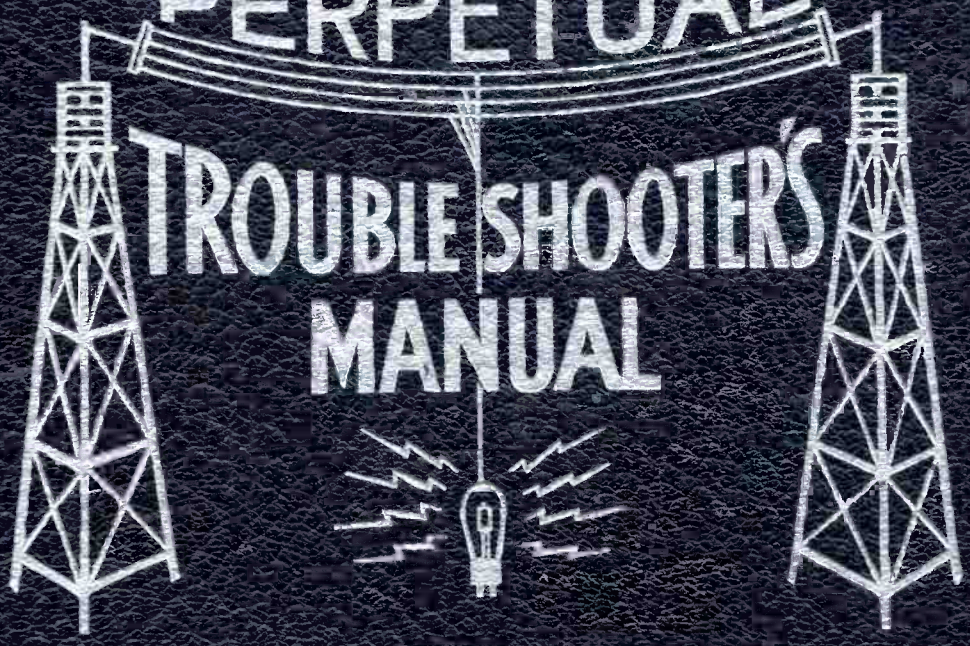
VOLUME I

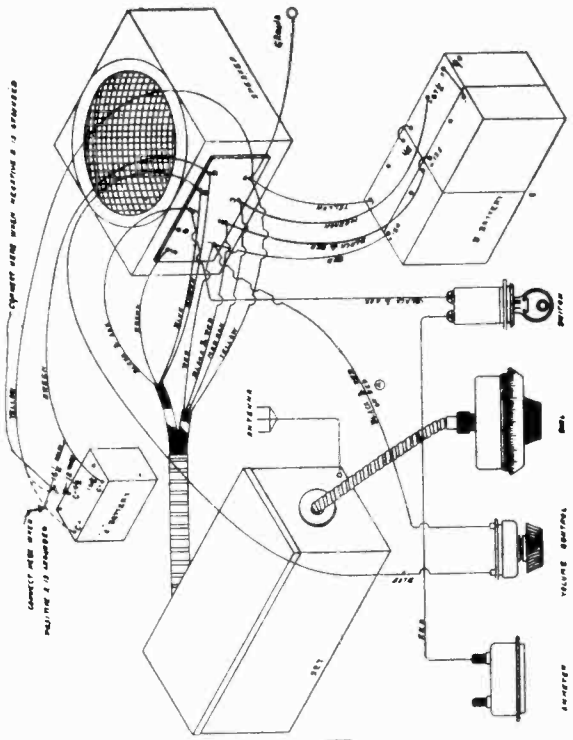
PERPETUAL TROUBLE SHOOTER'S MANUAL

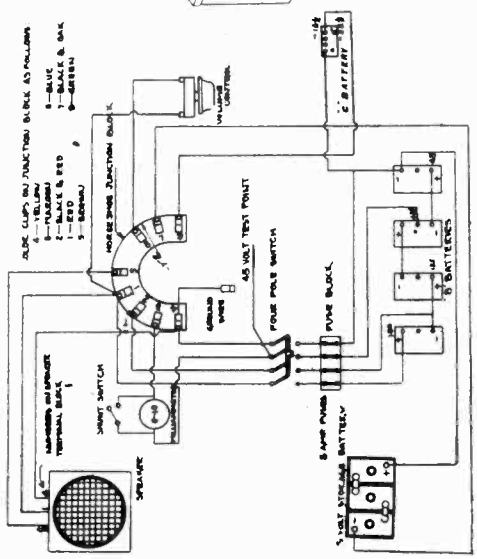


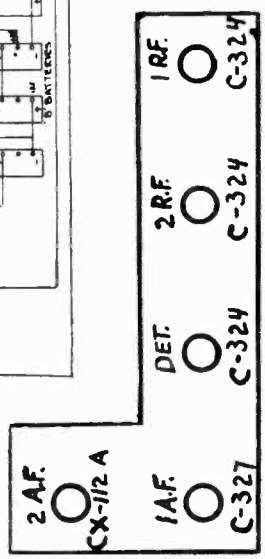
JOHN F. RIDER

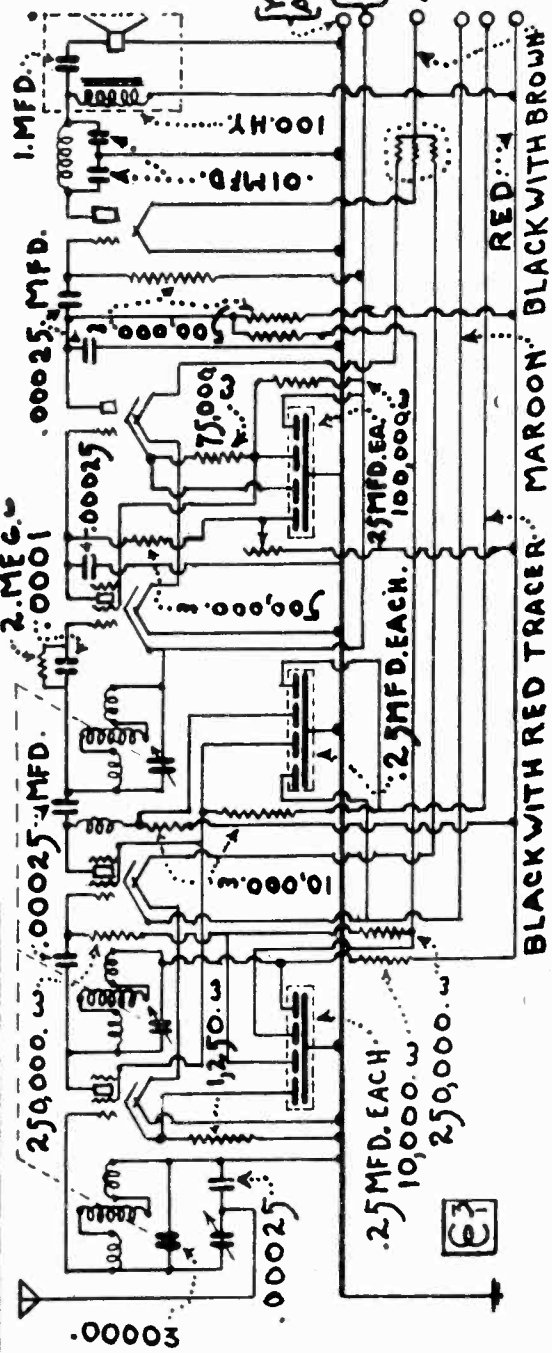
DELCO RADIO CORP

MODEL 3002









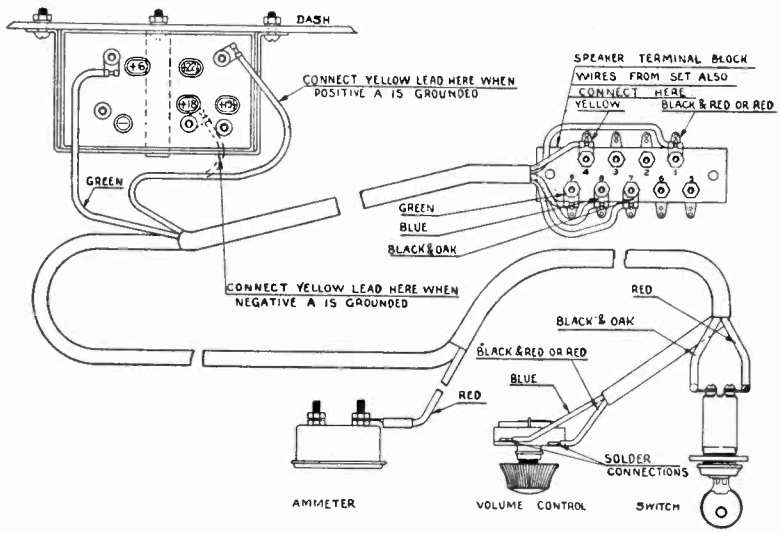
Delco Radio Model 3002

Type of Tube	Position of Tube	Tube in Test Kit					
		Filament Volts	Plate Volts	Control Grid Volts	Screen Volts	Plate M.A. Current	Plate M.A. Grid Test
224	1—R. F.	1.9	125	4.8	100	3.2	5.4
224	2—R. F.	1.9	72	0	42	2.2	2
224	Detector	1.9	15	0	10	.13	0
227	1—A. F.	1.9	45	1	-	.19	.27
212-A	2—A. F.	3.9	137	.2	-	5.5	10.5

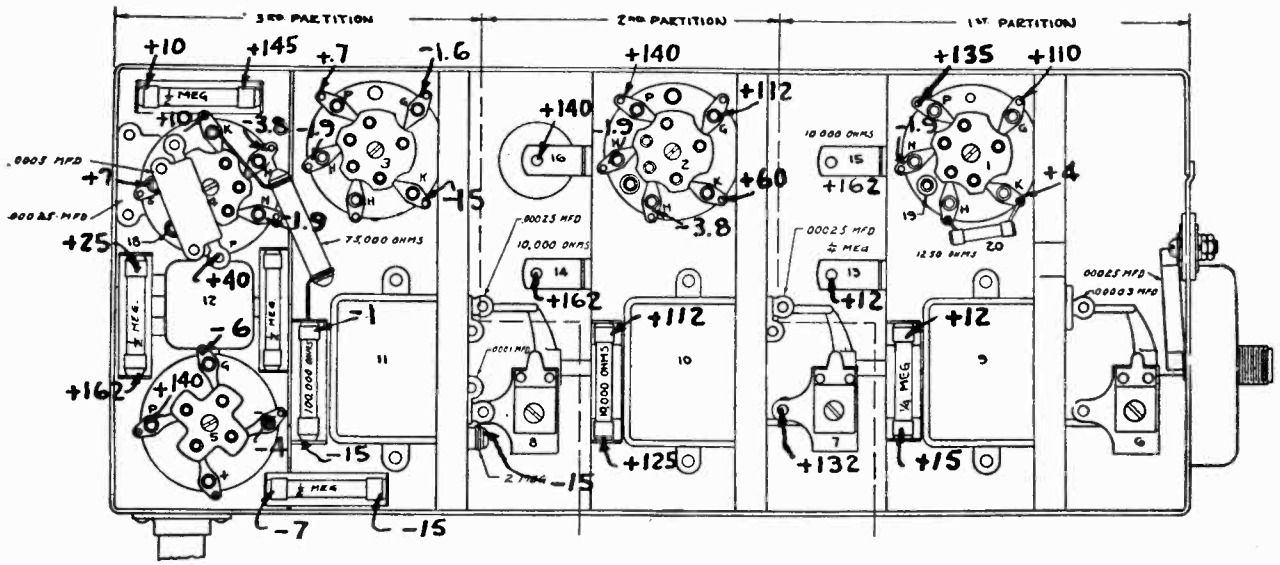
MODEL 3002
Notes
Parts Layout

DELCO RADIO CORP

After the set is in operation on a powerful signal, it will be necessary to tune the antenna circuit so that weaker signals will be received with the maximum volume. The best way to do this is to connect a milliammeter, with a zero to ten milliampere scale, in series with the B Plus 67.5 volt maroon lead. (Connect positive side of meter to set.) Insert a small screw driver in the hole in the bottom of the receiver located nearest the antenna terminal and adjust the large screw on the first balancing condenser. This is located about two inches above the hole. Adjustments should be made by turning the screw until the minimum reading on the meter is obtained. While this adjustment is being made, the station selector should be turned slightly in either way to determine whether or not the reading can be further decreased. This adjustment is a very delicate operation and requires only a slight movement in either direction, not to exceed one full turn. If a meter is not available, a weaker signal should be selected and the set adjusted to maximum volume by varying the position of the screw. Care should be taken not to apply excessive pressure in making this adjustment. While it will do no damage to ground the screw driver to the set while adjusting the screw, the signals will be cut out whenever the screw driver touches the case. A little tape wound around the screw driver will prevent this. It is impossible to receive a shock while making this adjustment. Make above adjustment only through the hole located nearest the aerial connection. After installation is complete, check all connections for correct locations and tightness.

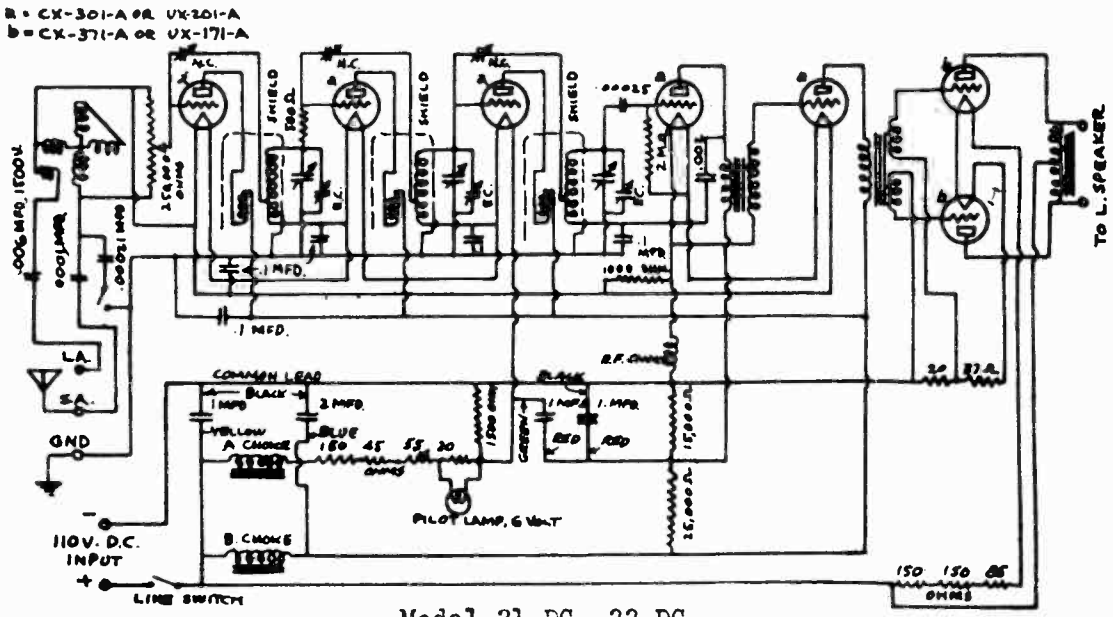


Control Wiring Harness Connections.

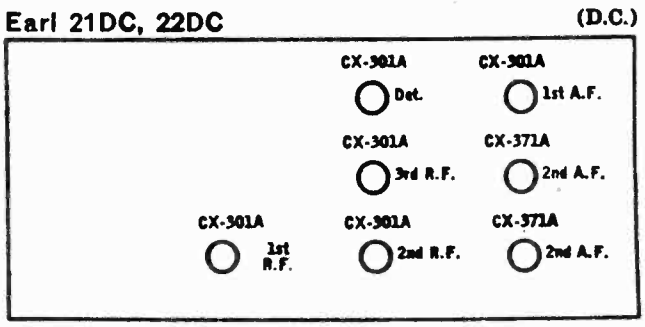


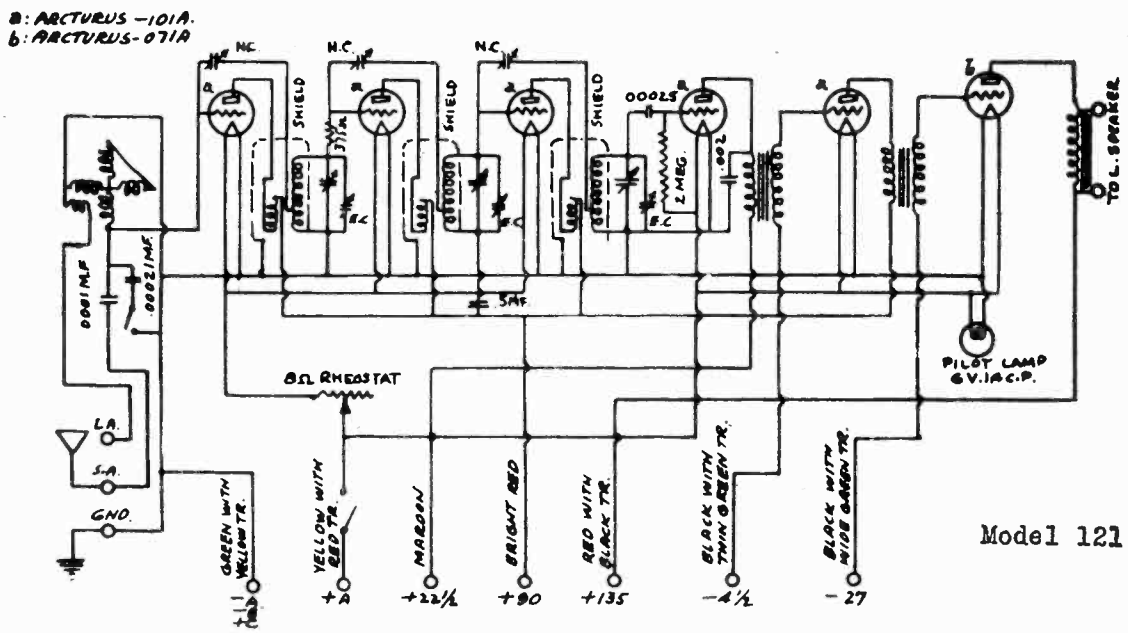
EARL RADIO CORP.

MODEL 21 DC, 22 DC
MODEL 121



Model 21 DC, 22 DC

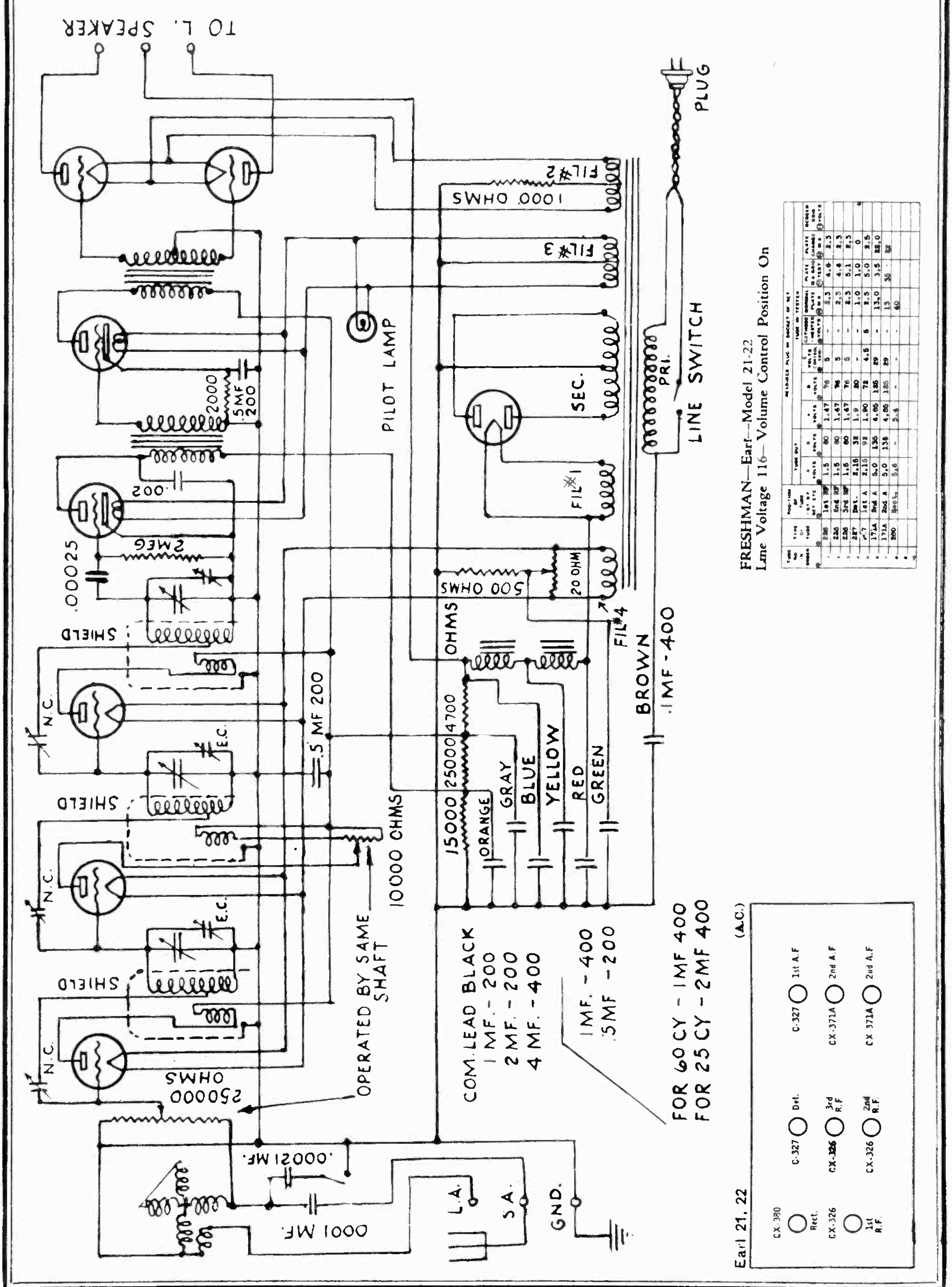




Model 121

MODEL 21, 22 AC
Schematic

EARL RADIO CORP.

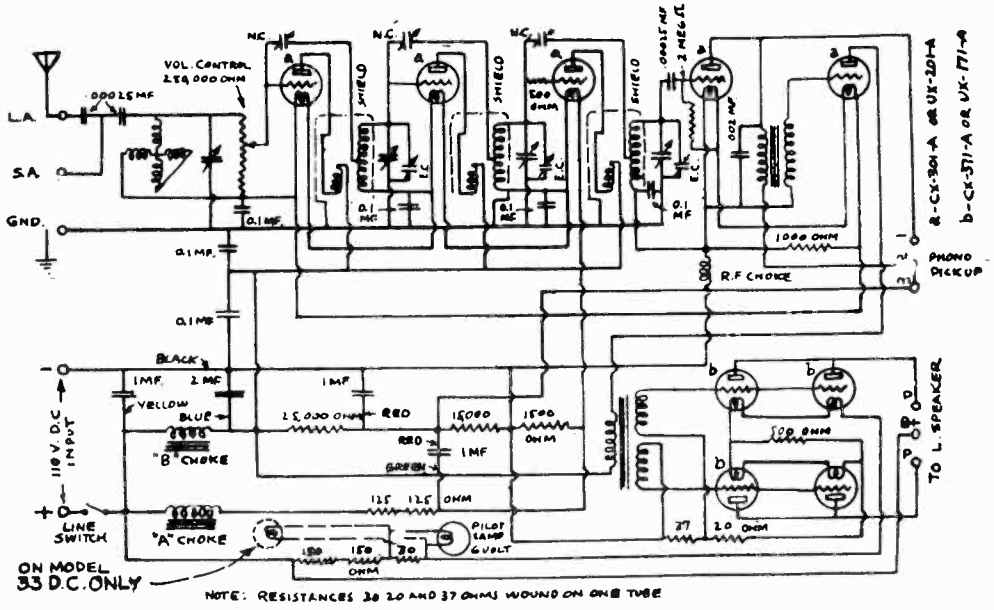


FRESHMAN—Earl—Model 21-22
Line Voltage 116—Volume Control Position On

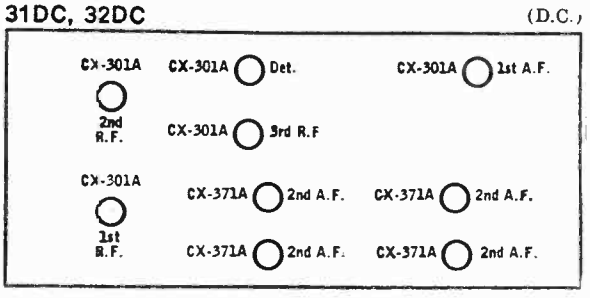
Tube No. in Model	Type of Tube	Position of Tube in Set	Tube Out: A Volts	Tube Out: B Volts	A Volts	B Volts	C Volts (Control Grid)	Cathode Heater Volts	Normal Plate M.A.	Plate M.A. Grid Test	Plate Change M.A.	Screen Grid Volts
1	226	1st RF	1.5	80	1.47	76	5	-	2.3	4.6	2.3	
2	226	2nd RF	1.6	80	1.47	76	5	-	2.3	4.4	2.3	
3	226	3rd RF	1.6	80	1.47	76	5	-	2.3	5.1	2.3	
4	227	Det.	2.15	32	1.9	30	-	-	1.0	1.0	0	
5	227	1st A	2.15	92	1.90	72	4.5	6	2.5	5.0	2.5	
6	171A	2nd A	5.0	136	4.85	135	29	-	13.0	3.5	12.0	
7	171A	2nd A	5.0	136	4.85	135	29	-	13	35	[illegible]	
8	280	Rect.	5.4	-	5.4	-	-	-	60			
9												
10												

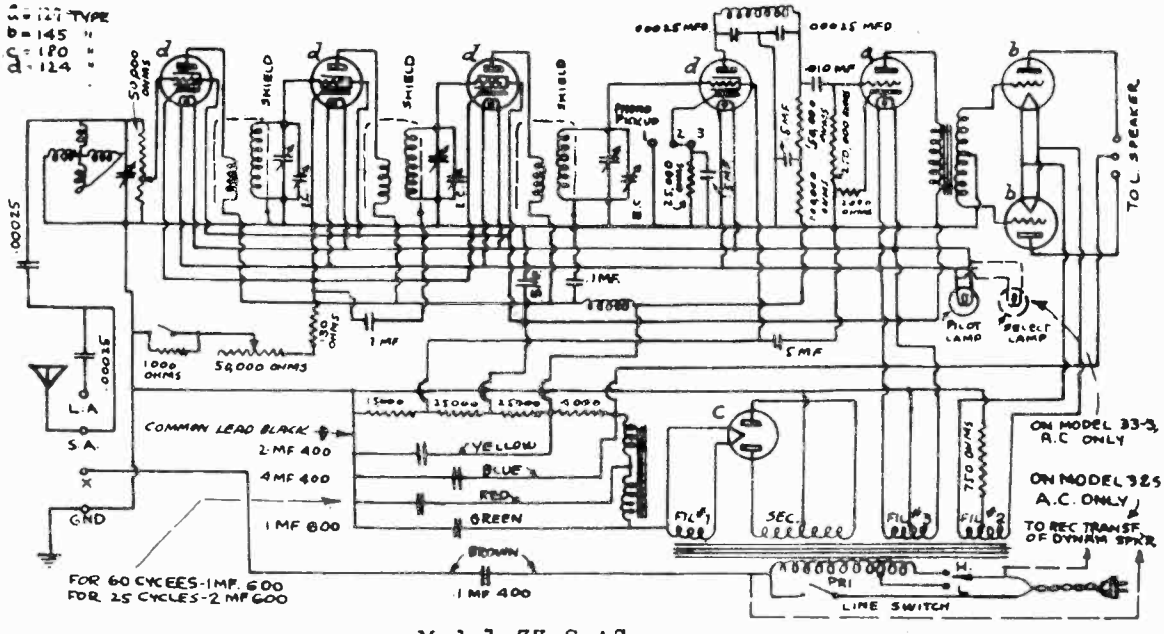
MODEL 24 DC
MODEL 31 DC, 32 DC
MODEL 33-S A C
Schematic

EARL RADIO CORP.



Model 24 DC, 31 DC, 32 DC

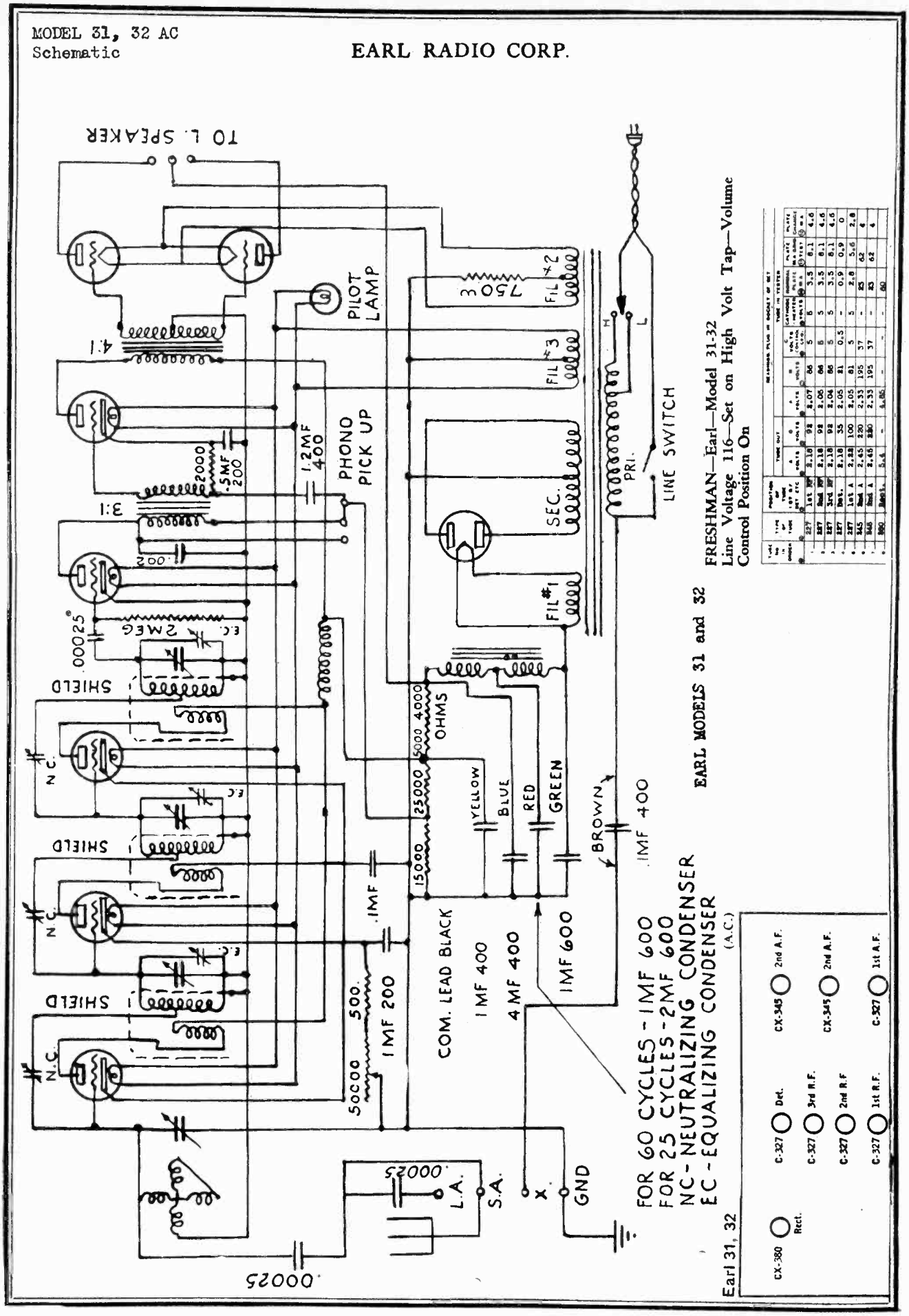




Model 33-S AC

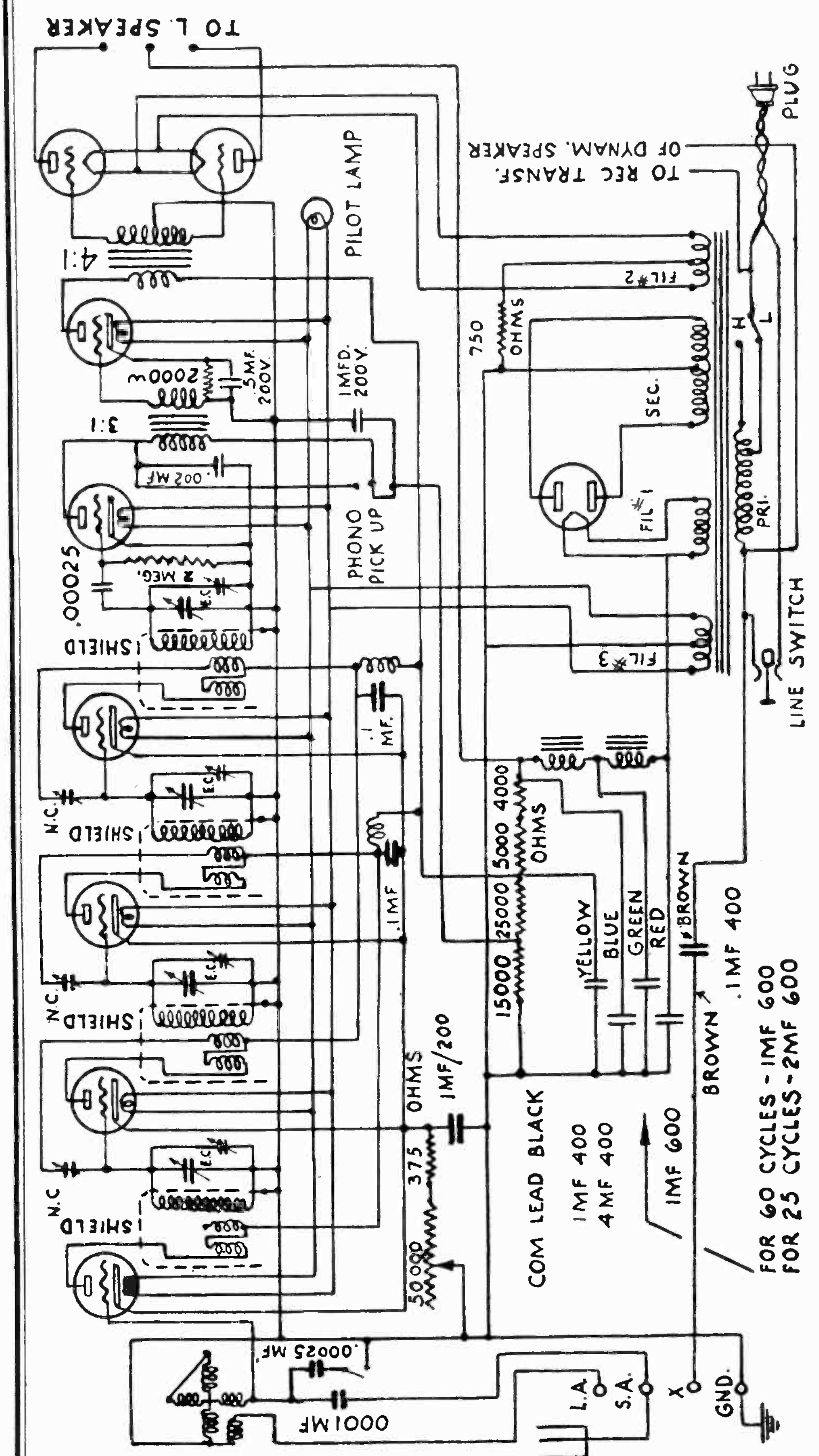
MODEL 31, 32 AC
Schematic

EARL RADIO CORP.



