct, there being no bracket provided. A template is also provided for this unit. No clearance space above the loudspeaker is required.

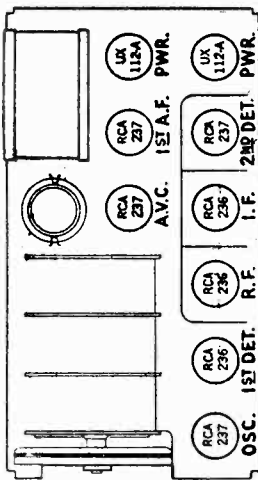


Figure 10—Radiotron Socket Location

CONTROL UNIT

Location The control unit is mounted on the steering column at a convenient height for the driver. Due to the large size of the steering wheel hub on some cars, this distance must be adjusted for best visibility.

Mounting Place the felt around the steering column and hold it in place by means of string or a piece of tape. Remove one screw from the clamp and place the box and clamp around the felt. Replace the screw that was removed and tighten both screws equally.

FLEXIBLE SHAFT

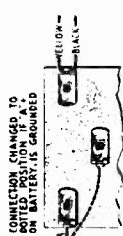
Location The flexible shaft is used to mechanically connect the tuning capacitor in the receiver assembly to the drive and dial in the control box. It should be placed and fastened to the car so that it connects these two points together and is clear of any foot room or instruments. On some cars a special length shaft will be required. Such flexible shafts are listed in Part IV, page 24.

Mounting Turn the Station Selector until the flat side of the shaft may be seen through the hole in the side of the unit. Insert the end of the shaft into the opening at the rear of the Control Unit making certain that it engages the end of the shaft inside of the latter. Turn the shaft until the set screw is visible and tighten the set screw against the flat side of the shaft. Thread the coupling nut of the shaft onto the Control unit.

Turn the Station Selector knob clockwise so that the dial is at the extreme counter-clockwise position. Then insert the free end of the shaft into the opening provided on the receiver, turning the Station Selector knob back and forth until the shaft meshes. Tighten the collar that holds the shaft to the receiver unit.

After completing these two operations, slowly turn the Station Selector knob to the extreme clockwise and then to the extreme counter-clockwise position. Normally, this will insure the use of the complete range of the dial. If, however, it is noticed that a slight amount of tension is present at either end of the dial, then the control unit must be turned on the steering column in the direction of the tension, while making this adjustment. Then returning it to its normal position will relieve this additional tension. Figure 12 gives the details of this latter adjustment.

Figure 11—Wiring Change for Cars Having Positive Side of "A" Battery Grounded



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Notes Part 4

Mounting Using the cover of the battery box as a template, locate the cover on the floor boards under the car and mark the boards for the center of the four mounting bolts. Drill four 3/8" holes in the floor boards. Insert the four carriage bolts in the holes from the top. Make sure the hanger bolts are in place in the cover and fasten the cover to the four bolts in the floor board. In the case of cars having metal floor boards, machine screws with spacers must be used instead of carriage bolts. Make sure that the mounting bolts do not project too far down into the box so that they will fail to clear the batteries.

After fastening the top securely in place, place the "B" batteries in the box and connect them to the receptacle as shown in Figure 14. Slip the cambic cover over the fuse and place the paper strips and plate over the terminals. Then lift the box into place, swing the hanger bolts into place and tighten both nuts securely. Care should be taken to draw up on all four nuts gradually.

For mounting both the antenna plate and the battery box, it is desirable to place the car on a "lift."

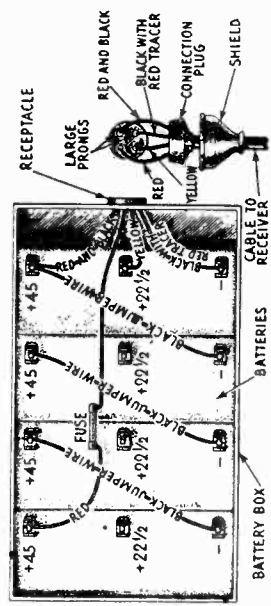


Figure 14—Battery Box Connections

IGNITION EQUIPMENT

Two .75 mfd. capacitors, six spark plug type suppressors and one distributor type suppressor are furnished to be installed in the car's ignition system so that its R.F. radiation may be reduced to a point so as not to interfere with radio reception.

One .75 mfd. capacitor is connected across the output of the generator. Remove a screw from the generator frame, usually the one holding the cut-out, insert the screw through the hole in the capacitor clamp and replace the screw. Connect the lead from the end of the capacitor to the terminal on the generator side of the cut-out switch.

The other capacitor is connected from the battery side of the ammeter to the car frame. Usually, one of the screws on the underside of the dash can be used to hold the capacitor, thereby making the ground connection. Then connect the lead to the ammeter terminal.

The spark plug type suppressors are inserted in series with each high tension lead at its point of connection to the plug. The distributor suppressor is inserted in series with the high tension lead from the coil at its point of connection to the distributor.

There are a number of variations in the installation of this ignition suppression equipment that are covered in Part II.

(2) CONNECTIONS

Loudspeaker to Receiver Insert the plug on the end of the loudspeaker cable into the two-contact receptacle on the end of the receiver. Fasten the pigtail under the self-tapping screw as shown in Figure 9

Main Cable to Receiver A long cable, from the control unit and battery box, is attached to the receiver by means of a six point female plug. Insert the plug into the receptacle on the receiver. A metal cap is fitted over two studs at the same time. Fasten the nuts over these studs securely.

Main Cables to Batteries Drill 1/2" hole in the toe boards directly below the end of the receiver unit to which connections are made. (If any holes that may be used for this purpose are already available, drilling additional holes is unnecessary). Pass the free end of the cable through the hole and thence to the "B" Battery location. Possibly other holes must also be drilled. Connect the "B" batteries to the cable as shown in Figure 15. The metal braid must be pushed back from the free end and taped so that sufficient length leads are obtained for connecting the batteries. If the battery box is used, solder the four prong plug onto the end of the cable as shown in Figure 14.

The cable should be fastened to the chassis of the car by means of the clamps or staples provided. Take up any slack by making a loop and tape securely.

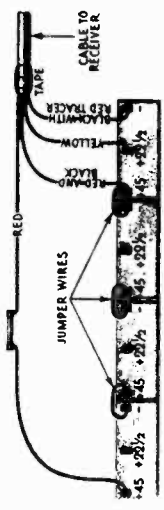


Figure 15—Cable Connections to "B" Batteries

Receiver to Antenna The antenna lead should follow the shortest practical path between the receiver and the antenna. It is very desirable to avoid passing it through the engine compartment or close to the ignition coil, if mounted on the dash or compartment side of bulkhead.

If a roof antenna is used, cut the lead from the antenna as short as possible and still allow length for connection. Then cut the antenna lead and shield from the receiver to a proper length, allowing about two inches extra on the shield so that it may be slit and braided into a pigtail. Solder and tape the connections securely. Then solder the frayed part of the pigtail and either fasten or solder it securely to the car frame. The pigtail should be as short as possible and a good electrical joint made to the car frame

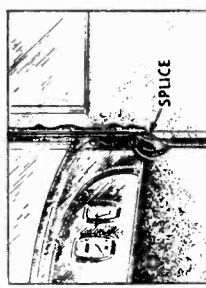


Figure 16—Proper Method of Grounding Shield When Using Roof Antenna

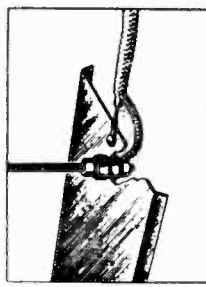


Figure 17—Proper Method of Grounding Shield When Using Plate Antenna

If the antenna plate is used, the antenna lead and shield should be cut in the same manner as for the top antenna, except that the pigtail must be slightly longer. An eyelet terminal is provided for soldering to the end of the antenna lead so that it may be held by the screw and nut at the end of the antenna plate. The pigtail should be fastened under one of the nuts that hold the plate to its mounting bolts. Figures 16 and 17 illustrate the correct manner in making both types of connections.

Receiver to "A" Battery One side of the "A" Battery connection is made through the frame of the car. The "hot" side is made by means of a single lead that is brought out from the main cable. This lead is provided with a lug that should be fastened under the nut that holds the battery connection to the starting motor switch

This completes the installation. All cables should be fastened securely to the car so that interference with its operation is avoided. This is especially true of those under the dash which may

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support. Usually, this can follow the path of the dome light lines. It should be noted however, that if the ignition coil is mounted on either side of the dash, it is preferable to run the lead-in down the column further from the coil.

4. Again test the antenna from the set end of the lead-in to ground for any possible shorts. If none exist then replace the head lining. Figure 18 shows a typical roof antenna installation.

(4) INSTALLATIONS ON MODEL A FORDS

The Model A Ford presents a somewhat involved problem for the installation of the RCA Victor Automobile Radiola. The reason for this is that due to the gasoline tank being part of the cowl, the usual location for the set and speaker cannot be used. Two positions for the receiver and three for the speaker are possible, each having several disadvantages.

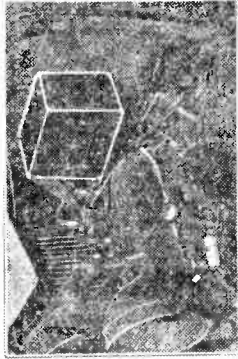


Figure 19—Location of Units in Model A Ford

The receiver unit may be mounted in the engine compartment as shown in Figure 19, more easily than at any other location. The disadvantage of this position is that due to the high noise level present even when suppressors are used, a satisfactory installation cannot always be made. The receiver is also subject to motor fumes, water and steam used in engine cleaning and the usual atmospheric conditions.

The other alternative position for the receiver is on the right side of the driving compartment as shown in Figure 20. The dimensions for a template to be mounted to the body to hold the receiver or loudspeaker are shown in Figure 21. The interference may be successfully eliminated at this location but the position of the receiver interferes with the leg room of the person riding beside the driver.



Figure 20—Alternative Position for Receiver and Loudspeaker

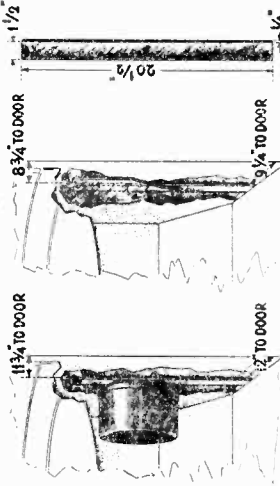


Figure 21—Dimensions of Bracket for Mounting Receiver or Loudspeaker to Side of Driver's Compartment

The loudspeaker may be mounted at either side of the car, using the same template for a bracket as that shown in Figure 21, on models not having pockets at either of these locations. On such models, such as the roadster, the loudspeaker can be mounted directly behind the gear shift lever and bolted to the seat base. This location is not seriously in the way and gives good acoustical results.

The batteries may be mounted behind the rear seat in the sedan models, in the rear compartment of coupes and roadsters or in a battery box on any model.

interfere with the driver's foot room. The switch may then be turned "on" and the receiver operated in the usual manner. Normally, starting the car engine will not introduce any objectionable noise. However, if ignition interference is present that is objectionable, then a reference to Part II will give the details for clearing up this trouble.

(3) INSTALLATION OF ROOF ANTENNA

In cars not already equipped with roof antennae, the usual installation is that of the antenna plate. Due to the high sensitivity of this receiver, entirely satisfactory results are obtained from the plate antenna in most installations. However, if the car is to be operated in a locality remote from any stations and having a general low degree of signal strength, the erection of a roof antenna is advisable. The following details cover the procedure to be used in a majority of closed cars. This work should be done by a competent "trim" man as a degree of skill, only acquired by experience, is necessary in removing and replacing the fabric top of a car.

The antenna should be composed of copper screen having a total area of at least 10 square feet. It should be located as far to the rear as possible and insulated from any metal part of the car which may ground it. In some cars having a metal rib in the center, it will be advisable to make the antenna in two pieces and use insulated wire as straps for bonding it together. All joints together with the lead-in connections should be well soldered.

USE TINNED OR BRIGHT COPPER OR BRONZ WIRE SCREEN ONLY. DO NOT USE GALVANIZED OR OXIDIZED COPPER SCREEN

USE SCREEN OF PROPER WIDTH TO AVOID CUTTING LENGTHWISE

DROP THE HEAD LINING FROM FRONT OF CAR SO THAT IT CAN BE FOLDED ON REAR SEAT WHILE WORKING

CUT HOLE TO CLEAR DOME LIGHT AND SOLDER EDGES OF SCREEN

STAGGER TACKS TO PERMIT LISTINGS ON HEAD LINING TO BE TACKED OVER SCREEN

TIGHTEN AND IF NECESSARY SOLDER THE DOME LIGHT CONNECTIONS

TACK DOME LIGHT WIRING TO UPPER EDGE OF BEAM SO THAT IT WILL NOT SAG OR VIBRATE.

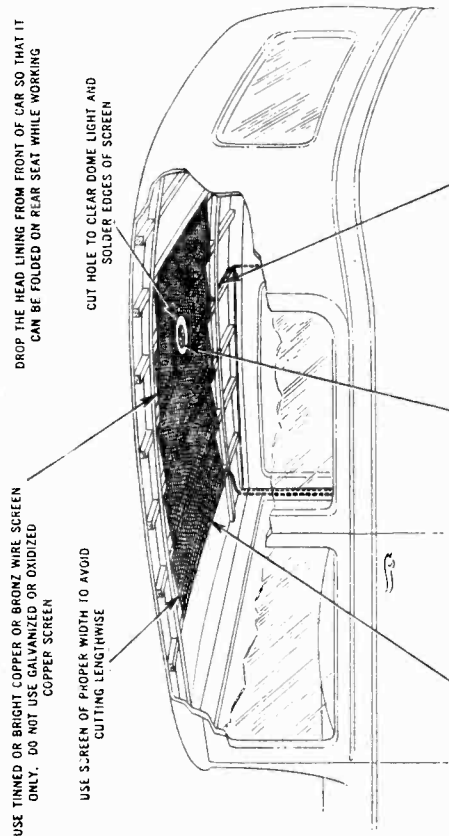


Figure 18—Details of Roof Antenna

1. First determine if there is a grounded metal screen in the roof of the car, as some cars use such a screen for the top material support. A sharp pointed instrument, connected on one side of a continuity tester, the other side being grounded, should be used. Push the point through the top lining and fish around until it comes in contact with the wire screen. If any reading is obtained, even though very small, the screen is grounded and it cannot be used for an antenna. If not, however, one corner of the head lining may be removed and a connection soldered to the screen which will make an excellent antenna.
2. If the screen is grounded or if no screen is present, it will be necessary to remove the head lining and a strip clipped from the screen several inches from all edges and from the dome light or insert a copper screen approximately of these same dimensions. If there is a possibility of the screen shifting, tack it to one of the ribs and lace the sides with cord.
3. Solder a length of shielded wire to the right front corner of the screen. Then solder or bond the shield securely to the car frame. The lead-in is then run down the right front roof

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Notes Part 6

PART II—SUPPRESSION OF IGNITION INTERFERENCE

In general, the use of the ignition suppressors and capacitors as described in Part I of this booklet will reduce the ignition interference to a negligible amount. However, on some installations it will be found that the noise is still present to a degree that is undesirable. In such cases, the following hints will aid the installation man in clearing up this trouble.

(1) IGNITION ADJUSTMENTS ON MOTOR

The first-step in clearing up a noisy installation is to thoroughly check and remedy any defects in the ignitor system of the car. By this we mean the spark plugs should be cleaned and adjusted or replaced, the breaker points replaced or adjusted and synchronized if necessary, the distributor arm filled out with solder until it makes a full even contact, and the generator commutator cleaned and its brushes adjusted or replaced. Also all wiring should be cleaned and loose connections or poor joints remedied. This work is the first step in the clean-up job and it should be done by a competent ignition expert, who has been acquainted with the need of accurately making all adjustments.

Usually, such adjustments though made on a motor that is performing efficiently, will materially reduce the ignition noise in the radio receiver.

(2) BY-PASS CAPACITORS

In some installations a re-arrangement of the connections of the by-pass capacitors will be found beneficial. For example, the by-pass capacitor connected to the battery side of the ammeter, if connected to the battery side of the ignition coil may be more effective.

In other cases using an additional capacitor at the coil, a total of three for the installation, will remedy the trouble. In all cases the generator capacitor is used, although if a clicking is heard when the cut-out makes and breaks its circuit, the pigtail should be connected to the load side rather than the generator side of the cut-out relay.

On some cars, two capacitors—one on each terminal—at the ammeter will greatly reduce the noise. This is especially true of 1932 Studebakers.

(3) IGNITION COIL

The car ignition coil, due to the high electromagnetic field surrounding it, should be at as great a distance as possible from the receiver, preferably on the opposite side of the metal bulkhead. On cars that have the ignition coil mounted on the instrument board directly over the receiver unit, it may be necessary to place it in the engine compartment. Where the switch is mounted into one end of the coil, the switch assembly must be removed from the coil and a bracket provided for mounting it. The leads from the coil should be shielded and the shield grounded. (Use Packard High Tension Cable for the high tension lead to the distributor).

Another important point is that of the primary connections. While not affecting the ignition system in its relation to the car, due to the use of auto-transformers as coils, interchanging the primary leads to a coil will sometimes materially reduce the ignition noise.

(4) ANTENNA PLATE

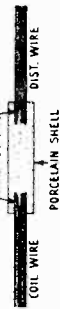
If grounding the antenna at its point of exit from the shield reduces or eliminates the noise, then it is feeding in through the antenna. The remedy in such a case is to place the antenna further toward the rear of the car. Also lowering it, slightly will greatly increase its signal pickup. Care must be exercised when doing this, to ascertain that the road clearance of the car is not reduced. Another important point to check is the grounding of the outer end of the antenna shield. Grounding this end of the shield to the chassis in practically all cases, materially reduces ignition noise. However, in certain cases, grounding this shield may increase the noise. In such cases the shield should be insulated with tape and left ungrounded.

(5) CABLES

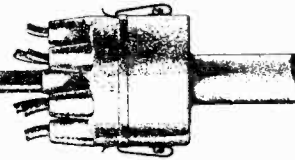
Proper placing of the various shielded cables may have a bearing on the ignition noise picked up as well as contact noise caused by a variable contact between the cable shields and the car frame.

The antenna lead should follow the shortest path between the receiver unit and the antenna. If there is any possibility of the shield rubbing against any of the car frame, the cable should be taped or clamped in place. The "B" battery cable should be taut and any slack taken up by means of a loop. It should also be fastened or taped securely.

SPUCE-IN TYPE SUPPRESSOR



PLUG-IN TYPE SUPPRESSOR



BINDING POST TYPE DISTRIBUTOR USING SPARK-PLUG TYPE SUPPRESSOR.

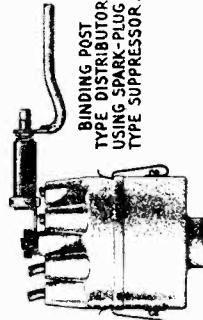


Figure 23—Installation of Various Types of Distributor Suppressors

(6) DISTRIBUTOR SUPPRESSORS

Three different styles of distributor suppressors are used, due to the variations in the distributor head connections. These are illustrated in Figure 23. The plug-in type is supplied with this equipment and is used in the majority of cars. The spark plug type with the end flattened is used in Packard and other cars having the binding post connection. The splice-in type is used on cars that do not have a readily removable connection to the distributor head. It is spliced into the high tension head, as close to the distributor as possible. This type may also be used on cars not having much room at the spark plugs, such as the Buick. While not furnished with regular equipment, the splice-in type suppressor is listed in Part IV.

PART III—SERVICE DATA

Service work in connection with the RCA Victor Automobile Radiola is very similar to that of the usual broadcast receiver. However, the following description of the circuit and method of making adjustments will be found helpful in locating and remedying any failure that may occur.

ELECTRICAL DESCRIPTION OF CIRCUIT

The following description of the circuit will give the service man a better understanding of the functioning of the receiver and thereby help him in his work. Figure 22 shows the schematic circuit diagram.

The first tube is the tuned R.F. stage. This is the screen Grid Radiotron, RCA-236. The control grid bias for this Radiotron is varied by means of the automatic volume control tube.

The output of the R. F. stage is coupled inductively to the grid coil of the first detector. At this point the oscillator output is also coupled inductively to the grid coil of the first detector.

MODEL M-30 Auto Radio Notes Part 7

R. C. A. VICTOR CO., INC.

If the other adjustments have not been tampered with—the intermediate tuning capacitors—the following procedure may be used for adjusting these capacitors.

1. Loosen the receiver unit clamping screw and dismount the receiver from its mounting bracket. Do not remove any of the connections or the flexible cable.
2. Procure an R. F. oscillator giving a modulated signal at exactly 1400 K. C. and 600 K. C. Also procure a non-metallic screw driver—Stock No. 7065—and a No. 5 Spintite socket wrench.
3. An output indicator is necessary. This should be a current-squared thermo-galvanometer substituted or connected in parallel to the loudspeaker leads.

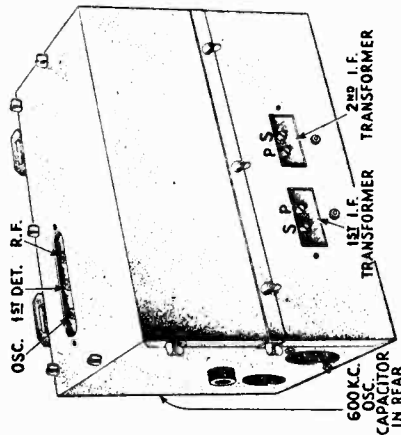


Figure 24—Location of Radio Frequency, Oscillator and Intermediate Frequency Adjustments

4. Remove the top cover of the receiver and remove the automatic volume control tube. Also ascertain that the tuning capacitor is fully meshed when the dial reads 150.
5. Place the oscillator in operation at exactly 1400 K. C. and couple it to the antenna. Set the dial at exactly 140 and adjust the coupling between the antenna and oscillator so that the output indicator does not give an excessive reading.
6. With the socket wrench, adjust the oscillator (see Figure 24), the first detector and the R. F. line-up capacitors until a maximum deflection is obtained in the output meter.
7. Set the oscillator at 600 K. C. Tune in this signal with the receiver and adjust for a deflection in the output meter. Now adjust the 600 K. C. series capacitor. Figure 24, until maximum output is obtained. Rock the tuning capacitor back and forth while making this adjustment.
8. Change the oscillator frequency to 1400 K. C. and set the dial at 140. Again make the adjustments given under 2, 3, 4, 5 and 6.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

A single intermediate frequency amplifier stage is used in this receiver. Two transformers are used and all circuits are tuned to 175 K. C. The circuits are peaked and when alignment adjustments are made, the capacitors are adjusted for maximum output. It will be necessary to remove the chassis from its mounting bracket as is the case of the R. F. adjustments.

This is a tuned grid circuit oscillator using a Radiotron RCA-237 and having a closely coupled plate coil that gives sufficient feedback to provide stable operation. The grid circuit is so designed that by means of a correct combination of capacity and inductance a constant frequency difference between the oscillator and the tuned R. F. circuits throughout the tuning range of the receiver is obtained.

The next circuit to examine is the first detector. The circuit is tuned by means of one of the gang condensers to the frequency of the incoming signal. Radiotron RCA-236 is used in this stage. In the grid circuit is present the incoming signal and oscillator frequencies. The beat frequency—175 K. C.—appears in the plate circuit of the first detector which is accurately tuned to 175 K. C. The next stage is that of the I. F. amplifier. A single stage is used, requiring two I. F. transformers, consisting of four tuned circuits. The plate circuit of the first detector, the grid and plate circuit of the I. F. amplifier and the grid circuit of the second detector are all tuned to 175 K. C. Radiotron RCA-236 is used in this stage and its control grid voltage is also varied by means of the automatic volume control tube.

At this point it is well to consider the action of the automatic volume control tube as it controls the R. F. and I. F. amplifiers of the receiver. The grid of the automatic volume control tube, RCA-237, is connected direct to the cathode of the second detector.

The change in the bias voltage of the second detector, due to fluctuation of the signal, is applied to the grid of the A. V. C. tube. This produces a voltage drop across a resistor in the plate circuit which constitutes the control grid bias for the R. F. and I. F. amplifier. As the value of the plate current is a direct result of the voltage applied to the grid, a greater plate current gives a greater voltage drop across the resistor in its plate circuit and therefore a higher bias on the I. F. and R. F. stage. This results in less sensitivity and vice versa. The volume control varies the bias on the grid of the volume control tube.

The second detector is of the grid-biased type, using Radiotron RCA-237. The purpose of the second detector is to extract the audio frequency component of the R. F. signal which represents the voice or musical modulations produced in the studio of the broadcasting station. The audio component is extracted and used to drive the first A. F. tubes while the R. F. current is by-passed and not further used.

The output of the second detector is coupled by means of resistance coupling to the grid of the first A. F. Radiotron RCA-237. This audio stage is used as a driver for the Class B amplifier.

The output of the first audio stage is coupled by means of transformer coupling to the grids of the Radiotrons UX-112-A used as a push-pull Class "B" power stage. This stage is so biased that normally no plate current flows. However, as the grid swings positive due to the signal voltage being applied, plate current flows which is entirely of an audio character. As there is little residual current when no signal is present, this is a very economical amplifier as well as providing a high undistorted output—2 Watts.

The entire "A" battery current drain is 2.85 Amperes and the "B" current 12 M.A. minimum and 25 M.A. average maximum.

Filament and heater current is supplied from the storage battery in the car. Plate current is supplied by means of four medium size "B" batteries. A fuse is provided in both filament and plate circuits to protect the batteries and tubes.

(1) R. F. AND OSCILLATOR ADJUSTMENTS

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that it will be at a 175 K. C. difference from the incoming R. F. signal throughout the tuning range of the set. Poor quality, insensitivity, and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

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MODEL M-30
Auto Radio
Voltage
Notes Part 8

(4) TESTING CAPACITORS

The by-pass capacitors are in a metal container. The internal wiring diagram is shown in Figure 26.

The capacitors can best be tested by freeing their connections and charging them with approximately 180 volts D. C. (use the four "B" batteries) and then noting their ability to hold the charge. After charging, short circuiting the capacitor terminals with a screw driver should produce a flash the size of the flash depending on the capacity of the capacitor and the voltage used for charging. A capacitor that will not hold its charge is defective and requires replacement of the entire unit.

(5) CHECKING RESISTANCE VALUES

The values of the various resistance units in this receiver are shown in the schematic diagram, Figure 22. When testing a receiver for defects, the various values of resistance should be checked. This may be done by a resistance bridge; the voltmeter-ammeter method, or by the following method.

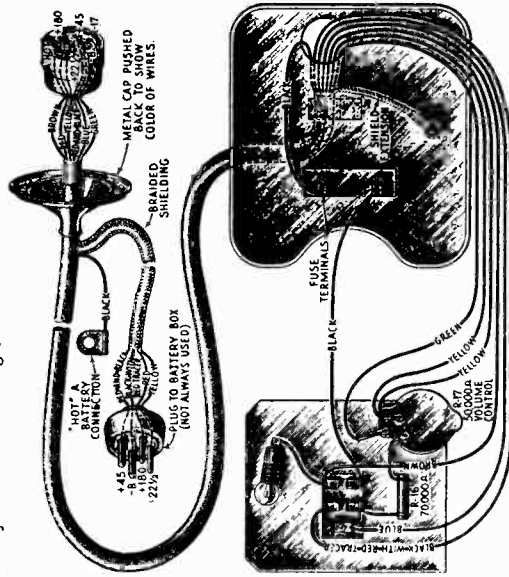


Figure 25—Control Box Wiring

For resistance of low value, 5000 ohms or less, use a voltmeter having a resistance not greater than 100 ohms per volt. For high values of resistance use a meter of 1000 ohms or more per volt. The Weston meters, Type 301 or 280, each have a resistance of 62 ohms per volt and are satisfactory for the low values. Use sufficient battery to give a good deflection on the meter, for example, a 45 volt "B" battery for a 0-50 voltmeter. Take two readings, one of the battery alone, and one of the battery with the unknown resistance in series. Then apply the following formula:

$$\left(\frac{\text{Reading obtained of battery alone}}{\text{Reading obtained with resistance in series}} - 1 \right) \text{Resistance of meter} = \text{Unknown Resistance}$$

(6) WIRING DIAGRAMS

The schematic wiring diagram is shown in Figure 22. The Control Unit wiring is shown in Figure 25 and the general wiring in Figure 26. A reference to these diagrams when locating trouble or replacing a unit will usually prove helpful. The internal connections of the cables are shown in Figure 27.

A detailed procedure for making these adjustments follows:

- Procure a modulated R. F. oscillator giving a signal at 175 K. C. The General Radio Type 360 is suitable. A non-metallic screw driver such as Stock No. 7065 is also necessary.
- Connect an output meter in the circuit. A current-squared galvanometer connected either in place of or across the loudspeaker leads is suitable.
- Remove the metal cover over the top of the receiver and then remove the oscillator and automatic volume control tube, Figure 10. Make a good ground connection between the receiver chassis and the car frame.
- Place the oscillator in operation and connect its output between the control grid connection of the first detector and ground, see Figure 10.
- Now adjust the secondary and primary of the second and first I. F. transformers until a maximum output is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary. Be sure the output from the oscillator is not great enough to overload the first detector and I. F. tubes.
- When the adjustments are made, the set should perform at maximum efficiency. However, due to the interlocking of adjustments, it is a good plan to always follow the I. F. adjustments with the R. F. and oscillator lineup capacitor adjustments as described in Part III, Section I.

(3) VOLTAGE READINGS AT RADIOTRON SOCKETS

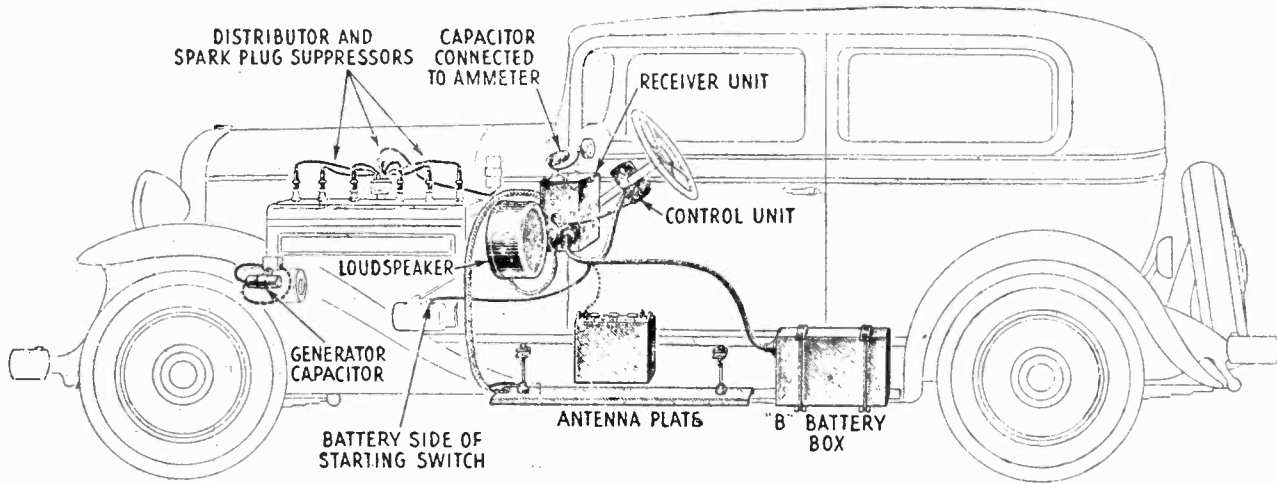
The following voltages taken at each Radiotron socket with the receiver in operating condition should prove of value when checking with test sets such as the Weston Model 547, Type 3, or others giving similar readings. The plate currents shown are not necessarily accurate for each tube, as the cable in the test set will cause some circuits to oscillate, due to its added capacity. Small variations of voltages will be caused by different tubes. Therefore, the following values must be taken as approximately those that will be found under varying conditions. The numbers in column 1 indicate the tube socket numbers shown in Figure 26.

RADIOTRON SOCKET VOLTAGES

Tube No.	VOLUME CONTROL AT MINIMUM					VOLUME CONTROL AT MAXIMUM (NO SIGNAL BEING RECEIVED)					
	Cathode to Heater Voltage	Cathode or Filament to Screen Grid Voltage	Cathode or Filament to Plate Voltage	Plate Current M. A.	Screen Grid Current M. A.	Heater or Filament Voltage	Cathode to Heater Voltage	Cathode or Filament to Screen Grid Voltage	Cathode or Filament to Plate Voltage	Plate Current M. A.	Screen Grid Current M. A.
1. R. F.	18	0.5	136	0	0	18	0.5	70	135	4.0	1.0
2. 1st Det.	1.0	3.0	150	0.25	0.1	1.0	3.0	42	150	0.25	0.1
3. Osc.	6.0	0	45	3.5	—	6.0	0	—	45	3.5	—
4. I. F.	18	1.0	136	0	0	18	1.0	—	135	4.0	1.0
5. 2nd Det.	12	10	110	0.5	—	12	10	—	110	0.5	—
6. 1st A. F.	15	2.0	165	3.5	—	15	2.0	—	165	3.5	—
7. A. V. C.	10	1.0	15	0	—	10	1.0	—	15	0	—
8. P. W. R.	—	20	155	1.5	—	—	20	—	155	1.5	—
9. P. W. R.	—	20	155	1.5	—	—	20	—	155	1.5	—

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Auto Radio
Notes Part 9

R. C. A. VICTOR CO., INC.



General View of Typical Installation of Automobile Radio

(7) VOLUME CONTROL

Normally, turning the volume control to the extreme counter-clockwise position will reduce the output volume of the receiver to zero. However, in event a powerful local station does not reduce to a satisfactory level, then check the following points.

- a. Automatic volume control tube. Try interchanging it with others of a similar type or replacing it with a new one.
- b. Volume control. Normally the volume control is of 50,000 ohms resistance. If for any reason it should be less, then the fixed resistor R-16 must also be reduced in value so that the proportion of 50,000 ohms to 70,000 ohms is maintained. For example—if the volume control measures 30,000 ohms, the fixed resistor should be replaced with one of 42,000 ohms. Such a replacement is much easier than a replacement of the complete volume control.

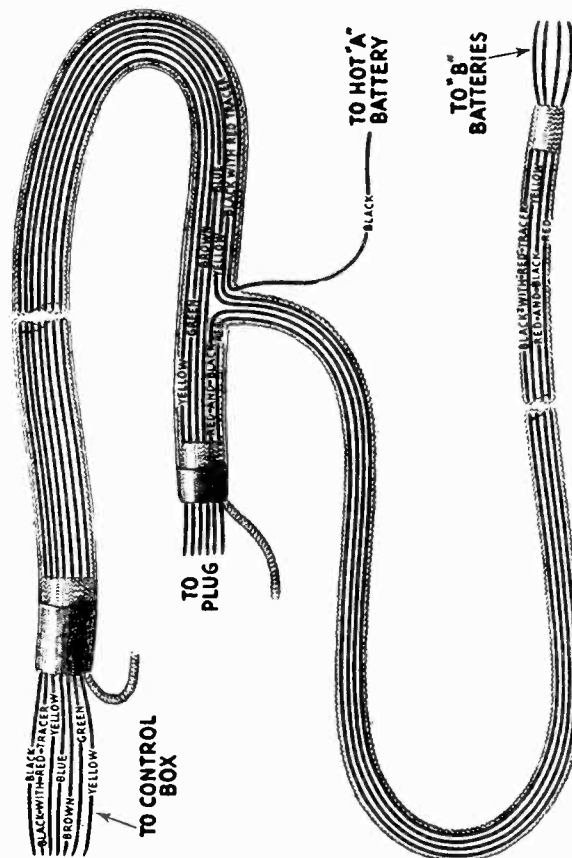


Figure 27—Internal Connections of Cables

PART IV—REPLACEMENT PARTS

On the following pages the parts that are required for replacement use are listed. It will be noted that several parts not included in the standard equipment are also listed. There are respectively, several types of ignition suppressors and special length flexible shafts. Reference to these parts has been made in the text and on some special installations they will be required.

