GENERAL ELECTRIC CO.

General Electric Modern Longfellow Grandfather Clock-Radio

Models H-91 and H-91-R

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts
Frequency Rating	50–60 Cycles or 25–40 Cycles
Power Consumption	120 Watts
Recommended Antenna Length	25–75 Feet
Type of Circuit	A. C. Screen Grid Super-Heterodyne
Number of Radiotrons	3 RCA-235, 1 UY-224, 3 UY-227, 2 RCA-247, 1 UX-280—Total of 10
Number of Radio Frequency Stages	One
Type of First Detector	Tuned Input Grid Bias
Number of Intermediate Stages	Two
Type of Second Detector	Power Grid Bias
Type of Automatic Volume Control	UY-227
(Controlling bias voltage on R. F. and I. F. stages by means of drop across resistor in plate circuit)	
Number of Audio Stages	One (Push-Pull)
Type of Rectifier	Full Wave, UX-280
Type of Loudspeaker	Dynamic with Special High Frequency Filter
Wattage Dissipation in Loudspeaker Field	Ten
Undistorted Output	Four Watts

PHYSICAL SPECIFICATIONS

Height	78 Inches
Depth	14¼ Inches
Width	17½ Inches
Weight (Packed for Shipment)	205 Pounds
Weight (Alone)	136 Pounds
Packing Case Dimensions	81½ Inches x 21¼ Inches x 19 Inches

INTRODUCTION

General Electric Radio, Models H-91 and H-91-R are ten tube, Super-Heterodyne type radio receivers incorporated in the cabinet of a massive electric Grandfather clock. Mechanical and electrical excellence together with the beauty of fine period furniture characterize this instrument.

Model H-91 is a straight radio receiver and model H-91-R is of the remote control type. Ten Radiotrons are used, three RCA-235 as R. F., and I. F. stages one UY-224 as first detector, three UY-227 as oscillator, automatic volume control and 2nd detector; two RCA-247 as the power output stage and one UX-280 as the rectifier.

These instruments, with the exception of the cabinet are similar to the model H-51 and H-51-R except than an automatic volume control tube and Radiotrons RCA-235 and RCA-247 in the R. F., I. F. and Power stages, have been included. For service data other than on the remote control unit that is applicable to vertical operation and on the automatic volume control circuit, reference should be made to the Service Notes already issued on the Model H-51 and H-51-R.

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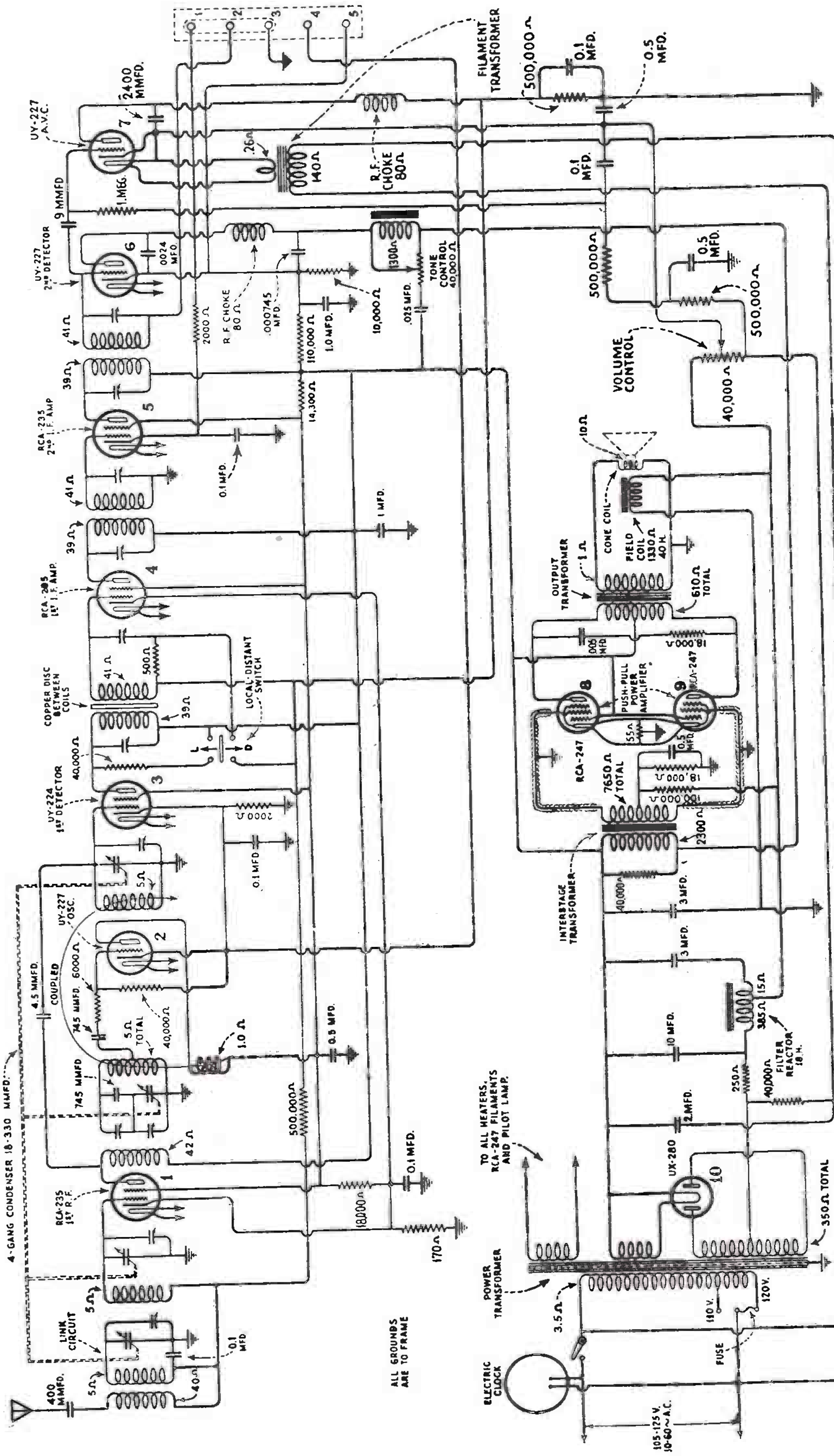
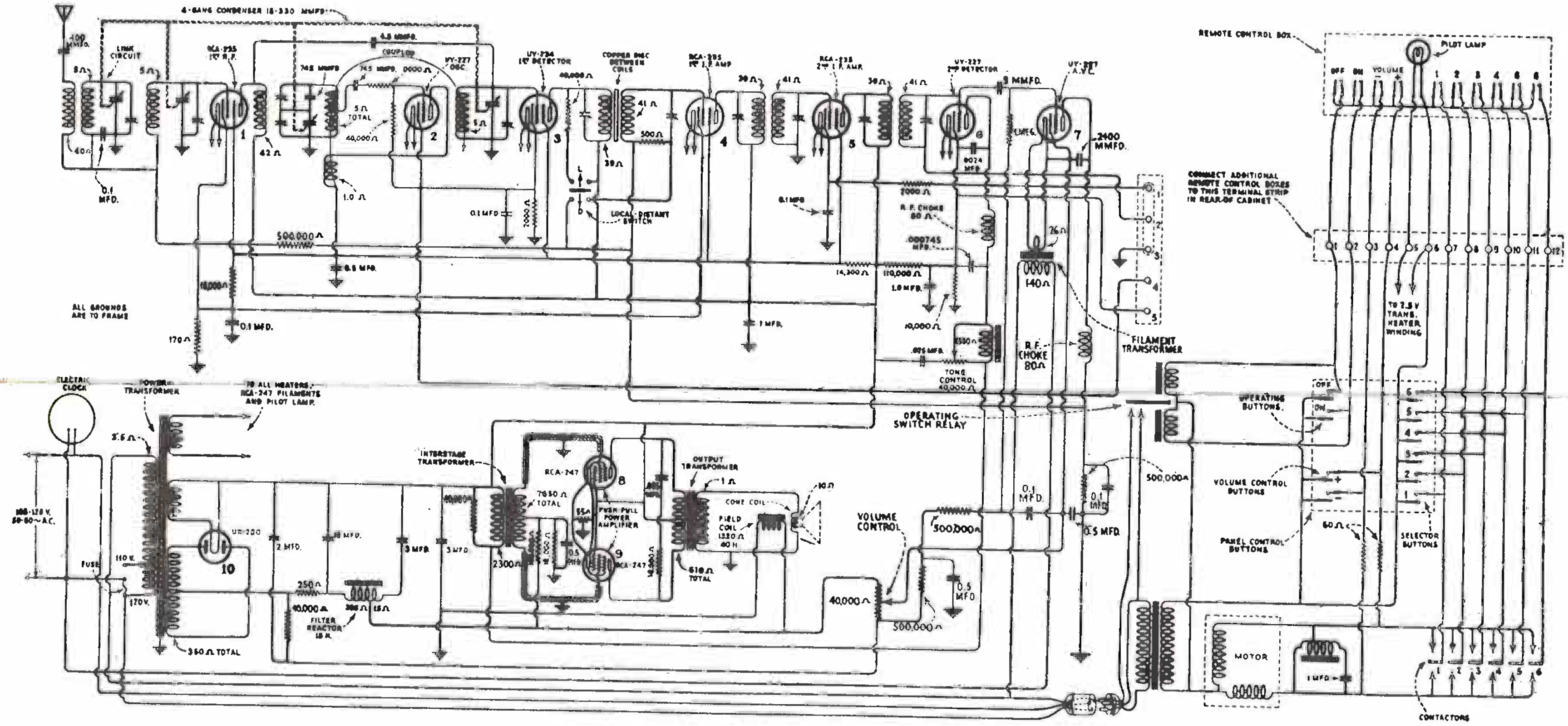


Schematic Diagram of Model H-91

GENERAL ELECTRIC CO.



Schematic Diagram of Model H-91-R

VOLUME CONTROL AT MINIMUM

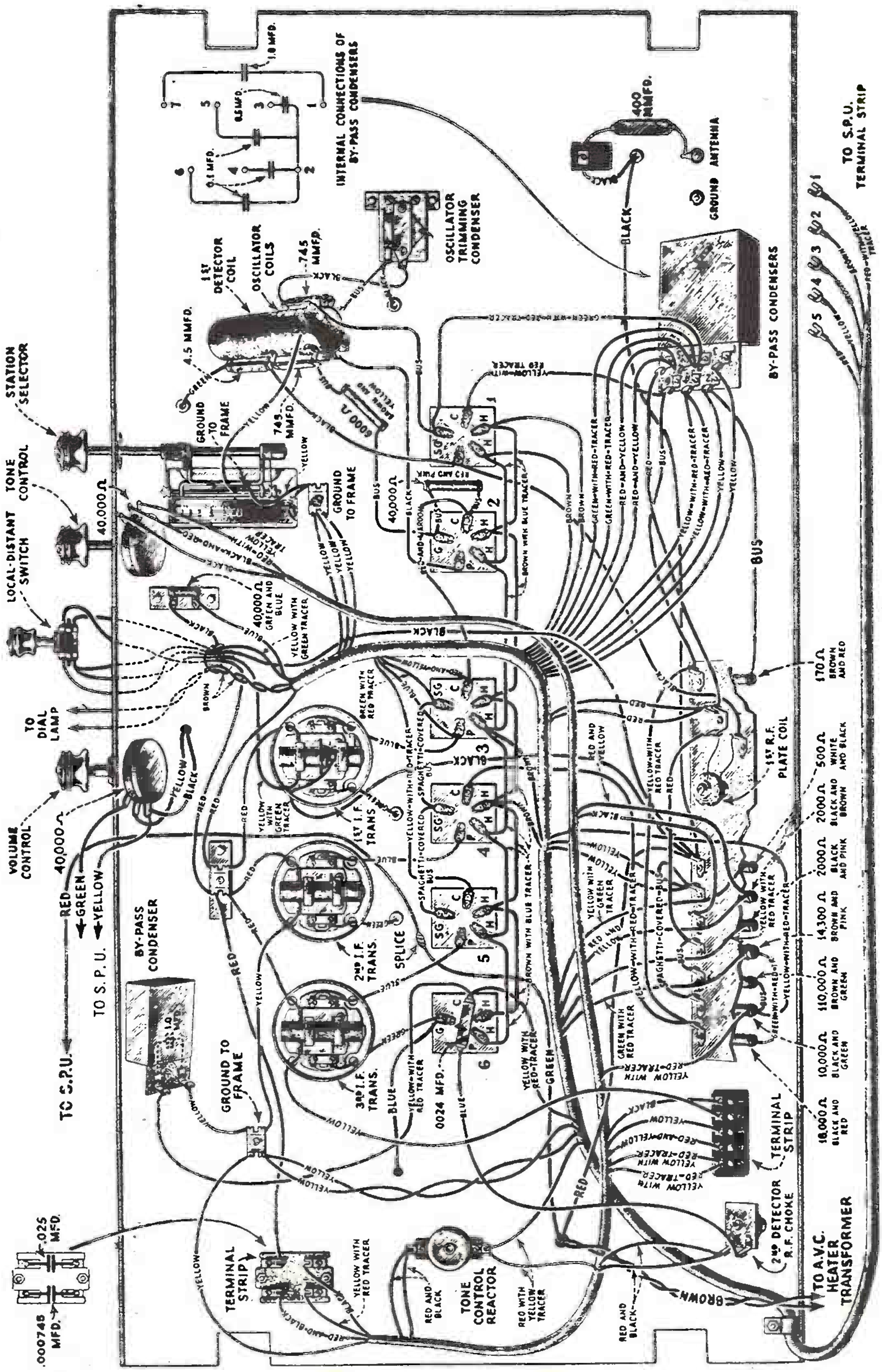
Radio-tron No.	Cathode to Heater Volts	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Screen Grid Current M. A.	Heater or Filament Volts
1	*0	*0	85	240	0	0	2.2
2	10	0	—	50	5.5	—	2.2
3	8.0	8.0	80	240	0.5	0	2.2
4	0	50	85	240	0	0	2.2
5	6.0	6.0	80	240	1.0	0.5	2.2
6	20	20	—	205	0.5	—	2.2
7	0	0	—	20	0	—	2.2
8	—	*12	245	245	22	6.0	2.2
9	—	*12	245	245	22	6.0	2.2

VOLUME CONTROL AT MAXIMUM

Radio-tron No.	Cathode to Heater 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.	Screen Grid Current M. A.	Heater or Filament Volts
1	*0	*0	72	245	5.0	0.75	2.2
2	8	0	—	55	7.0	—	2.2
3	6.5	6.5	65	225	0.5	0	2.2
4	0	0	75	240	5.0	0.75	2.2
5	4.5	4.5	70	225	2.5	0.5	2.2
6	20	20	—	200	0.5	—	2.2
7	0	0	—	25	0	—	2.2
8	—	*12	245	245	22	6.0	2.2
9	—	*12	245	245	22	6.0	2.2

* Not true reading due to resistance in circuit.

GENERAL ELECTRIC CO.



Wiring Diagram of Model H-91 Receiver Assembly

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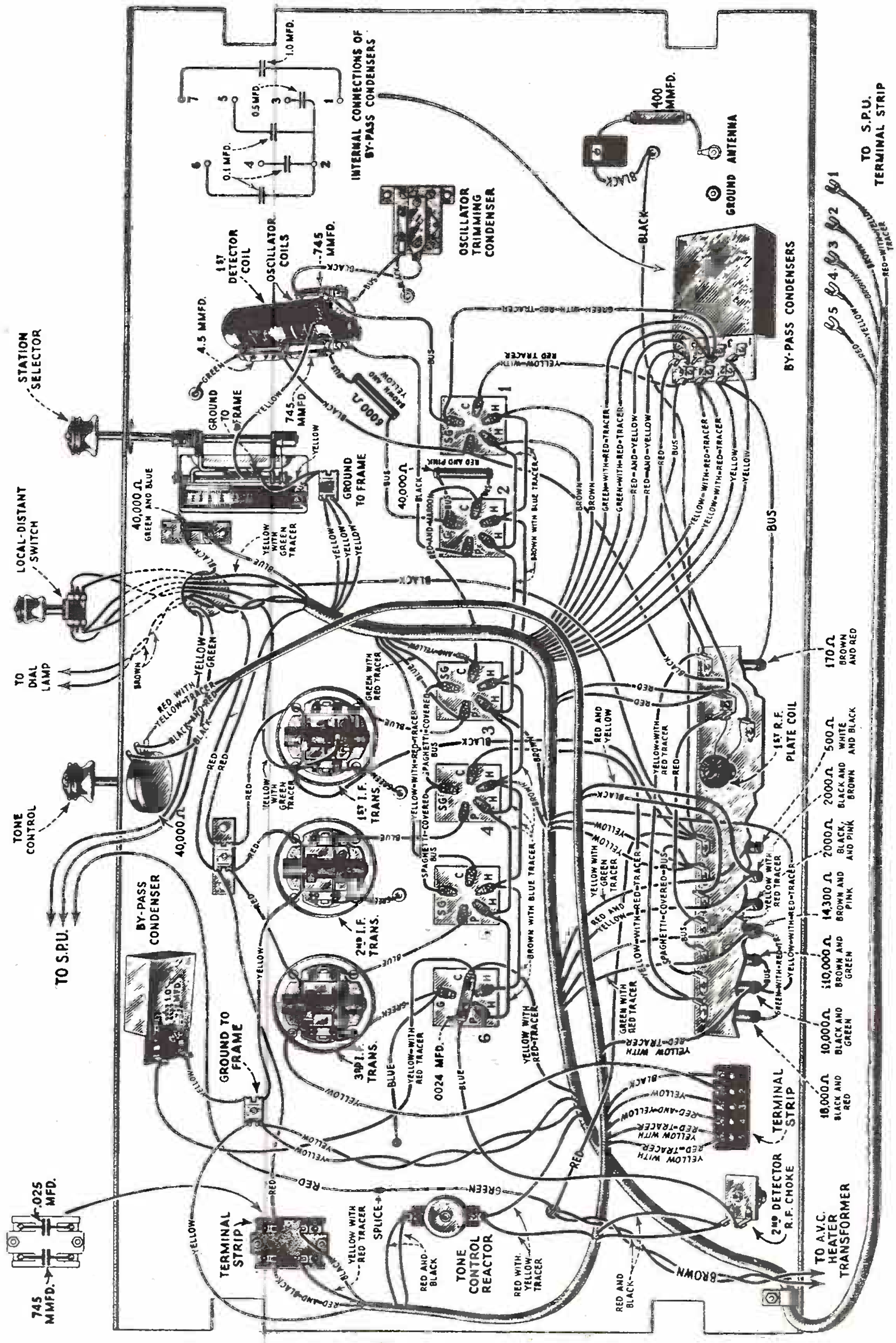
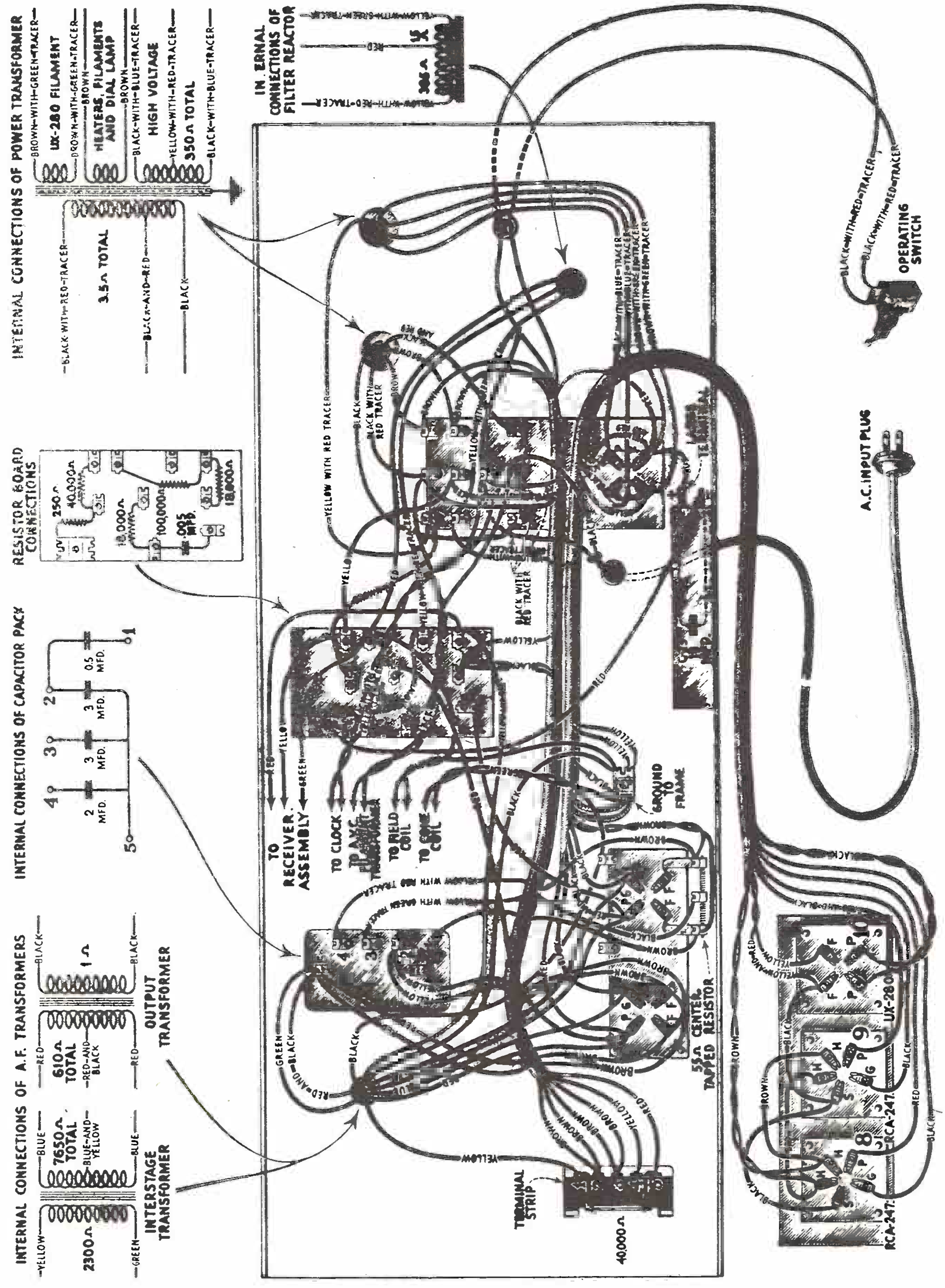


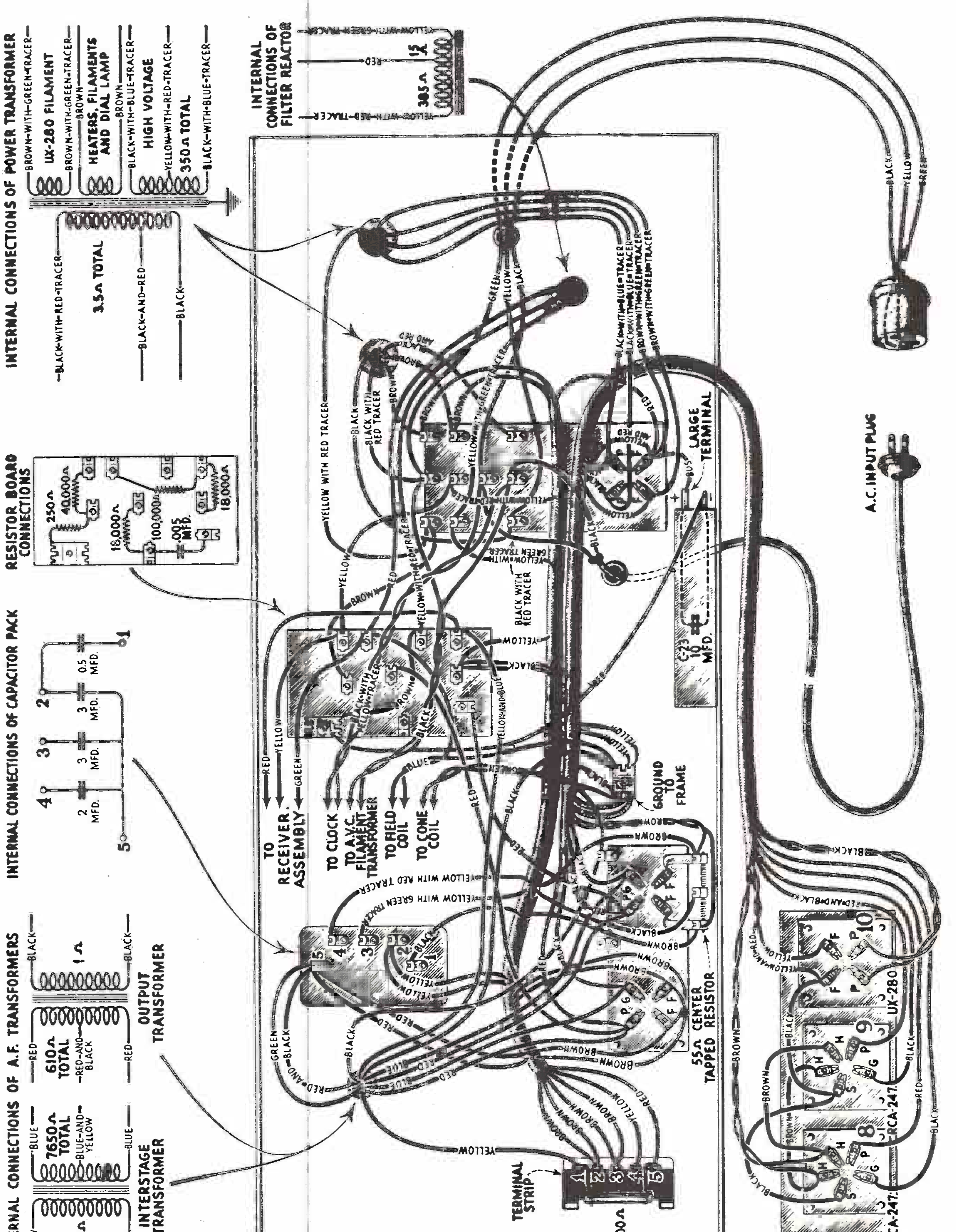
Wiring Diagram of Model H-91-R Receiver Assembly

GENERAL ELECTRIC CO.



Wiring Diagram of Model H-91 S. P. U.

GENERAL ELECTRIC CO.



Wiring Diagram of Model H-91-R S. P. U.

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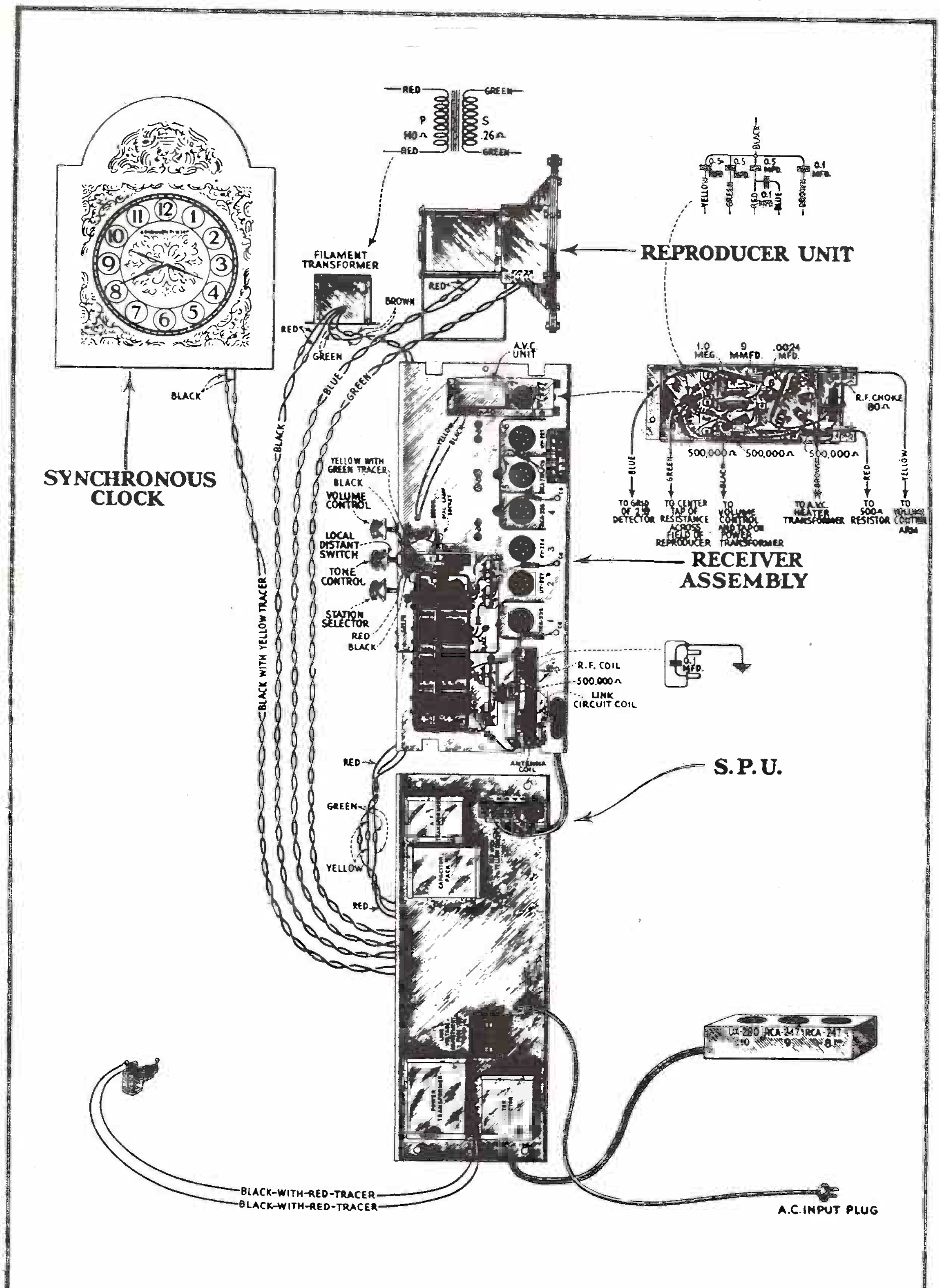

Assembly Wiring of Model H-91

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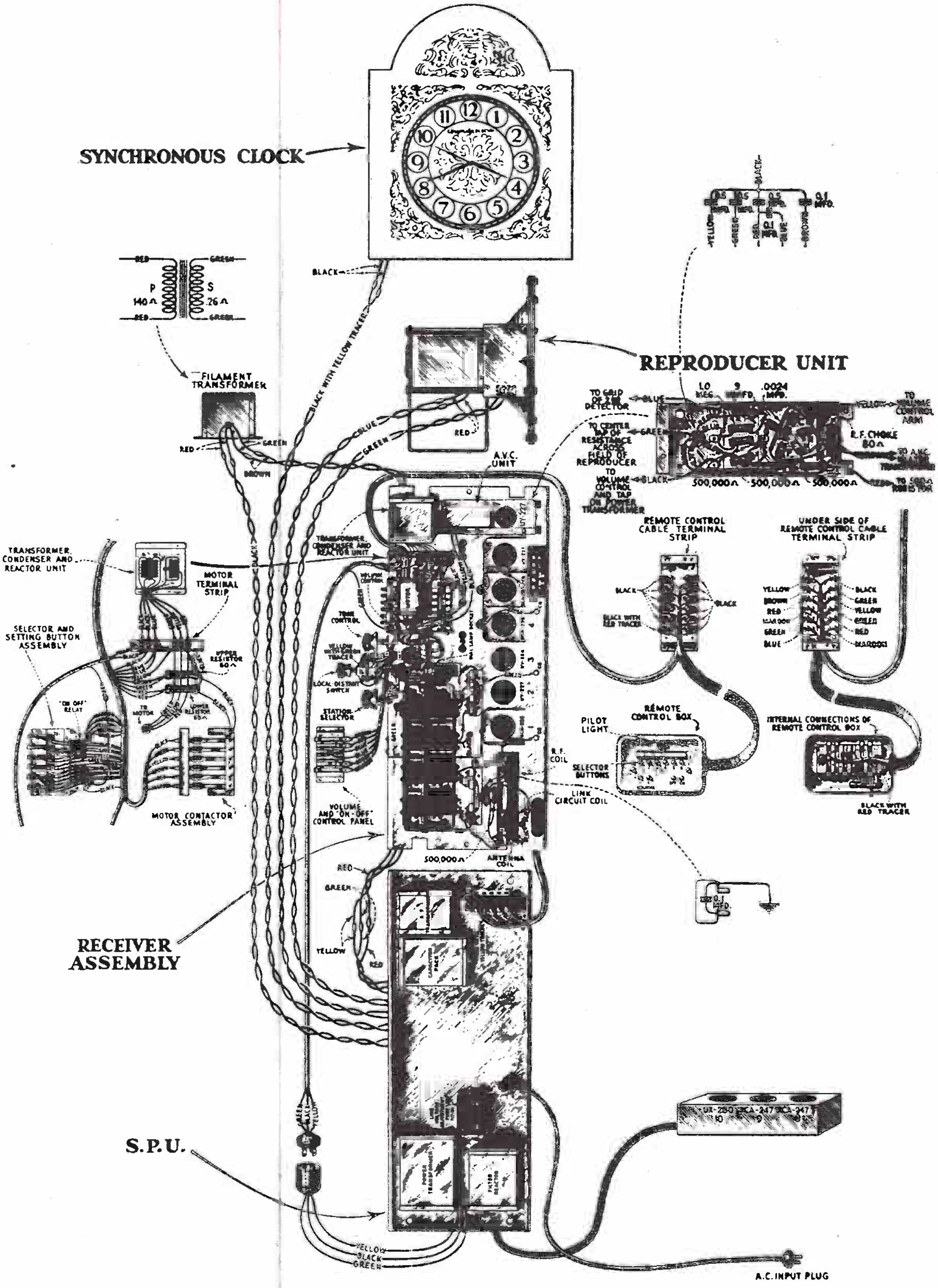
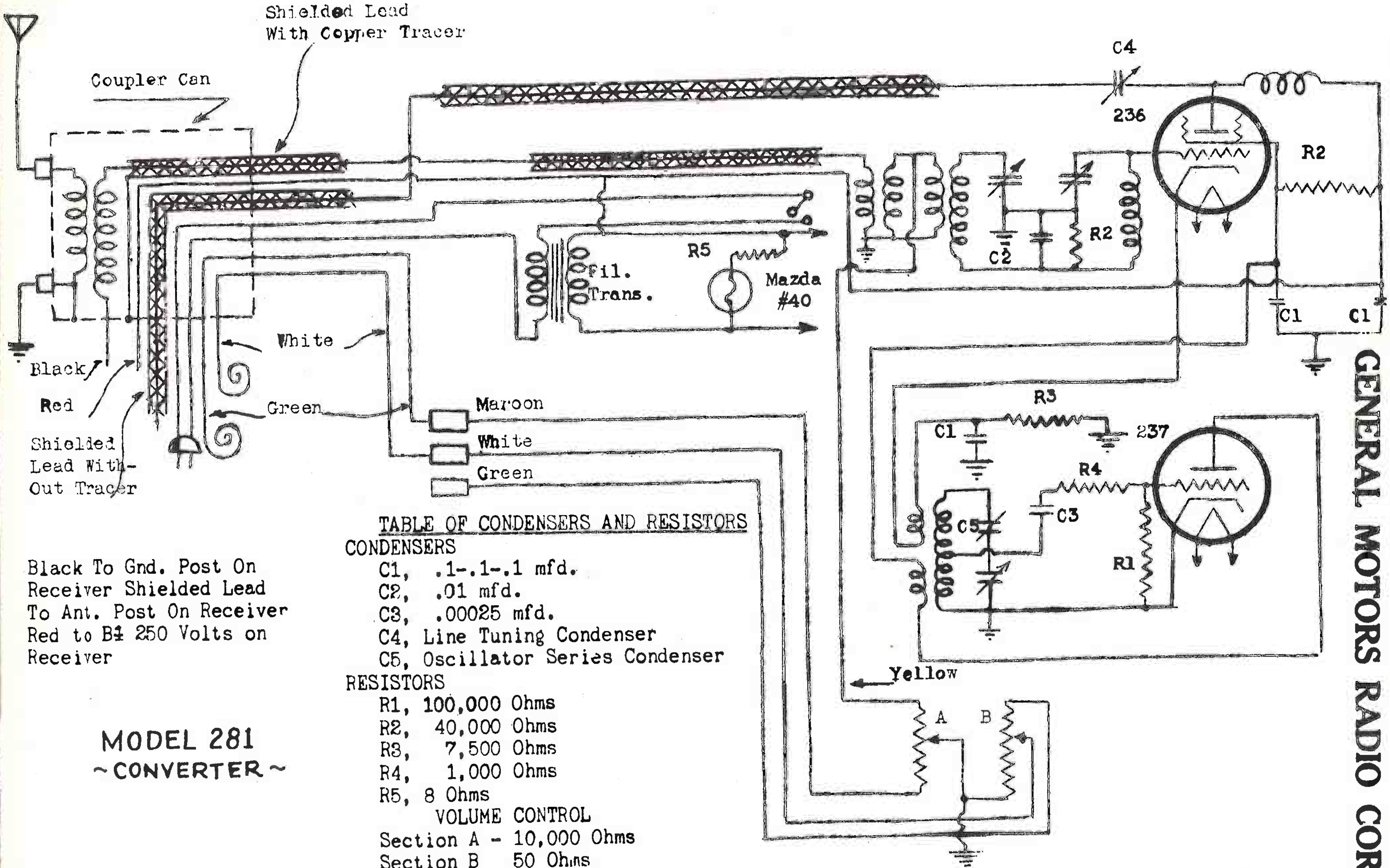


Assembly Wiring of Model H-91-R

GENERAL MOTORS RADIO CORP.