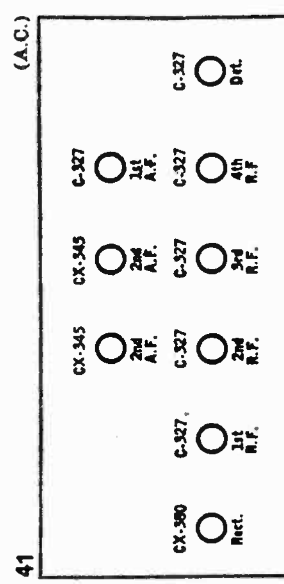
EARL RADIO CORP.

MODEL 41, 42 AC
Schematic



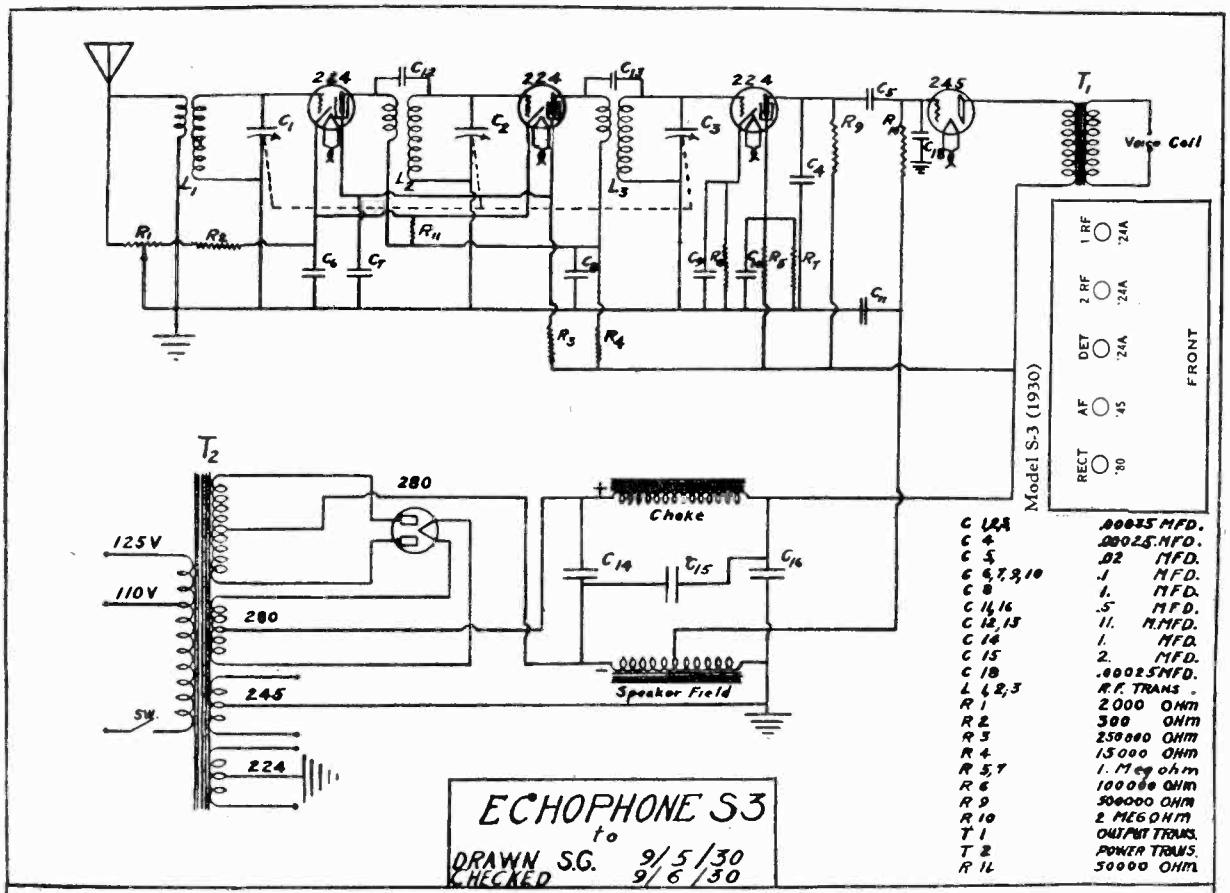
FRESHMAN—Earl—Model 41
Line Voltage 116—Set on High Volt Tap—Volume Control Position On

Tube No. in Order	Type of Tube	Position of Tube 1st R.F. Det. etc.	Tube Out: A Volts	Tube Out: B Volts	Readings Plug in Socket of Set: A Volts	B Volts	C Volts Control Grid	Tube in Tester: Cathode Heater Volts	Normal Plate mA	Plate mA Grid Test	Plate Change mA	Screen Grid Volts
1	227	1st RF	2.40	75	2.25	72	4	5	2.8	5.6	2.7	
2	227	2nd RF	2.40	75	2.25	72	4	5	2.8	5.5	2.8	
3	227	3rd RF	2.40	75	2.27	72	4	5	2.8	5.5	2.7	
4	227	4th RF	2.40	75	2.25	72	4	5	2.8	5.5	2.7	
5	227	Det.	2.40	26	2.25	15	1.5	0	1.0	1.0	0	
6	227	1st A	2.46	82	2.32	67	4	5	2.4	4.8	2.4	
7	245	2nd A	2.57	208	2.57	183	35	-	28	50	4	
8	245	2nd A	2.57	208	2.57	183	35	-	28	50	4	
9	280	Rect.	5.5	-	4.8	-	-	-	65	-	-	



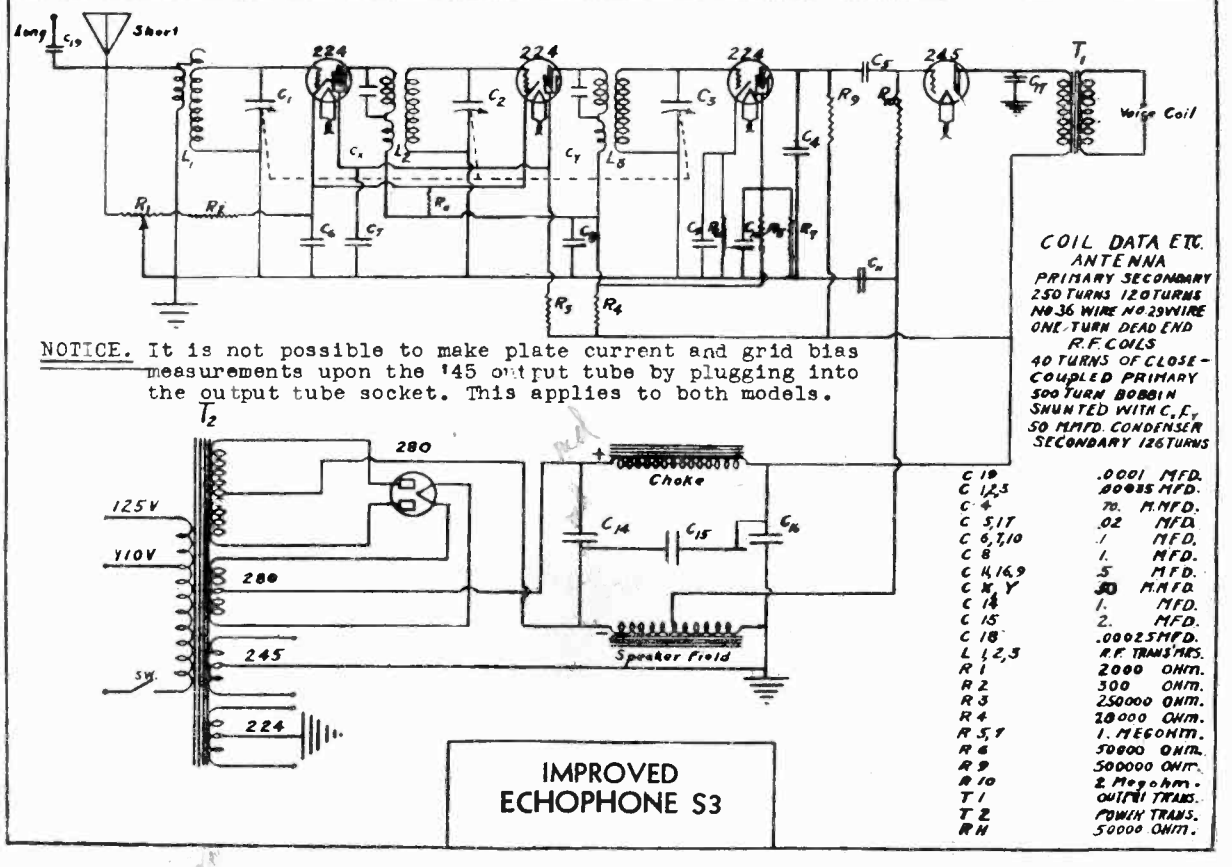
ECHOPHONE RADIO MFG. CO.

MODEL S-3
MODEL S-3 (Rev.)
Schematic



C 1,2,3	.00035 MFD.
C 4	.000125 MFD.
C 5	.02 MFD.
C 6,7,9,10	.1 MFD.
C 8	1. MFD.
C 11,16	.5 MFD.
C 12,13	11. MMFD.
C 14	1. MFD.
C 15	2. MFD.
C 18	.00025 MFD.
L 1,2,3	R.F. TRANS.
R 1	2000 OHM
R 2	300 OHM
R 3	250000 OHM
R 4	15000 OHM
R 5,7	1. Meg ohm
R 6	100000 OHM
R 9	500000 OHM
R 10	2 MEGOHM
T 1	OUTPUT TRANS.
T 2	POWER TRANS.
R 11	50000 OHM

ECHOPHONE S3
to
DRAWN S.G. 9/5/30
CHECKED 9/6/30



NOTICE. It is not possible to make plate current and grid bias measurements upon the '45 output tube by plugging into the output tube socket. This applies to both models.

COIL DATA ETC.
ANTENNA
PRIMARY SECONDARY
250 TURNS 120 TURNS
NO. 36 WIRE NO 29 WIRE
ONE TURN DEAD END
R.F. COILS
40 TURNS OF CLOSE-COUPLED PRIMARY
500 TURN BOBBIN
SHUNTED WITH C, F, 50 MMFD. CONDENSER
SECONDARY 126 TURNS

C 19	.0001 MFD.
C 1,2,3	.00035 MFD.
C 4	70. M.MFD.
C 5,17	.02 MFD.
C 6,7,10	.1 MFD.
C 8	1. MFD.
C 11,16,9	.5 MFD.
C X, Y	50 M.MFD.
C 14	1. MFD.
C 15	2. MFD.
C 18	.00025 MFD.
L 1,2,3	R.F. TRANSFRS.
R 1	2000 OHM.
R 2	300 OHM.
R 3	250000 OHM.
R 4	20000 OHM.
R 5,7	1. MEGOHM.
R 6	50000 OHM.
R 9	500000 OHM.
R 10	2 Megohm.
T 1	OUTPUT TRANS.
T 2	POWER TRANS.
R H	50000 OHM.

IMPROVED
ECHOPHONE S3

MODEL S-3
Voltage
Notes

ECHOPHONE RADIO MFG. CO.

Model S-3

1. **Plate of 245 Tube**
   #5 to ground
   Normal ..... 250 volts
   Low ..... 235 volts
   High ..... 275 volts

2. **R. F. Plate**
   #25 to ground
   Normal ..... 140 volts
   Low ..... 120 volts
   High ..... 160 volts

3. **R. F. Screen**
   #14 to ground
   Normal ..... 60 volts
   Low ..... 50 volts
   High ..... 75 volts

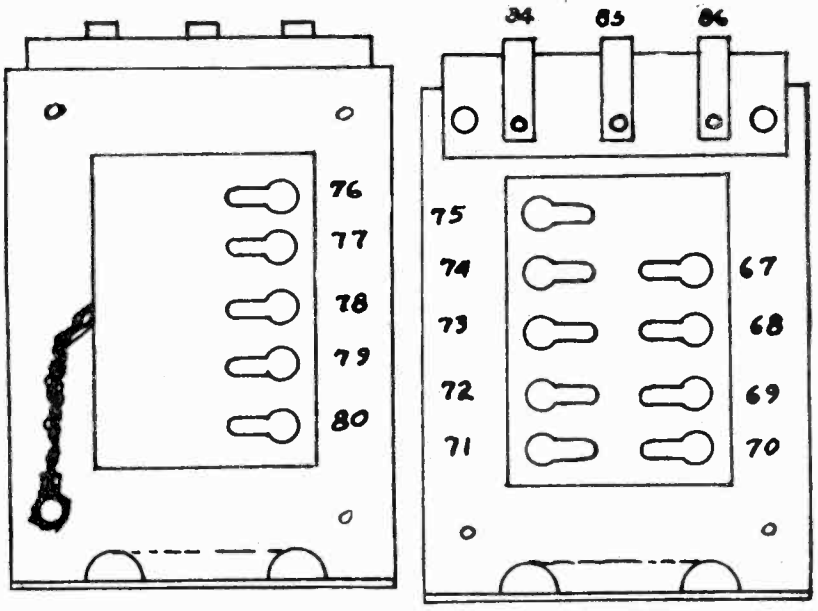
4. **Detector Plate**
   #13 to ground
   Normal ..... 80 volts
   Low ..... 70 volts
   High ..... 90 volts

5. **Detector Screen**
   #9 to ground
   Normal ..... 25 volts
   Low ..... 20 volts
   High ..... 30 volts

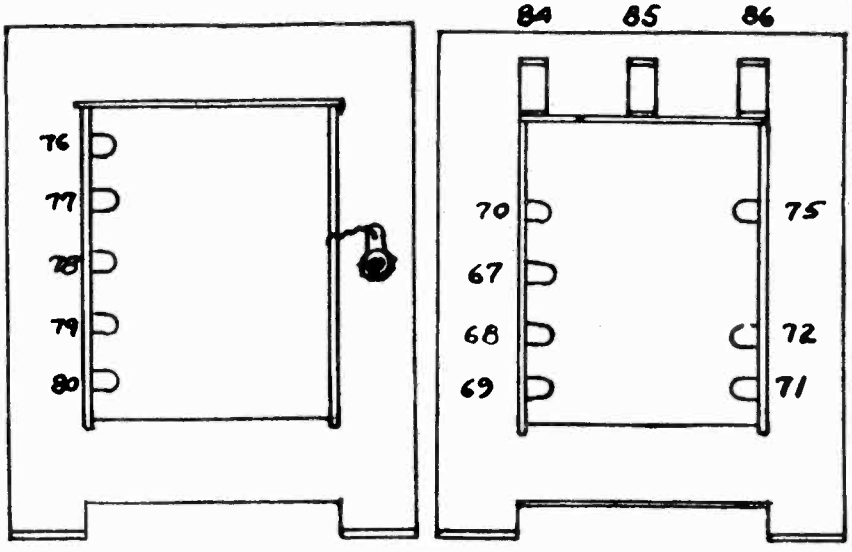
6. **Detector Cathode**
   #10 to ground
   ..... 5 to 10 volts

7. **R. F. Cathode**
   #15 to ground
   ..... 1.5 to 2.5 volts

8. **245 Bias**
   #48 to ground
   Normal ..... 50 volts
   Low ..... 40 volts
   High ..... 55 volts

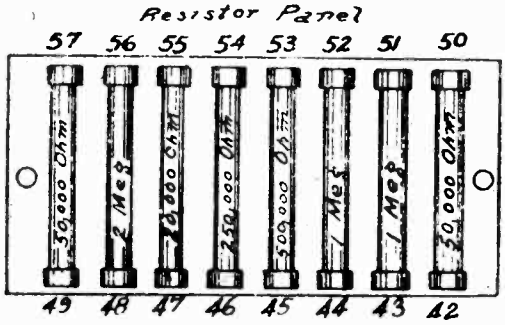


TYPE HA



TYPE JE

Drawing showing corresponding terminal positions on two types of power transformers used on S-3.



Power Transformer

75-73 Pri. winding 74 low voltage tap.

72-71 Fil. winding 280 tube 70 center tap.

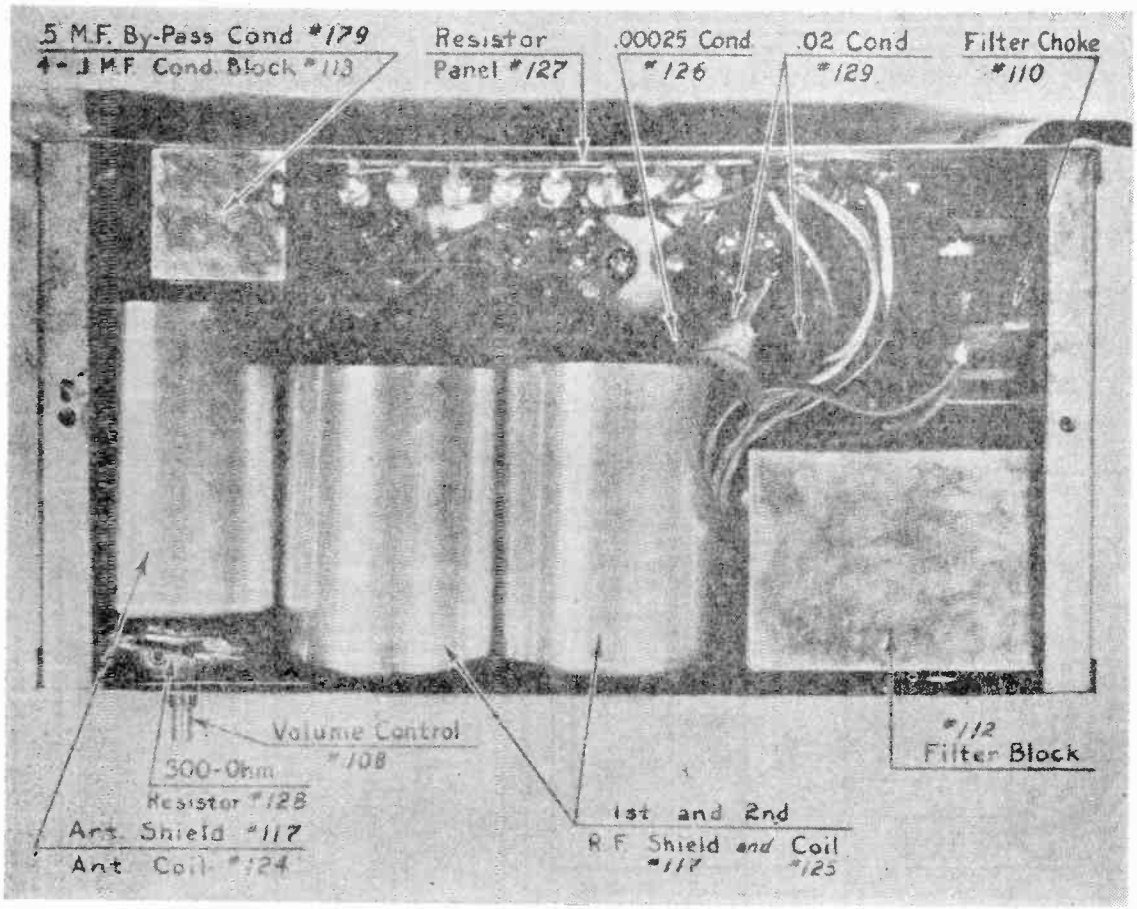
69-67 High voltage Sec. 68 center tap.

76-80 Fil. winding for 224 tubes.

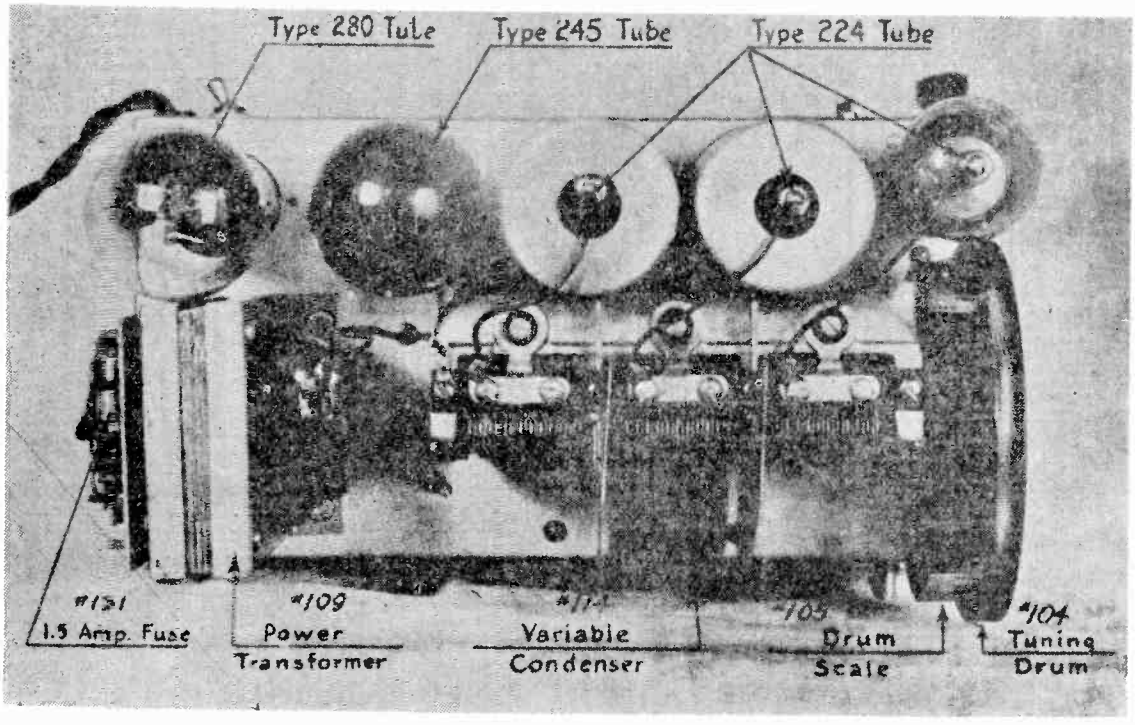
77-79 Fil. winding for 245 tube 78 center tap.

MODEL S-3
Chassis

ECHOPHONE RADIO MFG. CO.



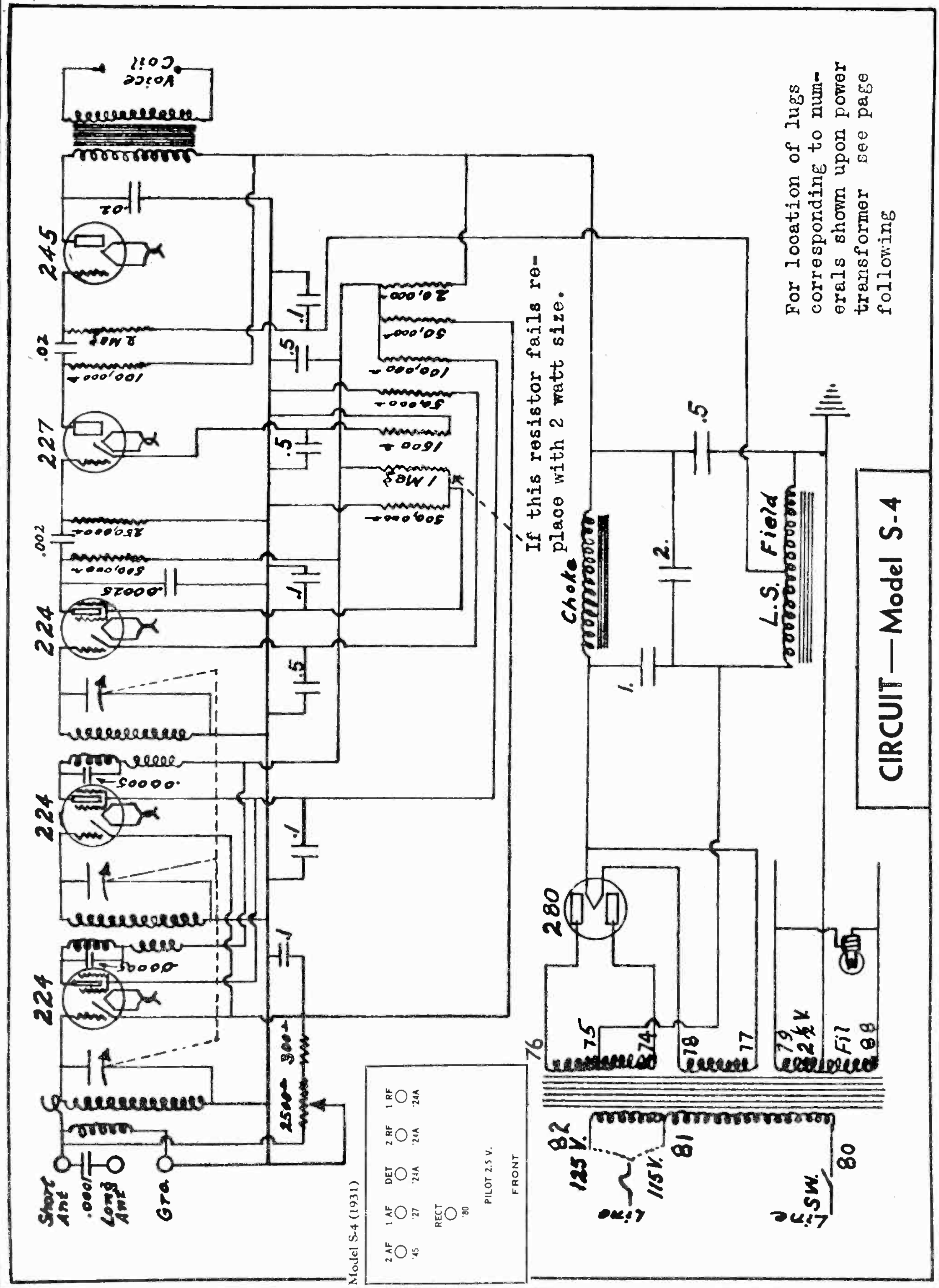
ECHOPHONE — Model S-3



ECHOPHONE — Model S-3

MODEL S-4
Schematic

ECHOPHONE RADIO MFG. CO.

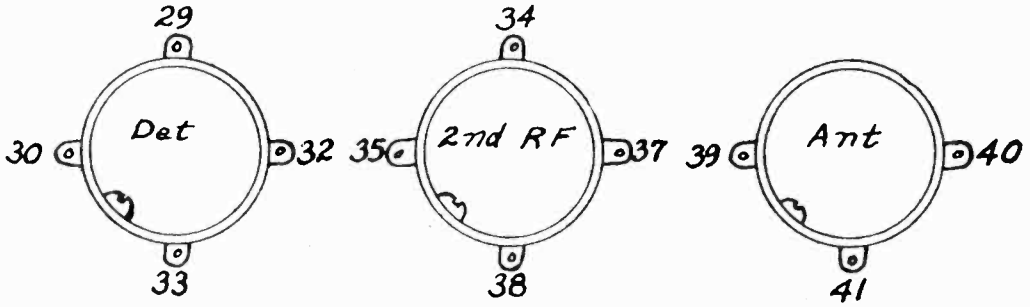


ECHOPHONE RADIO MFG. CO.

MODEL S-4
Voltage
Data

The Antenna coil has a bobbin primary and also a single close-coupled incomplete turn around grid end of secondary coil. The R. F. coils have a bobbin primary and also a close-coupled primary. A .00005 condenser is connected across the bobbin primary.

In some of the later S-4 models bank-wound "Litz" wire coils are used. These R. F. coils have a small honey-comb primary coil mounted in the ground end of the secondary coil and a capacitor across the plate and grid terminals of the coil. The "Litz" antenna coil has a tight-coupled primary wound over the ground end of the secondary coil.



Continuity Chart For
Litz Wire Bank Wound Coils
Echophone
Model – S4

1. Plate of 245 Tube.

#5 to ground

Normal—225 volts
Low— 200 volts
High— 250 volts

2. R. F. Plate.

#25 to ground

Normal—110 volts
Low— 100 volts
High— 120 volts

3. R. F. Screen.

#14 to ground

Normal—50 volts
Low— 40 volts
High— 60 volts

4. Detector Plate.

#13 to ground

Normal—30 volts
Low— 25 volts
High— 50 volts

5. Detector Screen.

#9 to ground

Normal—20 volts
Low— 15 volts
High— 30 volts

6. Detector Cathode

#10 to ground

3 to 6 volts

7. R. F. Cathode.

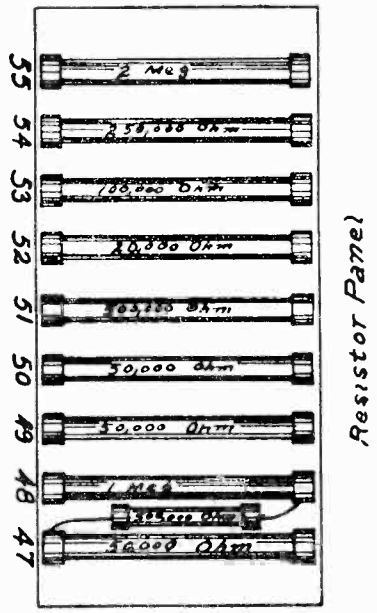
#15 to ground

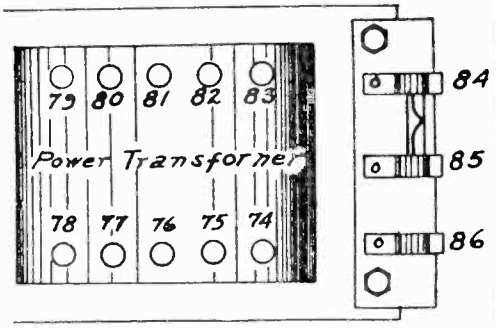
1.5 to 2.5 volts

8. 245 Bias.