R. C. A. VICTOR CO., INC.

MODEL M-30
Auto Radio
Parts List

REPLACEMENT PARTS

REPLACEMENT PARTS—(Continued)

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
2240	RECEIVER ASSEMBLY Resistor—30,000 ohms—Carbon type—1 watt	\$0.70	3287	CONTROL BOX ASSEMBLY Label—Metal trade mark label—Package of 5	\$0.75	8829	LOUDSPEAKER ASSEMBLY Cone—Speaker paper cone. Package of 5	\$8.00
2546	Resistor—1 megohm—Carbon type—1 watt—Package of 5	3.00	6153	Clamp—For clamping control box to steering wheel shaft—Package of 5	.50	8830	Housing—Speaker housing complete—Comprising front screen, back dust screen, cone and mounting bracket	3.00
2736	Resistor—170 ohms—Carbon type—1 watt—Package of 5	2.00	6154	Screw—Clamp mounting screw—Package of 50	.50	8831	Bracket assembly—Speaker housing mounting bolts, 4 washers and 4 nuts	.95
2741	Idle—Tuning capacitor drive idler—Package of 5	.80	6155	Shaft—Tuning dial shaft with gear and drive washer—Package of 5	1.25	8832	Cable—Speaker shielded cable less plug	.55
2742	Spring—Tuning capacitor drive tension spring—Package of 5	50	6156	Switch—Lock switch—Complete with mounting nut and washer	.80	8838	Speaker complete—Comprising speaker, housing case and cord—Assembled	13.50
2747	Cap—Grid contactor cap—Package of 5	.50	6157	Volume control—Volume control complete with mounting nut	1.50			
2749	Capacitor—2400 mmfd.	1.50	6158	Nut—Knurled nut for lock switch—Package of 10	.50			
2966	Resistor—28,000 ohms—Carbon type—1 watt—Package of 5	2.50	6159	Resistor—70,000 ohms—Carbon type—1/2 watt—Package of 5	2.00			
2994	Coil—2nd detector R.F. choke coil	.60	6160	Dial scale—Package of 5	.50			
3048	Resistor—500,000 ohms—Carbon type—1/2 watt—Package of 5	2.50	6161	Knob—Tuning control knob—Package of 5	1.50			
3078	Resistor—10,000 ohms—Carbon type—1 watt—Package of 5	2.50	6162	Spring—Knob tension spring—Package of 25	.50			
3118	Resistor—100,000 ohms—Carbon type—1/2 watt—Package of 5	2.00	6163	Knob—Volume control knob—Package of 5	1.50			
3288	Socket—U.V. Radiotron socket—Complete with insulation strip	.50	6164	Key—Lock switch key—Package of 10	.50			
6133	Socket—U.V. Radiotron socket—Complete with insulation strip	.50	6165	Lamp—Dial scale lamp—Package of 5	1.75			
6134	Resistor—1200 ohms—Carbon type—1 watt—Package of 5	2.00	6169	Felt—Felt strip for steering column—Package of 10	.50			
6135	Resistor—270 ohms—Carbon type—1/2 watt—Package of 5	2.00	7430	Control box complete—Less flexible shaft and cable	5.25			
6136	Resistor—3500 ohms—Carbon type—1 watt—Package of 5	2.00	7431	Cover assembly—Comprising top and bottom covers	1.20			
6137	Coil—R.F. coil	1.90	7432	Bracket assembly—Comprising bracket, stud, stop washer and lamp socket—Located inside of control box	2.20			
6139	Cord—Tuning condenser drive cord—Package of 5	3.30						
6140	Plug—6 prong male plug and plug receptacle	.65						
6141	Receptacle—Two prong receptacle for speaker cord plug—Package of 2	.50						
6142	Resistor—6,000 ohms—Carbon type—1/2 watt—Package of 5	.70						
6143	Resistor—10,000 ohms—Carbon type—1 watt—Package of 5	2.00						
6144	Resistor—4 ohms—Flexible wire type—Package of 5	2.00						
6145	Cover Plate—Adjustable capacitor adjustment cover plate—Located on back receiver shield—Package of 5	1.00						
6146	Screw—Self tapping hex head screw—For mounting cover plates to shield—Package of 40	.50						
6147	Nut—Wing nut for receiver shield—Package of 20	.60						
6148	Fuse—10 amperes—Package of 5	.50						
6149	Bumper—Rubber bumpers—Located on receiver mounting bracket—Package of 10	50						
6150	Plug—Six prong female plug—Located on main cable	50						
6151	RECEIVER ASSEMBLY—Continued Suppressor—Spark plug type suppressor	\$0.65	6152	Suppressor—Distributor type suppressor	.65	6153	Clamp—For clamping control box to steering wheel shaft—Package of 5	.50
6154	Suppressor—Distributor type suppressor	.65	6154	Screw—Clamp mounting screw—Package of 50	.50	6155	Shaft—Tuning dial shaft with gear and drive washer—Package of 5	1.25
7062	Capacitor—Adjustable capacitor 15-70 mmfd.	1.00	6156	Switch—Lock switch—Complete with mounting nut and washer	.80	6157	Volume control—Volume control complete with mounting nut	1.50
7065	Motor—Screw Driver—Used for I. F. and R. F. adjustment	1.10	6158	Nut—Knurled nut for lock switch—Package of 10	.50	6159	Resistor—70,000 ohms—Carbon type—1/2 watt—Package of 5	2.00
7299	Capacitor—745 mmfd.	.70	6160	Dial scale—Package of 5	.50	6161	Knob—Tuning control knob—Package of 5	1.50
7421	Capacitor pack—Comprising two 0.5 mfd., two 0.018 mfd., three 0.1 mfd., two 0.25 mfd., and one 5.0 mfd. capacitors in metal container	5.25	6162	Spring—Knob tension spring—Package of 25	.50	6163	Knob—Volume control knob—Package of 5	1.50
7422	Transformer—1st intermediate transformer	2.50	6164	Key—Lock switch key—Package of 10	.50	6165	Lamp—Dial scale lamp—Package of 5	1.75
7423	Transformer—2nd intermediate transformer	2.50	6169	Felt—Felt strip for steering column—Package of 10	.50	7430	Control box complete—Less flexible shaft and cable	5.25
7424	Transformer—Output transformer	2.50	7431	Cover assembly—Comprising top and bottom covers	1.20	7432	Bracket assembly—Comprising bracket, stud, stop washer and lamp socket—Located inside of control box	2.20
7425	Transformer—Interstage transformer	1.85						
7426	Board—Resistor board complete, less resistors, coil and capacitor	2.20						
7427	Cover plate—Intermediate adjustment cover plate—Located on front receiver shield—Package of 5	.50						
7428	Cover plate—Tuning capacitor trimmer adjustment cover plate—Located on top receiver shield—Package of 5	2.00						
7429	Capacitor—0.625 mfd. In metal casing with mounting bracket	.50						
8822	Capacitor assembly—Tuning capacitor assembly—Comprising 3 variable capacitors, drive bracket, driver cord, driver shaft and drum—Assembled	8.60						
8823	Shield—Drive shaft—Length 30"	1.90						
8824	Shield—Back cover shield for receiver chassis	2.05						
8825	Shield—Front cover shield for receiver chassis	1.10						
8826	Shield—Top cover shield for receiver chassis	1.15						
8827	Bracket—Receiver chassis mounting bracket complete with two rubber bumpers	1.20						
8828	Cable—Main cable less plug—From control box to receiver chassis and battery box	2.20						
8833	Flexible drive shaft—Length 42"	4.65						
8834	Flexible drive shaft—Length 51"	9.35						
8835	Flexible drive shaft—Length 66"	9.65						
8836	Flexible drive shaft—Length 78"	10.10						

Order By Stock Number Only

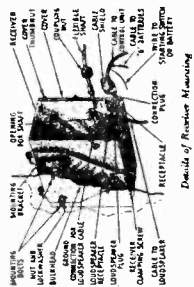
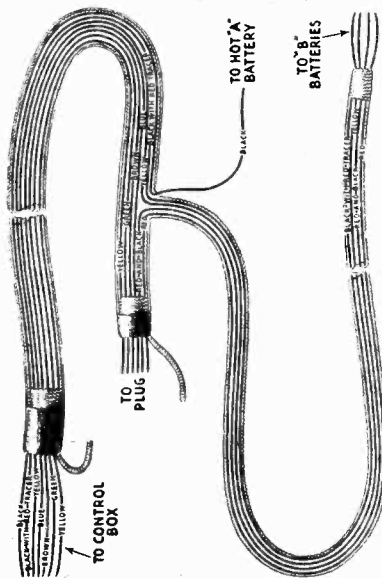
Order By Stock Number Only

MODEL M-30
Auto Radio
Resistance Data

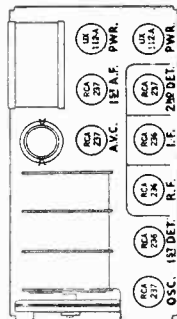
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All tubes removed from sockets and all batteries disconnected. Dial lamp removed

From Chassis To	Correct	Incorrect
Aerial to Ground	28 ohms	
RF Control Grid to 45+	500,005 ohms	
RF Control Grid to Chassis	0 ohms	TC- rf Cg-Y
RF Control Grid to AVC Plate	5 ohms	BLC- in tuned circuit
RF Cathode to 45+	170 ohms	
RF Cathode to chassis	0 ohms	BC- rf K-Y
RF Screen Grid to 180+	30,000 ohms	BC- rf Sg-Y
RF Screen Grid to chassis	0 ohms	FC-Y (4 mfd)
RF Plate to 180+	58 ohms	BC- 1 D Sg-Y
		TC- 1F Tr
1 Detector Cg to chassis	5 ohms	TC- 1 D Cg-Y
1 Detector Cathode to chassis	10,000 ohms	BC- 1 DK-Y
1 Detector Screen Grid to 180+	30,000 ohms	
1 Detector Screen Grid to chassis	0 ohms	
1 Detector Plate to 180+	89 ohms	
Oscillator Cg to chassis	40,000 ohms	Osc Grid Condenser
Oscillator Cathode to chassis	0 ohms	
Oscillator Plate to 180+	30,000 ohms	
Oscillator Plate to 1 D Screen	1 ohm	See Rf Screen
IF Control Grid to AVC Plate	40 ohms	TC- 1F Tr
IF Cathode to 45+	170 ohms	
IF Screen to 180+	30,000 ohms	See Rf Screen
IF Plate to 180+	40 ohms	TC- 1 D Plate
		TC- 1F Tr
2 Detector Control Grid to B-	89 ohms	
2 Detector Cathode to B-	28,000 ohms	
2 Detector Plate to 180+	100,080 ohms	
2 Detector Plate to Cathode	0 ohms	BC- 2 DP- 2 DK
1 Audio Control Grid to B-	1,000,000 ohms	
1 Audio Cathode to B-	3,589 ohms	BC- 1 AF K-B-
1 Audio Plate- 180+	920 ohms	
2 AF Cg to Cg	320 ohms	
2 AF Cg to chassis (A- grounded)	1,800 ohms	BC- 2 AF Cg-F
2 AF Plate to Plate	560 ohms	
Between B- and 22+	1,715 ohms	
Across Output Transformer Secondary	only .4 ohms	
AVC Plate to 45+	500,000 ohms	
AVC Control Grid to B-	28,000 ohms	
AVC Cathode to 22+	0-29,455 ohms	



A 4 ohm resistor is to be found between one output tube filament terminal and the "A" hot lead. This lead contains a fuse between the "A" terminal and the switch. The control grid of the AVC tube is joined directly to the cathode of the 2nd detector. The normal circuit arrangement used in the receiver assumes A- of the car battery connected to ground. If A+ is grounded, a change is required. This change is shown in the wiring diagram upon page 504-Y



RADIOTRON SOCKET VOLTAGES

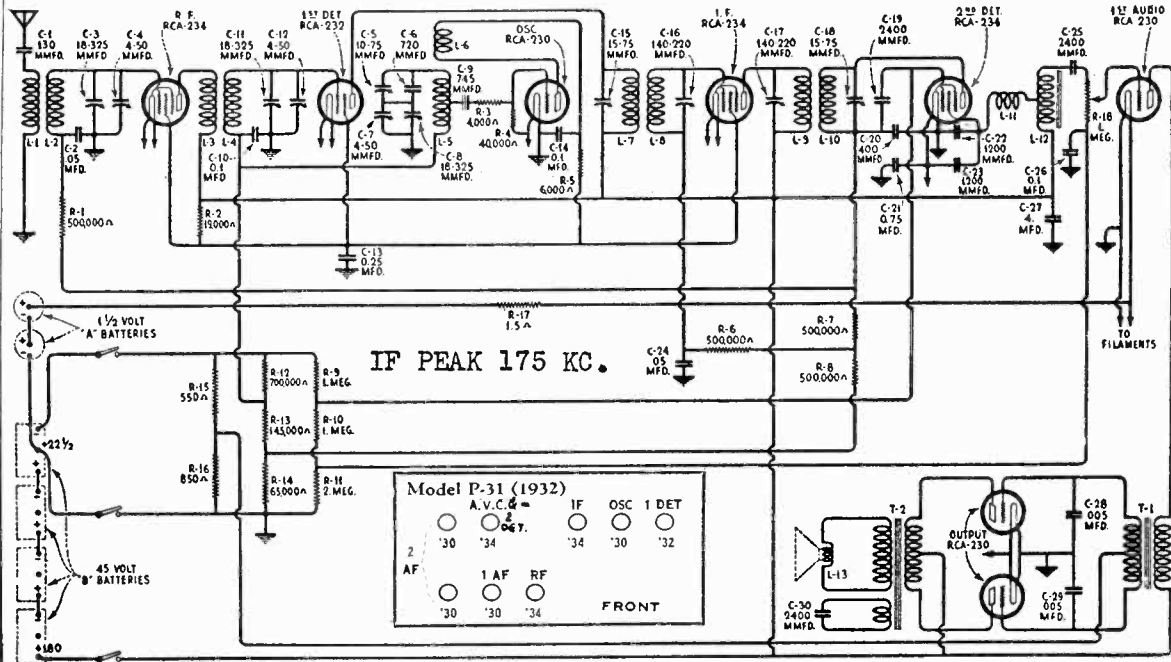
Tubes	VOLUME CONTROL AT MINIMUM		VOLUME CONTROL AT MAXIMUM	
	Minimum Plate Voltage	Maximum Plate Voltage	Minimum Plate Voltage	Maximum Plate Voltage
1. R. F.	15	100	15	100
2. 1st Det.	1.0	3.0	42	150
3. Osc.	6.0	0	45	3.5
3. I. F.	18	100	136	0
5. 2nd Det.	12	10	110	0.5
6. 1st A. F.	15	2.0	105	3.5
7. A. V. C.	10	1.0	15	0
8. P. W. R.	—	—	155	1.5
9. P. W. R.	—	—	153	1.5

(100 SIGNAL BEING RECEIVED)

Tubes	Minimum Plate Voltage	Maximum Plate Voltage
1. R. F.	10	70
2. 1st Det.	1.0	3.0
3. Osc.	6.0	0
4. I. F.	18	0.5
5. 2nd Det.	12	10
6. 1st A. F.	15	2.0
7. A. V. C.	5.0	9.0
8. P. W. R.	—	30
9. P. W. R.	—	20

R. C. A. VICTOR CO., INC.

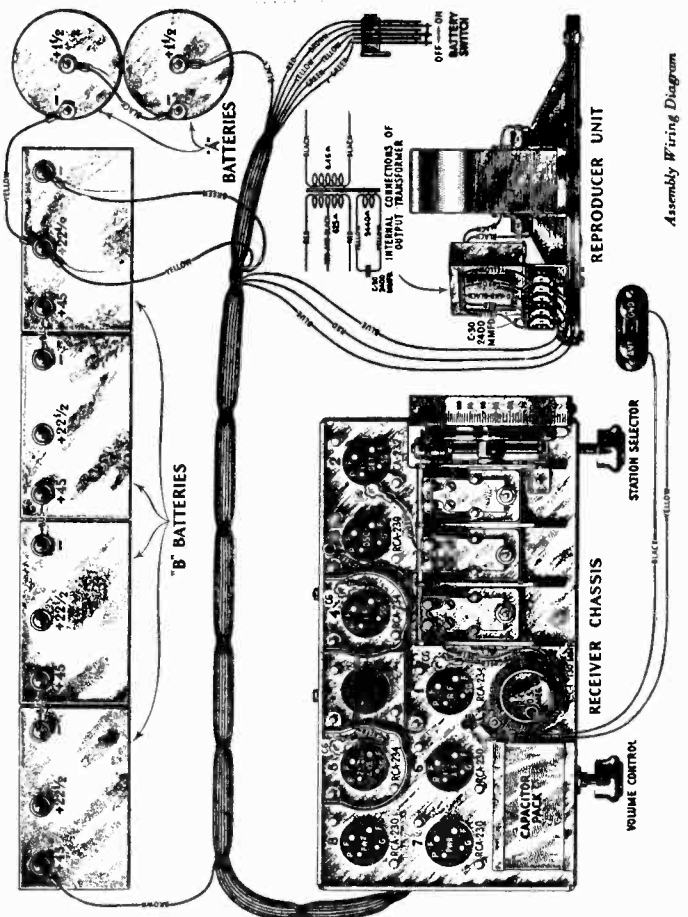
MODEL P-31
Portable
Schematic
Voltage



"A" Battery Current 0.48 Amps.
Average "B" Battery Current . . . 18 M. A.
Type of Audio Output Amplifier . . . Class "B"
Undistorted Output 0.75 Watts

RADIOTRON SOCKET VOLTAGES
(No Signal Being Received)

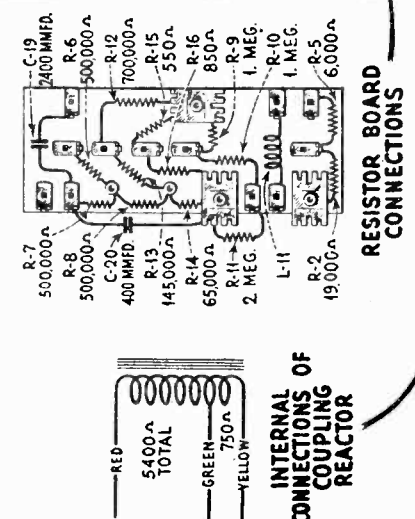
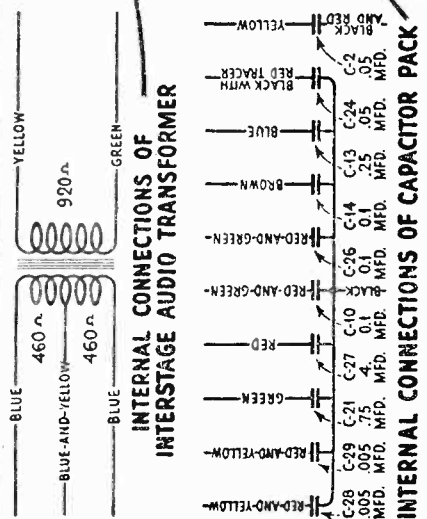
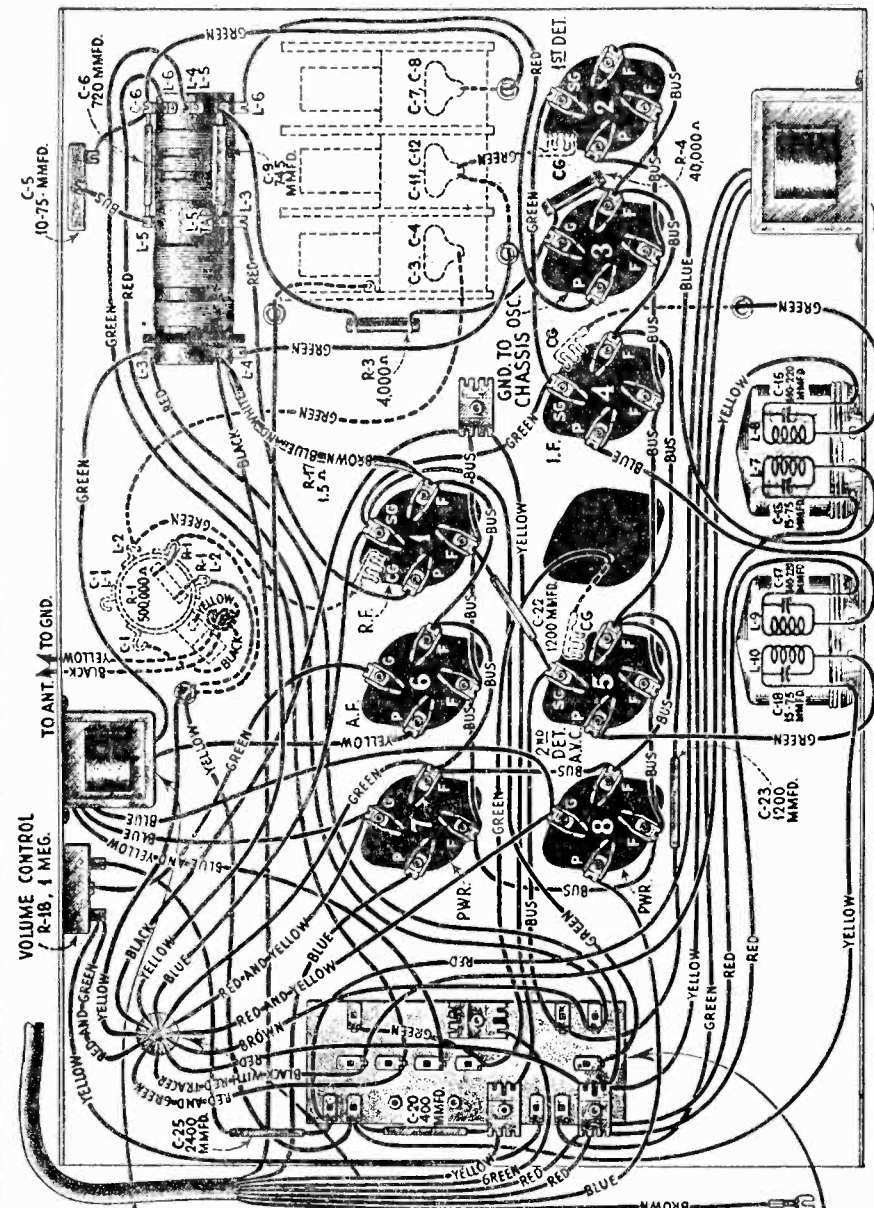
Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Screen Current M. A.	Plate Current M. A.	Filament Volts
1. R. F.	0.2	65	150	1.0	3.0	2.0
2. 1st Det.	0.5	65	150	0.1	0.2	2.0
3. Osc.	1.0	—	45	—	3.0	2.0
4. I. F.	0.5	65	150	1.0	3.0	2.0
5. 2nd Det.	2.0	150	—1.5	4.0	0	2.0
6. 1st A. F.	1.0	—	145	—	2.5	2.0
7. Power	14.0	—	150	—	1.5	2.0
8. Power	14.0	—	150	—	1.5	2.0



MODEL P-31
Portable
Chassis-Notes

R. C. A. VICTOR CO., INC.

PORTABLE
RADIOLA P-31



permanent magnet, dynamic-type loudspeaker. An extra winding, shunted by a capacitor, acts as a high frequency cut-off.

Service Data on the RCA Victor Portable Radiola P-31 is similar to that of other RCA Victor Super-Heterodyne receivers. Alignments of the R. F., Oscillator and I. F. stages should be made in a manner similar to that described in the Service Notes on the Automobile Radiola M-30. The location of the various line-up capacitors is the same as that of the M-30.

In making line-up adjustments on the P-31, there is one important feature that affects the operation, that should be remembered. That feature is the automatic volume control. Due to it being a combined A. V. C. and second detector, it cannot be removed from its socket or replaced with a dummy Radiator.

R. F., OSCILLATOR AND I. F. ADJUSTMENTS

The R. F., Oscillator and I. F. Adjustments in Model P-31 are similar to those of the Automobile Radiola M-30. However, due to the A. V. C. tube also being the second detector, it cannot be removed while line-up adjustments are made. The proper manner in making this adjustment is as follows:

- Set the volume control of the receiver at maximum.
- Reduce the output of the external oscillator or its coupling to the receiver until a definite reduction in output meter reading is obtained. The oscillator output should again be reduced until but a slight indication in the output meter is obtained. At this low input the A. V. C. action is not sufficiently flat to interfere with the proper alignment of the various circuits.

SERVICE DATA

The plate circuit of the first detector, the grid circuit of the I. F. amplifier, the plate circuit of the I. F. amplifier and the grid circuit of the second detector are all tuned to 175 K. C.

The Radiotron 11CA-234 used as the second detector is also the automatic volume control. It is a diode detector, being a straight rectifier, a triode audio amplifier and a bias control automatic volume control, the signal current across a reactor giving the necessary voltage drop.

The signal voltage is applied to the filament and plate of the second detector, being rectified by straight mode action. The audio output is then applied to the control grid and filament by means of capacitor C-19. The tube then operates as an Audio Amplifier, the screen grid acting as the plate. Now examining the input circuit it will be noted that the signal current flows through resistors R-7 and R-8. The drop across resistor R-8 constitutes the control grid bias for the I. F. amplifier and the drop across R-7 and R-8 constitutes the control grid bias for the R. F. stage. A small initial bias of 15 volts is present on these tubes being the drop across the 65,000 ohm resistor of the voltage dividing system. Also the control grid bias for the second detector is obtained from the drop across the resistor R-10 and R-11, while R-9 and R-10 in parallel constitute a grid leak for its operation as an audio amplifier, C-19 being the coupling capacitor.

The output of the detector is then coupled, by means of impedance coupling to the grid of the first A. F. amplifying tube. The grid leak is in the form of a potentiometer which is the volume control, its action controlling the audio voltage applied to the grid of the first A. F. tube. The output of this tube is the two RCA Radiotrons RCA-230 which are connected in Push-Pull as a Class "B" amplifier. The output of this stage is then transformer coupled to the cone coil of the

RCA-VICTOR CO., INC.

MODEL M-32
Installation Notes
Part 1

INTRODUCTION

This automobile radio receiver utilizes a highly-efficient six-tube Superheterodyne circuit, a remote control unit, and a newly-designed electrodynamic loudspeaker. Because of the inherently adverse conditions to which an instrument of this type is subjected, more attention should be given to its installation than is required by a modern radio for the home. Comparable performance, however, will be obtained if these instructions are carefully followed, both with respect to installation and operation.

Three new-type Radiotrons are used: (1) the "r-f exponential pentode" RCA-39, (2) the "duodiode triode" RCA-85, and (3) the "a-f power pentode" RCA-89. These tubes incorporate the most recent engineering features and contribute materially to the outstanding performance of this receiver. An innovation in design is found in the use of Radiotron RCA-85 which combines automatic volume control with the normal function of the second detector in a single stage.

The receiver unit is extremely compact and is enclosed by a metallic shield case. The case may be quickly detached from its mounting bolts, thereby affording maximum convenience in replacing Radiotrons or other servicing. The remote control unit

is arranged for clamping to the steering column and thus places the volume and tuning controls and the key-operated power switch readily accessible to the driver. The dial scale, located only slightly below the normal driving line of vision, is glare-proof illuminated and is calibrated to facilitate frequency selection.

High-quality reproduction is obtained by use of the new electrodynamic loudspeaker. This unit is protected against mechanical injury by enclosure in an acoustically correct and attractive metallic container equipped with tone equalizers.

Plate voltage supply for the Radiotrons is obtained from an economical "B" battery eliminator unit which is furnished as a part of the standard equipment. (A special companion model of this receiver without the eliminator and suitable for operation from external "B" batteries, is available if preferred. See Appendix I.) Equipment for the suppression of ignition interference is included with the instrument.

The use of a roof antenna in all installations is recommended. Satisfactory results in many cases, however, may be obtained with a plate-type antenna mounted beneath the floor of the car.

PART I—INSTALLATION

Equipment

A. Equipment Furnished:

1. Receiver Unit—complete with the following Radiotrons:
 - (a) Three RCA-39.
 - (b) One RCA-37.
 - (c) One RCA-85.
 - (d) One RCA-89.
2. Loudspeaker—with cable and connector plug, washer, and nuts (2).
3. "B" Battery Eliminator Unit.
4. Outfit Package—containing:
 - (a) Remote Control Unit—with bracket, felt, screws, and interconnecting cable.
 - (b) Switch Keys (2) and Fuse—packed in Instruction envelope (attached to control knob of item a).
 - (c) Flexible Shafts (2) and Set Screws (6).
 - (d) Antenna Coupling Connector Sleeve.
 - (e) Mounting Brackets (4) (for receiver and "B" battery eliminator units)—complete with screws (8), bolts (8), nuts (16), washers (8), and lock washers (8).
 - (f) Insulation Bushing (for cable entrance slot in "B" battery eliminator unit).
 - (g) Wiring Clamp (for loud-speaker cable).
 - (h) Ignition Interference Suppression Equipment:
 - 6 Sparkplug type suppressors (additional obtainable from your Dealer).
 - 1 Distributor type suppressor.
 - 2 Capacitors.
 - (i) Instruction Book

B. Additional Equipment Required:

1. Antenna—

- (a) Roof (built-in) type recommended.
- (b) Plate (sub-mounted) type—alternative. A special plate antenna complete with mounting clamps, studs, and lead-in wire is obtainable from your Dealer, if required.

Location of Units

The arrangement of units shown in Figure 1 is applicable to the majority of automobiles. In certain installations, however, such locations may be considered impractical or not in accordance with personal preference, thereby necessitating a slight change in layout. The following suggestions will be of assistance in determining the most suitable position for each unit in any given case.

Receiver and Loudspeaker—In mounting these units, the adaptability of both to bulkhead (the partition between the engine and driving compartments) suspension should be determined initially. Consideration should be given to the space available and to the possibility of interference of the units with other equipment beneath the instrument panel or of the mounting bolts with apparatus on the engine side of the bulkhead.

Remote Control Unit—The control unit should be mounted on the steering column in a position chosen to afford greatest accessibility.

MODEL M-52

Installation Notes
Part 2

RCA-VICTOR CO., INC.

Antenna—

Roof Type: Best results will be obtained by use of a 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 top fabric. Consult your Dealer as to the proper procedure for making this test.

In order to use an ungrounded support screen, one corner only of the head-lining need be removed. A shielded lead should be first soldered to the screen and then carried down the front pillar post nearest the receiver unit. Its shield covering must be soldered or bonded to the car frame prior to replacement of the head lining.

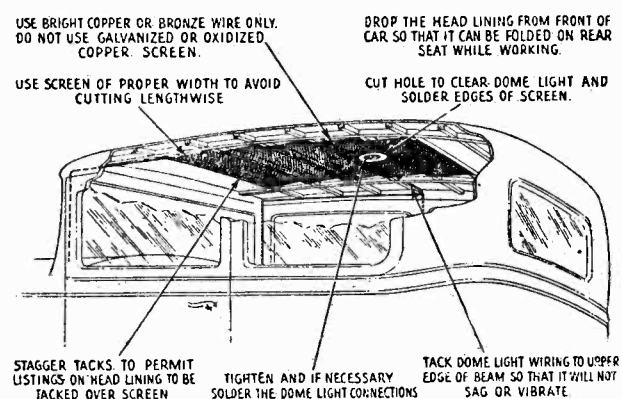


Figure 2

If the top support screen is grounded, or if no screen is present, it will be necessary to remove 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 light fixture. The possibility of subsequent shifting may be eliminated by tacking the screen to one 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 lead-in wire may then be attached as noted above and the head-lining replaced.

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.

Plate Type: For those cases where the installation of a roof antenna is considered impractical or too costly, satisfactory reception from local or semi-

distant powerful stations may be obtained by use of the special, plate-type antenna. 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 overcrowding. 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 antenna damage.

"B" Battery Eliminator—The "B" battery eliminator may be mounted at any convenient position in the car. It is preferable, however, to place this unit near the receiver and to use bulkhead suspension when sufficient space is available. To conserve mounting space, the eliminator may be fastened to the engine side of the bulkhead but, in such cases, it is important that the unit be located as far as possible from the exhaust manifold.

Mounting the Units

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

Receiver Unit—Assemble the mounting brackets (packed in receiver carton) to the rear of the shield case by means of the machine screws furnished. Support the unit in the proper location, allowing a clearance of at least one inch above the top surface to permit ready removal for servicing. On the proposed mounting surface mark the outlines of the four key-hole shaped, bracket slots. Then drill four $\frac{5}{16}$ inch holes, coinciding with the top of the slot markings, and insert the receiver mounting bolts loosely.

The front cover of the receiver unit case (held in place by four screws) must now be removed and all packing material—inserted for protection of the Radiotrons during shipment—withdrawn. Make certain that all tubes are in position and that the control grid clips are pressed down firmly over the respective dome terminals as shown by the diagram printed on the label affixed to the top of the case. Rotate the tuning control shaft until the plates of the variable capacitor are fully meshed and adjust both shafts to positions wherein the flatted portions face upward. Then replace the front cover and tighten the cover screws in place.

NOTE—In order to further examine the radio chassis, that unit may be withdrawn from the body of the case subsequent to the removal of three screws from the lower surface. The antenna lead and the associated shield pigtail, however, must first be passed through the case side—which operation may be facilitated by detaching the small rubber bushing secured in the entrance opening

RCA-VICTOR CO., INC.

MODEL M-32
Installation Notes
Part 3

Remote Control Unit—Detach the cover of the remote control unit by removing the push-on knobs, the knurled switch-retaining nut and the two front screws. Then insert the free end (without small coupling) of each flexible shaft housing through the rear bushings, making certain that each flexible shaft enters and extends the full depth in the drilled hole in the end of the corresponding control shaft. Tighten the control shaft set screws against the flexible shafts and finally secure the rear bushing set screws against each flexible shaft housing. The cover may now be replaced and the assembly rested in an upright position near the receiver unit.

Remove the set screws from the small couplings attached to the opposite ends of the flexible shafts and insert the shaft housings through the openings in the metallic cover plate encasing the tuning and volume control shafts of the receiver unit. *These shafts must be so inserted as to be crossed in the final assembly as indicated by Figure 1.* Make certain that the couplings are fully engaged over the receiver control shafts and then tighten the cover plate screws against each flexible shaft housing. Turn the control knobs on the remote control unit until the threaded openings for the coupling set screws (visible through slots in cover plate bushings) are at the top and line up with the flattened portions of the receiver unit control shafts. Finally, insert and tighten both coupling set screws.

Receiver and Remote Control Assembly—Hang the receiver unit in position over the mounting bolts and tighten those bolts in place. Then attach the remote control unit to the steering column by means of the clamp and screws provided. In order to prevent damage to the finish, the felt provided should first be wrapped around the column at the desired location and fastened with tape. After completing these operations, slowly rotate the Station Selector to each extremity of the dial, in turn, to insure use of the complete range.

NOTE—In some installations it will be found necessary or desirable to shorten the flexible shafts. This may be accomplished as follows: (1) Remove the shafts from the housings; (2) cut the housings to the proper length with a hack-saw; (3) re-insert the shafts in the housings as far as possible, so that the couplings at the receiver end of the shafts are in contact with the housings; (4) solder the protruding end of each shaft, to prevent unwinding when cut, at a point $27/32$ inch beyond the end of its housing (*Important—A large soldering iron must be used to insure thorough penetration of the solder through the shaft for a distance of about one quarter inch on either side of the cutting point—use only non-corrosive soldering flux*); (5) cut each soldered shaft with a hack-saw or pliers at the point mentioned—namely, $27/32$ inch (as accurately as possible) from the end of the housing; (6) remove all burrs from cut ends.

Loudspeaker—Place the loudspeaker with its cone opening against the proposed mounting surface

and mark an outline of the rectangular container. Determine the exact center of this area by drawing in the diagonals and mark that position with a center-punch. Next drill a $1/2$ inch hole at the center-punch mark and mount the loudspeaker by means of the threaded stud attached to its rear bracket. In hanging this unit, choose that position wherein the cable entrance opening is at the top.

Plate Antenna—The plate antenna, if used, should be bolted to the channel members of the automobile chassis by means of the clamps provided (see Figure 1 and notes under "Location of Units"). A shielded lead-in wire is provided with this assembly which should be brought into the driving compartment of the car through a $1/2$ inch hole drilled in the toe-board if no other opening is available. The fully-shielded end of this wire is to be connected to the receiver unit antenna lead by means of the coupling type connector, as described under "Connections—Antenna to Receiver." Cut off the opposite (unshielded) end as required for connection to the plate and to eliminate excessive slack. The pig-tail extension from the end of the shield should be soldered or securely bonded to the frame of the car.

"B" Battery Eliminator—The "B" battery eliminator is arranged for mounting in a manner similar to that employed for the receiver unit. It is important that this machine be mounted so that the internal rotating shaft will be horizontal in assembly.

Connections

Refer to Figure 1 and make connections as follows:

Main Wiring Cable—The main wiring cable for connection between the independent units of this instrument (attached to the remote control unit during shipment) should be connected as indicated graphically. If necessary, make a loop in this cable to eliminate excessive slack and tape securely.

The power input lead contained in this cable (single shielded conductor with lug) must be connected electrically to the ungrounded side of the car storage battery, preferably at the battery terminal of the ammeter. The shield pigtail of the power input lead should be soldered or securely bonded to the instrument panel or frame of the car.

Electrical connections to the "B" battery eliminator unit are accomplished by means of the five-conductor group extending from the main wiring cable. The individual (color coded) leads are to be connected to the internal screw type terminals of the eliminator unit (rendered accessible by removal of the sheet metal case) as shown in Figure C. Appendix II. *Prior to making these connections determine which side of the car storage battery is grounded. If the positive terminal is grounded, reverse the two leads—both from same end of dynamotor—connected to terminals 1 and 3 of filter*, as indicated in Figure C.

NOTE—The insulation bushing (contained in Outfit Package) should first be slipped over

MODEL M-32

Installation Notes

RCA-VICTOR CO., INC.

Part 4

the five leads and, when replacing the cover, secured in the cable entrance slot. The shield pigtail should be brought out through the bushing and fastened beneath the nearest cover mounting screw.

The *special* four prong plug attached to the main wiring cable must be inserted in the corresponding socket located on the left side of the receiver unit and the shield pigtail should be secured beneath a convenient screw in the lower surface of the container.

Loudspeaker to Receiver—The *standard* four-prong plug attached to the loudspeaker cable must be inserted in the remaining socket located on the left side of the receiver unit. The pigtail extending from the cable shield should be secured beneath that container screw to which the shield extension from the adjacent main wiring cable is attached.

Antenna to Receiver—The shielded lead-in wire extending from the roof or plate antenna should be cut to a length sufficient to facilitate attachment to the coupling type connector (secured to the receiver antenna lead) and to eliminate excessive slack. Refer to the detailed view of this coupling connector in Figure 1, which shows clearly the connections to be made as follows:

The small copper sleeve (packed in Outfit Package) should be slipped over the shield braid of the lead-in wire and the small internal insulated conductor passed through the female portion of the coupling type connector. Solder this conductor securely to the end of the internal eyelet. Then slip the sleeve forward to a position wherein the adjacent ends of the connector and the shield braid are covered. Finally solder the sleeve both to the coupling and to the shield and connect the assembly to that portion secured to the receiver antenna lead. Make certain that the shield pigtail extending from the antenna entrance bushing in the receiver container is securely fastened beneath one of the cover screws.

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.

(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.

For cap-type distributors, proceed as follows: 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 one of the by-pass capacitors against the generator frame. The screw holding the cut-out ordinarily may also 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, interference will be reduced by connecting the capacitor lead to the opposite side of the cut-out. The most suitable position for this lead must be determined by trial.)

(4) Clamp the other by-pass capacitor securely to the instrument panel (if metallic) or to a convenient portion of the metal frame of the car, and connect the capacitor lead to the battery side of the ammeter (usually the terminal with only one lead). In certain cases, interference will be reduced by connecting the lead of this capacitor to the battery side of the ignition coil instead of to the ammeter.

(5) It may be found necessary to secure the loudspeaker cable beneath the grounding clamp (packed in Outfit Package) in order to minimize ignition interference. This clamp (as shown in Figure 1) may be attached conveniently to the left side of the receiver container.

PART II—OPERATION

The instrument should be operated as follows:

1. Insert the key in the lock on the Control Unit and turn it to the "on" position clockwise.
2. Set the Volume Control (left-hand knob) at or near the extreme clockwise position. Then turn the Station Selector (right-hand knob) in either direction until a station is heard. (Note—The dial scale is calibrated in channels to aid in station identification. Add one cipher to the scale marking to obtain the actual frequency in kilocycles.)
3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now, re-adjust the Station Selector to the position midway between the points where the quality becomes poor or the signal disappears. *This operation insures the best quality of reproduction.*
4. Finally, advance the Volume Control (clockwise) until the desired level is obtained. Except on weak signals, the automatic volume control will maintain the volume substantially at the latter level, thereby precluding further manual adjustments. (Fading of the signal may be experienced in extreme cases, as when passing under bridges or other metallic structures, since such structures almost completely shield the antenna.)
5. When through operating, turn the key to the "off" position, counter-clockwise. The instrument is then locked by removing the key.

RCA-VICTOR CO., INC.

MODEL M-32
Battery Operated
Terminal Data

APPENDIX I—"B" BATTERY OPERATED MODEL

As noted in the Introductory section, a special instrument is available for "B" battery operation. This receiver is identical to the standard model except that the "B" Battery Eliminator Unit is omitted and a specially designed interconnecting cable is used. For such operation, four 45 volt "B" batteries are required and may be obtained from your Dealer.

The following parts are furnished as standard equipment with the battery operated receiver:

- 1 Fuse (rated 0.50 amp.)
- 2 Fuse Leads (with clips)
- 1 Fuse Insulation Sleeve
- 3 Battery Jumper Wires

Certain body types, such as coupes or sedans, afford sufficient space to permit internal mounting of the batteries. In these cases, it is necessary only to clamp the units in a manner to prevent injury or grounding through undue motion while the car is in operation. In such installations, the batteries will probably be most conveniently stacked "end to end" as shown in Figure 3.

For other installations, a special battery box for external mounting (also available from your Dealer) will probably be found necessary or desirable. This box (as shown in Figure 1) may be located at any position under the floorboards of the vehicle except near the exhaust line or where interference with free-moving parts of the chassis will be encountered. If placed in close proximity to the exhaust pipe or muffler, the heat radiation therefrom will cause rapid

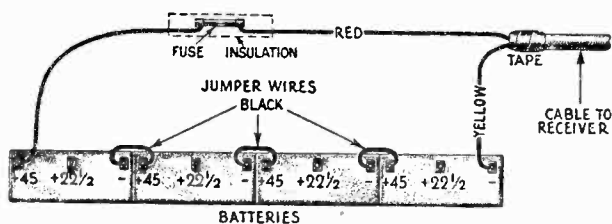


Figure 3

deterioration of the batteries. The box is of suitable dimensions to accommodate the following types of "B" batteries:

- Eveready—No. 485, No. 772, No. 796
- Burgess—No. 2305, No. 2308, D-308
- General—"Flying Squad" V 30 DX

If the battery box is used, it may be mounted most conveniently by drilling the required four (4) three-eighths inch holes in the floorboard with the box cover serving as a template. Insert the four

carriage bolts from above and fasten the box cover (with the hanger bolts inserted) in position beneath the floorboard with the nuts and lockwashers provided. Place the "B" batteries in the box and make all necessary internal connections (see Figure 4). With the fibre spacers in position above the batteries and the nuts on the hanger bolts unscrewed to the ends, lift the battery box into place, swing the hanger bolts into the case brackets and tighten all nuts. Make certain that both nuts are on each bolt and locked tightly. These operations, naturally, will be facilitated by placing the car on a lift.

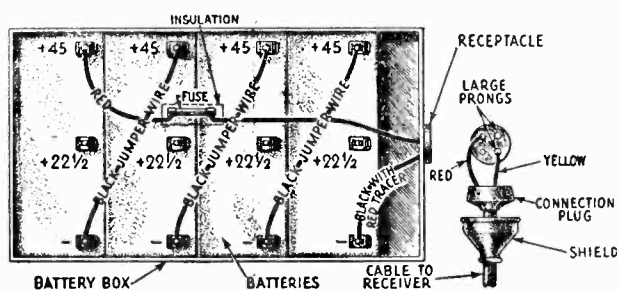


Figure 4

With the battery operated receiver, it will be noted that a plate circuit fuse must be employed. If the cable is to be connected directly to the batteries, the metal braid on the outside of the cable must be pushed back for a short distance in order to obtain leads of suitable length. As indicated in Figure 3, one fuse lead must be soldered to the cable wire and taped and the other connected to the end battery. The leads are equipped with clips (to permit ready replacement of the fuse) which in assembly are protected by an insulation sleeve. The end of the cable should be wrapped with tape for a short distance in order to prevent fraying and grounding to the battery terminals.

If the battery box is used, slip the rubber cover and the plug cap over the cable and solder the leads into the connection plug as indicated in Figure 4. Then fasten the cap to the plug, push the rubber cover forward and insert in the receptacle. One of the fuse leads must be connected to the proper terminal of the receptacle and the other to the end battery.

Worn out "B" batteries cause noisy and weak reception. Renew the batteries when they fail to give a reading of at least 35 volts per block as indicated by a high resistance voltmeter with the set turned "on."

MODEL M-32
Service Data
Voltage

RCA-VICTOR CO., INC.

APPENDIX II—SERVICE DATA

Electrical Specifications

Radiotrons Required
1 RCA-237, 3 RCA-239, 1 RCA-85, 1 RCA-89, Total—6

"A" Battery Consumption—Loudspeaker... 1.35 Amperes
Receiver... 2.15 Amperes
Converter... 3.0 Amperes

Plate Power Consumption... 35 M. A.
Undistorted Output... 1.25 Watts
Intermediate Frequency... 175 K. C.
R. F. Line-up Frequency... 1400 K. C.
Oscillator Line-Up Frequency... 1400 Only

This six tube automobile receiver gives excellent performance in respect to sensitivity, selectivity and tone quality. When used with the converter unit, operation entirely from the car battery is obtained.

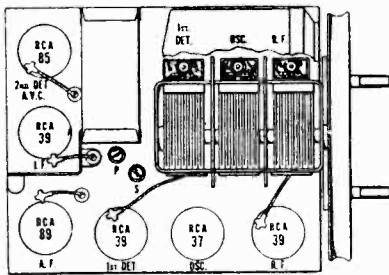


Figure A—Location of Radiotrons and Line-up Capacitors

Line-up Capacitor Adjustments

The receiver must be removed from its metal case to permit correct adjustment of the line-up capacitors. After being removed, a grounded metal plate must be provided for the receiver to rest upon, otherwise the adjustments will be found to be incorrect when the assembly is returned to its metal case. After removal from its case and placing upon the metal plate, proceed as follows:

I. F. Line-up Capacitor Adjustment—The I. F. Amplifier uses two transformers, one being of the untuned variety and one having each of its windings tuned by means of two adjustable capacitors. Figure A shows the location of these capacitors.