Black To Gnd. Post On Receiver Shielded Lead To Ant. Post On Receiver Red to B+ 250 Volts on Receiver

MODEL 281
~CONVERTER~

TABLE OF CONDENSERS AND RESISTORS

CONDENSERS
- C1, .1-.1-.1 mfd.
- C2, .01 mfd.
- C3, .00025 mfd.
- C4, Line Tuning Condenser
- C5, Oscillator Series Condenser

RESISTORS
- R1, 100,000 Ohms
- R2, 40,000 Ohms
- R3, 7,500 Ohms
- R4, 1,000 Ohms
- R5, 8 Ohms

VOLUME CONTROL
- Section A - 10,000 Ohms
- Section B 50 Ohms

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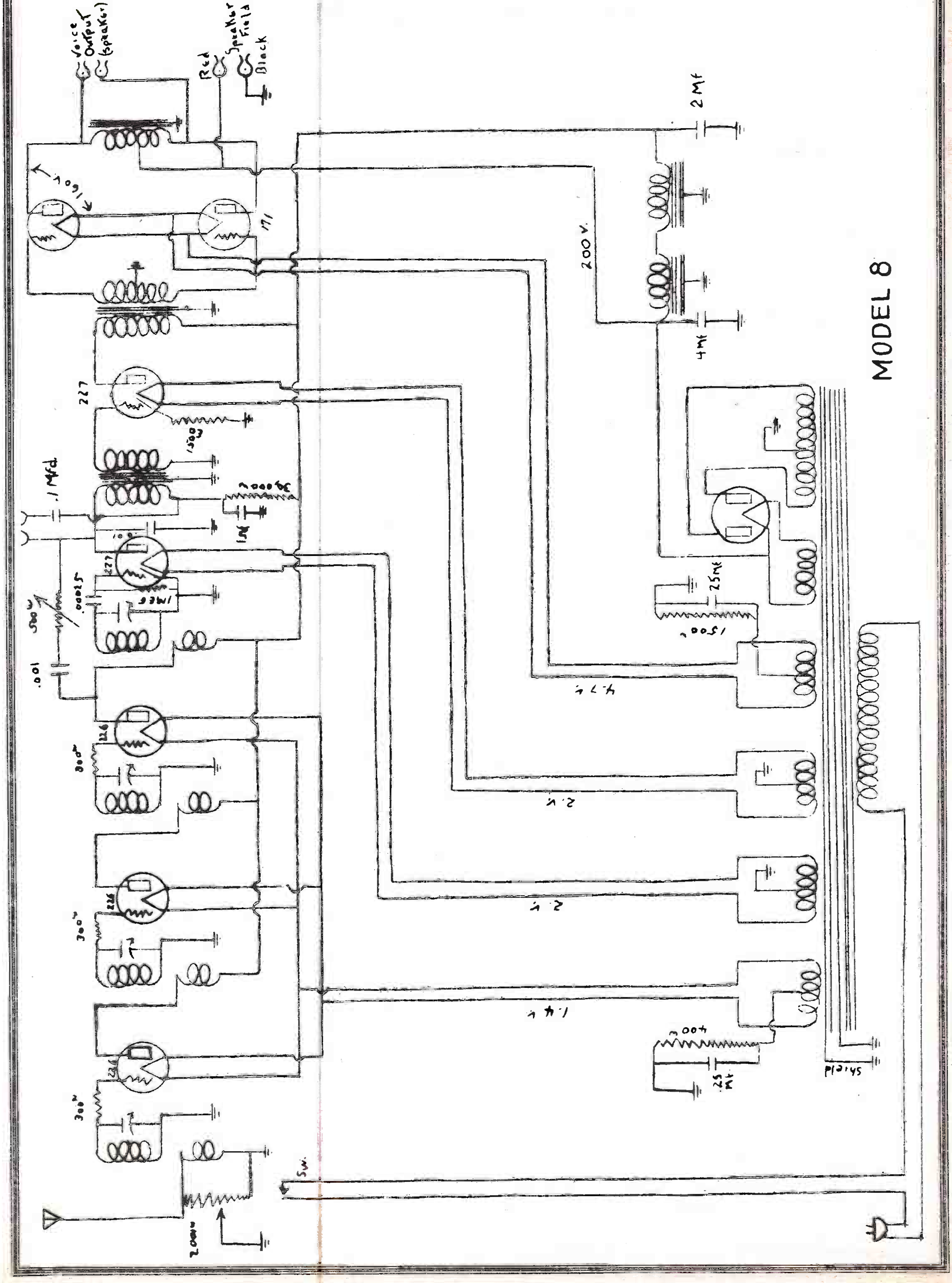

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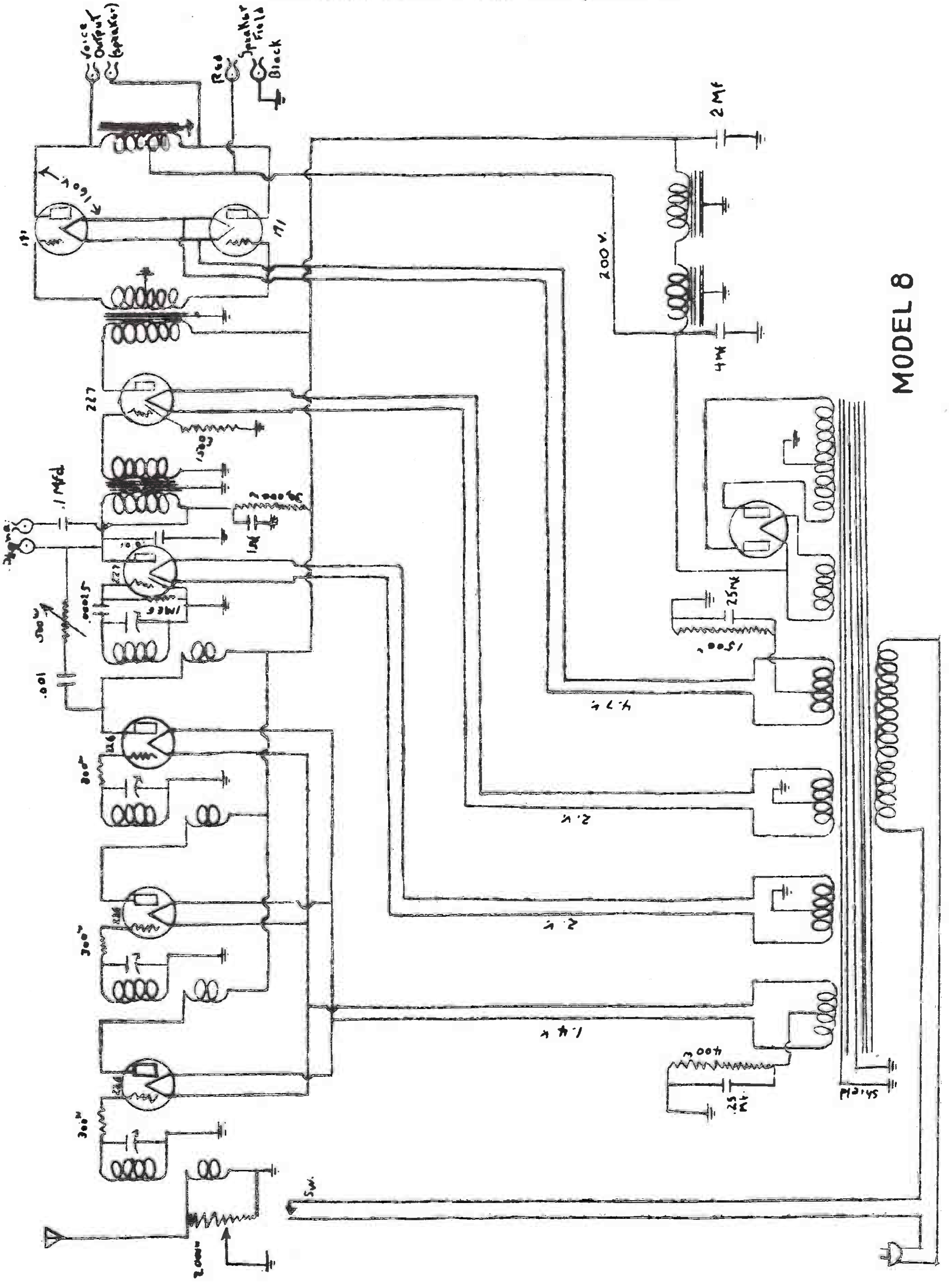

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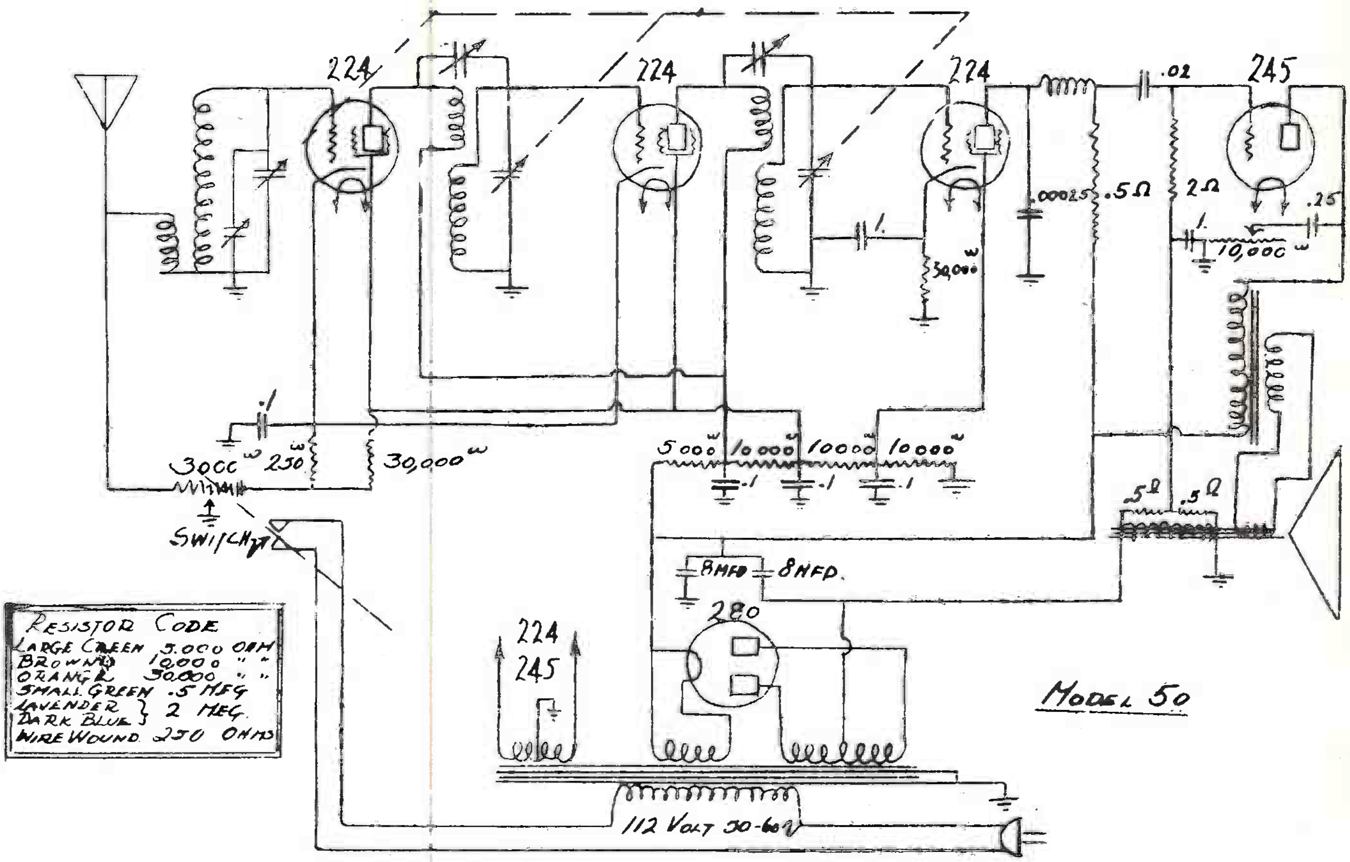

MODEL 50

VOLTAGE AND CURRENT VALUES:

With the volume control at maximum, the following readings should be obtained with an allowable variation of 10%:-

R.F. Plate Voltage	160	
R.F. Screen Grid Voltage	75	
R.F. Grid Bias	2	
R.F. Plate Current	2.2	mils approx.
R.F. Screen Current	.8	" "
245 Plate Voltage	210	
245 Plate Current	23	" "
245 Bias Voltage	50*	
Detector Screen Grid Voltage.	40	
Detector Bias Voltage	5**	
Detector Plate Current	.1	mils (no signal in receiver)
Detector Plate Voltage	100***	

Voltage readings were made with a 1000 ohm per volt meter, 250 volt range.

*The reading here on a set analyzer will show about 2 volts due to the fact that the 2 meg. ohm resistor is in series with the meter. To check grid voltage, drop across speaker divided by 2 will be the approximate voltage applied to grid. If plate current is about 25 mils and voltage about 220, it is safe to assume that the grid bias is O.K.

**Detector bias reading is taken at the overload point of an incoming signal where it generally reaches a maximum of 5 volts. With zero volume control, the reading here is approximately 4 volts. This, of course, is not the true reading, because resistance of volt meter becomes a parallel circuit, cutting down the resistance, and of course, dropping the voltage. Reading taken in this case was with 10,000 ohm meter (1000 per volt, 10 volt scale.)

***This reading is subject to considerable variation with meters of various resistances, as the voltage at this point is measured through a 500,000 ohm resistor. The voltage at the opposite end of the resistor should be 220 volts.

TRANSFORMER VOLTAGES:

224 - 245 Filament on one winding, 2.20 volts.
280 Filament - 4.5
High voltage winding, 315 each side of center tap.

RESISTANCE COLOR CODE - CARBON RESISTORS.

1 Watt

10,000 ohms - Brown with Black band, Orange Dot.
30,000 " - Orange with Black Band
500,000 " - Green with Black Band & Yellow Dot
2 meg. - Blue

2 Watt

5,000 ohms - Green with Black Band and Red Dot
300 " - R.F. Bias Resistor is wire wound.

RESISTANCE COLOR CODE - CARBON RESISTORS.

1 WATT

300 Ohm	- Wire Wound		
1100 "	- Blue		
2200 "	- Solid Red		
3000 "	- Orange	- Black End	- Red Dot
5000 "	- Green	- " "	- " "
10000 "	- Brown	- " "	- Orange Dot
20000 "	- Red	- " "	- " "
30000 "	- Orange	- " "	- " "
1/4 meg	- Red	- Green "	- Yellow "
1/2 "	- Green	- Black "	- " "
1 "	- Brown	- " "	- Green "
2 "	- Purple		
1000 ohm	- Brown	- Black "	- Red "
50000 "	- Green	- " "	- Orange "

2 WATT

5000 Ohm - Green with Black Band and Red Dot
2200 " - Red
300 " - R.F. Bias Resistor is Wire Wound.

RADIO FREQUENCY COILS.

Radio frequency coils in this Receiver are wound with 130, and 132 turns on the secondaries. The antenna coil has 132 turns, the second, third and detector coils have 130 turns.

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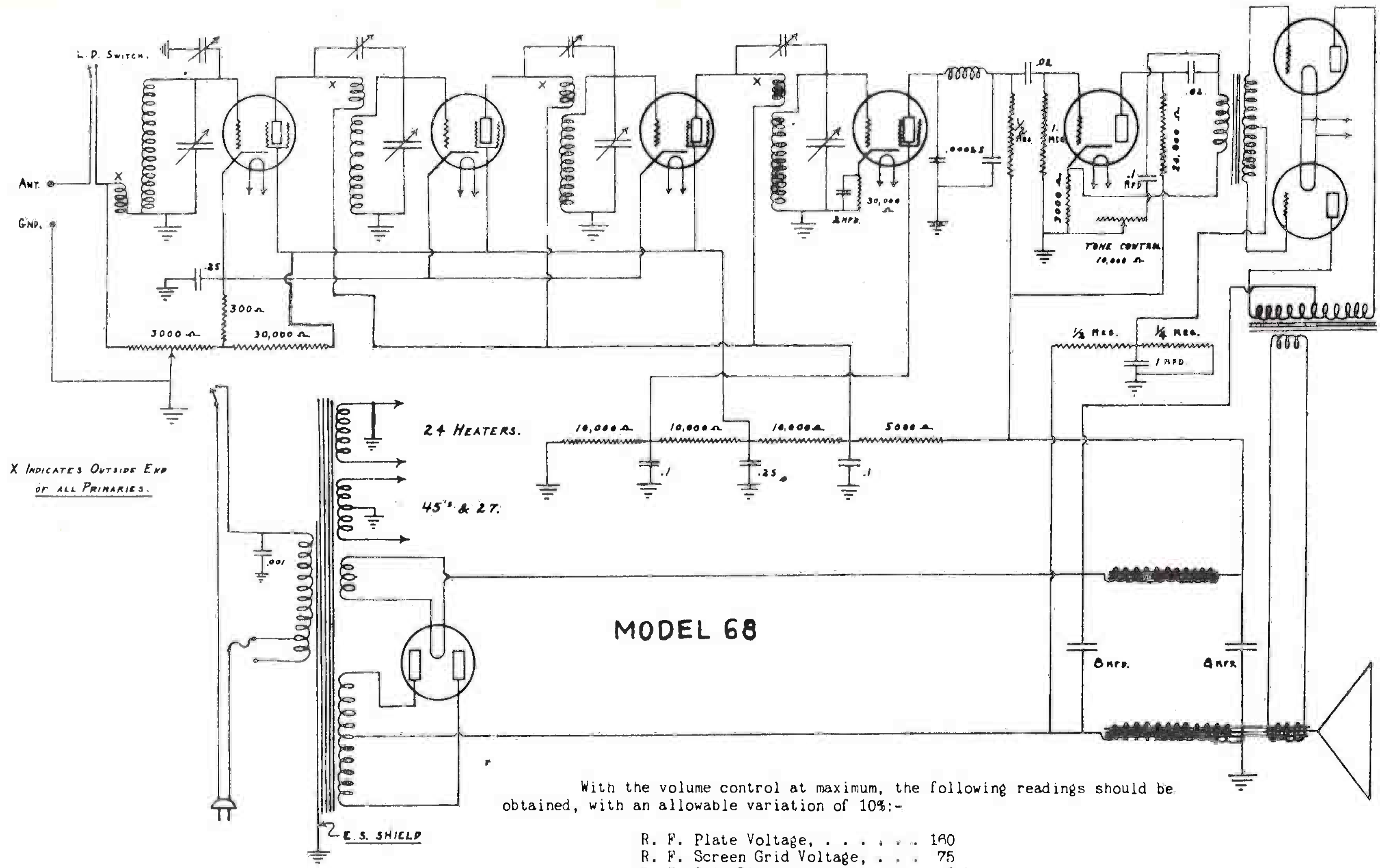

With the volume control at maximum, the following readings should be obtained, with an allowable variation of 10%:-

R. F. Plate Voltage, ...	180	
R. F. Screen Grid Voltage, . . .	75	
R. F. Grid Bias, ...	2.5	
R. F. Plate Current, ...	2.5	M
First A. F. Plate Current, ...	3½	M
First A. F. Plate Voltage, ...	115	V
First A. F. Bias,.	5	V
'45s Plate Voltage , ...	225	V
'45s Bias,.	50	V
'45s Plate Current,.	30	M
Detector Screen Grid Voltage . .	50	V
Detector Bias, ...	5	V
Detector Plate Current,.	.2	M (No signal in Receiver)
Detector Plate Voltage,.	100 *	

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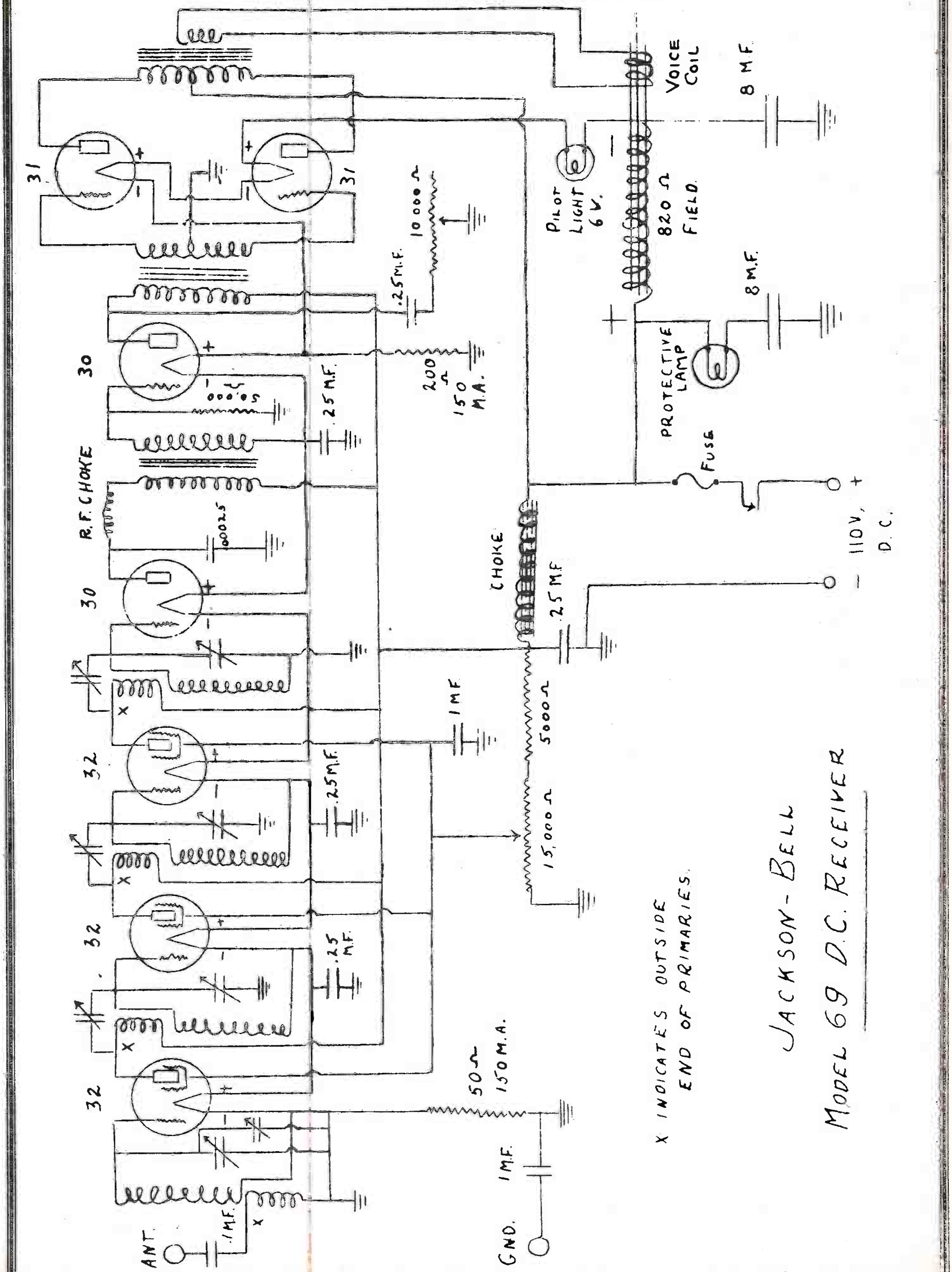

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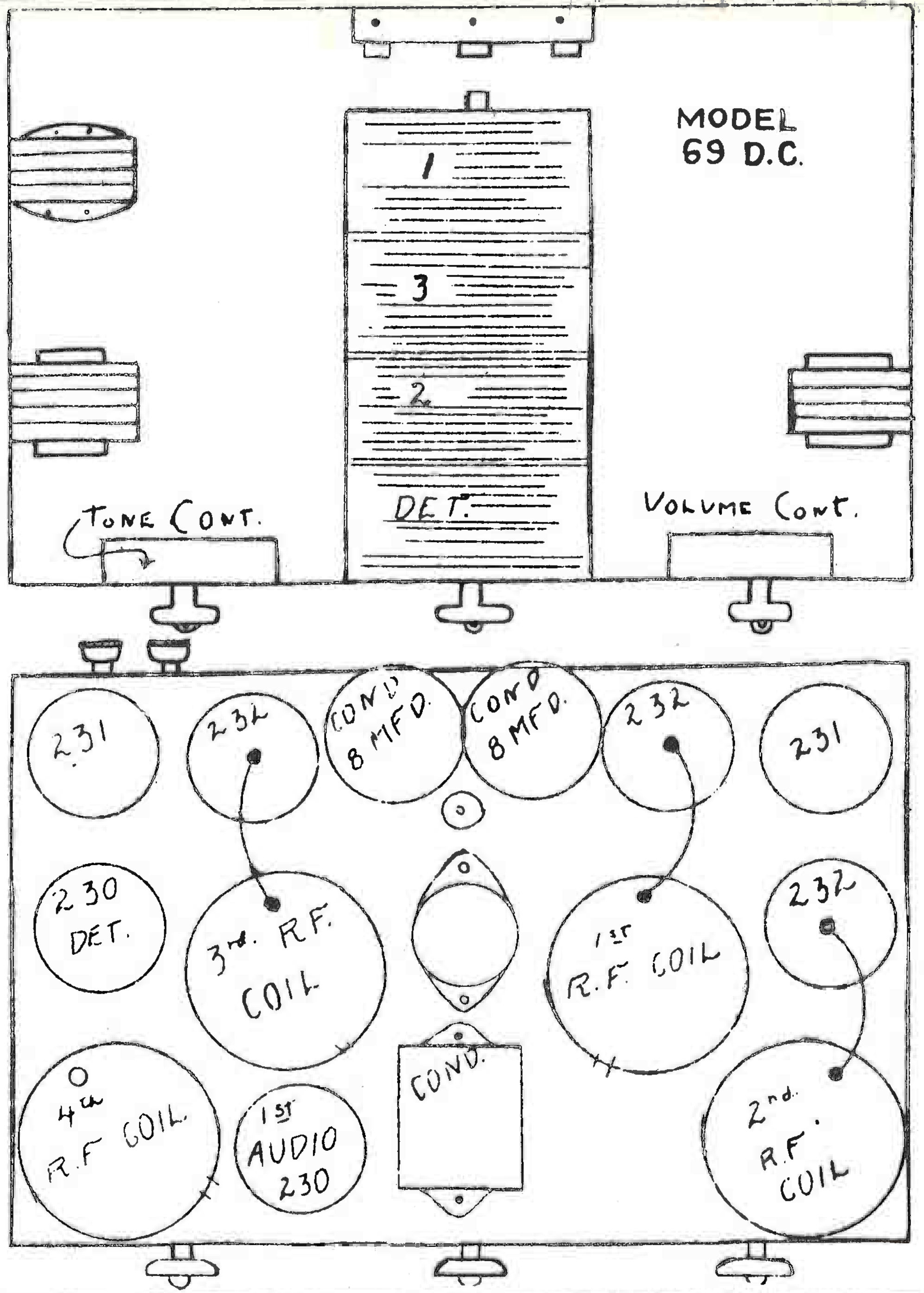


D.C. line 110 volts, voltages check as follows:-

R.F. Filament,	2 volts
R.F. Plate,	90 "
R.F. Screen Grid,	60 "
R.F. Bias,	2 "
Detector Filament,	2 "
Detector Plate,	90 "
Detector Bias,	10½ "
First Audio Filament,	2 "
First Audio Plate,	90 "
First Audio Bias,	2 "
Push-Pull Filament,	2 "
Push-Pull Plate,	95 "
Push-Pull Bias,	12½ "

CARBON RESISTOR COLOR CODE.

300 Ohm	Wire Wound		
1100 "	Blue		
2200 "	Solid Red		
3000 "	Orange	Black End	Red Dot
5000 "	Green	" "	" "
10000 "	Brown	" "	Orange Dot
20000 "	Red	" "	" "
30000 "	Orange	" "	" "
¼ meg	Red	Green "	Yellow "
½ "	Green	Black "	" "
1 "	Brown	" "	Green "
2 "	Purple		
1000 ohm	Brown	Black "	Red "
50000 "	Green	" "	Orange "

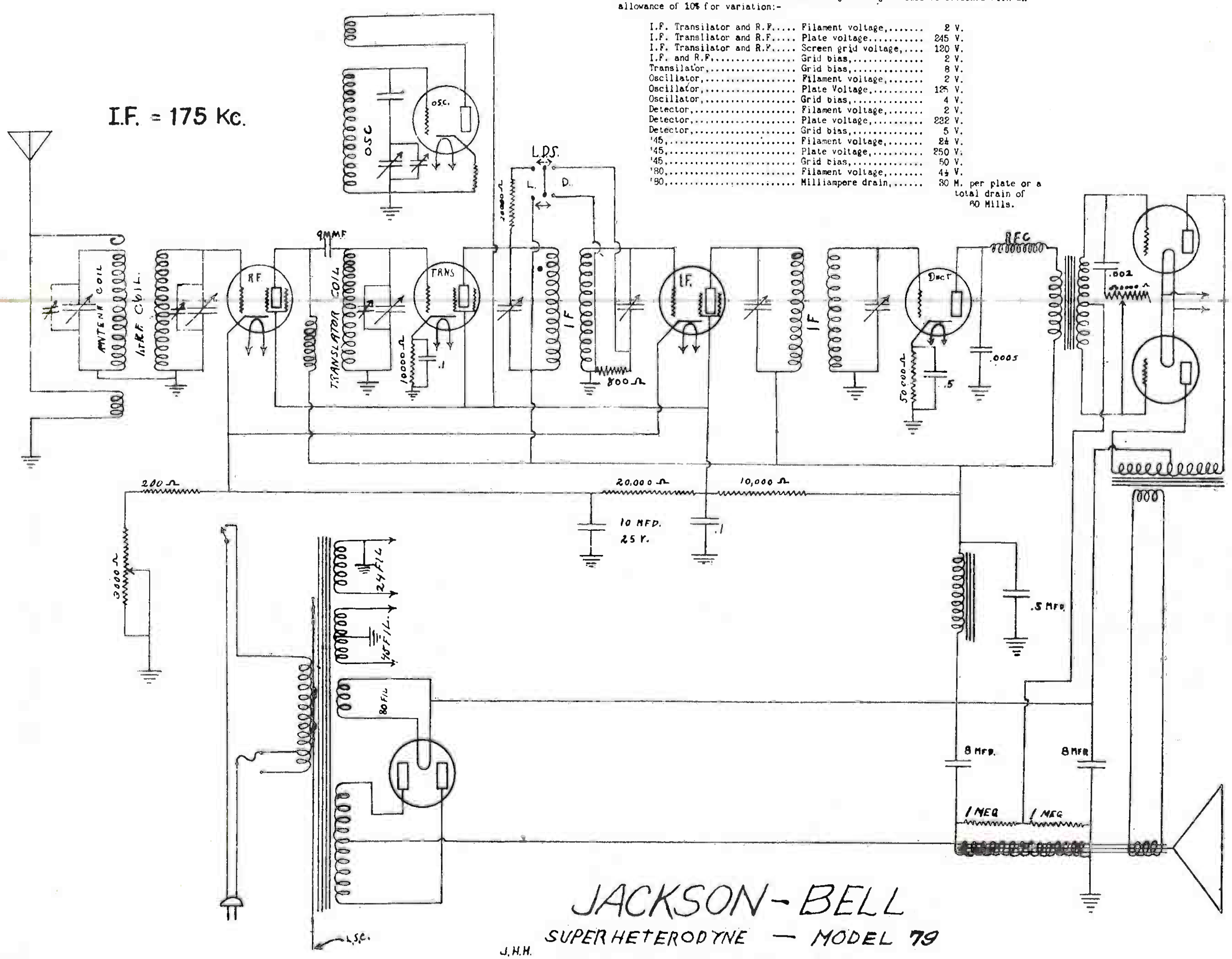
NOTE: For a short time, the 20,000 ohm is solid black.