#48 to ground

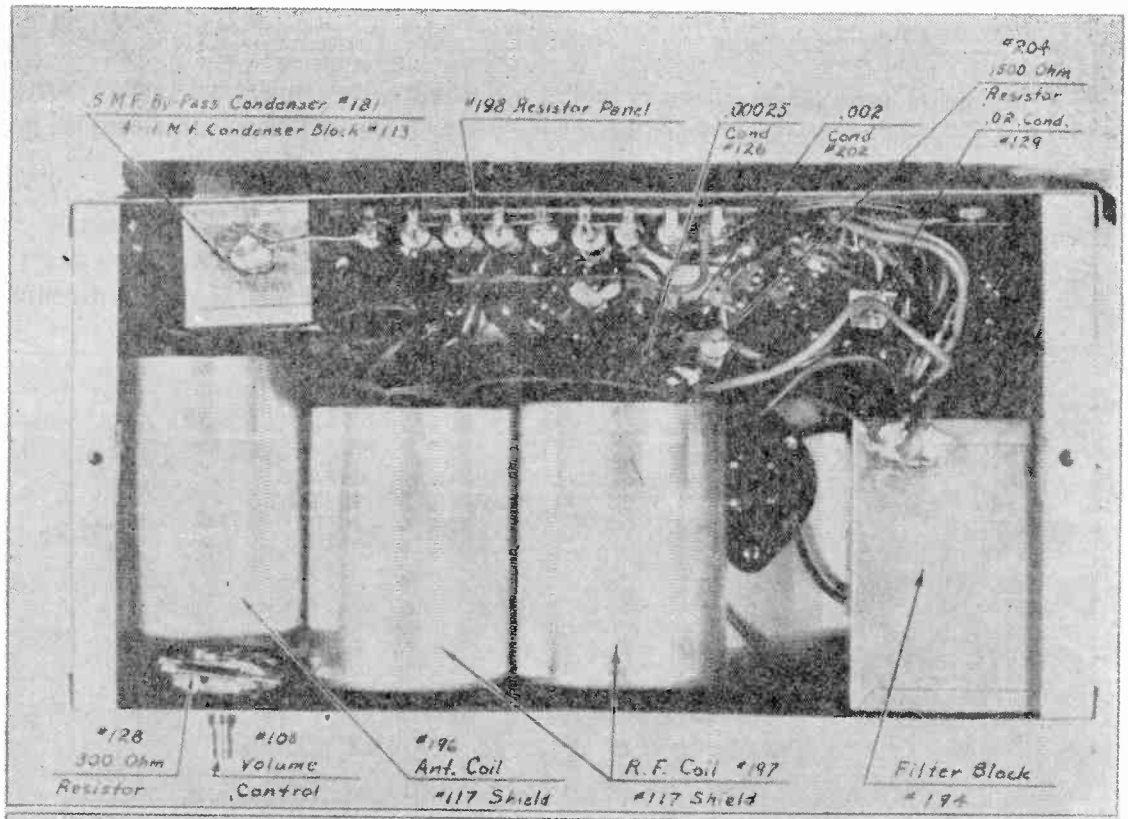
Normal—50 volts
Low— 40 volts
High— 55 volts

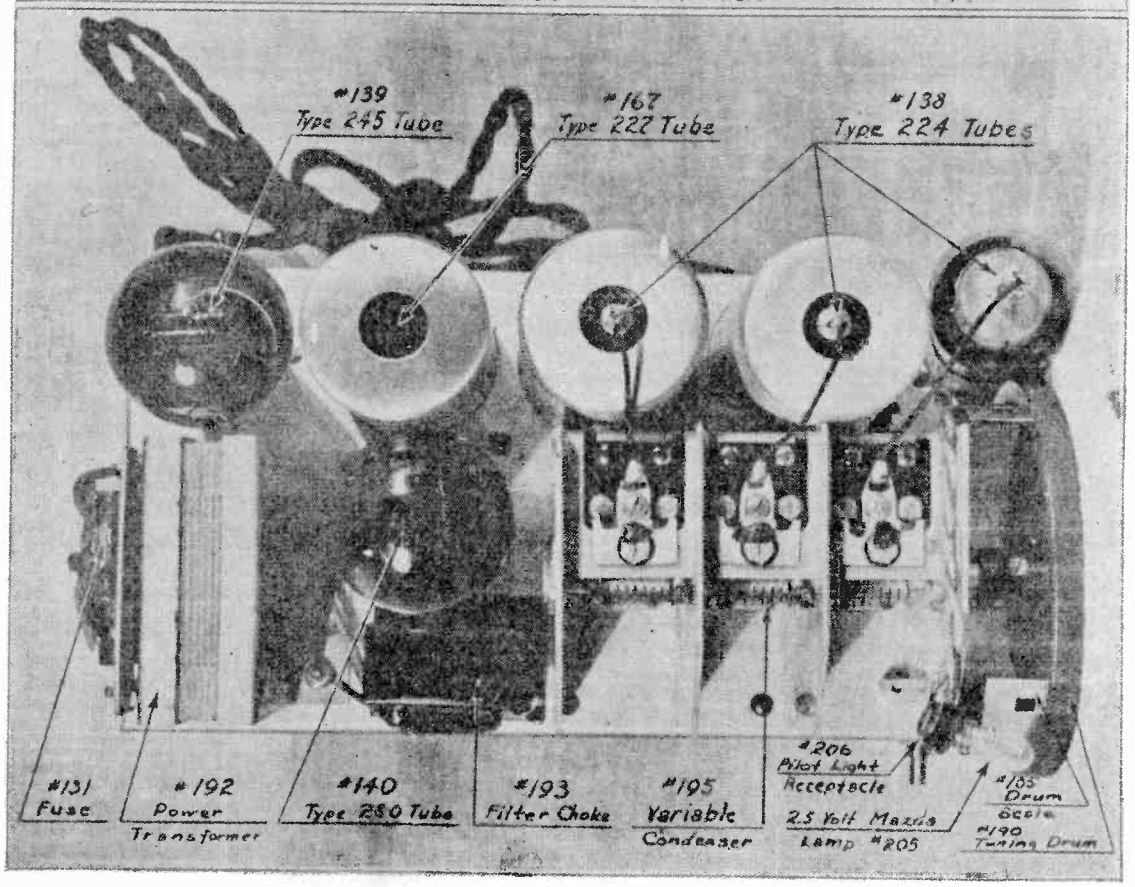




MODEL S-4
Chassis

ECHOPHONE RADIO MFG. CO.

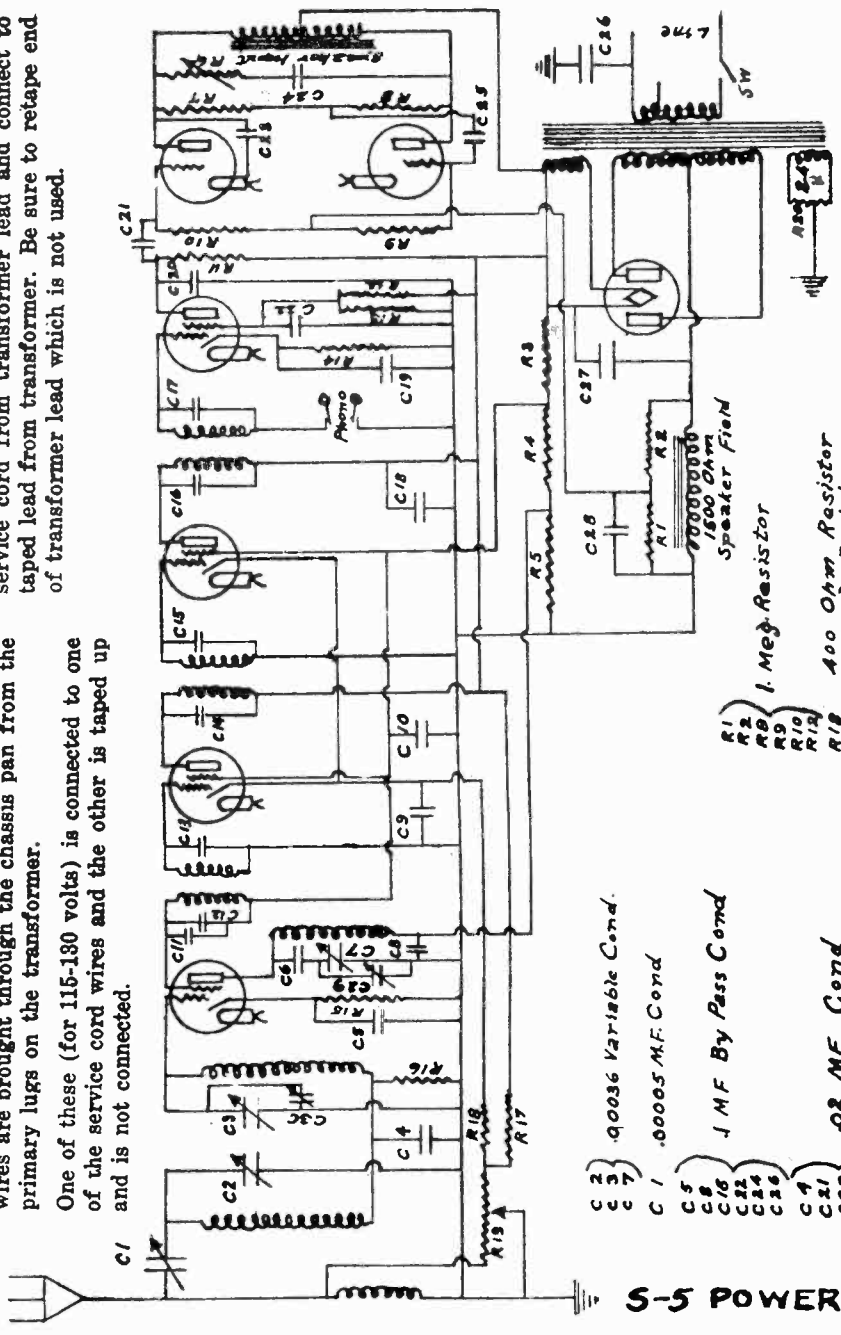




ECHOPHONE Model S-4

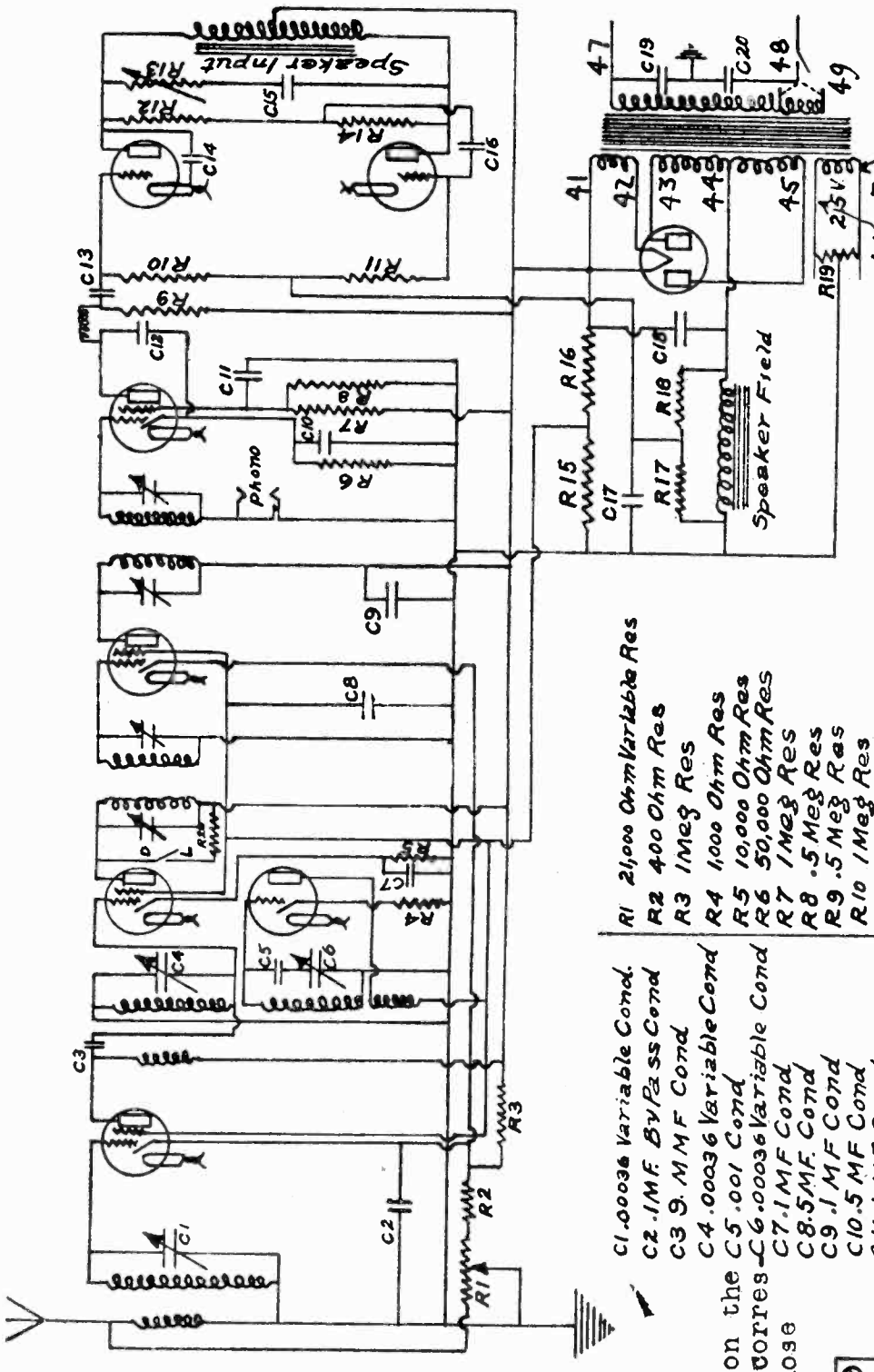
ECHOPHONE RADIO MFG. CO.

MODEL S-5
(Dynatron)
Schematic



MODEL S-5 (Rev.)
Schematic

ECHOPHONE RADIO MFG. CO.



Echophone Superheterodyne
Model S-5
CIRCUIT DIAGRAM

R1	21,000 Ohm Variable Res
R2	400 Ohm Res
R3	1 Meg Res
R4	1,000 Ohm Res
R5	10,000 Ohm Res
R6	50,000 Ohm Res
R7	1 Meg Res
R8	.5 Meg Res
R9	.5 Meg Res
R10	1 Meg Res
R11	1 Meg Res
R12	.25 Meg Res
R13	15,000 Ohm Variable Res
R14	1 Meg Res
R15	50,000 Ohm Res
R16	20,000 Ohm Res
R17	1 Meg Res
R18	1 Meg Res
R19	20 Ohm Center Tapped Res
R20	5,000 Ohm Res.

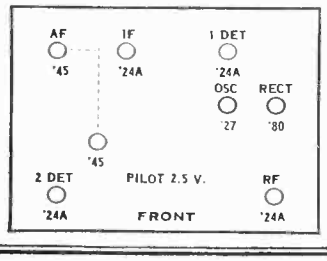
C1	.00036 Variable Cond.
C2	.1 MF By Pass Cond
C3	9 MMF Cond
C4	.00036 Variable Cond
C5	.001 Cond
C6	.00036 Variable Cond
C7	.1 MF Cond
C8	.5 MF Cond
C9	.1 MF Cond
C10	.5 MF Cond
C11	.1 MF Cond
C12	.00025 Cond
C13	.02 MF Cond
C14	.02 MF Cond
C15	.1 MF Cond
C16	.02 MF Cond
C17	.02 MF Cond
C18	8. MF Cond
C19	.05 MF Cond
C20	.05 MF Cond

The numbers on the Pwr. Trans. correspond with those shown below.

41	460
42	470
43	480
44	490
45	500

Power Transformer

Model S-5 (1931)

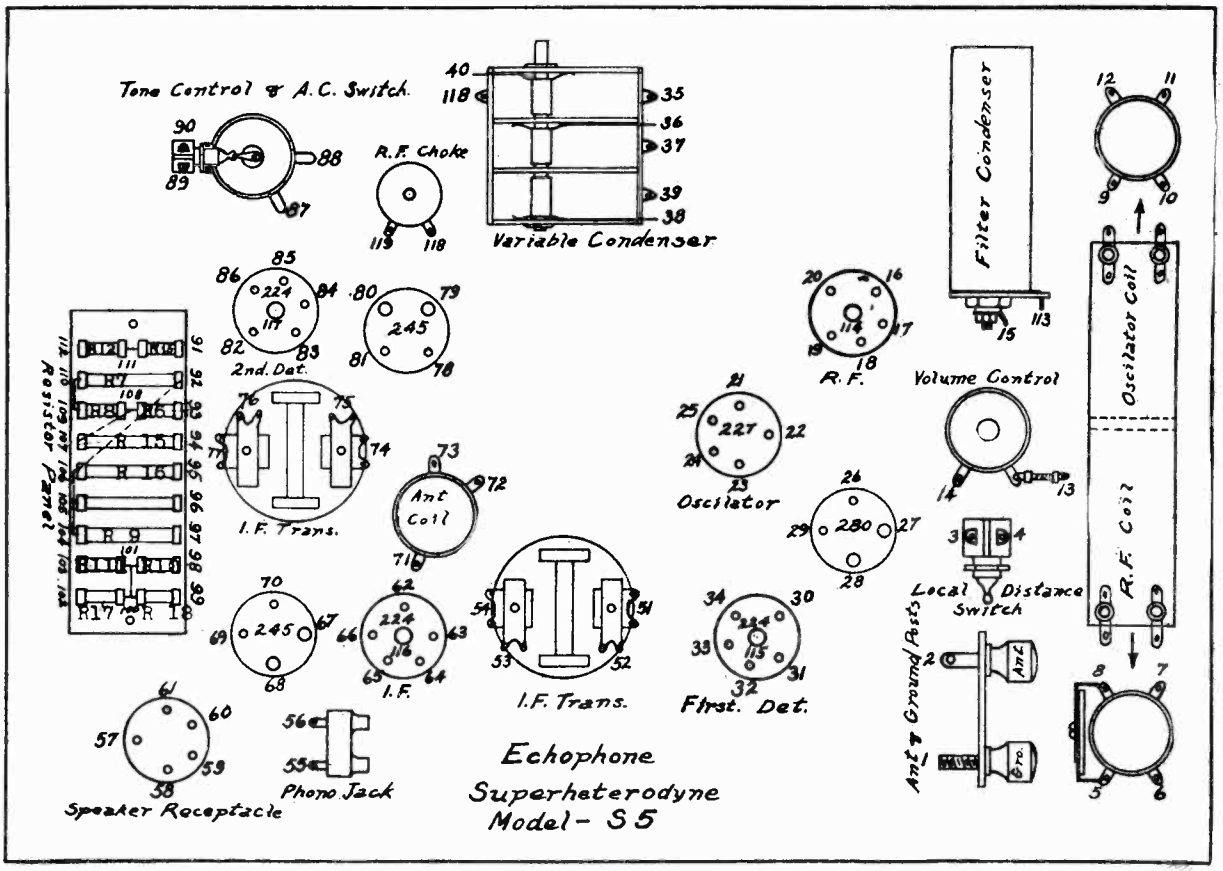


PEAK FREQUENCY

175 KC

ECHOPHONE RADIO MFG. CO.

MODEL S-5
Voltage
Data



Model S-5

VOLTAGE TESTS

Voltages given are tested on 250-volt scale of 1000 ohms, per volt meter.

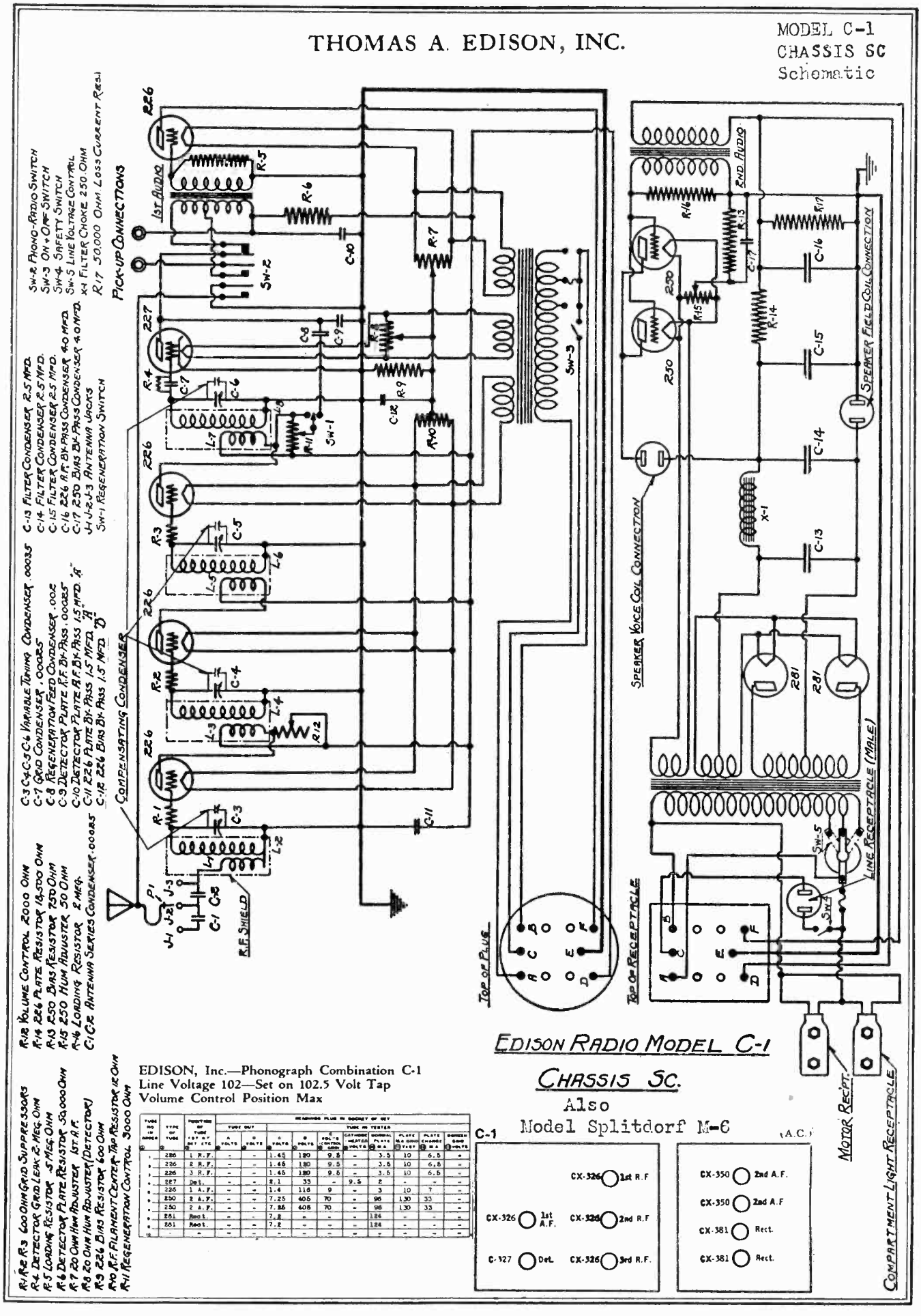
All voltage tests were made with volume control on full and tone control in off position, no signal in receiver, line voltage 115 volts with A. C. line connected to terminals 47-49 on power transformer.

Speaker must be connected to receiver.

R. F. Plate	
#19 to ground	
Low	210 volts
Normal	220 volts
High	230 volts
R. F. Screen	
#20 to ground	
Low	75 volts
Normal	80 volts
High	90 volts
R. F. Cathode	
#16 to ground	1.5 to 3 volts
Oscillator Plate	
#21 to ground	
Low	75 volts
Normal	80 volts
High	90 volts
Oscillator Cathode	
#28 to ground	4 to 6 volts
I. F. Plate	
#66 to ground	
Low	210 volts
Normal	220 volts
High	230 volts
I. F. Screen	
#62 to ground	
Low	75 volts
Normal	80 volts
High	90 volts
I. F. Cathode	
#63 to ground	1.5 to 3 volts
First Detector Plate	
#84 to ground	
Low	210 volts
Normal	220 volts
High	230 volts
First Detector Screen	
#80 to ground	
Low	75 volts
Normal	80 volts
High	90 volts
First Detector Cathode	
#31 to ground	5 to 7 volts
Second Detector Plate	
#83 to ground	60 to 80 volts
Second Detector Screen	
#82 to ground	
Low	25 volts
Normal	30 volts
High	35 volts
Second Detector Cathode	
#86 to ground	5 to 7 volts
245 Plates	
#61-58 to ground	
Low	210 volts
Normal	220 volts
High	230 volts
245 Bias	
#101 to ground	Neg. 20 to 40 volts
Speaker Field Voltage Drop	
#60-59	
Low	90 volts
Normal	100 volts
High	110 volts
280 Filament	
#27-28	4.5 to 5.2 volts
Filaments for All 2.5 Volt Tubes	
#67-68	2.2 to 2.5 volts

THOMAS A. EDISON, INC.

MODEL C-1
CHASSIS SC
Schematic



EDISON RADIO MODEL C-1

CHASSIS SC.

Also

Model Splitdorf M-6

EDISON, Inc.—Phonograph Combination C-1
Line Voltage 102—Set on 102.5 Volt Tap
Volume Control Position Max

SOCKET NUMBER	TUBE TYPE	FUNCTION OF TUBE	READINGS PLUG IN SOCKET OF SET: TUBE OUT A VOLTS	TUBE OUT B VOLTS	TUBE IN TESTER A VOLTS	TUBE IN TESTER B VOLTS	TUBE IN TESTER C VOLTS CONTROL GRID	CATHODE HEATER VOLTS	NORMAL PLATE M.A.	PLATE M.A. GRID VOLTS	PLATE CHANGE M.A.	GRID CHANGE VOLTS
1	226	1 R.F.	-	-	1.45	180	9.5	-	3.5	10	6.5	-
2	226	2 R.F.	-	-	1.45	180	9.5	-	3.5	10	6.5	-
3	226	3 R.F.	-	-	1.45	180	9.5	-	3.5	10	6.5	-
4	227	Det.	-	-	2.1	33	-	9.5	2	-	-	-
5	226	1 A.F.	-	-	1.4	116	9	-	3	10	7	-
6	250	2 A.F.	-	-	7.25	405	70	-	90	130	33	-
7	250	2 A.F.	-	-	7.25	405	70	-	90	130	33	-
8	281	Rect.	-	-	7.2	-	-	-	124	-	-	-
9	281	Rect.	-	-	7.2	-	-	-	124	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-

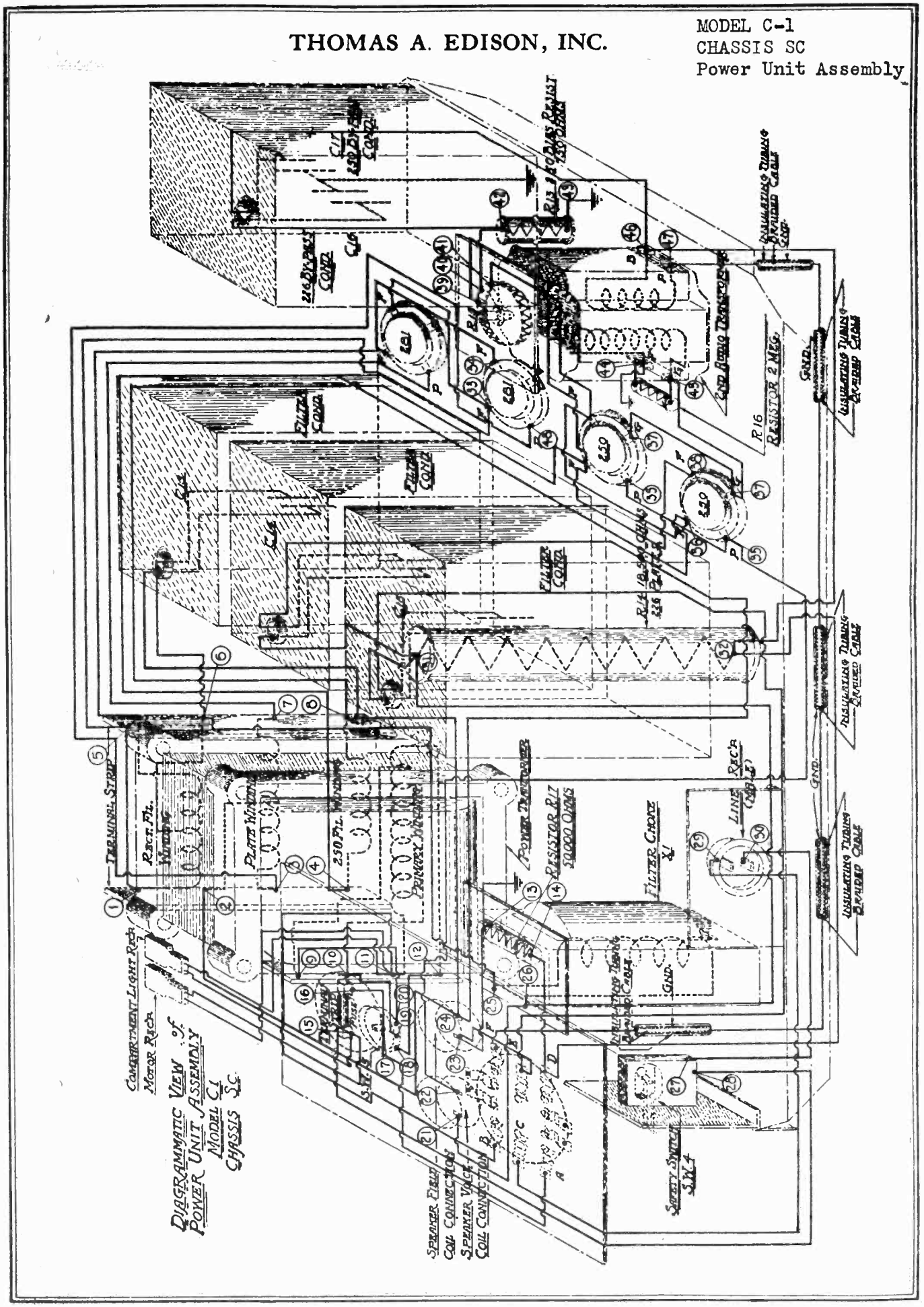
C-1 (A.C.)

CX-326	1st A.F.	CX-326	1st R.F.
C-327	Det.	CX-326	2nd R.F.
		CX-326	3rd R.F.

CX-350	2nd A.F.
CX-350	2nd A.F
CX-381	Rect.
CX-381	Rect.

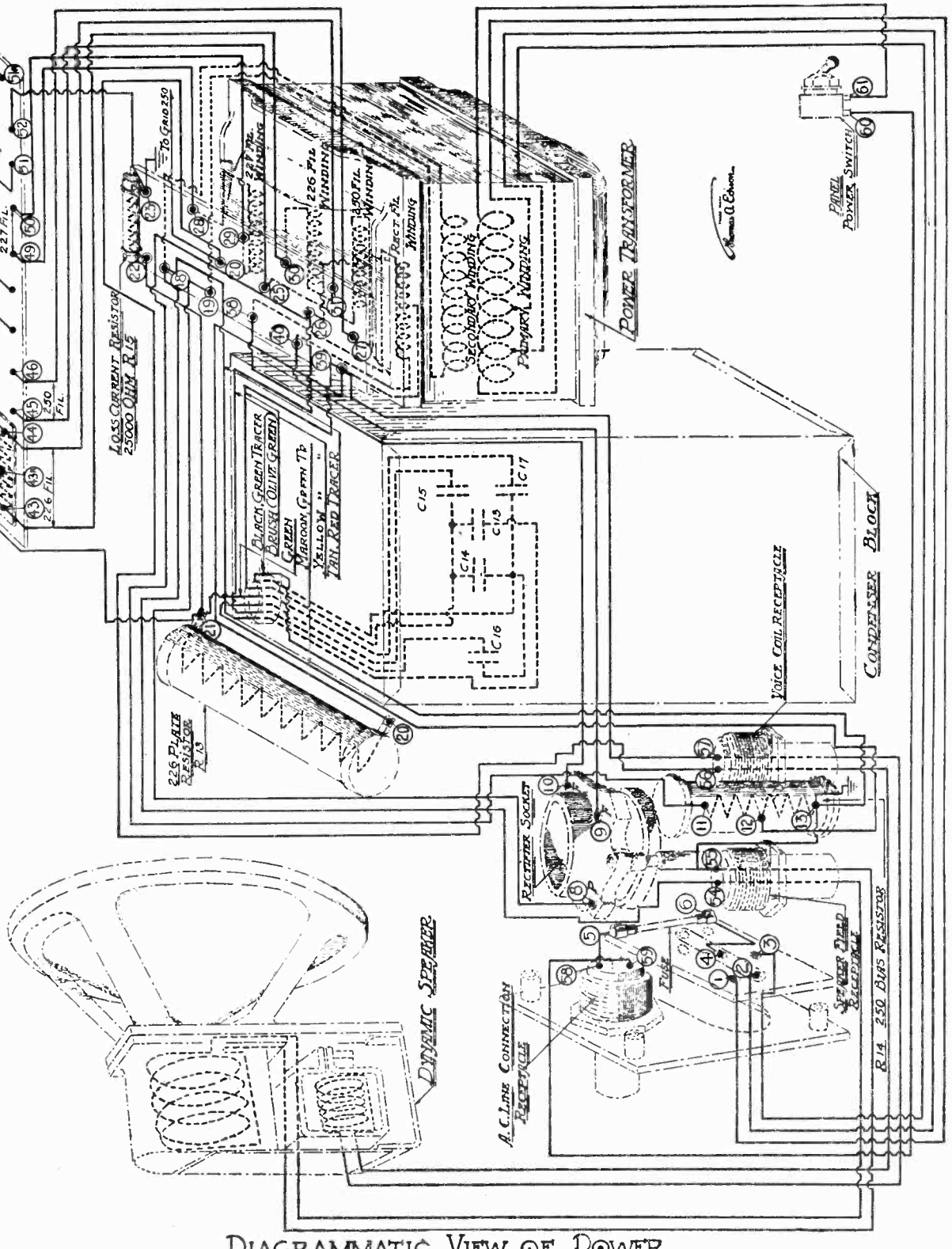
THOMAS A. EDISON, INC.

MODEL C-1
CHASSIS SC
Power Unit Assembly



THOMAS A. EDISON, INC.