- Procure a modulated oscillator giving a signal at 175 K. C. and having its output adjustable. A non-metallic screwdriver such as Stock No. 7065 is necessary together with an output meter.
- Remove the receiver from its case, place it in operation and connect the output of the oscillator between the control grid and ground of the first detector. Remove the oscillator tube and connect the output meter—preferably a thermo-galvanometer—across the voice

coil of the loudspeaker. Then with the volume control at maximum, reduce the oscillator output until a small indication is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

- Adjust the secondary and then the primary of the I. F. transformer until a maximum deflection is obtained in the output meter. This is the correct adjustment.

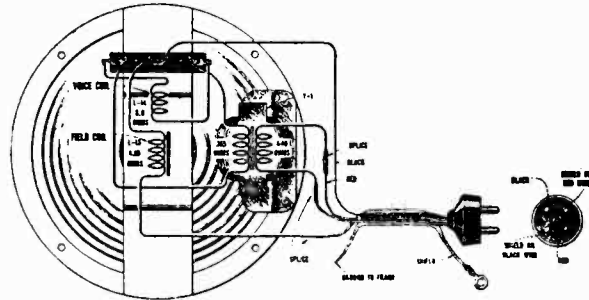


Figure B—Loudspeaker Wiring Diagram

R. F. Line-up Capacitor Adjustment—The R. F., 1st detector and oscillator stages are aligned at 1400 K. C. A modulated oscillator giving a signal at 1400 K. C. a socket wrench and an output meter are necessary for correctly making these adjustments.

- Remove the receiver from its metal case and place on a grounded metal plate. Connect the tuning control and place in operation. Connect the output of the oscillator between antenna and ground. Connect the output meter across the voice coil of the loudspeaker.
- Place the oscillator in operation at 1400 K. C. and adjust its output so that a small deflection is obtained when the receiver volume control is at maximum and the dial set at 1400. Then adjust the three line-up capacitors until a maximum deflection is obtained. This is done by means of a socket wrench.

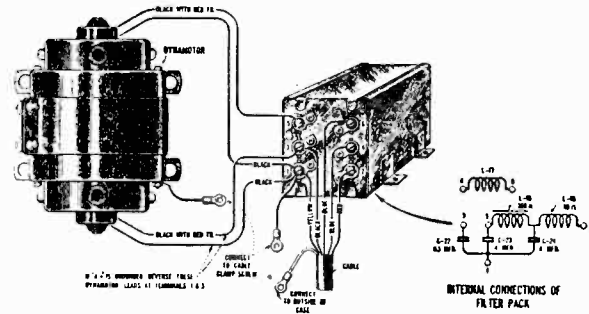


Figure C—Plate Supply Unit Wiring

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.	Filament or Heater Volts
1. R. F. RCA-39	0.9	71	177	4.5	5.2
2. 1st Det. RCA-39	6.0	67	172	1.35	5.2
3. Osc. RCA-37	—	—	72	5.5	5.2
4. I. F. RCA-39	0.9	71	177	4.5	5.2
5. 2nd Det. and A.V.C. RCA-85	—	—	175	4.5	5.2
6. P.W.R. RCA-89	18	178	160	18.0	5.2

Voltages are those at which Radiotrons are operating and with no signal impressed on input

OTHER IMPORTANT VOLTAGES

Battery Voltage... 6.0 Volts
Input to Dynamotor... 5.75 Volts
Battery Drain... 5 Amperes
Output from Dynamotor... 178 V. at 34.5 M.A.
Loudspeaker Field Drain... 1.35 Amperes

RCA-VICTOR CO., INC.

MODEL M-32 Chassis Wiring

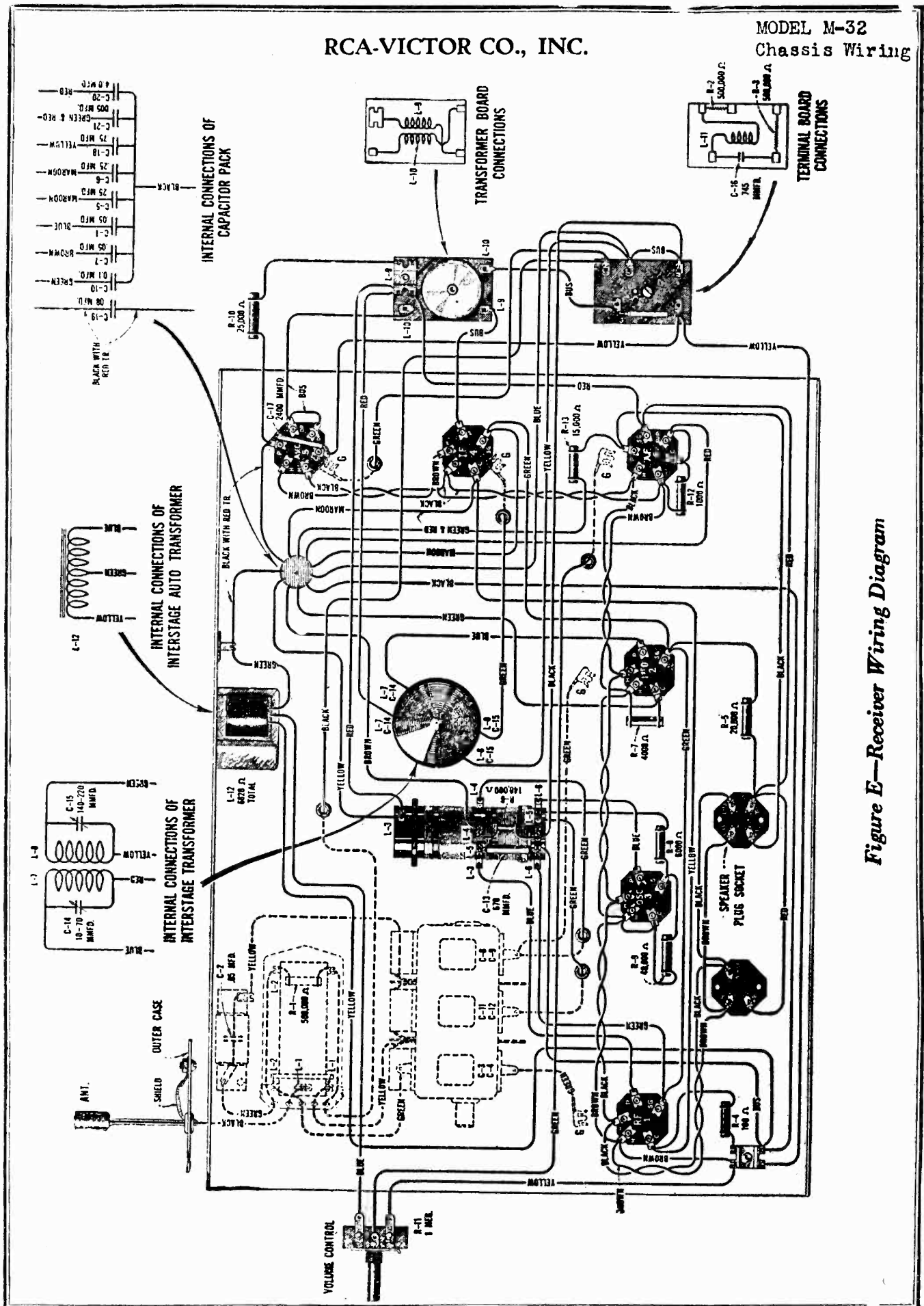


Figure E—Receiver Wiring Diagram

RCA-VICTOR CO., INC.

MODEL M-32
Schematic
Wiring Control Box

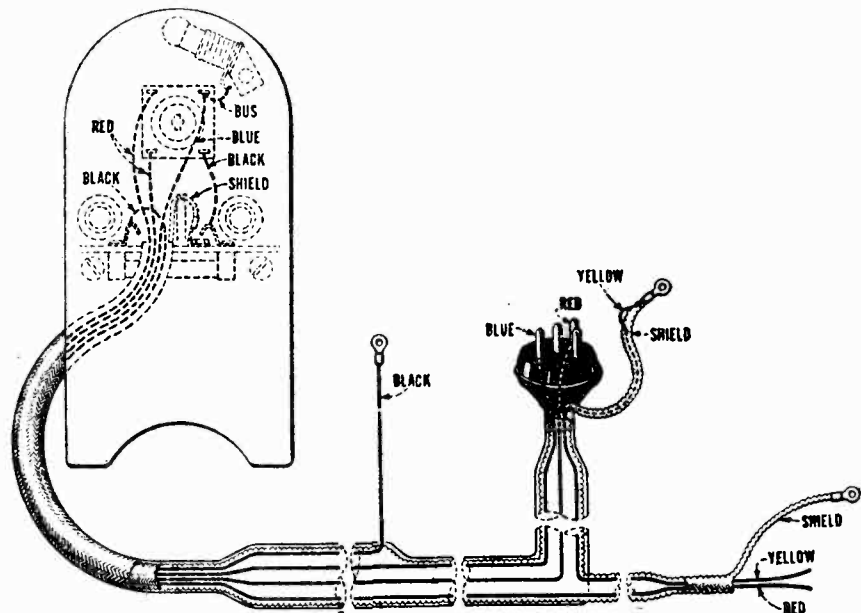


Figure F—Wiring Diagram of Control Box and Cables (top for Battery Model and bottom for Dynamotor Model)

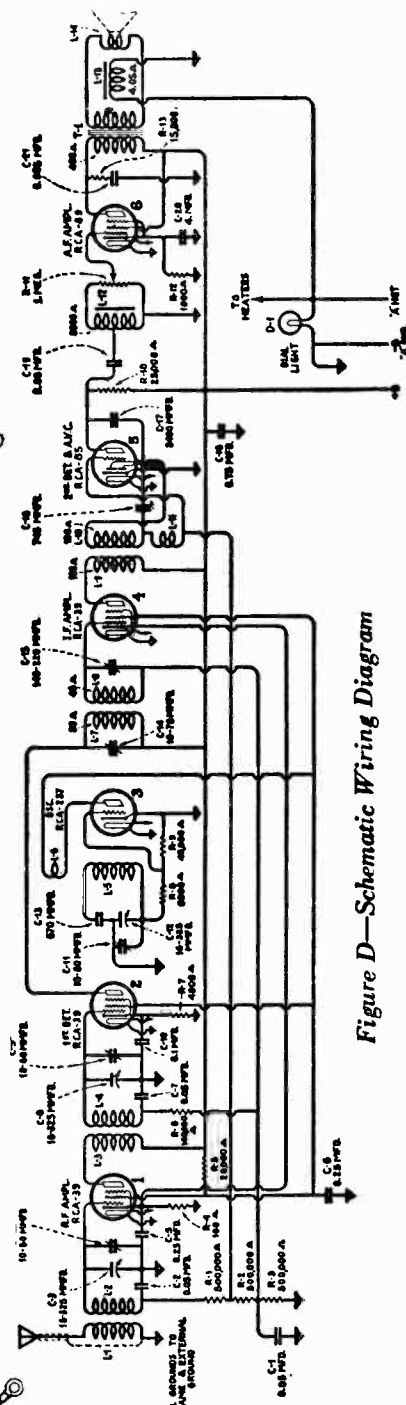
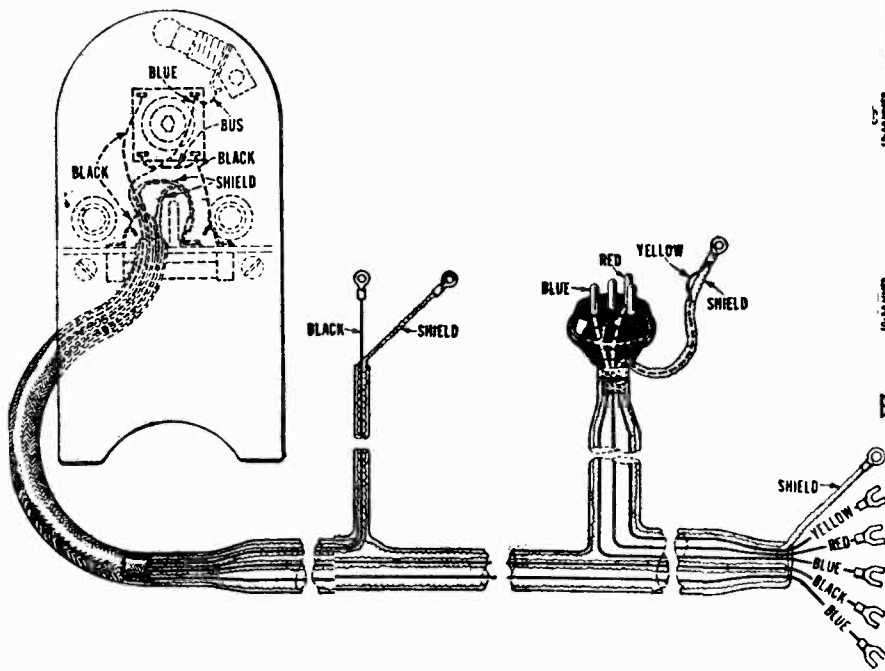


Figure D—Schematic Wiring Diagram

RCA-VICTOR CO., INC.

MODEL M-32
Parts List

REPLACEMENT PARTS

(Replacement Parts May be Purchased from Authorized Dealers and Distributors Only)

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
RECEIVER ASSEMBLIES			ANTENNA ASSEMBLY		
2734	Capacitor—745 mmfd.—Package of 5.....	\$2.20	3465	Cable—Antenna lead-in shielded cable.....	\$0.35
2747	Contact cap—Package of 5.....	.50	3466	Connector—Antenna lead-in connector.....	.60
2749	Capacitor—2,400 mmfd.....	1.50	3491	Washer—Rubber insulating washer—Used with insulator No. 6131—Package of 4....	.25
2816	Resistor—1,000 ohm—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	2.50	6129	Staple—Insulated staple—Package of 100...	.75
3264	Resistor—25,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	2.00	6130	Screw and nut—U bracket set screw— $\frac{1}{4}$ —16 x 1—Complete with lock nut—Pkg. of 10.	.50
3442	Resistor—100 ohms—Carbon type— $\frac{1}{4}$ watt—Package of 5.....	1.00	6131	Insulator—Insulator bushing for No. 7420—Package of 10.....	.70
3443	Resistor—140 ohms—Carbon type— $\frac{1}{4}$ watt—Package of 5.....	1.00	6381	Cable—Shielded antenna cable—For use with antenna plate.....	2.94
3447	Coil—Automatic volume control coupling coil.....	.66	7419	Bracket—U bracket for mounting antenna plates—Package of 2.....	1.60
3448	Cord—3 gang tuning capacitor drive cord.....	.50	7420	Stud—Antenna plate stud— $\frac{1}{4}$ —16 x 8"—Complete with 5 mounting nuts—Pkg. of 5.	1.90
3454	Scale—Dial Scale.....	.54	8819	Plate—Single antenna plate.....	1.75
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5.....	2.00	MISCELLANEOUS PARTS		
6143	Resistor—40,000 ohms—Carbon type— $\frac{1}{4}$ watt—Package of 5.....	2.00	6148	Fuse—10 amperes—Package of 5.....	.50
6186	Resistor—500,000 ohms—Carbon type— $\frac{1}{4}$ watt—Package of 5.....	2.00	6151	Suppressor—Spark plug suppressor.....	.65
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10.....	.50	6152	Suppressor—Distributor suppressor.....	.65
6241	Resistor—140,000 ohms—Carbon type— $\frac{1}{4}$ watt—Package of 5.....	2.00	6169	Felt—Felt strip for steering column—Pkg. of 10.	.50
6243	Resistor—6,000 ohms—Carbon type— $\frac{1}{4}$ watt—Package of 5.....	2.00	7065	Screwdriver—Non metallic Screwdriver—For line-up adjustments.....	1.10
6250	Resistor—4,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	2.00	7429	Capacitor—0.625 mfd. capacitor in metal casing with mounting bracket.....	2.20
6300	Socket—4 contact Radiotron socket.....	.55	7553	Cable—Inter-connecting cable complete with male section of connector plug—For eliminator operation.....	2.66
6317	Capacitor—0.05 mfd. capacitor.....	.70	7561	Cable—Inter-connecting cable complete with male section of connector plug—For battery operation.....	2.12
6320	Capacitor—670 mmfd.—Oscillator series capacitor—Package of 5.....	2.50	REPRODUCER ASSEMBLIES		
6358	Socket—3 contact socket.....	.38	6182	Terminal board—Reproducer terminal board with 3 terminals—Package of 5.....	.50
6359	Shield—Radiotron tube shield.....	.36	6364	Transformer—Output transformer.....	2.00
6360	Transformer—First intermediate frequency transformer.....	2.14	8702	Ring—Cone retaining ring.....	.80
6361	Transformer—Second intermediate frequency transformer.....	2.28	8961	Coil assembly—Comprising field coil, magnet and cone support.....	3.34
6362	Shaft—Tuning capacitor drive shaft with two "C" washers.....	.40	8962	Cone—Reproducer cone.....	1.12
6363	Volume control—Complete with mounting nut.....	1.38	8963	Bracket—Reproducer mounting bracket complete with washer and nuts.....	.98
6365	Coil—Detector and oscillator coil.....	2.32	8964	Housing—Reproducer housing.....	2.08
6366	Coil—R. F. coil assembly.....	1.60	8965	Screen—Dust screen.....	.40
7484	Socket—UY type Radiotron socket.....	.65	BATTERY BOX ASSEMBLY		
7485	Socket—Radiotron 6 contact socket.....	.70	2968	Receptacle—Four prong receptacle complete.....	.50
7545	Transformer—Interstage auto transformer.....	2.48	6122	Clamp—Cable clamp—Package of 15.....	.50
7546	Capacitor pack—Comprising one 0.08 mfd., one 0.1 mfd., two 0.05 mfd., two 0.25 mfd., one 0.75 mfd., one 0.005 mfd., and one 4.0 mfd. capacitors in metal container.....	3.58	6123	Plug—Four prong male plug.....	.50
7547	Drum—For 3 gang tuning capacitor.....	.70	6124	Cap—Plug cover rubber cap for #6123—Pkg. of 5.	1.50
7548	Capacitor—3 gang variable tuning capacitor assembly.....	3.50	6125	Fuse— $\frac{1}{4}$ ampere—Package of 5.....	.50
CONTROL BOX ASSEMBLIES			6126	Clip—Fuse clip—Package of 12.....	.50
3444	Socket—Dial lamp socket.....	.38	6127	Bolt—Carriage bolt for mounting top of box to car— $\frac{1}{4}$ —18 x $1\frac{1}{4}$ "—Complete with lock nut—Package of 5.....	.50
3445	Shaft—Volume control shaft with "C" washer.....	.48	7418	Bolt—Hanger bolt $\frac{1}{4}$ —18 x $9\frac{1}{2}$ "—Complete with two lock nuts—Package of 5.....	.50
3446	Shaft—Station selector shaft with "C" washer.....	.38	8817	Box body assembly—Comprising bottom plate, 2 side plates, 2 bottom strips and receptacle—Assembled.....	3.45
3454	Scale—Dial scale.....	.54	8818	Box cover assembly—Comprising cover plate, 2 strips and 2 rubber strips—Assembled....	1.70
6158	Nut—Knurled nut for lock switch—Pkg. of 10.	.50	8820	Plate and strip assembly—Carboard plate and strip assembly comprising six strips and one plate—Package of 5 sets.....	.75
G5021	Knob—Station selector knob or volume control knob—Package of 5.....	1.50	"B" ELIMINATOR ASSEMBLIES		
G5022	Label—Metal trade mark label—Pkg. of 5.	.75	3473	Brushes—One set of 2—For low voltage end of dynamotor.....	1.04
6164	Key—For lock switch—Package of 10.....	.50	3474	Brushes—One set of 2—For high voltage end of dynamotor.....	.82
6357	Switch—Lock switch complete.....	1.46	7554	Filter pack—Comprising one 0.5 mfd., two 4.0 mfd. capacitors, one reactor and two choke coils.....	4.87
7543	Shaft—Volume control or station selector flexible shaft—Approximately 39" long.....	1.92	7555	Dynamotor complete.....	23.52
7562	Shaft—Volume control or station selector flexible shaft—Approximately 51" long.....	1.62			
7563	Shaft—Flexible shaft—Volume control or station selector shaft—Approx. 27" long.....	1.94			
G7842	Cover—Control box cover assembly comprising cover, cover mounting screws, mounting clamp and clamp mounting screws.....	.76			

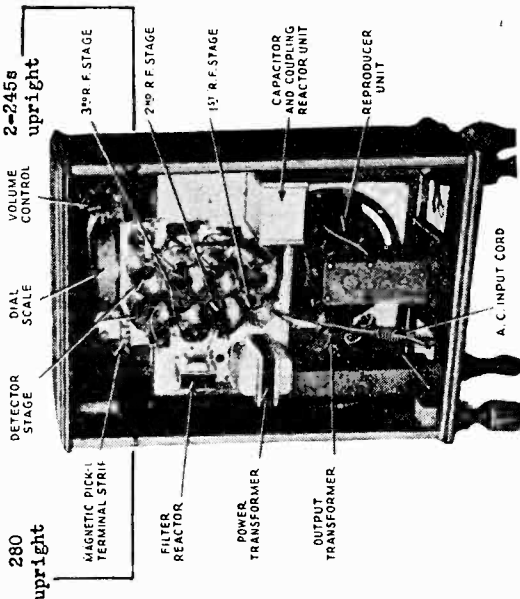
MODEL Radiola 48
Resistance Data

R. C. A. VICTOR CO., INC.

Between 1 rf P- 2 rf P
2 rf P- 3 rf P
D P- Output P

80 ohms
105 ohms
645 ohms

Rf plate windings
Rf p wdg and chk
Opt wdg and D P ohk



All tubes out of sockets and AC plug removed from power supply line.
Volume Control maximum unless otherwise stated.

From Chassis To Correct Incorrect

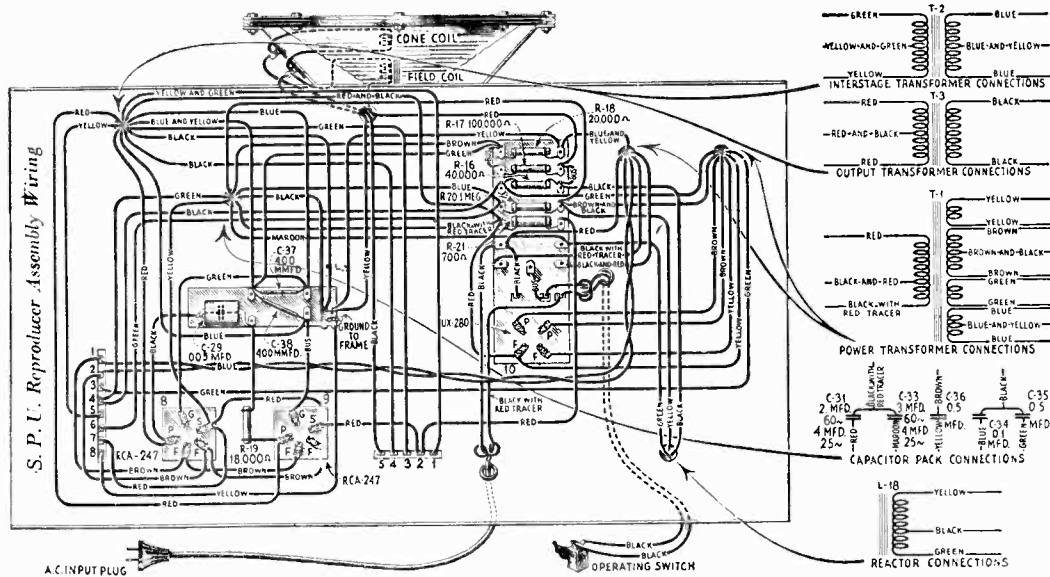
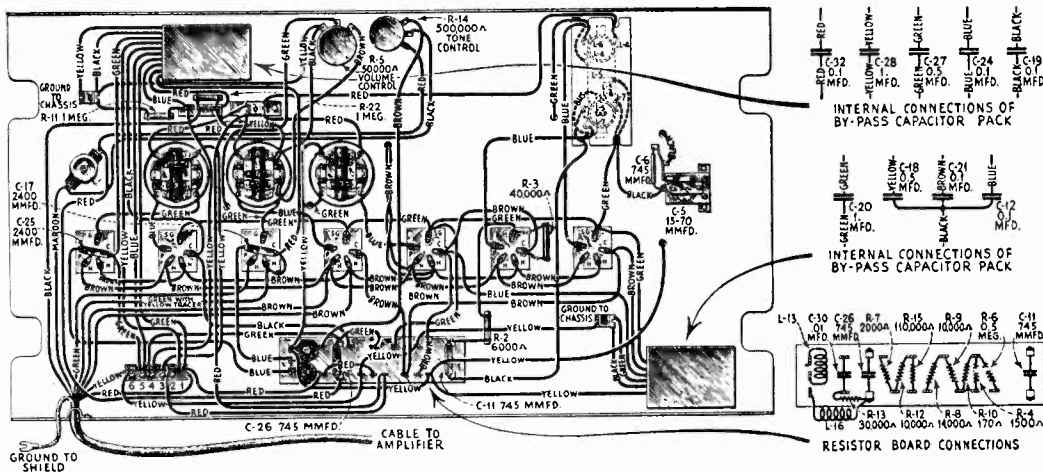
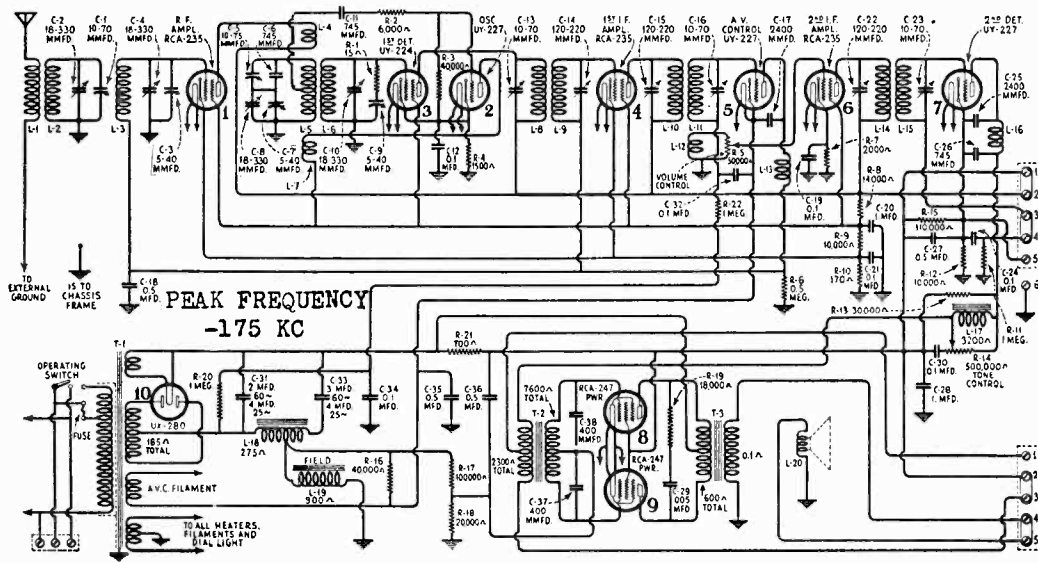
Aerial (V.C. Min)	50,000 ohms	
Aerial (V.C. Max)	30 ohms	
1 R-F Control Grid	3 ohms	TC- Cg-Y
1 R-F Heater	730 ohms	BC- D H-Y
1 R-F Cathode	120 ohms	BC- 1 rf K-Y
		BC- 3 rf K-Y
1 R-F Screen Grid (V.C.Min)	15,960 ohms	BC- 1 rf Sg-1 rf K
1 R-F Plate	13,917 ohms	BC- 1 rf P- 1 rf K
		BC- 3 rf P- 3 rf K
		FC-Y
2 R-F Control Grid	3 ohms	TC-Cg-Y
2 R-F Cathode	120 ohms	See Ir-F Cathode
2 R-F Screen Grid	16,950 ohms	BC- 1 rf Sg- 1 rf K
		BC- 3 rf Sg- 3 rf K
2 R-F Plate	13,917 ohms	See 1 R-F Plate
3 R-F Control Grid	3 ohms	TC-Cg-Y
3 R-F Cathode	170 ohms	See 1 R-F Cathode
		Rf ohk- 3 rf K
3 R-F Screen Grid	16,975 ohms	See 2 rf Sg.
3 R-F Plate	13,892 ohms	See 1 R-F Plate
Detector Control Grid	3 ohms	TC-Cg-Y
Detector Cathode	17,000 ohms	BC- D K-Y
Detector Screen Grid	210,627 ohms	BC- D Sg-Y
		See 2 R-F Screen Grid
Detector Plate	24,707 ohms	FC-Y (1. mfd)
		BC-D P- D K (See OutputP.)
Detector Plate to '80 Fil.	7,680 ohms	FC-Y (1.6 mfd)
Output Tube Control Grid	430,000 ohms	FC-Y (1.5 mfd)
Output Tube Control Grid	430,000 ohms	BLC- Af ohk
Output Tube Cg to Cg	860,000 ohms	BLC- Af ohk
Output Tube Plate (2 tubes)	17,492 ohms	FC-Y (2. mfd)
		FC-Y (.1 mfd)
Output Tube Plate to Plate	930 ohms	BC- Plate to Plate
'80 Plate	1,896 ohms	
'80 Plate to Plate	530 ohms	
Field Coil	1,330 ohms	
Output Transformer Secondary	.2 ohm	Disconnect voice coil
Voice coil only	2.5 ohms	

RADIOTRON SOCKET VOLTAGES -- 120-VOLT LINE

Tube No.	Cathode to Heater Volts D.C.	Control Grid- Volts D.C.	Screen Grid to Plate Volts D.C.	Plate Current M. A.	Heater or Filament Volts
RF	-4.0	-2.5	+85	3.0	2.3
RF	-3.6	-2.5	+85	3.5	2.3
RF	-3.6	-2.5	+75	3.5	2.3
DET	-2.8	-7.5	+55	0.5	2.3
AF	--	* -1.0		25.0	2.3
AF	--	* -1.0		25.0	2.3
VOLUME CONTROL at MAXIMUM					
RF	-4.0	-1.0	+6	0	2.3
RF	-4.0	-1.4	+6	0	2.3
RF	-4.0	-0.8	+6	0	2.3
DET	-2.8	-8.4	+75	.6	2.3
AF	--	* -1.0	--	25.0	2.3
AF	--	* -1.0	--	25.0	2.3
VOLUME CONTROL at MINIMUM					

R. C. A. VICTOR CO., INC.

MODEL R-50, R-55
Schematic
Chassis



MODEL R-50, R-55
Assembly Wiring
Voltage

R. C. A. VICTOR CO., INC.

SERVICE DATA

Information pertaining to R. F., Oscillator and I. F. adjustments together with general service data for this type receiver may be obtained from the Service Notes already issued on the RCA Radiola 80.

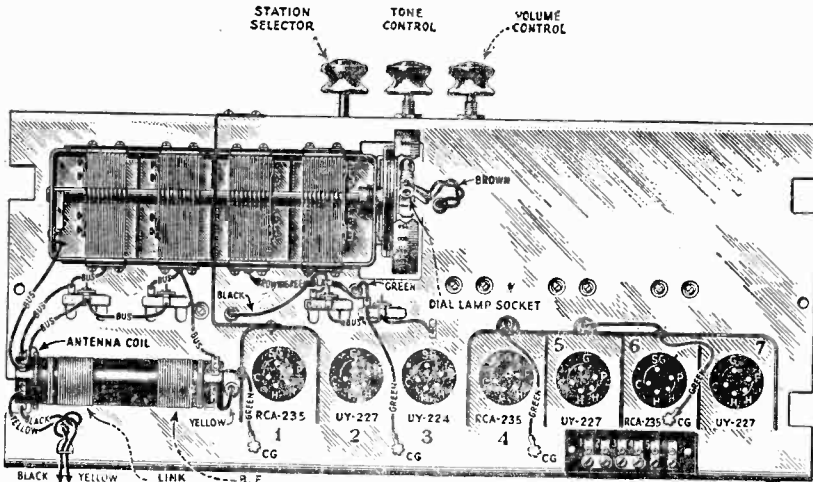
The beat frequency—175 K. C.—appears in the plate circuit of the first detector which is accurately tuned to 175 K. C. The tube used as a first detector is Radiotron UY-224.

R. F. OSCILLATOR AND I. F. ADJUSTMENTS

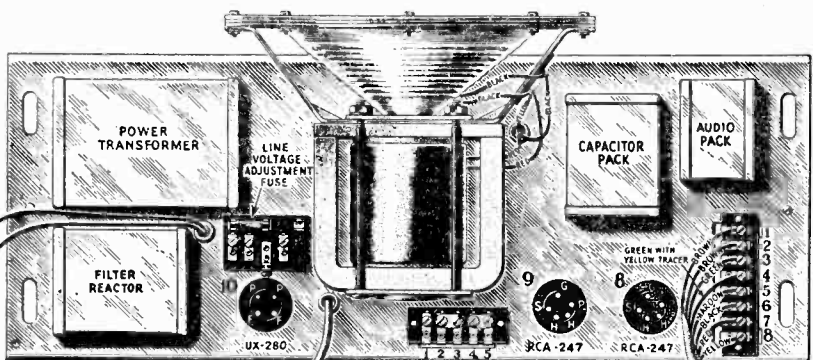
A reference to the RCA Radiola 80 Notes will give the details for making correct R. F., I. F. and Oscillator adjustments. However, due to the use of an automatic volume control tube, its action will defeat the use of an output meter. To overcome this, a "dummy" Radiotron UY-227 (one that has one heater prong removed but is otherwise O. K.) should be substituted for the tube in the automatic volume control socket. While apparently everything functions in the normal manner, the lack of tube capacity in the circuits will cause an incorrect alignment to be made.

In the RCA Victor Radiola R-50 and R-55 the I. F. transformers are adjusted for maximum output and no attempt at band pass tuning should be made when these adjustments are made.

It will be noted on the early Models of R-50 and R-55 that a small 9 mmfd. capacitor is inserted in series with the oscillator trimming capacitor. This capacitor is not used on later models that have a slightly different dial scale. When replacing a dial scale it may therefore be necessary to short this capacitor. A failure in the capacitor may be remedied either by replacing the capacitor or the dial scale.



RECEIVER ASSEMBLY



S.P.U. - REPRODUCER ASSEMBLY

OPERATING SWITCH

A.C. INPUT PLUG

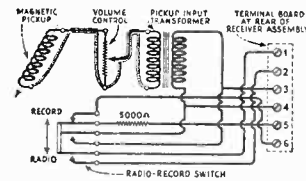


Figure 3—Magnetic Pickup connections

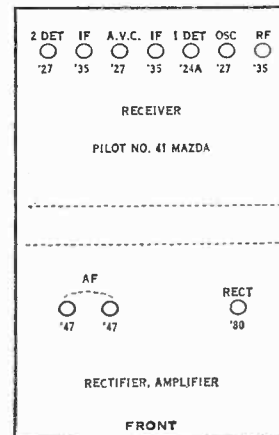
Note: Place the Radio-Record switch and input transformer in the receiver cabinet. Try connecting a wire from receiver terminal No. 6 to input transformer frame or braided shield to pickup and use connection that gives minimum hum.

VOLTAGES ARE THE SAME AT EITHER POSITION OF THE VOLUME CONTROL
 110 VOLT LINE

Radiotron No.	Heater to Cathode Volts	Cathode or Filament or Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Heater Volts
1. R.F.	2.0	*0.2	60	230	3.5	2.5
2. Osc.	5.0	0	—	50	4.0	2.5
3. 1st Det.	4.0	3.5	60	230	0.5	2.5
4. 1st I.F.	2.0	*0.2	60	230	3.5	2.5
5. A.V.C.	0	0	—	30	0.1	2.5
6. 2nd I.F.	2.0	3.5	60	230	2.5	2.5
7. 2nd Det.	20.0	*8.0	—	210	0.5	2.5
8. Pwr.	—	*10.0	250	235	25.0	2.5
9. Pwr.	—	*10.0	250	235	25.0	2.5

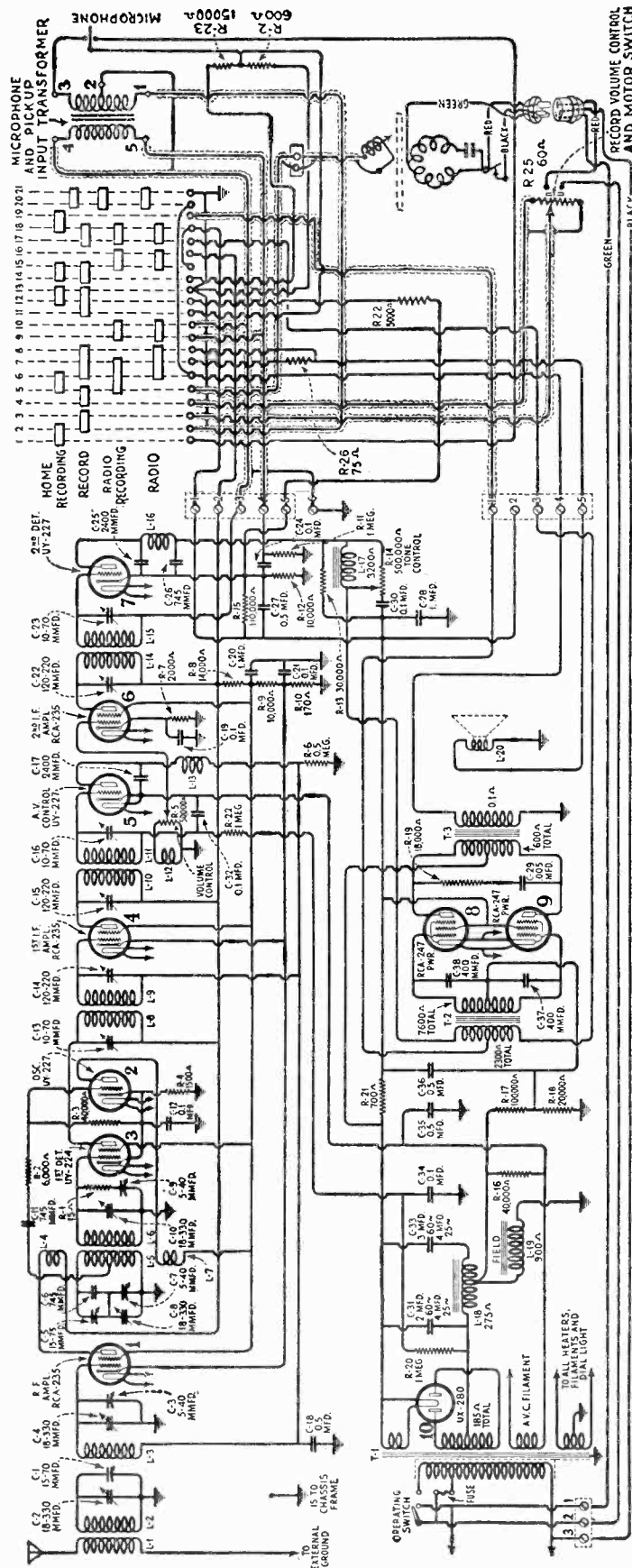
*These readings are not correct due to the resistance in the circuits

Models R-50, R-55, RAE-59 (1931)

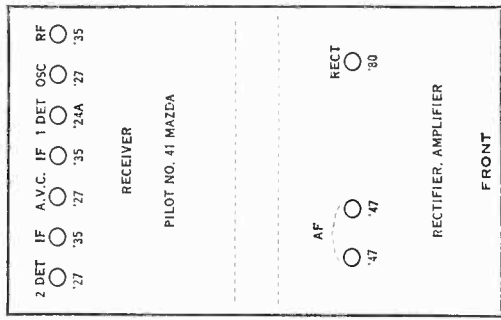


R. C. A. VICTOR CO., INC.

MODEL RAE-59 Schematic



Models R-50, R-55, RAE-59 (1931)



PEAK FREQUENCY-175 KC

The RCA Victor RAE-59 is a Combination DeLuxe Radio and Automatic Phonograph instrument that provides a large variety of home entertainment features. The radio receiver, amplifier and loud-speaker are identical with those used in Models R-50 and 55. The automatic record changing mechanism is of simple, sturdy design and may be operated at 33 1/3 R.P.M. as well as 78 R.P.M.