JACKSON-BELL CO., LTD.

With volume control at maximum the following readings should be obtained with an allowance of 10% for variation:-

I.F. Transilator and R.F.....	Filament voltage,.......	2 V.
I.F. Transilator and R.F.....	Plate voltage..........	245 V.
I.F. Transilator and R.F.....	Screen grid voltage,....	120 V.
I.F. and R.F...............	Grid bias,.............	2 V.
Transilator,...............	Grid bias,.............	8 V.
Oscillator,................	Filament voltage,.......	2 V.
Oscillator,................	Plate Voltage,.........	125 V.
Oscillator,................	Grid bias,.............	4 V.
Detector,..................	Filament voltage,.......	2 V.
Detector,..................	Plate voltage,.........	232 V.
Detector,..................	Grid bias,.............	5 V.
'45,.......................	Filament voltage,.......	2½ V.
'45,.......................	Plate voltage,.........	250 V.
'45,.......................	Grid bias,.............	50 V.
'80,.......................	Filament voltage,.......	4½ V.
'80,.......................	Milliampere drain,......	30 M. per plate or a total drain of 60 Mills.

I.F. = 175 Kc.



JACKSON-BELL

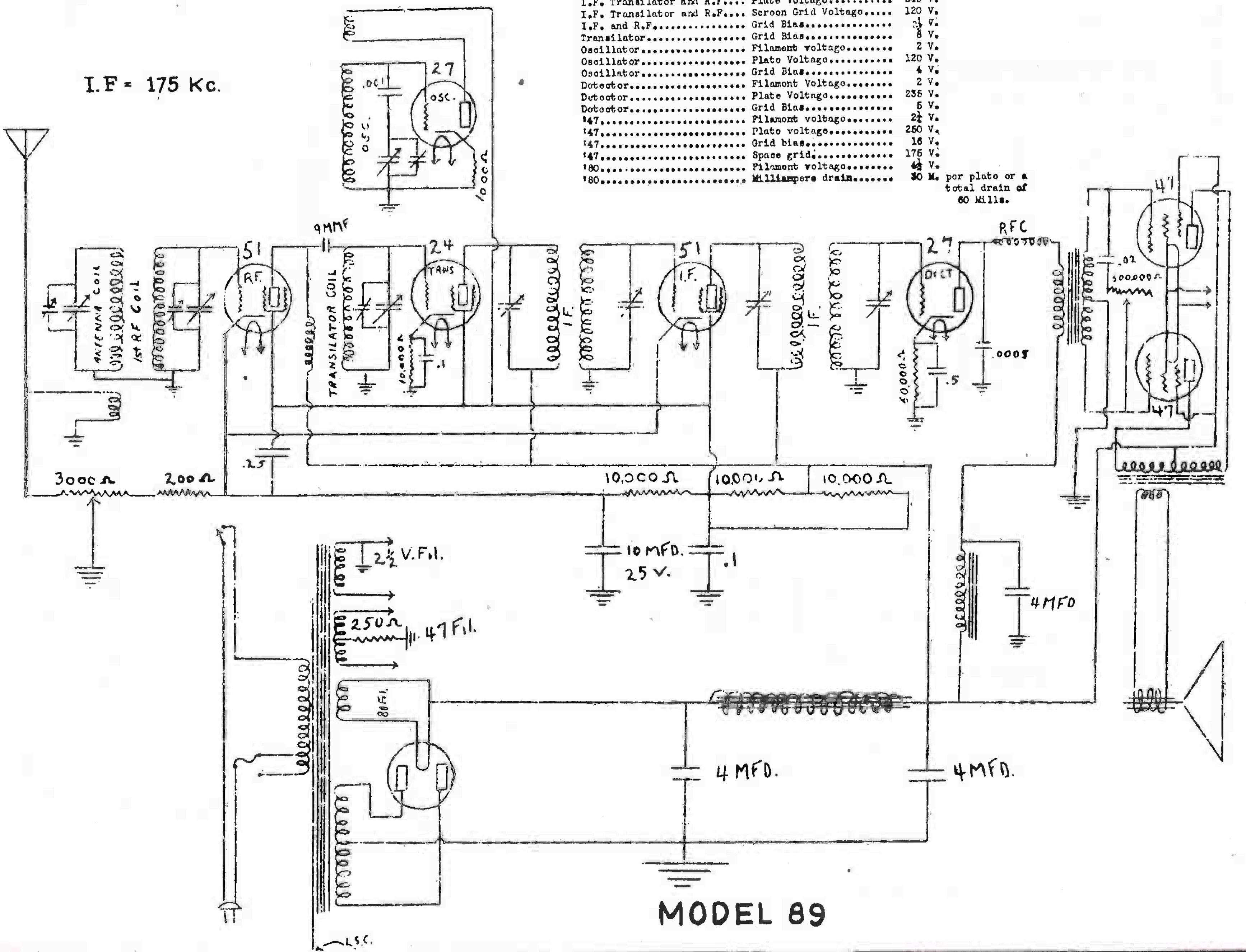
SUPERHETERODYNE — MODEL 79

J.H.H.

JACKSON-BELL CO., LTD.

With volume control at maximum the following readings should be obtained with an allowance of 10% for variations:-

I.F. Transilator and R.F.	Filament Voltage	2 V.
I.F. Transilator and R.F.	Plate Voltage	245 V.
I.F. Transilator and R.F.	Screen Grid Voltage	120 V.
I.F. and R.F.	Grid Bias	3½ V.
Transilator	Grid Bias	8 V.
Oscillator	Filament voltage	2 V.
Oscillator	Plate Voltage	120 V.
Oscillator	Grid Bias	4 V.
Detector	Filament Voltage	2 V.
Detector	Plate Voltage	235 V.
Detector	Grid Bias	5 V.
'47	Filament voltage	2½ V.
'47	Plate voltage	250 V.
'47	Grid bias	16 V.
'47	Space grid	175 V.
'80	Filament voltage	4½ V.
'80	Milliampere drain	30 M. per plate or a total drain of 60 Mills.



MODEL 89

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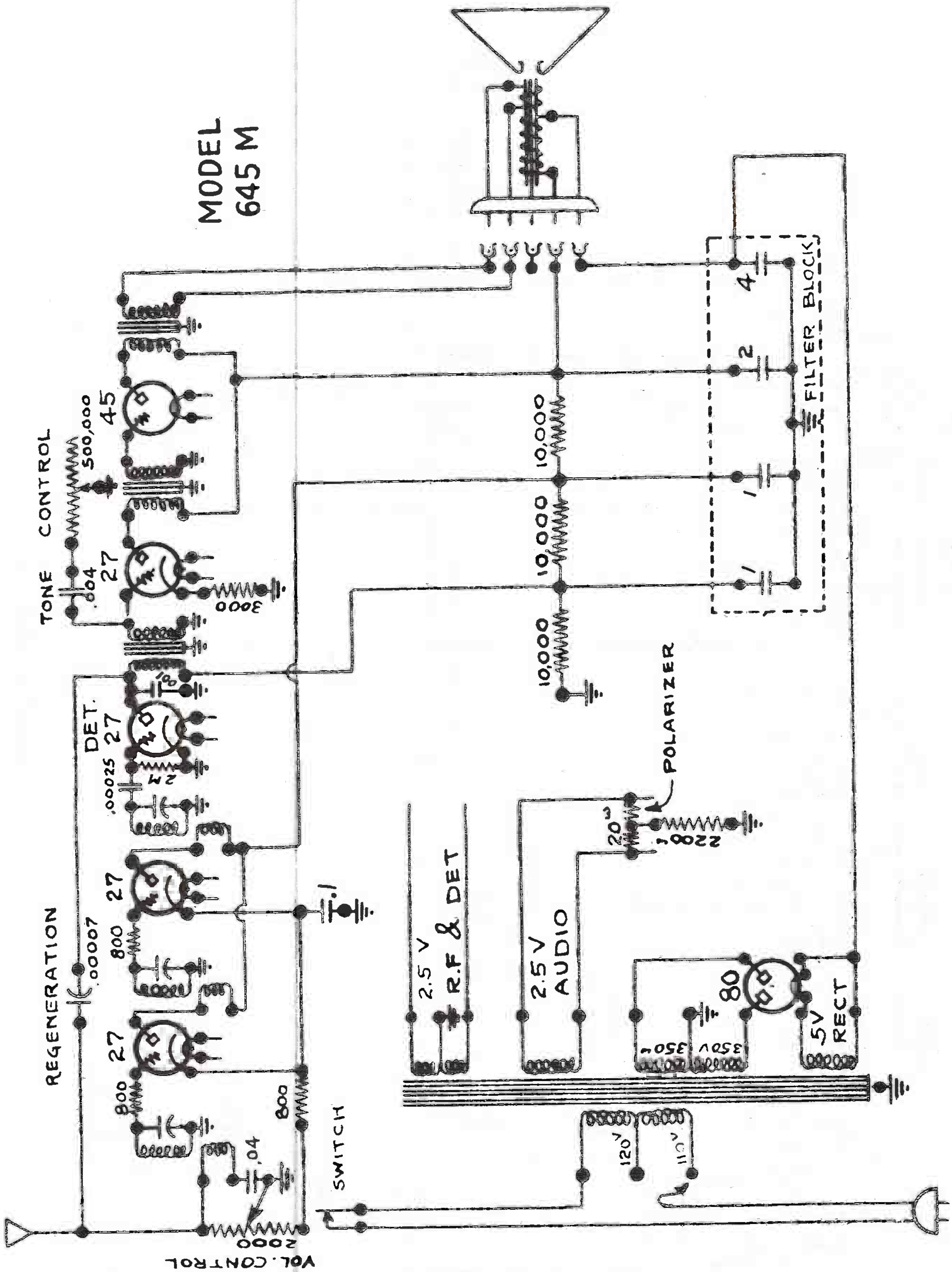

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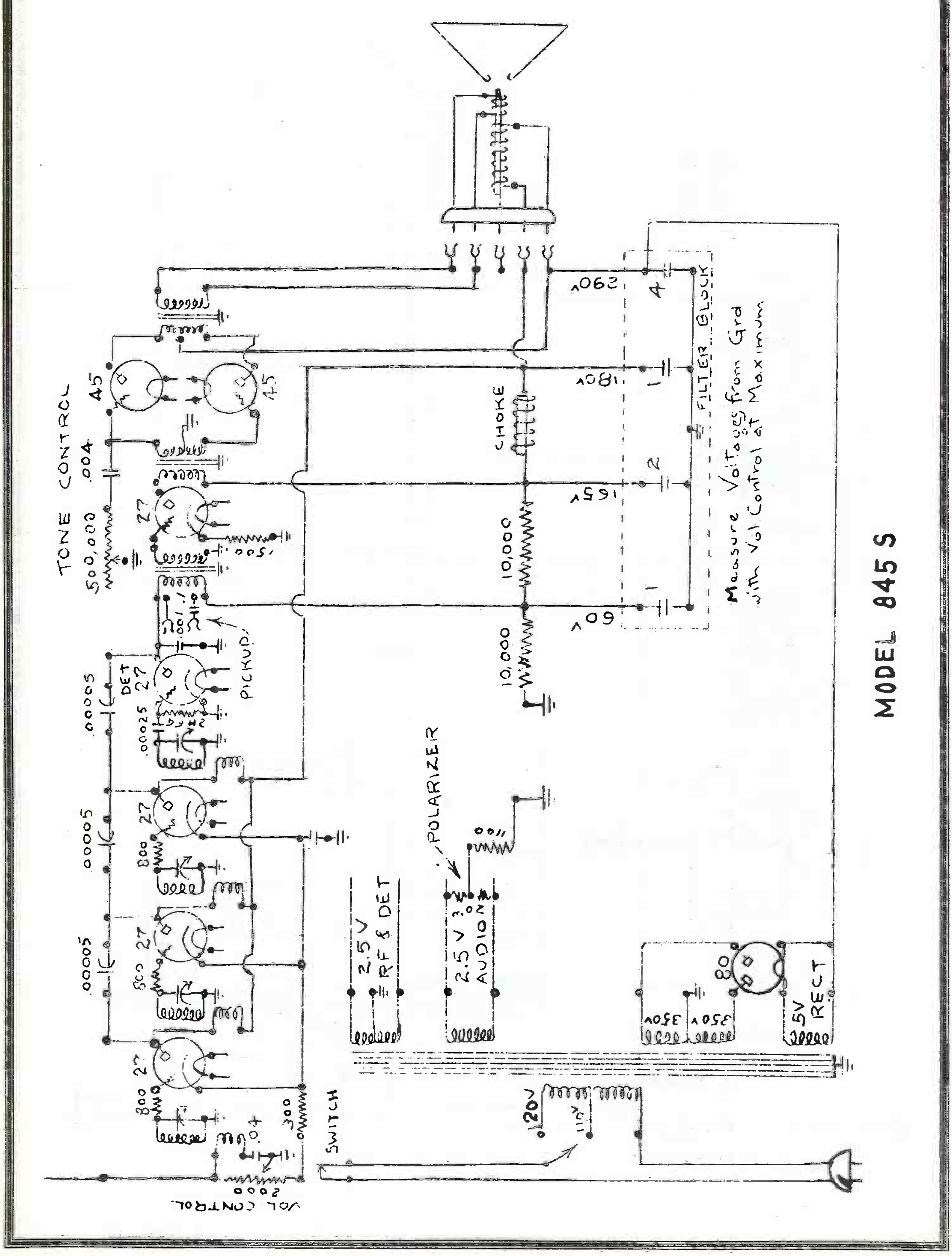


PHILADELPHIA STORAGE BATTERY CO.

Models 70 and 70-A Receivers

(Above Serial No. B-22,000)

Model 70 Receivers are for operation on 100-130 volt, 50-60 cycle AC lines
Model 70A Receivers are for operation on 100-130 volt, 25-60 cycle AC lines

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

Tube		Filament Volts	Plate Volts	Control Grid Volts	Screen Grid Volts	Cathode Volts	Plate Milli-amperes
Type	Circuit						
35	R. F.	2.25	250	5	70	6	4.3
24	OSC & 1st Det.	2.25	250	8	12	8	.5
35	I. F.	2.25	250	20	70	0	1.7
27	Rectifier Detector	2.25	...	0	0	0	0
35	Audio Amplifier	2.25	50	0	60	0	1.0
47	Output	2.25	240*	4*	255*	.	28*
80	Rectifier	4.70	260/plate	..	...	.	...

*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.

Table 2—Power Transformer Voltages

Terminals	A.C. Volts	Circuit	Color
1–2	105 to 125	Primary	White
3–5	2.5	Filament of 24 and 35's	Black
6–8	2.5	Filament of 47	Dark Green
9–10	5.	Filament of 80	Blue
11–13	700	Plates of 80	Yellow
4	...	Center Tap of 3–5	Black, Yellow Tracer
7	...	Center Tap of 6–8	Black, Green Tracer
12	...	Center Tap of 11–13	Yellow, Green Tracer

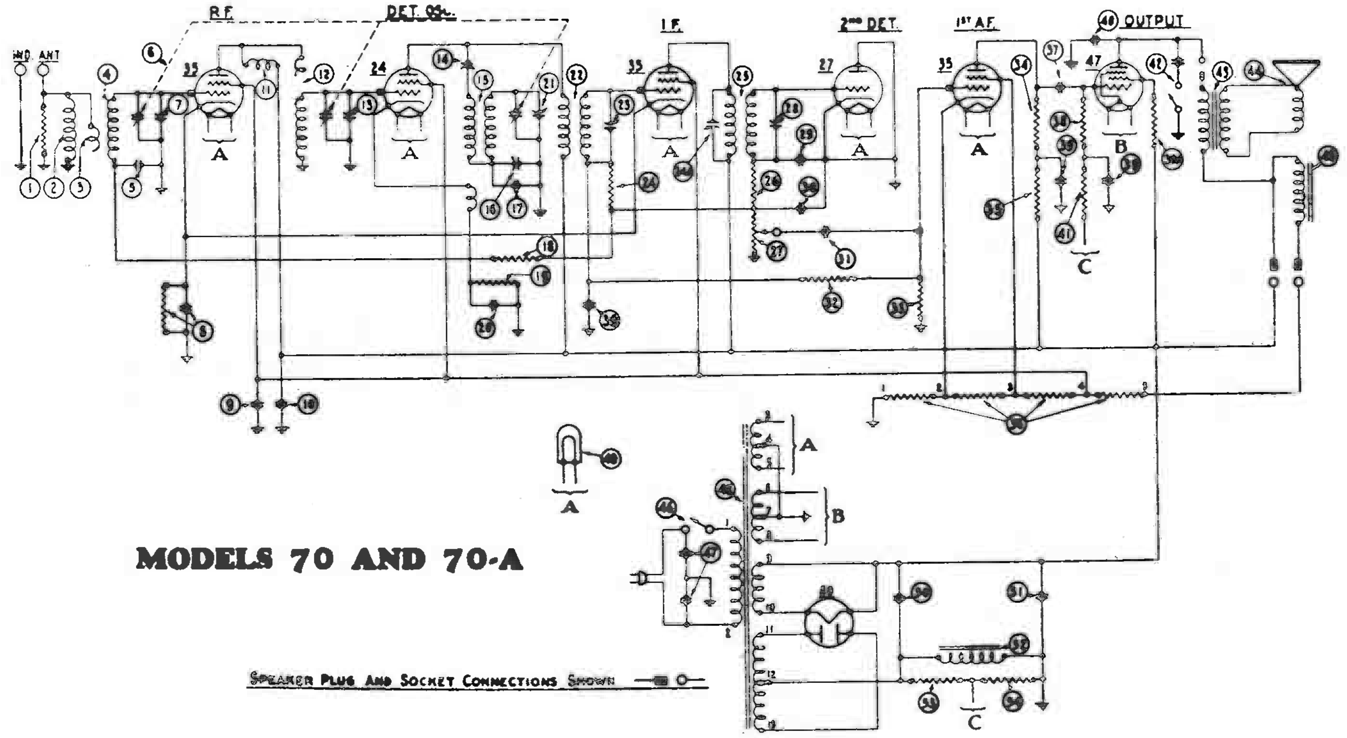
Table 3—Condenser Data

Nos. on Figs. 1 and 2	Capacity (mfd.)	Container
29 26	.00011	Blue and Yellow
17	.00041	Yellow and Orange
20	.0007	White and Yellow
6	.003	Orange and White
31 37 40	.01	Black Bakelite
47	.015 (Double)	Black Bakelite
5 10	.05	Black Bakelite
30	.05, .25, 1.5	Metal
8	.09 & 200 Ohms	Black Bakelite
9	.5	Metal
50 51 (50-60 cycles)	6	Electrolytic
51 (25-40 cycles)	10	Electrolytic
50 (25-40 cycles)	14	Electrolytic

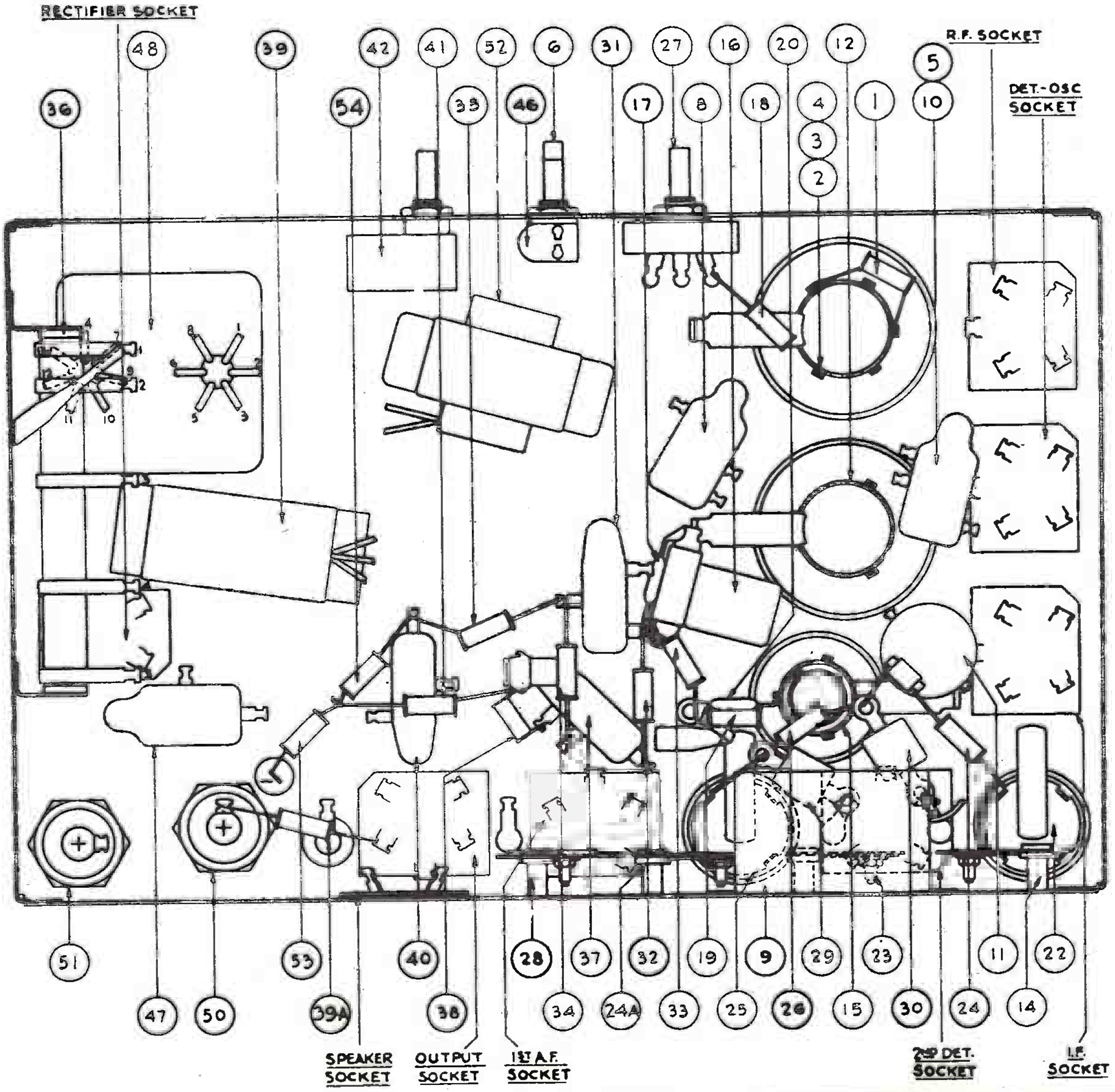
Table 4—Resistor Data

Nos. on Figs. 1 and 2	Power (watts)	Resistance (ohms)	Color		
			Body	Tip	Dot
36	Terminals 1-2, 2-3, 3-4, 4-5	26, 850, 1650, 1060	Long Tubular		
2	.5	1,000	Brown	Black	Red
20A	.5	2,900	Red	White	Red
1 19	.5	10,000	Brown	Black	Orange
35	.5	25,000	Red	Green	Orange
53	.5	51,000	Green	Brown	Orange
34	.5	70,000	Violet	Black	Orange
28	.5	99,000	White	White	Orange
41	.5	330,000	Red	Yellow	Yellow
25 54	.5	490,000	Yellow	White	Yellow
33	.5	1,000,000	Brown	Black	Green
18 24	.5	2,000,000	Red	Black	Green
32	.5	4,000,000	Yellow	Black	Green

PHILADELPHIA STORAGE BATTERY CO.



MODELS 70 AND 70-A



PHILADELPHIA STORAGE BATTERY CO.

Model 90

(Serial Nos. B-32,001 to B-35,000 and Above B-53,100)

Model 90 receivers are for operation on 100 to 130 volt, 50-60 cycle AC lines. This receiver is a nine tube superheterodyne with push-pull pentode output. Automatic volume control, 4 point tone control, super control screen grid tubes and combination first detector and oscillator tube are some of the additional features. The maximum power consumption is 100 watts.

Table 1—Tube Socket Readings Taken with A.C. Set Tester—A.C. Line 115 Volts

Tube		Filament Volts	Plate Volts	Control Grid Volts	Screen Grid Volts	Cathode Volts	Plate Milli-Amperes
Type	Circuit						
35	R.F.	2.5	225	0	38	6	4.2
24	Det.-Osc.	2.5	215	12	40	22	.5
35	I.F.	2.5	235	10	38	10	1.0
27	Det. Rectifier	2.5	...	...	...	10	...
27	Det. Amplifier	2.5	50	0	...	1.	1.0
27	1st Audio	2.5	90	0	...	1.	5.0
47	Output	2.5	210	10	225	...	31.
47	Output	2.5	210	10	225	...	31.
80	Rectifier	5.0	225/plate	...	...	...	...

Above readings taken with volume control at maximum and dial turned to low frequency end.

Table 2—Power Transformer Voltages

Terminals Figs. 1 and 2	A.C. Volts	Circuit	Color
1–2	115	Primary	White
4	...	Center Tap Heater	Black, Yellow Tracer
3–5	2.5	Heater	Black
6–8	2.5	Filament 47's	Dark Green
7	...	Center Tap Filament 47's	Black, Green Tracer
9–10	5.0	Filament 80	Light Blue
11–13	665	Plates 80	Yellow
12	...	Center Tap Plates 80	Yellow, Green Tracer

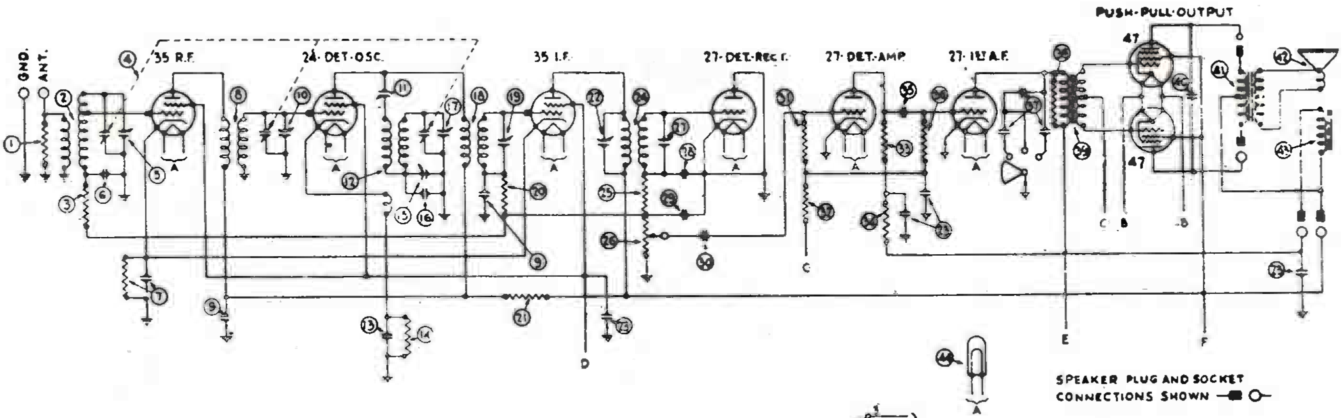
Table 3—Condenser Data

Nos. on Figs. 1 and 2	Capacity (Mfd.)	Container
28 29	.00011	Blue and Golden Yellow
16	.00041	Yellow and Orange
13	.0007	White and Golden Yellow
40	.001	Green and White
30 35	.01	Black Bakelite
45	.015	Black Bakelite
6	.05	Black Bakelite
8	.09	Black Bakelite
7	.09 & 200 Ohms	Black Bakelite
50	.15	Black Bakelite
23	2-.25, 2-.5	Metal
46	6.	Electrolytic
51	6.	Electrolytic

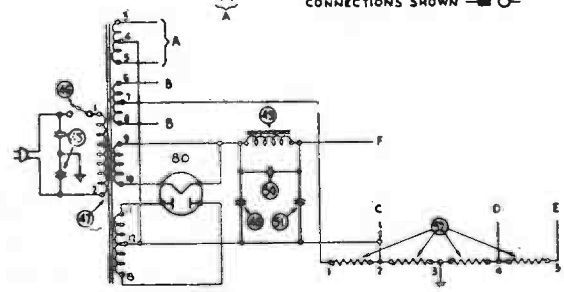
Table 4—Resistor Data

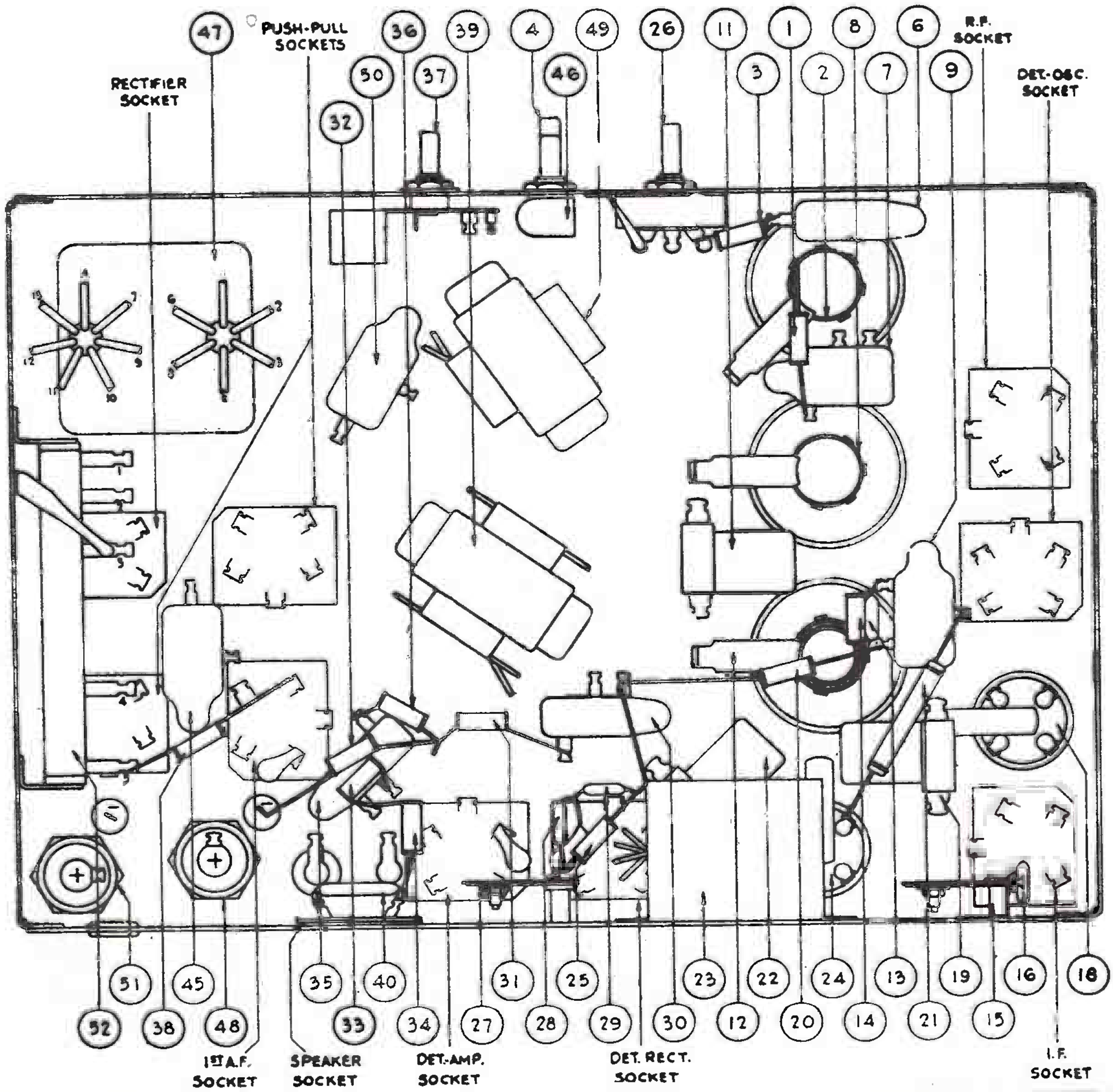
Nos. on Figs. 1 and 2	Power (Watts)	Resistance (Ohms)	Color		
			Body	Tip	Dot
52	(Terminals) 1–2	205	Long	Tubular	
	2–3	95			
	3–4	2,400			
	4–5	1,200			
21	1.	1,000	Brown	Black	Red
1	.5	10,000	Brown	Black	Orange
14	.5	15,000	Brown	Green	Orange
33 34	.5	25,000	Red	Green	Orange
38	.5	51,000	Green	Brown	Orange
25	.5	99,000	White	White	Orange
32	.5	490,000	Yellow	White	Yellow
3 20 31 36	.5	1,000,000	Brown	Black	Green

PHILADELPHIA STORAGE BATTERY CO.

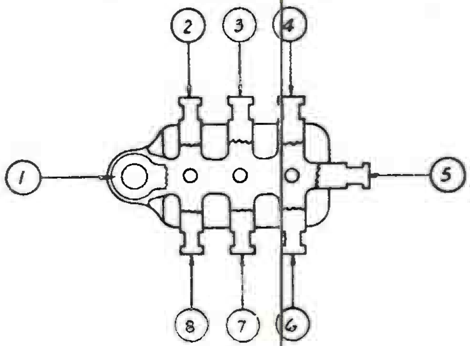


PHILCO MODEL 90





PHILADELPHIA STORAGE BATTERY CO.