MODELS R1, R2, C2
CHASSIS Jr and Jc
Power Unit Assembly

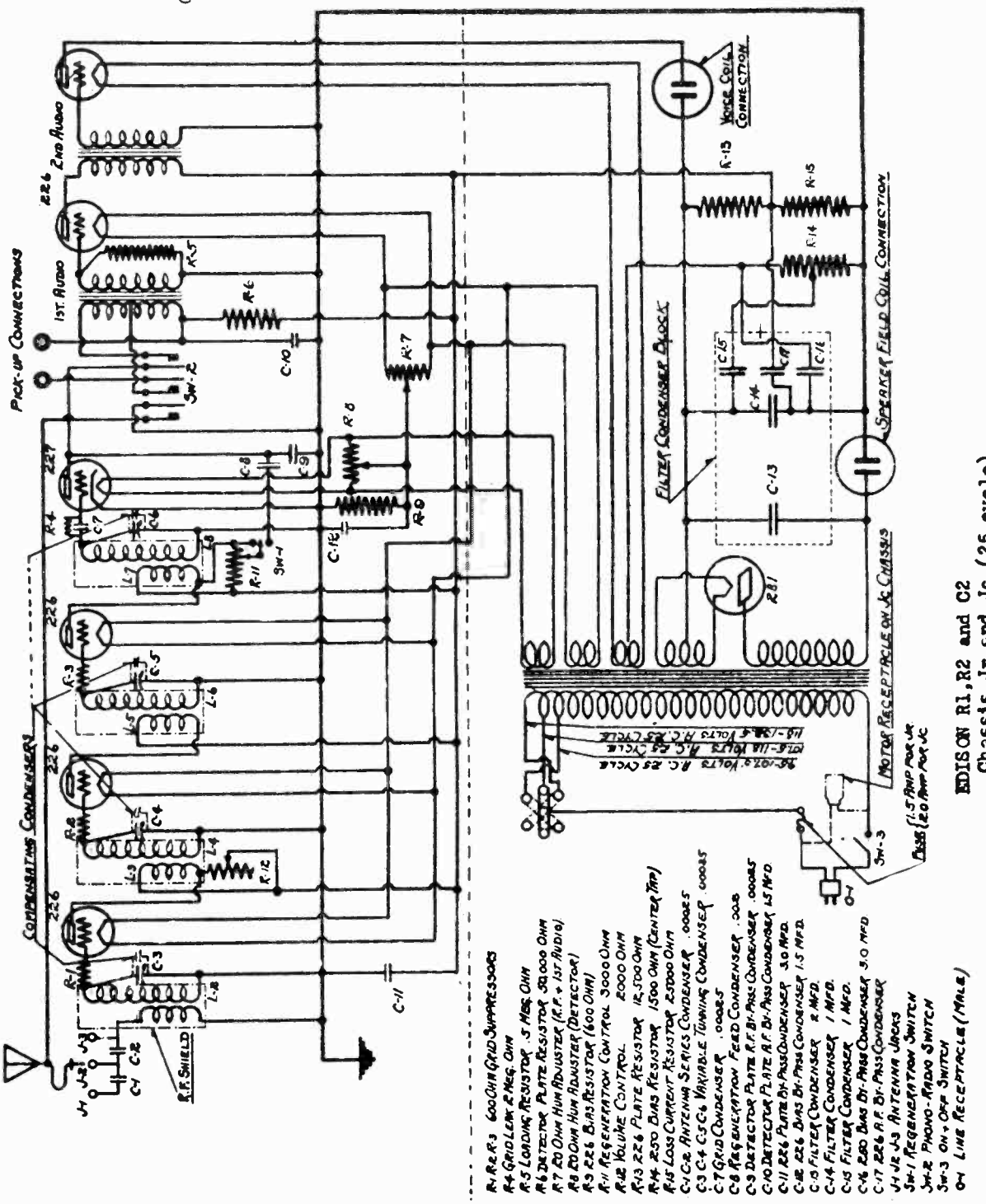


DIAGRAMMATIC VIEW OF POWER UNIT, DYNAMIC SPEAKER CONNECTED.

MODELS R1, R2 AND C2
CHASSIS JR AND JC
25 CYCLE

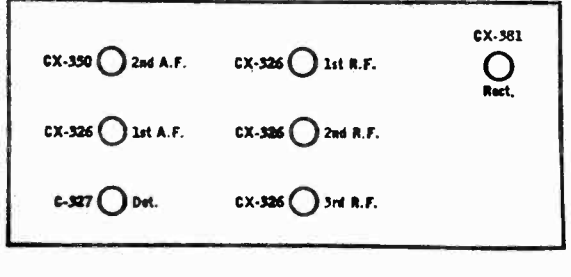
MODELS R1,R2,C2
CHASSIS Jr and Jc
Schematic Voltage

THOMAS A. EDISON, INC.



EDISON R1,R2 and C2
Chassis Jr and Jc (25 cycle)

R-1, R-2, C-2 (A.C.)

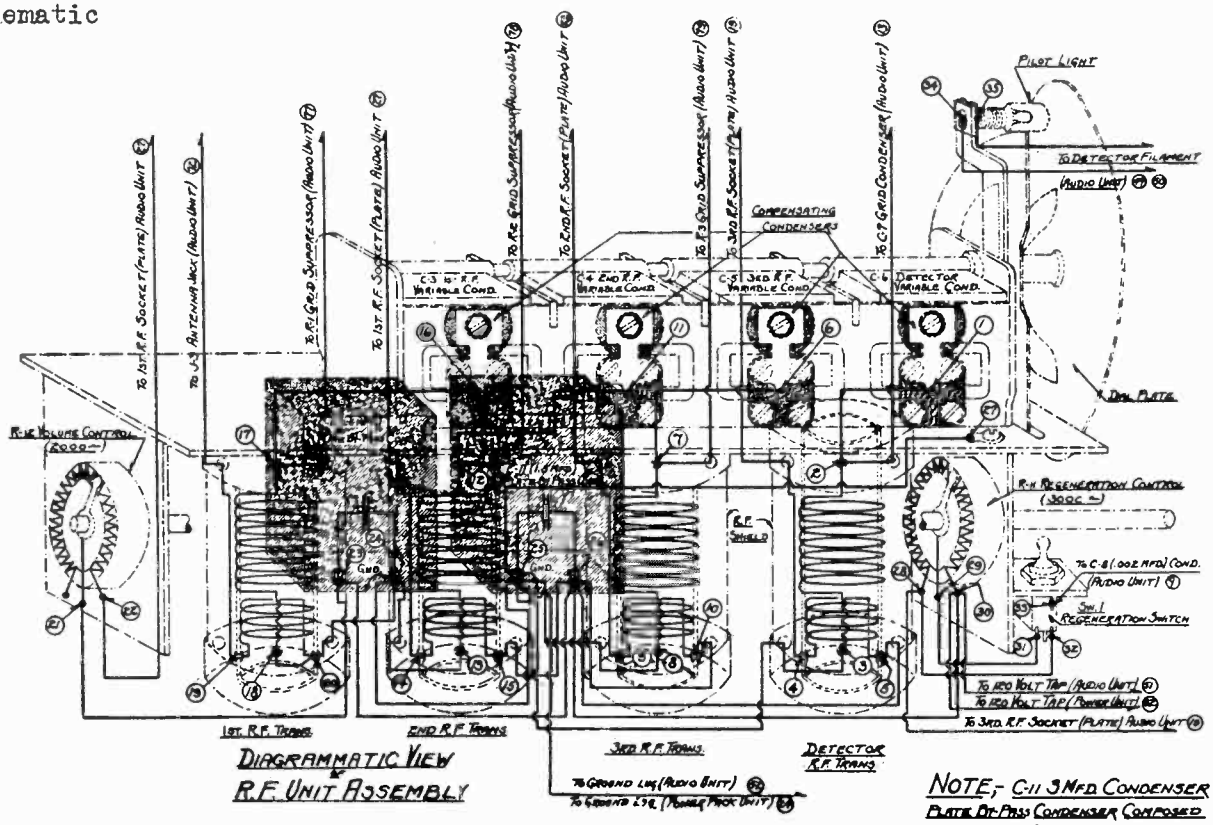


EDISON, Inc.—Models R-1, R-2 and Edison Radio Phonograph Combination C-2
Line Voltage 102—Set on 102.5
Volume Control Position Max

Tube No. in order	Type No.	Position of tube (1st R.F. Det. etc.)	Tube Out A volts	Tube Out B volts	Tube in Tester A volts	Tube in Tester B volts	Tube in Tester C volts (Position Grid)	Tube in Tester Cathode Heater volts	Tube in Tester Normal Plate M.A.	Plate M.A. Grid Test	Plate Change M.A.	Suggested Grid Volts
1	226	1 R.F.	-	-	1.45	180	9.5	-	3.5	10	6.5	-
2	226	2 R.F.	-	-	1.45	180	9.5	-	3.5	10	6.5	-
3	226	3 R.F.	-	-	1.45	180	9.5	-	3.5	10	6.5	-
4	227	Det.	-	-	1.9	33		-9.5	1.5	-	-	-
5	226	1 A.F.	-	-	1.35	115	5.5	-	2.5	10	7.5	-
6	250	2 A.F.	-	-	7.2	380	55	-	36	66	80	-
7	281	Rect.	-	-	7.2	-	-	-	100	-	-	-

MODELS R1, R2, C2 (60 cyc.)
Diagram
Schematic

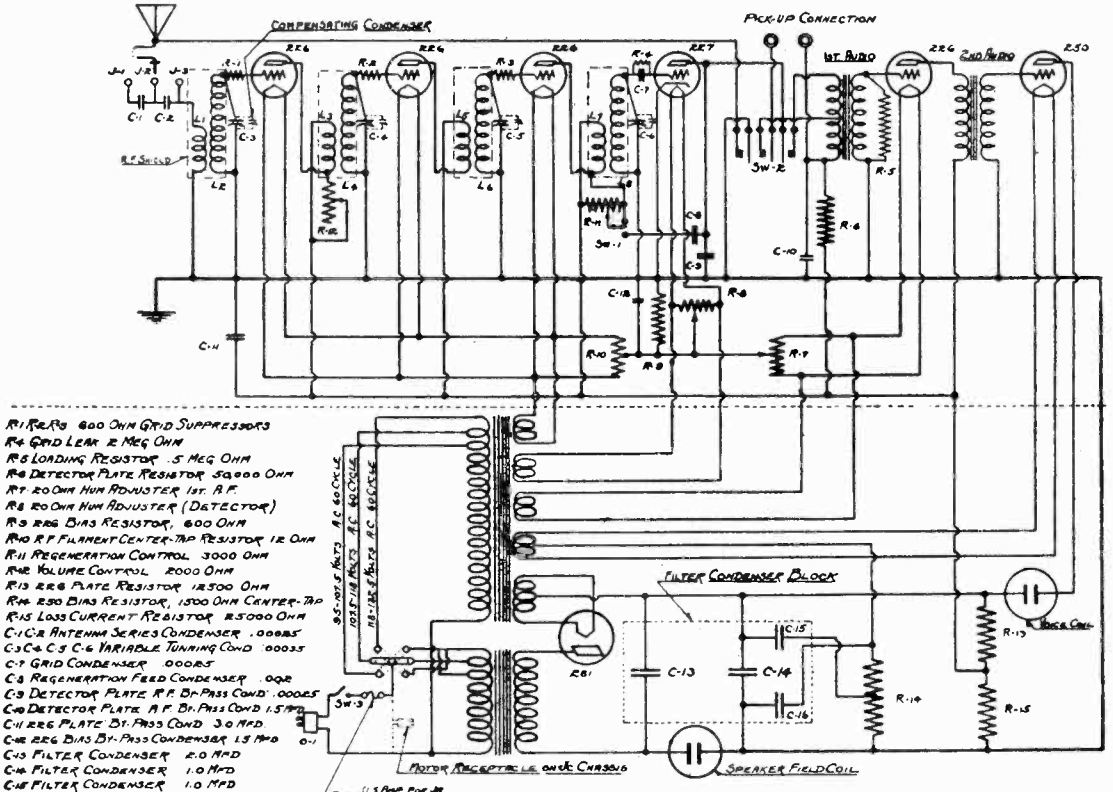
THOMAS A. EDISON, INC.



DIAGRAMMATIC VIEW
R.F. UNIT ASSEMBLY

MODELS R-1 R-2 + C-2
CHASSIS JK + JC

NOTE:- C-11 3 MFD. CONDENSER PLATE BY-PASS CONDENSER COMPOSED OF TWO 1.5 MFD. CONDENSERS IN PARALLEL



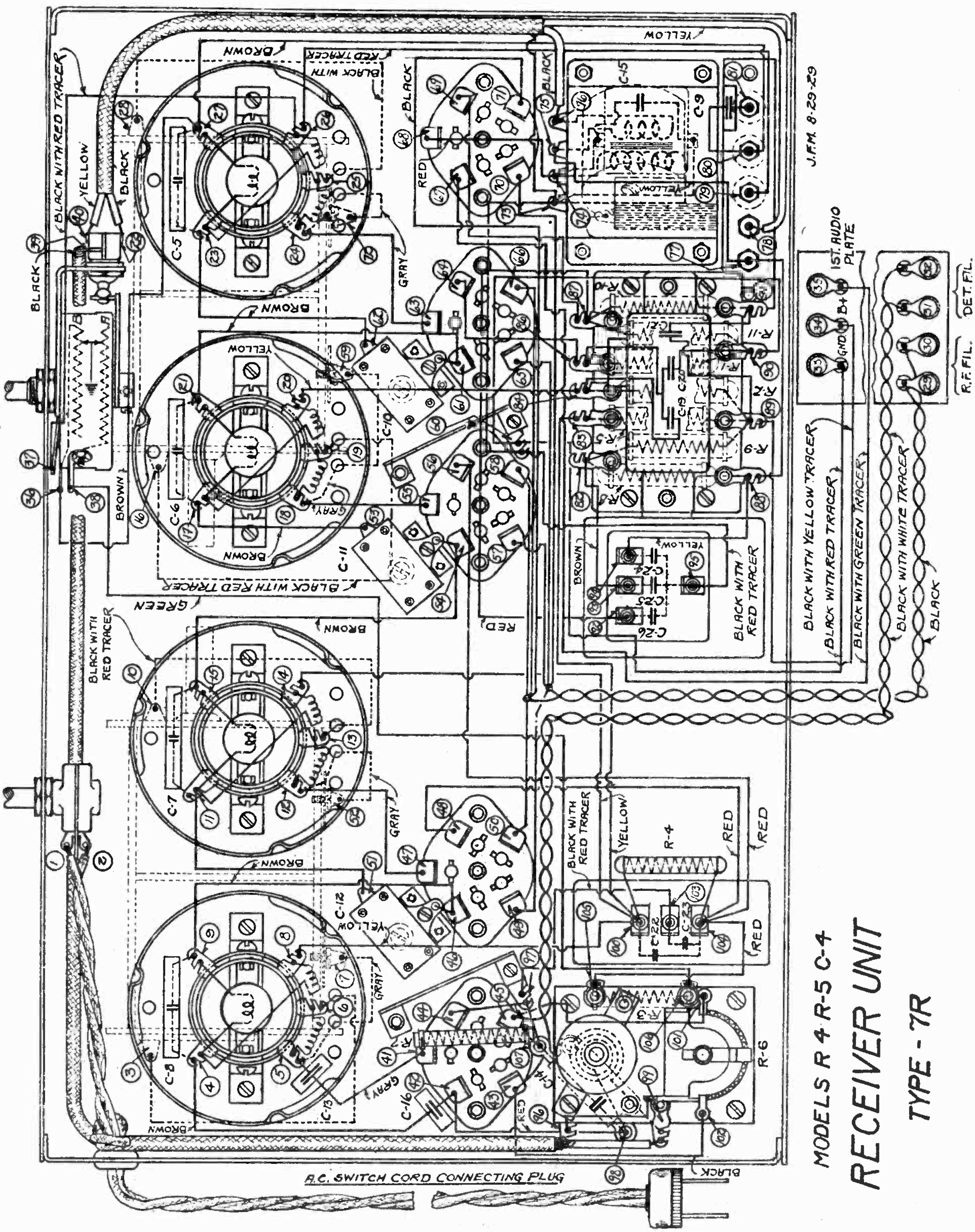
R1 R2 R3 600 OHM GRID SUPPRESSORS
R4 GRID LEAK 2 MEG OHM
R5 LOADING RESISTOR .5 MEG OHM
R6 DETECTOR PLATE RESISTOR 50,000 OHM
R7 20 OHM HUM ADJUSTER 1ST. A.F.
R8 20 OHM HUM ADJUSTER (DETECTOR)
R9 226 BIAS RESISTOR, 600 OHM
R10 R.F. FILAMENT CENTER-TAP RESISTOR 12 OHM
R11 REGENERATION CONTROL 3000 OHM
R12 VOLUME CONTROL 2000 OHM
R13 226 PLATE RESISTOR 12,500 OHM
R14 250 BIAS RESISTOR, 1500 OHM CENTER-TAP
R15 LOSS CURRENT RESISTOR 25,000 OHM
C-1 C-2 ANTENNA SERIES CONDENSER .00085
C-3 C-4 C-5 C-6 VARIABLE TUNING COND .00035
C-7 GRID CONDENSER .00025
C-8 REGENERATION FEED CONDENSER .002
C-9 DETECTOR PLATE R.F. BY-PASS COND .00025
C-10 DETECTOR PLATE A.F. BY-PASS COND 1.5 MFD
C-11 226 PLATE BY-PASS COND 3.0 MFD.
C-12 226 BIAS BY-PASS CONDENSER 1.5 MFD
C-13 FILTER CONDENSER 2.0 MFD
C-14 FILTER CONDENSER 1.0 MFD
C-15 FILTER CONDENSER 1.0 MFD
C-16 250 BIAS BY-PASS CONDENSER 3.0 MFD
J-1 J-2 J-3 ANTENNA JACKS
SW-1 REGENERATION SWITCH
SW-2 PHONO-RADIO SWITCH
SW-3 ON-OFF SWITCH
ON LINE RECEPTACLE (MALE)

SCHEMATIC DIAGRAM
EDISON RADIO FOR MODELS R-1 R-2 + C-2
CHASSIS JK + JC

Also
Model Splitdorf M-5

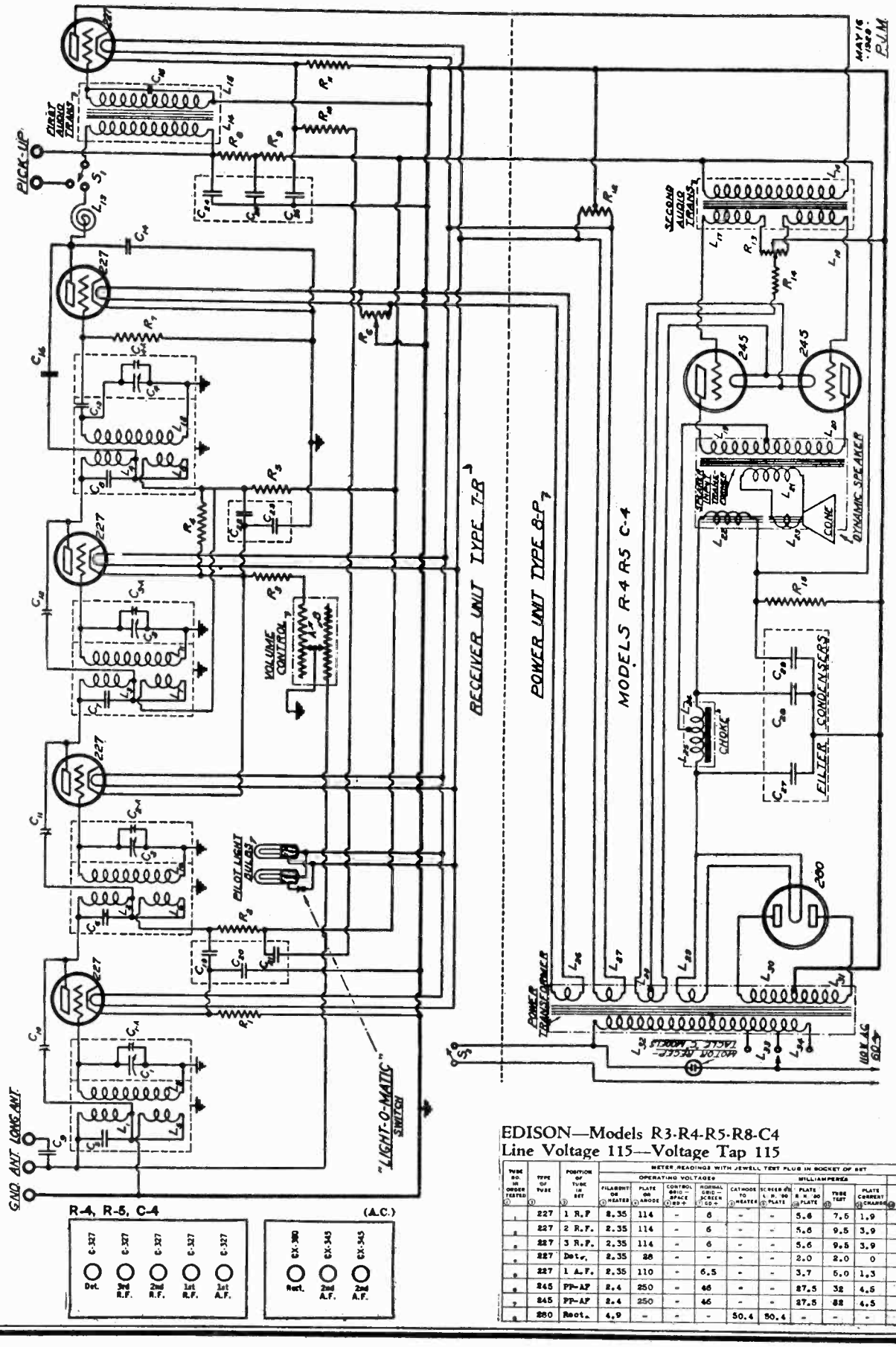
MODELS R4,R5,C4
Receiver Chassis Wiring

THOMAS A. EDISON, INC.



THOMAS A. EDISON, INC.

MODELS R4, R5, C4
Schematic



EDISON—Models R3-R4-R5-R8-C4
Line Voltage 115—Voltage Tap 115

TUBE NO. IN ORDER TESTED	TYPE OF TUBE	POSITION OF TUBE IN SET	METER READINGS WITH JEWELL TEST PLUG IN SOCKET OF SET — OPERATING VOLTAGES						MILLIAMPERES			
			FILAMENT OR HEATER	PLATE OR ANODE	CONTROL GRID — SPACE CHARGE GRID — GRID NO. 2 +	NORMAL GRID — SCREEN GRID — GRID NO. 2 +	CATHODE TO HEATER	SCREEN GRID NO. 2 + PLATE	PLATE R. H. NO. 30 PLATE	TUBE TEST	PLATE CURRENT CHANGE
1	227	1 R.F.	2.35	114	-	6	-	-	5.6	7.5	1.9
2	227	2 R.F.	2.35	114	-	6	-	-	5.6	9.5	3.9
3	227	3 R.F.	2.35	114	-	6	-	-	5.6	9.5	3.9
4	227	Det.	2.35	28	-	-	-	-	2.0	2.0	0
5	227	1 A.F.	2.35	110	-	6.5	-	-	3.7	5.0	1.3
6	245	PP-AF	2.4	250	-	46	-	-	27.5	32	4.5
7	245	PP-AF	2.4	250	-	46	-	-	27.5	32	4.5
8	280	Rect.	4.9	-	-	-	50.4	50.4	-	-	-

IDENTIFICATION OF PARTS

TO ACCOMPANY PLATE No. 1-A

"LIGHT-O-MATIC" MODELS R-4, R-5 and C-4

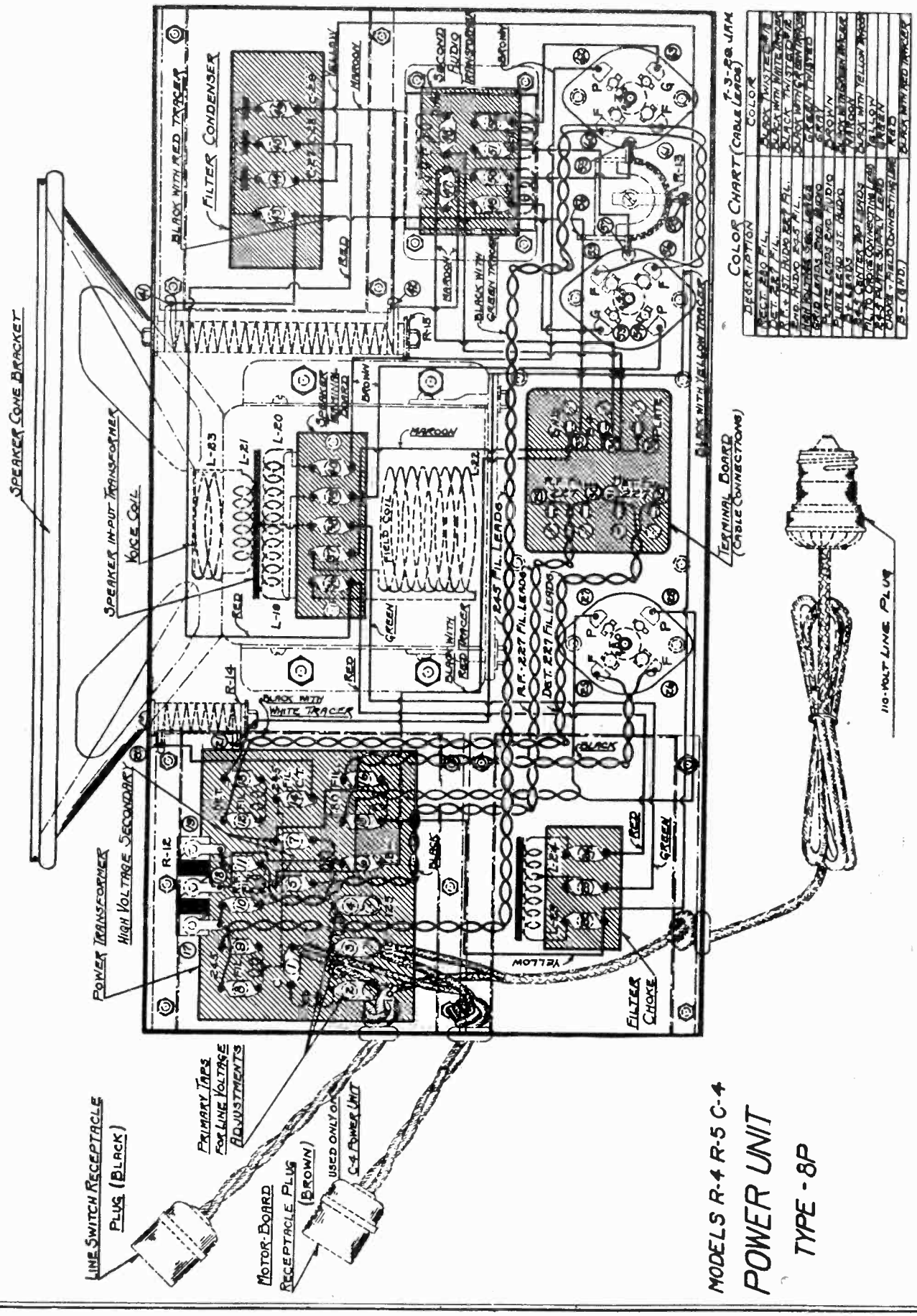
NO.	NAME AND FUNCTION	ELECTRICAL VALUE
C-1 C-2	Tuning condenser, 1st r. f. stage. Tuning condenser, 2nd r. f. stage.	2-gang variable condenser, maximum capacity. each section 355 mmfds.
C-3 C-4	Tuning condenser, 3rd r. f. stage. Tuning condenser, detector stage.	2-gang variable condenser, maximum capacity. each section 355 mmfds.
C-5 C-6 C-7 C-8	Each a fixed condenser tuning the long wave primary circuit of the associated transformer to approximately 450 kilocycles.	Each a .00025 mfd. fixed moulded mica condenser.
C-9	Long antenna series condenser.	.000125 mfd. fixed moulded mica condenser.
C-10 C-11 C-12	Neutralizing condensers, 1st, 2nd and 3rd r. f. stages, respectively.	Each an adjustable condenser, 40 to 80 mmfds.
C-13	Detector grid condenser.	.0001 mfd. fixed moulded mica condenser.
C-14	Detector plate condenser.	.001 mfd. fixed moulded mica condenser.
C-15	High frequency cut-off condenser.	.00045 mfd. fixed moulded mica condenser.
C-16	Detector Neutralizing Condenser	.000125 Mfd. fixed condenser.
C-19 C-20 C-21	Plate by-pass condenser, 1st r. f. stage. Bias by-pass condenser, 1st r. f. stage. Hum balance condenser (1st a. f.)	.1 mfd. 300v. paper condenser. .1 mfd. 300v. paper condenser. .16 mfd. 300v. paper condenser. (C-19, 20 and 21 in same can.)
C-22 C-23	Plate by-pass condenser, 2nd and 3rd r. f. Bias by-pass condenser, 2nd and 3rd r. f.	.1 mfd. 300v. paper condenser. 1. mfd. 150v. paper condenser. (C-22 and 23 in same can.)
C-24 C-25 C-26	A. f. by-pass condenser, detector plate. Filter condenser, detector plate supply Bias by-pass condenser, 1st a. f. stage.	1. mfd. 300v. paper condenser. .5 mfd. 300v. paper condenser. 1. mfd. 150v. paper condenser. (C-24, 25 and 26 in same can.)
C-27 C-28 C-29	1st filter condenser. 2nd filter condenser. 3rd filter condenser.	2. mfd. 600v. paper condenser. 2. mfd. 600v. paper condenser. 1. mfd. 300v. paper condenser. (C-27, 28 and 29 in same can.)
C-1A C-2A C-3A C-4A	Tuning conpensator, 1st r. f. Tuning compensator, 2nd r. f. Tuning compensator, 3rd r. f. Tuning compensator, detector.	Each an adjustable air and mica dielectric condenser mounted on side of variable condenser section which it shunts.
R-1	Bias resistor, 1st r. f. stage.	1,000 ohm resistance, 1 watt.
R-2	Isolating resistor, 1st r. f.	1,000 ohm resistance, 1 watt.
R-3	Minimum bias resistor, 2nd and 3rd r. f.	400 ohm resistance, 1 watt.
R-4 R-5 R-6 R-7 R-8 R-9	Bleeder resistor. Isolating resistor, 2nd and 3rd r. f. Detector heater hum adjuster. Detector grid leak. 2nd section detector filter resistor. 1st section detector filter resistor.	40,000 ohm resistance, 1 watt. 400 ohm resistance, 1 watt. 20 ohm potentiometer. 1.5 megohm resistance, 1 watt. 25,000 ohm resistance, 1 watt. 25,000 ohm resistance, 1 watt.

IDENTIFICATION OF PARTS (Continued)

NO.	NAME AND FUNCTION	ELECTRICAL VALUE
R-10	Hum balance resistor (1st a. f.)	6,000 ohm resistance, 1 watt.
R-11	Bias resistor, 1st a. f. stage.	2,000 ohm resistance, 1 watt.
R-12	R. f. and a. f. heater center tapped resistor.	20 ohm fixed center-tapped resistance.
R-13	Push-pull balancing resistor.	200 ohm center-tapped potentiometer.
R-14	Bias resistor, 2nd a. f. stage.	780 ohm, 5 watt resistance.
R-15	Power supply loss current resistor.	10,000 ohm, 5 watt resistance.
L-1 L-2 L-3 L-4	Long wave primary, 1st r. f. transformer. Long wave primary, 2nd r. f. transformer. Long wave primary, 3rd r. f. transformer. Long wave primary, detector input transformer.	Each a 500 microhenry coil.
L-5 L-6 L-7 L-8	Short wave primary, 1st r. f. transformer. Short wave primary, 2nd r. f. transformer. Short wave primary, 3rd r. f. transformer. Short wave primary, detector input transformer.	Each a 7½ turn coil.
L-9 L-10 L-11 L-12	Secondary, 1st r. f. transformer. Secondary, 2nd r. f. transformer. Secondary, 3rd r. f. transformer. Secondary, detector input transformer.	Each a 245 microhenry coil, (measured in sheld).
L-13	Detector plate r. f. choke.	50 to 65 millihenry choke.
L-14 L-15	Primary, 1st a. f. transformer. Secondary, 1st a. f. transformer.	4:1 ratio a. f. transformer.
L-16 L-17 L-18	Primary, 2nd a. f. transformer. Secondary, 2nd a. f. transformer. Secondary, 2nd a. f. transformer.	5:1 ratio a. f. transformer with separate secondaries connected in series by variable resistance R-13.
L-19 L-20 L-21 L-22 L-23	Half primary, speaker input transformer. Half primary, speaker input transformer. Secondary, speaker input transformer. Field coil, dynamic speaker. Voice coil, dynamic speaker.	Speaker input transformer, mounted in speaker frame, utilizing center tapped primary. 4,500 ohm field coil.
L-24 L-25	Inside third of filter choke. Outside two-thirds of filter choke.	20 henry, 375 ohm choke.
L-26 L-27 L-28 L-29 L-30 L-31 L-32 L-33 L-34	Detector heater secondary winding. R. f. and a. f. heater secondary winding. 2nd a. f. fil. secondary winding. Rectifier fil. secondary winding. Half high voltage secondary winding. Half high voltage secondary winding. Low line voltage primary winding. Additional section of primary winding for medium voltage. Additional section of primary winding for high line voltage.	Power transformer.
S-1	Radio-phono. switch.	S. P. D. T. toggle switch, operated by volume control shaft.
S-2	Line switch.	S. P. S. T. toggle switch.
	Light-O-Matic Switch.	Located in dial mechanism, operating Light-O-Matic pilot light.
	Motor Receptacle (Brown).	This plug provides 110 volts A. C. for operation of phonograph motor in radio phonograph combination model.
	Volume Control	A—Wire wound, 5,000 ohms. B—Graphite, 10,000 ohms.

THOMAS A. EDISON, INC.