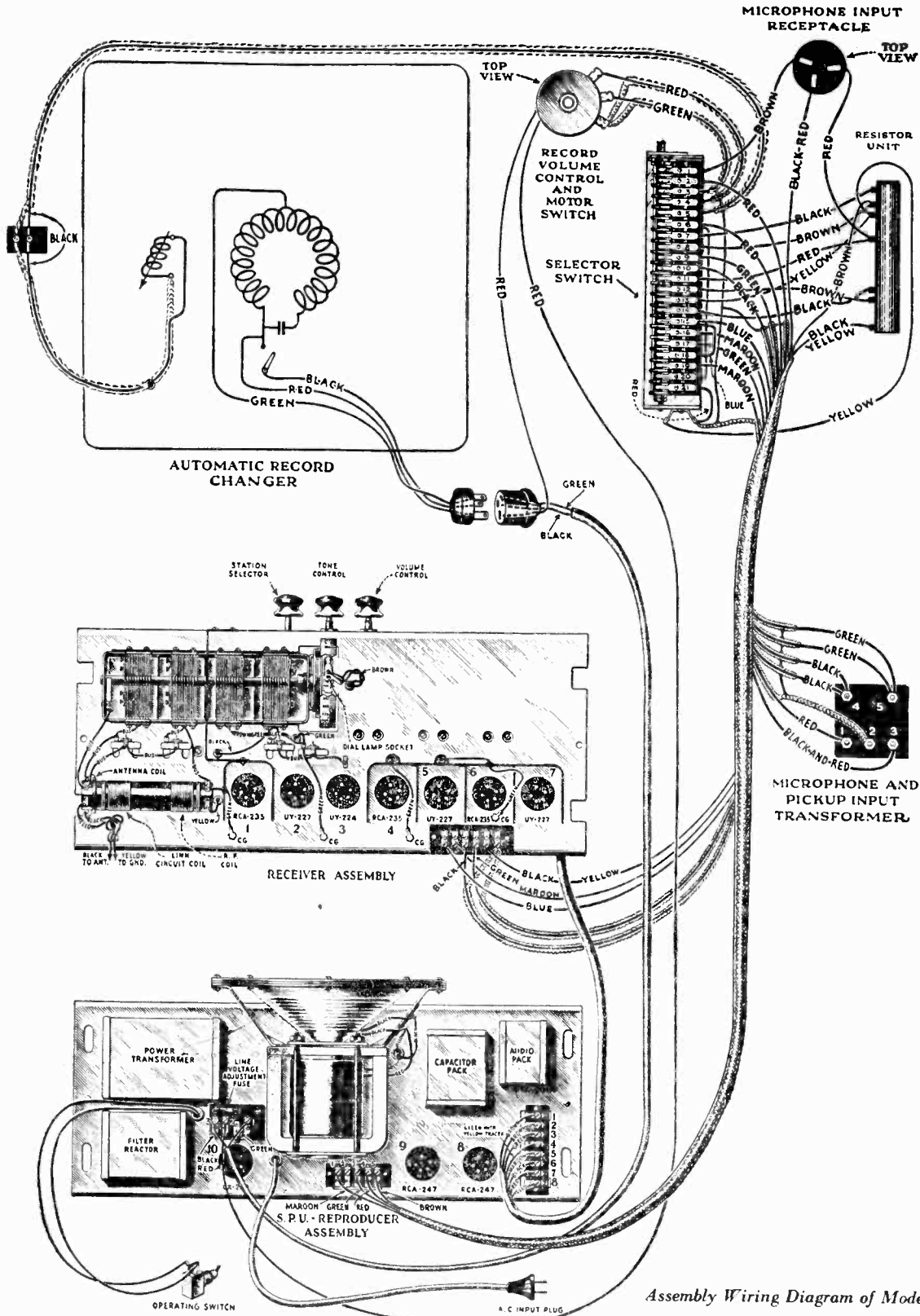
Excellent home recording is a feature of this instrument, its high quality being due to the use of a two button studio microphone and a high gain amplifier. Also a much greater power output is available, due to the use of Radiotrons RCA-247 in the output stage.

SERVICE DATA

A reference to the R-50 and R-55 Service Notes will give the details of any service work necessary in conjunction with the receiver and amplifier assemblies. Figure 1 shows the schematic wiring diagram and Figure 2 the assembly wiring. A reference to the Service Notes on the RCA Victor Record changing mechanism will give any details of service work in conjunction with this unit.

MODEL RAE-59
Assembly Wiring

R. C. A. VICTOR CO., INC.



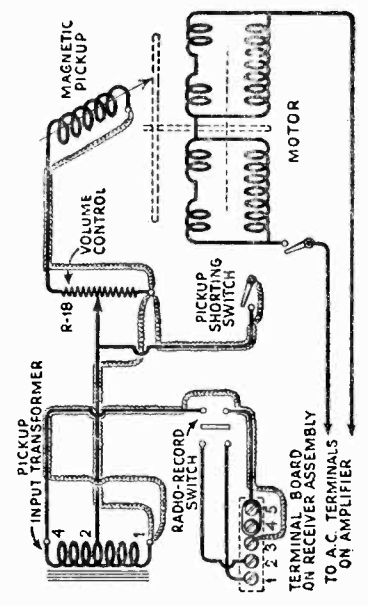
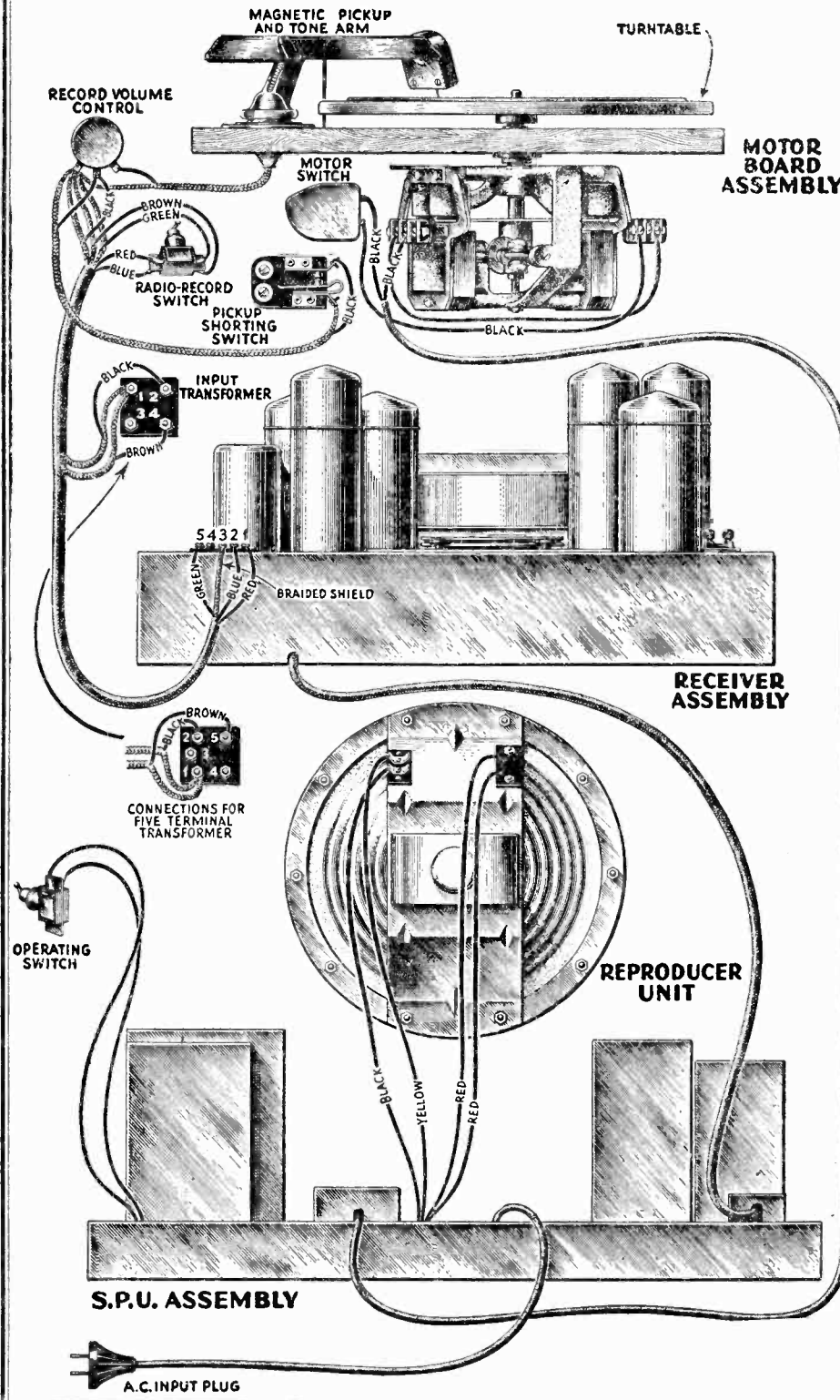
Assembly Wiring Diagram of Model RAE-59

R. C. A. VICTOR CO., INC.

MODEL RE-73
Assembly Wiring

RCA Victor Radiola Electrola RE-73 is an eight tube screen grid tuned R. F. type radio receiver combined with a standard Electrola mechanism. The receiver assembly and amplifier of this model is similar to that used in the 1930 Victor Receivers, Models R-35, R-39, and RE-57. The loudspeaker used is similar to that employed in the RCA Victor Superette R-7.

A reference to the RCA Radiola 86 Service Notes will give the details of any service work necessary in conjunction with the motor board assembly.



Schematic Diagram of Motor Board

MODEL RE-73
Parts List

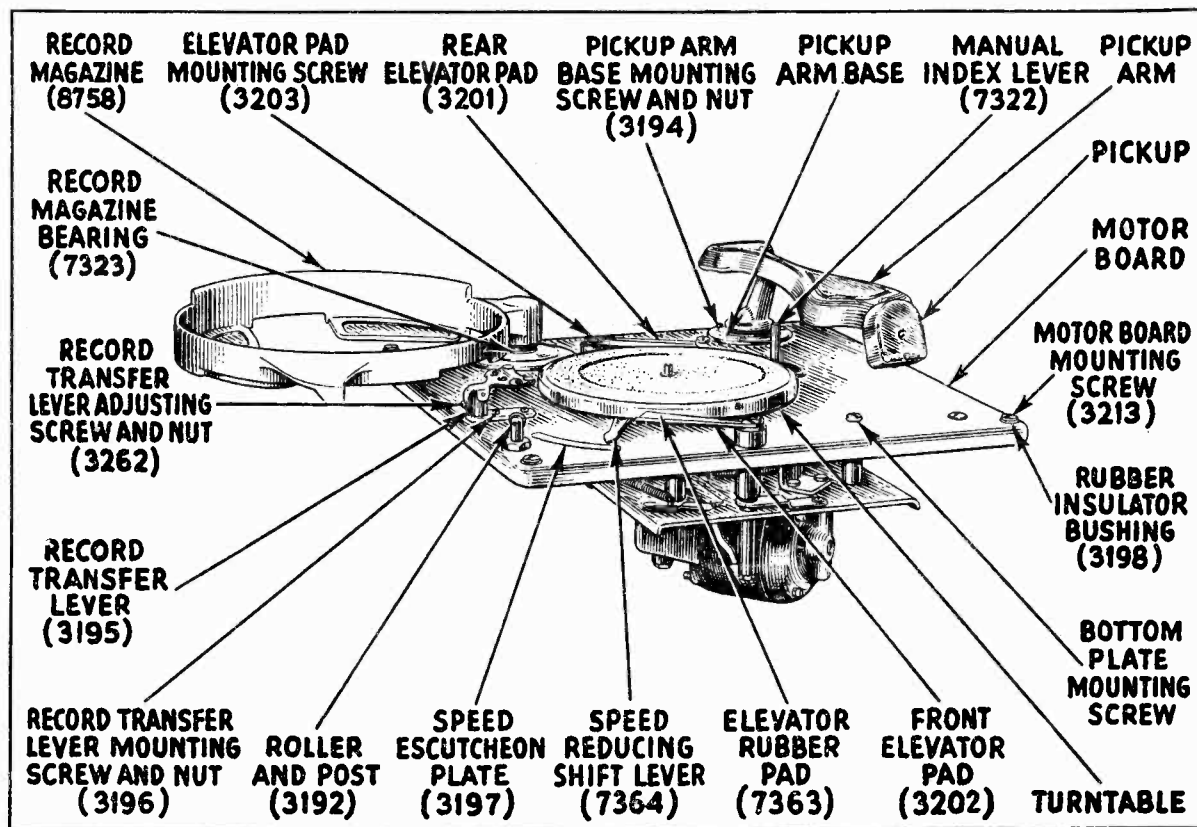
R. C. A. VICTOR CO., INC.

REPLACEMENT PARTS

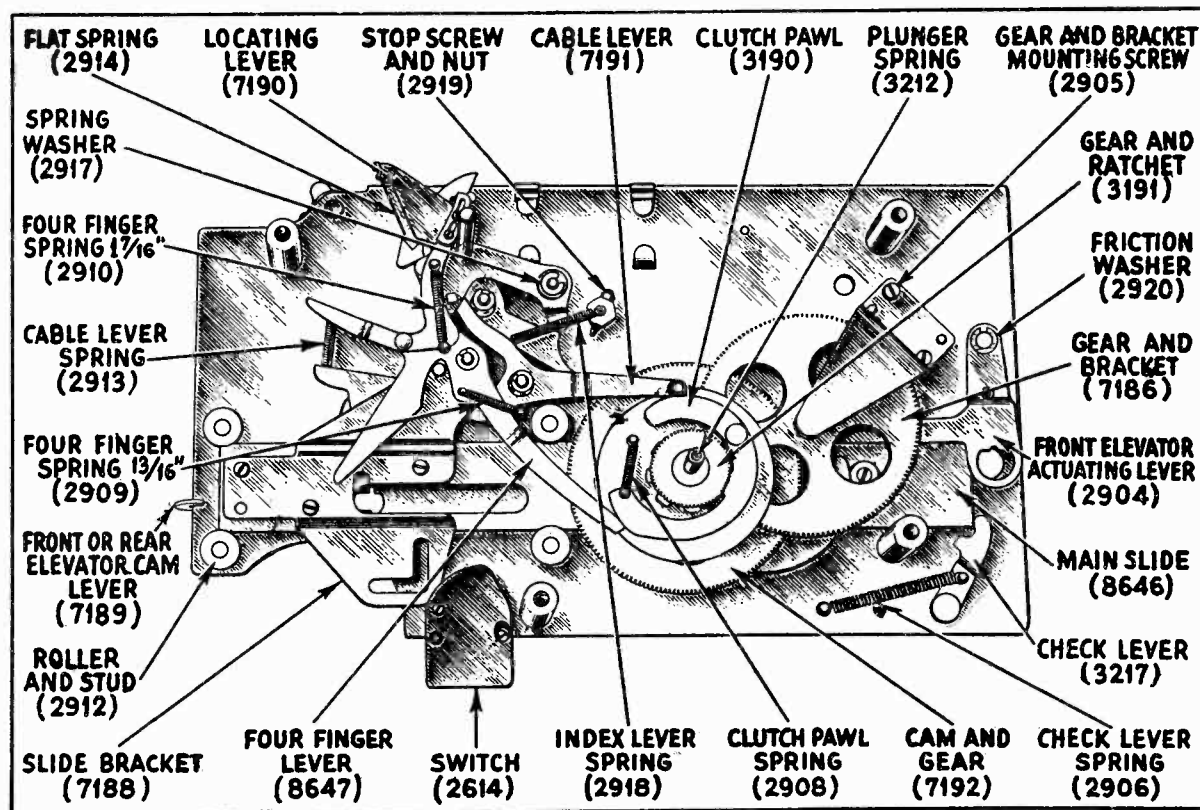
Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
RECEIVER ASSEMBLY—Continued					
10838	Resistor—9000 ohms—Carbon type—Package of 5	\$2.50	3052	Screw assembly—Pickup pole piece mounting screw, nut, washer—Package of 10 sets	.50
10839	Resistor—130 ohms—Carbon type—Package of 5	2.50	3101	Switch—Record-radio toggle switch with mounting nuts and escutcheon plate—Located on top of motor board	1.25
10840	Resistor—2800 ohms—Carbon type—Package of 5	2.50	3102	Receptacle—Needle receptacle	.75
10841	Resistor—1½ megohm—Carbon type—Package of 5	2.50	3158	Screw assembly—Motor mounting screw assembly—Comprising 3 screws, 3 bushings, 3 metal washers and 12 cushion washers	.80
10842	Capacitor—10 mfd. condenser—Package of 2	.60	3162	Regulator—Speed regulator with mounting screws—Comprising cam and shaft, bushing and bracket	.80
10843	Shield—Radiotron shield body with cap—Package of 1 set	.90	3163	Escutcheon—Speed regulator escutcheon with mounting screw—Package of 5	2.00
10844	Shield—Coil shield body with cap—Package of 1 set	.90	3164	Control—Record volume control with mounting washer and nut—Less knob	1.70
10851	Panel—Radio chassis escutcheon panel—Less dial	3.00	3167	Magnet—Pickup magnet	2.60
10920	Cable—Wiring cable—Used to connect receiver to amplifier	2.75	3168	Coil—Pickup coil	.85
10948	Spring—Tuning condenser spring—Package of 5	.50	3169	Shoe—Pickup pole shoe R. H.	1.45
10949	Link—Tuning condenser link—Bakelite—Package of 5	.60	3170	Shoe—Pickup pole shoe L. H.	1.45
10969	Roller—Tuning condenser roller and shaft with eyelet screw and nut—Package of 5	.50	3249	Sleeve—Spindle sleeve complete with set screw	.50
S. P. U.					
2721	Socket—UX-245 Radiotron double socket with insulator and rivets	1.00	6067	Lever—Speed control regulator lever for motor—Comprising lever, spring, mounting bolt, nut and washer	1.60
2722	Resistor—55 ohm—Mid-tapped—Wire wound—Filament resistor	1.00	6069	Coil assembly—Located nearest governor—105-125 volts, 60 cycles—Comprising 2 current coils, 1 voltage coil, laminated core end bracket, terminal board, nuts, bolts, screws and washers—Completely assembled ready for mounting	8.40
2723	Switch—Operating switch—Toggle—With mounting nuts and washer—Package of 5	3.00	6070	Coil assembly—Located farthest from governor—105-125 volts, 60 cycles—Comprising 2 current coils, 1 voltage coil, laminated core, end bracket, terminal board, nut, bolts, screws and washers—Completely assembled ready for mounting	8.40
2757	Strip—Terminal strip—Two contact	.50	RECEIVER ASSEMBLY		
2880	Resistor—70,000 ohms—Carbon type—Package of 5	3.00	2012	Condenser—1200 MMFD. condenser	\$0.55
2963	Resistor—8,000 ohms—Carbon type—Package of 5	2.50	2546	Resistor—1 megohm—Carbon type resistor—Package of 5	3.00
7053	Resistor—715 ohms—Wire wound	.70	2746	Socket—Dial lamp socket	.50
7054	Cord—Amplifier power cord with male connector plug	1.00	2747	Cap—Contact cap—Package of 5	.50
7075	Socket—UX-280 Radiotron socket	1.80	2748	Posts—Twin binding posts with lock washers and nut—Antenna and ground	.50
7224	Cover—Fuse cover with bushing and insulator	.50	2804	Knob—Volume or station selector knob—Package of 5	2.50
10845	Transformer—A. F. transformer	14.00	2966	Resistor—28,000 ohm—Carbon type—Package of 5	2.50
10907	Fuse—3 ampere—Package of 5	1.00	2970	Resistor—½ megohm—Carbon type—Package of 5	2.50
10908	Cover—Terminal strip cover—Package of 2	.50	7124	Socket—UY Radiotron socket	.80
10909	Condenser—Condenser bank—60 cycles	16.00	7303	Dial—Station selector dial scale—Package of 5	3.00
10910	Capacitor—Extra filter capacitor for 25 cycles	5.00	10426	Screw—Cam wheel adjusting screw—Package of 20	.50
10911	Reactor—Filter reactor	4.50	10805	Shield—Round condenser shield	.75
10912	Strip—Terminal strip—8 contacts	.70	10806	Shield—Variable condenser shield	1.50
10913	Cable—Amplifier wiring cable	2.00	10807	Shield—White enamel lamp shield	.60
10915	Transformer—Power transformer—105-125 volts—25-40 cycles	16.00	10808	Indicator—Dial indicator—Package of 5	.50
10917	Transformer—Power transformer—105-125 volts—50-60 cycles	12.00	10809	Plate—Cover plate with screw—Package of 5	.50
PHONOGRAPH PARTS					
2614	Switch—Automatic brake contact switch	1.40	10810	Roller—Cam roller—Package of 5	.50
2615	Springs—Brake springs—Set of 4 springs—Package of 2 sets	.50	10811	Condenser—Variable condenser	3.50
2620	Cushions—Pickup rubber cushion—Comprising 1 damper and 2 pivot cushions—Package of 5 sets	1.25	10812	Shaft—Cam roller shaft with washer and nut—Package of 2	.50
2622	Coil assembly—Located nearest governor—105-125 volts, 25 cycles—Comprising 2 current coils, 1 voltage coil, laminated core, end bracket, terminal board, nuts, bolts, screws and washers—Completely assembled ready for mounting	9.00	10813	Control—Tone control with plate washers and nut	1.60
2623	Coil assembly—Located farthest from governor—105-125 volts, 25 cycles—Comprising 2 current coils, 1 voltage coil, laminated core and bracket, terminal board nuts, bolts, screws and washers—Completely assembled ready for mounting	9.00	10814	Shield—Filter coil and capacitor shield with washers and nuts—Package of 2	.60
2691	Governor—Comprising shaft with worm, brake disc, weights, springs and screws—Assembled	5.25	10815	Coil—Filter coil and capacitor with mounting screws, lock washers and nuts	\$1.50
2692	Bearings—Governor shaft bearings—One set of 2	1.35	10816	Coil—3rd R. F. coil	1.60
2693	Gear—Governor drive worm gear with set screw	1.35	10817	Coil—Link coil	1.50
2695	Bearings—Threaded thrust bearing with lock nut for end of turntable spindle	.50	10818	Condenser—Bank of two condensers—0.25 and 0.75 mfd.	1.80
2759	Box—Needle box with lid—Package of 2	.60	10819	Condenser—Bank of three condensers—Three 0.1 mfd.	1.80
2765	Screw—Pickup needle holding screw—Package of 10	.80	10820	Condenser—100 mmfd. condenser	.50
2766	Screw—Pickup cover mounting screw—Package of 10	.50	10821	Coil—Resistor board coil	.80
2767	Spring—Pickup magnet spring—Package of 10	.50	10822	Wheel—Cam wheel with spring washers, cup washer and pin	2.60
2768	Armature—Pickup armature	.50	10824	Strip—Terminal strip with insulation and rivet—Two contact	.50
2770	Plate—Pickup damper plate—Package of 5	.50	10825	Inductor—Stabilizing inductor with screw, lock washer and nut	2.20
2771	Screw—Pickup damper plate mounting screw—Package of 10	.50	10826	Control—Volume control with nut, washer and locking plate	2.50
2787	Switch—Pickup shorting switch	1.00	10828	Coil—Antenna coupling coil	1.50
2789	Cord—Motor cord—Connects motor coil and starting switch	.60	10829	Coil—1st R. F. coil	1.60
2826	Cable—Shielded cable from shorting switch to record volume control	.50	10830	Coil—2nd R. F. coil	1.60
2829	Knob—Motor board lifting knob and screw—Package of 2	\$0.50	10831	Strip—Terminal strip with link	.70
2858	Rest—Pickup rubber rest with mounting bracket—Package of 5	.50	10832	Socket—UX Radiotron single socket with insulator	.60
			10833	Strip—Terminal strip with insulation and rivets—Six contacts	.70
			10834	Clip—Tube socket clips—Package of 10	.50
			10835	Capacitor—0.01 mfd.	.50
			10837	Capacitor—Bank of three 0.1 mfd. capacitors	.75

MODEL RE-73
Top Views

R. C. A. VICTOR CO., INC.



Top view of mechanism showing parts



Top view of mechanism with plate removed

Re-aligning
Tuning Condensers

R. C. A. VICTOR CO., INC.

Under normal conditions, the occasion will seldom arise when it will be necessary to re-align the tuning condensers. Low sensitivity and selectivity and improper dial settings over certain sections of the dial for stations of known broadcast frequencies are indications that the tuning condensers are out of line.

NOTE: Improper dial settings should not be confused with improper location of selector scale.

The parts required for re-aligning consist of a modulated oscillator such as stock No.A-6004; a special aligning wrench, stock No.A-6085; and a 0-8 a-c. voltmeter.

The Victor oscillator is accurately calibrated at 550,710,1000,1300 and 1500 kilocycles. These aligning frequencies, which are the correct values used in the factory, must be employed in all cases. If a standard wavemeter is not available for calibrating, the signals from a number of reliable broadcast stations, operating on known frequencies from 550 to 1500 KC, can be used by plotting a curve of oscillator dial settings against frequencies.

Proceed to re-align the tuning condensers in the following manner:

- a. Disconnect the link (on straight radio models) across the two terminals on the base of the amplifier, and connect one side of the 0-8 volt a-c. voltmeter to the terminal nearer the UX-245 Radiotrons. Connect the other side of the a-c. voltmeter to No.3 terminal (ground) on the amplifier terminal strip or clip to any clean metallic part of the amplifier base. The meter is thus connected in the speaker output circuit, but the voice coil is out of the circuit. Silent aligning can thus be accomplished.
- b. Connect the shielded leads from the oscillator terminals to the antenna and ground terminals of the radio set, making sure that the ground wire is still connected to the radio chassis.
- c. Remove the small metal plate in the center of the cam wheel by taking out the retaining screw.
- d. Place the radio set in operation with the volume control turned to maximum.
- e. Place the oscillator in operation at 550 KC. and move the tuning lever of the Victor Radio until the oscillator signal is heard. Adjust the oscillator output volume control to obtain a reading of 2 or 3 volts on the a-c. voltmeter.
- f. It will be noted on the inside of the cam wheel that there are five groups of five screws each, and that the first screw of each group is opposite a cam roller. Using the special socket wrench No.A-6085, adjust each of the first screws until the reading on the a-c. voltmeter is a maximum. As the condensers are brought into alignment, it may be necessary to decrease the setting of the oscillator volume control in order to prevent the voltmeter from going off the scale.
- g. Move the tuning lever of the Victor Radio to 710 KC. and set the oscillator dial at this same frequency. Now adjust the second screw of each group until a maximum reading is obtained on the voltmeter.
- h. Repeat this procedure for 1000 KC., 1300 KC., and 1500 KC. The alignment is now complete. The flexible cam strip around the outer edge of the cam wheel assures perfect alignment between the aligning frequencies mentioned.
- i. Remove all oscillator and meter connections, and reconnect the link (or wire in the case of combination models).

R. C. A. VICTOR CO. INC.

SERVICE NOTES

for

RCA Victor Automatic Record
Changing Mechanism

The RCA Victor Automatic Record Changing Mechanism is used in RCA Victor Models RAE-26, RAE-59 and RAE-79. Except for the finish of exposed parts, these units are identical. This mechanism is of simple, fool-proof design and will perform efficiently with a minimum of service requirements. Features of this mechanism are: continuous playing of one side of ten 10-inch records, operation at either 33 $\frac{1}{3}$ or 78 R.P.M. for playing standard or Program Transcription records manually or automatically, a special clutch to prevent jamming in case of failure of a part and a heavy duty motor operating at synchronous speed thereby eliminating any need for regulating devices. A general view of the mechanism is shown on the cover page. Figure 1 shows the schematic wiring diagram.

The Replacement Parts for this mechanism are listed in the Service Notes on each individual instrument. The identification nomenclature given on pages 10 and 11, will be found useful in identifying parts. Where parts are identical in all models the Stock Number of each part is given in addition to its name.

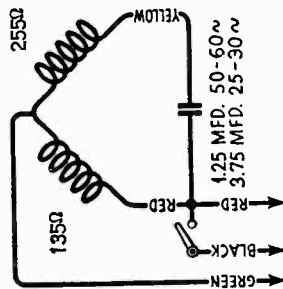


Figure 1—Schematic Diagram

INSTALLATION

After unpacking the instruments in which this mechanism is used, it is imperative that certain preliminary checks be made before they are placed in operation. These checks should be performed in the order given and any adjustments found necessary must be made.

- When installing the instrument it is advisable to see that all parts are properly lubricated without excessive grease or oil on any parts. This is especially important in the speed reducing unit. A lack of oil in the spindle bearings or between the sprocket and the surface upon which it rests, may be the cause of a "wow" at slow speed. Also excessive grease on the gears or on the damper pads may cause this same condition. The motor should be lubricated with light oil once every six months. Oil holes are provided at each end of the motor. Once a year the turntable and speed reducing unit should be removed and all exposed gears thoroughly cleaned and lubricated with light grease. All bearings should be lubricated with oil. Be careful not to lose the spiral spring in the end of the spindle or the washers under the turntable and speed reducing unit.

- The motor board must be level. This should be checked both ways by means of a small spirit level. Placing the cabinet legs on the same surface will usually insure the motor board being level.

- A small spring is located in the center of the turntable spindle. Be sure that this is in position before placing the turntable on the spindle. After placing the turntable on the spindle make sure that the spindle nose may be easily depressed. If it is not, then remove the turntable and turn the spring upside down or replace it with a new spring.

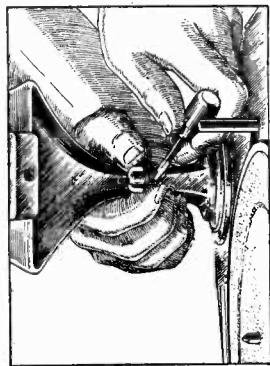


Figure 2—Adjusting height of tone arm

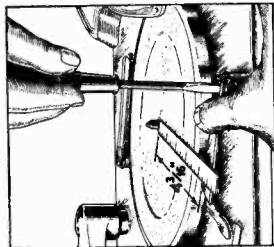


Figure 3—Adjusting elevator pad

- Examine the wire cable that is attached to the back of the tone arm. It should be seated on the small pulleys over which it passes.
- Place a Home Recording needle into the pickup as far as it will go. Then lower the pickup on the side of the turntable. The needle should extend from $\frac{1}{8}$ " to $\frac{1}{16}$ " below the top of the metal edge of the turntable. If it does not, an adjustment cap be made by means of a screw located under the tone arm. Lifting the arm provides accessibility to the screw. See Figure 2.
- If when starting the automatic mechanism, the needle lowers onto the smooth outer rim of the record but fails to swing into the first groove, it may be caused by the following:
 - Cabinet not level. Check as indicated in Paragraph 1.
 - Weak tension in spring. A flat spring presses against the tone arm lever on the under side of the motor board. See Figure 17 Page 11. Bending it so as to increase its tension against the tone arm lever will cause the needle to swing into the first record groove. Be careful not to bend it too much as excessive tension will cause the needle to skip several grooves.
- After the instrument has completed one record changing operation, a ten inch record should extend about three-quarters way over each elevator pad. If this condition does not exist, an adjustment can be made by means of the screws that hold the pads in position. A pair of pliers heavily padded with cloth or other soft material should be used to hold the elevator shafts while loosening and tightening the screws. The distance from the closest part of either pad to the edge of the spindle is approximately $4\frac{3}{16}$ ". Figure 3 shows the method of making this adjustment.

If any adjustments are necessary other than the foregoing, a reference to the Service Date section of this booklet should be made.

Remember That the Control Lever Can Be Changed from Automatic to Manual Only When the Mechanism is Not Changing Records

MODEL RE-73
Notes Part 2

R. C. A. VICTOR CO., INC.

(3) FAILURE OF NEEDLE TO LOWER PROPERLY

Failure of the needle to lower onto the smooth outer rim of the 10-inch records when the instrument is playing automatically may be caused by:

- (a) Improper Tone Arm Setting. Loosen the set screws as shown in Figure 5. With the mechanism out of its cycle, press the locating lever at a point near the flat spring until the lever strikes the stop screw. Holding the locating lever, Figure 17, in this position, move the front portion of the trip lever, Figure 15, until the pin against which the flat spring presses, is making contact with the locating lever. Holding the two levers in this position, move the pickup arm until the needle is $\frac{1}{16}$ " from the first groove of a standard 10-inch record. Now retighten the two set screws shown in Figure 5.

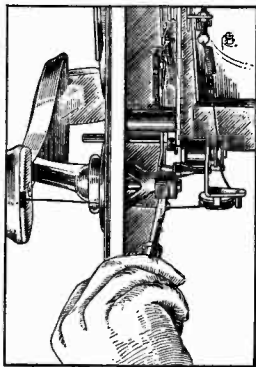


Figure 5—Adjusting position of tone arm

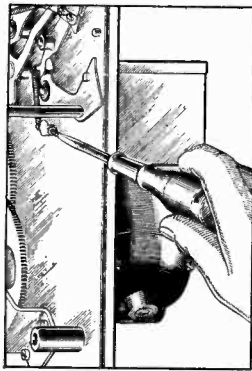


Figure 6—Adjusting tone arm locating screw

- (b) Improper adjustment of tone arm locating screw. This adjustment, shown in Figure 6, can be used to make a substitute adjustment for that described in (a), when the mechanism is out of the cabinet. Make the adjustment so that the needle will lower exactly $\frac{1}{16}$ " from the first groove on a standard 10-inch record. Loosen the lock nut on the adjusting screw by means of a No. 4 Spintite wrench on which the shoulder has been ground sufficiently thin for clearance. Do not attempt to make this adjustment without first loosening the lock nut. Tighten the lock nut when the proper adjustment has been made.

(4) FAILURE OF NEEDLE TO LOWER ONTO RECORD SURFACE

Failure of the needle to lower onto the record surface may be caused by:

- (a) Cable out of pulley. Examine the tone arm cable and ascertain that it is seated in the pulley.
- (b) Shielded pickup wire improperly placed. Examine the shielded lead coming out of the tone arm base and make sure that it is free from the moving parts of the mechanism.
- (c) Incorrect setting of tone arm lowering screw. Check the position of the tone arm as described in Paragraph 5, Page 4.
- (d) Turntable washer not in place. A leather washer is supplied to fit under the turntable. If this part is not in place, the turntable will be too low, and may cause the needle not to lower onto the record.
- (e) Incorrect adjustment of cable tension screw. The cable tension screw shown in Figure 7 should be so adjusted that the needle will lower smoothly onto the record without dropping. When this adjustment is obtained, the cable will be slightly loose when the needle is lowered onto a record. Loosen the lock nuts, turn the screw to the right or left as required and retighten the lock nut. Check the adjustment to make sure that the needle clears the record on the return of the tone arm. The needle should rise $\frac{1}{16}$ " from the record before any horizontal motion takes place.

(5) NEEDLE FAILS TO CLEAR RECORD AFTER PLAYING

Failure of the needle to clear the record surface on the return of the tone arm is caused by loose adjustment of the cable tension. Adjust this tension as described in Section 4, Page 4.

SERVICE DATA

The following Service information will be found useful in making any adjustments or correction of any irregular operation that may be necessary. All the major adjustments are accessible from the rear of the cabinet. For the sake of clearness the illustrations in this text do not show the cabinet background.

No special tools are required other than a small offset screw driver. (Stock No. 2930) A stand consisting of three Stock No. 7203, will be found useful in supporting the mechanism should removal from the cabinet be required.

(1) SPEED VARIATIONS (WOW)

A variation in the speed of the turntable evidenced by distortion on long sustained notes when playing Program Transcription records may be caused by any of the following:

- (a) Improper operation. It is very important when changing the speed shift lever from 78 R.P.M. operation to 33 $\frac{1}{3}$ R.P.M. operation, to place the hand on the turntable and hold it until it is positively engaged by the driving mechanism.

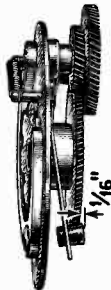


Figure 4—Adjustment of damper pads

- (b) Lack of proper lubrication. It is important that excessive grease on the gear reducing mechanism be avoided and that sufficient oil is present between the ratchet and the surface upon which it rests. Also clean and oil the spindle bearing and wipe off any excess lubricant that may be on the damper pads or the drive gear upon which it rests.
- (c) Improper Adjustment of the Damper Pads. The damping pads with the necessary springs are provided to place a load on the 33 $\frac{1}{3}$ R.P.M. driving gear at all times while it is in operation. Placing such a load on the gear takes up any possible play and reduces the possibility of a "wow" during operation at the slower speed. Adjust these pads by slipping each spring to one side and bend them until they are $\frac{1}{16}$ " beyond the opposite surface upon which they rest. (See Figure 4).
- (d) Washers Not in Place. A metal washer is placed directly under the speed reducing mechanism and a leather washer directly over it, both washers being over the spindle. These washers must be in their proper position. Also if the leather washer has become hard it must be replaced.
- (e) In some cases, removing the speed reducing mechanism and turning it approximately 90° and then replacing it, may eliminate a "wow" caused by improper meshing of the gears.

(2) ADJUSTMENT OF MAGAZINE ROLLER

The magazine roller should be set in such a position that the plane of the roller is 90° to a line drawn from the center of the magazine bearing to the center of the roller. The height should be adjusted so that it will just touch the magazine when it is empty.

R. C. A. VICTOR CO., INC.

MODEL RE-73
Notes Part 3

(6) FAILURE OF RECORD TO DEPOSIT ON TURNTABLE

Incorrect lowering of the record onto the turntable may be caused by:

- (a) Improper turntable spindle height. The height of the turntable spindle nose should be approximately $\frac{1}{32}$ " above the inside bottom surface of the record magazine. Adjustment of this height made by means of the screw at the bottom of the motor. (See Figure 8).

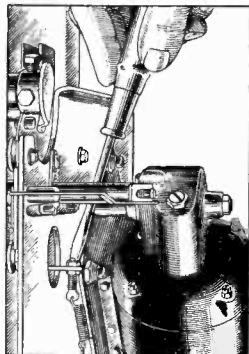


Figure 7—Adjusting tone arm cable tension screw

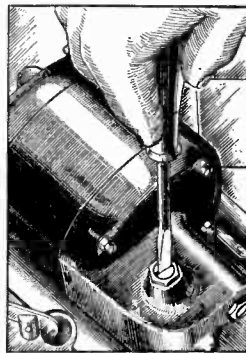


Figure 8—Adjusting spindle height

- (b) Improper setting of magazine. The horizontal swing of the magazine should be so adjusted when the mechanism is out of cycle that the outer surface at its nearest point to the nearest side of the turntable spindle is $5\frac{1}{32}$ ". This can be done by loosening the two screws as shown in Figure 9, moving the magazine to its correct position and retightening the screws.
- (c) Improper height of record transfer lever. The small plate on top of the motor board at the left side of the turntable should be so adjusted that it will depress approximately $\frac{1}{16}$ " when the magazine swings over the turntable. When this adjustment is made correctly, the transfer lever will engage the bottom record in the magazine as the latter is swinging back into the playing position. A small adjusting screw and lock nut are provided for this adjustment. See Figure 10.

- (d) Improper Position of Record Transfer Lever. When a ten-inch record is placed so that its edge touches both pins on the record transfer lever, a line drawn from the center of the hole of the lever to the center of the record hole should pass directly over the center of the spindle. See Figure 11. The two record transfer lever mounting screws can be loosened and the lever shifted until this condition exists. Also when a record is on the turntable it should just clear this lever. Unless this adjustment is properly made the record may not center properly over the spindle.

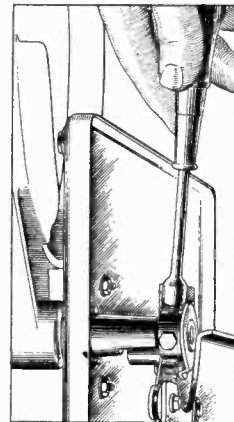


Figure 9—Magazine adjustments

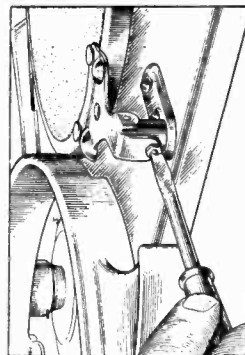


Figure 10—Record transfer lever adjustment

- (e) Weak spring in turntable spindle. The spring inside the turntable spindle which holds up the spindle nose will cause the records to align improperly with the turntable spindle if the spring tension is too weak or if the spindle nose is sticking inside the spindle. Access to the spring for stretching the coils or for replacement can be obtained by removing the turntable.

(7) RECORDS DISCHARGED IMPROPERLY FROM TURNTABLE

Failure of the Record on the turntable to be removed and placed in the magazine can be caused by:

- (a) Improper horizontal adjustment of elevator pads. The elevator pads Figure 16, should be so adjusted that the inside of the pad flange is $4\frac{3}{16}$ " from the nearest side of the turntable spindle. See Figure 3. Loosen the screw on top of the elevator shaft, move the pad to its correct position, holding both the pad and the elevator shaft in position and tighten the screw. Care should be observed that the ridge in the elevator shaft is not turned against the slot in the elevator shaft, actuating lever so as to cut the latter. Grip the shaft with padded pliers while this adjustment is being made in order to prevent the shaft from turning. If for any reason the elevator pads have been removed, always place the one with the rubber surface toward the front of the mechanism when replacements are being made.
- (b) Improper adjustment of elevator shaft. The elevator shafts should rise to such a height as to give $\frac{1}{16}$ " clearance between the lowest surface of the elevator pad bottom and the top of the empty magazine. This adjustment can be made by means of the screw and lock nut as shown in Figure 12.

(8) FAILURE TO TRIP ON ECCENTRIC GROOVE

Failure of the mechanism to change records when the eccentric groove is reached may be caused by:

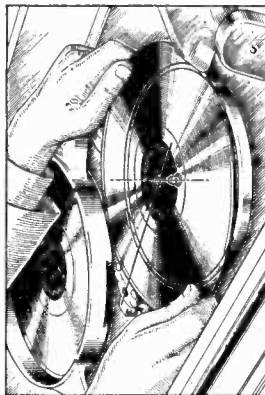


Figure 11—Method of checking transfer lever lateral adjustment

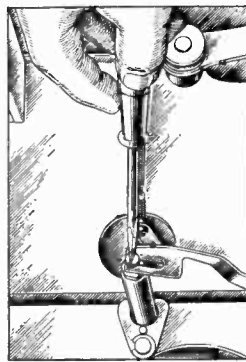


Figure 12—Adjusting height of elevator shaft

- (a) Improper setting of the latch plate. Adjust the latch plate, Figure 17, by means of a small offset screw driver such as Stock No. 2930, until it makes proper contact with the latch trip when the eccentric groove is reached.
- (b) Weak spring on trip lever. A weak spring on the latch trip lever will be a cause of failure to trip.

(9) INABILITY TO SET FOR MANUAL OPERATION

The manual operation lever should set in its back position so as to free the tone arm and prevent the mechanism from tripping. This change from automatic to manual operation should be made only when the mechanism is out of its cycle, otherwise the mechanism will reject continuously. The back position of the lever should be such that the end of the lever causes the latch trip to clear the latch plate by $\frac{1}{16}$ ". An incorrect setting of the latch plate may cause the trip lever to clear the plate at one position of the tone arm, but to make contact with the plate at some other position of the tone arm. Check this point when adjusting the latch plate.