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 arrangements and the tables list the lug numbers.

Conaenser 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
3615-AA	.05	1-3-5-8	...	...	1-5
3615-AB	.05	1-4-7-8	...	...	1-4
3615-AC	.05	1-5-7-8	...	...	1-7
3615-AD	.05	3-5-8	...	...	3-5
3615-AE	.05	1-7-8	...	...	7-8
3615-AF	Twin .05	4-7-8	...	...	4-8 & 7-8
3615-AG	.05	1-3-5	...	...	1-5
3615-AH	.05	1-5	...	...	1-5
3615-AJ	Twin .05	1-3-6-8	...	...	1-3 & 1-6
3615-AK	.05	1-5-7-8	...	...	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
3793-J	.015	2-5-7	...	...	2-5
3793-K	Twin .015	1-3-5-8	...	...	1-3 & 1-5
3793-L	Twin .015	5-7-8	...	...	7-8
3793-M	Twin .015	5-7-8	...	...	5-8 & 7-8

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
3903-R	.01	4-7-8	...	...	4-7
3903-S	Twin .01	1-5-7	...	...	1-5 & 1-7
3903-T	.01	5-7-8	...	...	7-8
3903-U	.01	1-2-5-7	...	...	1-7
3903-W	.01	2-4-7	...	...	2-7
3903-X	.01	3-5-8	...	...	3-8
3903-Y	.01	3-5	...	...	3-5

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
4989-J	.09	3-5	...	...	3-5
4989-K	Twin .09	3-5	...	...	3-5
4989-L	.09	3-4-8	200	3-8	4-8
4989-M	Twin .09	4-7-8	...	...	4-8 & 7-8

PHILADELPHIA STORAGE BATTERY CO.

PHILCO RADIO CHASSIS DATA

	MODEL	TUBES 27	24	35	47	45	80	14	17	32	33	30	2	3	71A	SPEAKER Type	Cone Assembly	Field Assembly	Output Transformer	VOLUME CONTROL Part No.	Resistance (Ohms)	TONE CONTROL Part No.	2 Point	4 Point	Capacity (Mfd.)	POWER TRANSFORMER 50–60 Cycles	25–40 Cycles	50–60 230 Volts
Early Models	70 B.G.	1	4		1		1									K-3	02996	02987	2673	5039	5000 & 210	03140	✓		2-.01	5117	5118	5119
	70 H.B.	1	4		1		1									K-3	02996	02987	2673	5039	5000 & 210	03140	✓		2-.01	5117	5118	5119
	210	1	4		1		1									K-3	02996	02987	2673	5039	5000 & 210	03140	✓		2-.01	5117	5118	5119
	310	1	4		1		1									K-3	02996	02987	2673	5056	5000 & 210	03168	✓		2-.01	5117	5118	5119
	410	2	5		1		1									K-4	02996	02987	2673	5039	5000 & 210	03140	✓		2-.01	5117 5906	5118 5923	5119 5924
	510	1	4		1		1									K-3	02996	02987	2673	5039	5000 & 210	03140	✓		2-.01	5117	5118	5119
Automatic Volume Control	70 B.G.	1	1	3	1		1									K-3	02996	02987	2673	6015	1,000,000	03637	✓		.01	5117	5118	5119
	70 H.B.	1	1	3	1		1									K-3	02996	02987	2673	6015	1,000,000	03637	✓		.01	5117	5118	5119
	210	1	1	3	1		1									K-3	02996	02987	2673	6015	1,000,000	03637	✓		.01	5117	5118	5119
	310	1	1	3	1		1									K-3	02996	02987	2673	6307	1,000,000	04652	✓		.01	5117	5118	5119
	410	2	2	3	1		1									K-4	02996	02987	2673	6015	1,000,000	03637	✓		.01	5117 5906	5118 5923	5119 5924
	510	1	1	3	1		1									K-3	02996	02987	2673	6015	1,000,000	03637	✓		.01	5117	5118	5119
Push Pull 45's	90 B.G.	2	4			2	1									K-2	02996	02987	2766	5039	5000 & 210	03137		✓	.015, 2-.01	4938	4939	4940
	90 L.B.	2	4			2	1									H-2	02874	02988	2766	5039	5000 & 210	03137		✓	.015, 2-.01	4938	4939	4940
	90 H.B.	2	4			2	1									H-2	02874	02988	2766	5039	5000 & 210	03137		✓	.015, 2-.01	4938	4939	4940
Single Pentode	90 B.G.	4	3		1		1									K-3	02996	02987	2673	5724	500,000	03137		✓	.015, 2-.01	5362	5363	5364
	90 L.B.	4	3		1		1									H-3	02874	02988	2673	5724	500,000	03137		✓	.015, 2-.01	5362	5363	5364
	90 H.B.	4	3		1		1									H-3	02874	02988	2673	5724	500,000	03137		✓	.015, 2-.01	5362	5363	5364
	490	5	4		1		1									K-4	02996	02987	2673	5724	500,000	03137		✓	.015, 2-.01	5362 5906	5363 5923	5364 5924
Push Pull Pentode	90 B.G.	3	1	2	2		1									K-5	02996	02987	2635	6015	1,000,000	03137		✓	.015, 2-.01	6072	6073	6074
	90X	3	1	2	2		1									H-6	02874	02988	2635	6015	1,000,000	03137		✓	.015, 2-.01	6072	6073	6074
	490	4	2	2	2		1									K-8	02996	02987	2635	6015	1,000,000	03137		✓	.015, 2-.01	6072 5906	6073 5923	6074 5924
Push Pull 45's	112	4	4			2	1									H-2	02874	02988	2766	4093	500,000	03137		✓	.015, 2-.01	4446	4447	4595
	212	4	4			2	1									H-2	02874	02988	2766	4093	500,000	03137		✓	.015, 2-.01	4446	4447	4595
Push Pull Pentodes	112	4	4		2		1									H-6	02874	02988	2635	4093	500,000	03137		✓	.015, 2-.01	5594	5595	5596
	112X	4	4		2		1									H-6	02874	02988	2635	4093	500,000	03137		✓	.015, 2-.01	5594	5595	5596
	212	4	4		2		1									H-6	02874	02988	2635	4093	500,000	03137		✓	.015, 2-.01	5594	5595	5596
	50 B.G.		3		1		1									P-2	02861*	02942	2660	5232	1750					5266	5267	5268
	50 L.B.		3		1		1									S-2	02887**	02942	2660	5232	1750					5266	5267	5268
	51 B.G.		2	1	1		1									P-2	02861	02942	2660	5839	5000					5266	5267	5268
	51 L.B.		2	1	1		1									S-2	02887	02942	2660	5839	5000					5266	5267	5268
	551		2	1	1		1									P-2	02861*	02942	2660	5839	5000					5266	5267	5268
	4	1	1				1																			5785	5786	5787
	46 B.G.							3	1				1	1 (E)	2	N-2	02996	02924	2766	4141	1750							
	46 H.B.							3	1				1	1 (E)	2	N-2	02996	02924	2766	4141	1750							
	35 B.G.									3	1	3				R-2	02887**		2646	5317	5000 (Dual)	03637	✓		.01			
	35 H.B.									3	1	3				R-2	02887**		2646	5317	5000 (Dual)	03637	✓		.01			

*Used with spacer washer 3316 and mounting screw W-161 when replacing cone assembly 02970.
**Used with spacer washer 2616 and mounting screw W-161 when replacing cone assembly 02949.

PHILADELPHIA STORAGE BATTERY CO.

Checking I. F. Oscillator Calibration

Any oscillator which is not crystal controlled particularly those which are battery operated and portable, should be checked from time to time for correct frequency calibration. The calibration can be appreciably affected by rough handling of the oscillator while it is being moved about, and by the condition of the tubes and batteries. If an oscillator is in constant daily use, it should be checked two or three times a week and any necessary adjustment made to correct errors in calibration.

One of the most accurate and convenient methods of making this check is through the use of the signals from reliable broadcasting stations. Most of the better class stations have accurate crystal controlled frequency regulation which assures broadcasting on the assigned frequency. Intermediate frequency oscillators can be checked with the aid of broadcast signals in the following manner:

175 KC Intermediate Frequency Oscillator Check—Place radio set in operation, and tune it accurately to a station broadcasting on any of the following frequencies: 700, 1050, or 1400 KC. When a station is heard at any one of these three points, disconnect the antenna and substitute a connection to the output of the oscillator. Place the oscillator in operation at 175 KC. If the oscillator is calibrated correctly, its signal should be heard on the receiver without changing the tuning of the broadcast receiver in any way. If it is necessary to re-tune the set before the oscillator signal can be heard at maximum volume for the particular setting of the attenuator and the radio set volume control, the oscillator is off calibration. Its compensating condenser should be re-adjusted until the signal is heard at exactly 700, 1050, and 1400 KC. (These frequencies are the fourth, sixth, and eighth harmonics of 175 KC.) In the Philco Oscillator Model 095, this compensating condenser is the one nearer the 175 KC switch position.

260 KC Intermediate Frequency Oscillator Check—Proceed in the same manner as for the 175 KC check described above, but tune the broadcast receiver to a signal at 780, 1040, or 1300 KC. Remove the antenna and substitute the connection from the oscillator, the latter being in operation at 260 KC. Check in the same manner as for 175 KC, making any necessary adjustments of the 260 KC compensating condenser so as to make the oscillator signal heard at 780, 1040, or 1300 KC. (Third, fourth, and fifth harmonics, respectively of 260 KC). In the Philco 095 oscillator, this compensating condenser is nearer the 260 KC switch position.

POWER CONSUMPTION OF PHILCO MODELS

A number of requests have been received for information on the power consumption of various Philco Receivers. The table below lists the different instruments with the power consumption in watts of each.

Model	Watts	Model	Watts
511	75 A.C.	211	135 "
65	95 "	70	80 "
86	90 "	90	95 "
87	95 "	112	105 "
76	95 "	212	135 "
77	95 "	270	100 "
95	105 "	40	210 D.C.
96	105 "	41	210 D.C.
296	145 "	41-E	420 "
20	75 "	42	210 "
220	100 "	42-E	420 "
111	105 "	46	42 "

The power consumption of the 25 cycle models is the same as that of the 60 cycle models. Instruments rated at 230 volts consume the same power as those rated at 110 volts.

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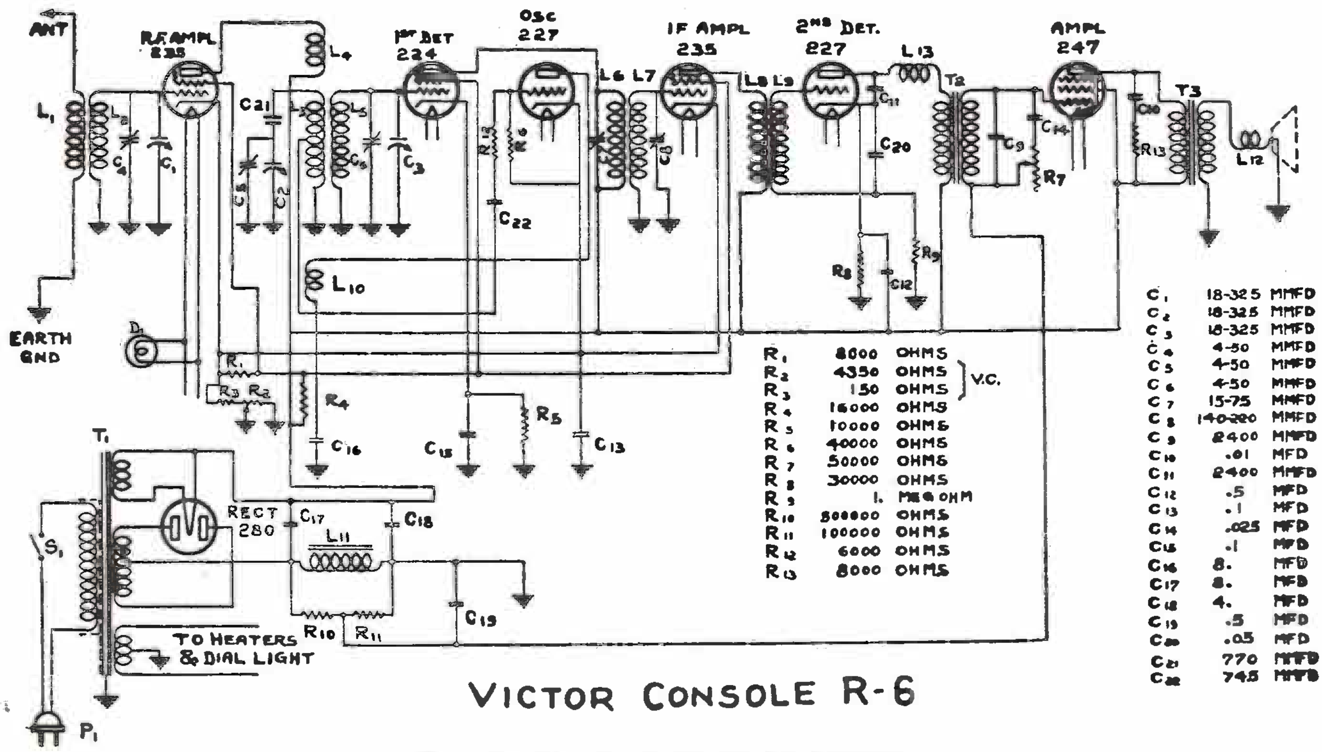


Figure 1—Schematic Diagram for 7-tube Receiver

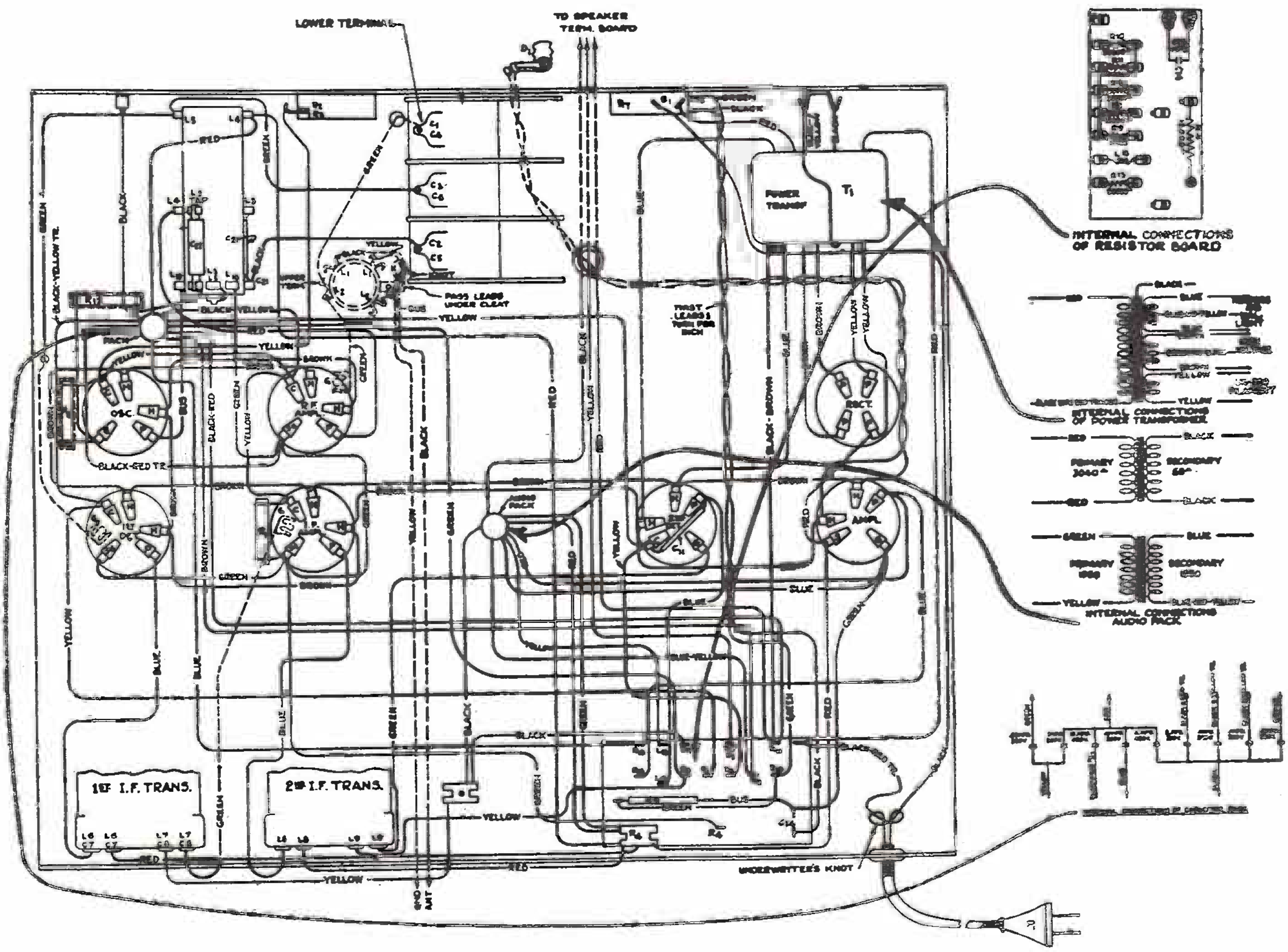


Figure 2.—Wiring Diagram for 7-tube Receiver

RCA-VICTOR, INC.
SERVICE NOTES
for
Victor Radio R-12

Victor Console, R-12 is a nine tube Super-Heterodyne Radio Receiver providing excellent performance in all the features incorporated in modern radio broadcast receivers.

Automatic volume control, push-pull Pentode output stage, tone control, calibrated kilocycle dial, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are some of the features of this receiver. Referring to Figure 1, the schematic circuit diagram, and tracing a signal through the various stages, we find the following action taking place.

The first tube is the tuned R. F. stage. This is the new Super Control Screen Grid Radiotron, UY-235. The outstanding feature of this Radiotron is that due to its grid potential plate current curve having a constant rate of curvature, cross modulation, moduation distortion, and hum modulation effects are eliminated from the receiver. Also it is very adaptable to automatic volume control action due to its characteristics that preclude the necessity of a local distant switch. The control grid bias for this Radiotron is varied by means of the automatic volume control tube.

The output of this circuit is coupled inductively to the grid coil of the first detector. At this point the oscillator should be considered as its output is also coupled inductively to the grid coil of the first detector. This is a tuned grid circuit oscillator using a Radiotron UY-227, and having a closely coupled plate coil that gives sufficient feed-back 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 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 UY-235 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 automatic volume control functions in the usual manner in that the signal voltage is applied to its grid and the voltage drop across a resistor in the plate circuit is the grid voltage applied to the I. F. and R. F. stages. As the value of the plate current is a direct result of the signal 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 signal output of the I. F. stage is always maintained at a constant value.

The volume control should now be considered as its position in the circuit has a large bearing on the quiet and smooth action of this receiver.

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.

The second detector is a high-plate voltage, grid-biased type, using Radiotron UY-227, which gives sufficient output to drive two Radiotrons UY-247 connected in push-pull without an intermediate audio stage. 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 power tubes while the R. F. current is by-passed and not further used.

A grid filter consisting of a 1 megohm resistor (R-13) in the second detector circuit and a 0.5 megohm resistor (R-4) in the R.F. circuit helps to reduce any possible hum in these stages. The power A. F. stage consists of two Radiotrons UY-247 connected in push-pull. Transformer coupling is used between the detector and the grids of the Radiotrons UY-247 as well as from the plates to the cone coil of the reproducer unit.

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 UY-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.

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 UY-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.

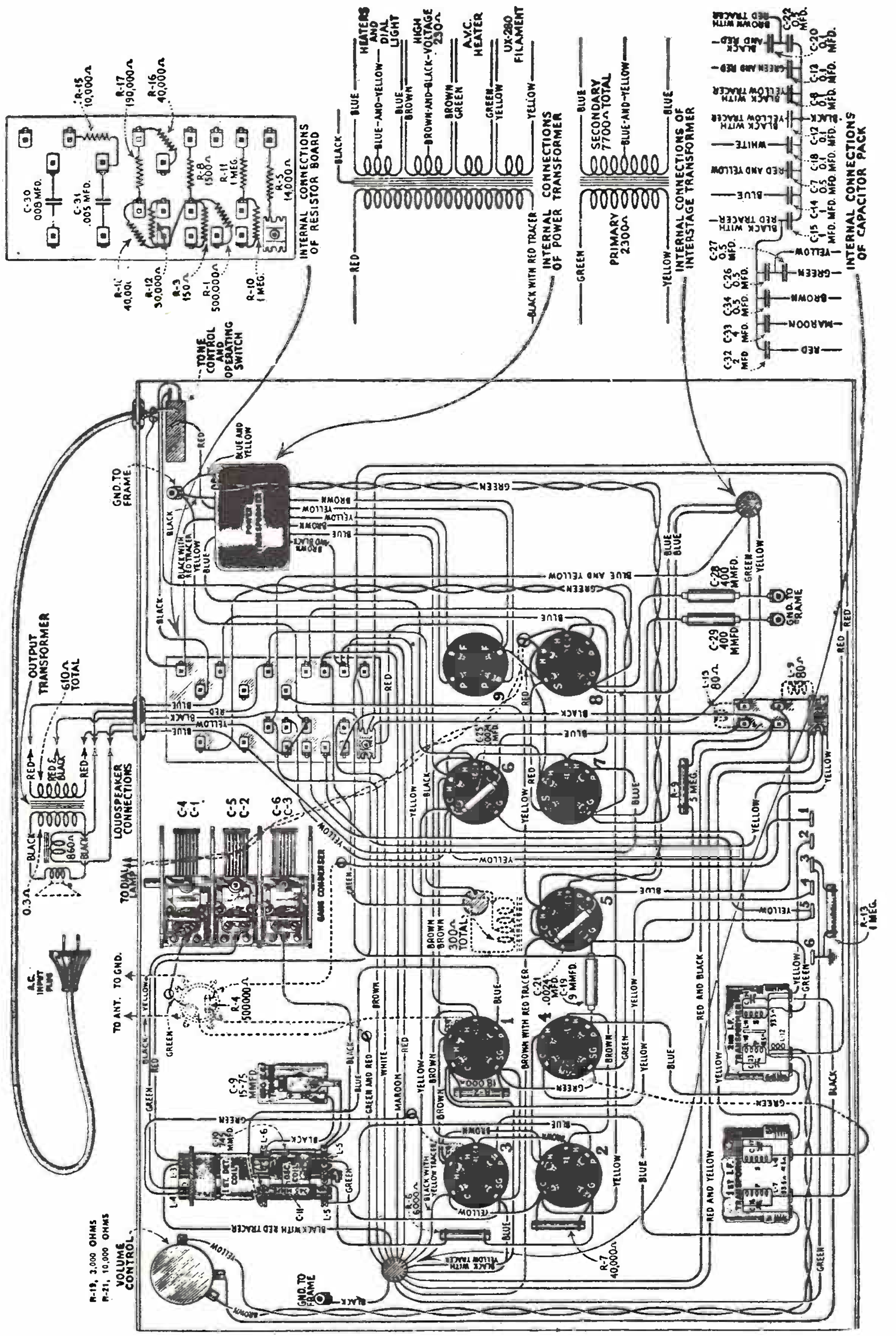
SERVICE DATA

Information pertaining to general service data for this type receiver may be obtained from the Service Notes already issued on the Victor Radio Superette. Figure 1 shows the schematic diagram, Figure 2 the proper connections for attaching a magnetic pickup to the R-12 and Figure 3 the wiring diagram. The voltage readings and replacement parts are shown on page 3.

R. F. OSCILLATOR AND I. F. ADJUSTMENTS

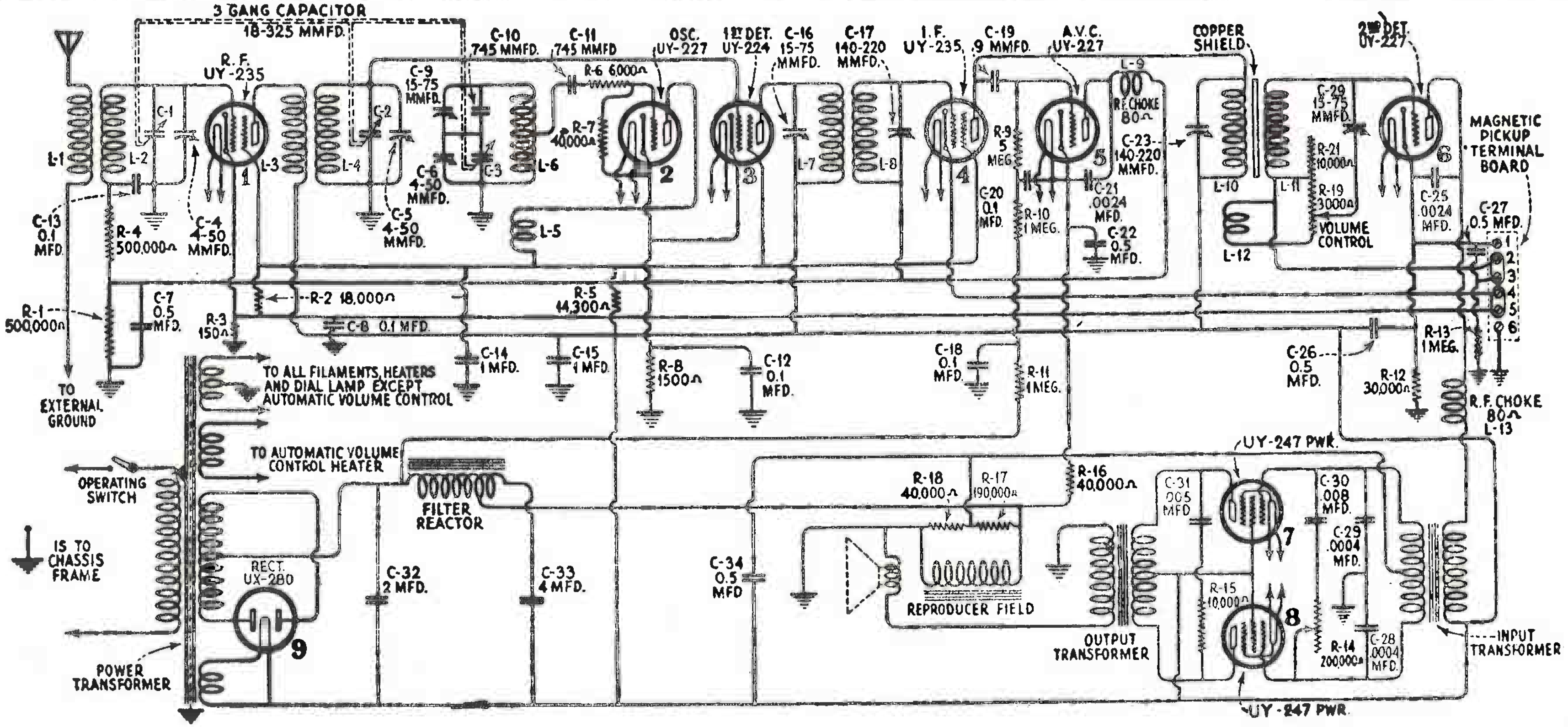
A reference to the Victor Radio Superette Service Notes will give the details for making correct R. F., I. F. and Oscillator adjustments. However, due to the use of an automatic volume control tube, its action will defeat the use of an output meter. To overcome this, a "dummy" Radiotron UY-227 (one that 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.

RCA-VICTOR, INC.



Wiring Diagram of Model R-12.

RCA-VICTOR, INC.



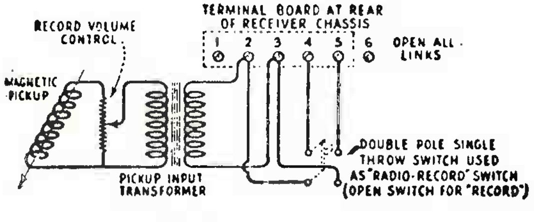
RADIOTRON SOCKET VOLTAGES

110 VOLT A. C. LINE

(Volume Control Setting Does Not Effect 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	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.



Magnetic Pickup Connections.

RCA-VICTOR, INC.

SUPPLEMENT

to

VICTOR RADIO R-12 SERVICE NOTES

Late production of the Victor Radio R-12 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.

Figure 1 shows the revised schematic diagram and Figure 2 the wiring diagram.

The replacement parts listed and supplied are entirely interchangeable with either the old or new models. In the case of the older models, however, the additional black lead supplied in the new capacitor pack should be joined to the old black ground lead. All other capacitor leads are exactly the same and are soldered to the same points.

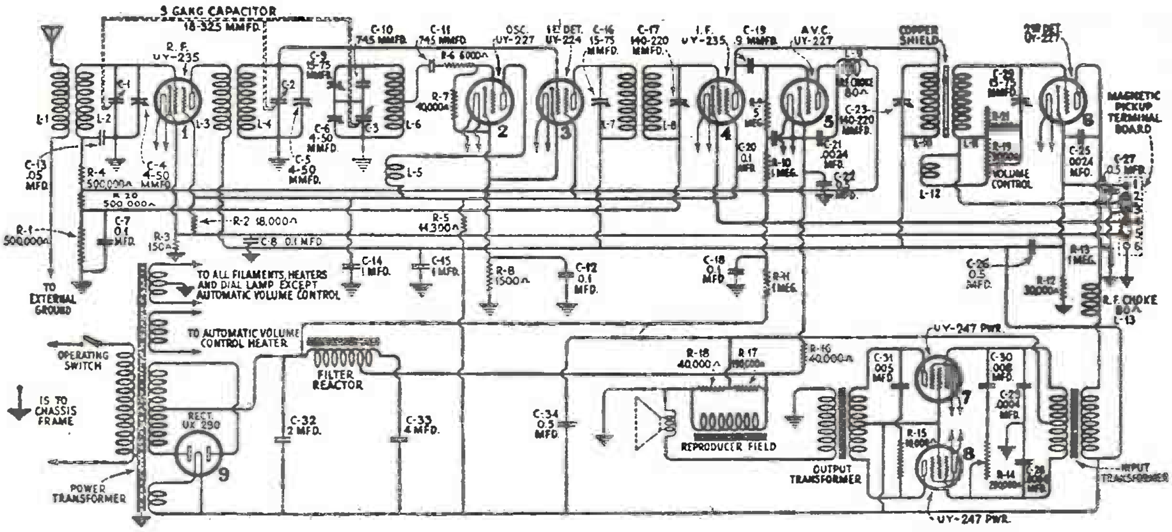


Figure 1—Revised Schematic diagram of late production R-12

RCA-VICTOR, INC.

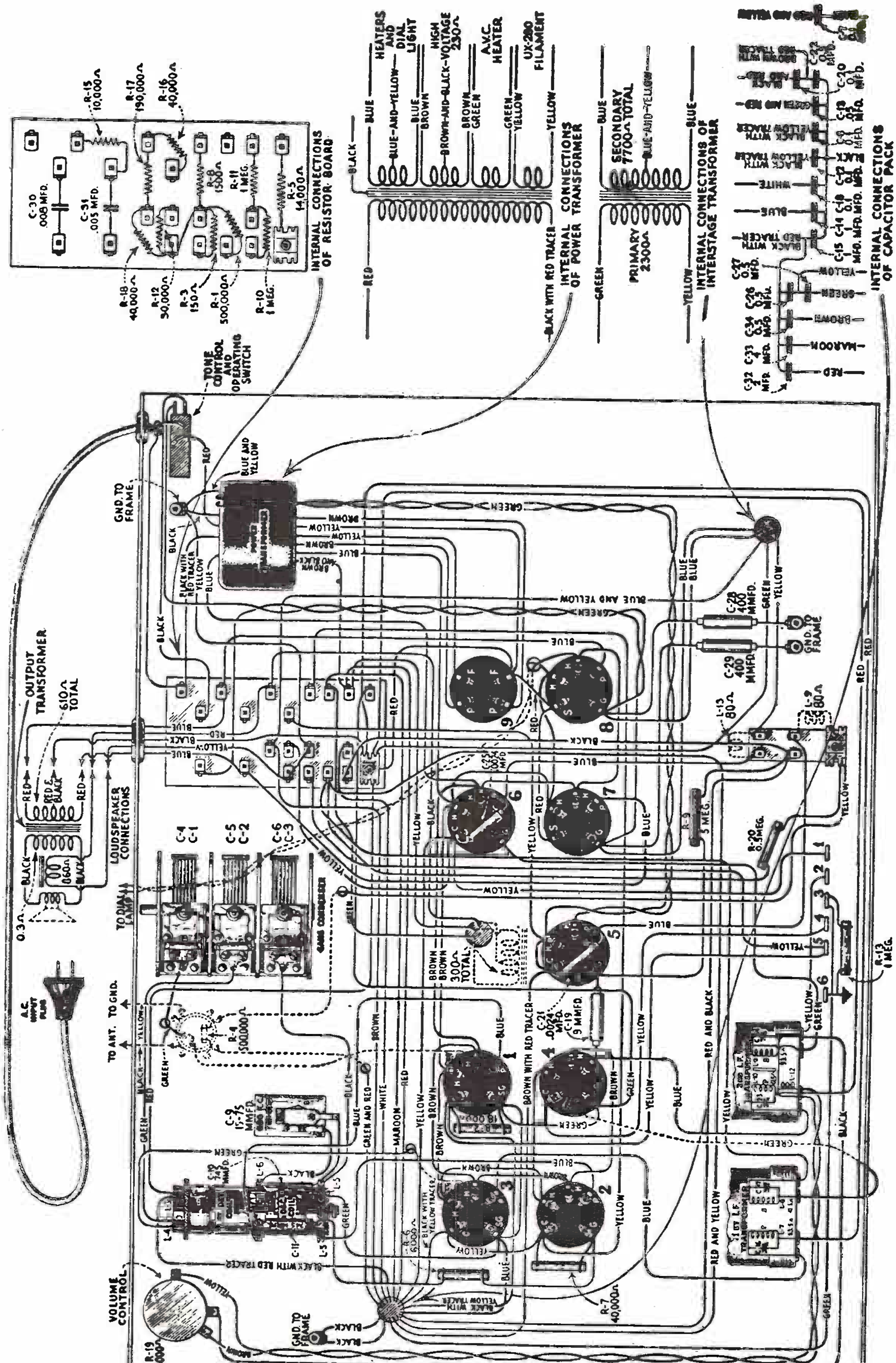


Figure 2—Wiring diagram of late production R-12

RCA-VICTOR, INC.