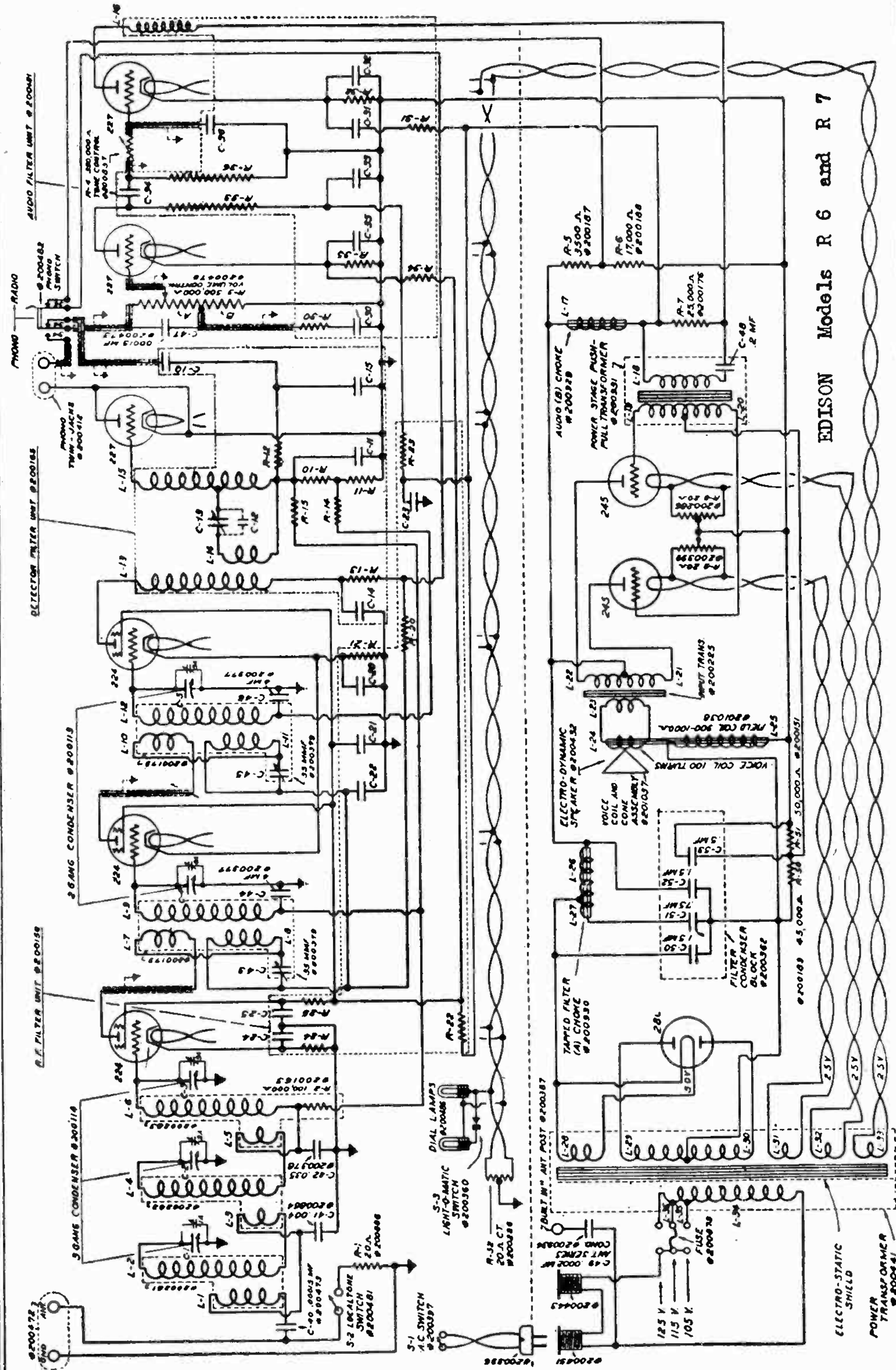
MODELS R4, R5, C4
Power Unit Chassis Wiring



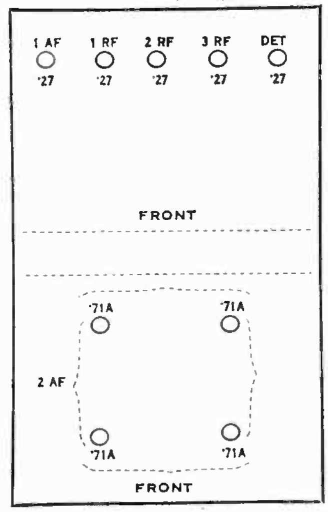
MODELS R6,R7
Schematic

THOMAS A. EDISON,, INC.

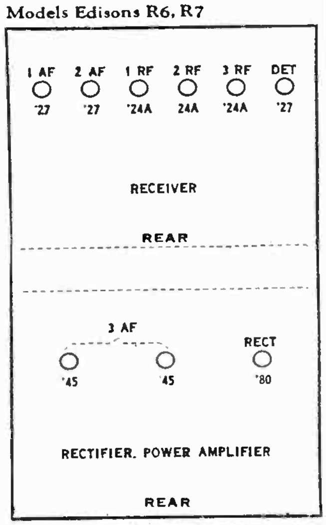
EDISON Models R 6 and R 7



Models Edisons R4, R5 (DC)



Models Edisons R6, R7

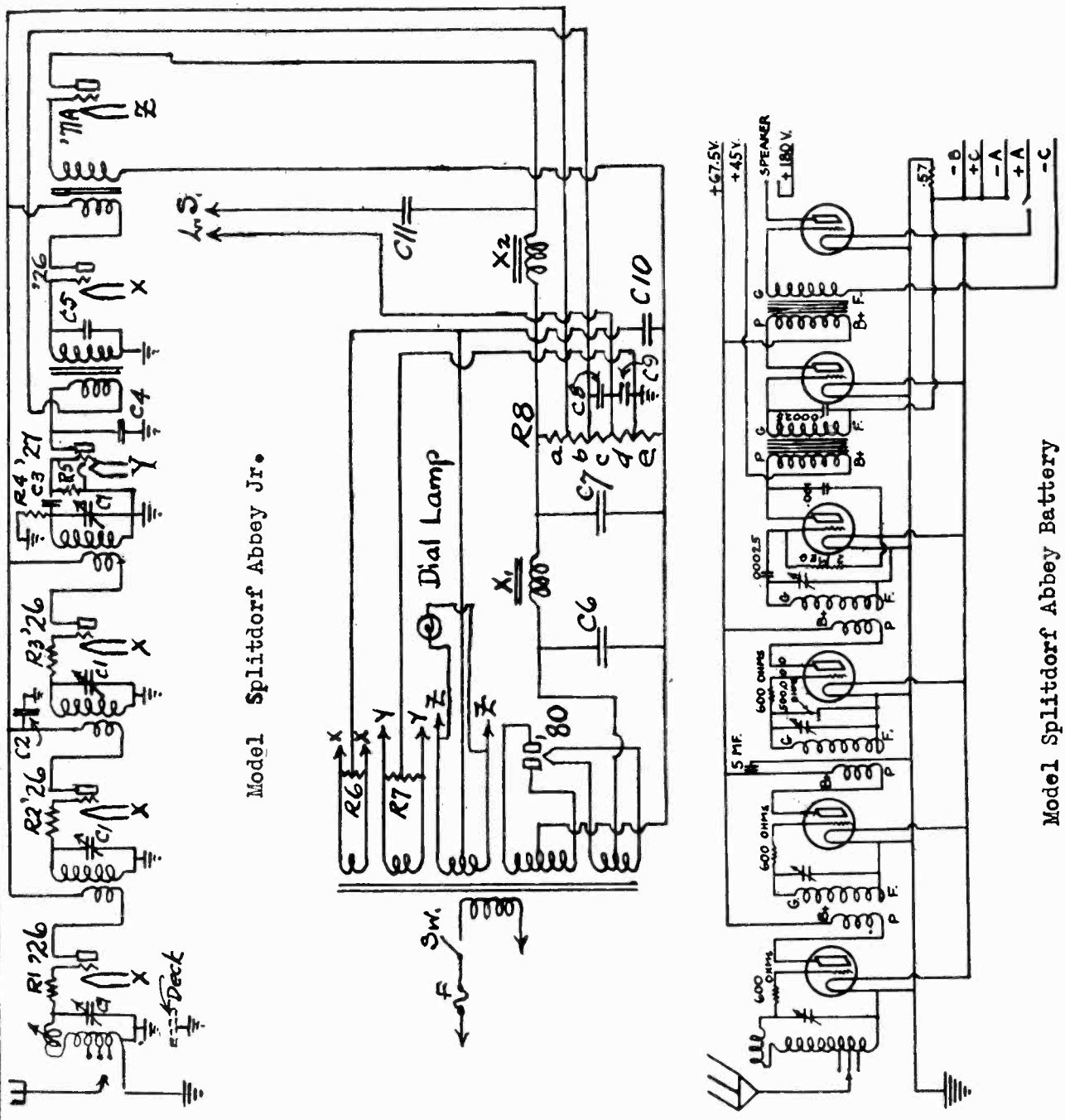


EDISON—Models R6 and R7
Line Voltage 115—Voltage Tap 115
*Grid Volts 8-10 on Strong Signal
†Volume Control Minimum 2.5—Maximum .5

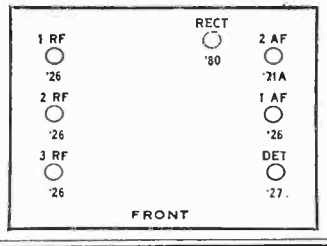
Tube No. in Order Tested	Type of Tube	Position of Tube in Set	Filament or Heater	Plate or Anode	Control Grid-Space	Normal Grid-Screen	Cathode to Heater	Screen or L. H. '80 Plate	Plate R. H. '80 Plate	Tube Test	Plate Current Change	
1	224	1 R.F.	2.2	190	.2	80	2.5	.9	3.5	6.0	2.5	
2	224	2 R.F.	2.2	190	.2	80	2.5	.9	3.5	6.0	2.5	
3	224	3 R.F.	2.2	190	.2	80	2.5	.9	3.5	6.0	2.5	
4	227	Det.	2.2	-	-	-*	-	-	-	-	-	
5	227	1 A.F.	2.2	40	-	.5-2.5†	3.0	-	1.1	1.4	3.0	
6	227	2 A.F.	2.2	115	-	.5	6.0	-	3.8	4.8	1.0	
7	245	PP-AF	2.45	260	-	45	-	-	31.0	36.0	5.0	
8	245	PP-AF	2.45	260	-	45	-	-	31.0	36.0	5.0	
9	280	Rect.	4.85	-	-	-	-	48.0	48.0	-	-	

THOMAS A. EDISON, INC.

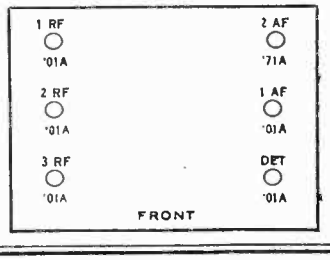
MODEL Splitdorf Abbey Jr.
MODEL Splitdorf Abbey Bat
Schematic



Model Splitdorf Abbey Jr.

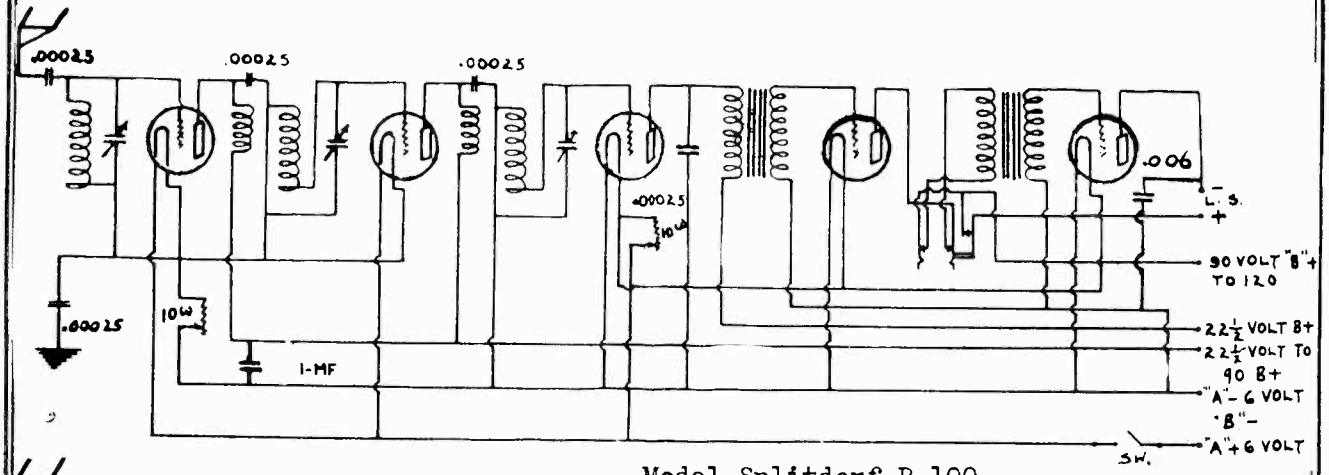


Model Splitdorf Abbey—Battery

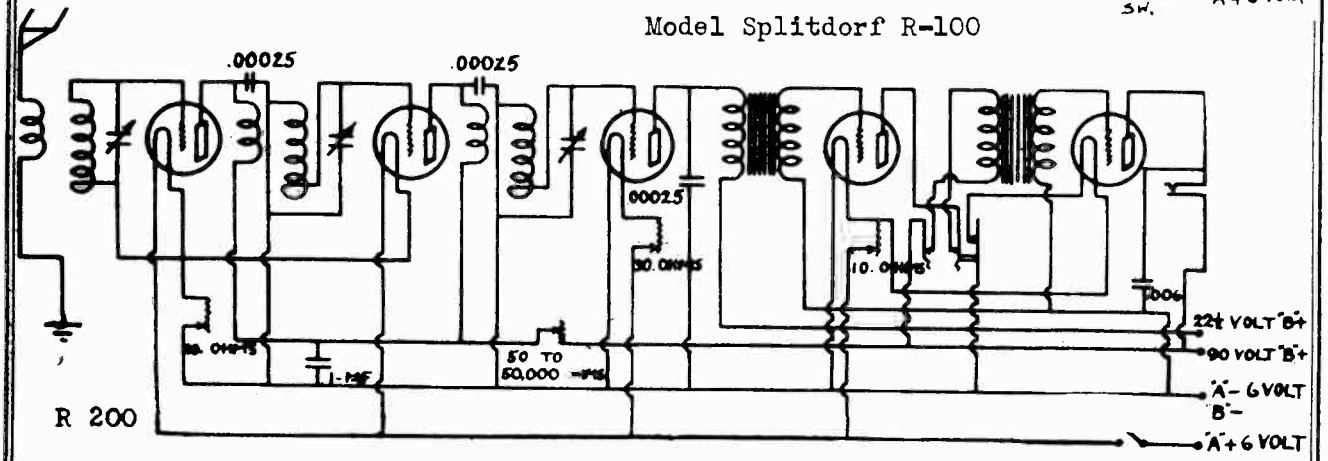


MODEL Splitdorf R-100
MODEL Splitdorf R-200
MODEL Splitdorf RV-695
Schematic

THOMAS A. EDISON, INC.

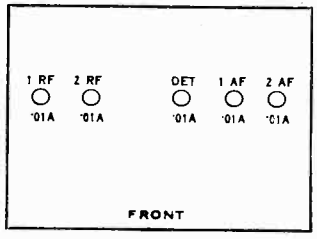


Model Splitdorf R-100

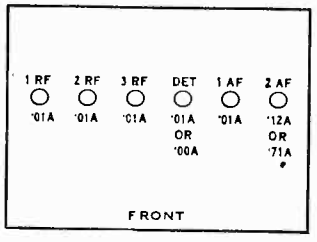


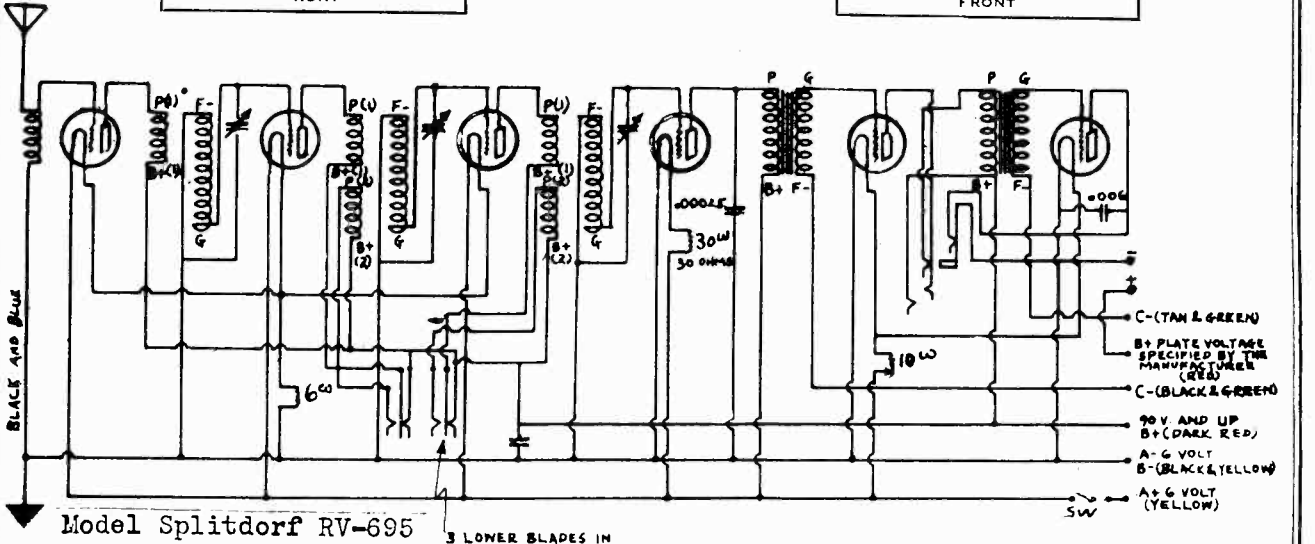
Model Splitdorf R-200

Models Splitdorfs R100, R200,



Model Splitdorf RV695



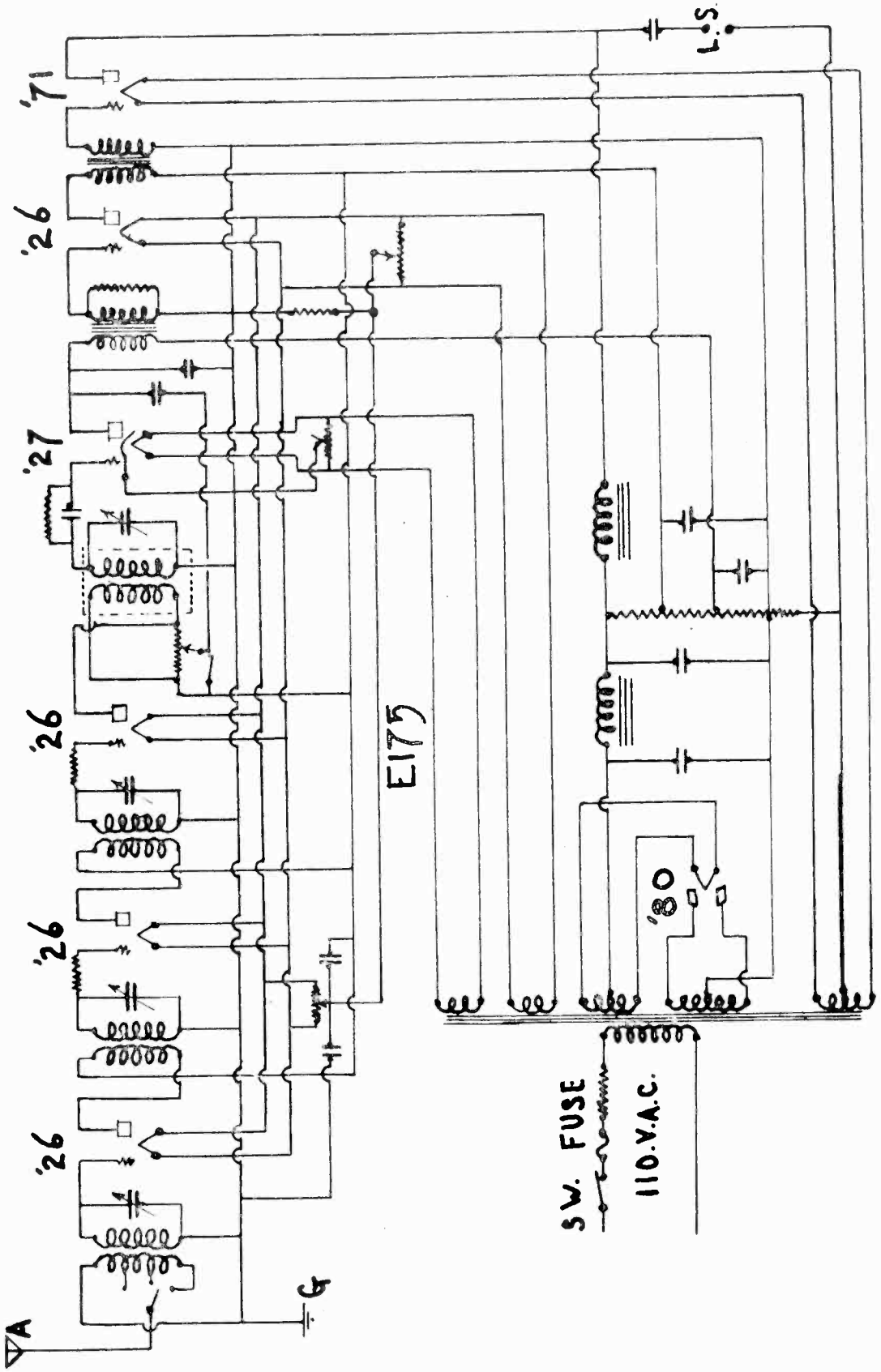


Model Splitdorf RV-695

3 LOWER BLADES IN JACK SWITCH

MODEL Splitdorf E-175
Schematic

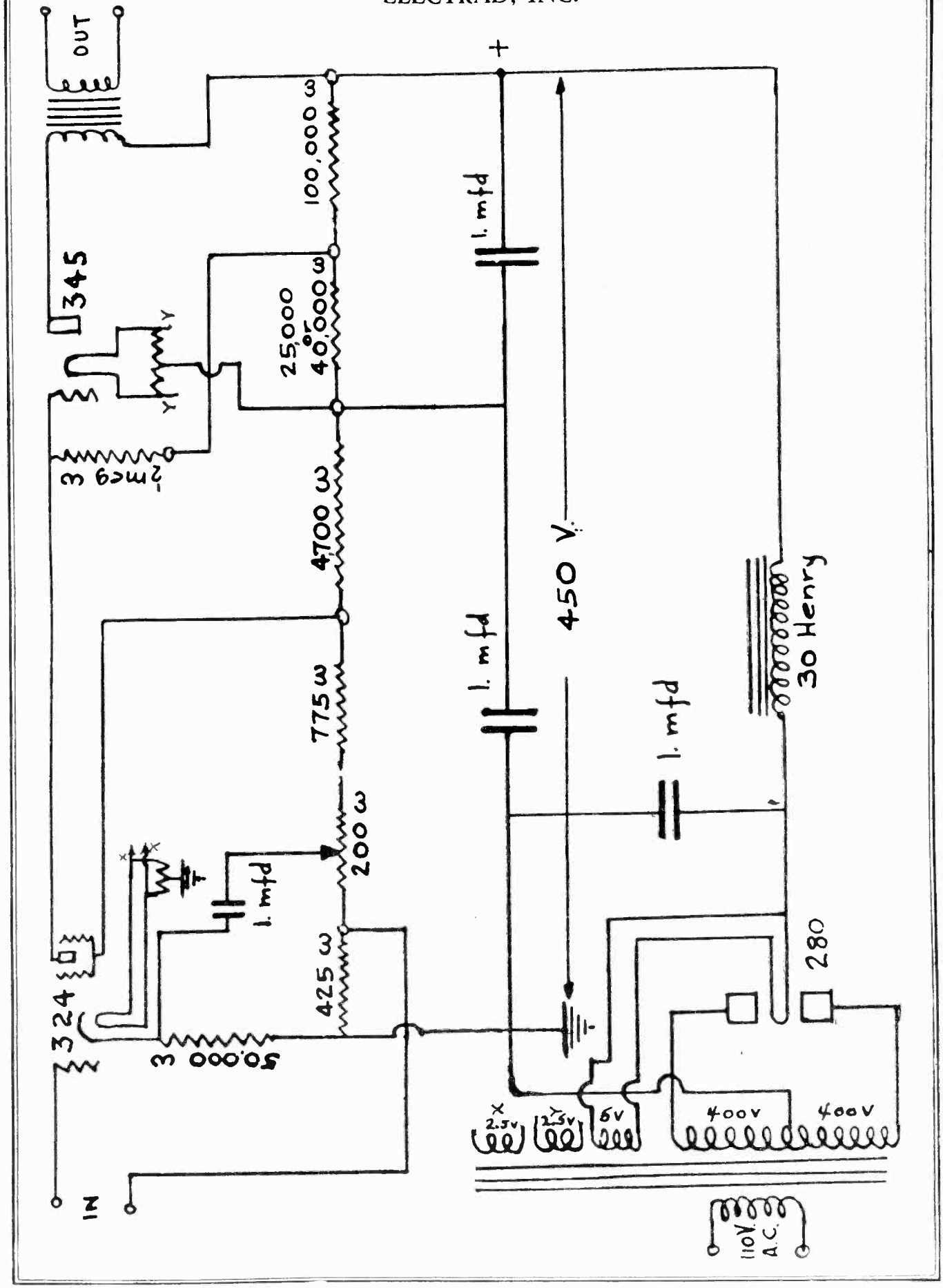
THOMAS A. EDISON, INC.



Model Splitdorf E-175

ELECTRAD, INC.

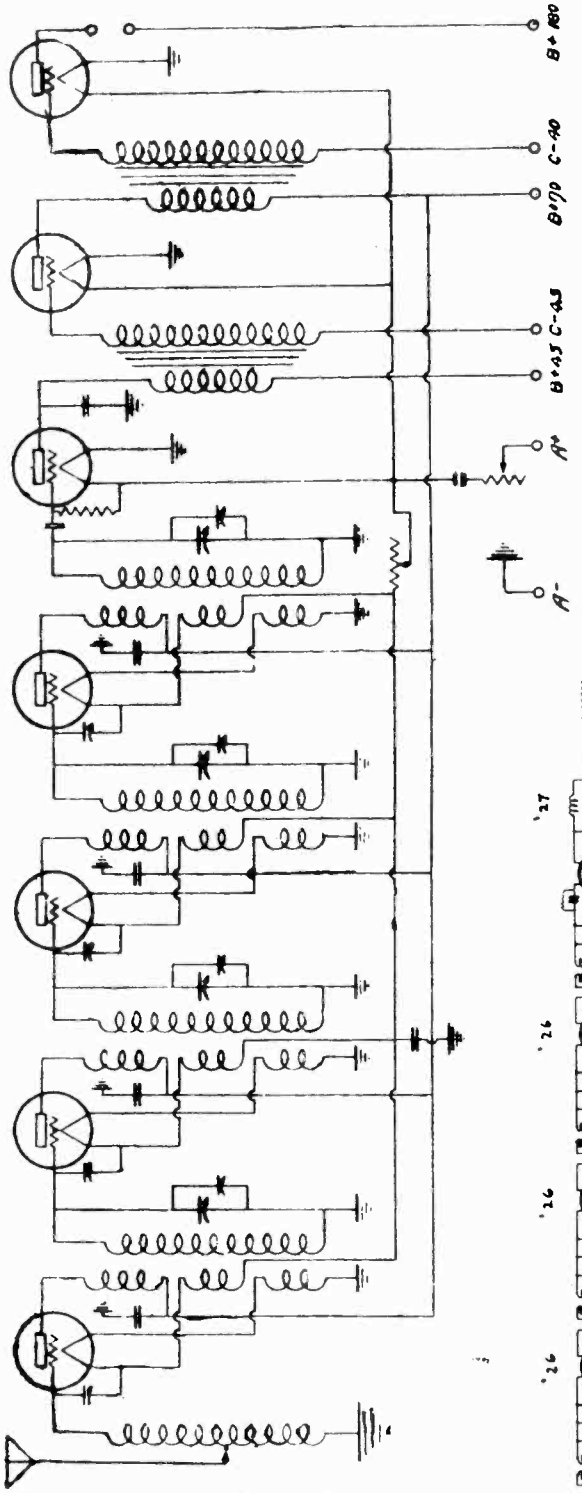
MODEL Loftin-White '45

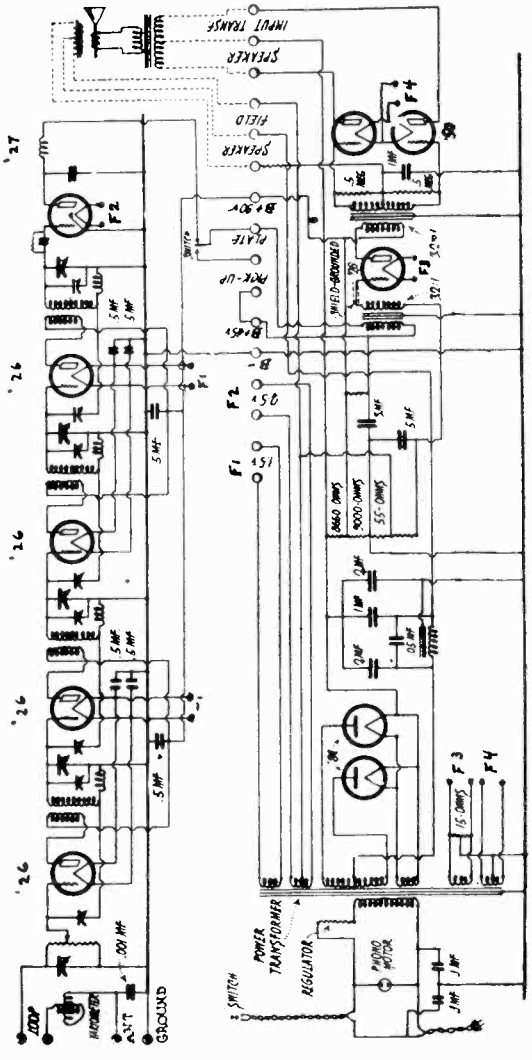


ELECTRICAL RESEARCH LABORATORIES, Inc.

MODEL S-61
MODEL R-1
Schematic

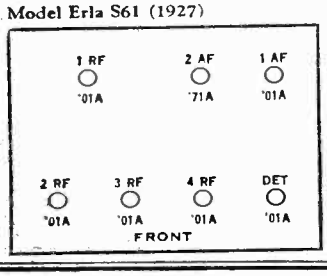
ERLA S-61 RFL SET RADIO RECEIVER CIRCUIT



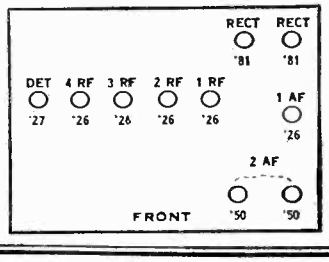


ERLA Model R-1 and Model A Power Unit

Model Erla S61 (1927)

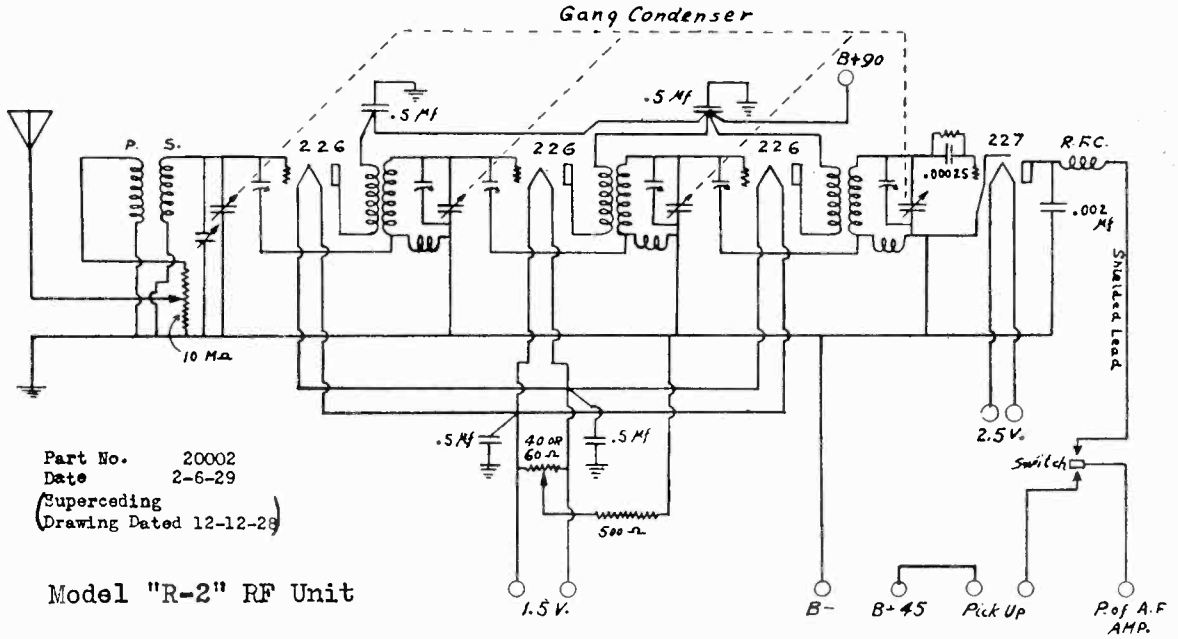


Model Erla R1-A (1928)



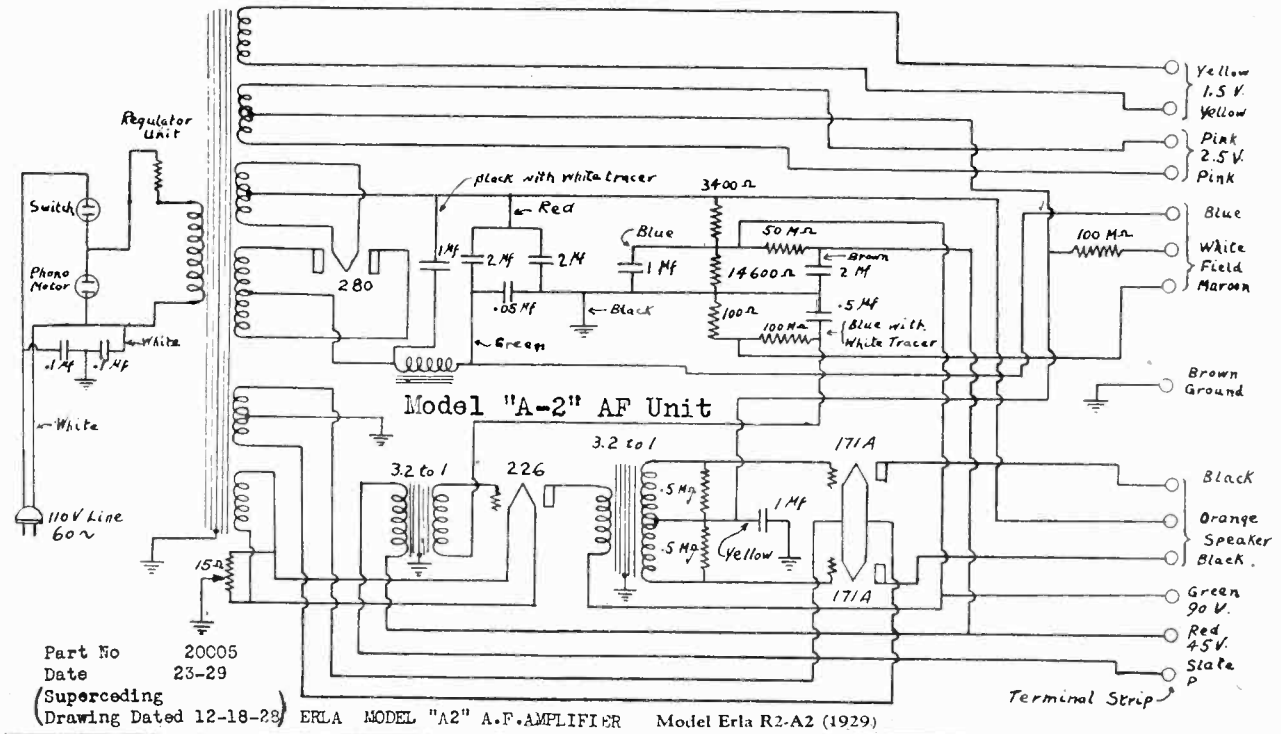
MODEL RF Unit
MODEL AF Unit
Schematic

ELECTRICAL
RESEARCH LABORATORIES, Inc.