(10) FAILURE TO STOP

Failure of the mechanism to stop after the "off" button has been pressed, and the mechanism has completed its cycle is caused by improper setting of the secondary stop switch. See Figure 17. The switch body should be so mounted that the contacts will open $\frac{1}{32}$ " when the cycle is completed, but will close as soon as the mechanism has tripped.

(11) CONTINUED TRIPPING OF MECHANISM

This condition may be caused by:

- (a) Manual operation lever set for non-automatic operation during cycle.
- (b) Improper setting of latch plate.
- (c) Improper timing of gears and associated parts. See Section 13 for the correct method of retiming.

(12) CLUTCH SLIPPING

Slipping of the clutch when the mechanism is passing through the cycle causing a loud clicking noise, may be caused by:

- (a) Weak spring on pawl carrier. Remove the pawl spring Figure 17, and increase its tension by removing two or three coils.

MODEL RE-73
Notes Part 4

R. C. A. VICTOR CO., INC.

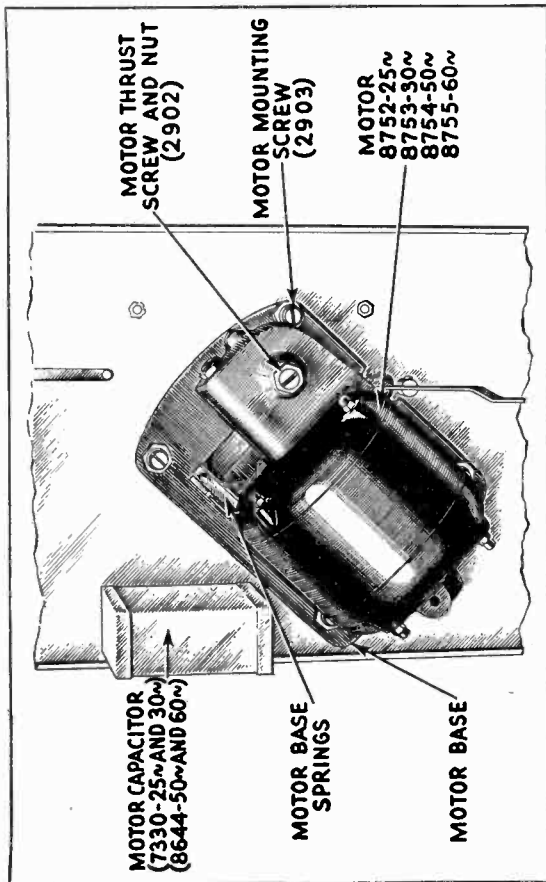


Figure 14—Motor parts

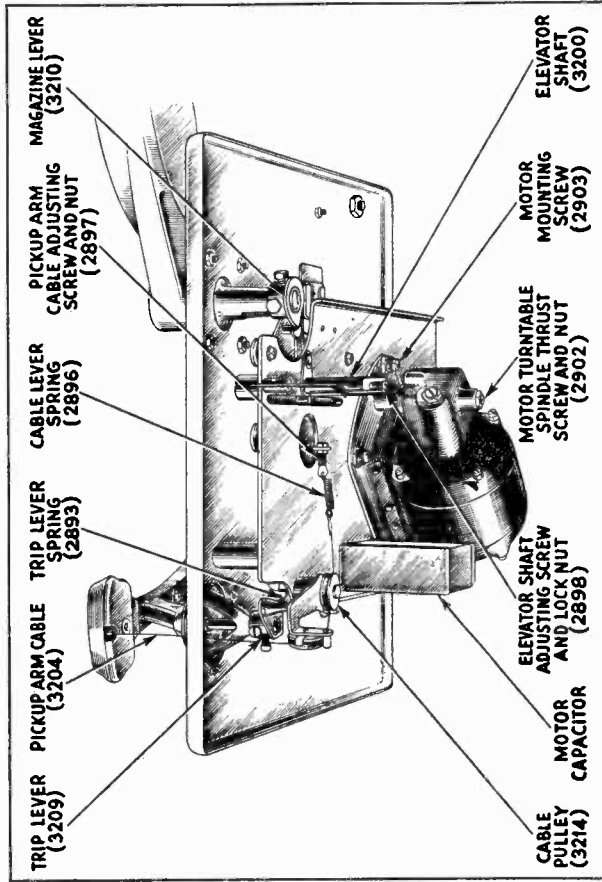


Figure 15—Bottom view of mechanism showing parts

- (b) Turntable spindle shaft too low. This condition will cause binding between the pawl carrier and the clutch wheel. Raise the spindle as shown in Figure 8.
- (c) Binding in any of the moving parts. Such binding may be in the slide, the magazine, the elevator shaft or the gears. The slide rollers at the left are mounted on eccentric shafts for adjustment of play. These may be so regulated as to cause excessive binding of the slide. Examine all of these parts carefully, and take any necessary steps to relieve the binding.

(13) RETIMING THE MECHANISM

Should it be necessary to retime the mechanism after replacing parts, or because of continued tripping proceed in the following manner:

- (a) Allow the mechanism to operate until the slide Figure 17 is in its extreme forwarding position. When this setting is reached the straight side of the cam, Figure 17, will be parallel with the side of the slide. Check the position of the trip lever and roller at this time to see that they are approximately as shown in Figure 13. If the various parts are not in their proper relation, the mechanism should be retimed.

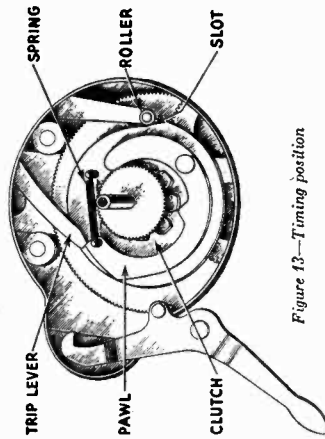


Figure 13—Timing position

- (b) Loosen the set screw in the clutch wheel and lift the wheel from the turntable spindle.
- (c) Lift the pawl carrier until it disengages from the gear.
- (d) Lower the pawl carrier into mesh with the gears so that the trip lever is touching the end of the pawl as shown in Figure 13, when the cable lever roller is engaged in the slot on the side of the pawl carrier as shown.
- (e) Recheck to see that the straight side of the cam is parallel with the slide.
- (f) Replace the clutch wheel and retighten the set screw, making sure that the set screw fits into the spot on the turntable spindle.

(14) REMOVING MOTOR BOARD

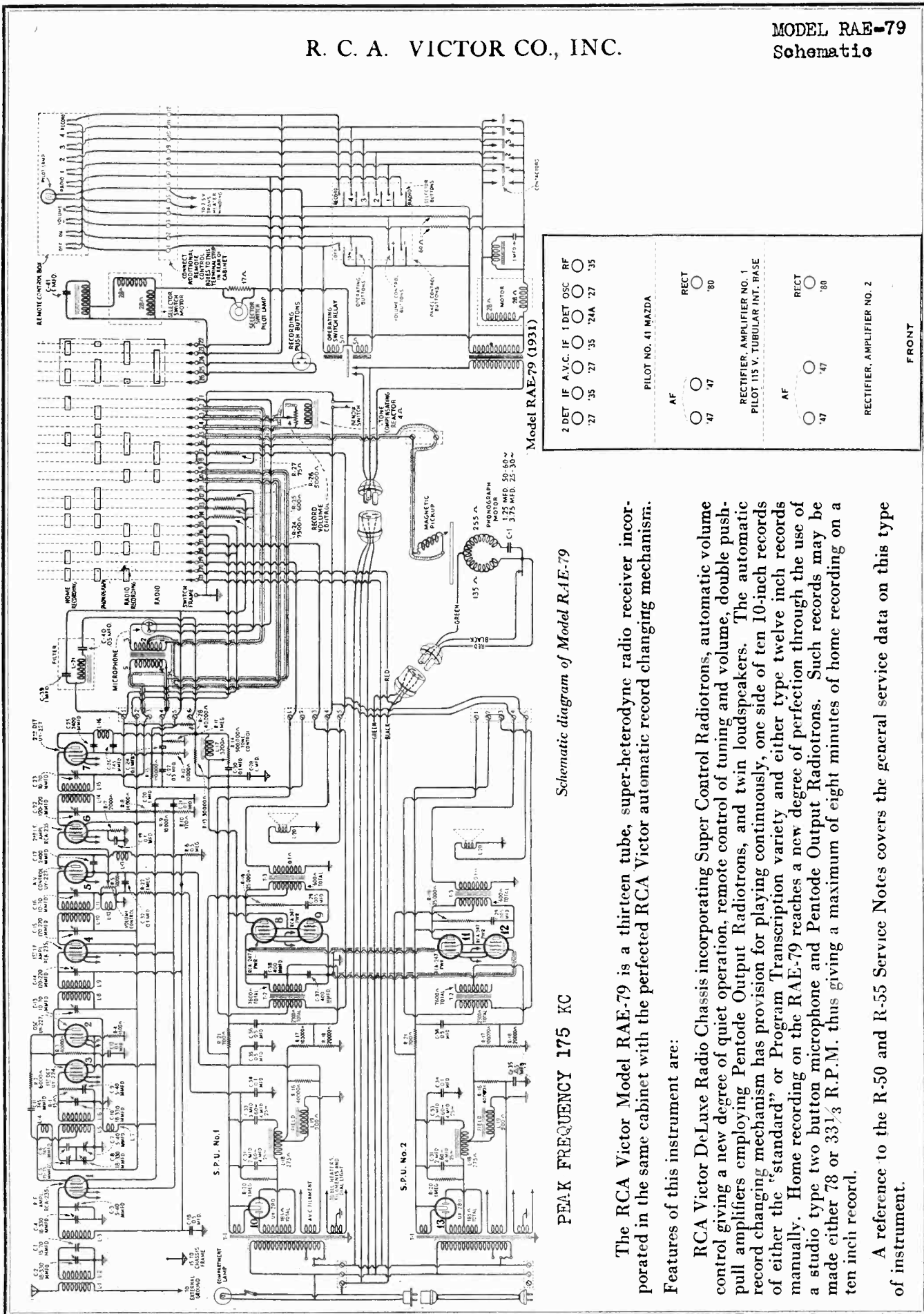
Should it be necessary to remove the motor board from the mechanism for replacement of any of the parts, the following procedure should be used:

- (a) Remove nuts and washers from the bolts which hold the motor board to the cabinet, and disconnect the pickup leads and power wiring to the mechanism. Then lift the mechanism from the cabinet.
- (b) Loosen the two set screws and remove the magazine lever Figure 9.
- (c) Lift out magazine.
- (d) Unhook tone arm cable from spring.
- (e) Loosen the three small screws in the tone arm base, taking care not to lose the lock nuts.
- (f) Disengage the tone arm lever from the tone arm shaft and carefully lift the tone arm from the motor board, bringing the tone arm lever and the shielded cable up through the tone arm base hole in the motor board.
- (g) Remove the screw and lock nuts in the bottom of the elevator shaft.
- (h) Lift elevator shaft from mechanism.
- (i) Unfasten wires from motor board.
- (j) Remove the four motor board screws which support the bottom plate.
- (k) Carefully lift the motor board from the mechanism.

Access can now be had to all the parts on the bottom plate. The parts can be assembled in the reverse order from that given above. It will then be necessary to make various adjustments after the parts have been reassembled.

R. C. A. VICTOR CO., INC.

MODEL RAE-79
Schematic



2 DET IF A.V.C. IF 1 DET OSC RF	PILOT NO. 41 MAZDA	RECT	RECTIFIER, AMPLIFIER NO. 1
27 35 27 35 24A 27 35		'80	PILOT 115 V. TUBULAR INT. BASE
		AF	RECT
		'47	AF
		'47	RECTIFIER, AMPLIFIER NO. 2

Schematic diagram of Model RAE-79

PEAK FREQUENCY 175 KC

The RCA Victor Model RAE-79 is a thirteen tube, super-heterodyne radio receiver incorporated in the same cabinet with the perfected RCA Victor automatic record changing mechanism. Features of this instrument are:

RCA Victor DeLuxe Radio Chassis incorporating Super Control Radiotrons, automatic volume control giving a new degree of quiet operation, remote control of tuning and volume, double push-pull amplifiers employing Pentode Output Radiotrons, and twin loudspeakers. The automatic record changing mechanism has provision for playing continuously, one side of ten 10-inch records of either the "standard" or Program Transcription variety and either type twelve inch records manually. Home recording on the RAE-79 reaches a new degree of perfection through the use of a studio type two button microphone and Pentode Output Radiotrons. Such records may be made either 78 or 33 1/3 R.P.M. thus giving a maximum of eight minutes of home recording on a ten inch record.

A reference to the R-50 and R-55 Service Notes covers the general service data on this type of instrument.

FRONT

MODEL RAE-79
Receiver Chassis

R. C. A. VICTOR CO., INC.

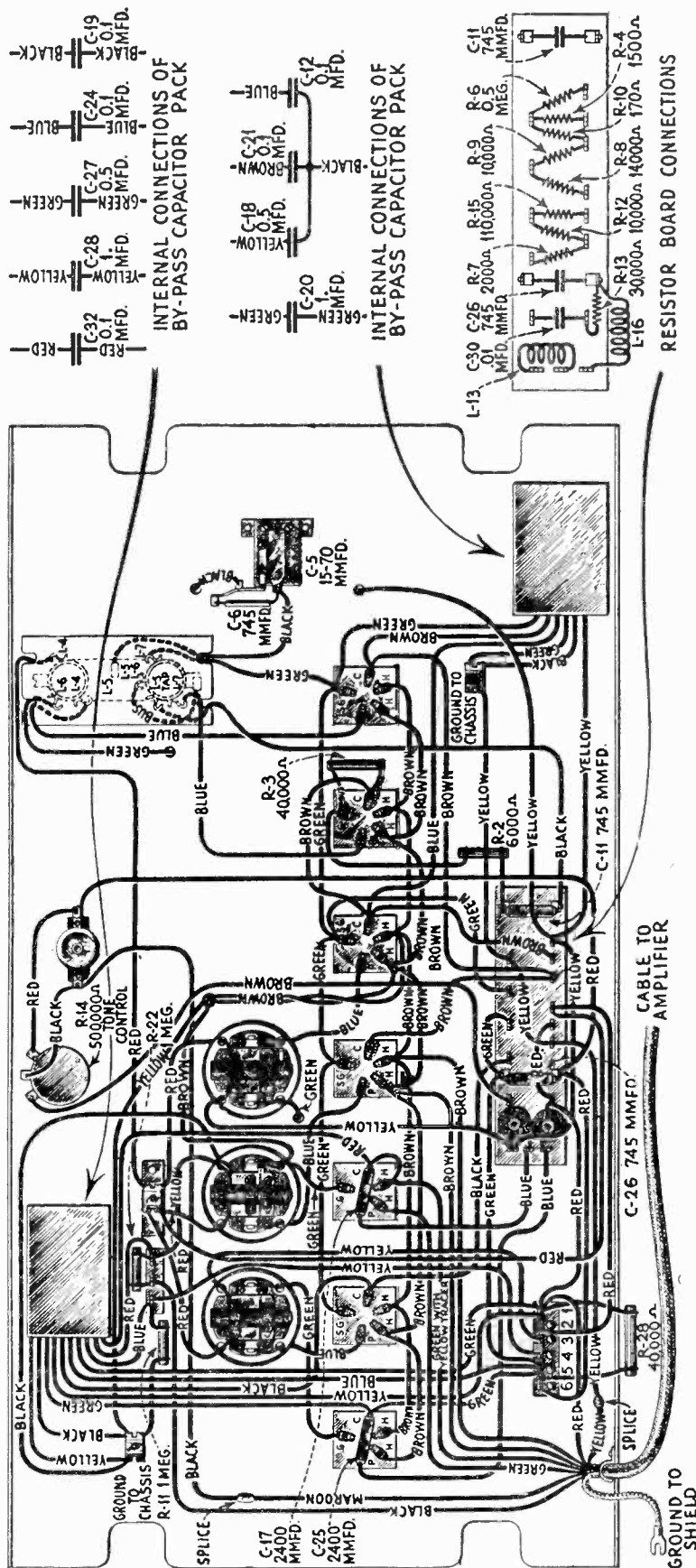
SERVICE DATA ON REMOTE CONTROL UNIT

The Remote Control Contactors of Model RAE-79 are adjusted at the Factory with a 115 volt A. C. input being applied to the receiver. Due to the extreme selectivity of the receiver used, it may be necessary to readjust the motor contactors when the instrument is used on extremely high or low line voltages. The following test covers these adjustments thoroughly.

This is also true on Models used at frequencies other than that specified. For example, when a 60 cycle model is used on 50 cycles, the phonograph motor must be changed and the remote control contactors completely readjusted.

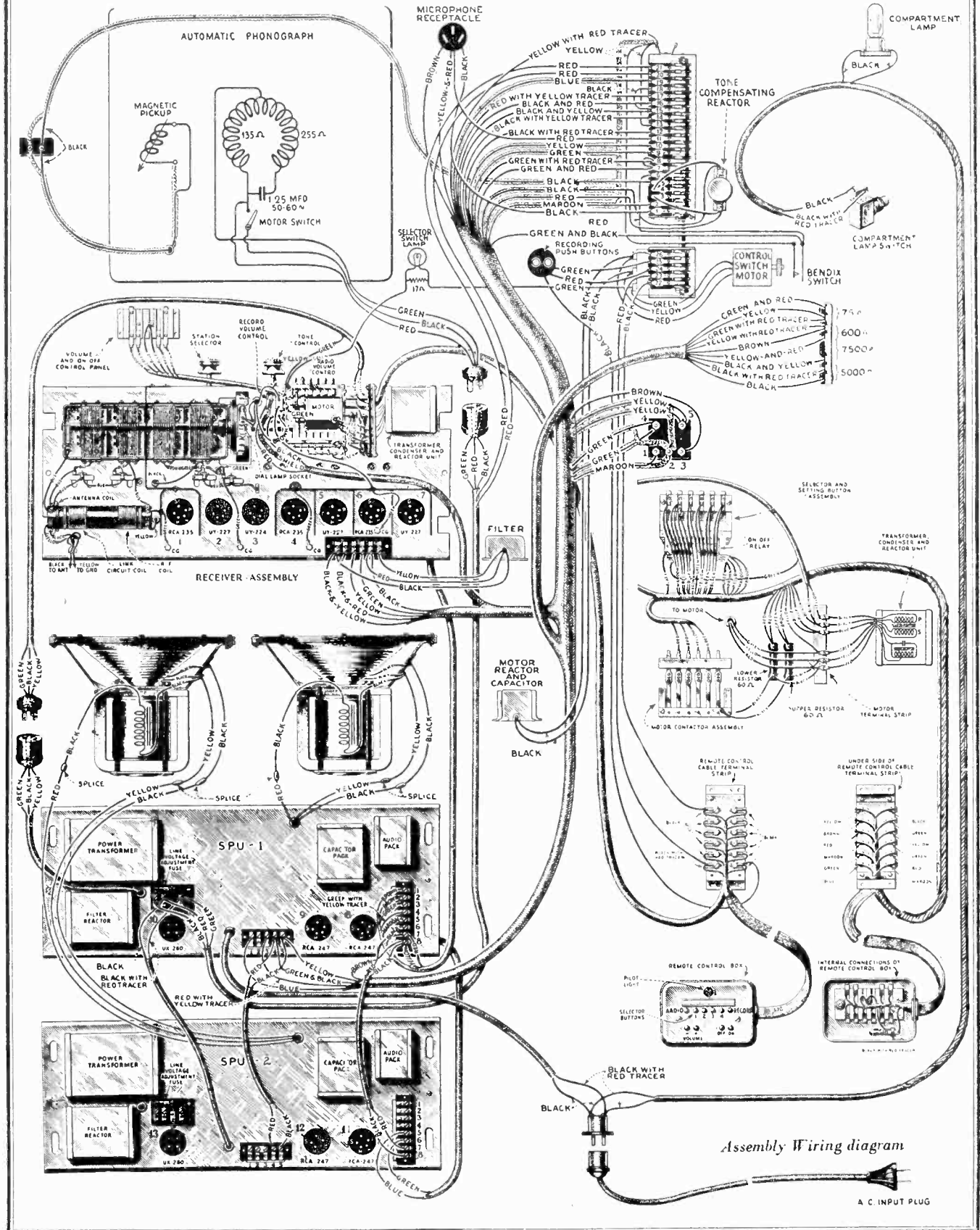
The remote control feature is unique in that it not only allows control of the receiver from a distant point but also pre-selects the desired station accurately. Manual tuning, other than necessary for the original setting of the selector buttons, is therefore eliminated. Selection of any one of four stations, adjustment of the volume control, turning the receiver "on" or "off" or changing from Radio to Record may be accomplished at one or more remote points from the receiver. Operation of the tone control or home recording must be done at the receiver.

One control box and twenty-five feet of flat cable are supplied. If desired, any number of additional units may be installed or the cable lengthened to seventy-five feet.



R. C. A. VICTOR CO., INC.

MODEL RAE-79
Assembly Wiring



MODEL RAE-79
Remote Control

R. C. A. VICTOR CO., INC.

Electrical Description of Unit

The remote control feature consists of a standard R-50 chassis with a special gang condenser; a capacitor motor coupled to the gang condenser through a series of gears; a series of drums and contactors by which the motor is started in the right direction for a given station and stopped at the right point; a special volume control geared to the motor; a relay to turn the set "on" or "off" and a remote control box by which these operations are controlled.

The motor is provided with a tapped reactor and condenser for changing the phase angle of the applied current so that operation in either direction may be secured. The motor operates at 23 volts for the station selector and 18 volts for the volume control.

Referring to Figure 1 we see the normal position of the motor armature. It will be noted that a spring holds the armature so that the gear at one end is meshed with the volume control gears. At 18 volts, the voltage used for volume control operation, the gears remain in this position and operation of the volume control is secured. When the speed of the motor is increased by operating it at 23 volts, this voltage being used when the selector buttons are pressed, the end thrust of the armature causes it to move laterally, thereby disengaging the gear at the volume control end and engaging the gear at the station selector end. See Figure 2. The spring at the end of the armature causes it to always return to the volume control position when the current is "off" at the motor. As this action takes place with the motor operating in either direction, controlling the voltage at which the motor is operated determines its function. A sixty ohm resistor is placed in each motor circuit controlling the volume to reduce the voltage from 23 to 18 volts.

The proper direction of operation and stopping of the motor for selection of a desired station is controlled by a series of drums and contactors. Figure 3 shows a schematic circuit of the motor and its adjacent circuits. The drums hold the contactors in the proper position so that when a particular selector button is depressed, the motor will turn in the right direction. When the contactor is at the point on the drum where it is half way between each contact, the motor stops. This is 180° from the hole that is used to set the drum for a particular station.

The setting of the drums is made by the pins on the front panel. These are known as the "setting buttons." The selector button is pressed and the drum is moved by the motor until the corresponding contactor is midway between the contacts. The pin will now fall in the hole in the drum if pushed in by the finger. See Figure 4. Holding the pin firmly in the hole, the desired station is then accurately tuned in by means of the manual station selector knob. After tuning, the pin is then released. As the point on the opposite side of the drum is where the diameter of the drum changes, the contactor is half way between the contacts. Pressing the selector buttons will therefore cause no movement of the motor. If another button is pressed and the drum moved, pressing the original button will always bring the drum back to the position for which it was set.

Referring to Figure 10, the schematic diagram, it will be noted that a common lead is used for the pilot lamp and the selector buttons in the remote control box. By doing this, when a selector button on the box is pressed, the current through the common lead is increased, likewise the voltage drop in the lead is increased. The result is that while the motor is running the pilot lamp becomes very dim. As soon as the motor stops, the lamp flashes bright, thus indicating that the motor has stopped and the station is tuned in. If the station is not then heard, it is necessary to press the + volume control button a little at a time until the desired output level is obtained.

Special Installations

(1) INCREASING LENGTH OF REMOTE CONTROL BOX CABLE

The cable to the remote control box supplied with the remote control models is twenty-five (25) feet in length. This is ample for most rooms as it is very rare that a person wishes to listen to a program at a greater distance from the loudspeaker.

If, however, it is desired to place the remote control box at a greater distance from the set, any twelve conductor cable, the wires of which are No. 14 or larger in size, may be used to splice onto the regular cable and increase the total length up to seventy-five (75) feet. Figure 5 shows the method recommended for adding this additional cable.

(2) INCREASING NUMBER OF REMOTE CONTROL BOXES

One remote control box is supplied as standard equipment. Any number of additional boxes may be installed if desired although only one box can be used at a time for controlling the receiver. The boxes should be connected in parallel at the terminal strip on the rear of the Radiola. Figure 11 shows such a connection.

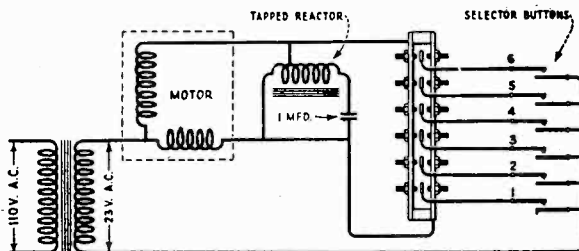


Figure 3—Schematic diagram of motor circuits

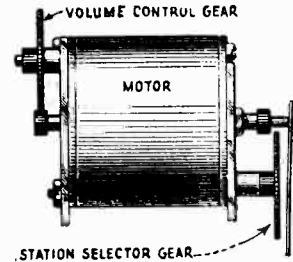


Figure 1—Motor with armature in volume control position

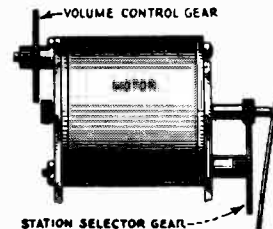


Figure 2—Motor with armature in station selector position

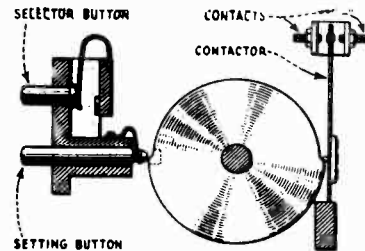


Figure 4—End view of drum and contactor

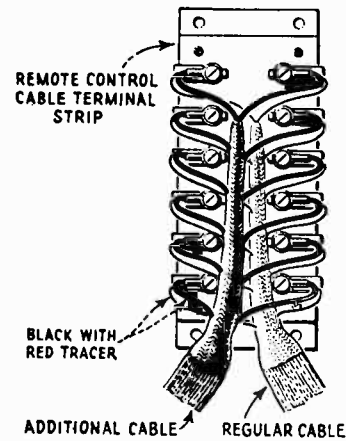


Figure 6—Connections for adding additional boxes

MODEL RAE-79
Motor Adjustment

R. C. A. VICTOR CO., INC.

Adjustments

(1) ADJUSTMENT OF MOTOR CONTACTORS

The four station selector motor contactors located at the rear of the motor may require adjustment due to changes in the amount of friction in the entire drive assembly. Need for adjustment is evidenced by the motor failing to stop at the exact point for a particular station.

In order to make these adjustments two tools are necessary. They may be constructed, see Figure 7, or obtained as a spare part, the replacement parts section listing them. The chart on page 4 gives the procedure to be followed for making adjustments. This procedure must be repeated on each contactor that is out of adjustment.

If all contactors are out of adjustment in a similar manner, then the friction screw, see Figure 8, requires adjustment. This should be either tightened or loosened, the exact adjustment to be determined by trial. The adjustment that is correct for one contactor will be correct for all, assuming the friction screw to be at fault.

(2) REPLACING OR ADJUSTING CONTACTORS

Six contactors are used for connecting the motor so that it rotates in the proper direction. To make this adjustment or replacement, a special offset screw driver will be required unless the unit is to be removed from the base. This is shown in Figure 12.

Referring to Figure 4 we see that when the setting button is in the hole in the drum, the contactor for that particular drum is exactly half way between the contacts. The holes that hold the contactors are elongated so that they may be raised or lowered until they rest exactly half way between the contacts when the setting button is inserted in the drum hole. This is the only adjustment required of these contactors, and with the special screw driver is quite easy to make.

(3) MAKING REPLACEMENTS

The operating relay, the resistors, the motor, the gears and other small parts may be replaced. All power transformers when replaced must have the primaries so connected that the pilot light on the remote control box lights properly. If the transformers are improperly phased, the lamp will brighten instead of dim when a selector button is pressed. The drum assembly is specially fitted and assembled and any individual replacements can not be made. If trouble is experienced in this assembly, a complete replacement of the unit will be required.

SELECTOR SWITCH AND MISCELLANEOUS INFORMATION

(1) BENDIX LOUDSPEAKER SWITCH

At the end of the selector switch motor a switch is located that shorts the cone coil when the instrument is changing from one function to another.

The switch is operated by the lateral thrust of the motor wherever it goes into operation. If for any reason, noise should be heard when changing from Radio to Record or Home Recording, it may be due to this switch not functioning. Bending the lever so that it makes proper contact will remedy this condition.

(2) PRECAUTIONS WHEN MAKING RADIO RECORDING RECORDS

When making radio recording records, it is necessary that the radio volume be adjusted for its greatest undistorted output if good quality records are to be obtained. While using the maximum undistorted output it is also important that the volume control should not be advanced beyond this point, as it is possible that the maximum *distorted* output, if fed into the pickup long enough will cause the pickup coil to heat and its wax to run out.

(3) SERVICE DATA ON MICROPHONE

The Microphone used on Model RAE-79 is a two-button studio type that has excellent frequency characteristics and is simple and rugged in construction. Generally, any failure in the microphone can be remedied only by replacing the unit. However, an unbalance in the buttons may be corrected by means of a small adjustment. The following procedure details the correct manner in making this adjustment. Refer to Figure 9.

(a) Remove the microphone from its shell. Be careful not to lose its supporting springs. Measure the D. C. resistance of each button. This may vary from 200 to 1000 ohms, but each button should be measured within 50% of the other.

(b) Loosen the set screw shown in Figure 9, and adjust the pressure of the cup by either increasing or decreasing its pressure against the diaphragm. Increasing the pressure reduces the resistance and decreasing it, increases the resistance of the button. Usually it is best practice to match the buttons by increasing the resistance rather than by decreasing it. Be very careful however to avoid spilling any carbon granules.

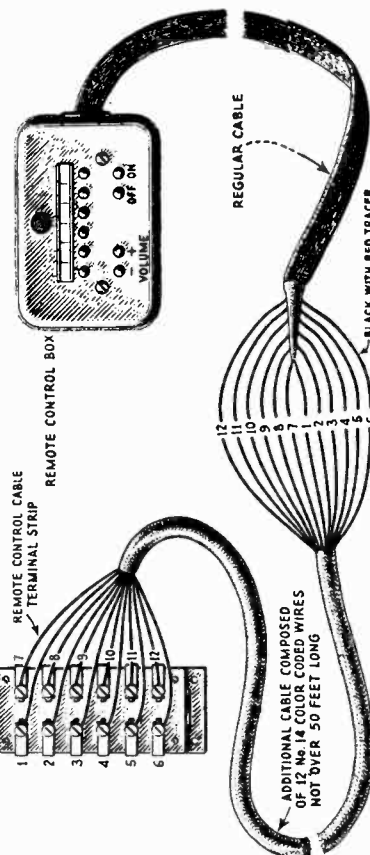


Figure 5

Wiring diagram for method for connecting additional cable

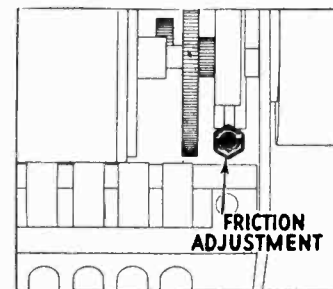


Figure 8—Location of Friction Adjustment

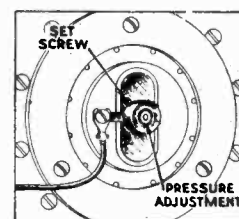


Figure 9—Details of Microphone Adjustment

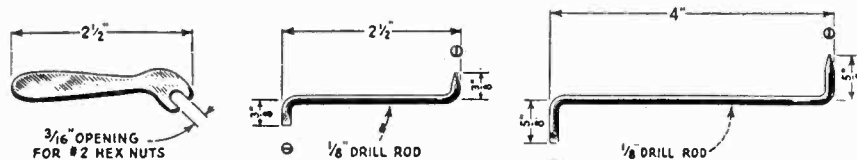
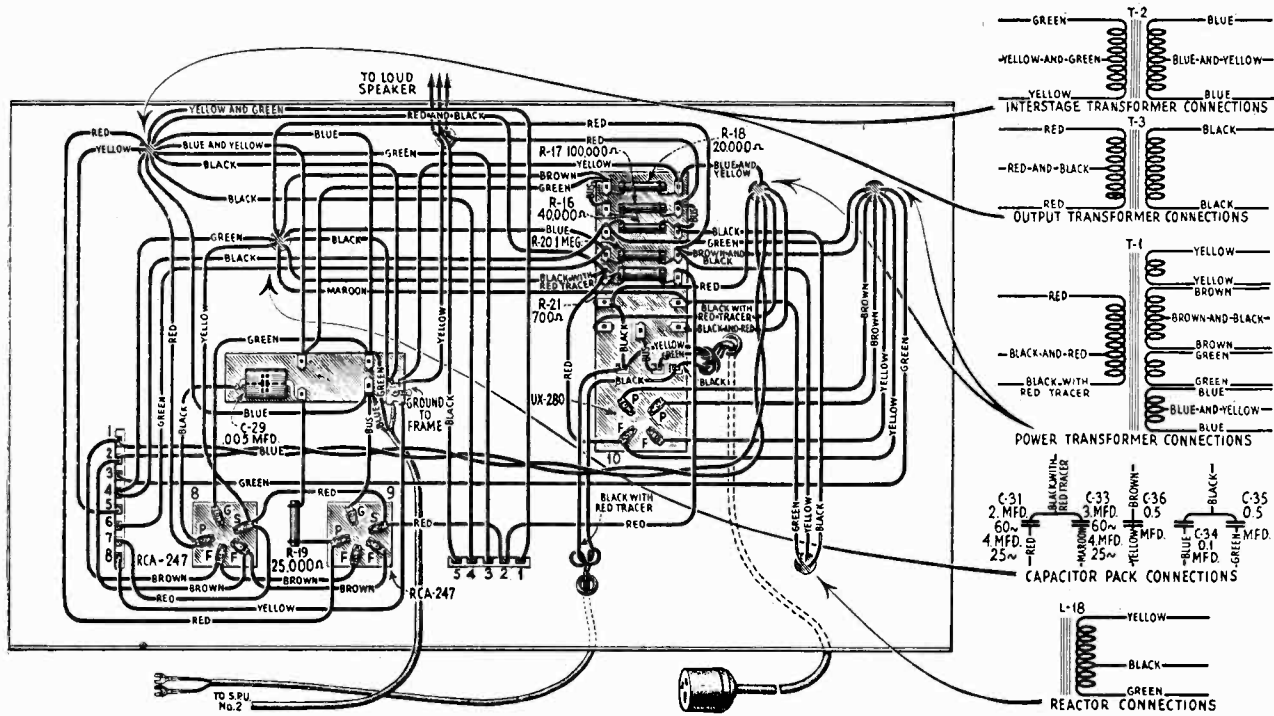


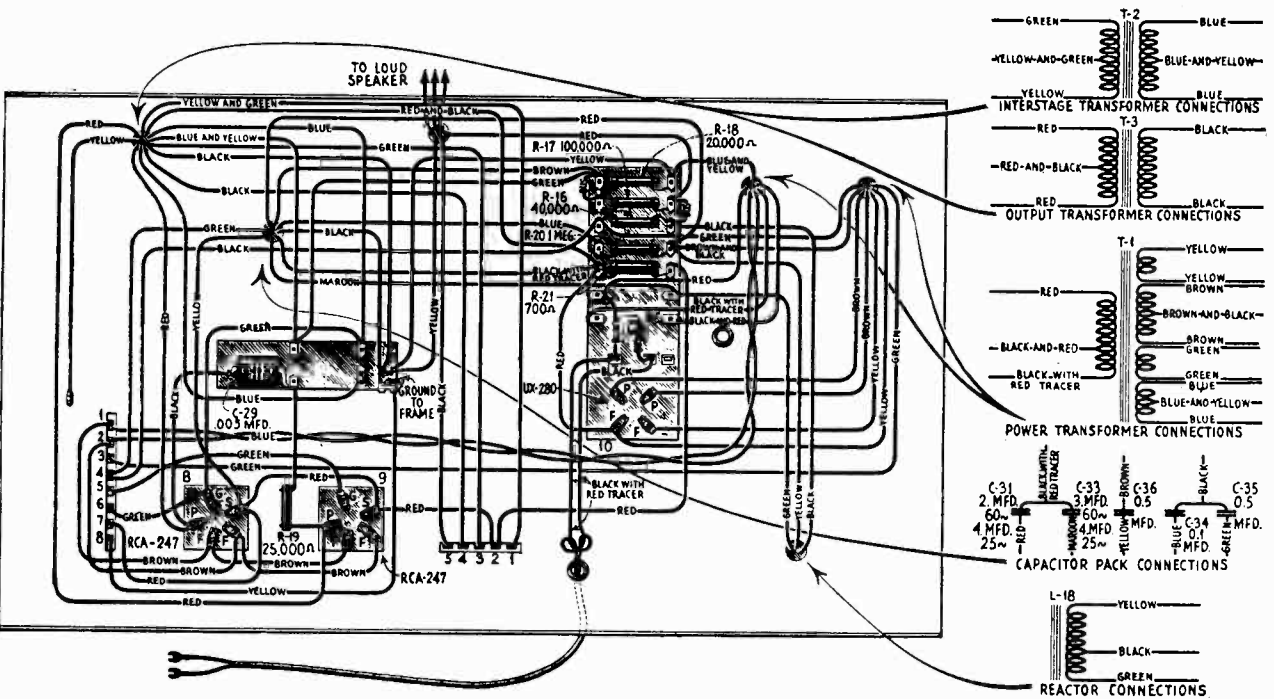
Figure 7—Constructional details of special tools used with remote control models