SERVICE NOTES for VICTOR RADIO R-20 and R-21

The Victor Radio R-20 and R-21 are ten tube screen grid automatic volume control Super-Heterodyne radio receivers. With the exception of the Audio Transformer, Speaker and Cabinet both models are identical.

Features of these Models are. Super Control Screen Grid Radiotrons in the R. F. and I. F. stages, automatic volume control so arranged in the circuit to reduce noise between channels, push-pull Pentode output stage, accurately calibrated dial reading directly in kilocycles, totally shielded chassis and sensitivity, selectivity and fidelity superior to any previous Victor receiver.

Referring to Figure 1 and tracing a signal through the various stages, we find the following action taking place.

The signal voltage, indeuced into the antenna system, is coupled by means of the antenna coil to the tuned circuit of the "link circuit." The link circuit tunes exactly with the tuned R. F. and first detector circuits. There is no gain in the circuit, it being merely a selection circuit.

A tuned R. F. stage follows which uses Radiotron UY-235. The control grid bias for this tube is a function of the automatic volume control tube. The output is coupled inductively to the first detector grid circuit together with the output from the oscillator.

The first detector is tuned by one unit of the gang condenser. In its grid circuit, there is present the incoming signal and the oscillator signal, the latter being at a 175 K. C. higher than the former. The tube 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 tube used as a first detector is Radiotron UY-224.

The next circuit is that of the first I. F. stage. It is a high gain Amplifier having both its grid and plate circuits tuned to 175 K. C. Its grid voltage is controlled by the automatic volume control tube.

At this point the automatic volume control tube should be considered as its grid is controlled by the output from the first I. F. Stage.

The automatic volume control tube functions in the usual manner in that the signal voltage is applied to its grid and the voltage drop across a resistor in its plate circuit is the grid voltage applied to the R. F. and first I. F. amplifier. As the value of the plate current is a direct result of the signal 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 R. F. and I. F. stage. This results in less sensitivity and vice versa. The signal output of the first I. F. stage is always maintained at a constant value.

The volume control should now be considered as its position in the circuit has a large bearing on the quiet and smooth action of the receiver.

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 I. F. Amplifier. By means of it the signal voltage applied to the second I. F. amplifier 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 placed 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.

The second detector is a high-plate voltage, grid-biased type, using Radiotron UY-227, which gives sufficient output to drive two Radiotrons UY-247 connected in push-pull without an intermediate audio stage. 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 power tubes while the R. F. current is by-passed and not further used.

A grid filter consisting of a 1 megohm resistor in the second detector circuit helps to reduce any possible hum in these stages. The power A. F. Stage consists of two Radiotrons UY-247 connected in push-pull. Transformer coupling is used between the detector and the grids of the Radiotron UY-247 as well as from the plates to the cone coil of the reproducer unit.

A tone control, consisting of an inductor .01 mfd. Capacitor and a 0.5 meg. variable resistor is in the plate circuit of the second detector. The tone control functions to reduce the high frequency output as the resistance is reduced, without accentuating the bass response. The two 0.0004 mfd. condensers, connected in series with their mid-point grounded are connected across the secondary of the imput transformer. The purpose of these condensers is to prevent audio oscillations and provide a high frequency audio cut-off.

A 0.005 mfd. condenser connected in series with an 18,000 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 of Radiotrons UY-247 is obtained by using a portion of the drop across the reproducer field. One 100,000 and 20,000 ohm resistors act as the voltage dividing resistors.

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. Figure 1 shows the schematic diagram.

R. F. OSCILLATOR AND I. F. ADJUSTMENTS

A reference to the Victor Radio 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.

In the Model R-20 and R-21 the I. F. transformers are adjusted for maximum output and no attempt at band pass tuning should be made when these adjustments are made.

RCA-VICTOR, INC.

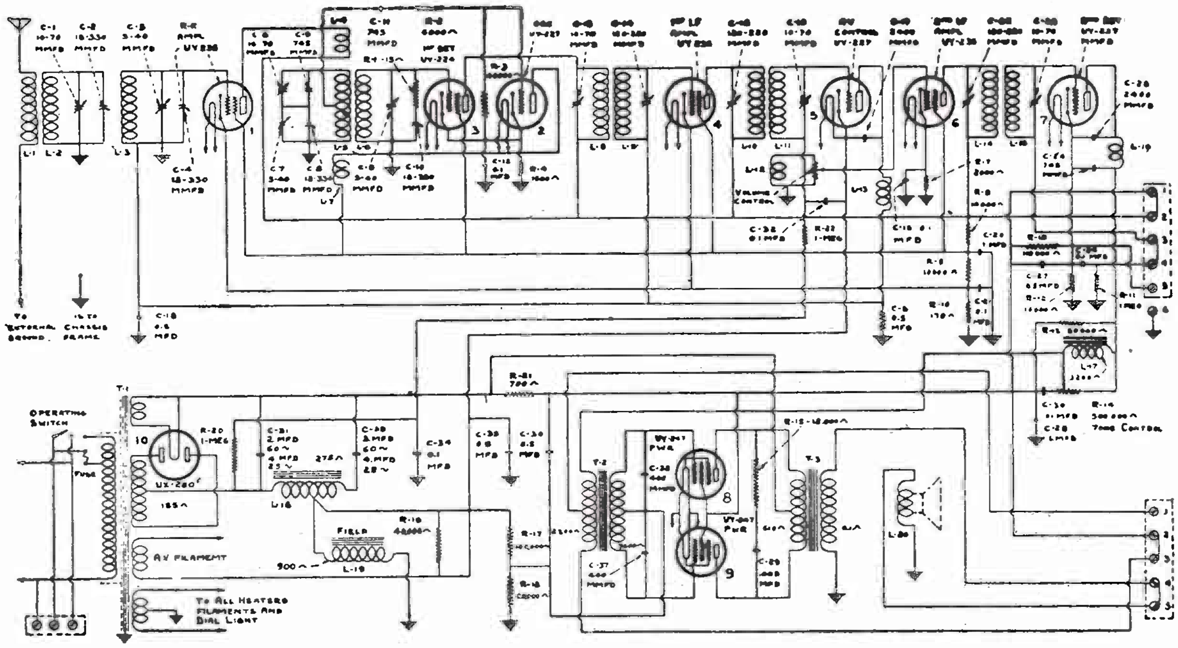
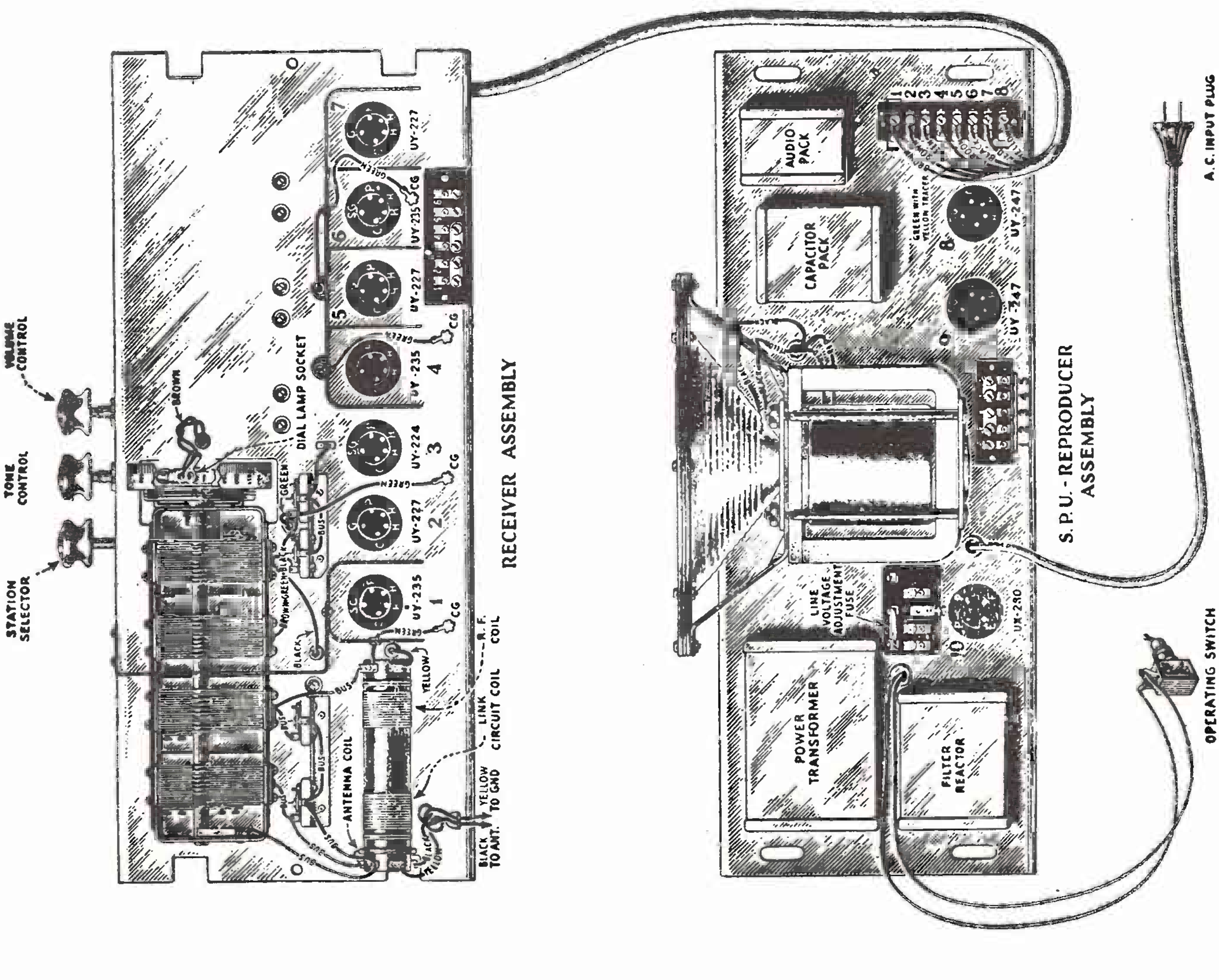


Figure 1 - Schematic Wiring Diagram.



RCA-VICTOR, INC.

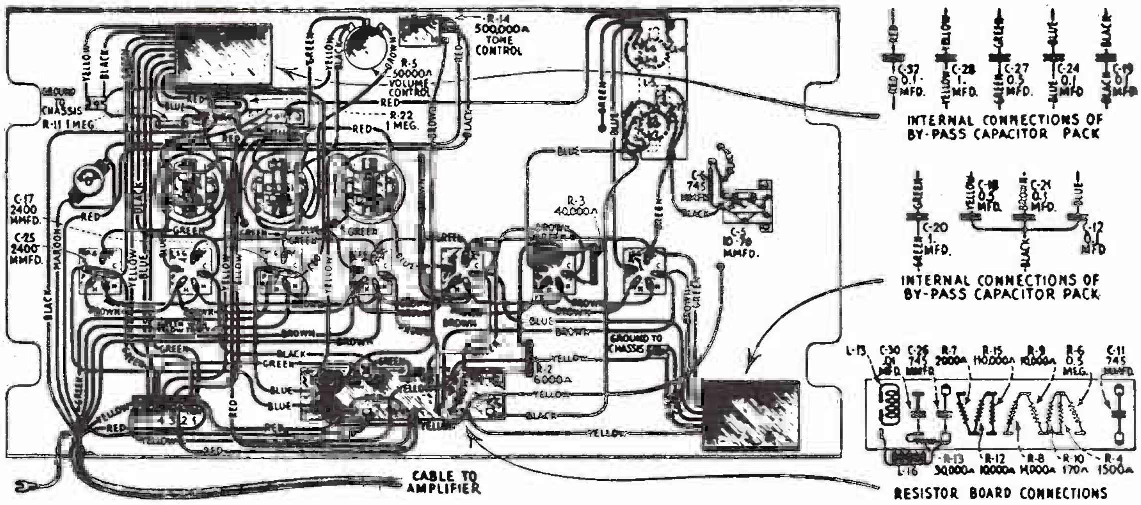


Figure 2—Receiver Assembly Wiring Diagram

RADIOTRON SOCKET VOLTAGES

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	58	210	3.0	2.5
2—Osc.	5.0	0	—	50	3.5	2.5
3—1st Det.	4.0	3.5	55	210	1.1	2.5
4—1st I.F.	2.0	*0.2	58	210	3.0	2.5
5—A.V.C.	0	0	—	30	0.1	2.5
6—2nd I.F.	2.0	3.5	55	210	2.0	2.5
7—2nd Det.	20.0	*8.0	—	190	0.5	2.5
8—Pwr.	—	*10.0	230	215	25.0	2.5
9—Pwr.	—	*10.0	230	215	25.0	2.5

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

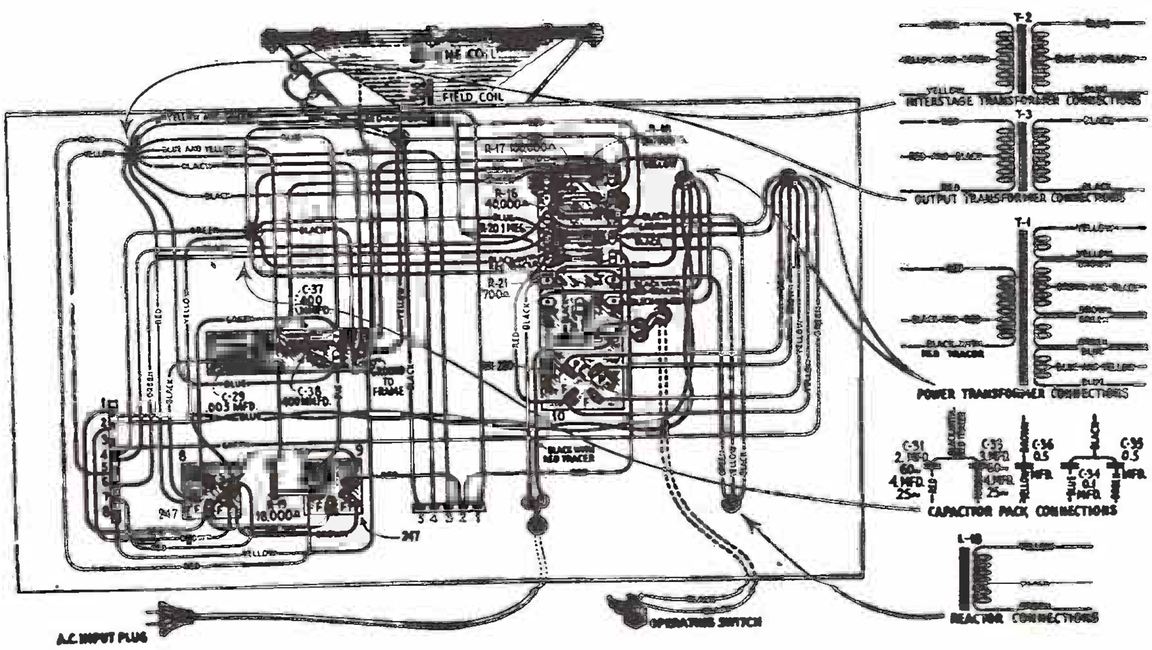
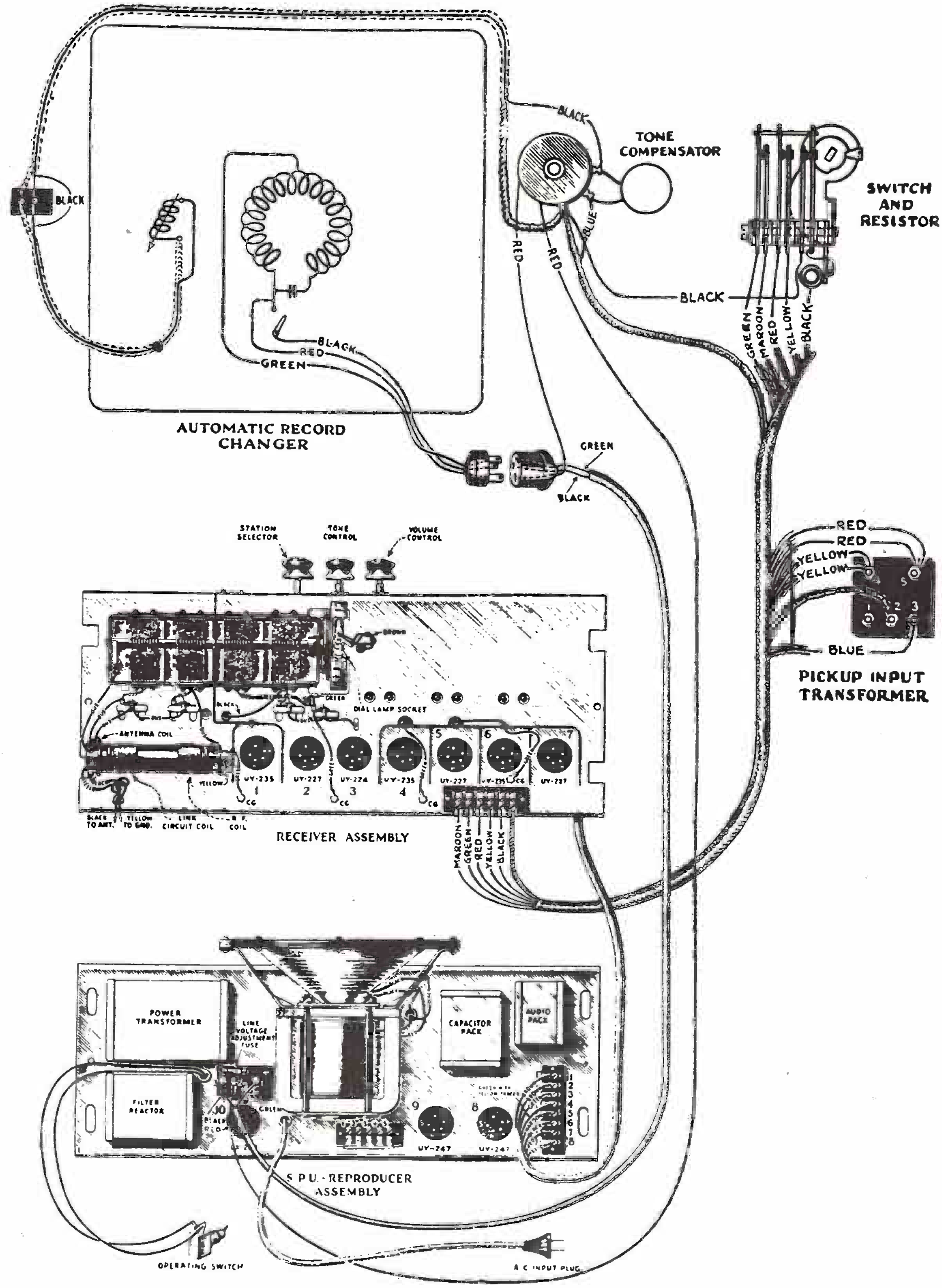


Figure 3—S.P. U. Reproducer Assembly Wiring

RCA-VICTOR, INC.



RCA-VICTOR, INC.

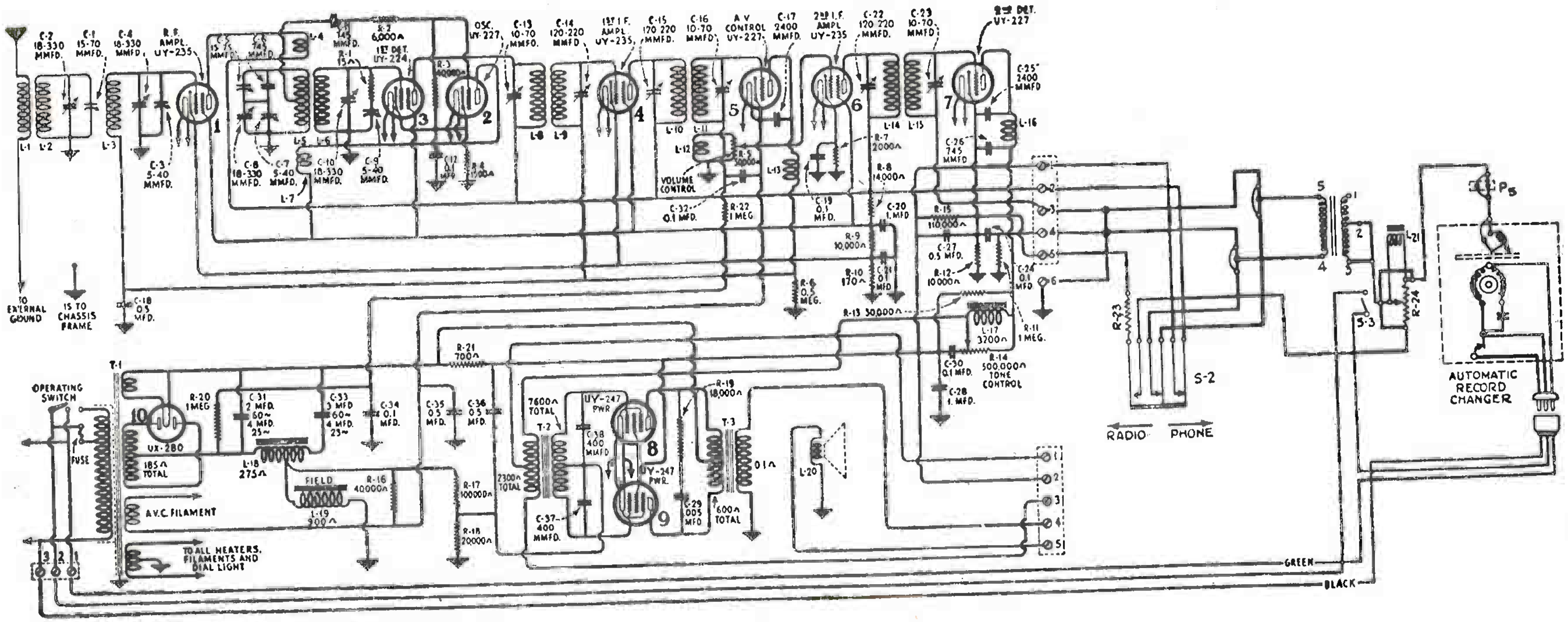
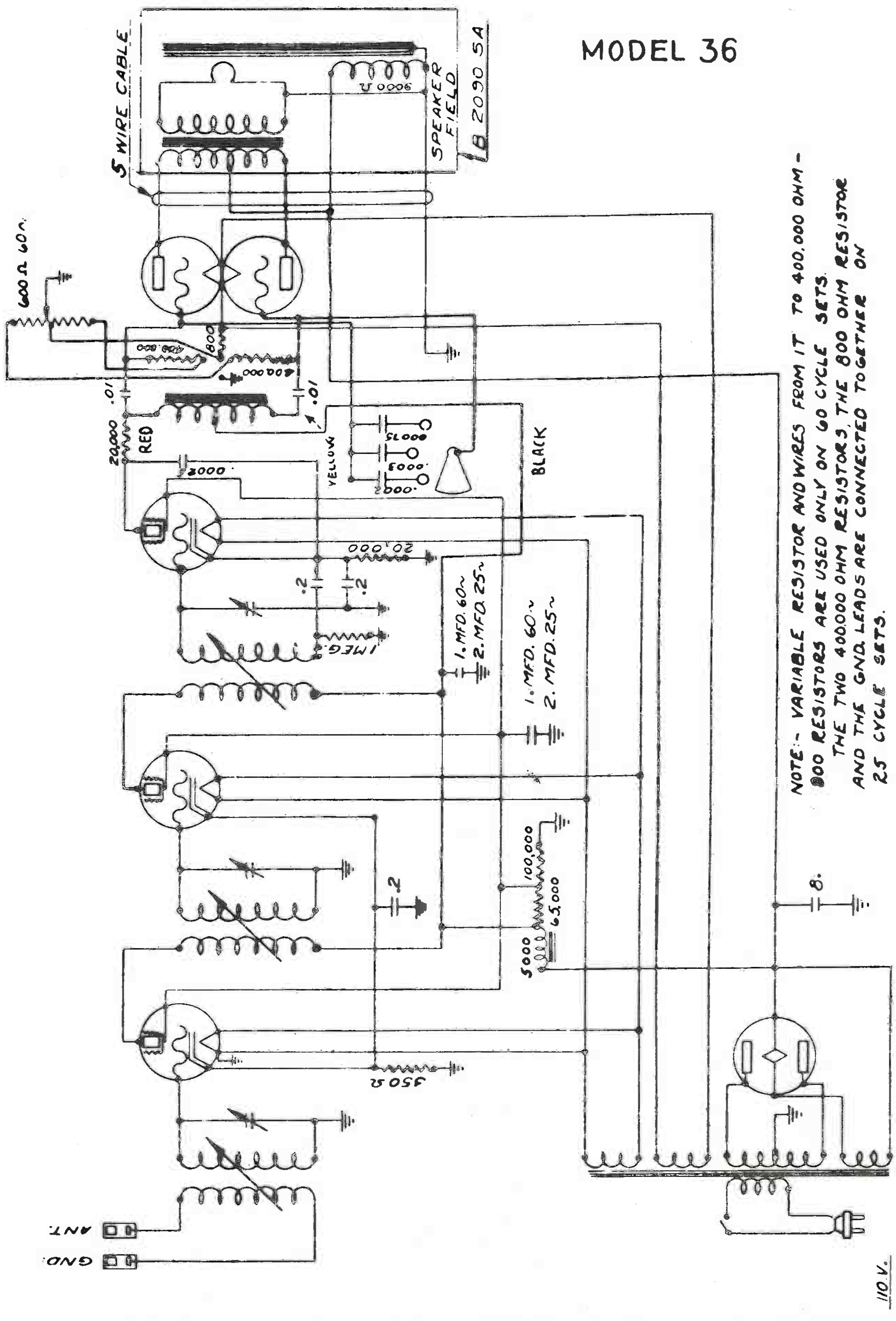


Figure 1—Schematic Wiring Diagram of Model RAE-59

The 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 loudspeaker are identical with those used in Model R-21. The automatic record changing mechanism is of simple, sturdy design and may be operated at 33⅓ R.P.M. as well as 78 R.P.M.

SEARS, ROEBUCK & CO.

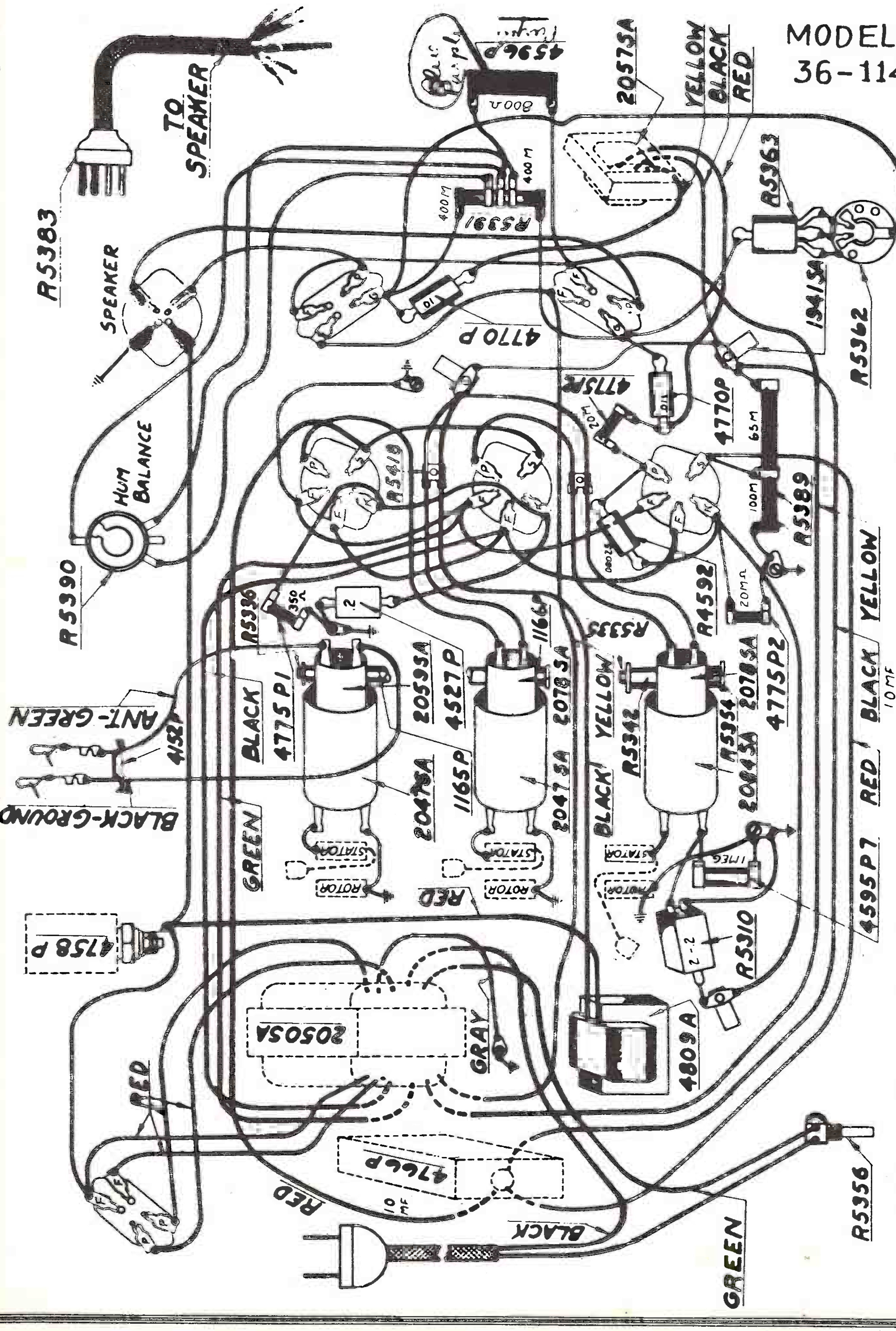
MODEL 36



NOTE:- VARIABLE RESISTOR AND WIRES FROM IT TO 400,000 OHM - 800 RESISTORS ARE USED ONLY ON 60 CYCLE SETS. THE TWO 400,000 OHM RESISTORS, THE 800 OHM RESISTOR AND THE GND. LEADS ARE CONNECTED TOGETHER ON 25 CYCLE SETS.

SEARS, ROEBUCK & CO.

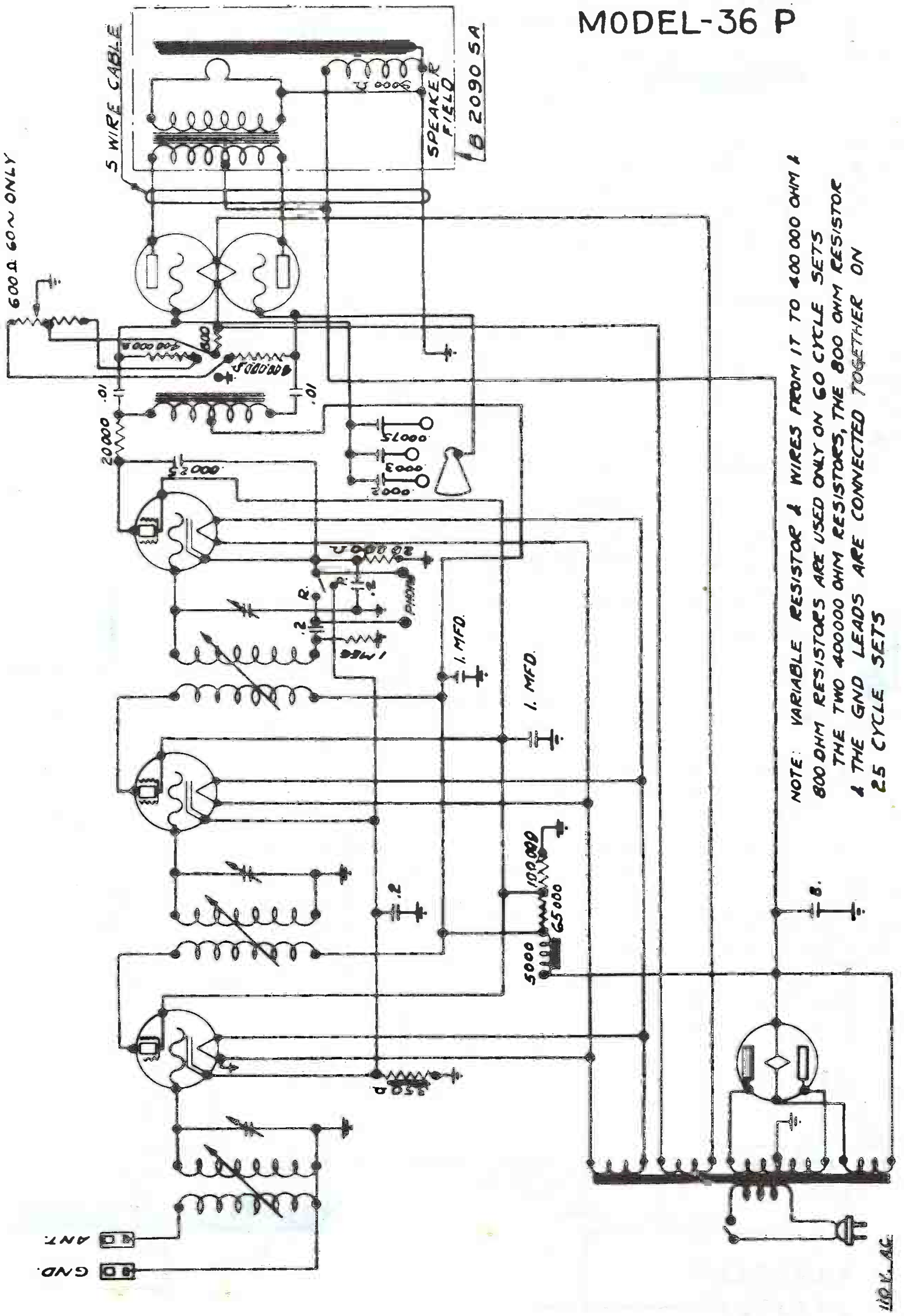
MODELS
36-114



ACTUAL WIRING DIAGRAM AND REPLACEMENT PARTS LIST

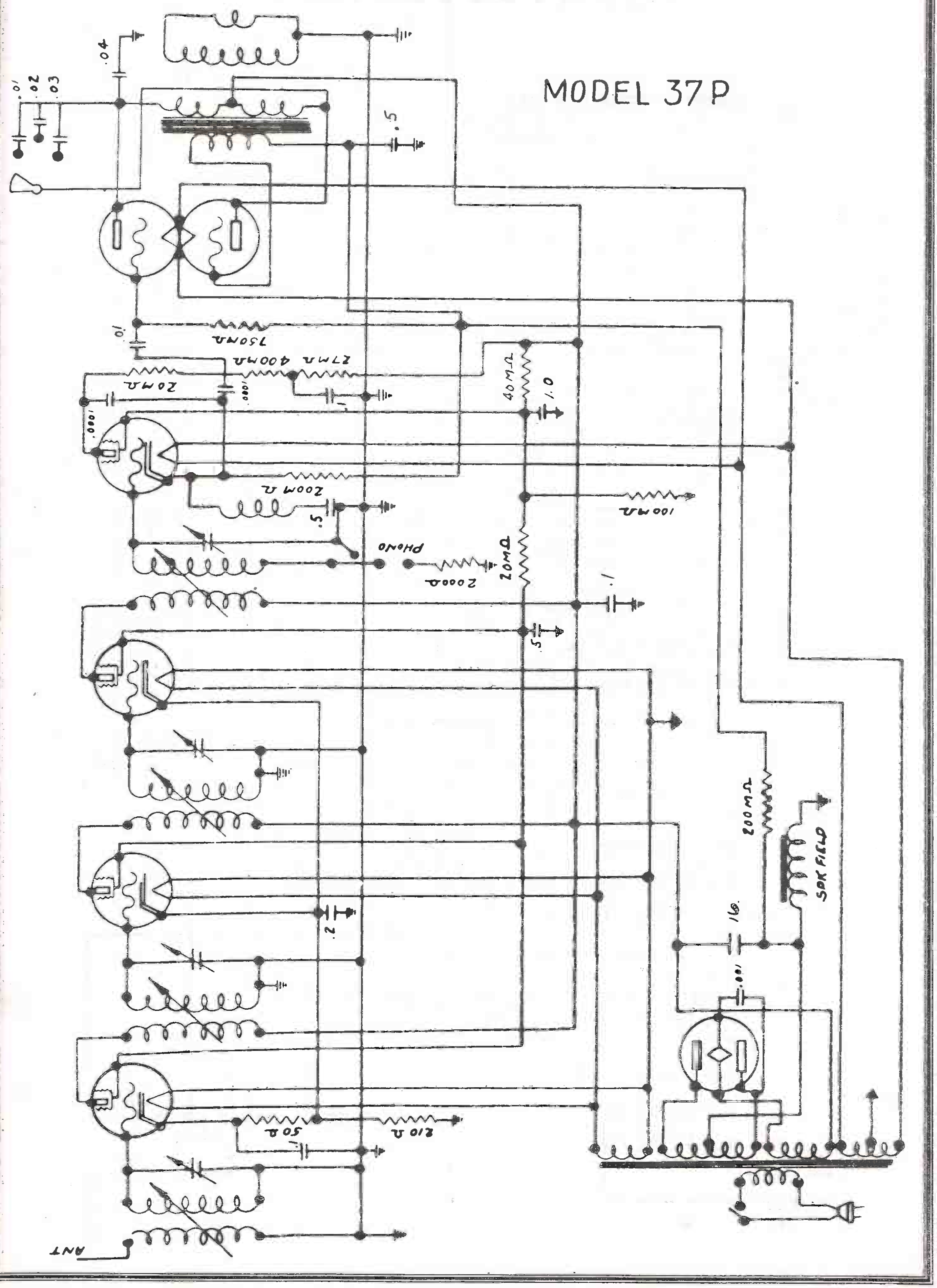
SEARS, ROEBUCK & CO.