Part No. 20002
Date 2-6-29
(Superceding
Drawing Dated 12-12-28)

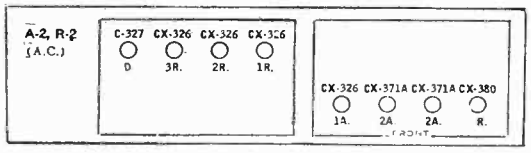
Model "R-2" RF Unit

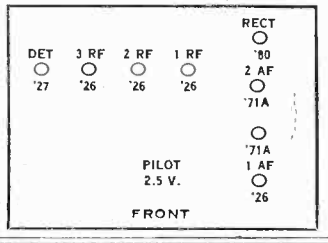


Part No 20005
Date 23-29
(Superceding
Drawing Dated 12-18-28)

ERLA MODEL "A2" A.F.AMPLIFIER

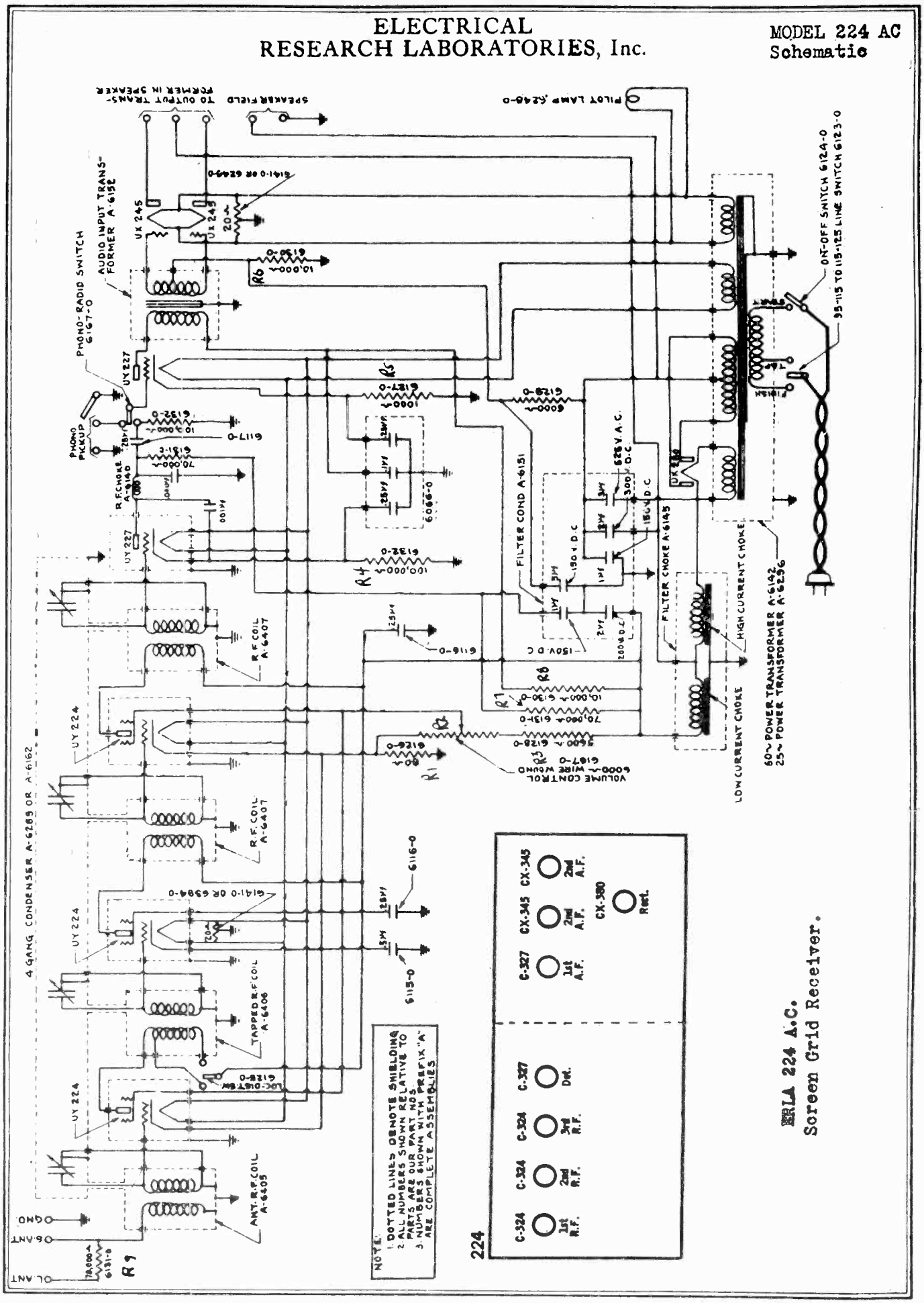
Model Erla R2-A2 (1929)





ELECTRICAL RESEARCH LABORATORIES, Inc.

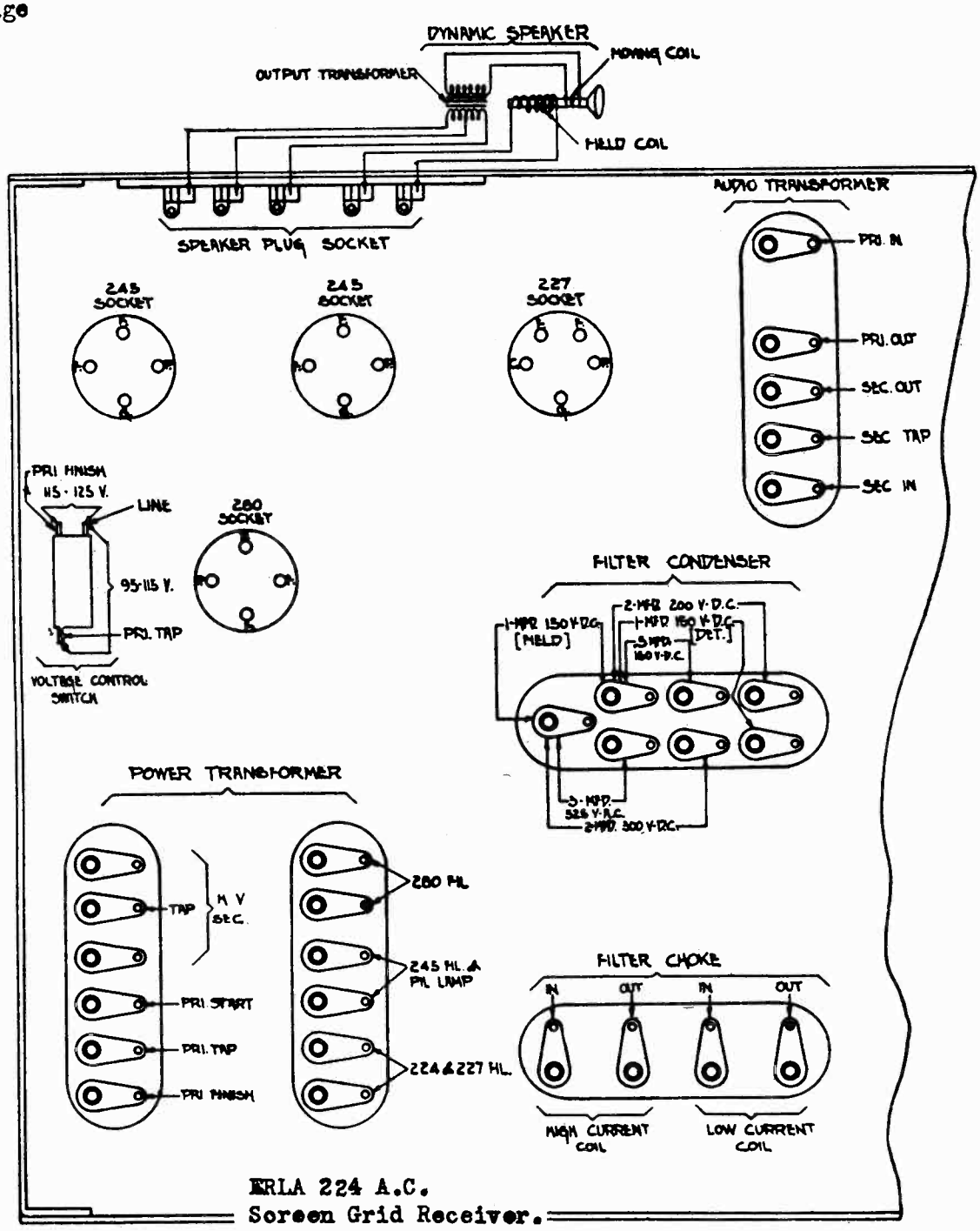
MODEL 224 AC
Schematic



ERLA 224 A.C.
Screen Grid Receiver.

MODEL 224 AC
Chassis
Voltage

ELECTRICAL RESEARCH LABORATORIES, Inc.



ERLA 224 A.C.
Screen Grid Receiver.

Details of Power Supply Terminal Connections

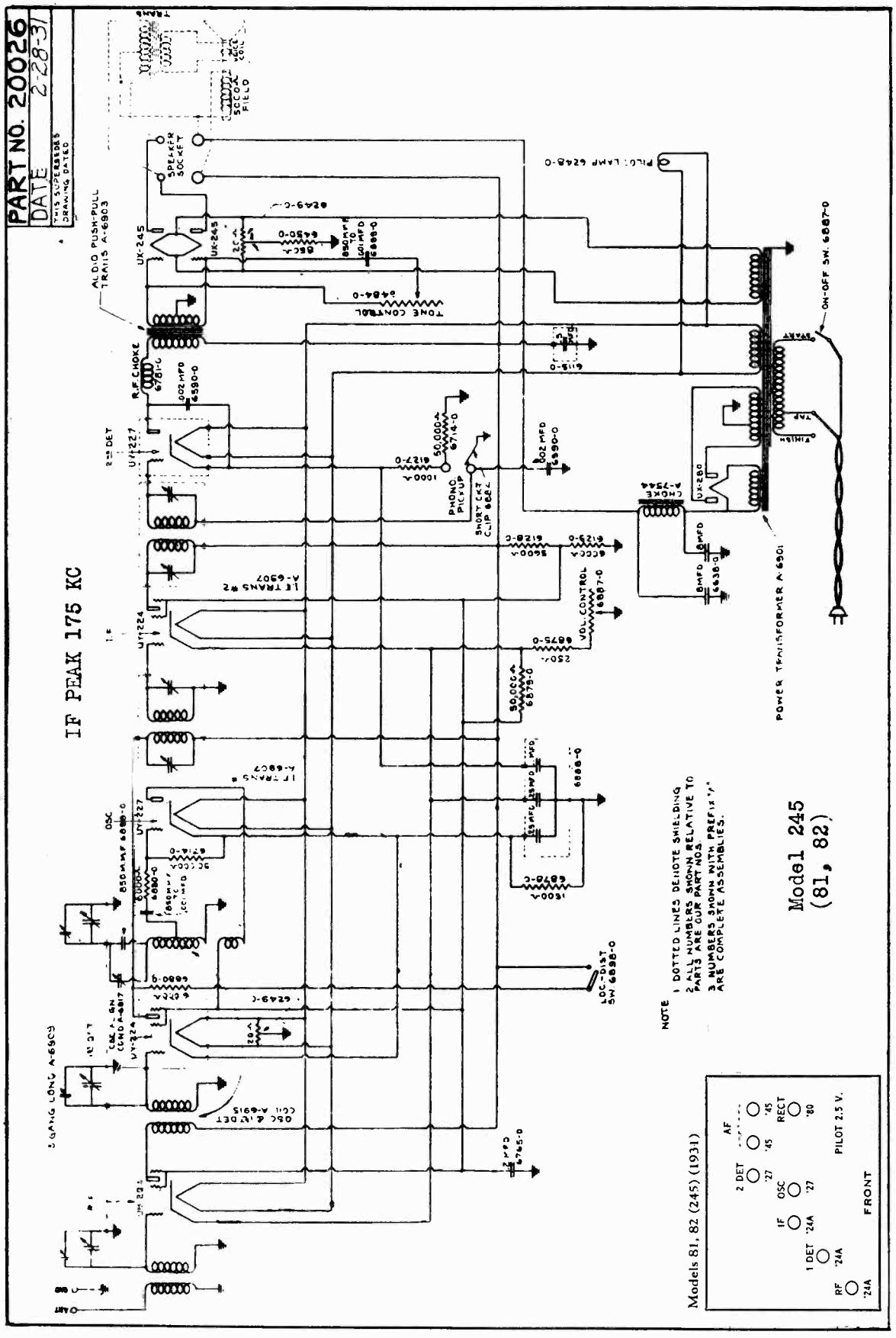
	Tube	Fil.	Screen Grid to cathode	Plate to cathode	Ground to cathode	Grid to Filament
	280	4.8 to 5v AC		340 to 360v DC		
	245	2.4 to 2.5v AC		240 to 250v DC		45 to 50v DC
Audio	227	2.35 to 2.4v AC		90 to 100v DC	4.5v DC	
DET.	227	2.35 to 2.4v AC		60 to 75v DC	6 to 7.5v DC	
	224	2.35 to 2.4v AC	75 to 80v DC	160 to 170v DC	1.5 to 2v DC	

(The above are based on line voltage of 110 volts and the switch in the 95-115 position.)

(Volume control set to full volume position.)

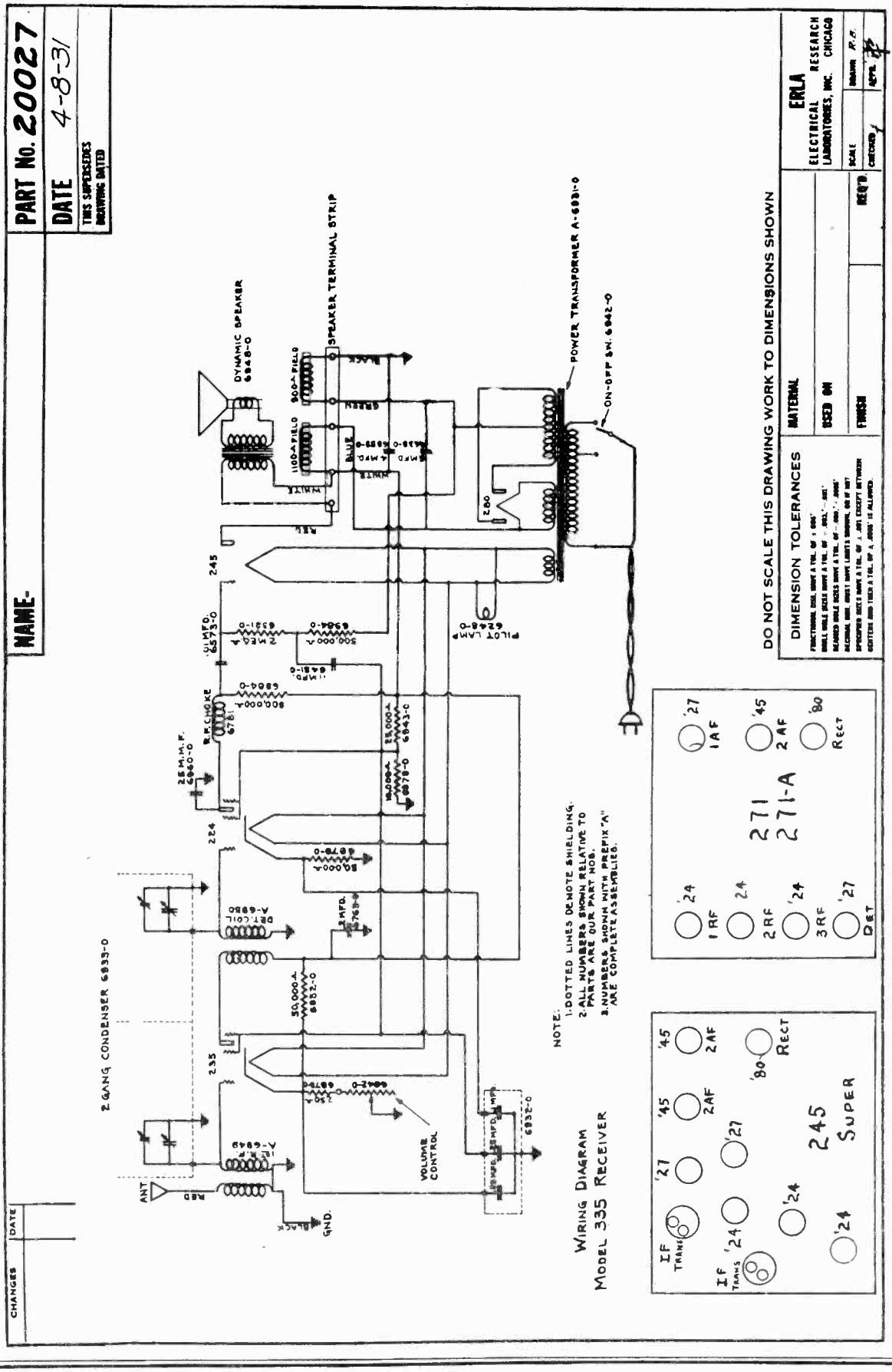
ELECTRICAL RESEARCH LABORATORIES, Inc.

MODEL 81, 82 (245)
Schematic



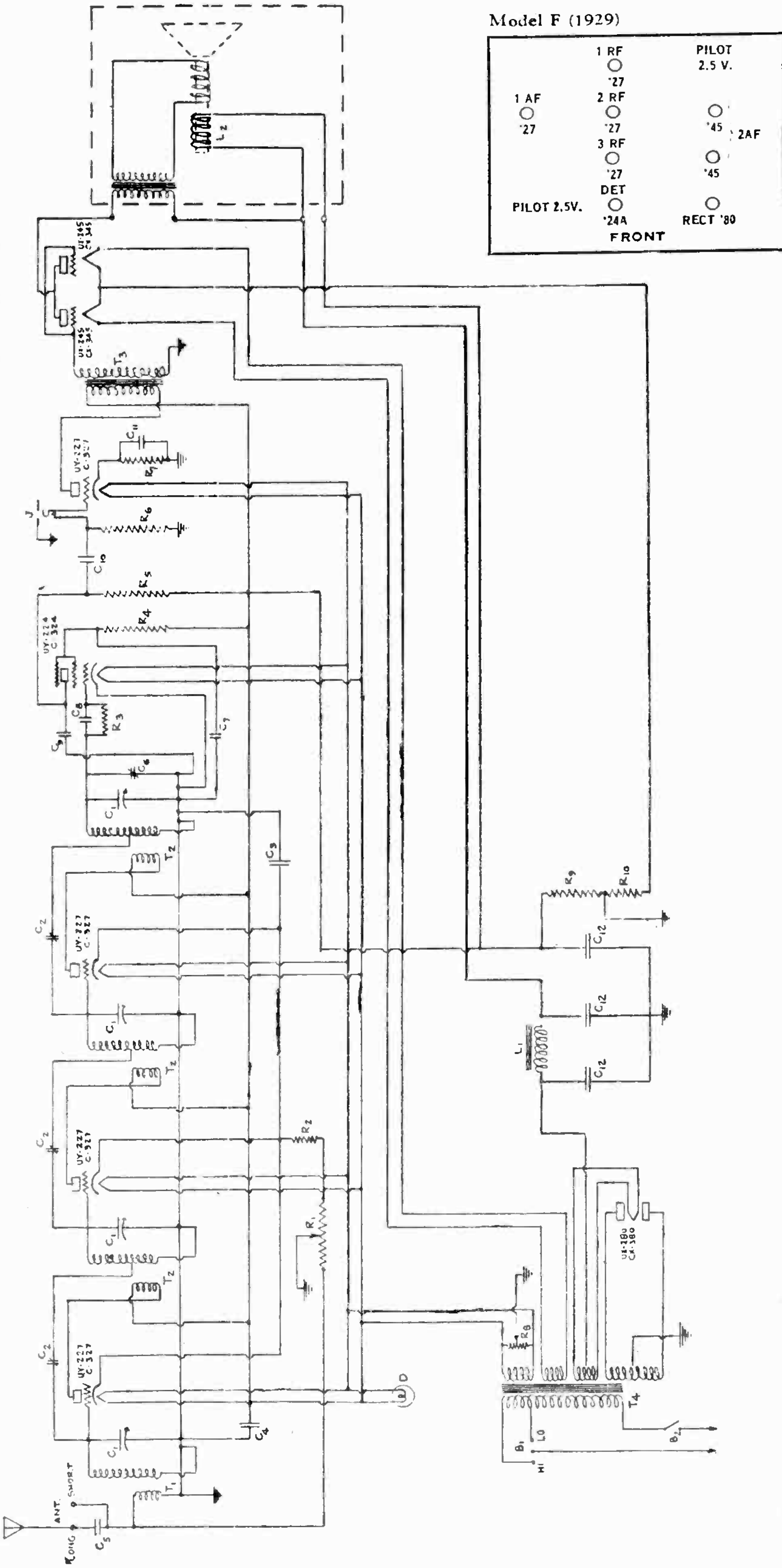
ELECTRICAL RESEARCH LABORATORIES, Inc.

MODEL 335
Schematic



MODEL F
Schematic
Data

EMERSON RADIO AND PHONOGRAPH CORPORATION



Model F (1929)

Model "F"

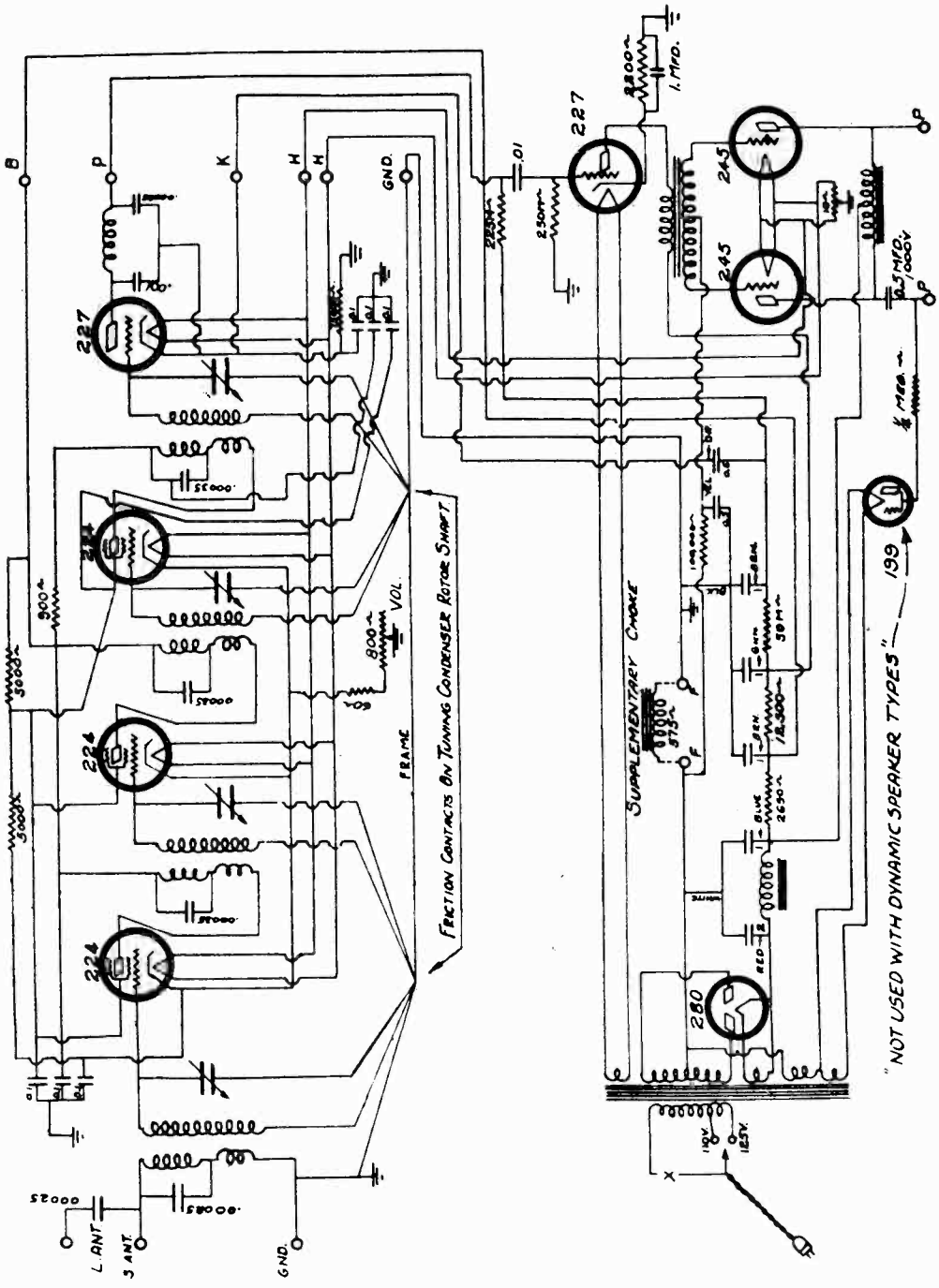
Line Voltage 115—Set on High Volt Tap—Volume Control Position Full On *Last Stage Is 2 No. 245 in Parallel

Tube No. in Order	Type of Tube	Position of Tube 1st RF Det. Etc.	Readings, Plug in Socket of Set: Tube Out: A Volts	Tube Out: B Volts	Tube in Tester: A Volts	B Volts	C Volts (Control Grid)	Cathode-Heater Volts	Normal Plate M A	Plate M A Grid Test	Plate Change M A	Screen Grid Volts
1	227	1st RF	2.4	119	2.3	115	7	7	3.8	4.6	.8	-
2	227	2nd RF	2.4	119	2.3	115	7	7	3.8	4.6	.8	-
3	227	3rd RF	2.4	119	2.3	115	7	7	3.8	4.6	.8	-
4	224	Det.	2.4	50	2.3	50	0.8	-	0.7	0.7	-	5.
5	227	1st A	2.4	128	2.3	100	8.5	8.5	6.2	7.5	1.3	-
6	245	2nd A*	5.2	290	2.4	175	31	-	24.	28	4.	-
7	245	2nd A*	5.2	290	2.4	175	31	-	24.	28	4	-
8	280	Rect.	-	-	4.75	-	-	-	90.	-	-	-
9												
10												

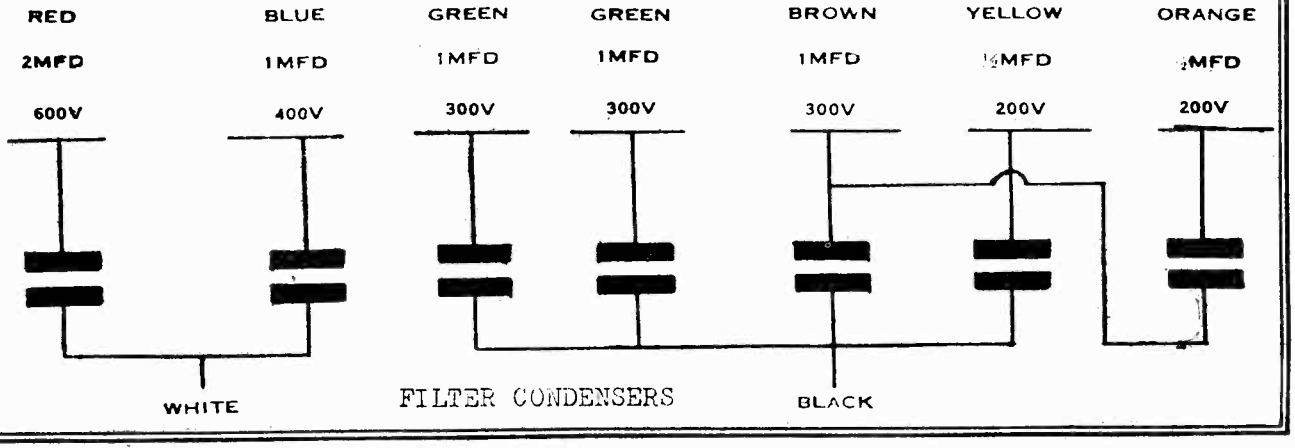
C_1 Tuning Condenser.
C_2 Neutralizing Condenser.
C_3 R.F. Grid Bias Condenser .25 MF.
C_4 R.F. Plate By-Pass Condenser .25 MF.
C_5 Antenna Condenser .00025 MF.
C_6 Det. Padding Condenser.
C_7 Det. Screen Grid Bias Condenser .25 MF.
C_8 Det. Control Grid Condenser .0001 MF.
C_9 Det. Plate Condenser .0005 MF.
C_{10} 1st Audio Coupling Condenser 0.1 MF.
C_{11} 1st Audio Grid Condenser 0.5 MF.
C_{12} Filter Condensers 8.0 MF Each.
L_1 Filter Choke.
L_2 Speaker Field 2500 Ohms.
J Phonograph Jack.
D Dial Lamp.
R_1 Volume Control 15,000 Ohms.
R_2 R.F. Grid Bias Resistance 620 Ohms.
R_3 Det. Control Grid Resistance .5 Megohm.
R_4 Det. Screen Grid Resistance .5 Megohm.
R_5 1st Audio Coupling Resistance .1 Megohm.
R_6 1st Audio Grid Resistance .5 Megohm.
R_7 1st Audio Grid Bias Resistance 1750 Ohms.
R_8 Hum Control 20 Ohms.
R_9 Loss Current Resistance 4500 Ohms.
R_{10} 245 Grid Bias Resistance 650 Ohms.
T_1 Antenna Transformer.
T_2 R.F. Inter stage Transformer.
T_3 Input Audio Transformer.
T_4 Power Transformer.
B_1 Hi-Lo S.P.D.T. Toggle Switch.
B_2 S.P.S.T. Toggle Switch.