MODEL RAE-79
SPU-1, SPU-2
Chassis

R. C. A. VICTOR CO., INC.



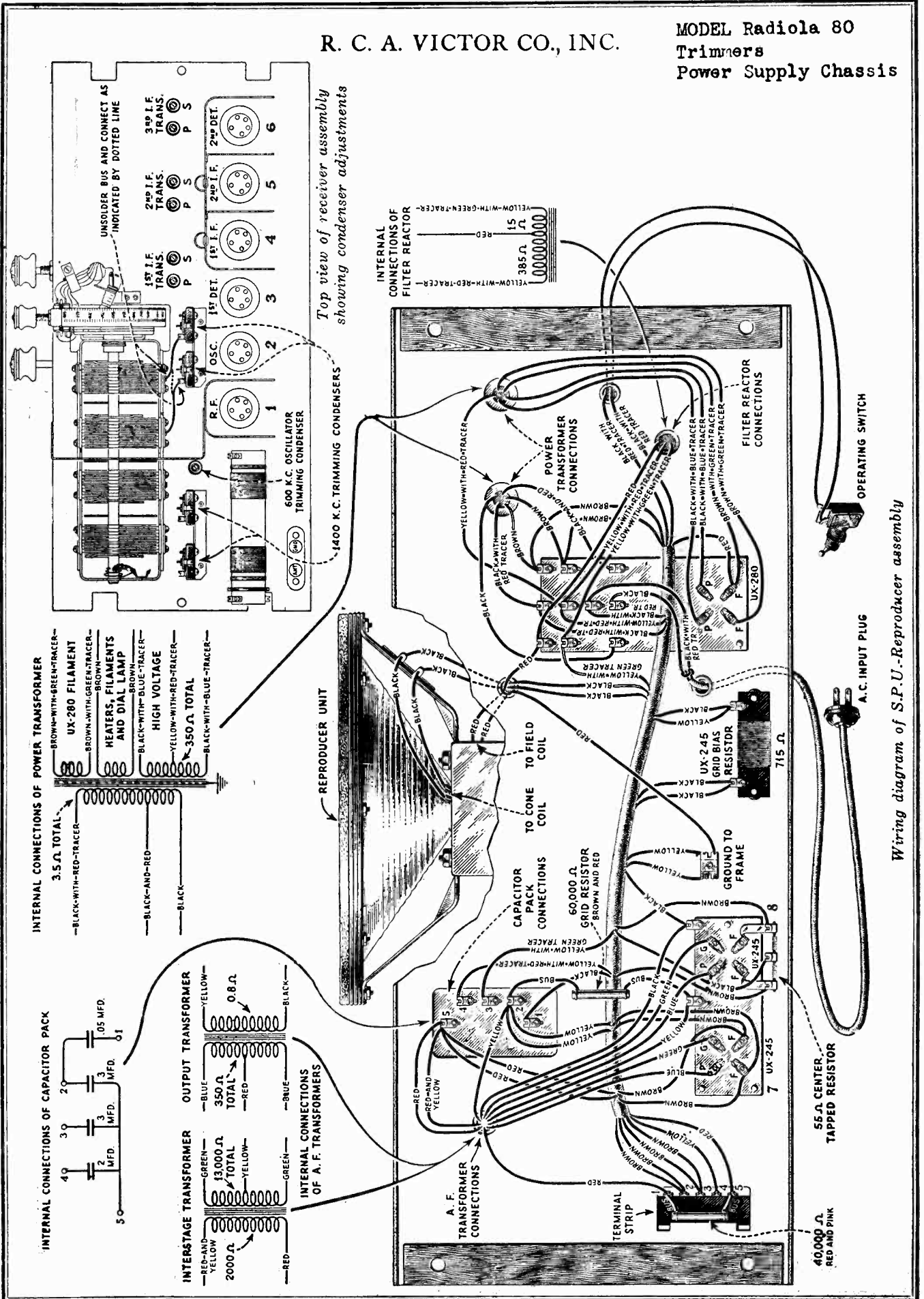
S. P. U. No. 1 wiring



S. P. U. No. 2 wiring

R. C. A. VICTOR CO., INC.

MODEL Radiola 80
Trimmers
Power Supply Chassis

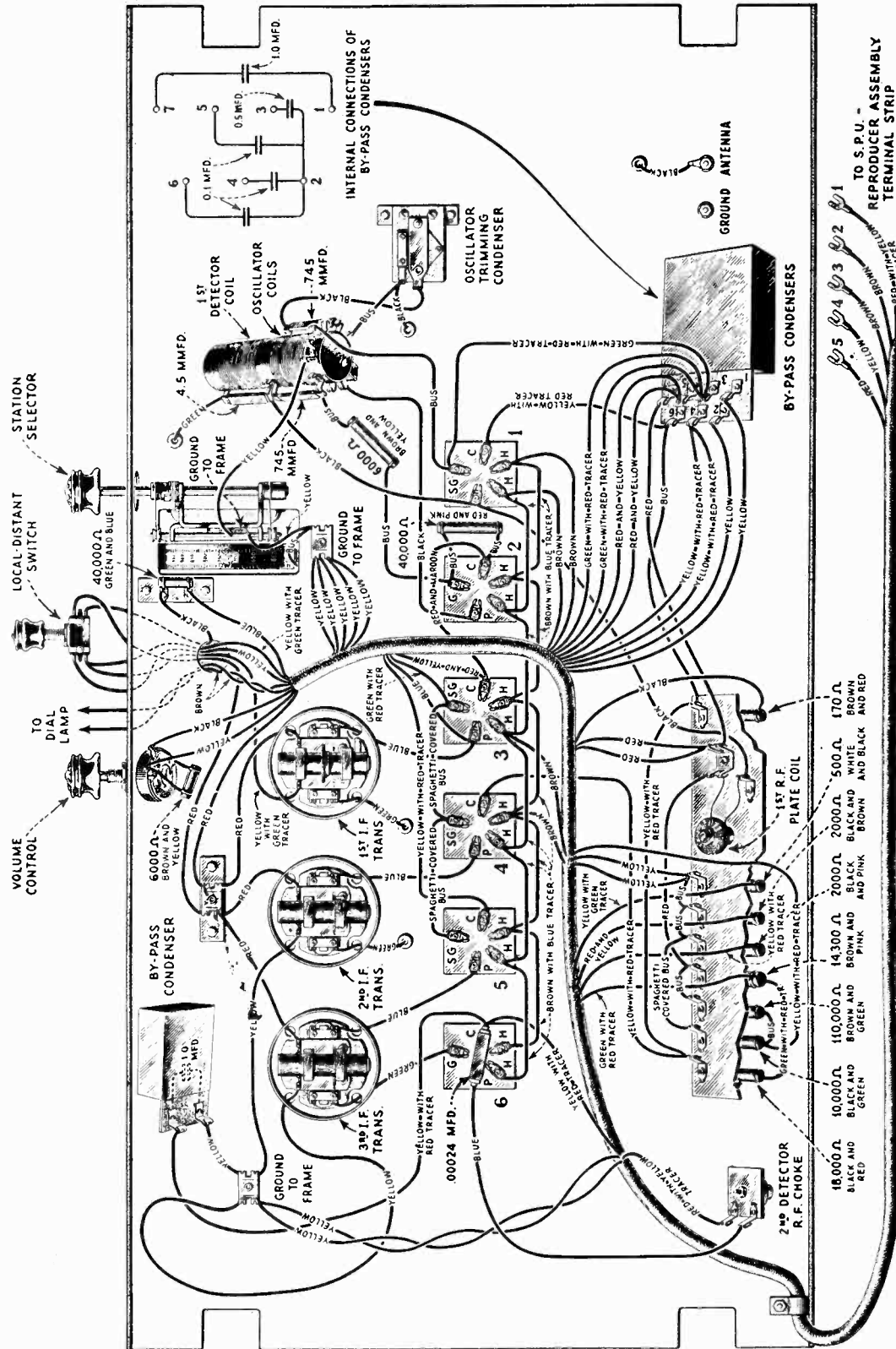


Top view of receiver assembly showing condenser adjustments

Wiring diagram of S.P.U.-Reproducer assembly

MODEL Radiola 80
Receiver chassis

R. C. A. VICTOR CO., INC.



Wiring diagram of receiver assembly

MODEL Radiola 80
Resistance Data

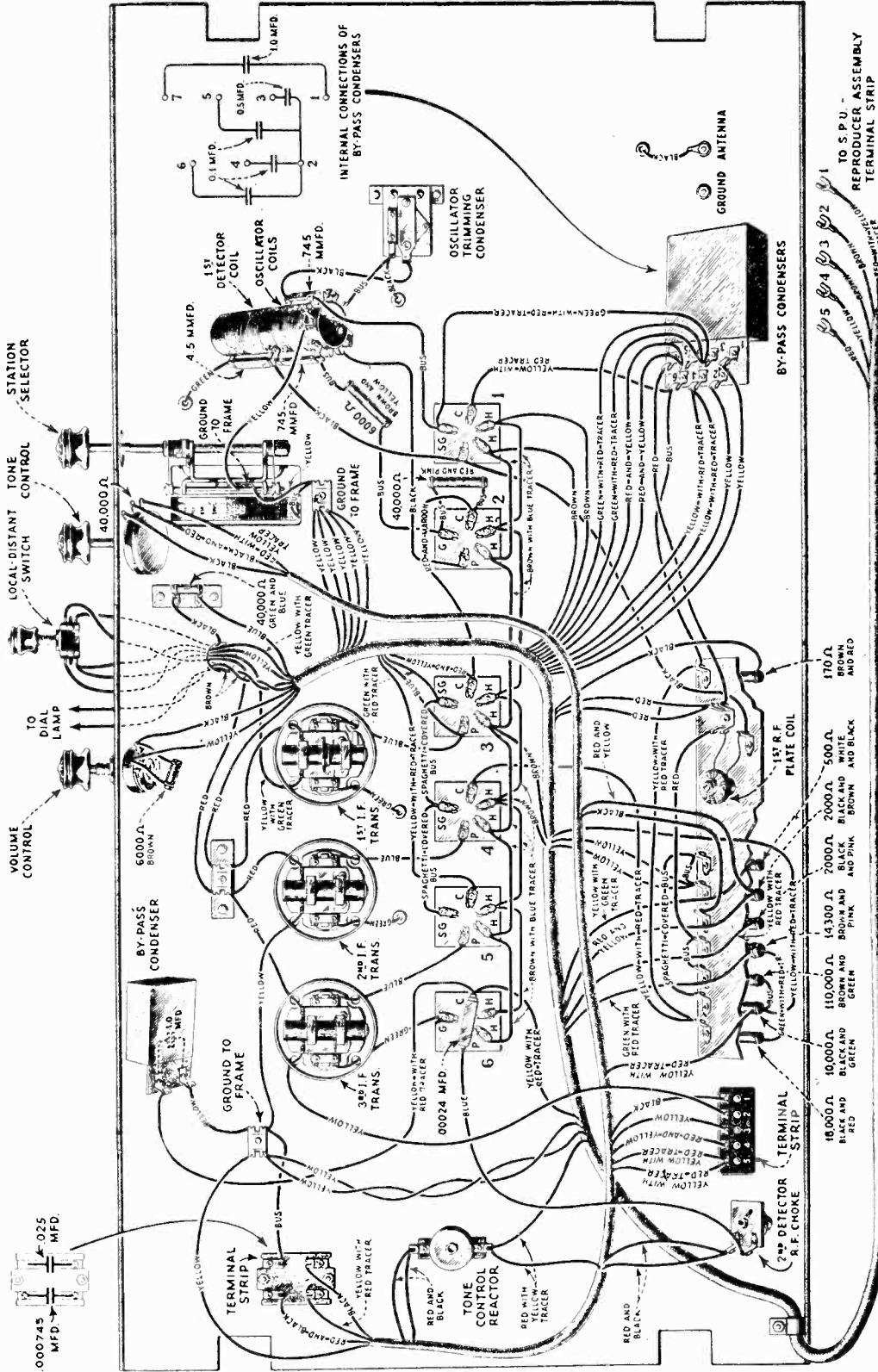
R. C. A. VICTOR CO., INC.

All tubes out of sockets and AC plug disconnected from power supply.
Volume Control set for maximum signal unless otherwise specified

From Chassis To	Correct		Incorrect
Aerial to Ground	40	ohms	
Chassis to			
Link circuit condenser stator	5	ohms	TC-Y
RF Control Grid	5	ohms	TC- rf Cg-Y
RF Cathode (V.C.Min)	2,570	ohms	BC- rf K-Y (.1 mfd) BC- rf Sg-Y (.5 mfd)
RF Cathode (V.C. Max)	170	ohms	See V.C. Min
RF Screen Grid	16,000	ohms	BC- rf Sg- Y (.5 mfd) BC-2 D - Y (1. mfd) FC- '80 F-Y (3. mfd)
RF Plate	26,597	ohms	See RF Cathode
RF Plate to '80 Fil	42	ohms	
1 Detector Control Grid	5	ohms	TC- 1 D Cg-Y
1 Detector Cathode	2,000	ohms	BC- 1 D K-Y (.1 mfd)
1 Detector Screen Grid	16,000	ohms	See RF Screen
1 Detector Plate (distant)	26,594	ohms	See RF Screen
1 Detector Plate to '80 Fil9 distant)	39	ohms	
Oscillator Control Grid	42,000	ohms	BC- 1 D K-Y (.1 mfd) Oscillator Grid condenser
Oscillator Cathode	2,000	ohms	BC- 1 D K-Y (.1 mfd)
Osc control grid to cathode	40,000	ohms	
Oscillator Plate	16,000	ohms	See RF Screen
Oscillator Plate to RF Screen	1	ohm	
1 IF Control Grid	41	ohms	TC- 1 IF Cg-Y
1 IF Control Grid to distant switch	541	ohms	"Distant" Adjustment
1 IF Cathode	170	ohms	See RF Cathode
1 IF Screen Grid	16,000	ohms	See Rf Screen
1 IF Plate	26,594	ohms	See RF Screen
1 IF Plate to '80 Fil	39	ohms	
2 IF Control Grid	41	ohms	TC- 2 IF Cg-Y
2 IF Cathode	2,000	ohms	BC- 2 IF K-Y (.1 mfd)
2 IF Screen Grid	16,000	ohms	See RF Screen
2 IF Plate	26,594	ohms	See RF Screen
2 Detector Control Grid	41	ohms	TC-2D Cg-Y
2 Detector Cathode	9,346	ohms	BC-2D K-Y (1. mfd)
2 Detector Plate	28,540	ohms	FC-'80 F-Y (3 mfd)
2 Det Plate to '80 Fil	1,985	ohms	BC-2DP-2DK(.0024 mfd)
'45 Control Grid	66,500	ohms	
'45 Control Grid to Control Grid	13,000	ohms	
'45 Plate	26,730	ohms	See RF Screen
'45 Plate to 45 Plate	350	ohms	
'45 Plate to '80 Fil	175	ohms	
'45 Filament	730	ohms	BC-715 ohm unit-Y (.05 mfd)
'80 Filament	26,555	ohms	
'80 Filament to '80 Plate	28,445	ohms	FC-80F (2 mfd) FC-80F (3 .mfd) Harm. Condenser (3. mfd)
80 Anode to 80 Anode	350	ohms	See RF Screen
Speaker field only	1,330	ohms	
Output transformer secondary only	.8	ohm	
Voice coil only	10	ohms	
Oscillator coil only	5	ohms	
Across AC Plug	3.5	ohms	

MODEL Radiola 82
Receiver Chassis

R. C. A. VICTOR CO., INC.



Wiring diagram of the receiver assembly.

RADIOLA 82

MODEL Radiola 82
Resistance Data

R. C. A. VICTOR CO., INC.

All tubes removed from sockets and AC plug disconnected from power supply.
Volume Control set for maximum signal unless otherwise stated. Phonograph pickup disconnected from terminal board and terminals 1,2 and 3 joined.
Terminals 4 and 5 left open.

From Chassis To	Correct	Incorrect
Aerial to Ground	40 ohms	
Chassis to		
Link Circuit condenser stator	5 ohms	TC-Y
RF Control Grid	5 ohms	TC- rf Cg-Y
RF Cathode (V.C.Min)	2,570 ohms	BC- rf K-Y (.1 mfd)
RF Cathode (V.C.Max)	170 ohms	See V.C. Min
RF Screen Grid	16,000 ohms	BC- rf Sg-Y (.5 mfd)
		BC- 2 D K-Y (1. mfd)
		FC- 80 P-Y (3. mfd)
		See RF Cathode
RF Plate	26,597 ohms	
RF Plate to 80 Fil	42 ohms	
1 Det. Control Grid	5 ohms	TC- 1 D Cg
1 Det. Cathode	2,000 ohms	BC- 1 D K-Y (.1 mfd)
1 Det. Screen Grid	16,000 ohms	See RF Screen
1 Det. Plate (distant adj)	26,594 ohms	See RF Screen
1 Det Plate to '80 Fil (distant)	39 ohms	
Oscillator Control Grid	42,000 ohms	BC- 1 D K-Y (.1 mfd)
		Oscillator grid cond
Oscillator Cathode	2,000 ohms	BC- 1 D K-Y (.1 mfd)
Osc. Cg to Cathode	40,000 ohms	
Oscillator Plate	16,000 ohms	See RF Screen
Osc Plate to RF Screen	1 ohm	
1 IF Control Grid	41 ohms	TC- 1 IF Cg-Y
1 IF Cathode	170 ohms	See RF Cathode
1 IF Screen Grid	16,000 ohms	See RF Screen
1 IF Plate to '80 Fil	39 ohms	
2 IF Control Grid	41 ohms	TC- 2 IF Cg-Y
2 IF Cathode	2,000 ohms	BC- 2 IF K-Y (.1 mfd)
2 IF Screen Grid	16,000 ohms	See RF Screen
2 IF Plate	26,594 ohms	See RF Screen
2 Detector Control Grid	41 ohms	TC- 2 D Cg-Y
2 Detector Cathode	9,546 ohms	BC- 2 D K-Y (1. mfd)
2 Detector Plate	28,635-29,894 ohms*	*Depending upon tone setting
		Tone control condenser
		FC-'80 P-Y (3.mfd)
2 Det Plate to '80 Fil	2,080-3,539 ohms*	*Depending upon tone setting

'45 Control Grid	66,500 ohms	Correct
'46 Control Grid to Control Grid	13,000 ohms	
'45 Plate	26,730 ohms	
'45 Plate to '45 Plate	350 ohms	
'45 Plate to '80 Fil	175 ohms	
'45 Filament	730 ohms	
'80 Filament	26,555 ohms	
From Chassis To	Incorrect	
'80 Fil to '80 Plate	28,445 ohms	
'80 Anode to '80 Anode	350 ohms	
Speaker Field only	1,380 ohms	
Output Transformer Secondary Only	.8 ohm	
Voice Coil only	10 ohms	
Oscillator coil only	5 ohms	
Across AC Plug	3.5 ohms	

See RF Screen

BC-715 Ohm Unit-Y

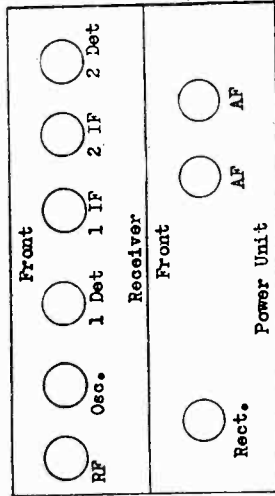
Incorrect

FC- 80 F (2 mfd)

FC- 80 F (3. mfd)

Har. condenser (3. mfd)

See RF Screen



Volume Control at Maximum
*Not True Reading Due to Resistor in Circuit

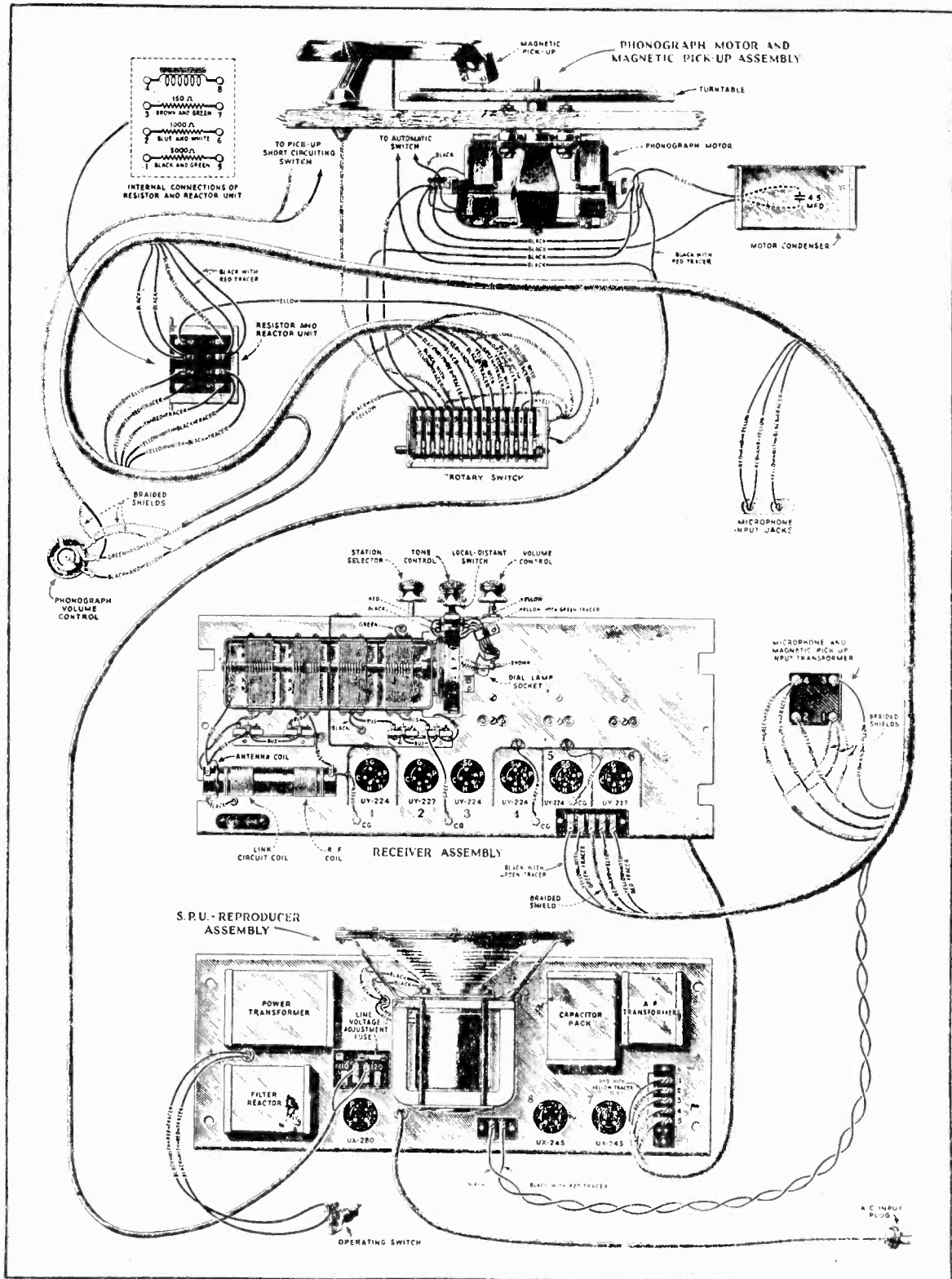
Part No.	Value	Resistance	Notes
1	1.0K	1,000	
2	1.0K	1,000	
3	1.0K	1,000	
4	1.0K	1,000	
5	1.0K	1,000	
6	1.0K	1,000	
7	1.0K	1,000	
8	1.0K	1,000	
9	1.0K	1,000	
10	1.0K	1,000	
11	1.0K	1,000	
12	1.0K	1,000	
13	1.0K	1,000	
14	1.0K	1,000	
15	1.0K	1,000	
16	1.0K	1,000	
17	1.0K	1,000	
18	1.0K	1,000	
19	1.0K	1,000	
20	1.0K	1,000	
21	1.0K	1,000	
22	1.0K	1,000	
23	1.0K	1,000	
24	1.0K	1,000	
25	1.0K	1,000	
26	1.0K	1,000	
27	1.0K	1,000	
28	1.0K	1,000	
29	1.0K	1,000	
30	1.0K	1,000	
31	1.0K	1,000	
32	1.0K	1,000	
33	1.0K	1,000	
34	1.0K	1,000	
35	1.0K	1,000	
36	1.0K	1,000	
37	1.0K	1,000	
38	1.0K	1,000	
39	1.0K	1,000	
40	1.0K	1,000	
41	1.0K	1,000	
42	1.0K	1,000	
43	1.0K	1,000	
44	1.0K	1,000	
45	1.0K	1,000	
46	1.0K	1,000	
47	1.0K	1,000	
48	1.0K	1,000	
49	1.0K	1,000	
50	1.0K	1,000	

Volume Control at Minimum

Part No.	Value	Resistance	Notes
1	1.0K	1,000	
2	1.0K	1,000	
3	1.0K	1,000	
4	1.0K	1,000	
5	1.0K	1,000	
6	1.0K	1,000	
7	1.0K	1,000	
8	1.0K	1,000	
9	1.0K	1,000	
10	1.0K	1,000	
11	1.0K	1,000	
12	1.0K	1,000	
13	1.0K	1,000	
14	1.0K	1,000	
15	1.0K	1,000	
16	1.0K	1,000	
17	1.0K	1,000	
18	1.0K	1,000	
19	1.0K	1,000	
20	1.0K	1,000	
21	1.0K	1,000	
22	1.0K	1,000	
23	1.0K	1,000	
24	1.0K	1,000	
25	1.0K	1,000	
26	1.0K	1,000	
27	1.0K	1,000	
28	1.0K	1,000	
29	1.0K	1,000	
30	1.0K	1,000	
31	1.0K	1,000	
32	1.0K	1,000	
33	1.0K	1,000	
34	1.0K	1,000	
35	1.0K	1,000	
36	1.0K	1,000	
37	1.0K	1,000	
38	1.0K	1,000	
39	1.0K	1,000	
40	1.0K	1,000	
41	1.0K	1,000	
42	1.0K	1,000	
43	1.0K	1,000	
44	1.0K	1,000	
45	1.0K	1,000	
46	1.0K	1,000	
47	1.0K	1,000	
48	1.0K	1,000	
49	1.0K	1,000	
50	1.0K	1,000	

MODEL Radiola 86
Assembly Wiring

R. C. A. VICTOR CO., INC.



MODEL SWA-2 SW Converter
Chassis - Parts List

R. C. A. VICTOR CO., INC.

MODEL SWA-2 SHORT WAVE CONVERTER

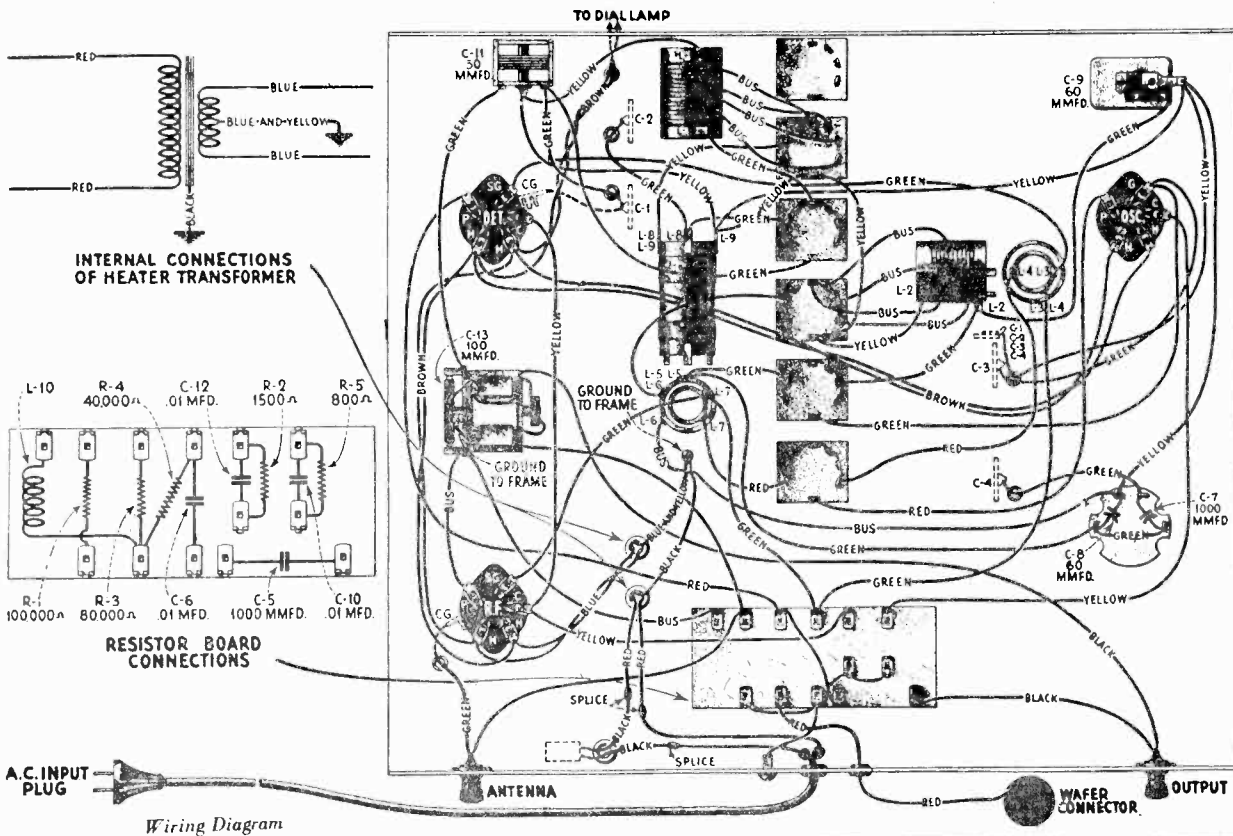
RCA Victor Short Wave Converter SWA-2 is a 1' rec tube, single control short wave unit designed to convert all short wave signals from 13.8-200 meters to a single frequency so that they may then be amplified by means of the usual broadcast receiver.

One Radiotron UY-224 is used as an R. F. Amplifying stage, one UY-224 as the detector and one UY-227 as the oscillator. Heater current for these Radiotrons is obtained from a small transformer incorporated in the unit. Plate supply is obtained from the broadcasting receiver.

A wafer connector is supplied that may be inserted under the tube socket when a receiver using a UX-280 rectifier and a filter in the negative side of the line is used. Under these conditions—most modern receivers are so designed that this is true—the plate supply to the converter is obtained through the contact on the wafer connector to the UX-280 filament. On receivers where this condition does not exist, but where Pentode output tubes are used, the wafer connector can be used to make connection to the screen grid of the Pentode. On receivers where neither condition exist any connection that gives a filtered D. C. output of from 180 to 260 volts between the contact and ground will be suitable.

Due to the SWA-2 being identical with the converter chassis used in the RO-23, reference to the RO-23 Service Notes should be made for data pertaining to Service work.

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
2747	Cap—Grid contactor cap—Package of 5	\$0.50	6109	Knob—Knob with pointer—Package of 5	\$1.75
2977	Knob—Station selector, or Resonator knob—Package of 5	2.50	6110	Dial lamp shield and indicator	.50
3058	Resistor—100,000 ohms—Carbon type—1 watt—Package of 5	2.50	6111	Escutcheon—Range switch knob escutcheon—Package of 5	1.80
3153	Resistor—1500 ohms—Carbon type—1 watt—Package of 5	2.75	6112	Cushion—Receiver chassis rubber cushions—Package of 5	.50
3285	Cord—Drive cord—Package of 5	1.00	7062	Capacitor—Adjustable capacitor—15-70 mmfd.	1.00
3286	Spring—Drive cord tension spring—Package of 5	1.40	7298	Capacitor—0.01 mfd.	.80
3288	Socket—UY Radiotron socket—Complete with insulation strip	.50	7106	Capacitor—Double adjustable capacitor—One section 10-70 mmfd.—One section 800-1000 mmfd.	1.10
3289	Contact lug—Complete with mounting rivets—Package of 10	.50	7407	Coil—High frequency detector coil	1.05
3290	Switch—Antenna—"Off and On"—Toggle type—2 used—Complete with mounting nut	1.00	7408	Coil—Low frequency detector and oscillator coil	1.45
3291	Board—Terminal board with two soldering terminals complete with mounting rivets—Located on switch bracket—Package of 5	.50	7409	Coil—High frequency oscillator coil	1.85
3292	Drive shaft with pulley—Package of 5	2.35	7410	Capacitor—Variable capacitor—7 plate—Complete with mounting nut and washers	1.75
3293	Coil—For resistor board assembly	.65	8806	Transformer—Filament power transformer	3.25
6100	Coil—Coil assembly with mounting eyelet—For switch and bracket assembly	.75	8807	Transformer—Filament power transformer—110 volts—25 cycle	5.75
6101	Socket—Dial lamp socket and bracket with mounting rivets	.50	8808	Transformer—Filament power transformer—220 volts—60 cycle	3.40
6102	Capacitor—1000 mmfd.—Package of 5	2.50	8809	Board—Resistor board less resistors, capacitors and coil	1.00
6103	Resistor—800 ohms—Carbon type—1 watt—Package of 5	2.00	8810	Lever—Switch lever assembly—Comprising shaft, 3 switch levers and coupling bushing	.70
6104	Resistor—80,000 ohms—Carbon type—1 watt—Package of 5	2.00	8811	Switch—Range switch complete with mounting washer and nut	6.60
6105	Resistor—40,000 ohms—Carbon type—3 watt—Package of 5	2.00	8812	Capacitor—Variable tuning capacitor assembly	5.10
6106	Coupling—Switch lever shaft coupling with 2 taper pins—Package of 5	.50	8813	Dial drum and axle	1.20
6107	Switch—Toggle type—Power switch	1.00	10820	Capacitor—100 mmfd.	.50
6108	Binding post—Complete with terminal lug, mounting washer and mounting nut—Package of 5	1.75			
				CABINET	
			3229	Escutcheon—Tuning dial escutcheon with mounting screws	.70
			6113	Foot—Cabinet felt foot—Package of 15	.50
			9399	Cabinet—Complete less equipment	12.00



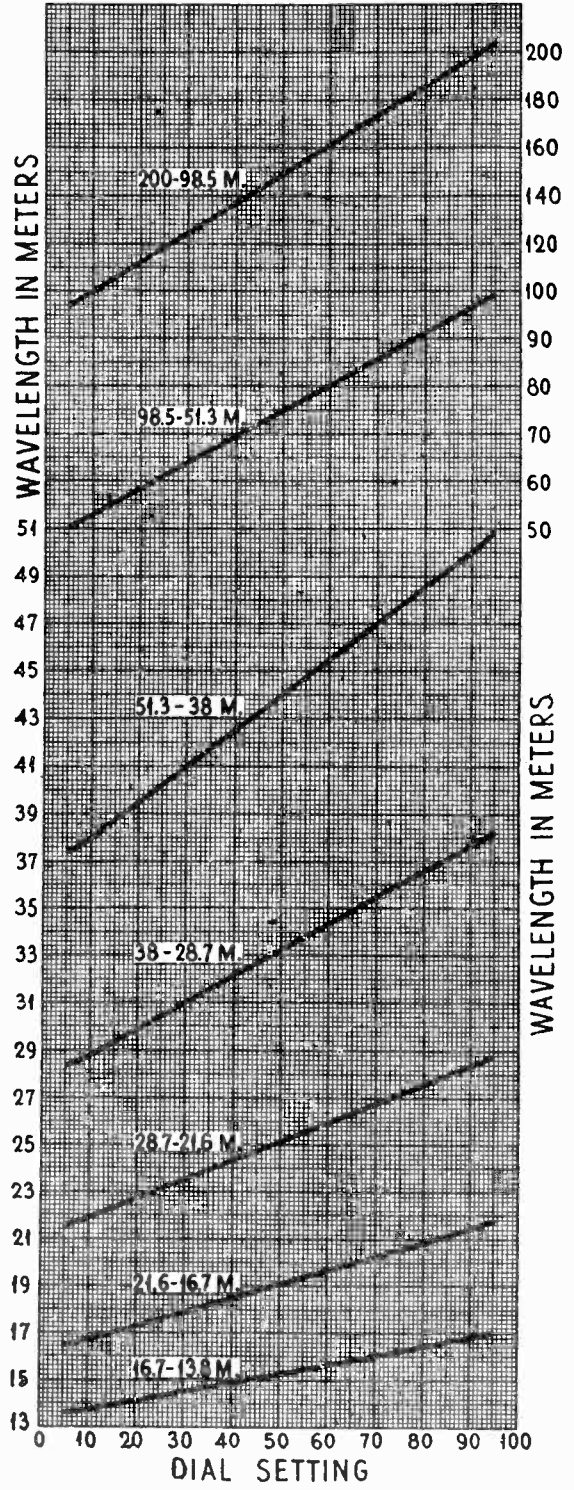
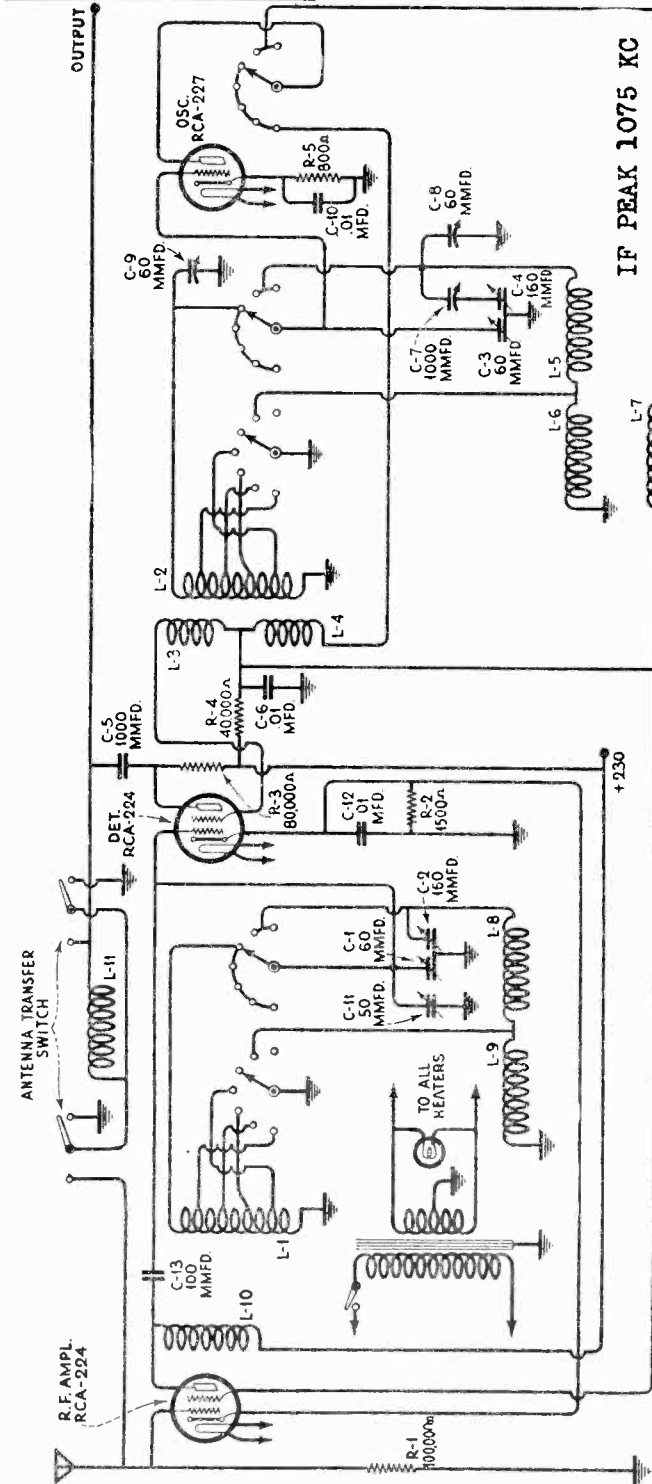
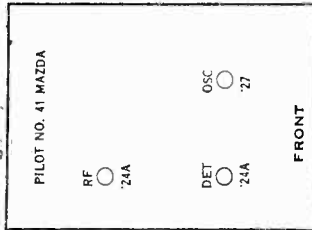
Wiring Diagram

Model SW-2 (1931)

R. C. A. VICTOR CO., INC.

MODEL SWA-2 SW Converter Schematic

MODEL SWA-2 SHORT WAVE CONVERTER



Voltage Rating 105-125 Volts and 200-250 Volts
 Frequency Rating 50-60 cycles and 25-40 cycles
 Power Consumption 20 Watts
 Recommended Antenna Length 25-75 feet

Approximate Calibration
 of Short Wave Tuning Dial of RO-23
 (with 1075 K.C. Intermediate Frequency).

MODEL 2-25
 Portable
 Victrola

R. C. A. VICTOR CO., INC.

REPLACEMENT PARTS

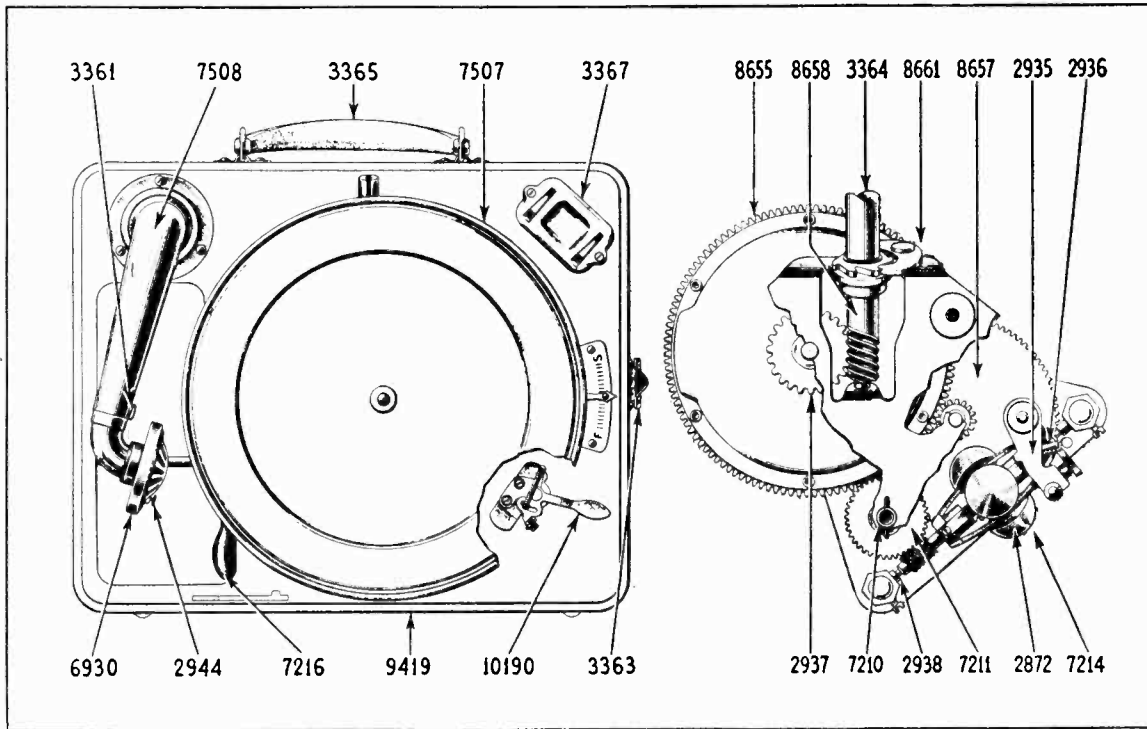


Figure 2—Cabinet, Motor Board and Motor Parts

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
2872	Governor ball and spring assembly—Comprising ball, spring, mounting screws and washers—Package of 5.....	\$0.75	7211	Gear—Turntable spindle gear complete with set screw.....	\$0.50
2935	Lever—Speed regulator lever complete with stud and spring—Package of 2.....	.50	7214	Governor assembly—Comprising governor spindle, disc, collar, governor balls and springs.....	2.50
2936	Spring—Speed regulator lever spring—Package of 10.....	.50	7216	Key—Winding key.....	1.00
2937	Gear—Winding gear and sleeve.....	.90	7226	RCA Victor motor oil—1 pint can.....	.50
2943	Cap—Turntable spindle cap screw—Package of 5.....	1.50	7227	RCA Victor motor grease—1 pint can.....	.60
2944	Screw—Sound box needle screw—Package of 20.....	1.00	7228	RCA Victor spring lubricant—1 pint can.....	.65
2947	Leather—Friction leather for brake—Package of 20.....	.50	7447	Plate—Top plate assembly comprising top and bottom plates complete.....	3.00
3361	Hook—Tone arm and crank hook.....	.65	7507	Turntable—Complete with covering.....	2.90
3362	Hinge—Cabinet hinge with mounting screws—Package of 2.....	.60	7508	Tube—Taper tube with pivot pin—Less sound box—Used with sound box No. 6930.....	2.20
3363	Lock—Lid lock with mounting screws.....	.90	8655	Barrel—Spring barrel complete with main spring and driving gear—Less winding gear.....	3.00
3364	Extension—Winding shaft extension.....	.70	8656	Spring—Main spring.....	1.15
3365	Handle—Carrying handle complete with bracket and mounting rivets.....	.90	8657	Gear—Intermediate gear complete with pinion and shaft.....	.70
3366	Scale—Speed regulator scale complete with mounting screws.....	.50	8658	Shaft—Winding shaft—Comprising shaft, collar, pin, ratchet and washer—Less winding extension.....	1.25
3367	Holder—Needle holder.....	.75	8661	Motor—Motor complete with spindle cap.....	12.00
6930	Sound box—Complete with needle screw.....	4.50	9419	Cabinet complete—Less mechanism.....	Price on application
7210	Spindle—Turntable spindle complete with pins and ball bearing—Less gear.....	.80	10190	Brake—Turntable hand brake—Package of 2.....		.50

R. C. A. VICTOR CO. INC.

MODEL 2-25
Portable
Victrola

RCA Victor Portable Victrola Model 2-25

The RCA Victor Portable Victrola Model 2-25 is a small portable type reproducing instrument built into a metal 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 RCA Victor Motor Oil and Motor Grease when lubricating this instrument.