MODEL-36 P

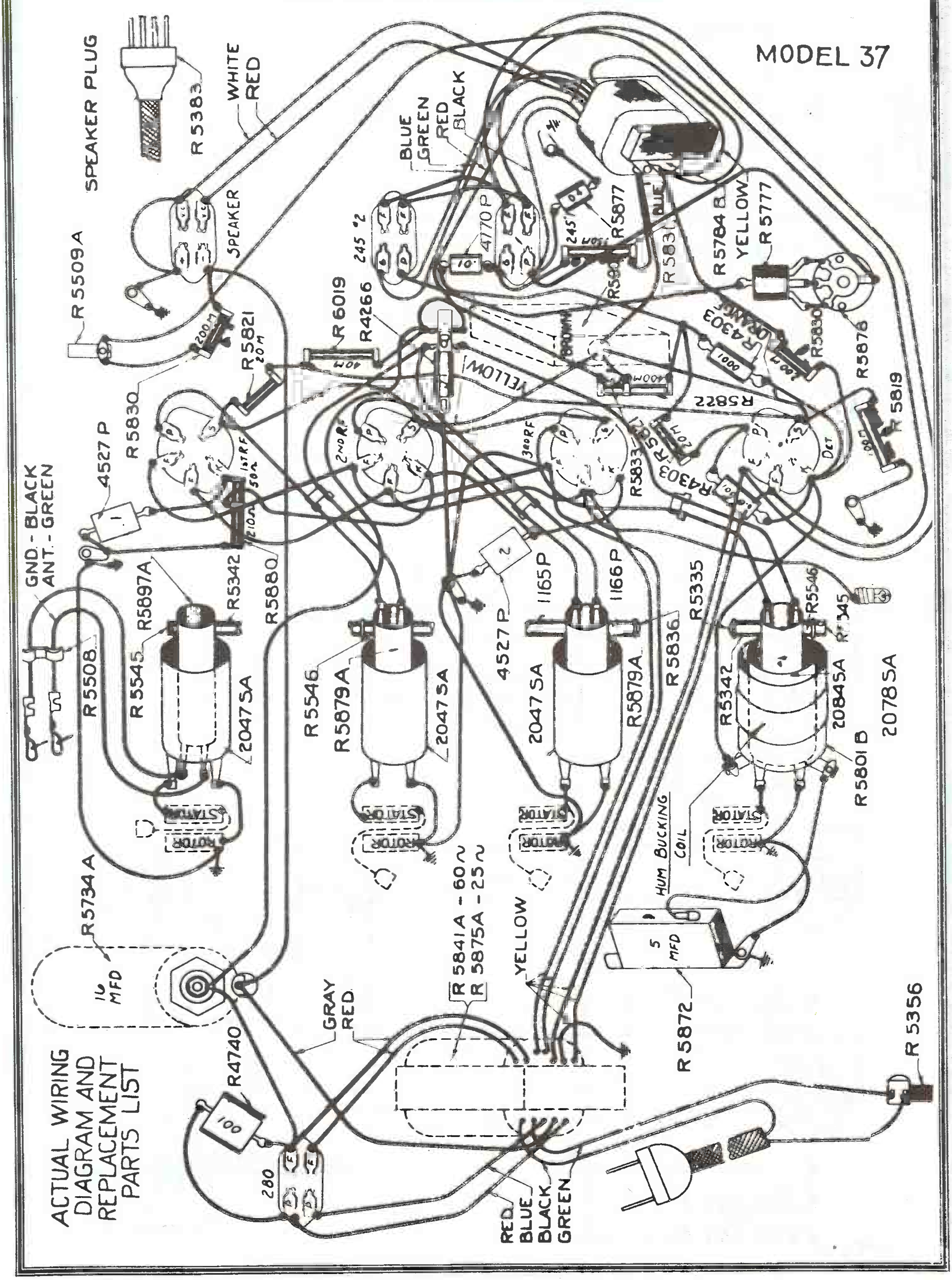


SEARS, ROEBUCK & CO.

MODEL 37P



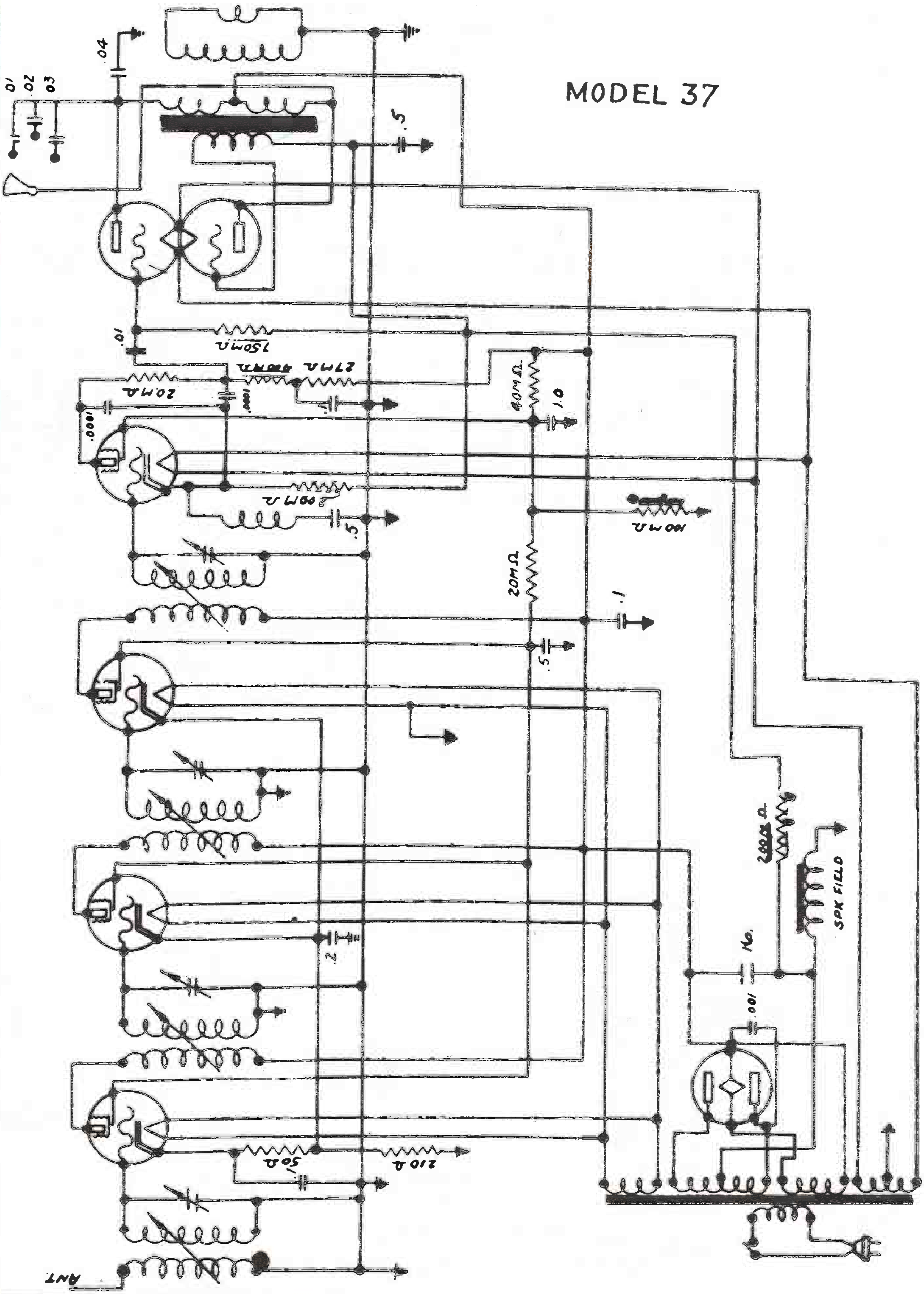
SEARS, ROEBUCK & CO.



ACTUAL WIRING DIAGRAM AND REPLACEMENT PARTS LIST

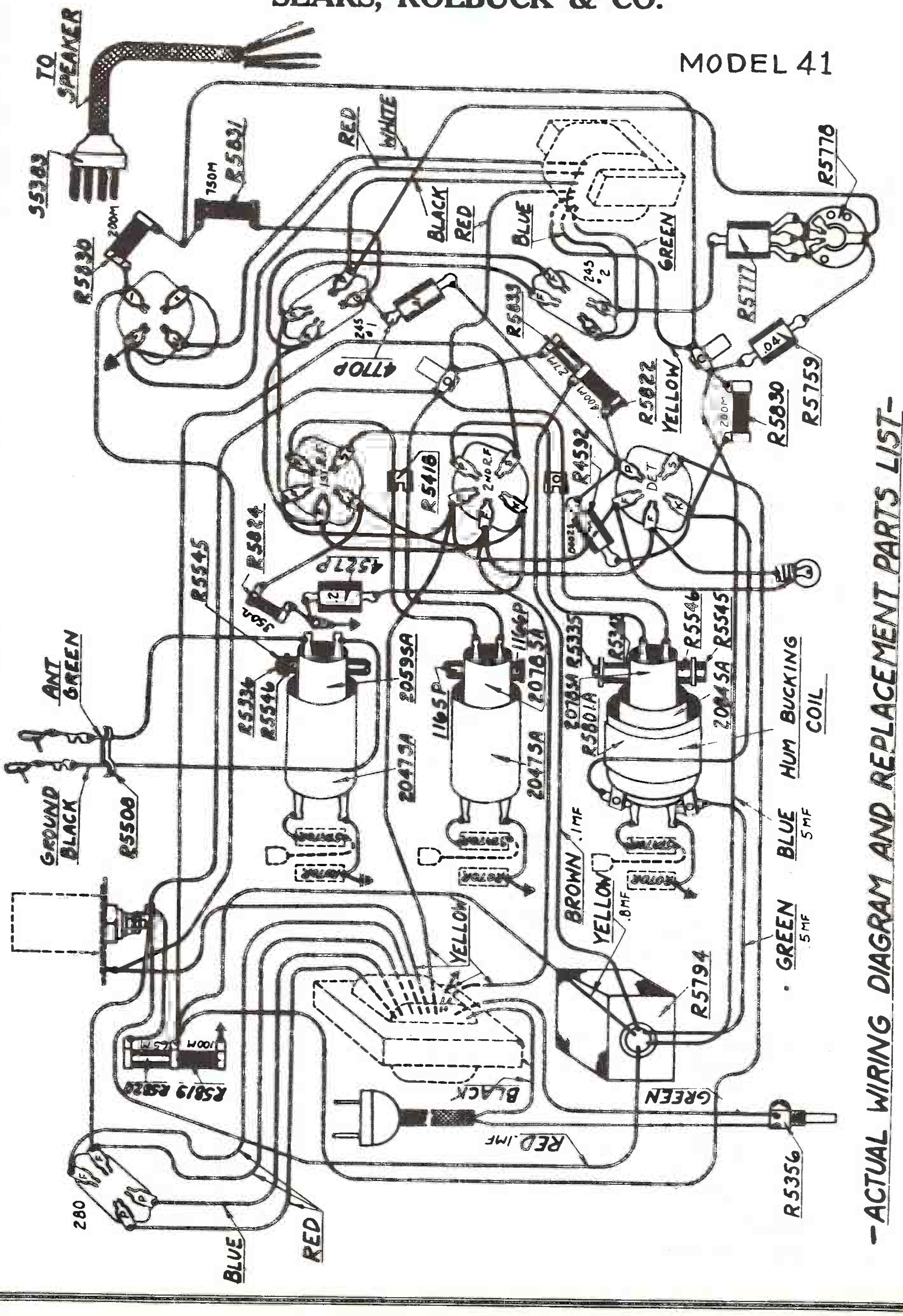
SEARS, ROEBUCK & CO.

MODEL 37



SEARS, ROEBUCK & CO.

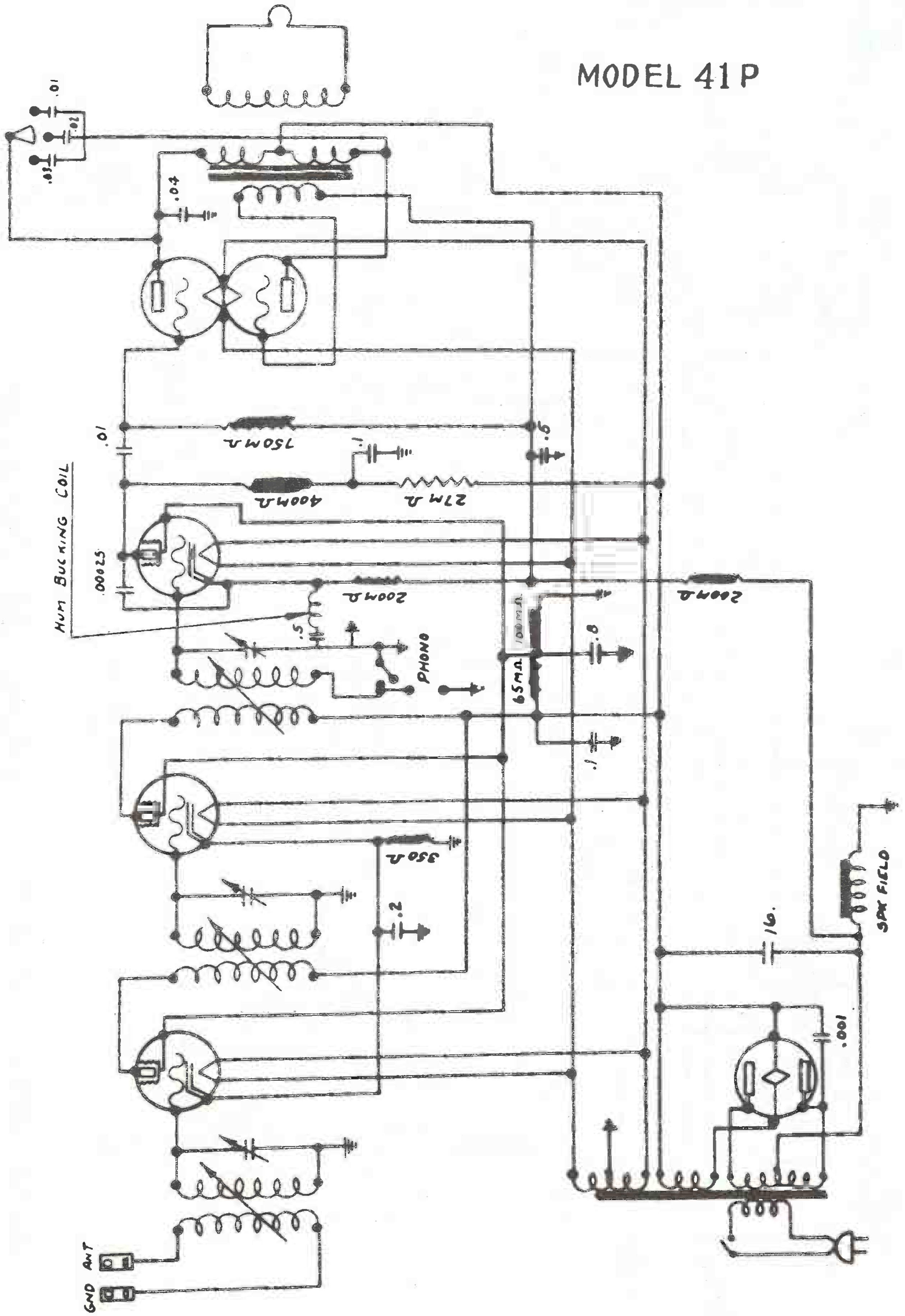
MODEL 41



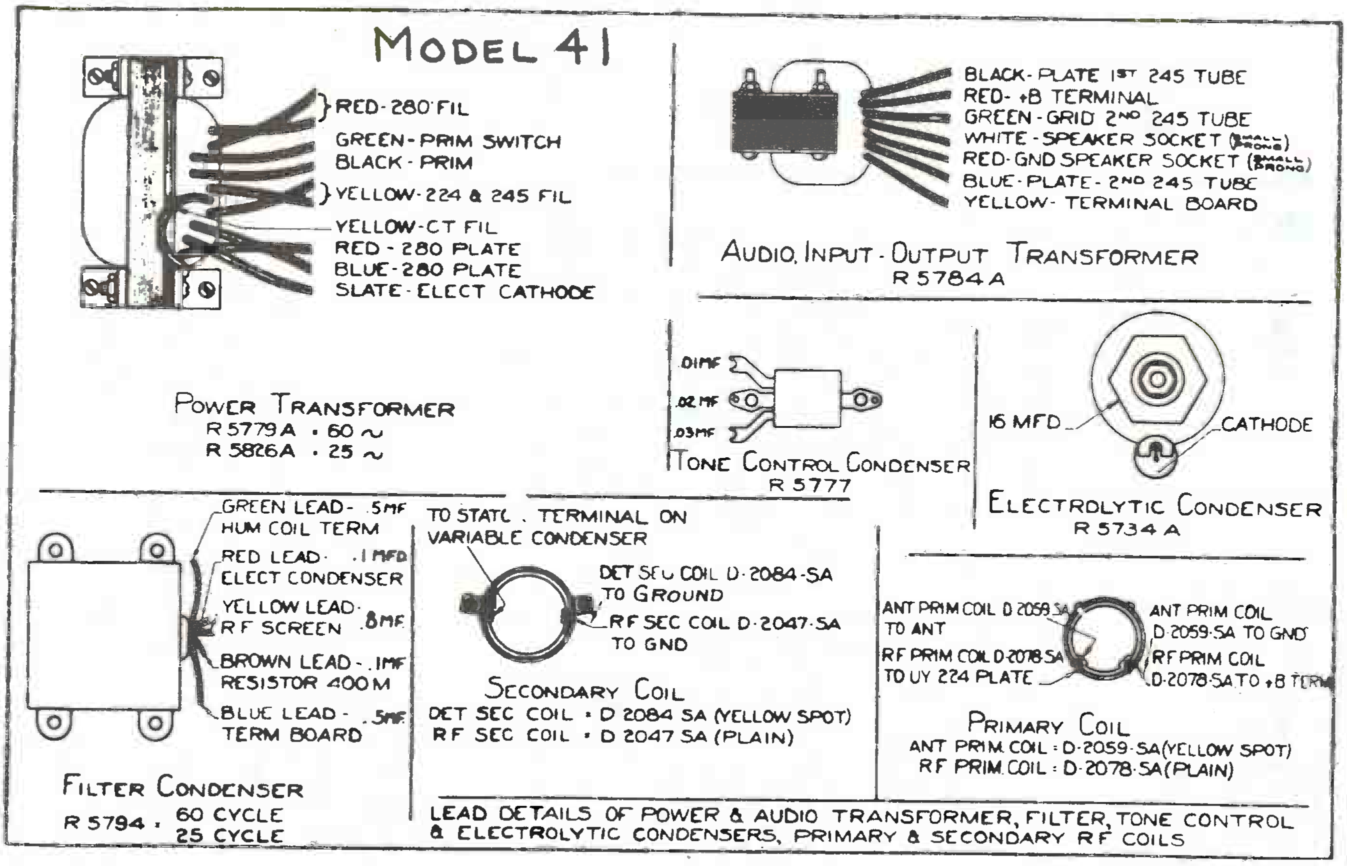
-ACTUAL WIRING DIAGRAM AND REPLACEMENT PARTS LIST-

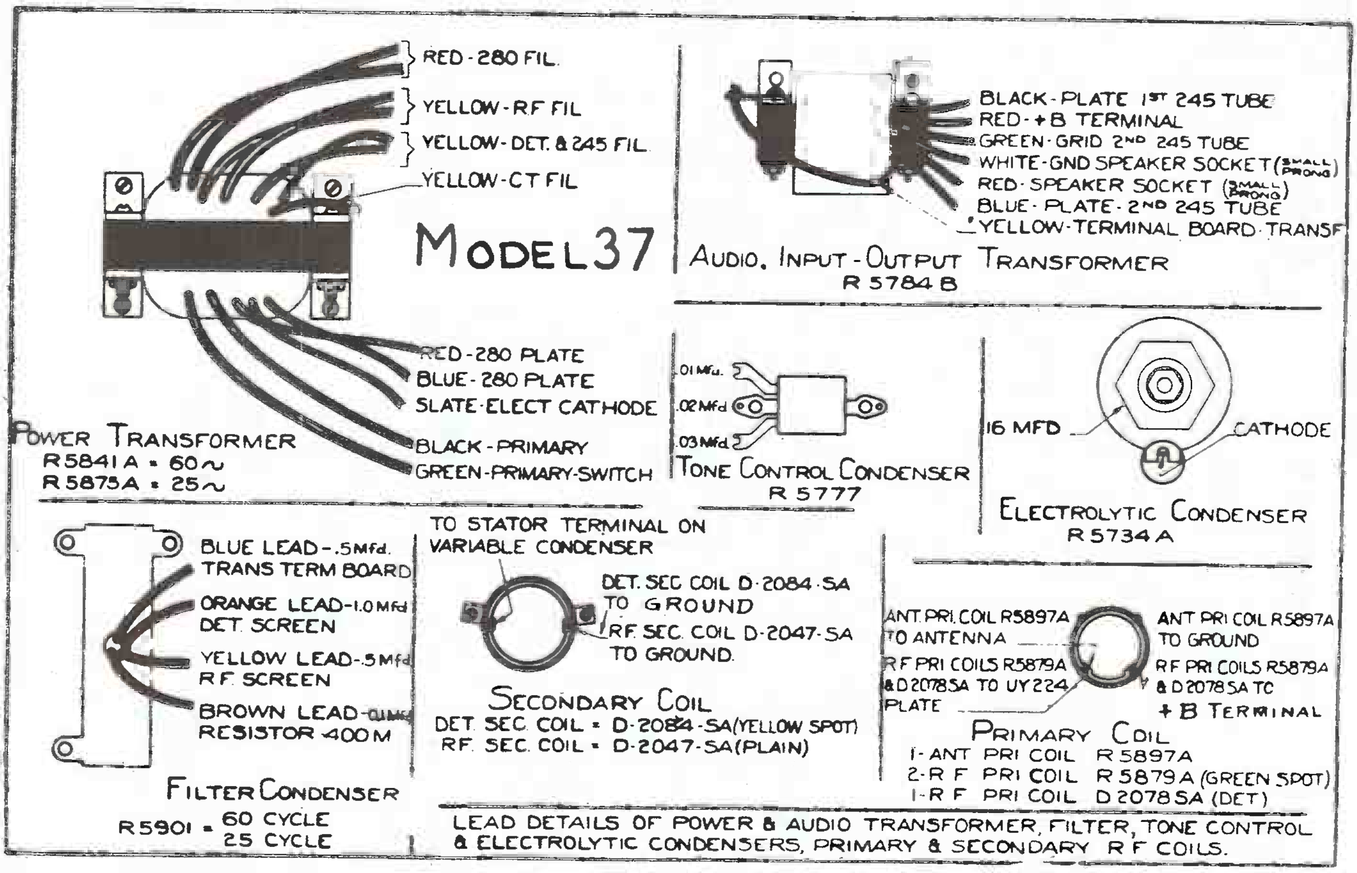
SEARS, ROEBUCK & CO.

MODEL 41P



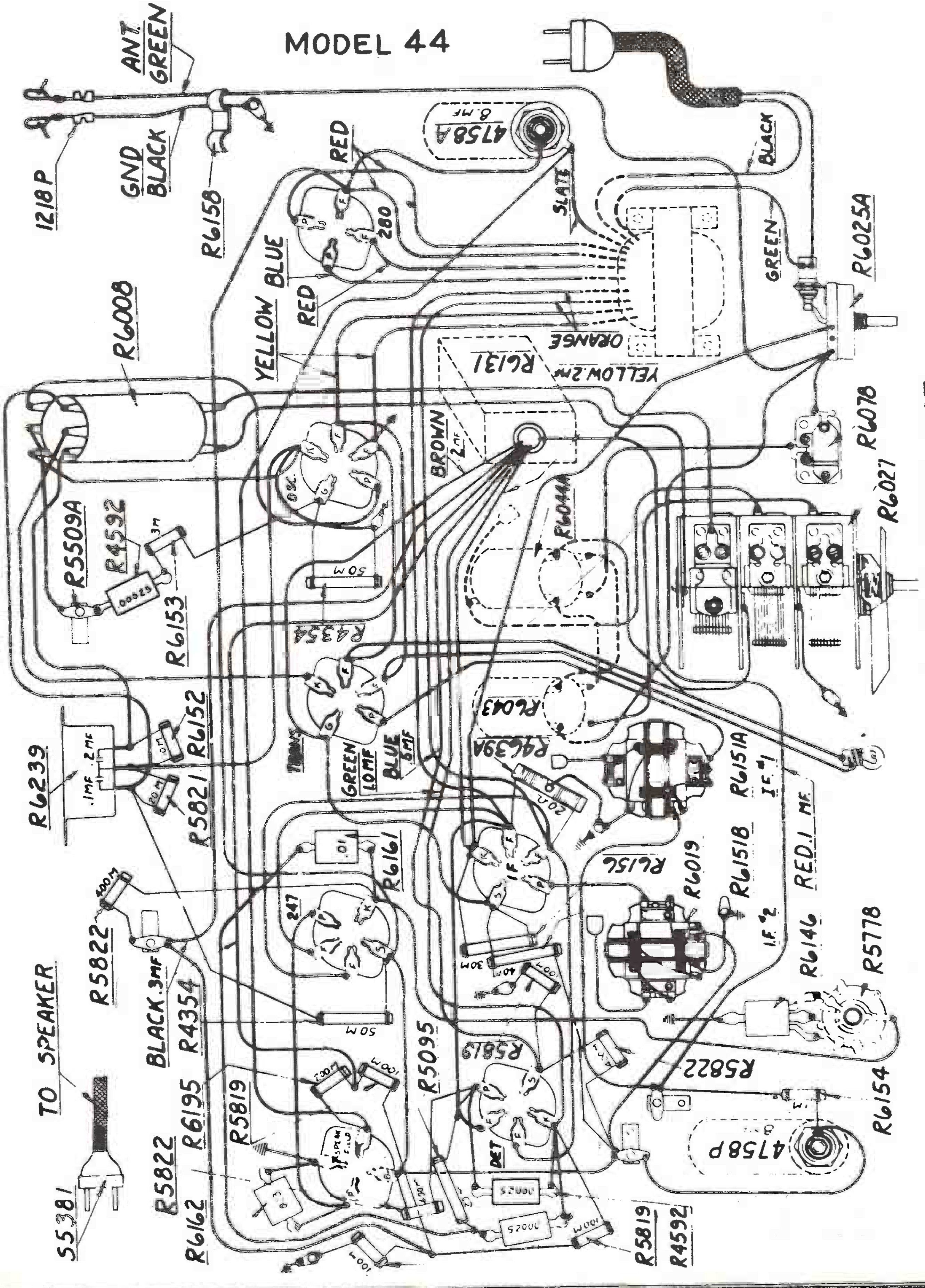
SEARS, ROEBUCK & CO.





SEARS, ROEBUCK & CO.

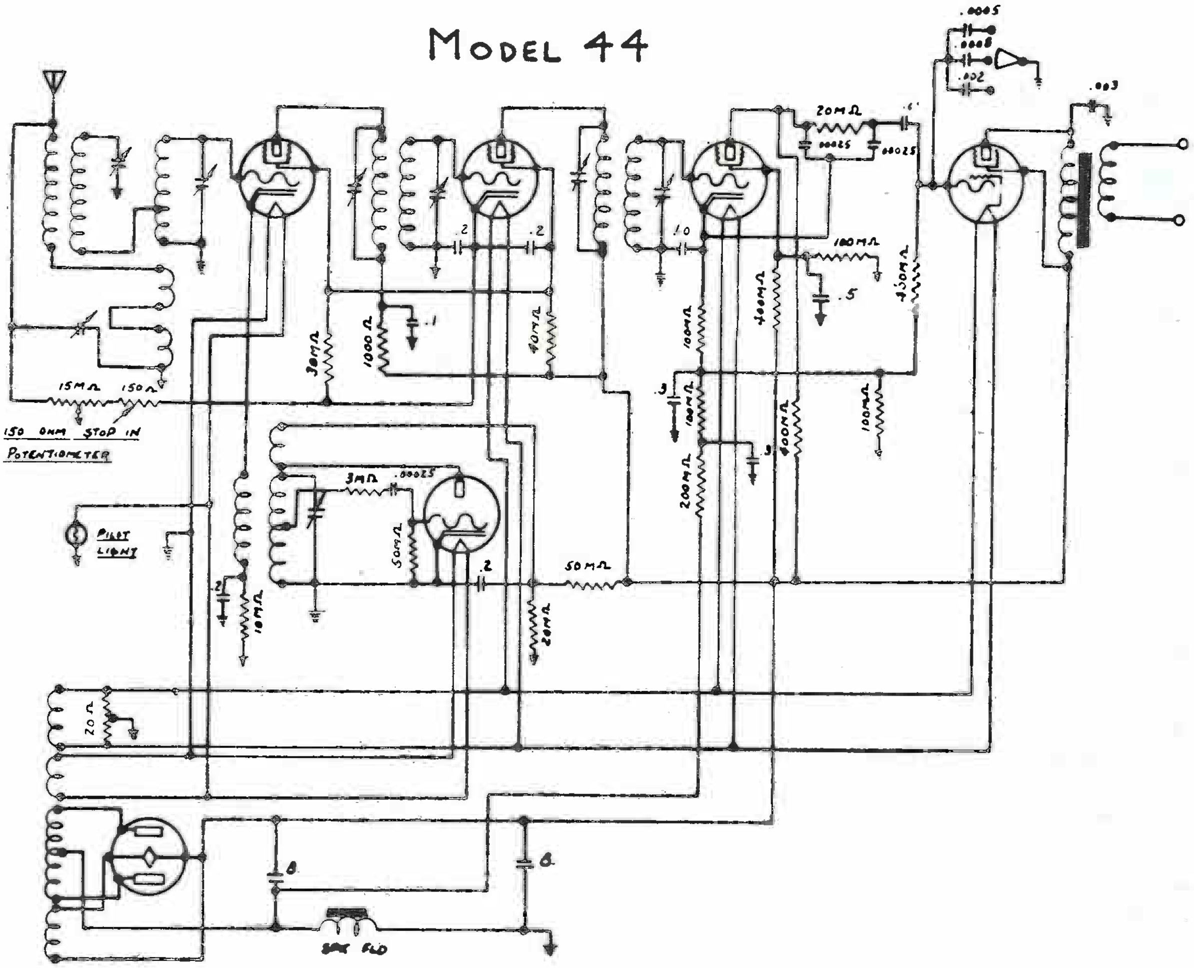
MODEL 44

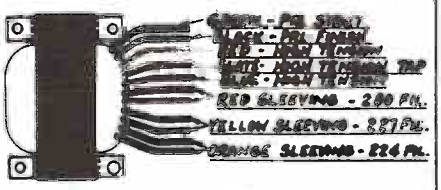


ACTUAL WIRING DIAGRAM AND REPLACEMENT PARTS LIST

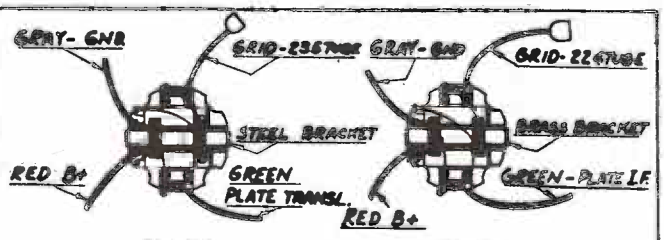
SEARS, ROEBUCK & CO.