MODEL 65
Schematic

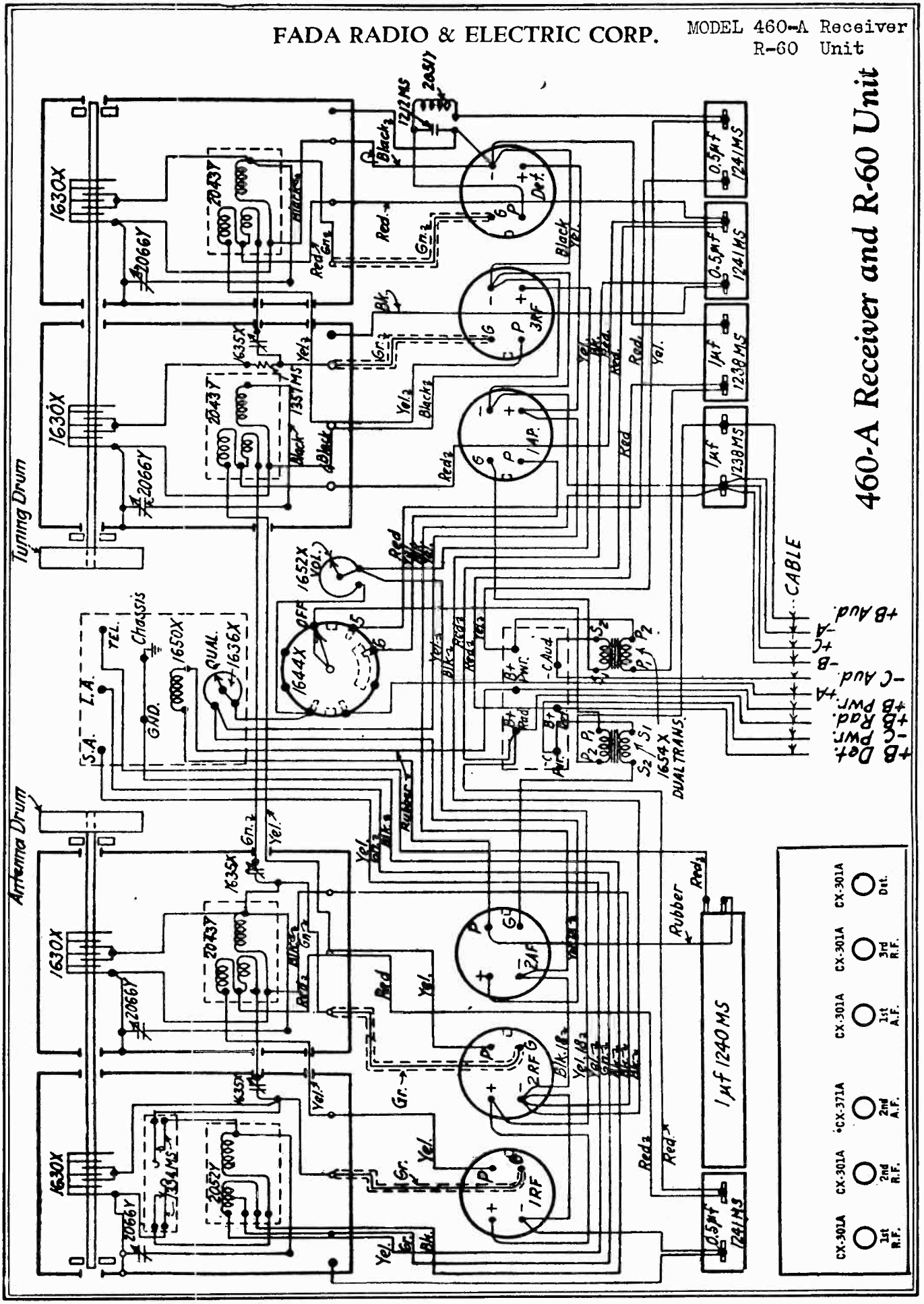
EMERSON RADIO AND PHONOGRAPH CORPORATION



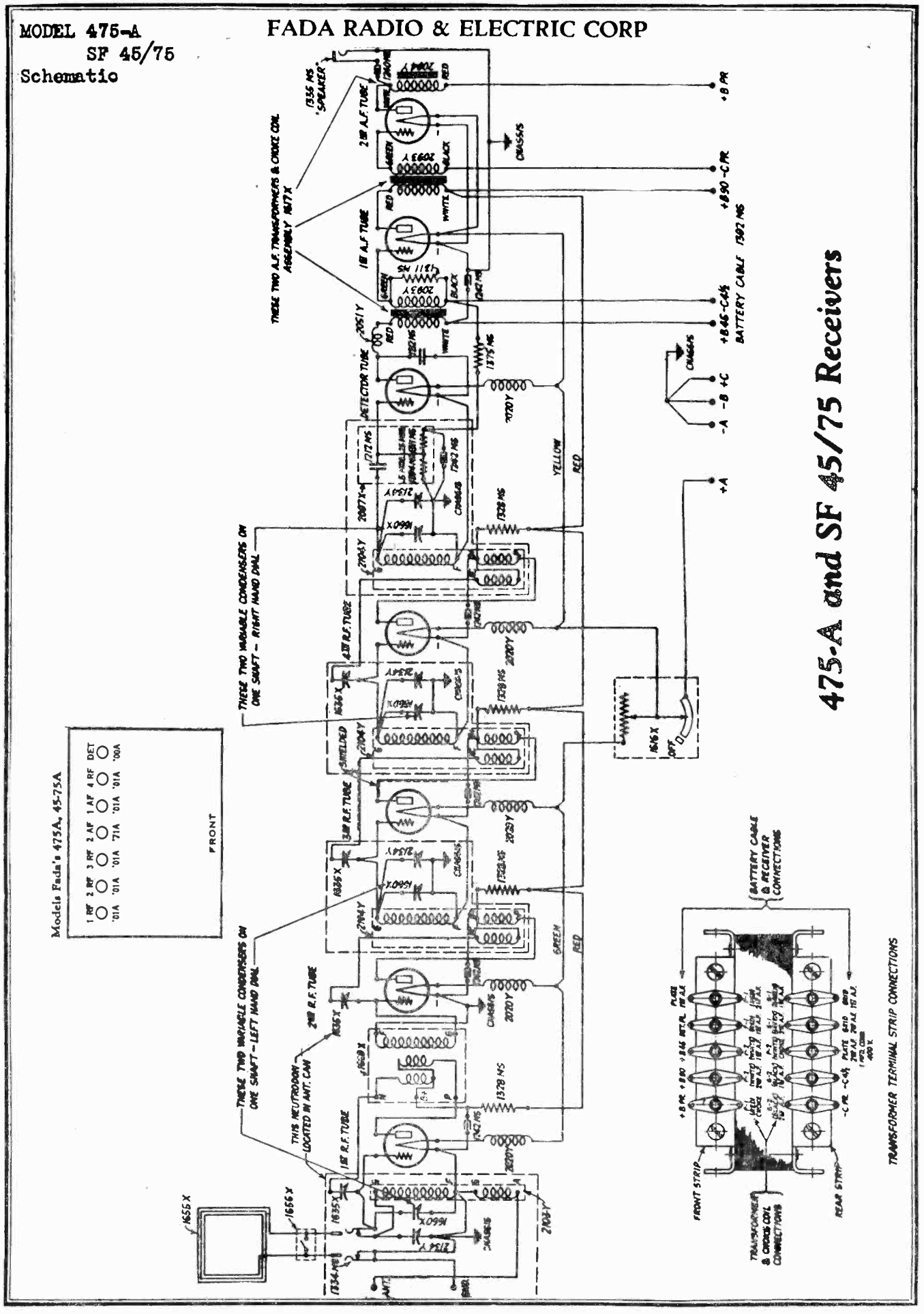
Voltage Data On Next Page



FILTER CONDENSERS

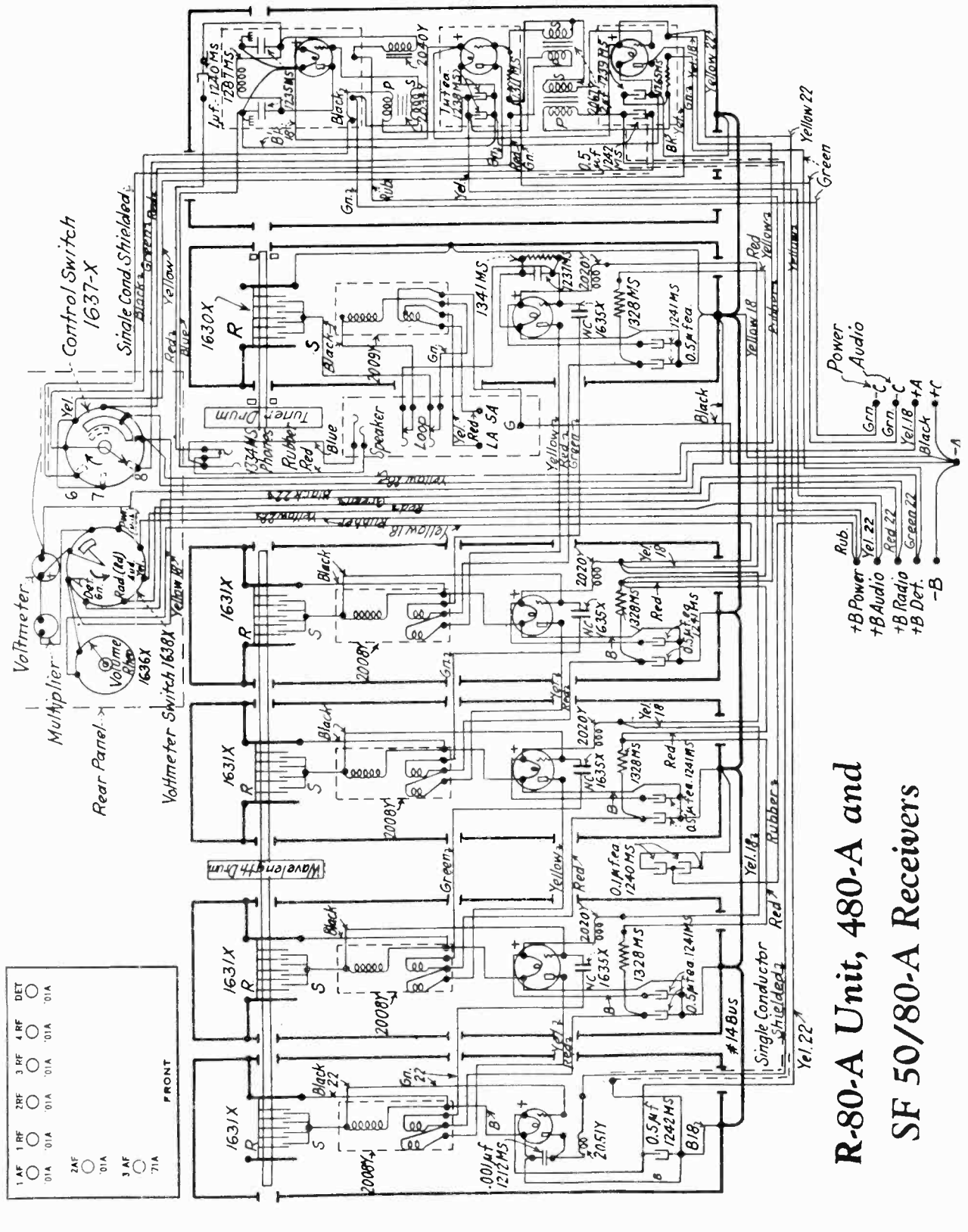


MODEL 475-A
SF 45/75
Schematic



FADA RADIO & ELECTRIC CORP.

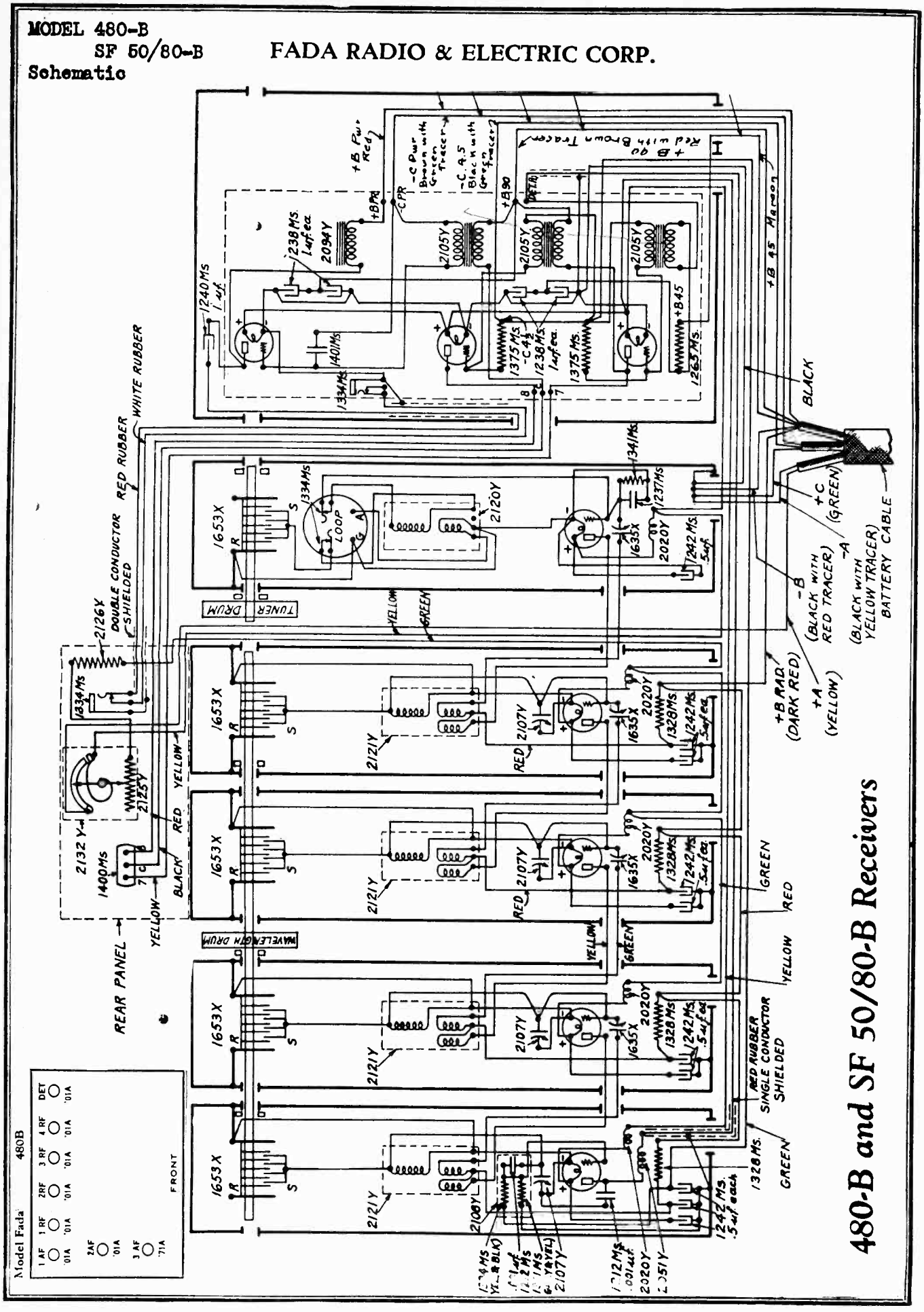
MODEL R-80-A Unit
480-A
SF 50/80-A
Schematic



R-80-A Unit, 480-A and
SF 50/80-A Receivers

MODEL 480-B
SF 50/80-B
Schematic

FADA RADIO & ELECTRIC CORP.



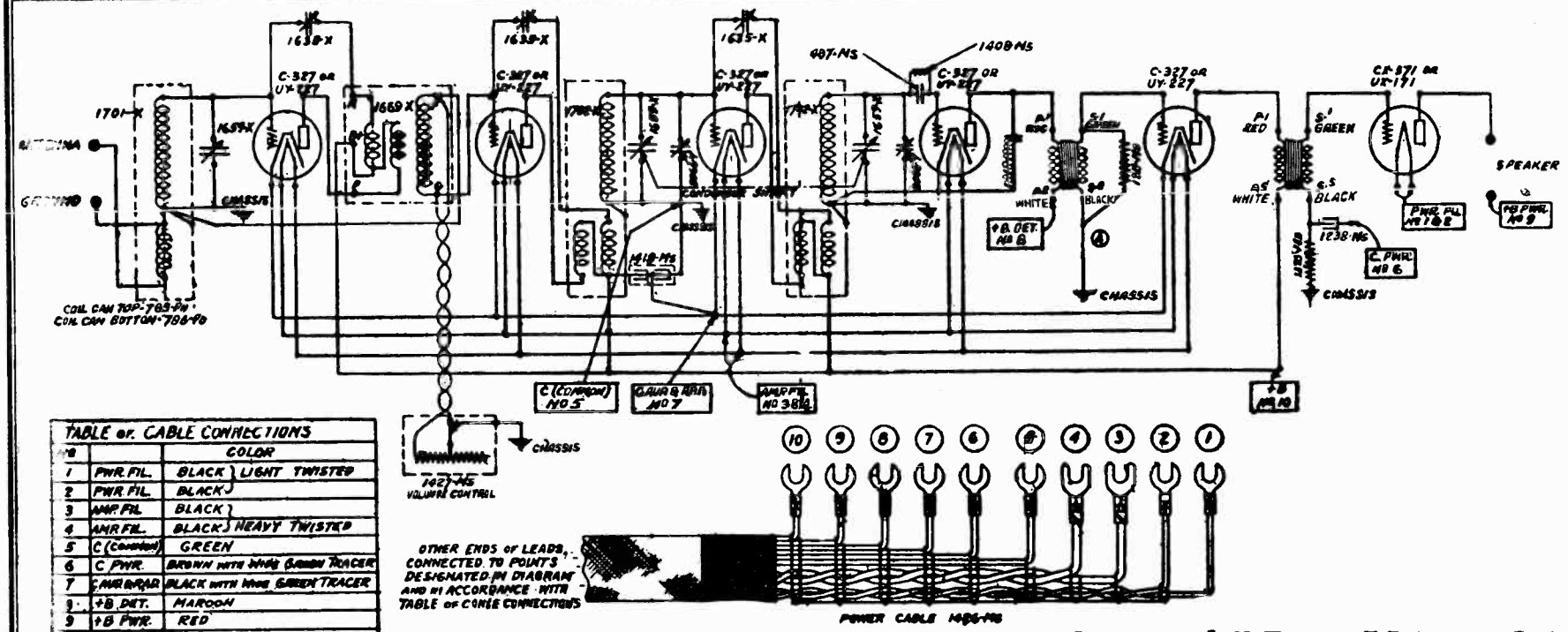


TABLE OF CABLE CONNECTIONS		
MS		COLOR
1	PWR. FIL.	BLACK } LIGHT TWISTED
2	PWR. FIL.	BLACK }
3	AMP. FIL.	BLACK }
4	AMP. FIL.	BLACK } HEAVY TWISTED
5	C (Common)	GREEN
6	C. PWR.	BROWN WITH WIDE GREEN TRACER
7	C. AVR & BIAS	BLACK WITH WIDE GREEN TRACER
8	+B DET.	MAROON
9	+B PWR.	RED
10	+B	RED WITH WIDE BLACK TRACER

"Special" A. C. Receiver

265-UA or CA and RP-65-UA or CA
262-UA or CA and RP-62-UA or CA

For Power Unit See Model "C"

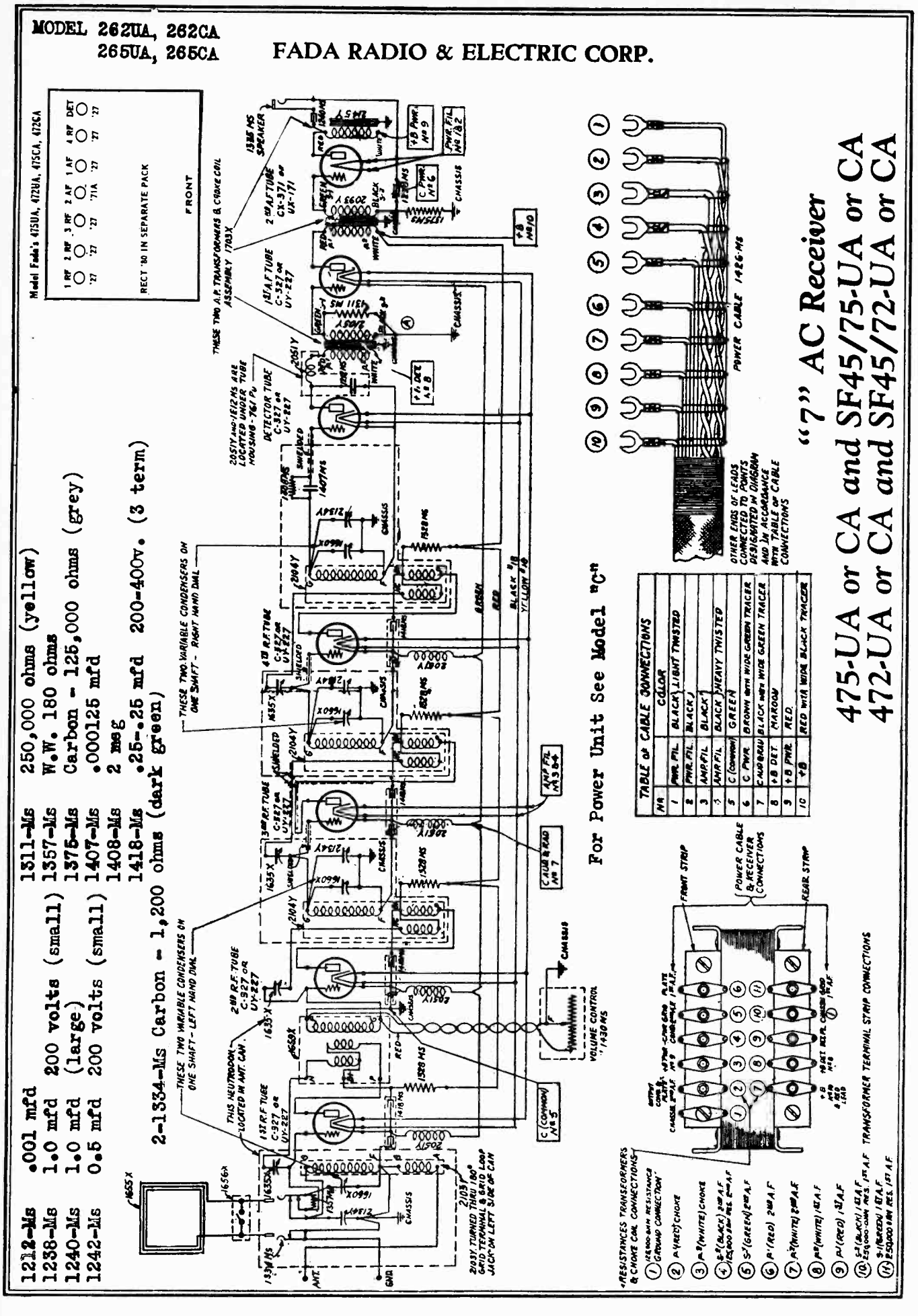
Model Fada's 262UA, 265UA, 262CA, 265CA

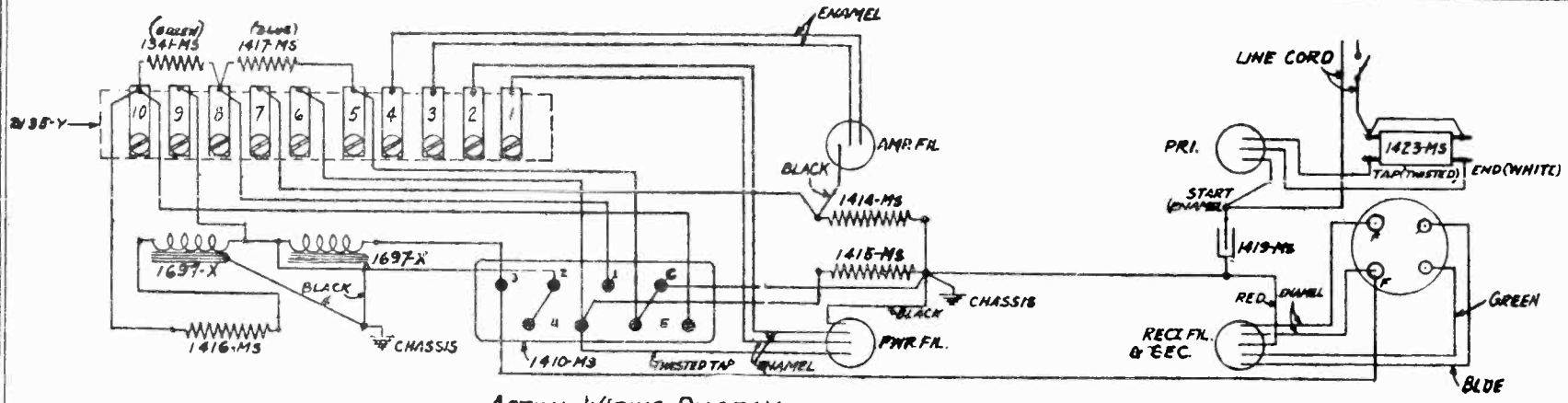
1 RF	2 RF	2 AF	3 RF	1 AF	DET
'27	'27	'71A	'27	'27	'27

RECT '80 IN SEPARATE PACK

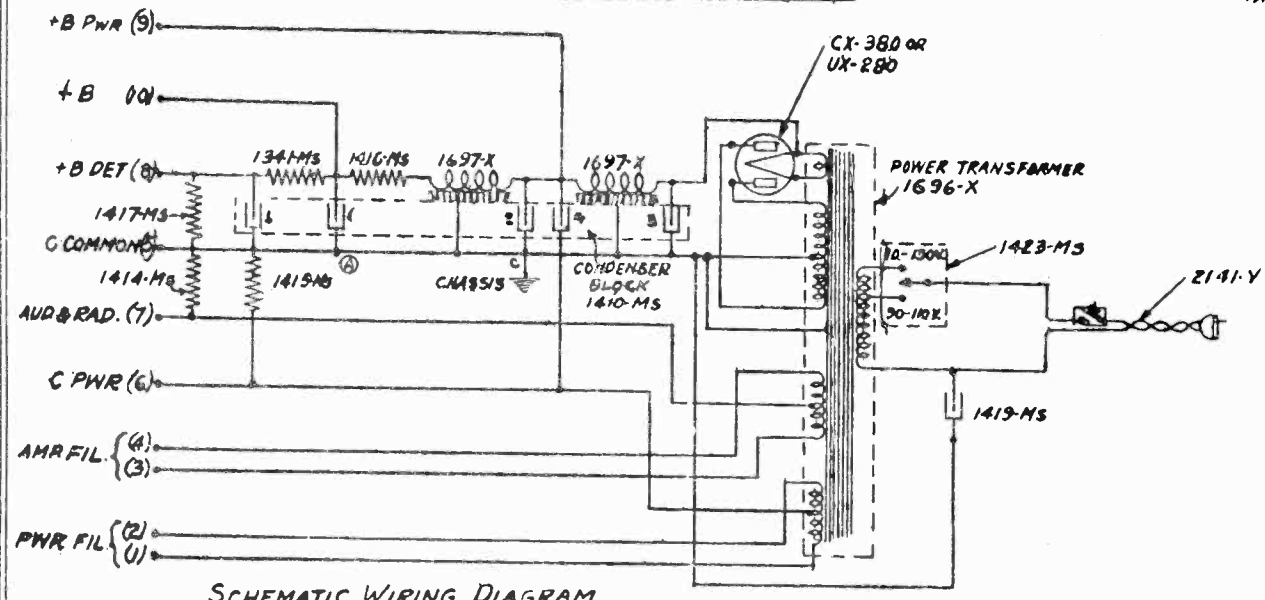
FRONT

1212-Ms	Condenser - Detector filter - .001 mfd
1238-Ms	Condenser - By-pass - 1.0 mfd - 200 Volts (small)
1242-Ms	Condenser - By-pass - 0.5 mfd - 200 Volts (small)
1311-Ms	Resistance - carbon - 250,000 ohms (yellow)
1375-Ms	Resistance - carbon - 125,000 ohms (grey)
1407-Ms	Grid Condenser - .000125 mfd
1408-Ms	Grid Leak - 2 meg
1418-Ms	Condenser - By-pass - 0.25 - 0.25 mfd 200-400V.
1341-Ms	Resistance - carbon (green) 20,000 ohms
1410-Ms	Main filter condenser block - 10½ mfd
1414-Ms	Resistance - W.W. (yellow & white) - 250 ohms
1415-Ms	Resistance - W.W. (green & white) 2,000 ohms
1416-Ms	Resistance - W.W. (white & white) 3,000 ohms
1417-Ms	Resistance - carbon (blue) - 50,000 ohms
1419-Ms	Condenser (line buffer) - 0.5 mfd - 400 volts





ACTUAL WIRING DIAGRAM



SCHEMATIC WIRING DIAGRAM

TABLE OF CABLE CONNECTIONS

1, 2	POWER FILAMENT
3, 4	AMP. FILAMENT
5	C. COMMON
6	C PWR
7	C AUD. & RAD.
8	+B DET.
9	+B PWR
10	+B

Type "J" unit for 25 cycle current is similar, except that a 1706X power transformer is used instead of the 1696X transformer as indicated on the type "C" unit for 60 cycles.

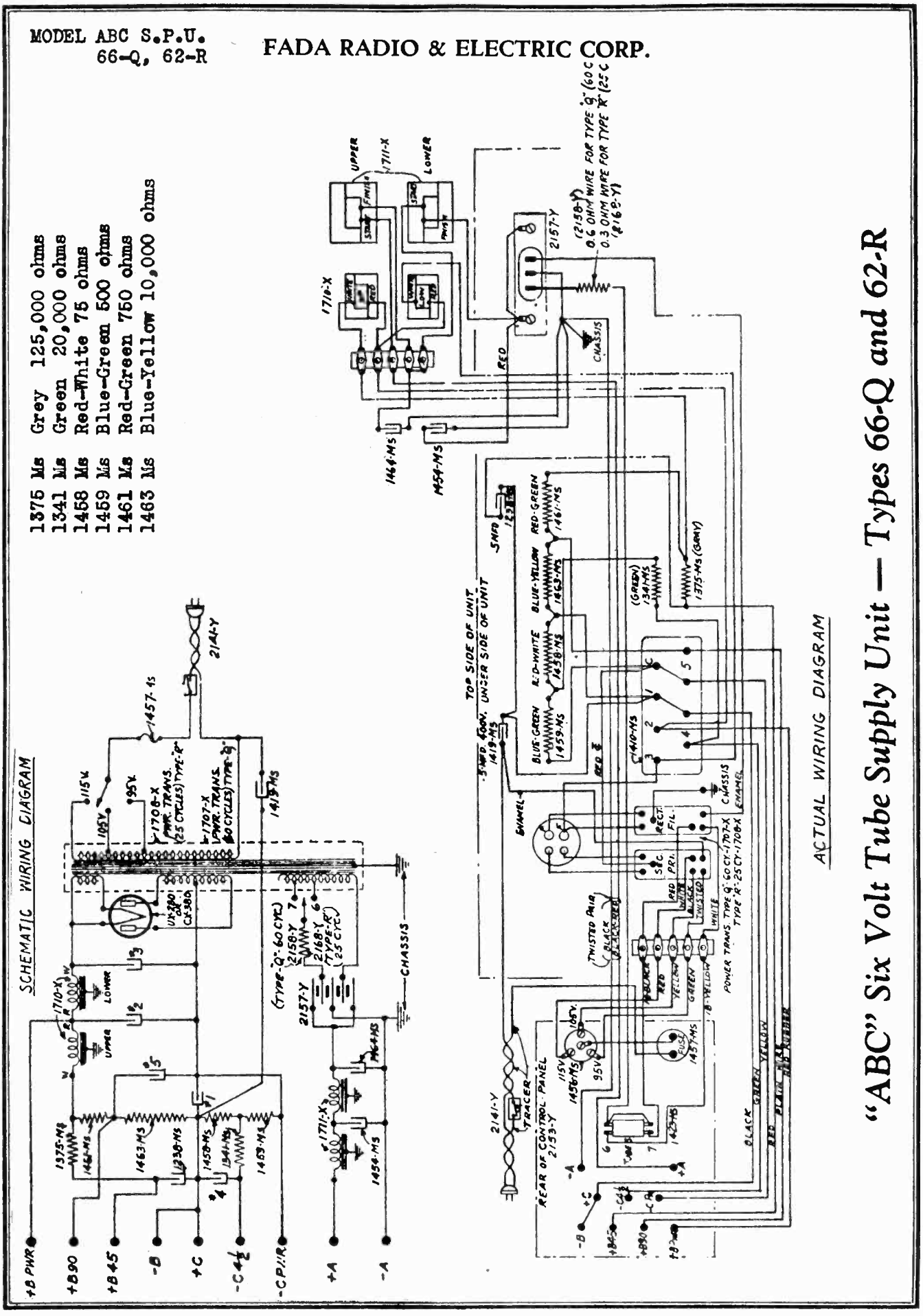
1341 Ms	Carbon	20,000 ohms	red and green or green only
1414 Ms	Wire	250 ohms	yellow and white
1415 Ms	Wire	2,000 ohms	green and white
1416 Ms	Wire	3,000 ohms	white and white
1417 Ms	Carbon	50,000 ohms	blue

Type "C" Electric Unit, used with "Special" and "7" AC Receivers

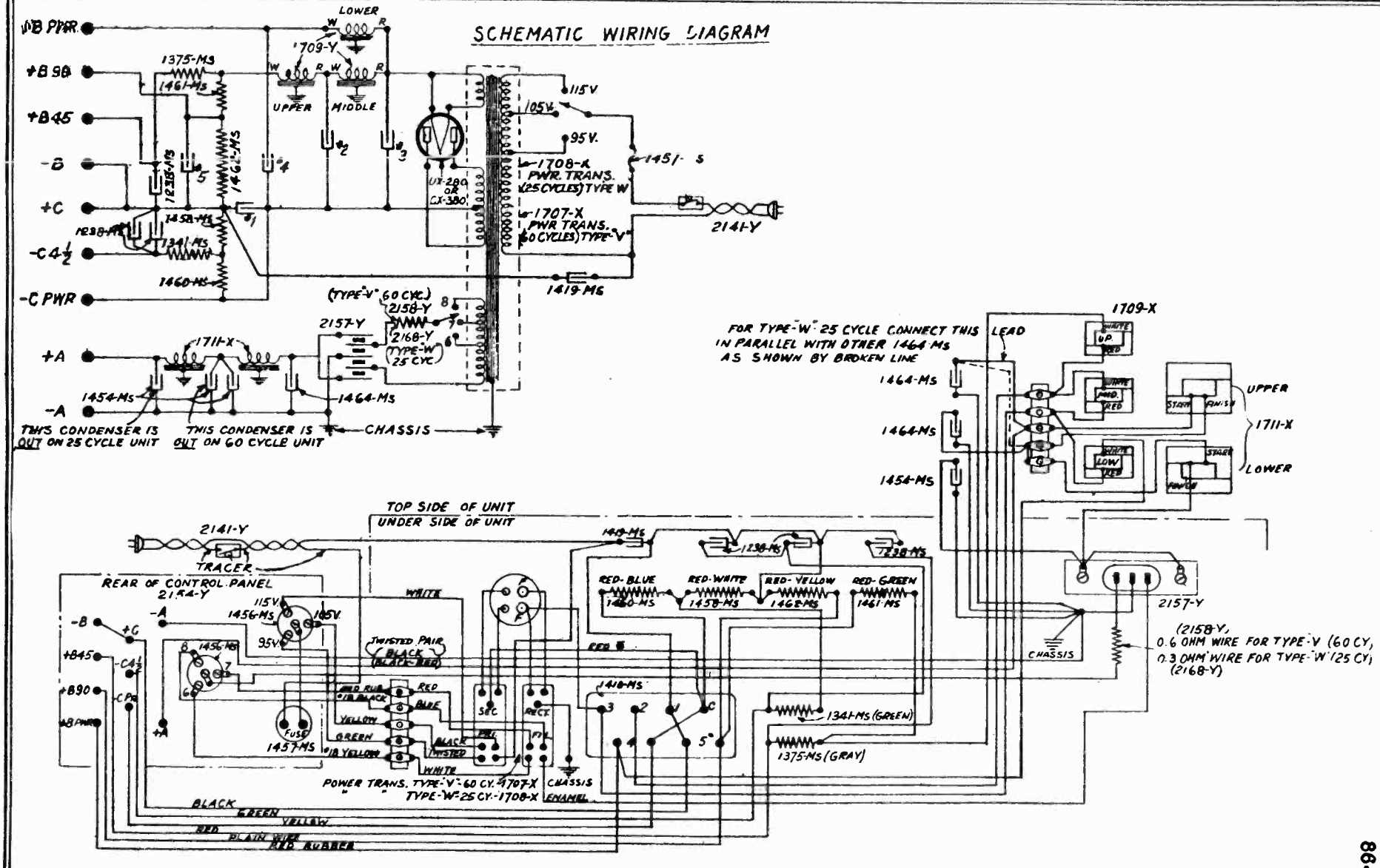
MODEL ABC S.P.U.
66-Q, 62-R

FADA RADIO & ELECTRIC CORP.