Initial Operation. When the instrument is first played, wind the motor and allow it to run down completely several times. This insures a complete distribution of lubricant within the spring barrel. Maximum run is dependent on this point.

The speed of the motor should be adjusted so that the turntable revolves at 78 R. P. M. This can be checked by means of a Stroboscope Disc in conjunction with a source of A. C. illumination of proper frequency for the disc used or by counting the revolutions. In both cases a record must be playing in the normal manner when the check is made.

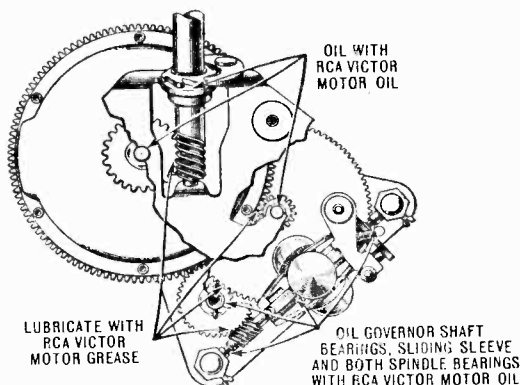


Figure 1—Lubrication Diagram of Model 2-25

Motor. Figure 1 shows a view of the motor with the top plate removed. 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 in Model 2-25 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 four machine screws that hold the motor in place. The motor may then be removed through the hole in the motor board.

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 will correct this condition.

The RCA Victor Portable Victrola Model 2-65 is a small portable type instrument 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 parts should be covered with a light film of oil to prevent rusting. Use only RCA Victor Motor Oil and Motor Grease when lubricating this instrument.

Initial Operation. When the instrument is first played, wind the motor and allow it to run down *completely* several times. This insures a complete distribution of lubricant within the spring barrel. Maximum run is dependent on this point.

The speed of the motor should be adjusted so that the turntable revolves at 78 R.P.M. This can be checked by means of a Stroboscope Disc in conjunction with a source of A.C. illumination of proper frequency for the disc used or by counting the revolutions. In both cases a Record must be playing in the normal manner when the check is made.

Motor. Figure 1 shows a view of the motor with the top plate removed. Before lubricating the parts shown in this illustration, a thorough cleaning with carbon tetra-chloride (Carbona) or gasoline is necessary. If necessary disassemble the entire motor for such cleaning.

Tone Arm. The joint between the goose neck and tone arm and that between the tone arm and sound chamber must be free to swing easily without play and be sealed with grease. The goose neck is detached or adjusted by means of two collars that hold it in place. The bearing between the tone arm and sound box is accessible when the swivel and three mounting screws are removed. Failure to seal these joints will result in poor quality. Unnecessary friction at either of these points will cause undue record wear.

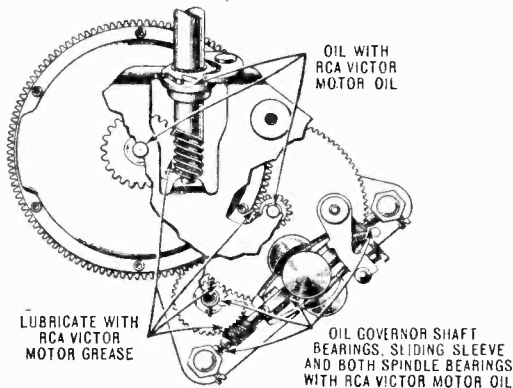


Figure 1—Lubrication Diagram of Model 2-65

AUTOMATIC STOP MECHANISM

The Automatic Stop Mechanism is simple of design and effective in operation. Figure 2 shows its principal parts.

Failure to Start. Should pulling the tone arm to the right and then placing the sound box on the record fail to start the motor, it may be due to:

(a) Improper location of base plate. Loosen the screws A, B, and C and shift position of mechanism counter-clockwise until proper operation is secured.

(b) Worn or rounded surfaces at point D. Square these points with a small file.

(c) Insufficient tension at spring E. Remove a few turns or replace spring.

Failure to Trip. Should the mechanism fail to stop the motor at the end of a Victor record having the eccentric groove, check the following:

(a) Improperly adjusted base plate. Loosen screws A, B, and C and shift the mechanism clockwise until proper operation is obtained.

(b) Loose or improperly adjusted latch plate.

(c) Insufficient tension at spring F. Remove several turns or replace spring.

Tripping during Operation. Premature tripping during the operation of a record may be caused by:

(a) Binding at bearing G. Clean and lubricate this bearing.

(b) Insufficient bite at point D. Loosen the screws A, B, and C and adjust the base plate so that a larger bite is obtained at point D.

MOTOR

The motor used in Model 2-65 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.

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 eight machine screws that hold the motor board in place. The sound deflector is also removed.

(c) Remove the three motor mounting screws, together with the one holding the speed regulator lever. Remove this lever. The motor board may now be turned over and the motor pulled clear and placed in a position convenient for work. The various parts are

easy of access and adjustments or replacements are simple to make.

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

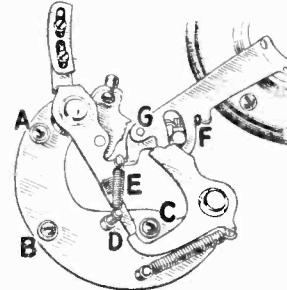


Figure 2—Automatic Stop Mechanism

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) The new spring is furnished coiled and with a heavy wire clamp. Hit the spring flat on a table thereby driving the clamp to one edge of the spring. Grasp the exposed part of the spring firmly with the right hand and pull the clamp off with the left hand. Allow the spring to gradually release its tension in the right hand and then unwind it completely.

(e) Place the hooked end of the spring over the barrel hook and wind the spring into the barrel toward the center. Be careful to push each turn completely inside the barrel before winding on the next turn.

(f) Place a tablespoonful of spring lubricant between the spring leaves and in the center of the spring.

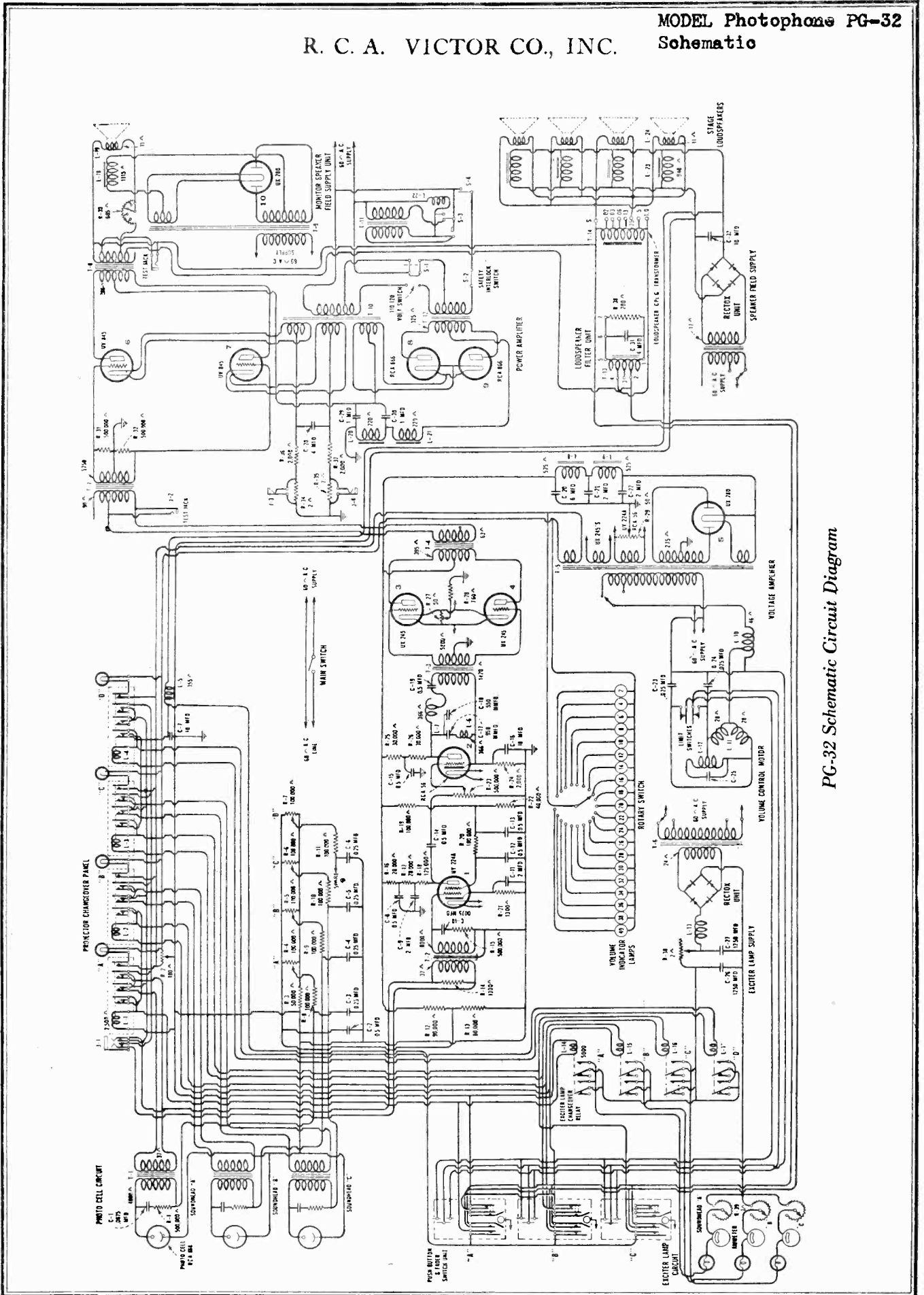
(g) Place the gear in position and rivet it with six rivets to the spring barrel. Use a small punch for flattening the ends of the rivets. Place the gear on a flat surface while re-riveting the barrel to it.

(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 will correct this condition.

R. C. A. VICTOR CO., INC.

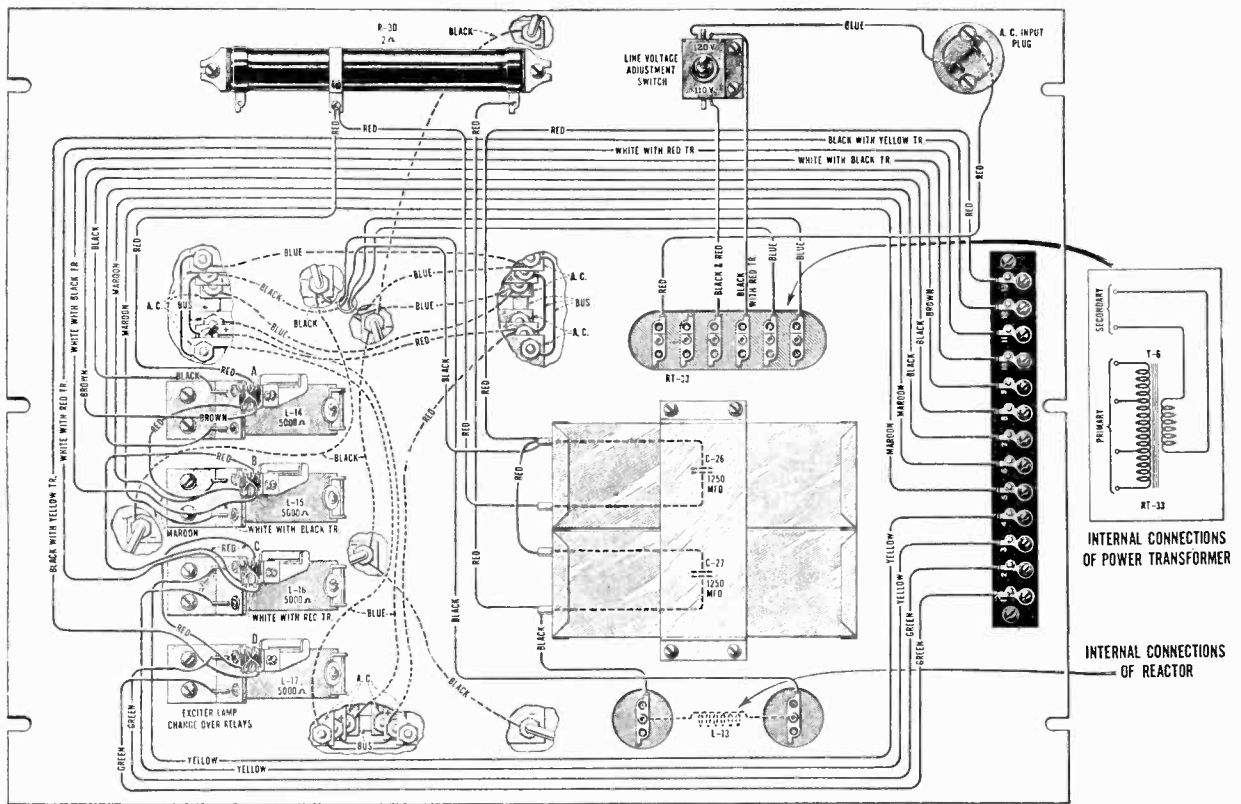
MODEL Photophone PG-32 Schematic



PG-32 Schematic Circuit Diagram

R. C. A. VICTOR CO., INC.

MODEL Photophone PG-32
Voltage
Exciter Lamp Chassis

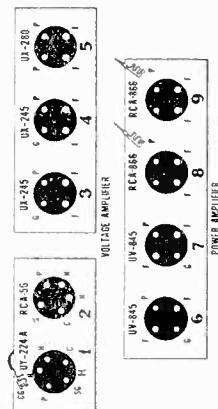


Exciter Lamp Supply Panel Wiring

Service Data

(2) RADIOTRON SOCKET VOLTAGES

The following voltages taken at each Radiotron socket with the amplifier in operating condition should prove of value when checking with test sets such as the Photophone KR-13 Multitester or the Weston Model 517, Type 3, or other giving similar readings. The plate currents shown are not necessarily accurate for each tube, as the cable in the test set will cause some circuits to oscillate, due to its added capacity. Small variations of voltages will be caused by different tubes and line voltages. Therefore, the following values must be taken as approximately those that will be found under varying conditions. The numbers in column 1 indicate the tube socket numbers shown in Figure 21.



RADIOTRON SOCKET LAYOUT

Figure 21—Radiotron Socket Layout

Due to the voltage drop in the plate resistors caused by the current consumed in the test voltmeter, the screen grid and plate voltage readings obtained for the Radiotrons UY-224-A and RCA-56 are not true values.

To measure the plate current of the Radiotrons UY-845 a low range voltmeter or a millivoltmeter is required. The meter should be connected to a Yaxley No. 75 phone plug or a similar plug and the plug inserted into the plate current metering jacks on the base of the power amplifier.

Two millivolts read on the test meter equals one milliampere of plate current.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

VOLTAGE AMPLIFIER

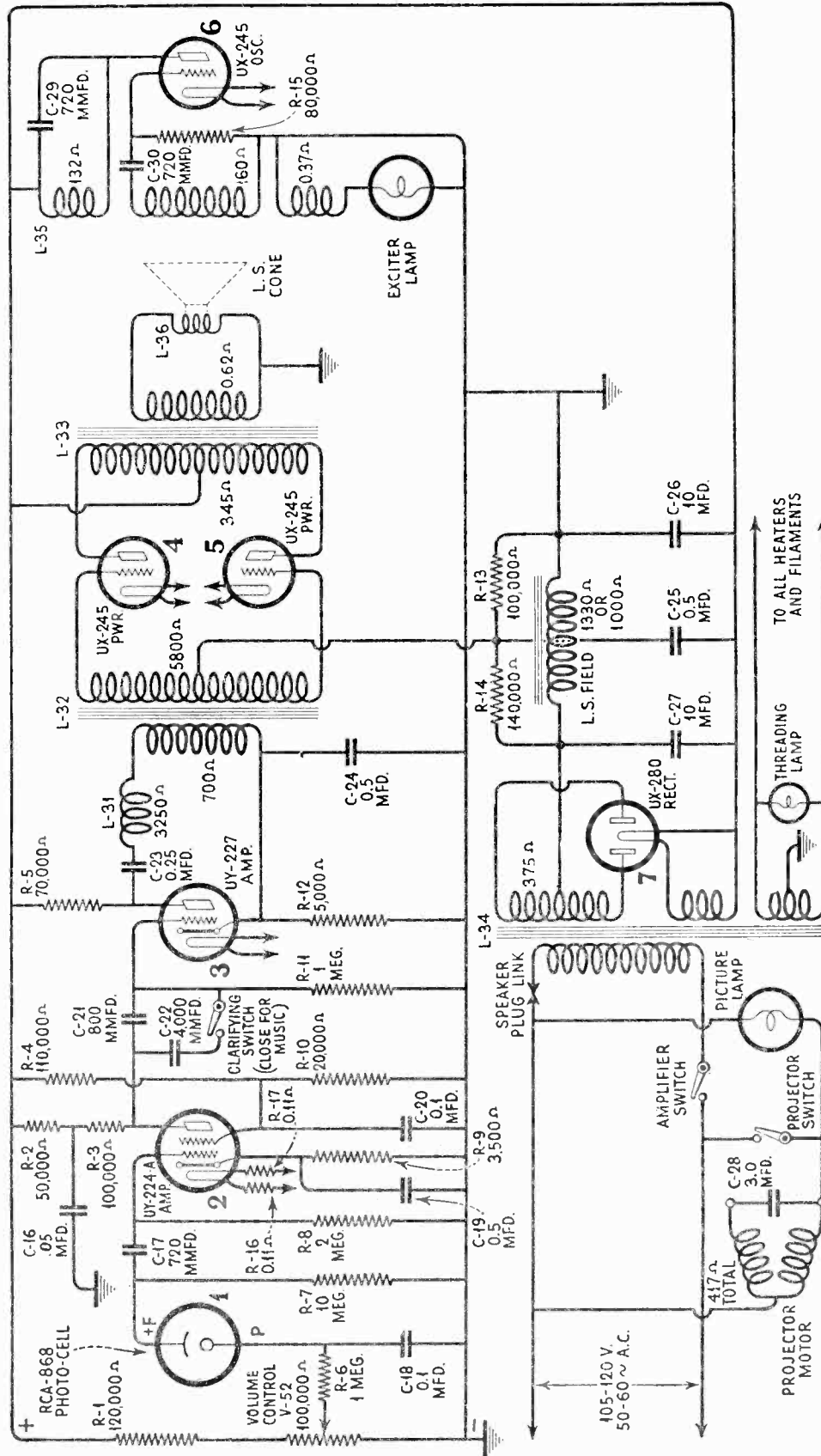
Radiotron No.	Control Grid to Cathode or Filament Volts	Screen Grid to Cathode or Filament Volts	Plate to Cathode or Filament Volts	Plate Current M. A.	Filament or Heater Volts
1. UY-224-A	1.2	45	90	1.0	2.2
2. RCA-56	6.0	115	115	2.5	2.2
3. UY-245	48.0	250	250	30.0	2.3
1. UY-245	—	250	250	30.0	2.3
5. UY-280	—	—	—	50.0	5.0

POWER AMPLIFIER

6. UY-845	—	—	—	60-75	10.0
7. UY-845	—	—	—	60-75	10.0

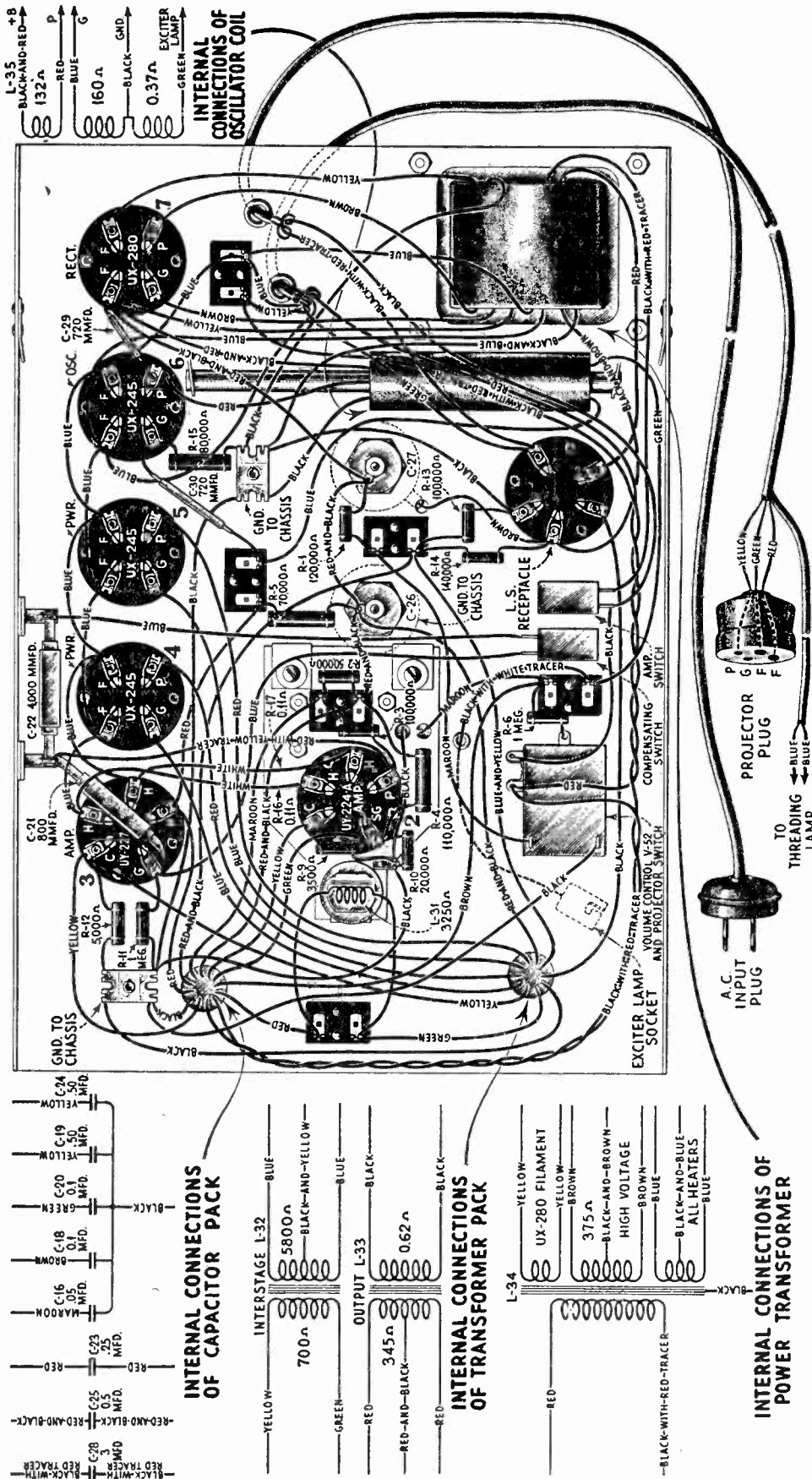
R. C. A. VICTOR CO., INC.

MODEL Photophone PG-38
Schematic



MODEL Photophone PG-38
Chassis

R. C. A. VICTOR CO., INC.

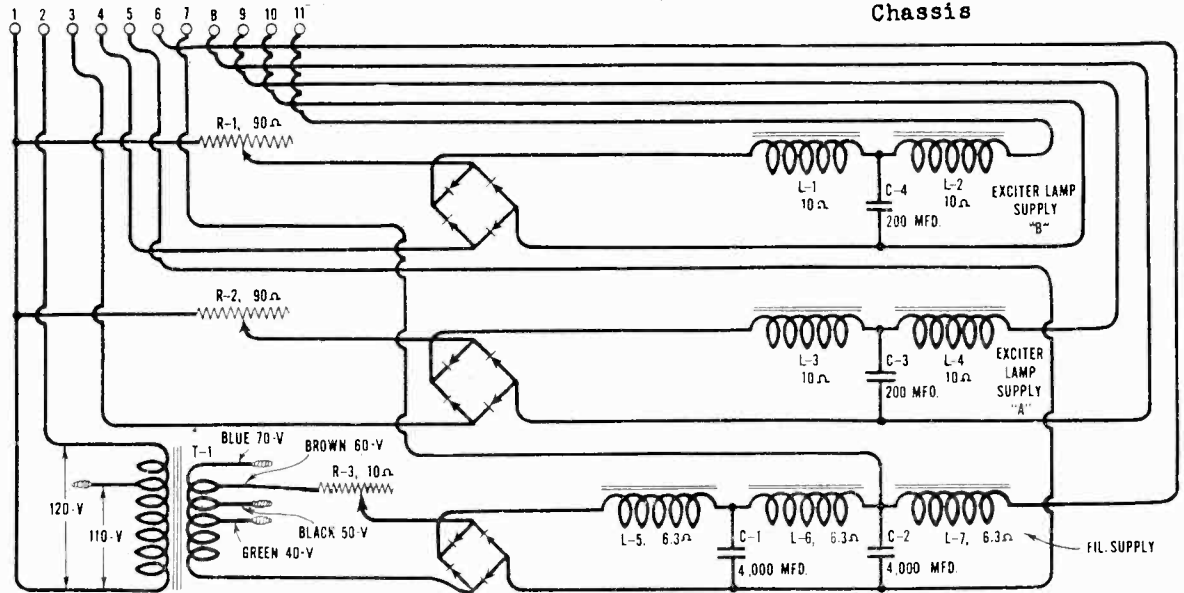


Radioiron No.	Control Grid to Cathode or Filament Volts	Screen Grid to Cathode or Filament Volts	Plate to Cathode or Filament Volts	Plate Current M. A.	Filament or Heater Volts
2-UY-224-A	0.1	28	150	0.5	2.3
3-UY-227	1.5	—	110	2.0	2.5
4-UX-245	35	—	240	30	2.5
5-UX-245	35	—	240	30	2.5
6-UX-245 Osc.	75	—	240	25	2.5

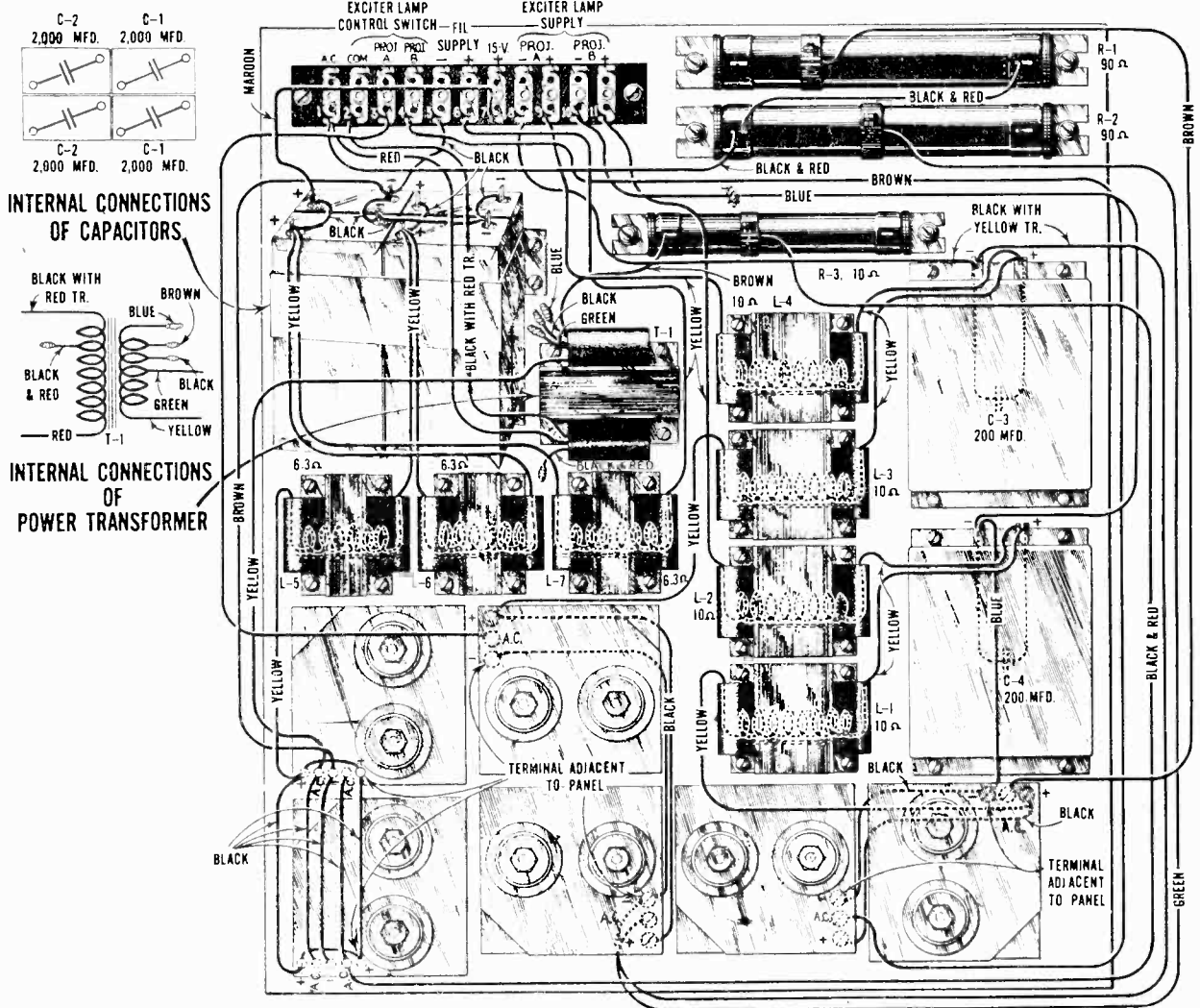
Volume Control at Minimum
115 Volt Line

R. C. A. VICTOR CO., INC.

MODEL Photophone PK-25
Schematic
Chassis



SCHEMATIC DIAGRAM PK-25 UNIT



WIRING DIAGRAM PK-25 UNIT

R.C.A. RADIOTRON CO.

Detectors
Amplifiers

TUBE SYMBOLS
AND BOTTOM VIEWS OF
SOCKET CONNECTIONS

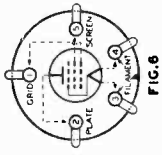


FIG. 6

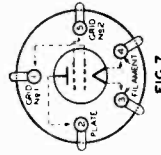


FIG. 7

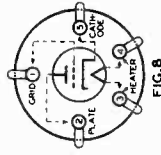


FIG. 8

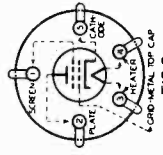


FIG. 9

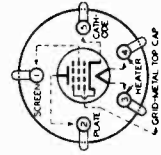


FIG. 10

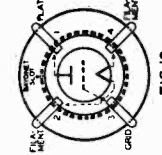


FIG. 11

DETECTORS AND AMPLIFIERS

TYPE	PURPOSE	BASE	SOCKET CONNECTIONS	DIMENSIONS MAX. OVERALL	CATHODE TYPE	HEATING		FILAMENT (OHMS HEATER)	FILAMENT SUPPLY VOLTS	PLATE SUPPLY VOLTS	NEGATIVE GRID BIAS VOLTS	SCREEN VOLTS	PLATE SCREEN CURR. MILLI-AMPS	MUTUAL INDUCTANCE MICRO-HMS	VOLTAGE GAIN	OHMS LOAD FOR STATED POWER OUTPUT
						VOLTS	AMPERES									
RCA-247	BAND PRE-AMPLIFIER	SMALL 7-PIN	FIG. 20	4 1/2" x 1 1/2"	HEATER	2.5	0.8	250	100	250	3.0	100	4.0	2.0	300000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-287	SUPER-CONTROL DETECTOR	SMALL 7-PIN	FIG. 21	4 1/2" x 1 1/2"	HEATER	2.5	0.8	250	125	250	3.0	100	5.0	2.0	300000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-617	BAND PRE-AMPLIFIER	SMALL 7-PIN	FIG. 20	4 1/2" x 1 1/2"	HEATER	2.5	0.8	250	125	250	3.0	100	5.0	2.0	300000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-687	SUPER-CONTROL DETECTOR	SMALL 7-PIN	FIG. 21	4 1/2" x 1 1/2"	HEATER	2.5	0.8	250	125	250	3.0	100	5.0	2.0	300000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
UX-501-A	DIODE DETECTOR	MEDIUM 4-PIN	FIG. 1	4 1/2" x 1 1/2"	FILAMENT	5.0	0.25	90	135	250	4.5	50	0.65	0.15	—	—
UX-112-A	DIODE DETECTOR	MEDIUM 4-PIN	FIG. 1	4 1/2" x 1 1/2"	FILAMENT	5.0	0.25	90	135	250	4.5	50	0.65	0.15	—	—
RCA-22	RADIO FREQ. AMPLIFIER	MEDIUM 4-PIN	FIG. 4	5 1/2" x 1 1/2"	FILAMENT	3.3	0.132	135	67.5	135	1.5	45	1.7	0.6	725000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-24-A	BIASED DETECTOR	MEDIUM 4-PIN	FIG. 9	5 1/2" x 1 1/2"	HEATER	2.5	1.75	180	270	250	3.0	100	4.0	1.7	400000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-26	AMPLIFIER	MEDIUM 4-PIN	FIG. 1	4 1/2" x 1 1/2"	FILAMENT	2.5	1.75	180	270	250	3.0	100	4.0	1.7	400000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
UY-527	BIASED DETECTOR	MEDIUM 4-PIN	FIG. 8	4 1/2" x 1 1/2"	HEATER	2.5	1.75	180	270	250	3.0	100	4.0	1.7	400000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
UY-527	BIASED DETECTOR	MEDIUM 4-PIN	FIG. 8	4 1/2" x 1 1/2"	HEATER	2.5	1.75	180	270	250	3.0	100	4.0	1.7	400000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-30	DIODE DETECTOR	SMALL 4-PIN	FIG. 1	4 1/2" x 1 1/2"	FILAMENT	2.0	0.06	180	180	180	3.0	100	2.5	—	—	—
RCA-32	RADIO FREQ. AMPLIFIER	MEDIUM 4-PIN	FIG. 4	5 1/2" x 1 1/2"	FILAMENT	2.0	0.06	180	180	180	3.0	100	2.5	—	—	—
RCA-32	DIODE DETECTOR	MEDIUM 4-PIN	FIG. 4	5 1/2" x 1 1/2"	FILAMENT	2.0	0.06	180	180	180	3.0	100	2.5	—	—	—
RCA-34	SUPER-CONTROL DETECTOR	MEDIUM 4-PIN	FIG. 4A	5 1/2" x 1 1/2"	FILAMENT	2.0	0.06	180	180	180	3.0	100	2.5	—	—	—
RCA-35	SUPER-CONTROL DETECTOR	MEDIUM 4-PIN	FIG. 9	5 1/2" x 1 1/2"	HEATER	2.5	1.75	180	270	250	3.0	100	4.0	1.7	400000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-36	RADIO FREQ. AMPLIFIER	SMALL 4-PIN	FIG. 8	4 1/2" x 1 1/2"	HEATER	6.3	0.3	180	90	180	3.0	100	5.8	1.4	600000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-36	BIASED DETECTOR	MEDIUM 4-PIN	FIG. 8	4 1/2" x 1 1/2"	HEATER	6.3	0.3	180	90	180	3.0	100	5.8	1.4	600000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-37	AMPLIFIER	SMALL 4-PIN	FIG. 8	4 1/2" x 1 1/2"	HEATER	6.3	0.3	180	90	180	3.0	100	5.8	1.4	600000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-37	BIASED DETECTOR	SMALL 4-PIN	FIG. 8	4 1/2" x 1 1/2"	HEATER	6.3	0.3	180	90	180	3.0	100	5.8	1.4	600000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-39	SUPER-CONTROL DETECTOR	SMALL 4-PIN	FIG. 8A	4 1/2" x 1 1/2"	HEATER	6.3	0.3	180	90	180	3.0	100	5.8	1.4	600000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-44	SUPER-CONTROL DETECTOR	SMALL 4-PIN	FIG. 8A	4 1/2" x 1 1/2"	HEATER	6.3	0.3	180	90	180	3.0	100	5.8	1.4	600000	3.5 Ma. (1) Resistor, 50000 Ohms Conversion Conductance, 475 Microhms
RCA-55	BIASED DETECTOR	SMALL 4-PIN	FIG. 8	4 1/2" x 1 1/2"	HEATER	2.5	1.0	250	250	250	2.0	2.0	0.8	—	—	—
RCA-56	AMPLIFIER	SMALL 4-PIN	FIG. 8	4 1/2" x 1 1/2"	HEATER	2.5	1.0	250	250	250	2.0	2.0	0.8	—	—	—
RCA-57	BIASED DETECTOR	SMALL 4-PIN	FIG. 8	4 1/2" x 1 1/2"	HEATER	2.5	1.0	250	250	250	2.0	2.0	0.8	—	—	—
RCA-57	SUPER-CONTROL DETECTOR	SMALL 4-PIN	FIG. 11	4 1/2" x 1 1/2"	HEATER	2.5	1.0	250	250	250	2.0	2.0	0.8	—	—	—
RCA-58	SUPER-CONTROL DETECTOR	SMALL 4-PIN	FIG. 11	4 1/2" x 1 1/2"	HEATER	2.5	1.0	250	250	250	2.0	2.0	0.8	—	—	—
RCA-75	BIASED DETECTOR	SMALL 4-PIN	FIG. 13	4 1/2" x 1 1/2"	HEATER	6.3	0.3	250	250	250	2.0	2.0	0.8	—	—	—
RCA-77	RADIO FREQ. AMPLIFIER	SMALL 4-PIN	FIG. 11	4 1/2" x 1 1/2"	HEATER	6.3	0.3	250	250	250	2.0	2.0	0.8	—	—	—
RCA-77	DIODE DETECTOR	SMALL 4-PIN	FIG. 11	4 1/2" x 1 1/2"	HEATER	6.3	0.3	250	250	250	2.0	2.0	0.8	—	—	—
RCA-78	SUPER-CONTROL DETECTOR	SMALL 4-PIN	FIG. 11	4 1/2" x 1 1/2"	HEATER	6.3	0.3	250	250	250	2.0	2.0	0.8	—	—	—
RCA-85	BIASED DETECTOR	SMALL 4-PIN	FIG. 13	4 1/2" x 1 1/2"	HEATER	6.3	0.3	250	250	250	2.0	2.0	0.8	—	—	—
UX-189	DIODE DETECTOR	SMALL 4-PIN	FIG. 1	4 1/2" x 1 1/2"	FILAMENT	3.3	0.063	90	90	90	4.5	50	0.65	0.15	—	—
RCA-864	AMPLIFIER	SMALL 4-PIN	FIG. 1	4 1/2" x 1 1/2"	FILAMENT	1.1	0.25	135	135	135	8.0	100	3.5	—	—	—

TUBE SYMBOLS
AND BOTTOM VIEWS OF
SOCKET CONNECTIONS

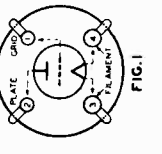


FIG. 1

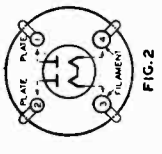


FIG. 2

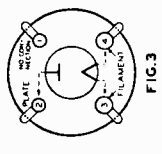


FIG. 3

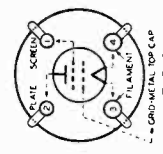


FIG. 4

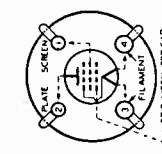


FIG. 4A

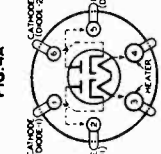


FIG. 5

* For Grid leak Detectors - plate volts 45, grid screen 25, filament or to cathode.
 † Applied through plate coupling resistor of 250,000 ohms.
 ‡ Applied through plate coupling resistor of 50,000 ohms.
 § Characteristics are for Triode Unit only.
 ¶ Characteristics are for Pentode Unit only.
 ** Maximum.
 *** Exceeds through plate coupling resistor of 200,000 ohms.
 **** Characteristics are for Triode Unit only.
 ***** Characteristics are for Pentode Unit only.

Power Amplifiers
Rectifiers
Photo Tubes

R.C.A. RADIOTRON CO.