Model 44

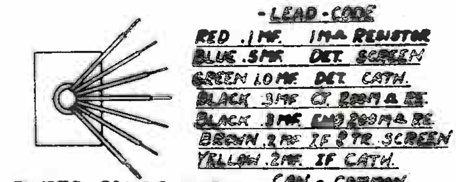




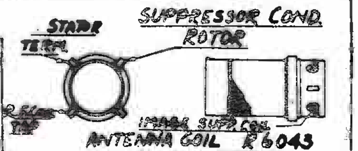
POWER TRANSFORMER
60 CYCLE R6160
25 CYCLE R 6085



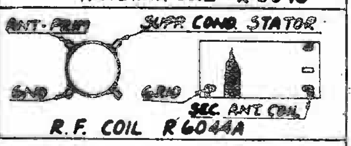
R6151A R6151B
ASSEM I.F TRANS. AND I.F TUNING CONDENSERS



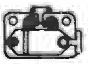
FILTER CONDENSER
R6131



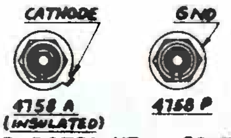
ANTENNA COIL R6043



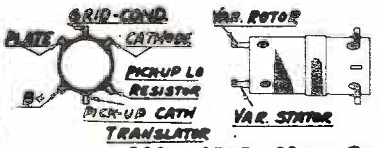
R.F. COIL R6044A



SUPPRESSOR COND. R6218



ELECTROLYTIC CONDENSERS

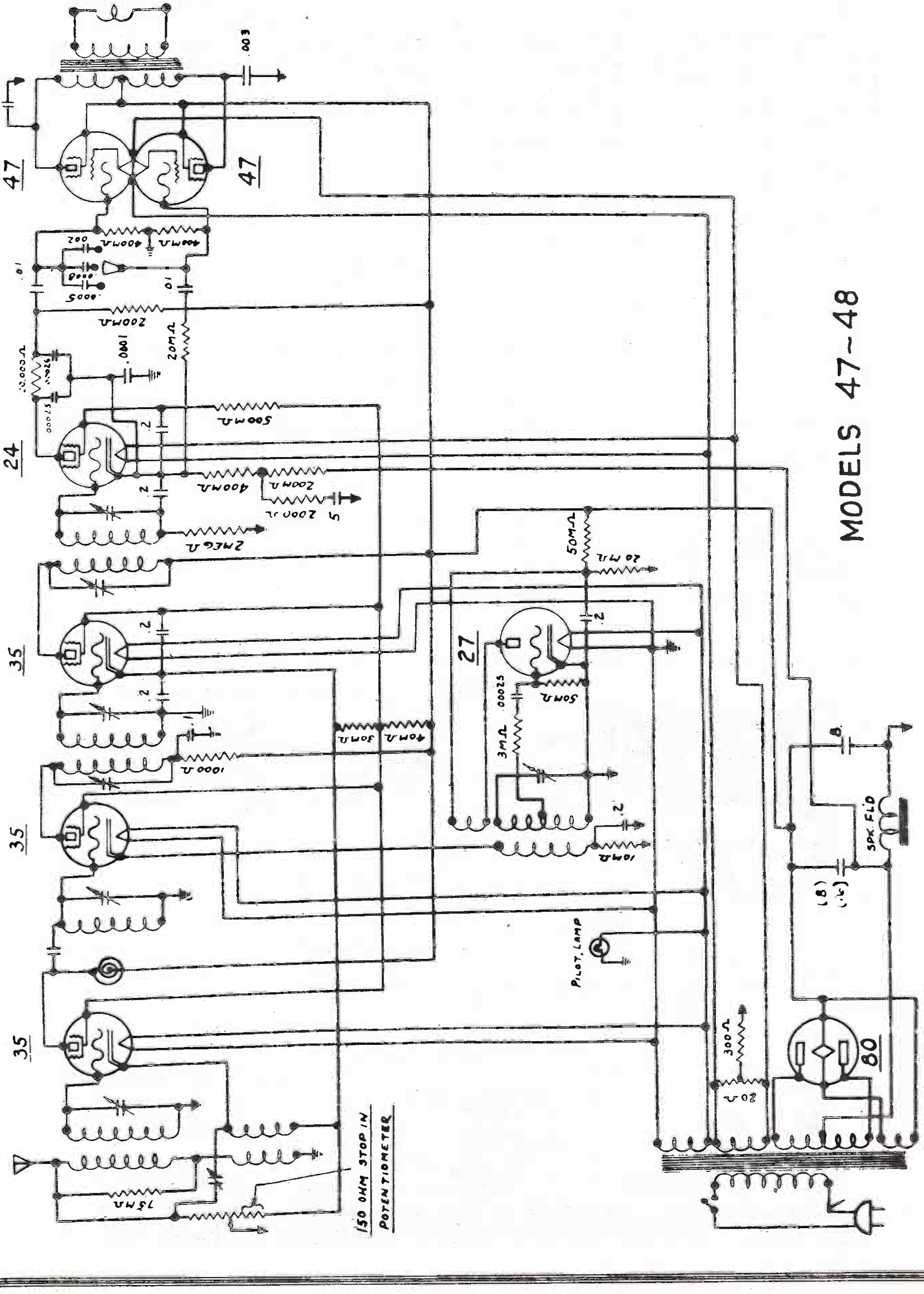


OSCILLATOR COIL R6008

TONE CONTROL CONDENSER R6146

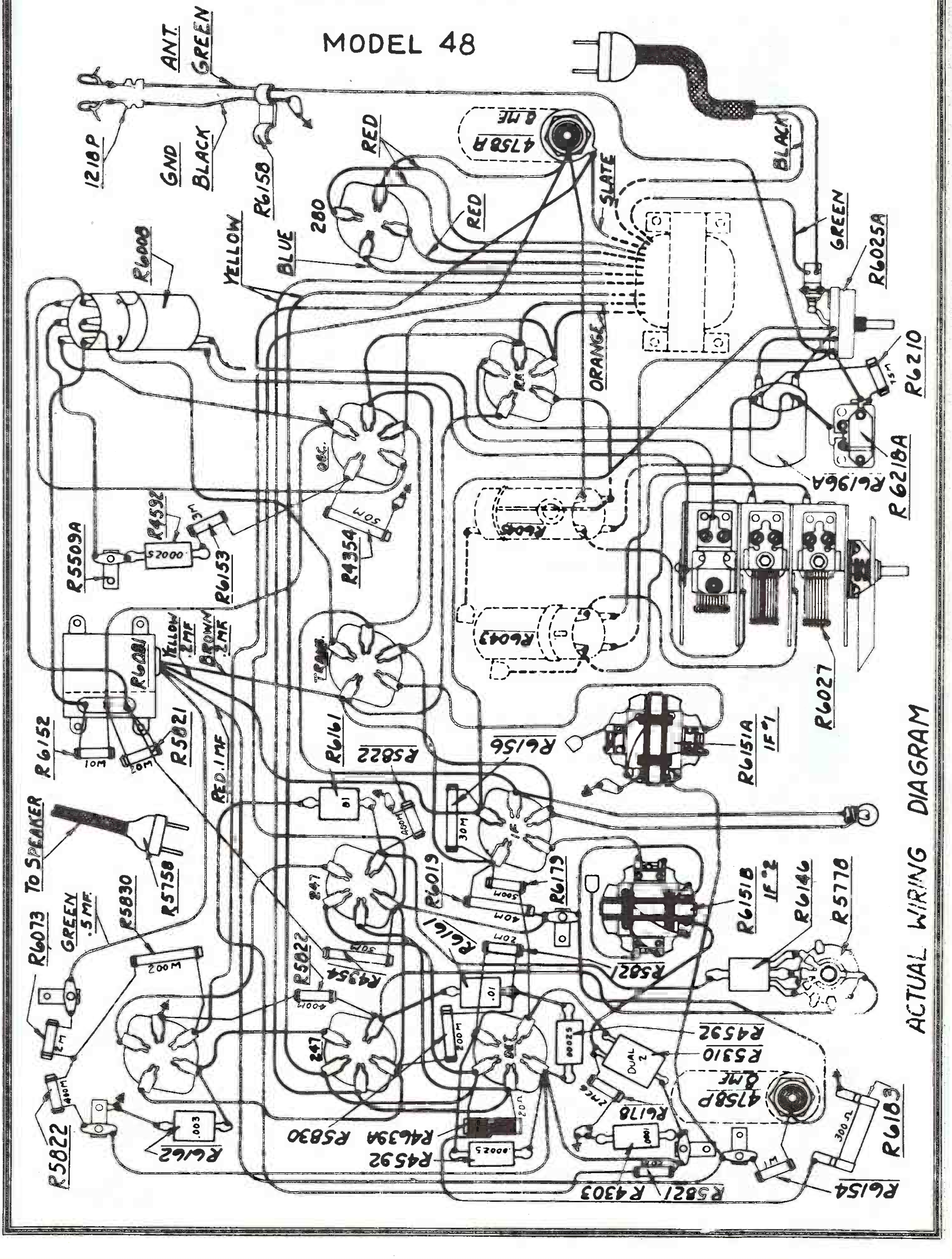
LEAD DETAILS OF POWER TRANSFORMER-I.F. TRANS.-I.F TUNING COND-FILTER, TONE CONTROL ELECTROLYTIC & SUPPRESSOR CONDENSERS- R.F.-ANT & OSCILLATOR COILS Model 44

SEARS, ROEBUCK & CO.

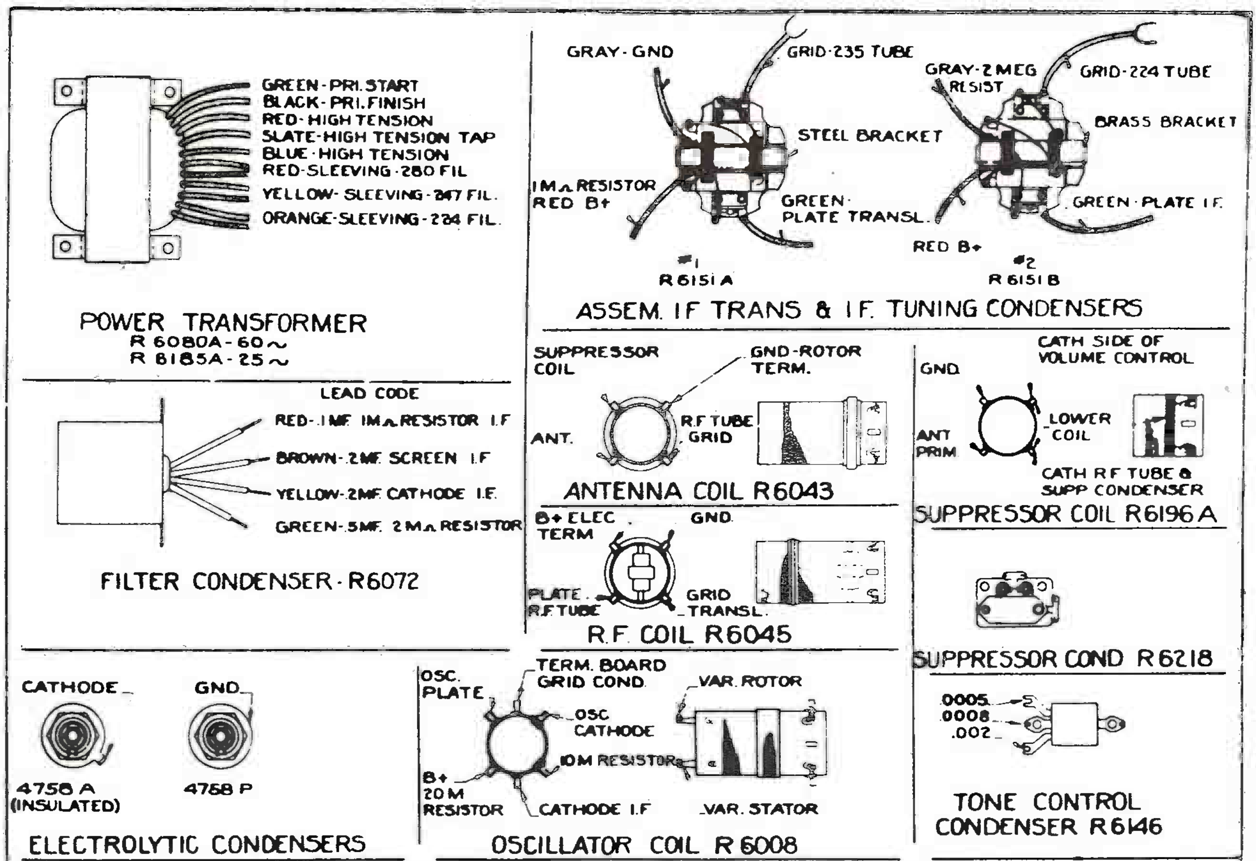


SEARS, ROEBUCK & CO.

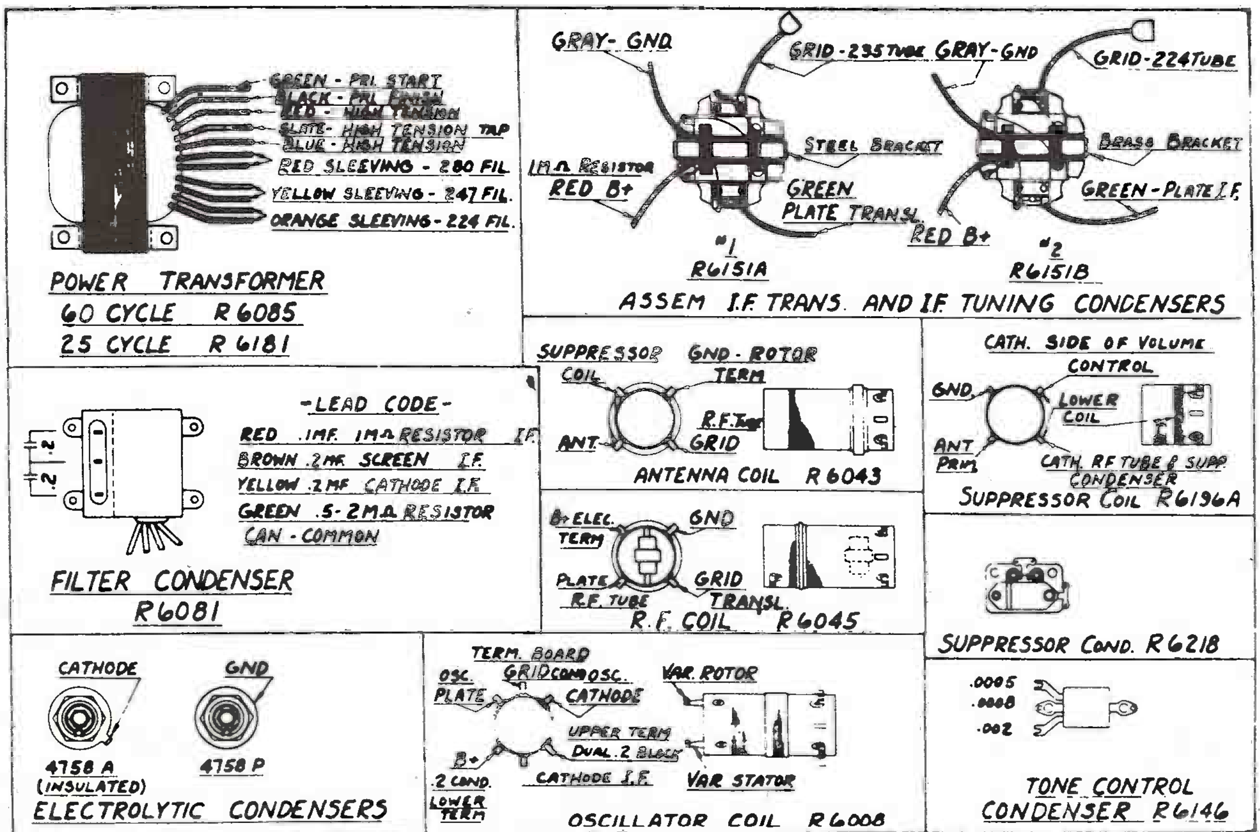
MODEL 48



SEARS, ROEBUCK & CO.



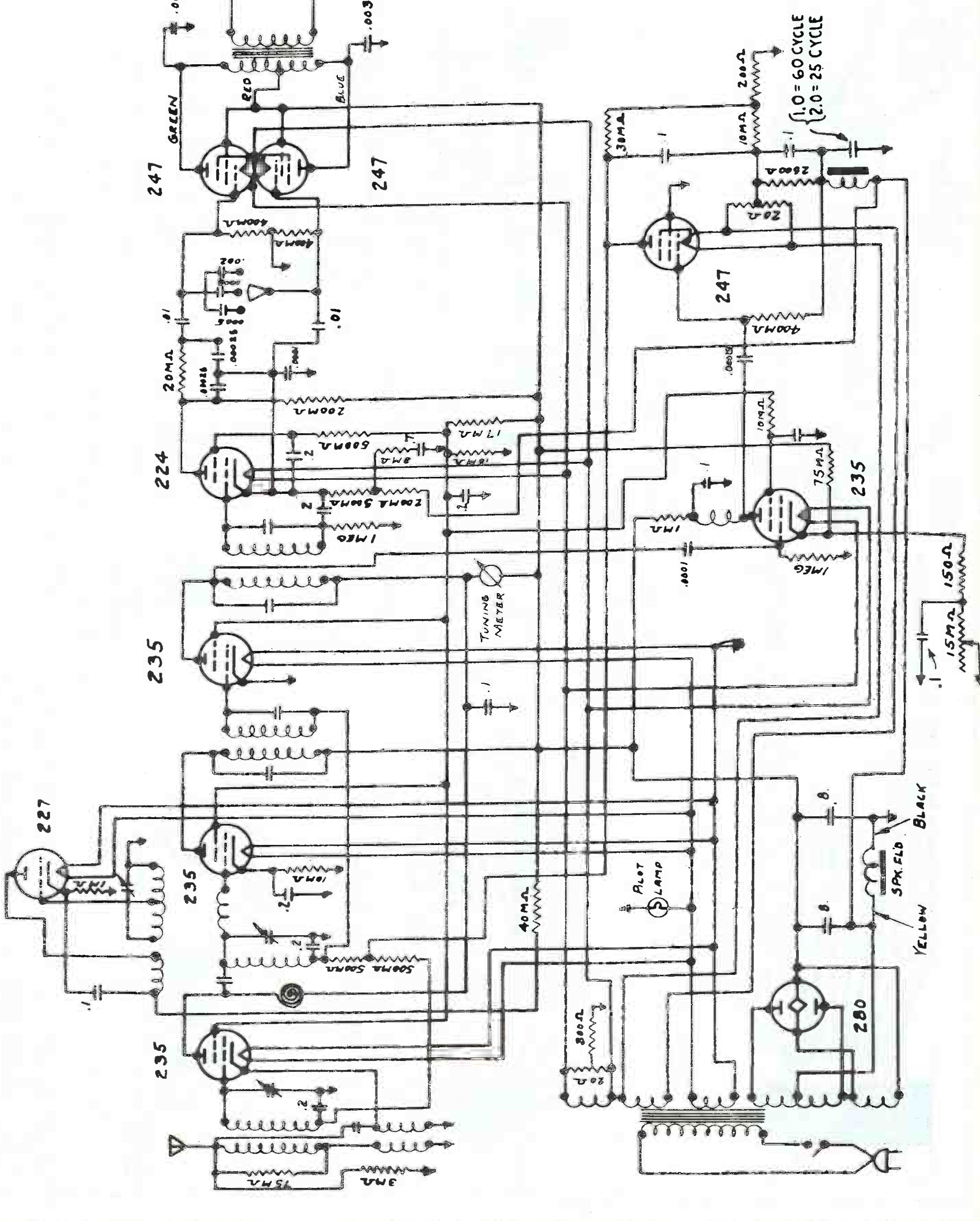
LEAD DETAILS OF POWER TRANSFORMER-I.F. TRANS.-I.F. TUNING COND.-FILTER, TONE CONTROL ELECTROLYTIC & SUPPRESSOR CONDENSERS-R.F. ANT-OSCILL. & SUPPRESSOR COILS. MODEL 47



LEAD DETAILS OF POWER TRANSFORMER-I.F. TRANS.-I.F. TUNING COND.-FILTER, TONE CONTROL ELECTROLYTIC & SUPPRESSOR CONDENSERS- R.F.-ANT- OSCILL. & SUPPRESSOR COILS-MODEL 48

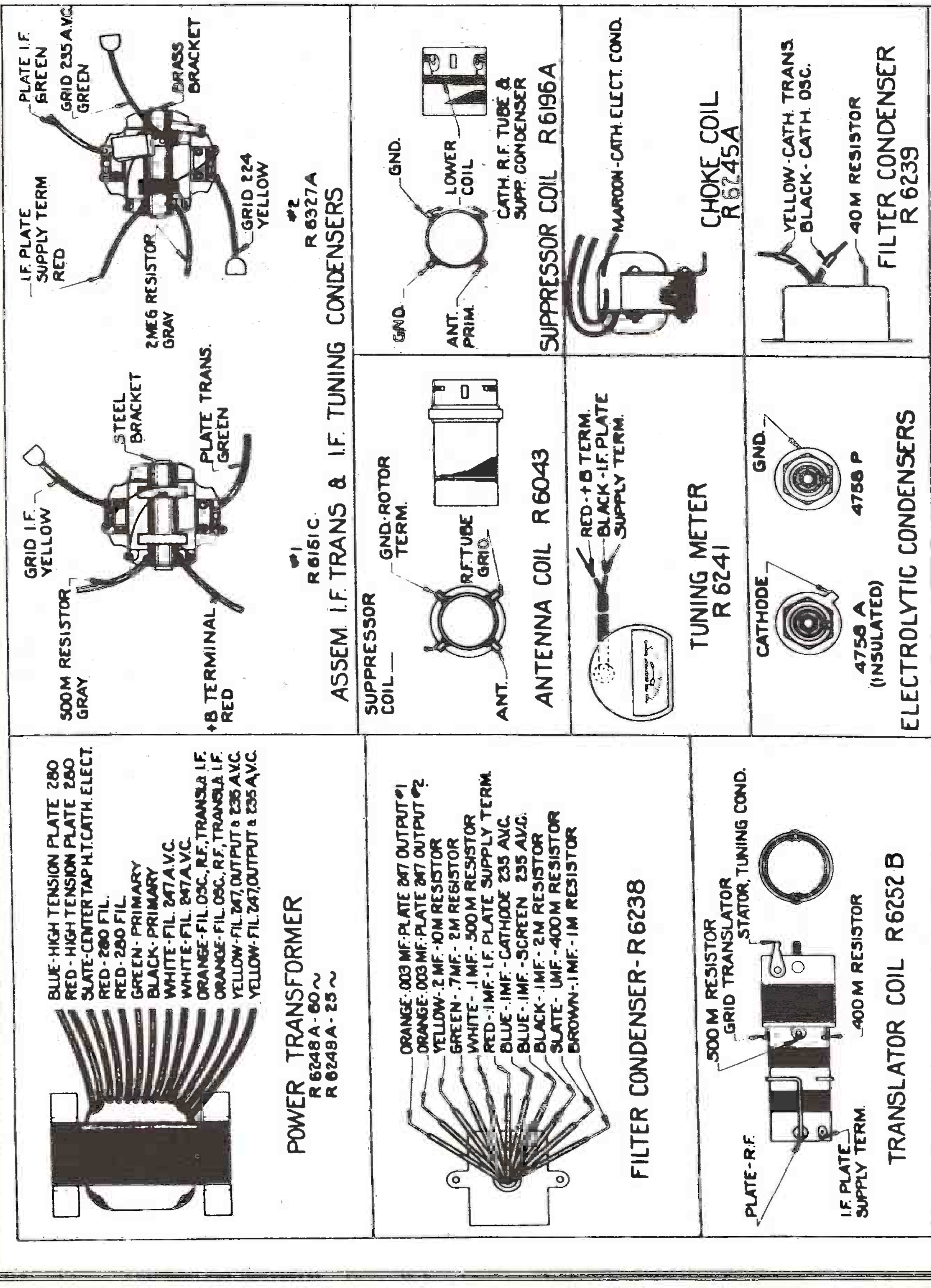
SEARS, ROEBUCK & CO.

MODEL 50 AVC.



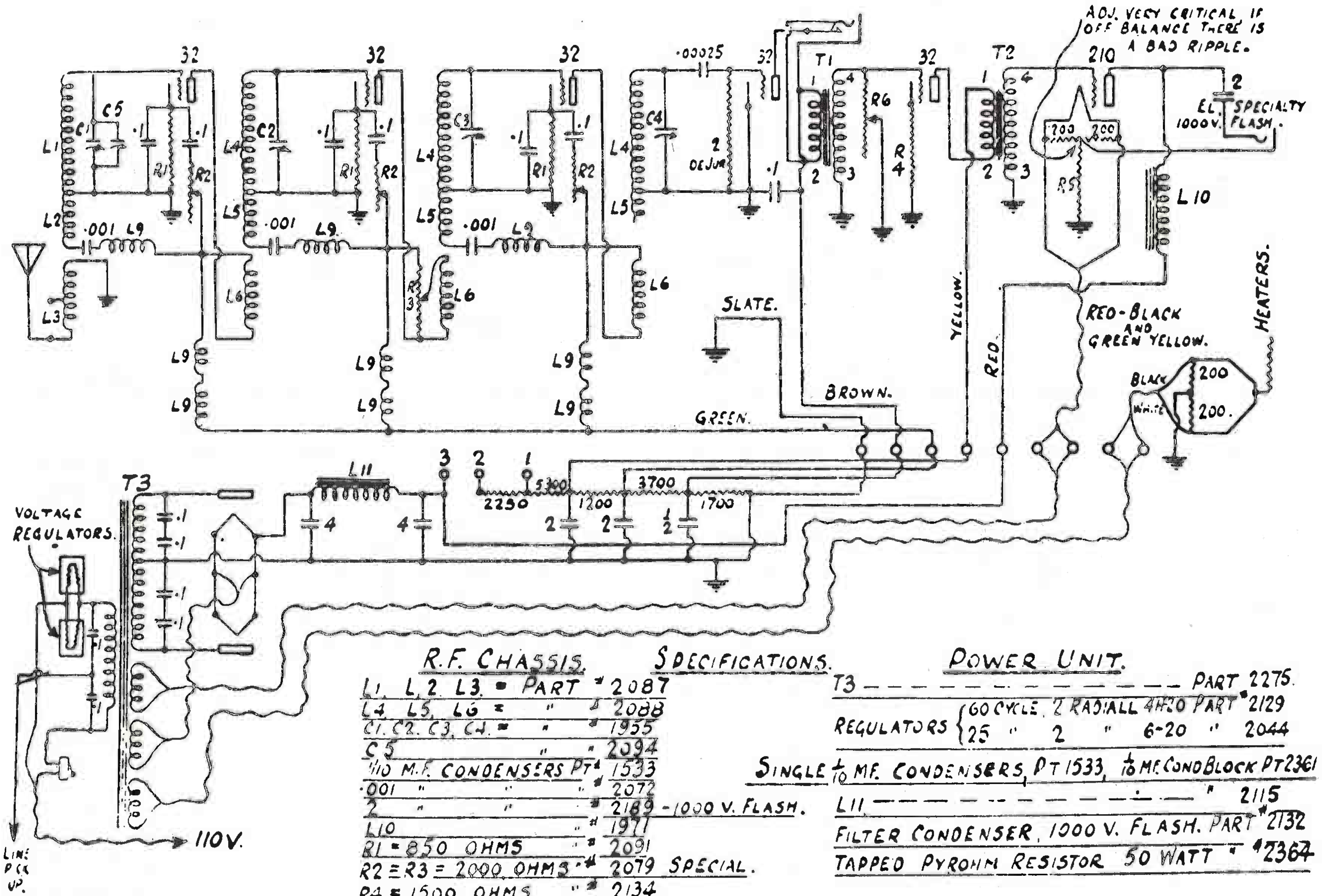
SEARS, ROEBUCK & CO.

MODEL 50 AVC.



LEAD DETAILS OF POWER TRANSFORMER-I.F. TRANS.-I.F. TUNING COND.-FILTER COND.-ELECTROLYTIC COND.-ANTENNA, SUPPRESSOR, TRANSLATOR AND CHOKE COILS - TUNING METER.

STANDARD RADIO MFG. CORP., LTD.
(ROGERS)



R.F. CHASSIS. SPECIFICATIONS.

L1, L2, L3, = PART	#2087
L4, L5, L6 = "	#2088
C1, C2, C3, C4 = "	#1955
C5 "	#2094
1/10 M.F. CONDENSERS PT.	#1533
.001 " "	#2072
2 " "	#2189 -1000 V. FLASH.
L10	#1971
R1 = 850 OHMS	#2091
R2 = R3 = 2000 OHMS "	#2079 SPECIAL.
R4 = 1500 OHMS "	#2134
R5 = 2500 " "	#2319
R6 = 150000 " "	#2321 SPECIAL
T1 = "	#1889
T2 = "	#1890.
L9 R.F. CHOKE "	#2254

POWER UNIT.

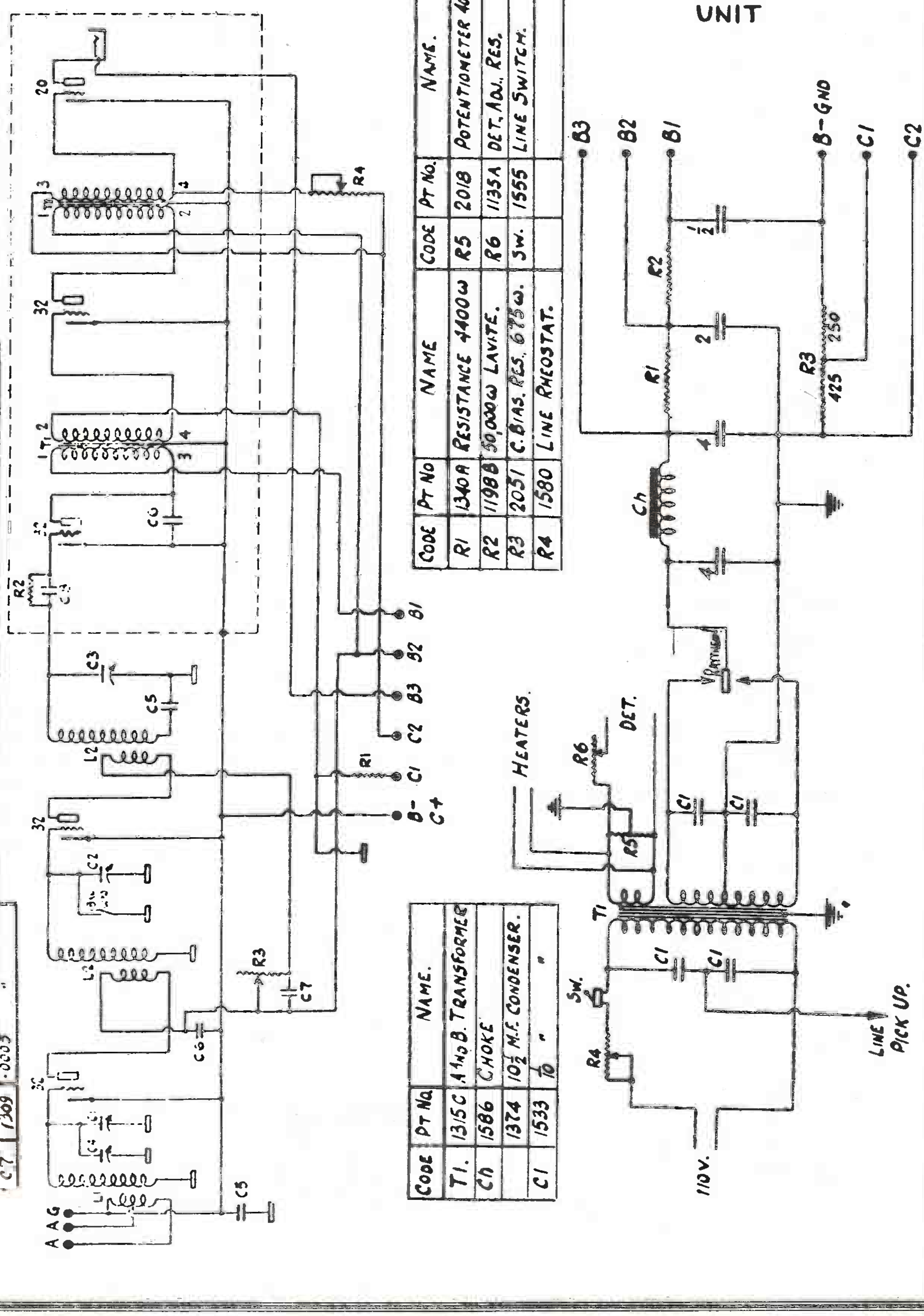
T3	PART 2275.
REGULATORS { 60 CYCLE 2 RADIALL 4H20 PART	#2129
{ 25 " 2 " 6-20 "	2044
SINGLE 1/10 MF. CONDENSERS, PT 1533, 1/10 MF. COND BLOCK	PT 2361
L11 "	2115
FILTER CONDENSER, 1000 V. FLASH. PART	#2132
TAPPED PYROHM RESISTOR 50 WATT "	#2364

ROGERS

ADVANCED CHASSIS AND POWER UNIT.

STANDARD RADIO MFG. CORP., LTD.
(ROGERS)

TYPE 220 RECEIVER AND POWER UNIT



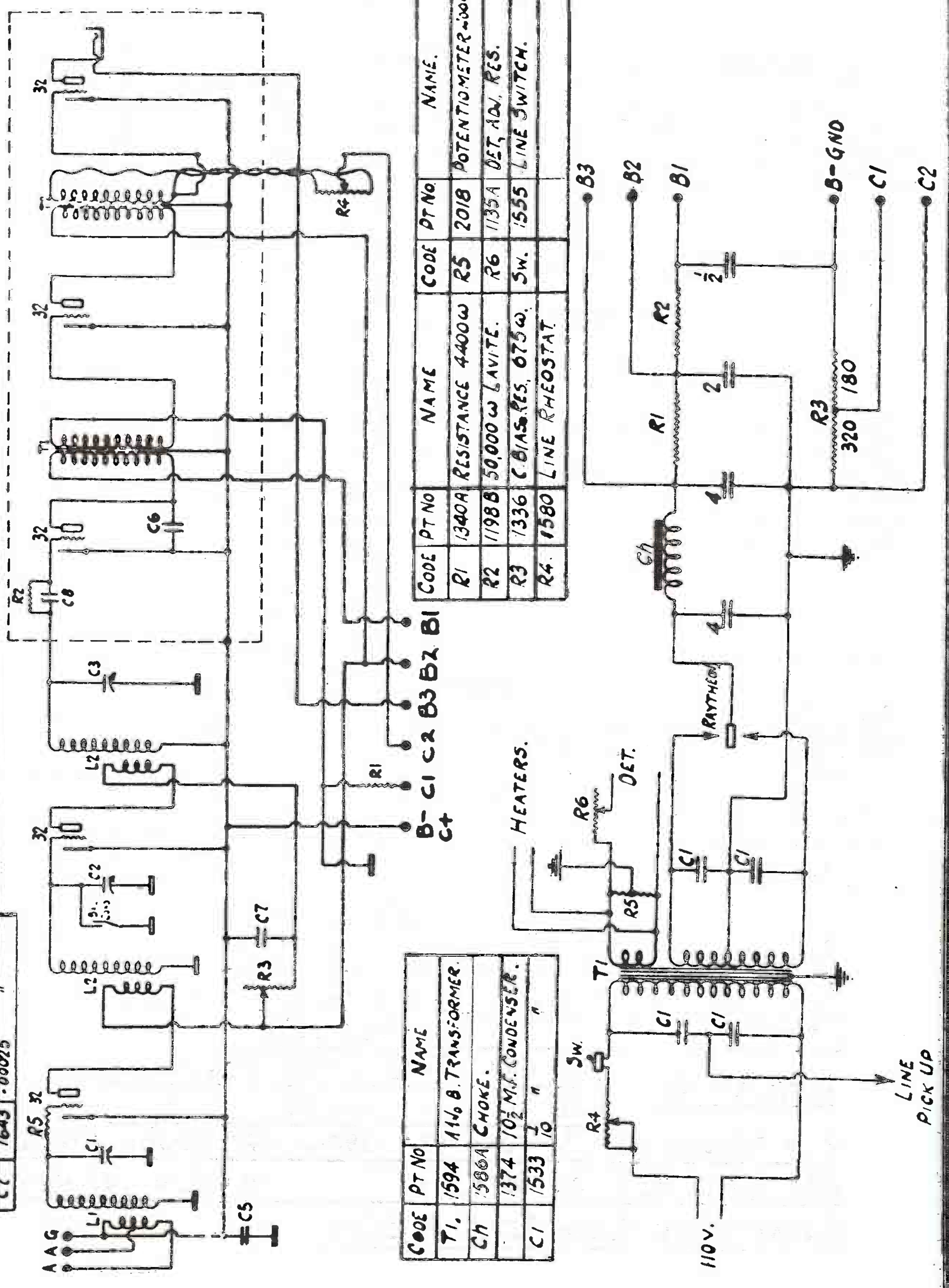
CODE	PT	NAME
C1-2-3	1271	VAR. CONDENSER
CA	1286	TRIMMER CONDENSER
C5	1033	½ MF CONDENSER
C6	1641	.002 "
C7	1309	.0003 "
C8	1122	.00025 CONDENSER.
R1	1163	1/10 MEG. GRID LEAK.
R2	1123	2 " "
R3	1295A	RHEO. 100000 OHMS.
R4	1295B	POT., 100,000 OHMS
L1	1304	PICK UP COIL
L2	1305	R.F. COIL.
T1+2	182F	AUDIO TRANSFORMER.

CODE	PT NO	NAME	CODE	PT NO.	NAME.
R1	1340A	RESISTANCE 4400W	R5	2018	POTENTIOMETER 400W
R2	1198B	50,000W LAVITE.	R6	1135A	DET. ADJ. RES.
R3	2051	C.BIAS. RES. 675W.	SW.	1555	LINE SWITCH.
R4	1580	LINE RHEOSTAT.			

CODE	PT NO.	NAME.
T1.	1315C	A AND B. TRANSFORMER
Ch	1586	CHOKE
	1374	10½ M.F. CONDENSER.
C1	1533	1/10 " "

STANDARD RADIO MFG. CORP., LTD.
(ROGERS)

TYPE 250 RECEIVER AND POWER UNIT



CODE	PT	NAME
C1-2-3	1487	VAR. CONDENSER
R5.	2166	RESISTANCE 400 OHMS
C3	1038	1/2 MF. CONDENSER.
C6	1641	.002 "
C7	1643	.00025 "

CODE	PT	NAME
C8	1122	.00025 CONDENSER
R1	1163	1/10 MEG. GRID LEAK.
R2	1123	2 "
R3	1644	RHEO. 100,000 OHMS.

CODE	PT	NAME
R4	1806	POT. 250,000 OHMS
L1	1635	PICK UP COIL.
L2	1636	R.F. COIL
T1+2	182F	AUDIO TRANSFORMER.

CODE	PT NO	NAME
R1	1340A	RESISTANCE 4400Ω
R2	1198B	50,000Ω LAVITE.
R3	1336	C. BIAS. RES. 675Ω.
R4.	1580	LINE RHEOSTAT.

CODE	PT NO	NAME.
R5	2018	POTENTIOMETER-300Ω
R6	1135A	DET. ADJ. RES.
SW.	1555	LINE SWITCH.

CODE	PT NO	NAME
T1.	1594	1146 B. TRANSFORMER
Ch	1586A	CHOKE.
	1374	10 1/2 M.F. CONDENSER.
C1	1533	1/10 " "

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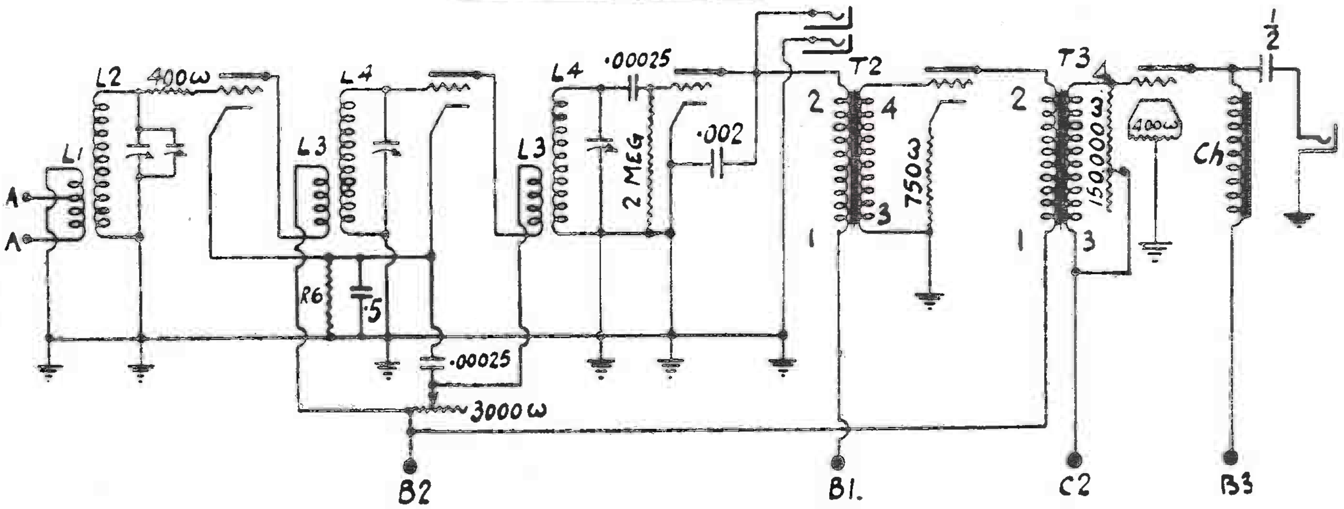
(ROGERS)

400 SERIES RECEIVER AND POWER UNIT.

R.F. CHASSIS.



L1-L2 PT No 2034 L3-L4 PT No 2035 Ch PT No 1946

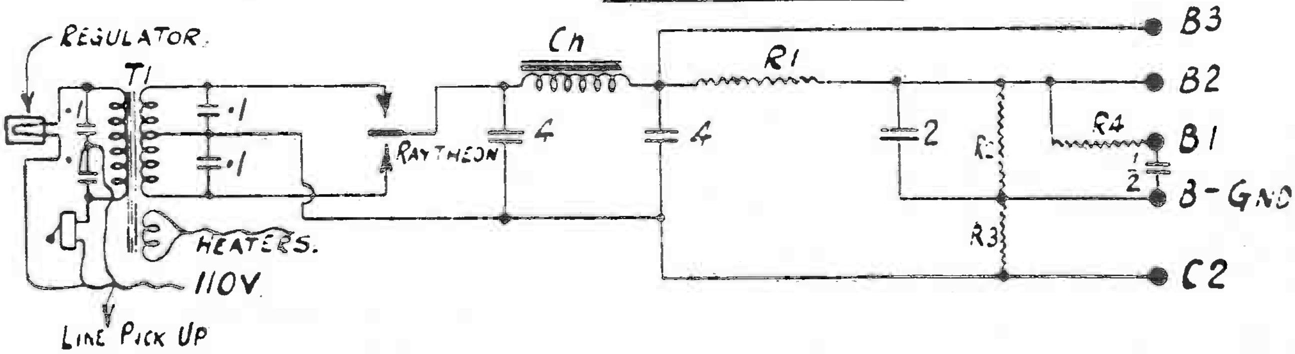
3000 OHM REGENERATION CONTROL PT No 2017

150000 " VOLUME CONTROL " " 2016

T2 AND T3 :- " " 182F.

R6 = 400 OHMS :- " " 2166.

POWER UNIT.



SPECIFICATIONS.

POWER UNIT FOR TYPE 15 POWER TUBE.

T1 :- UNIVERSAL (25 AND 60 CYCLE) PART 2260

Ch PART 2271.

REGULATORS. { 25 CYC TYPE 6-20 REGULATOR
60 " " 4H-20 " }

R1 = 7000ω R2 = 20000ω R3 = 1390ω R4 = 50000ω LAVITE

B3 = 250V. B2 = 110V. B1 = 30V. C2 = 50V. 10½ M.F. COND.

1/10 COND - 800V. FLASH TEST PT 2285.

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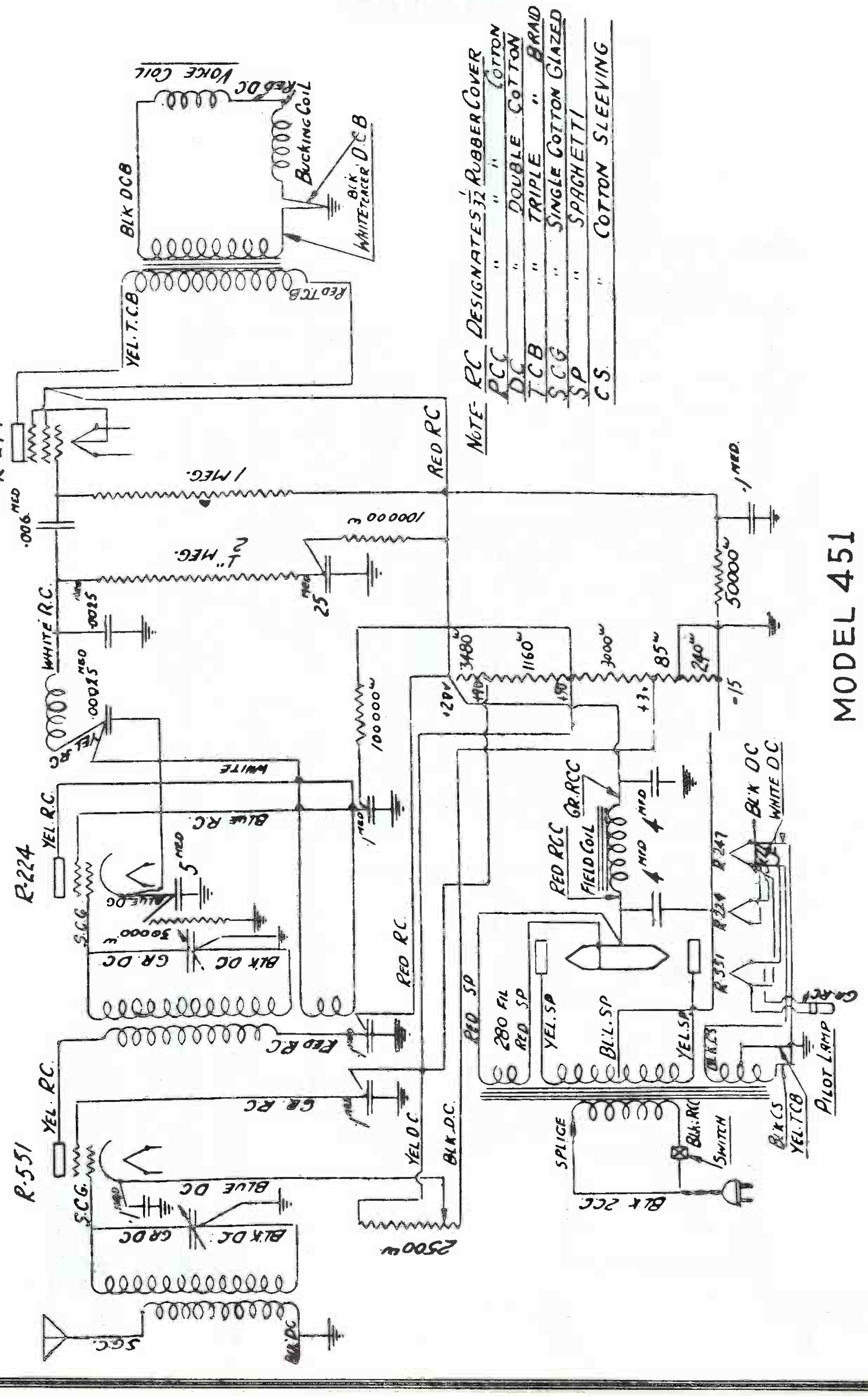

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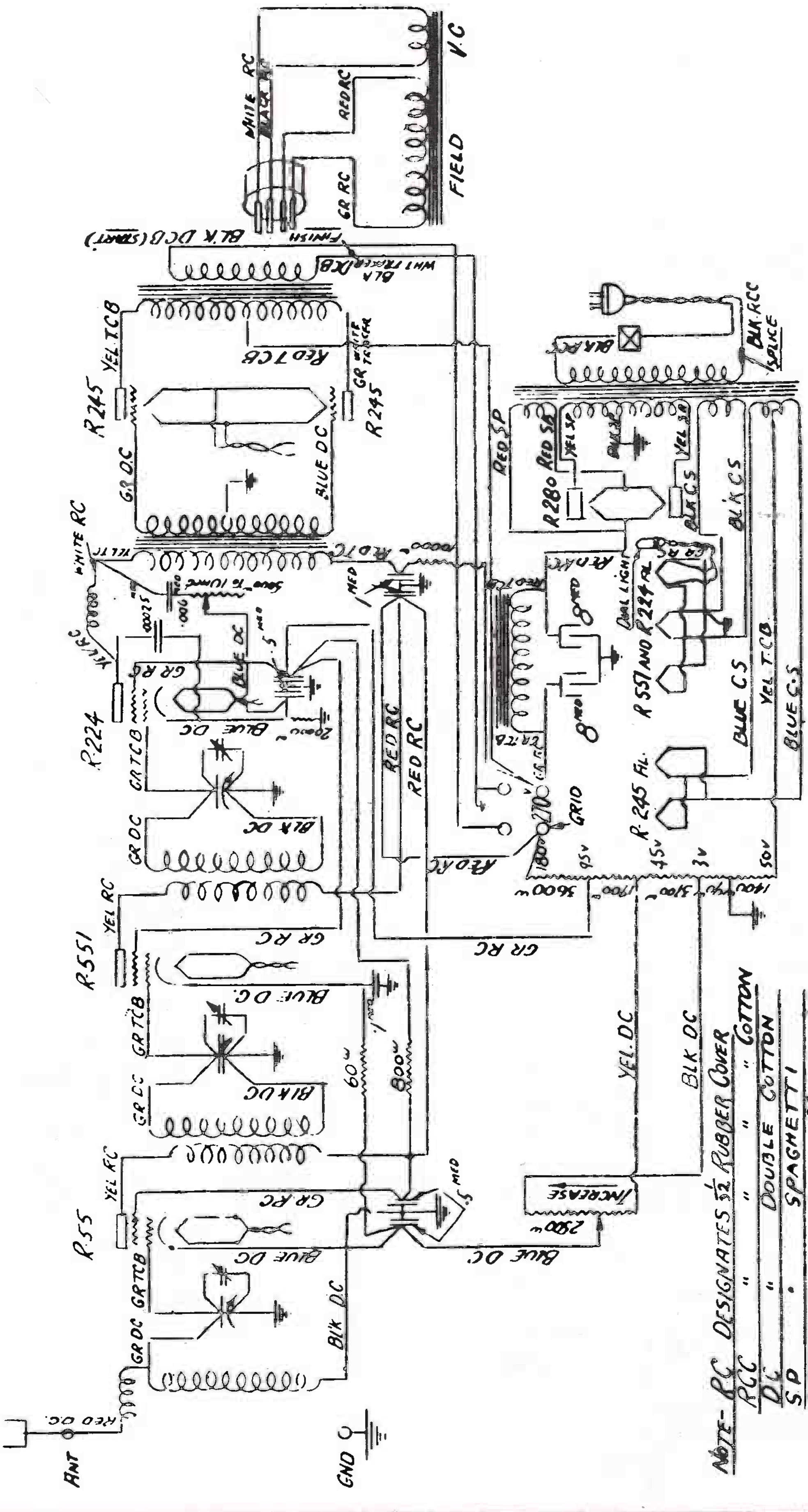

MODEL-545

NOTE- RC DESIGNATES 1/32 RUBBER COVER
RCC " " " COTTON
DC " DOUBLE COTTON
SP " SPAGHETTI
CS " COTTON SLEEVING

NOTE- ALL DC VOLTAGES MEASURED TO GROUND AND AC VOLTAGES MEASURED AT SOCKETS.

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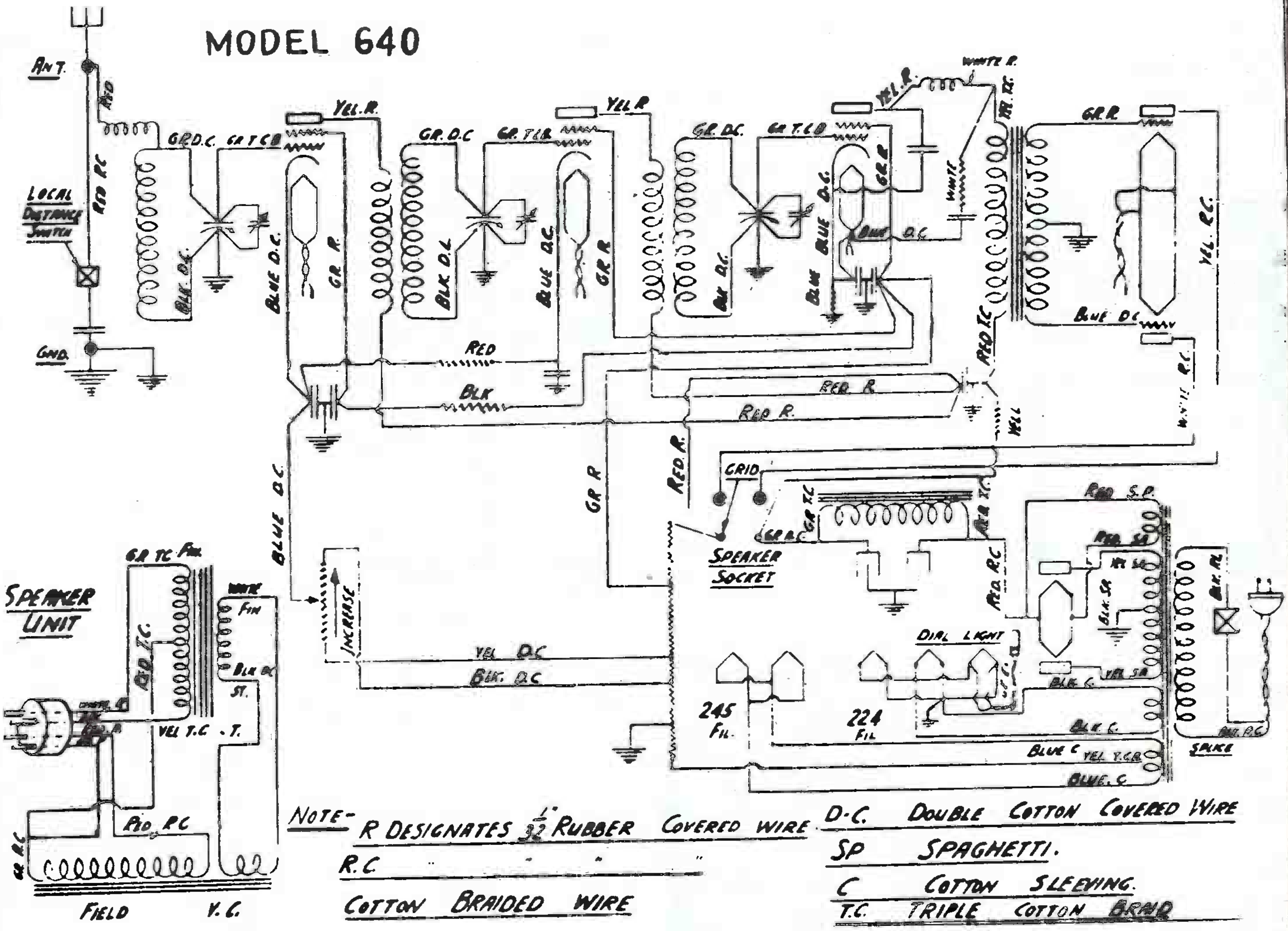
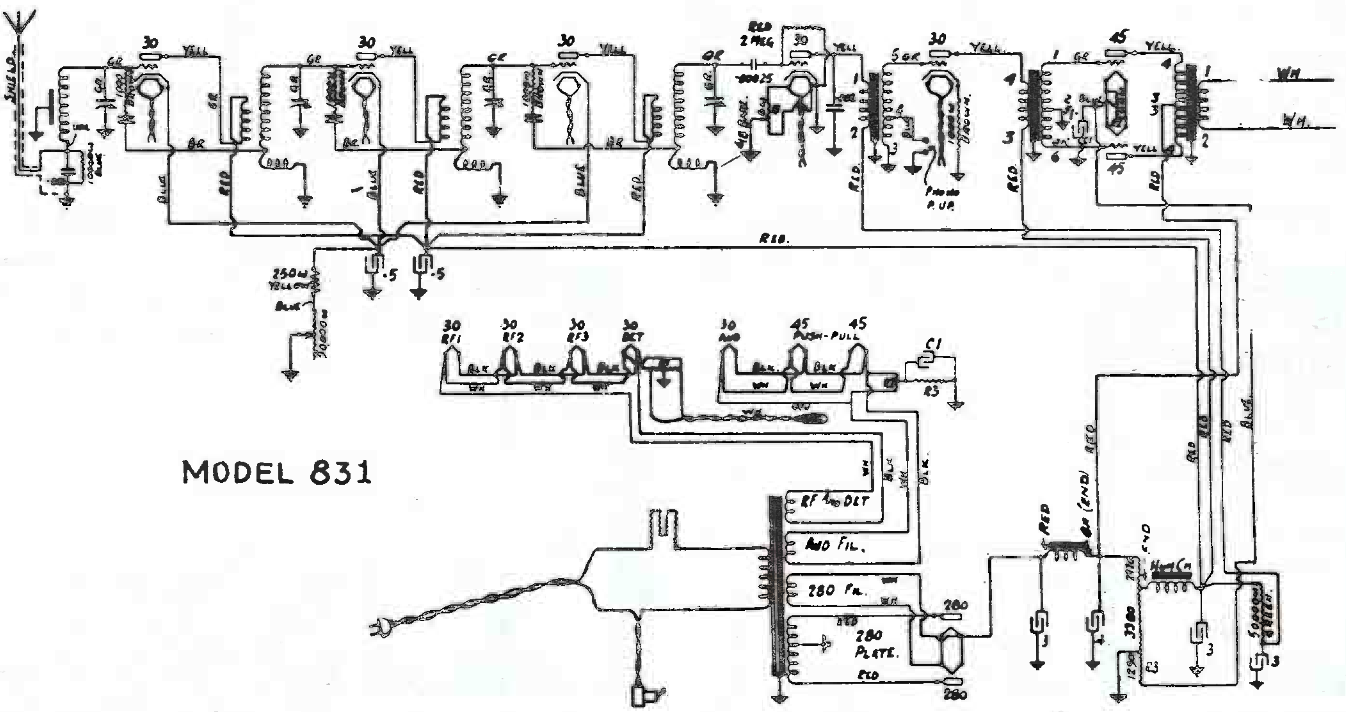
MODEL 640



NOTE- R DESIGNATES $\frac{1}{32}$" RUBBER COVERED WIRE
R.C " " " "
COTTON BRAIDED WIRE

D.C. DOUBLE COTTON COVERED WIRE
SP SPAGHETTI.
C COTTON SLEEVING.
T.C. TRIPLE COTTON BRAID



MODEL 831

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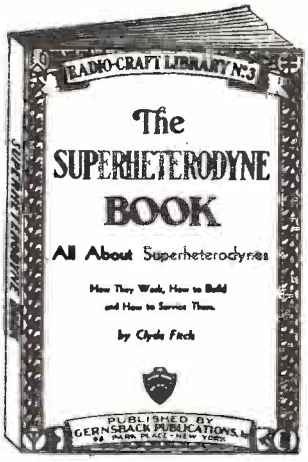
The following is a short list of contents: Basic Principles of the Superheterodyne; The Oscillator; First Detector; Single Dial Tuning Systems; Intermediate Amplifier; Second Detector, Audio Amplifier and Power Supply; Commercial Superheterodyne Receivers; Servicing Superheterodynes.



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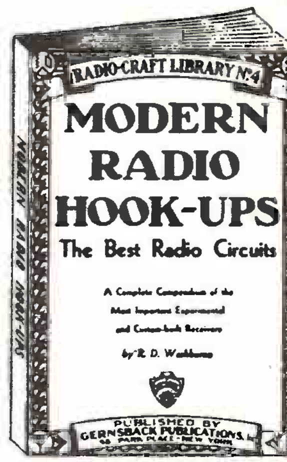
It is fascinating to the experimenter, or even to the up-to-date Service Man, to take a commercial set and to change it into one using a famous hookup that is not found in any manufactured set; and it is usually worth the trouble because results are far superior than in the original. Many excellent circuits have never been commercialized, but limited only to home-set builders. Thousands of these popular circuits have been requested from time to time, and in this book we have included over 150 circuits, which include the famous Peridyne, Cash-Box A.C.-D.C. Set and others.

The circuits cover the following: BROADCAST RECEIVERS, ALL-WAVE RECEIVERS, SHORT-WAVE RECEIVERS, CONVERTERS AND ADAPTERS, TELEVISION RECEIVERS, HOME RECORDING APPARATUS, AUTOMOBILE RECEIVERS, AUDIO AND POWER AMPLIFIERS, POWER UNITS and MISCELLANEOUS EQUIPMENT.



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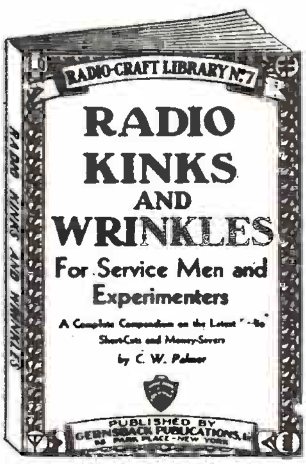

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For Service Men and Experimenters
A Complete Compendium on the Latest Radio Short-Cuts and Money-Savers

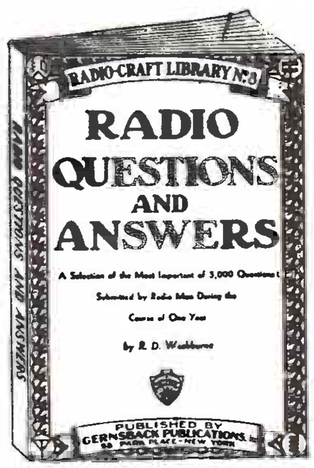
By C. W. PALMER

It often becomes necessary for experimenters and Service Men to call upon their memory for some short cut or radio wrinkle that will solve a problem quickly. In business "short cuts" mean time and money saved, and to the Service Man "time saved" means money earned.

This book is a compilation of important radio kinks and wrinkles; the entire contents of the book has been selected with great care in order to discuss only such items as are constantly used today.

Here are some of the more important chapters: Introduction; Servicing Short-Cuts; Testing Equipment and Meters; Vacuum Tubes and Circuits; Volume-control Methods; Amplifiers and Phonograph Reproducers; Power Supply Equipment; Coils and Tuning Circuits; Short Waves; Loud Speakers; Tools and Accessories.

RADIO QUESTIONS AND ANSWERS



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A Selection of the Most Important of 5,000 Questions Submitted by Radio Men During the Course of One Year
By R. D. WASHBURNE

There has been collected a wide variety of questions which have come into our editorial offices during the past two years, and only those whose answers would benefit the majority of men engaged in radio have been incorporated in this amazing question and answer book.

The tremendously long list of topics better explains the subjects which are treated. Here are the titles:

Radio Servicing; Receiver Design; Theory; Home Recording; Television; Sound Equipment; Short Waves; Antennas; Operating Notes; Test Equipment; Vacuum Tubes; Engineering; Ultra-Short-Waves; Police Radio; Reproducers; Graphs; Superheterodynes; Automotive Sets; Power Packs; Automatic Volume Controls; Remote Control Devices; Aligning Procedure; Photoelectricity; Tone Control; Coil Construction; Adapters; Measuring Apparatus; Band-Selectors; Meters; Symbols; Microphones; Converters; Definitions; Public Address Equipment; Modernizing Methods; Set Analyzers; Midget Sets; Oscillators; Phonograph Pickups; Tube Testers; Diagrams.

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SUPPLEMENT No. 2

Index and Incidental Information

THE index below lists all the diagrams contained in both the first and second supplements to the 1932 OFFICIAL RADIO SERVICE MANUAL. Place this sheet before page 579, so that it will be as close as possible to the main index. In looking for a particular receiver, be sure to consult both this index *and* the main index.

The completely revised index promised with this supplement could not be completed in time because of the great amount of work involved in its preparation, but it will definitely be included with the third supplement. It will appear in a new and more convenient form, and will include every diagram published in both the 1931 and 1932 MANUALS and in all the supplements. As a record of commercial receivers it will be of great interest and value to all radio Service Men.

Owners of the OFFICIAL RADIO SERVICE MANUAL are requested to observe a few simple rules in regard to the question service. First of all, please bear in mind the fact that it is necessarily limited to matters concerning commercial receivers. Out of justice to the hundreds of Service Men who send in legitimate service inquiries every week, we cannot undertake to do special design work, draw up elaborate diagrams to fit odd collections of parts, enter into involved discussions of radio theory, identify mysterious short-wave stations, or do similar jobs that have no relation to service work.

Answering straight service letters is enough of a problem in itself, as frequently this involves considerable digging through files of service manuals. Sometimes fifteen or twenty minutes of research is necessary merely for a yes or no answer to a question.

We cannot offer opinions on the relative merits of different makes of apparatus, nor can we obtain discounts on any kind of merchandise. If you want catalogs or special data from a manufacturer, write to him directly; if you do not know his address, send your letter, in a stamped envelope, to us, and we will forward it.

Please be reasonable and limit your questions to not more than three or four per letter, and send *one* coupon for *each* question. Please write clearly; use a typewriter if you have one, or at least pen and ink and white paper. We have a "dead letter" file containing dozens of letters that cannot be answered because names or addresses, or both, have been omitted, or the writing is undecipherable, or the language is one that no scholar can identify.

* * *

Many owners of the MANUAL evidently have not read the first section of the book, which contains a wealth of practical service data that answers many of their everyday service problems. For intance, we have had dozens of requests for the R.M.A. standard color code, yet this is fully explained on page 117. Take an evening off sometime and study the section from page 5 to 129. You'll be surprised to see how much you can learn.

* * *

Past issues of RADIO CRAFT have contained articles describing servicing instruments of various kinds. The following list should be remembered for reference. Back copies of the magazine cost 25 cents each and may be obtained from RADIO CRAFT, 98 Park Place, New York, N. Y. Specify the issue you want.

"How to Test the Pentodes", page 155, September, 1931.

"Modernizing the Jewell 133A Analyzer", page 211, October, 1931.

"Mutual Conductance Meter", page 282, November, 1931.

"Magic in Meters", November and December, 1931, and January, 1932. (These articles tell everything you want to know about shunts and multipliers for all kinds of meters.)

"Vacuum Tube Voltmeter", page 466, February, 1932.

"The Supreme Diagnometer", February, March and April, 1932.

"Short-Checkers and Pre-Heaters", page 474, February, 1932, and page 535, March, 1932.

"A Service Test Panel for the Shop", page 533, March, 1932.

"Improving the Weston 537 Analyzer", page 605, April, 1932.

"Combination Oscillator and Tube Tester", page 586, April, 1932.

"Constructing a Simple Set Tester", page 659, May, 1932.

"Servicing Modern Supers", page 670, May, 1932.

"A Modern Tube Checker", page 671, May, 1932.