TUBE SYMBOLS AND BOTTOM VIEWS OF SOCKET CONNECTIONS

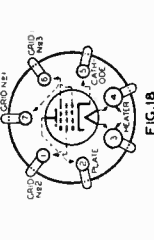


FIG. 18

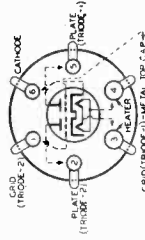


FIG. 19

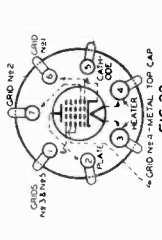


FIG. 20

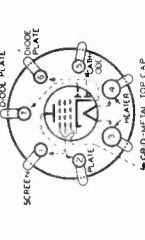


FIG. 21

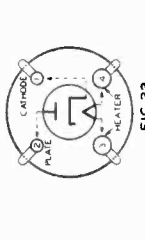


FIG. 22

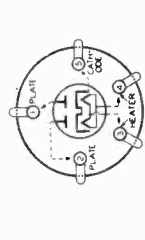


FIG. 23

POWER AMPLIFIERS

TYPE	PURPOSE	BASE	SOCKET CONNECTIONS	DIMENSIONS MAX. OVERALL		CATHODE TYPE	RATING		FILAMENT (ON HEATER)	FILAMENT VOLTS	FILAMENT AMP. @ 100 V	PLATE SUPPLY VOLTS	NEGATIVE GRID BIAS VOLTS	SCREEN VOLTS	PLATE SCREEN CURR. MILLI-AMPS.	MUTUAL COEFFICIENT	VOLTAGE AMPLIFICATION FACTOR	OHMS LOAD FOR STATED OUTPUT	POWER OUTPUT MILLIWATTS		
				LENGTH	MAX. DIA.		MAX. PLATE VOLTS	MAX. SCREEN VOLTS													
RCA-243	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 1	5 1/2"	1 1/2"	FILAMENT	2.5	2.5	250	0.5	250	43.0	45.0	60.0	800	5200	4.2	2500	3500		
RCA-245	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 1A	4 1/2"	1 1/2"	HEATER	2.5	1.75	250	0.5	250	16.5	16.5	250	34.0	6.5	100000	220	7000	3000	
RCA-10	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 1	5 1/2"	2 1/2"	FILAMENT	7.5	1.25	425	0.8	425	37.0	31.0	18.0	5150	1550	8.0	11000	900		
UX-20	POWER AMPLIFIER	SMALL 4-PIN	FIG. 1	4 1/2"	1 1/2"	FILAMENT	3.3	0.132	135	0.6	135	35.0	39.0	18.0	3000	950	8.0	9600	1800		
RCA-31	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 1	4 1/2"	1 1/2"	FILAMENT	2.0	0.130	180	0.6	180	135	22.5	8.0	4100	525	3.3	6500	110		
RCA-33	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 1	4 1/2"	1 1/2"	FILAMENT	2.0	0.26	180	0.6	180	135	30.0	12.3	6300	925	3.8	7000	185		
RCA-38	POWER AMPLIFIER	SMALL 4-PIN	FIG. 1A	4 1/2"	1 1/2"	HEATER	6.3	0.3	135	0.6	135	100	9.0	2.0	84000	950	80	8500	200		
RCA-41	POWER AMPLIFIER	SMALL 4-PIN	FIG. 1A	4 1/2"	1 1/2"	HEATER	6.3	0.4	180	0.6	180	135	13.5	7.0	102000	975	150	13500	625		
RCA-42	POWER AMPLIFIER	SMALL 4-PIN	FIG. 1A	4 1/2"	1 1/2"	HEATER	6.3	0.7	250	0.6	250	167.0	167.5	17.0	3.0	85000	1800	150	9500	1250	
RCA-43	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 1A	4 1/2"	1 1/2"	HEATER	6.3	0.7	250	0.6	250	165	16.5	250	34.0	6.5	100000	2200	220	2000	3000
RCA-44	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 1A	4 1/2"	1 1/2"	HEATER	25.0	0.3	135	0.6	135	135	15.0	15.0	95	20.0	45000	2000	90	4500	900
RCA-46	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 7	5 1/2"	2 1/2"	FILAMENT	2.5	1.75	250	0.6	250	30.0	31.5	31.0	1650	2125	3.5	2700	825		
RCA-48	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 7	5 1/2"	2 1/2"	FILAMENT	2.5	1.75	250	0.6	250	48.5	50.0	34.0	22.0	1610	2175	3.5	3900	1500	
RCA-47	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 8	5 1/2"	2 1/2"	FILAMENT	30.0	0.4	135	0.6	135	100	20.0	9.0	10000	2800	28	2000	1600		
RCA-48	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 15	5 1/2"	2 1/2"	HEATER	30.0	0.4	135	0.6	135	100	20.0	9.0	10000	2800	28	2000	1600		
RCA-49	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 7	4 1/2"	1 1/2"	FILAMENT	2.0	0.12	180	0.6	180	135	20.0	5.7	4900	1125	4.5	6000	170		
UX-50	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 1	6 1/2"	2 1/2"	FILAMENT	7.5	1.25	450	0.6	450	50.0	63.0	45.0	1800	2000	3.8	4100	2400		
RCA-59	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 18	5 1/2"	2 1/2"	HEATER	2.5	2.0	250	0.6	250	80.0	84.0	26.0	26.0	1800	2100	3.8	4350	4900	
RCA-59	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 18	5 1/2"	2 1/2"	HEATER	2.5	2.0	250	0.6	250	18.0	18.0	20.0	26.0	2400	2600	6.0	5000	1250	
RCA-71A	POWER AMPLIFIER	MEDIUM 4-PIN	FIG. 1	4 1/2"	1 1/2"	FILAMENT	5.0	0.25	400	0.6	400	40.0	43.0	17.3	17.0	1820	1850	3.0	3000	400	
RCA-79	TRIM AMPLIFIER	SMALL 4-PIN	FIG. 18	4 1/2"	1 1/2"	HEATER	6.3	0.6	180	0.6	180	20.0	20.0	17.0	17.0	3000	1570	4.7	7000	300	
RCA-88	POWER AMPLIFIER	SMALL 4-PIN	FIG. 14	4 1/2"	1 1/2"	HEATER	6.3	0.4	180	0.6	180	180	22.5	22.5	20.0	2750	1700	4.7	6500	400	
RCA-89	POWER AMPLIFIER	SMALL 4-PIN	FIG. 14	4 1/2"	1 1/2"	HEATER	6.3	0.4	180	0.6	180	180	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
RCA-89	POWER AMPLIFIER	SMALL 4-PIN	FIG. 14	4 1/2"	1 1/2"	HEATER	6.3	0.4	180	0.6	180	180	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	

*Two grids tied together. *Grid #2 to plate tied to plate. *Grid #3 tied to cathode. *Grid #4 to control grid. *Grid #2 and #3 tied to plate. *Grids #1 and #2 connected together. Grid #3 tied to plate.

RECTIFIERS

TYPE	PURPOSE	BASE	SOCKET CONNECTIONS	DIMENSIONS MAX. OVERALL	CATHODE TYPE	FILAMENT (ON HEATER)	FILAMENT VOLTS	FILAMENT AMP. @ 100 V	MAX. PLATE VOLTS	MAX. SCREEN VOLTS	MAX. A.C. VOLTAGE PER PLATE	MAX. D.C. OUTPUT CURRENT	MAX. A.C. VOLTAGE PER PLATE	MAX. D.C. OUTPUT CURRENT	MAX. A.C. VOLTAGE PER PLATE	MAX. D.C. OUTPUT CURRENT	MAX. A.C. VOLTAGE PER PLATE	MAX. D.C. OUTPUT CURRENT	MAX. A.C. VOLTAGE PER PLATE	MAX. D.C. OUTPUT CURRENT
RCA-523	FULL-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 2	5 1/2"	2 1/2"	FILAMENT	5.0	3.0	40	3.0	40	100	50	100	50	100	50	100	50	100
RCA-525	HALF-WAVE RECTIFIER	SMALL 4-PIN	FIG. 9	4 1/2"	1 1/2"	HEATER	25.0	0.3	180	0.6	180	100	100	100	100	100	100	100	100	100
RCA-1	MULTI-WAVE RECTIFIER	SMALL 4-PIN	FIG. 22	4 1/2"	1 1/2"	HEATER	6.3	0.3	180	0.6	180	100	100	100	100	100	100	100	100	100
RCA-80	FULL-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 2	5 1/2"	2 1/2"	FILAMENT	5.0	2.0	40	3.0	40	100	50	100	50	100	50	100	50	100
UX-81	MULTI-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 3	6 1/2"	2 1/2"	FILAMENT	7.5	1.25	400	0.6	400	100	100	100	100	100	100	100	100	100
RCA-82	FULL-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 2	4 1/2"	1 1/2"	FILAMENT	2.5	3.0	40	3.0	40	100	50	100	50	100	50	100	50	100
RCA-83	FULL-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 2	5 1/2"	2 1/2"	FILAMENT	5.0	3.0	40	3.0	40	100	50	100	50	100	50	100	50	100
RCA-84	FULL-WAVE RECTIFIER	SMALL 4-PIN	FIG. 23	4 1/2"	1 1/2"	HEATER	6.3	0.5	180	0.6	180	100	100	100	100	100	100	100	100	100
RCA-866	MULTI-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 16	6 1/2"	2 1/2"	FILAMENT	2.5	5.0	40	3.0	40	100	50	100	50	100	50	100	50	100

*Mercury Vapor Type. Tube Voltage drop is 15 volts, approx. *Grid #1 is control grid. Grid #2 and #3 tied to plate. *Grid #3 tied to cathode.

PHOTO TUBES

TYPE	PURPOSE	BASE	SOCKET CONNECTIONS	DIMENSIONS MAX. OVERALL	CATHODE TYPE	FILAMENT (ON HEATER)	FILAMENT VOLTS	FILAMENT AMP. @ 100 V	MAX. ANODE CURRENT	MAX. ANODE VOLTAGE	MAX. ANODE CURRENT	MAX. ANODE VOLTAGE
RCA-868	PHOTO TUBE	SMALL 4-PIN	FIG. 1	4 1/2"	1 1/2"	FILAMENT	30	0.3	30	20	55	55

Static Sensitivity: 55 Microamperes per Lumen. Dynamic Sensitivity: 50 and 48 Microamperes per Lumen at 1000 and 5000 Cycles per Second, respectively. Note: Pin #1 and #3—No Connection. Pin #2—Anode (+). Pin #4—Cathode (-). Refer to FIG. 1 for Pin Numbers.

The first digits of many type numbers have been dropped. These types are identified now by the last two digits only.

TUBE SYMBOLS AND BOTTOM VIEWS OF SOCKET CONNECTIONS

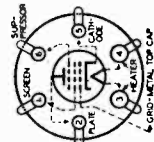


FIG. 11

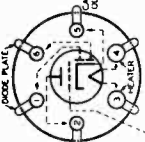


FIG. 13

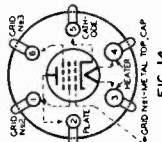


FIG. 14

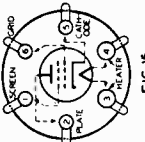


FIG. 15

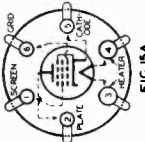


FIG. 16A

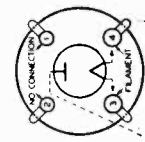
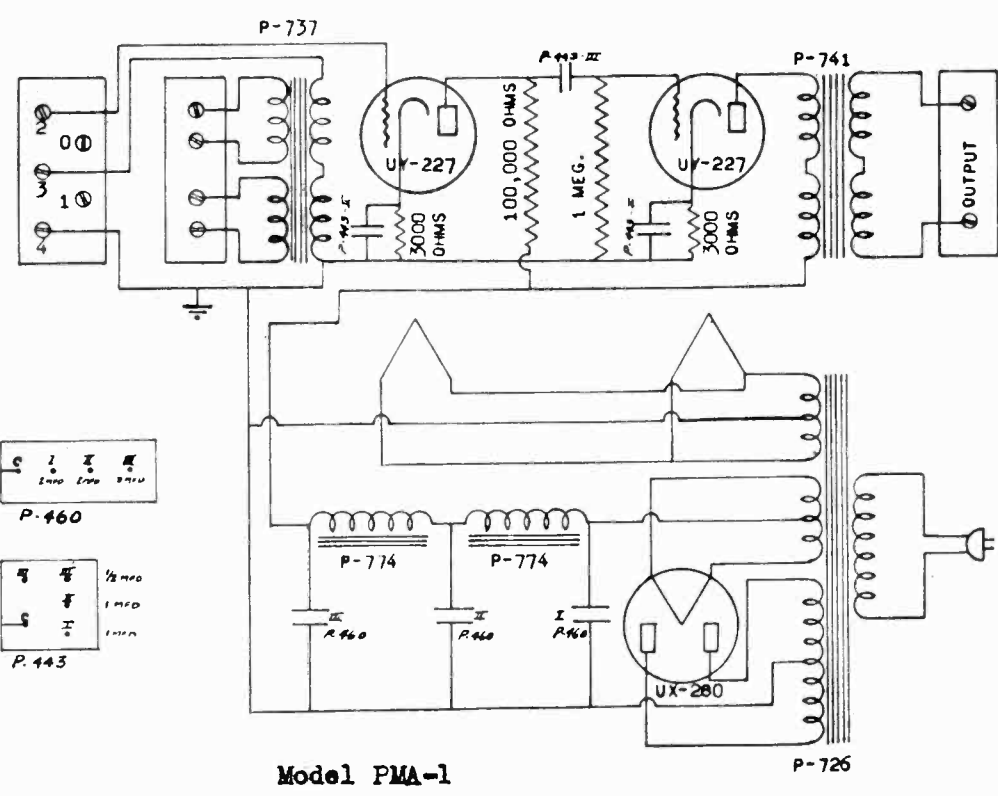
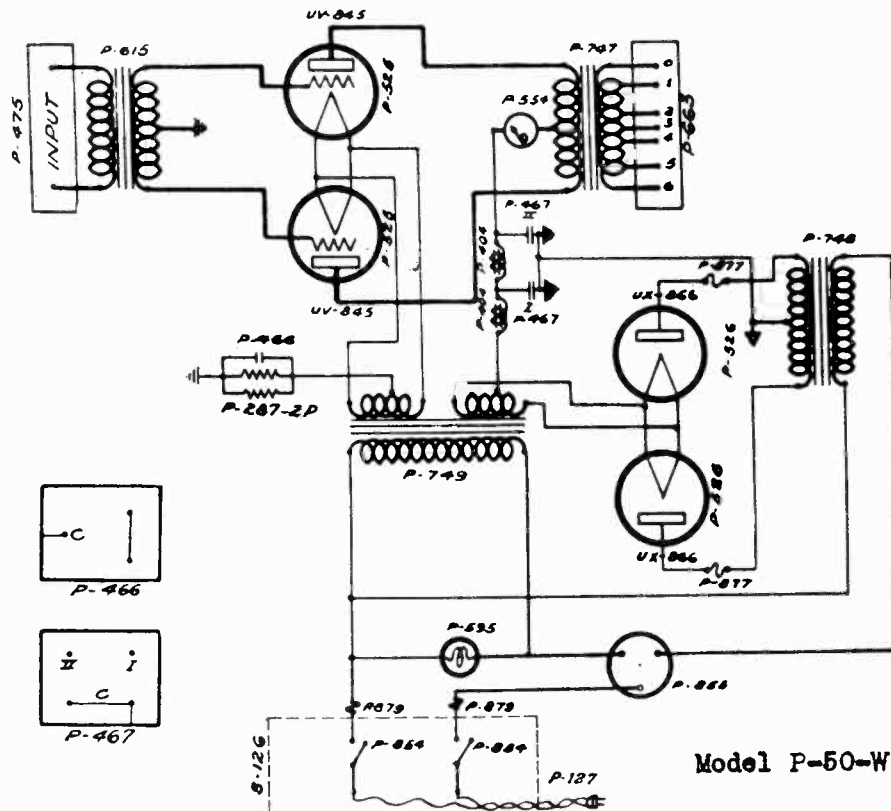


FIG. 16

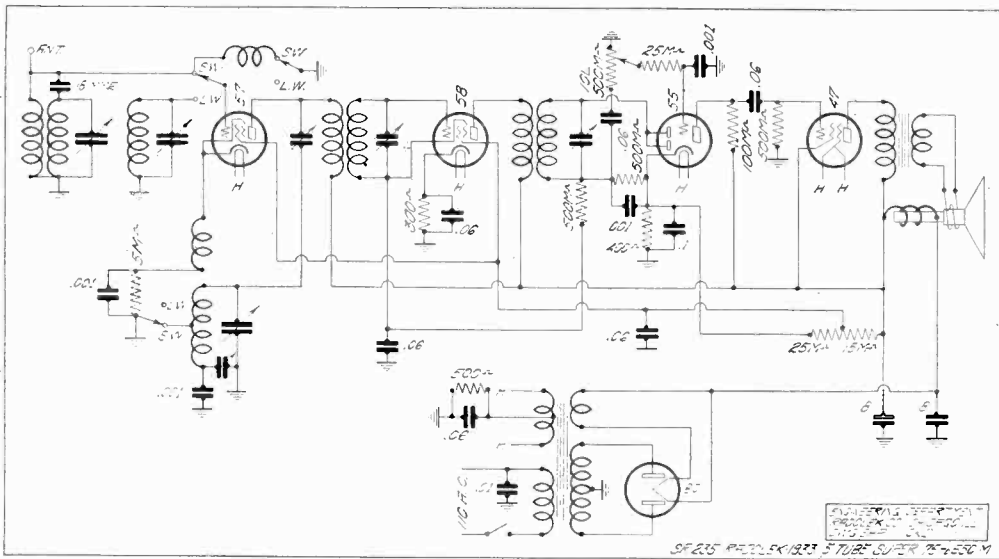
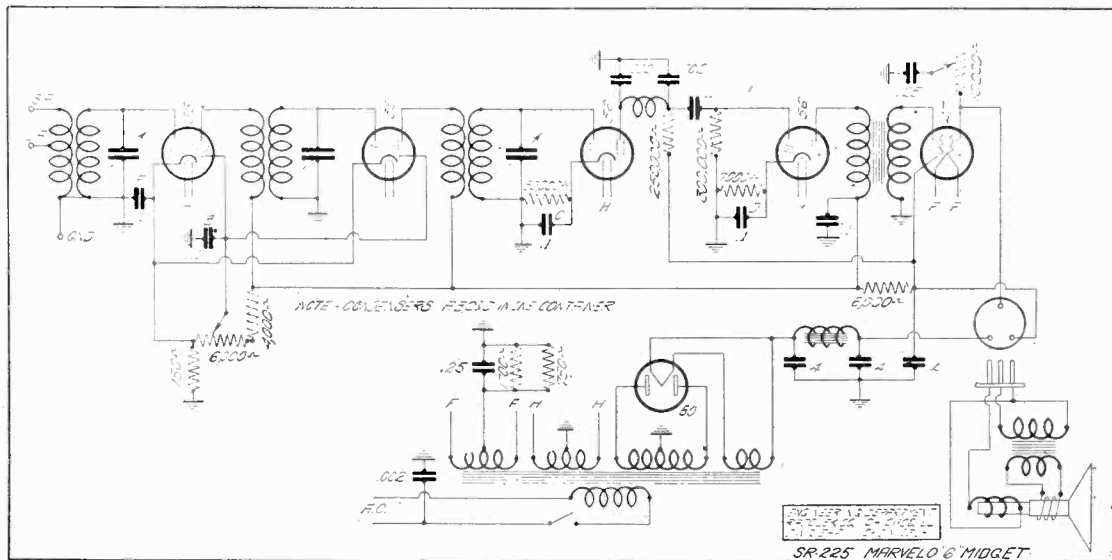
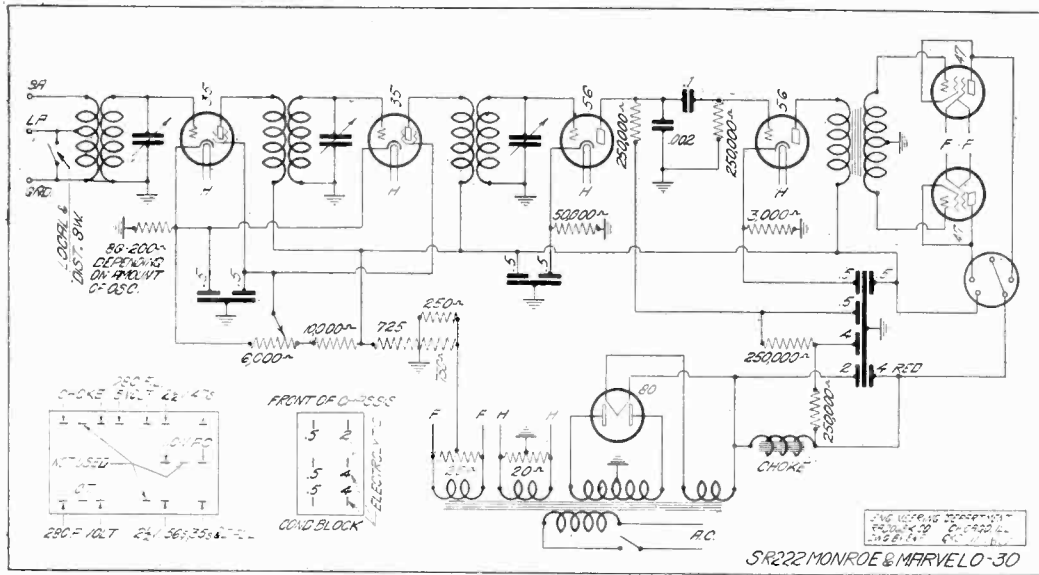
RADIO RECEPTOR CO.

MODEL PMA-1
MODEL P-50-W



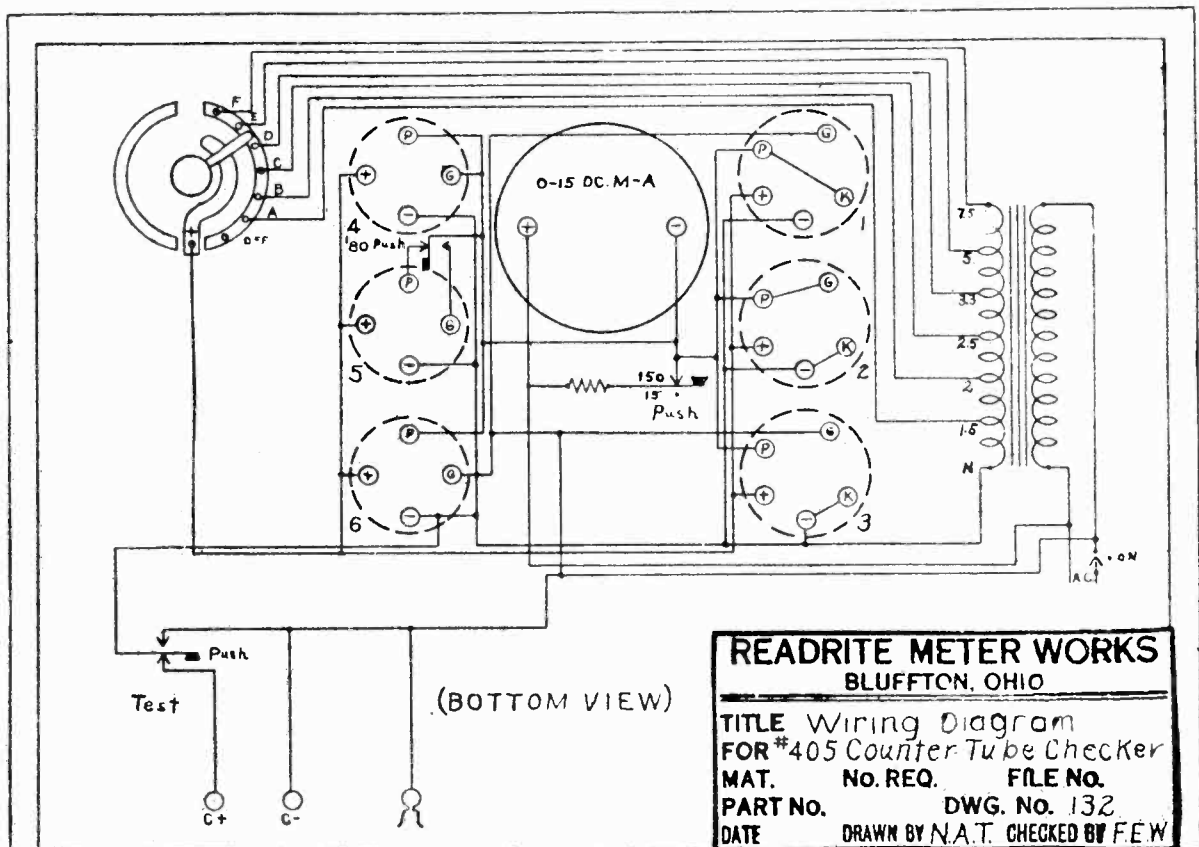
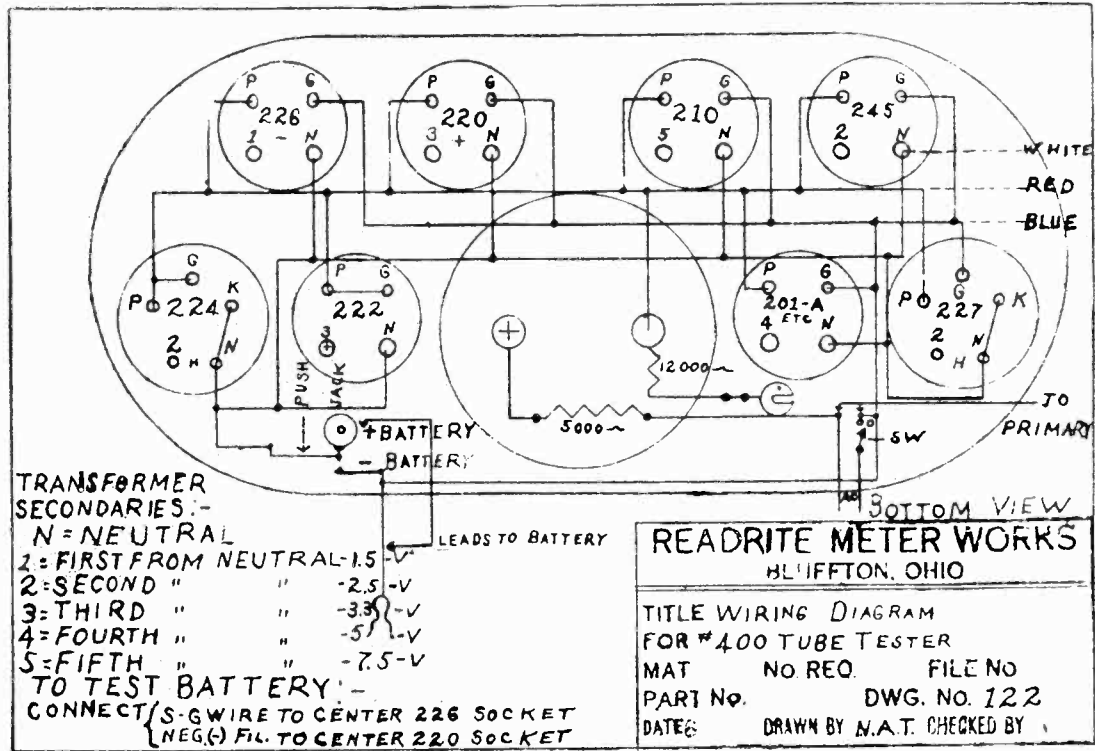
RAD OLEK

MODEL Monroe-Marvelo 30
 MODEL Marvelo "6" Midget
 MODEL Radolek 5 Tube Super



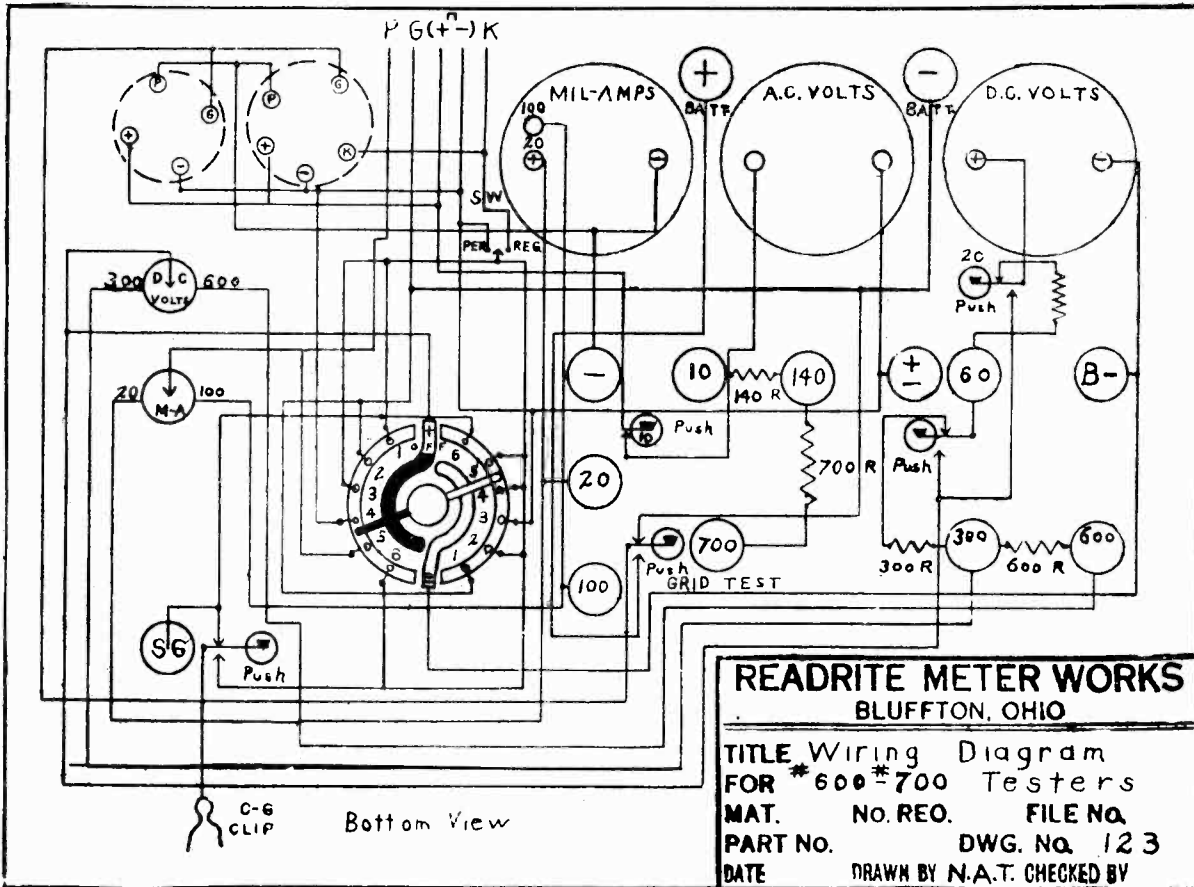
READRITE METER WORKS

MODEL 400 Tube Tester
MODEL 405 Tube Checker



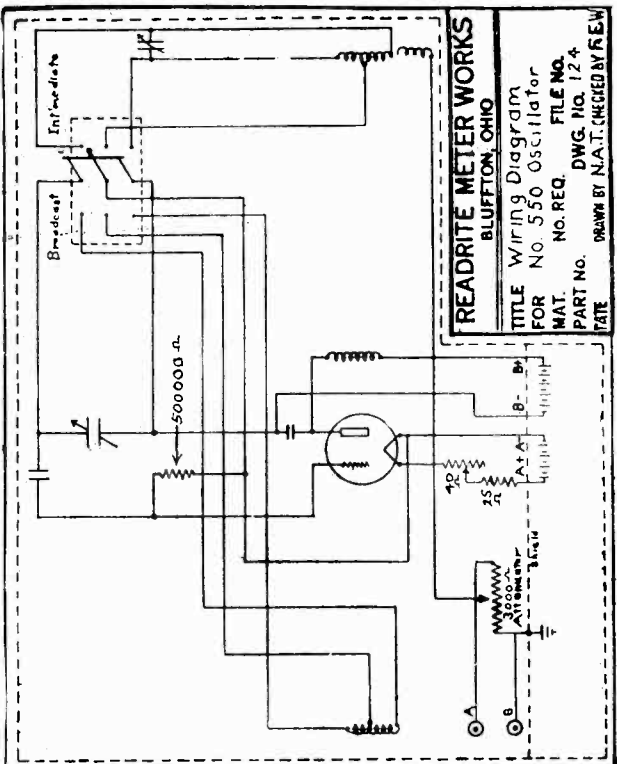
MODEL 600,700 Testers
 MODEL 550 Oscillator
 MODEL 800 Capacity Meter
 MODEL 850 Capacity Tester

READRITE METER WORKS



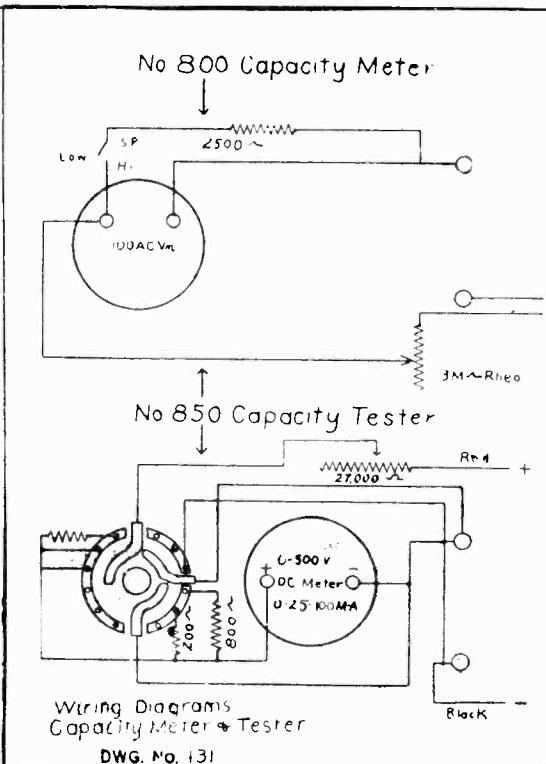
READRITE METER WORKS
 BLUFFTON, OHIO

TITLE Wiring Diagram
 FOR #600 #700 Testers
 MAT. NO. REQ. FILE NO.
 PART NO. DWG. No. 123
 DATE DRAWN BY N.A.T. CHECKED BY



READRITE METER WORKS
 BLUFFTON, OHIO

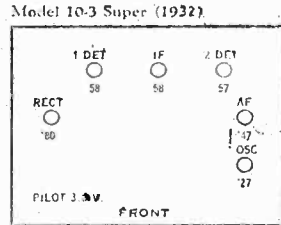
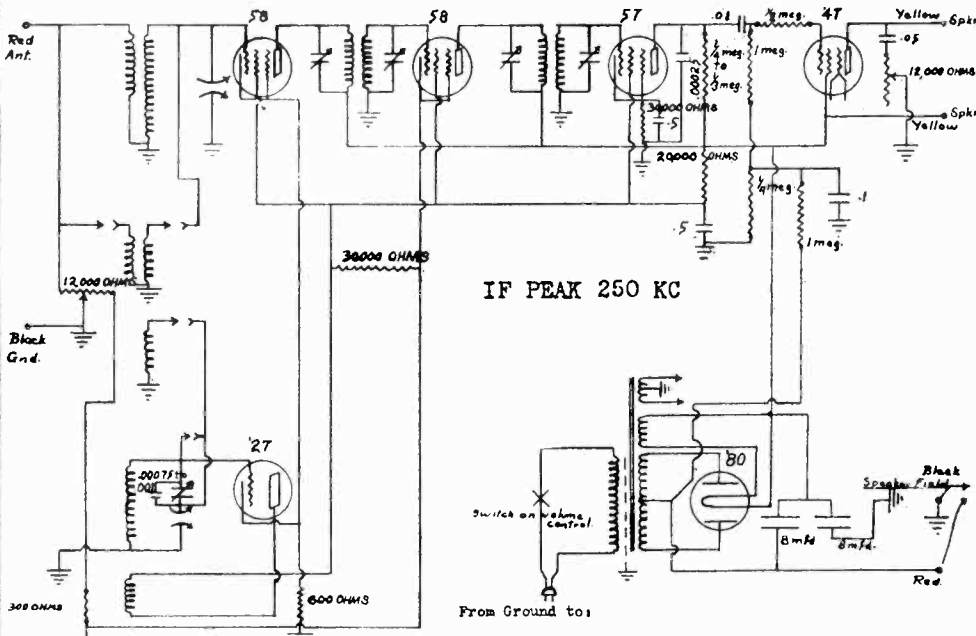
TITLE Wiring Diagram
 FOR No. 550 Oscillator
 MAT. NO. REQ. FILE NO.
 PART NO. DWG. No. 124
 DATE DRAWN BY N.A.T. CHECKED BY



Wiring Diagrams
 Capacity Meter & Tester
 DWG. No. 131

MODEL 10-3
MODEL 15-3

REMLER COMPANY, LTD.



IF PEAK 250 KC

Model 10-3

A.C. Voltages:

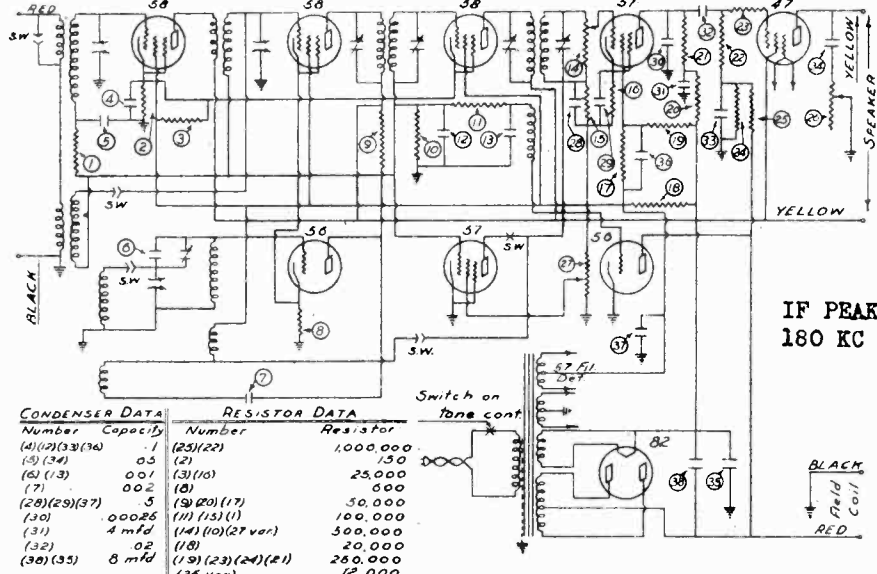
Line	--	120 volts
Heater filaments	--	2.3 "
Power tube filament	--	2.3 "
Rectifier filament	--	5.0 "

#580 Rectifier tube filament	--	235 volts
#47 Power " screen grid	--	235 "
#47 " " plate	--	230 "
#47 " " grid	--	17 "
#58 Mixer " plate	--	235 "
#58 " " screen grid	--	60 "
#58 " " kathode	--	4 "
#58 Intermediate " Plate	--	235 "
#58 " " screen grid	--	60 "
#58 " " kathode	--	2 to 20 volts

#57 Detector Tube plate	--	120 volts
#57 " " screen grid	--	60 "
#57 " " kathode	--	32 "
#327 Oscillator Tube plate	--	60 "
#327 " " kathode	--	4 "

Due to small current, meter readings will be inaccurate on detector plate and power tube grid.

Speaker field (red lead) -- 105 volts negative.



CONDENSER DATA

Number	Capacity
(4)(12)(33)(36)	.1
(5)(34)	0.5
(6)(13)	0.01
(7)	0.02
(20)(29)(37)	5
(30)	0.0025
(31)	4 mfd
(32)	0.2
(38)(35)	8 mfd

RESISTOR DATA

Number	Resistor
(25)(22)	1,000,000
(21)	150
(3)(10)	25,000
(8)	000
(9)(20)(17)	50,000
(11)(15)(1)	100,000
(14)(10)(27 var)	500,000
(18)	20,000
(19)(23)(24)(21)	250,000
(26 var)	12,000

Model 15-3

Voltage readings for servicing purposes follow:

D. C. VOLTAGES FROM GROUND:

#82 Rectifier tube filament	--	260 volts	#56 " " kathode	--	5 "
#47 Power " screen grid	--	260 "	#57 Detector " screen grid	--	110 "
#47 " " plate	--	245 "	#57 " " plate	--	135 "
#47 " " grid	--	18 "	#57 " " kathode	--	90 "
#58 R.F. " screen grid	--	95 "	#57 Noise suppressor " tube plate	--	Var. 0-90
#58 " " plate	--	260 "	#57 " " kathode	--	0
#58 " " kathode	--	2.5 "	#57 " " screen grid	--	Var. 0-90
#58 Mixer " screen grid	--	95 "	VOLTAGES:		
#58 " " plate	--	260 "	Line	--	120
#58 " " kathode	--	5 "	Heater Filaments	--	2.35
#58 Intermediate " screen grid	--	95 "	Power tube filament	--	2.35
#58 " " plate	--	260 "	Detector tube filament	--	2.5
#58 " " kathode	--	2.5 "	Rectifier filament	--	2.5
#56 Oscillator " plate	--	60 "			

Set the LOCAL - DISTANCE switch on DISTANCE and the wave-charging switch on L.C.M. With the 180 K.C. signal attenuated so low as to be just audible adjust the four controlling trimmers of the I.F. for maximum signal.

The two I.F. transformers and their trimmers are located in the upper right shield cans at the extreme left of the chassis.

To make the dial run true to its Kilocycle markings, set the dial at or near 800 K.C. using an oscillator or a Broadcasting Station of known frequency. By tuning to an oscillator or station at or near 560 K.C. the dial may now be made to "track" by adjusting the radio set's oscillator series peaking condenser. This is located next to the oscillator tube socket beneath the chassis but must be adjusted thru the hole in the chassis between the oscillator tube and the variable tuning condenser.