1375 Ms	Grey	125,000 ohms
1341 Ms	Green	20,000 ohms
1458 Ms	Red-White	75 ohms
1459 Ms	Blue-Green	500 ohms
1461 Ms	Red-Green	750 ohms
1463 Ms	Blue-Yellow	10,000 ohms



"ABC" Six Volt Tube Supply Unit — Types 66-Q and 62-R



ACTUAL WIRING DIAGRAM

"ABC" Six Volt Tube Supply Unit — Types 86-V and 82-W

MODEL 10,11,30,31
MODEL 10Z,11Z,30Z,31Z FADA RADIO & ELECTRIC CORP.
Schematic

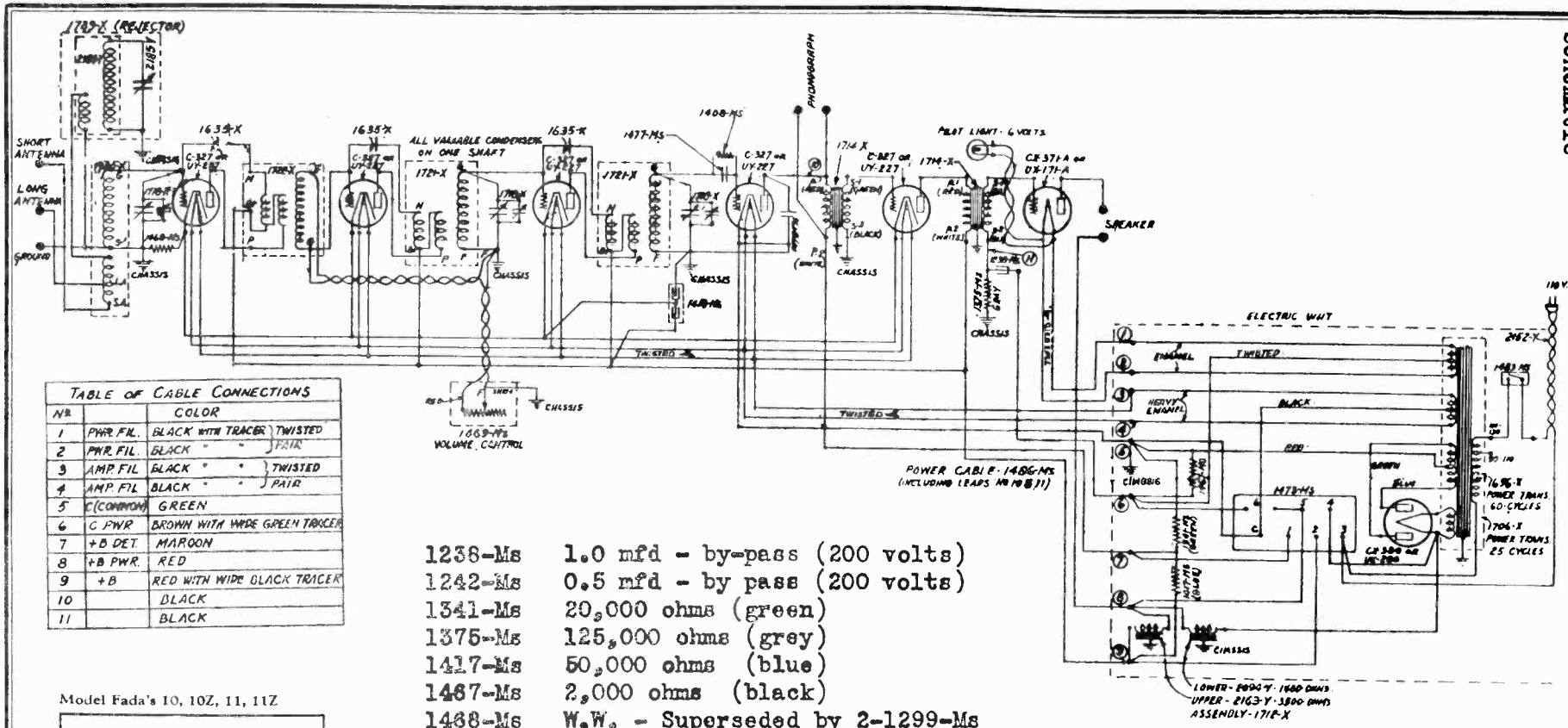
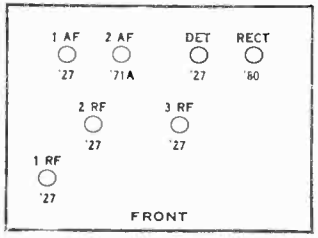


TABLE OF CABLE CONNECTIONS			
NO.		COLOR	
1	PWR. FIL.	BLACK WITH TRACER	TWISTED PAIR
2	PWR. FIL.	BLACK " "	
3	AMP. FIL.	BLACK " "	TWISTED PAIR
4	AMP. FIL.	BLACK " "	
5	C (COMMON)	GREEN	
6	C PWR.	BROWN WITH WIDE GREEN TRACER	
7	+B DET.	MAROON	
8	+B PWR.	RED	
9	+B	RED WITH WIDE BLACK TRACER	
10		BLACK	
11		BLACK	

Model Fada's 10, 10Z, 11, 11Z

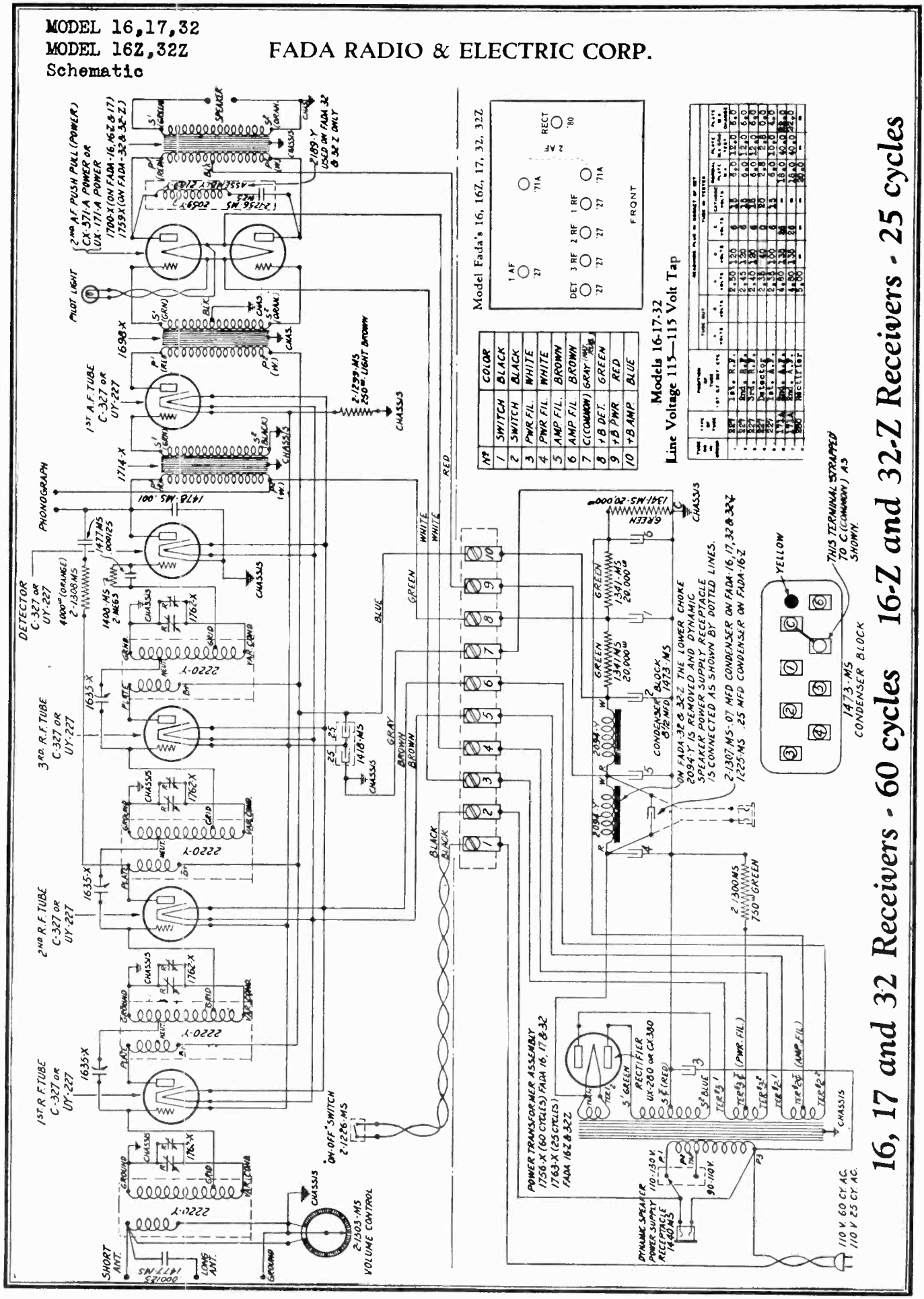


1238-Ms	1.0 mfd - by-pass (200 volts)
1242-Ms	0.5 mfd - by pass (200 volts)
1341-Ms	20,000 ohms (green)
1375-Ms	125,000 ohms (grey)
1417-Ms	50,000 ohms (blue)
1467-Ms	2,000 ohms (black)
1468-Ms	W.W. - Superseded by 2-1299-Ms
1469-Ms	Volume control - 20,000 ohms
1477-Ms	.000125 mfd moulded mica (green dot)
1478-Ms	Condenser - .001 mfd moulded mica (yellow)
1485-Ms	Pilot lamp - 6 volts (orange)
2-1299-Ms	Resistor - 250 ohms (light brown)
2094-Y	Choke - 1,400 ohms
2163-Y	Choke - 3,500 ohms

10, 11, 30 and 31 Receivers—60 cycles
10Z, 11Z, 30Z and 31Z Receivers—25 cycles

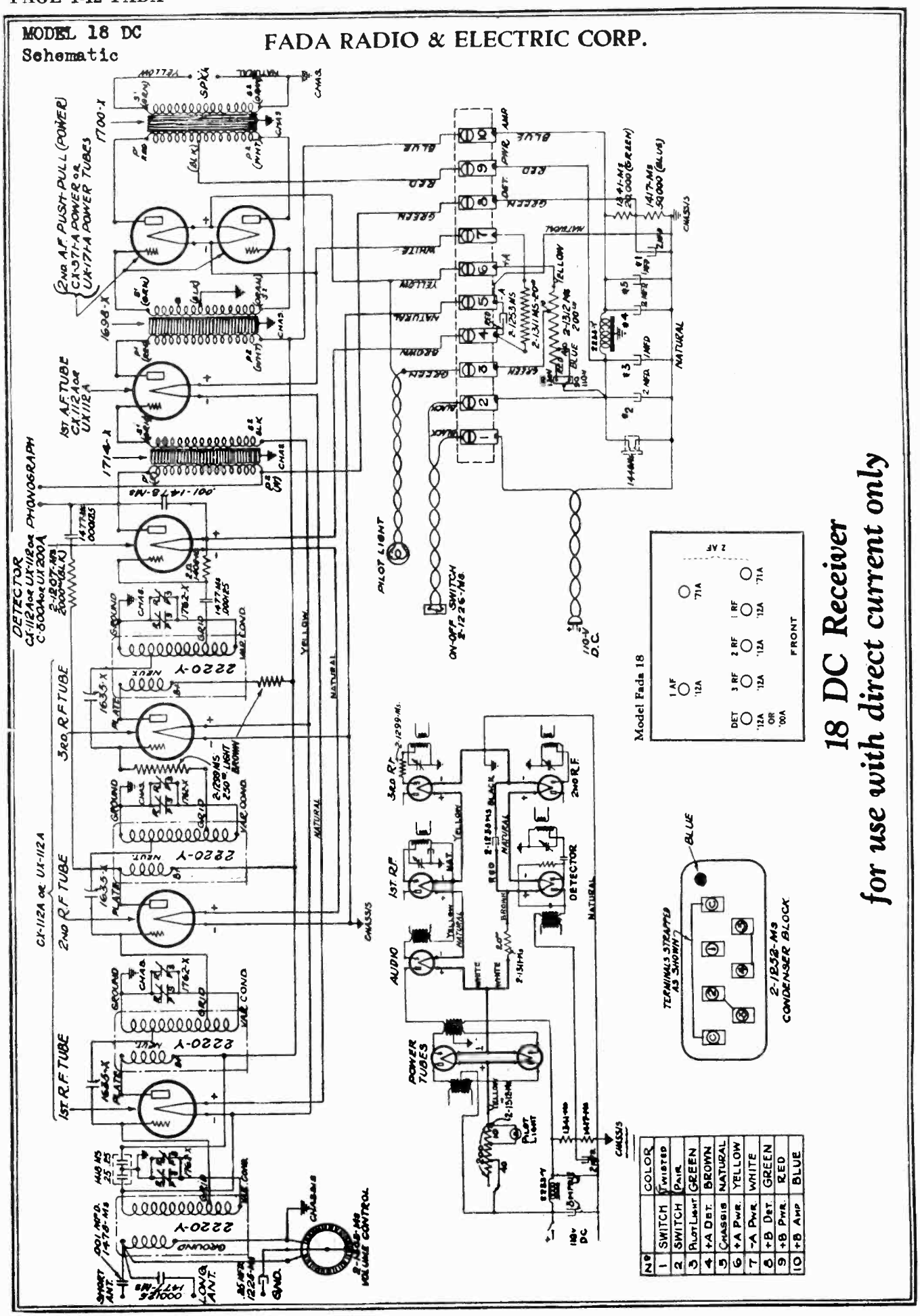
MODEL 16,17,32
MODEL 16Z,32Z
Schematic

FADA RADIO & ELECTRIC CORP.



MODEL 18 DC
Schematic

FADA RADIO & ELECTRIC CORP.



No		COLOR
1	SWITCH	Twisted
2	SWITCH	Pair
3	Pilot Light	GREEN
4	+A Det.	BROWN
5	Chassis	NATURAL
6	+A Pwr.	YELLOW
7	-A Pwr.	WHITE
8	+B Det.	GREEN
9	+B Pwr.	RED
10	+B Amp	BLUE

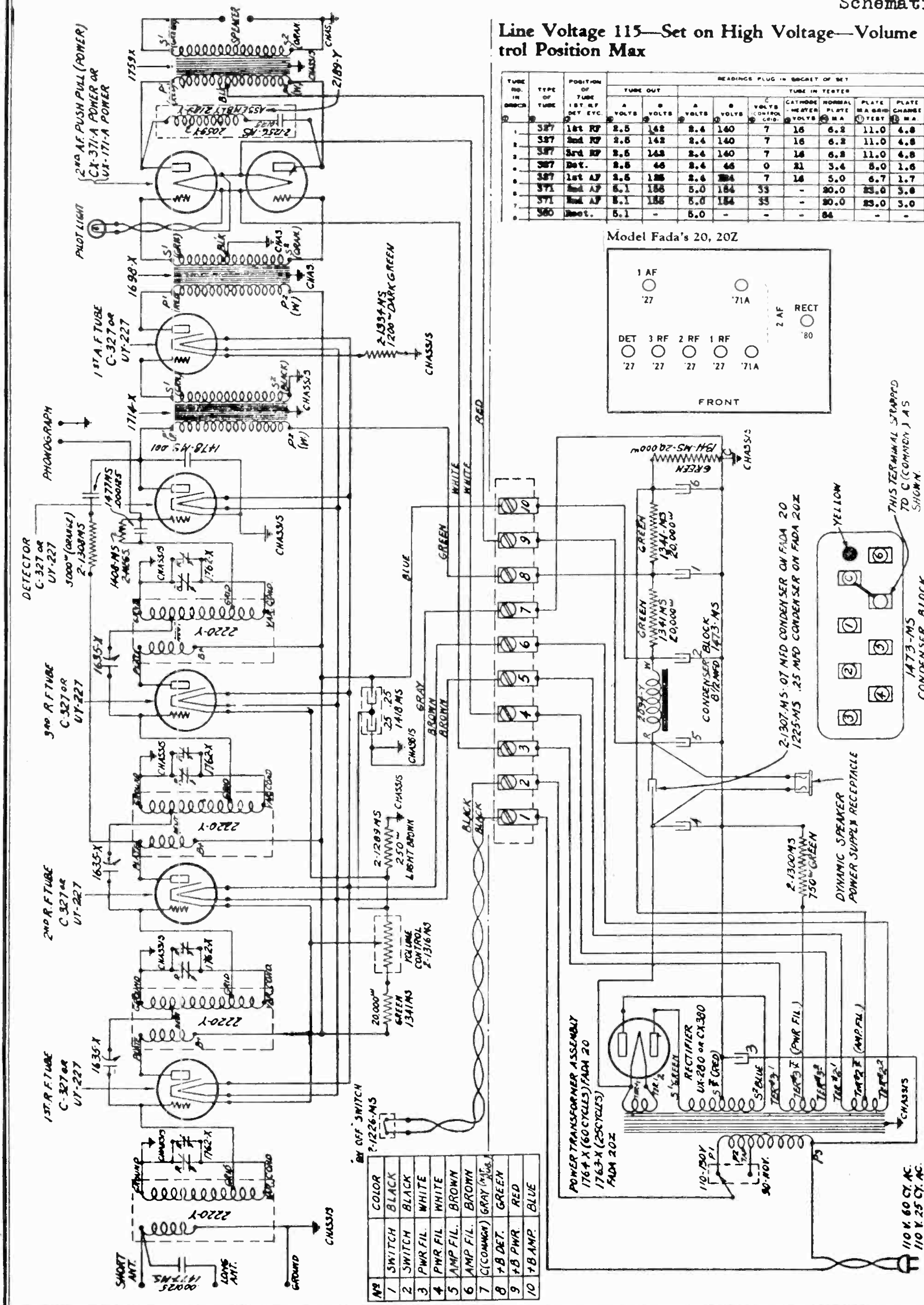
FADA RADIO & ELECTRIC CORP.

MODEL 20,
MODEL 20Z
Schematic

Line Voltage 115—Set on High Voltage—Volume Control Position Max

Tube No. in Order	Type of Tube	Position of Tube 1st RF Det Etc.	Readings Plug in Socket of Set									
			Tube Out		Tube in Tester							
			A Volts	B Volts	A Volts	B Volts	C Volts Control Grid	Cathode-Heater Volts	Normal Plate MA	Plate MA Grid Test	Plate Change MA	Screen Grid Volts
1	327	1st RF	2.5	142	2.4	140	7	16	6.2	11.0	4.8	-
2	327	2nd RF	2.5	142	2.4	140	7	16	6.2	11.0	4.8	-
3	327	3rd RF	2.5	142	2.4	140	7	16	6.2	11.0	4.8	-
4	327	Det.	2.5	46	2.4	46	0	21	3.4	8.0	1.6	-
5	327	1st AF	2.5	185	2.4	184	7	16	5.0	6.7	1.7	-
6	371	2nd AF	5.1	186	5.0	184	33	-	20.0	23.0	3.0	-
7	371	2nd AF	5.1	186	5.0	184	33	-	20.0	23.0	3.0	-
8	380	Rect.	5.1	-	5.0	-	-	-	84	-	-	-

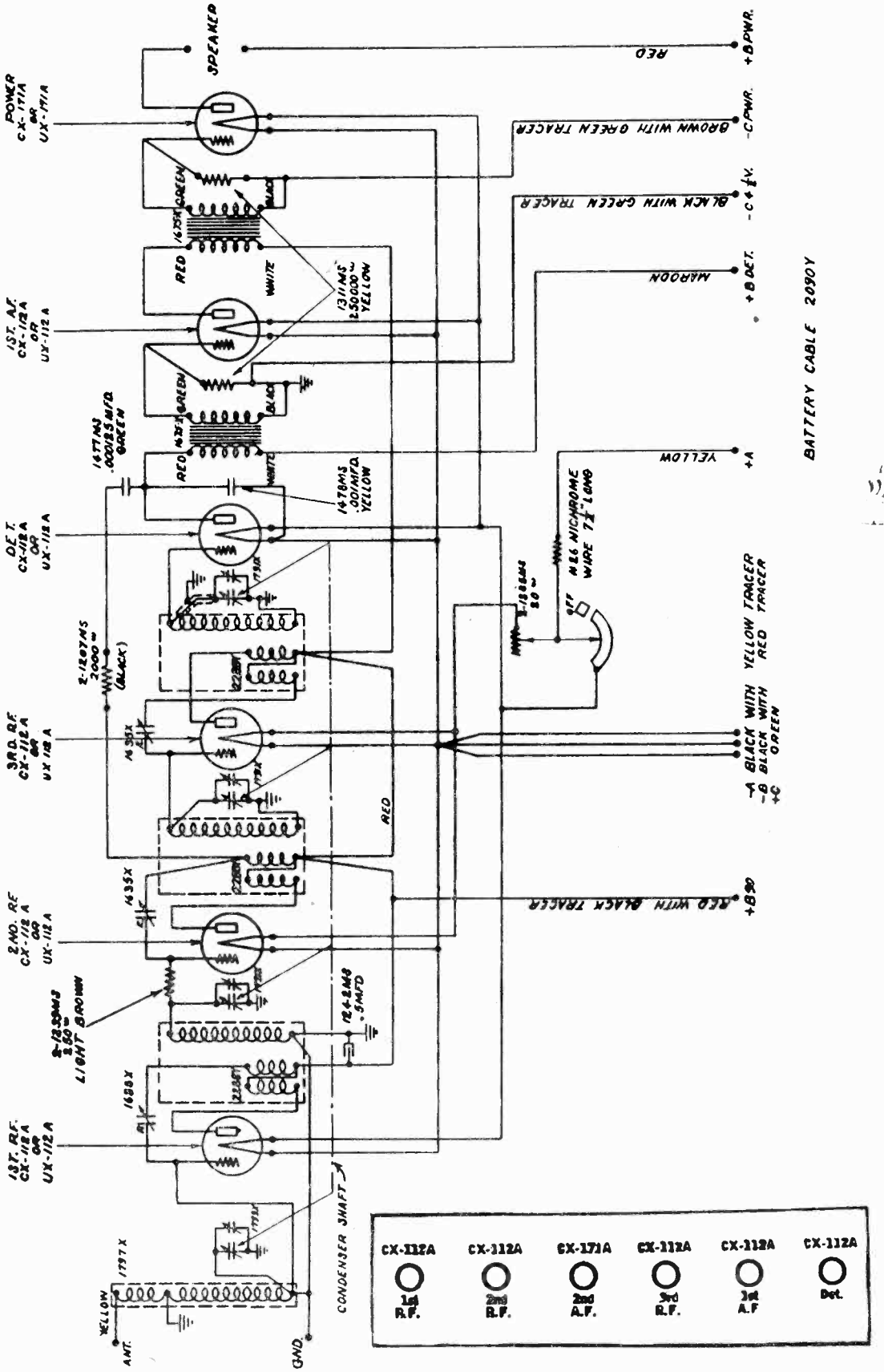
Model Fada's 20, 20Z



20 Receiver—AC 60 cycles 20-Z Receiver—AC 25 cycles

MODEL 22 Battery
Schematic

FADA RADIO & ELECTRIC CORP.

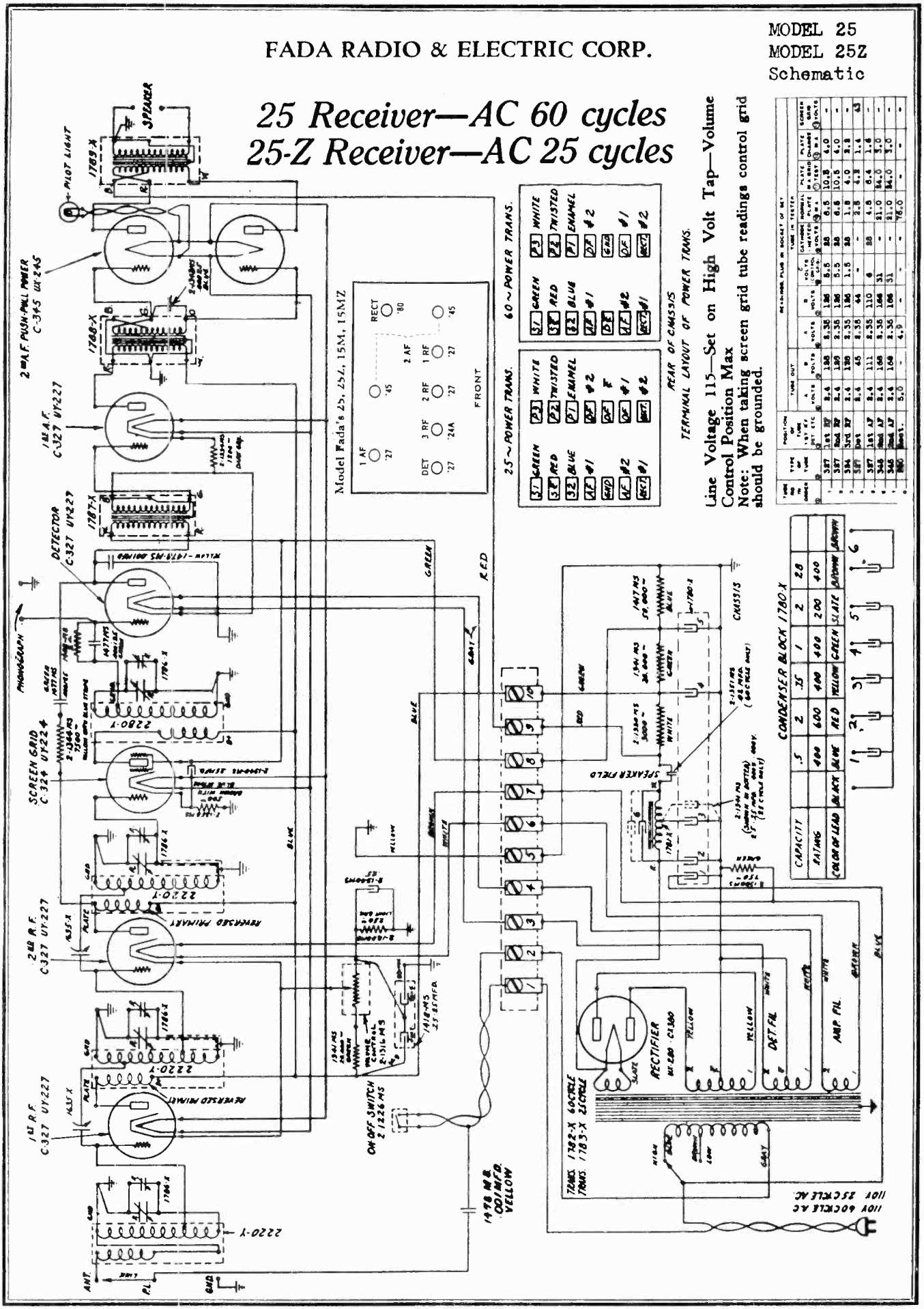


22 Battery Model Receiver

FADA RADIO & ELECTRIC CORP.

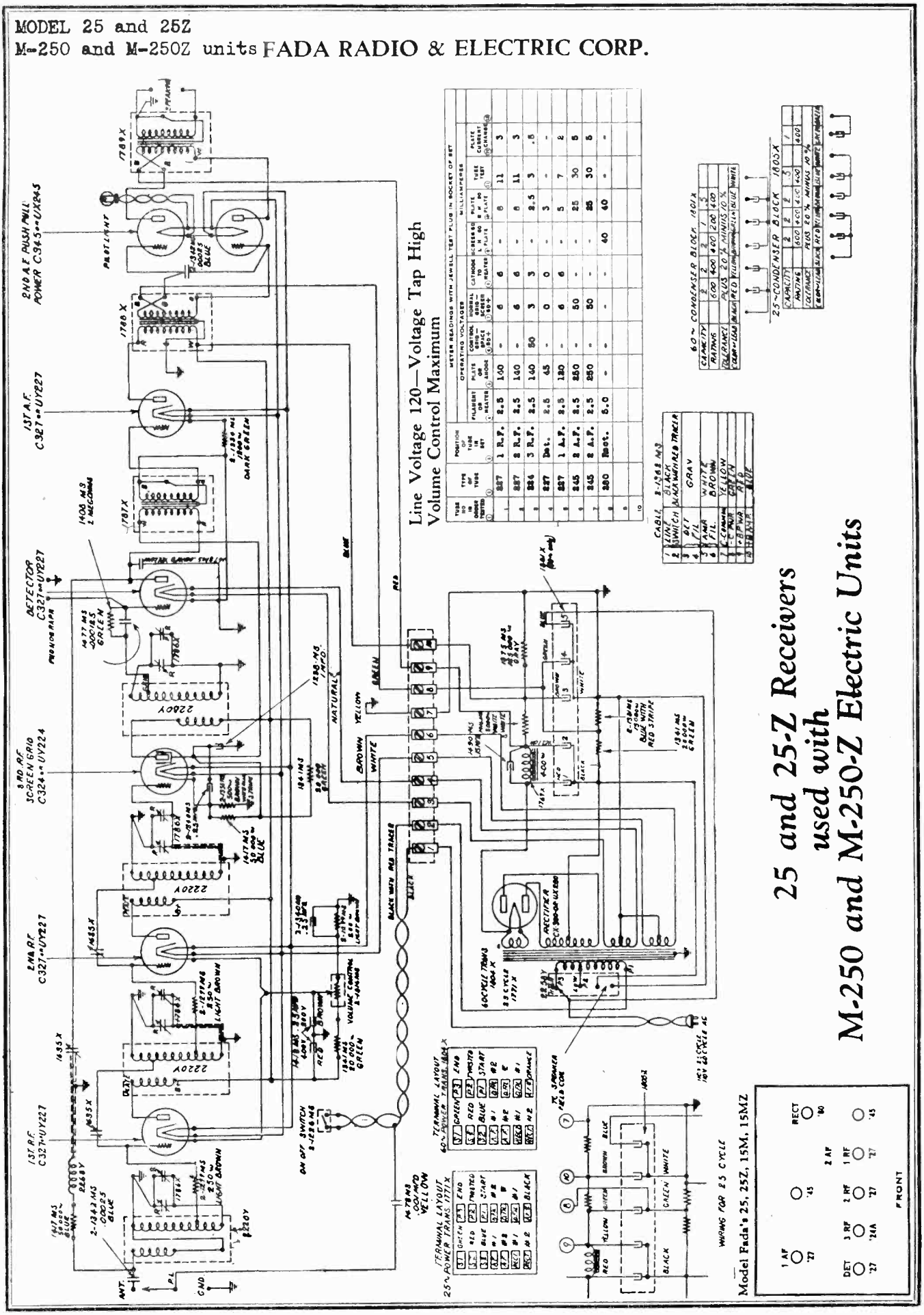
MODEL 25
MODEL 25Z
Schematic

25 Receiver—AC 60 cycles
25-Z Receiver—AC 25 cycles



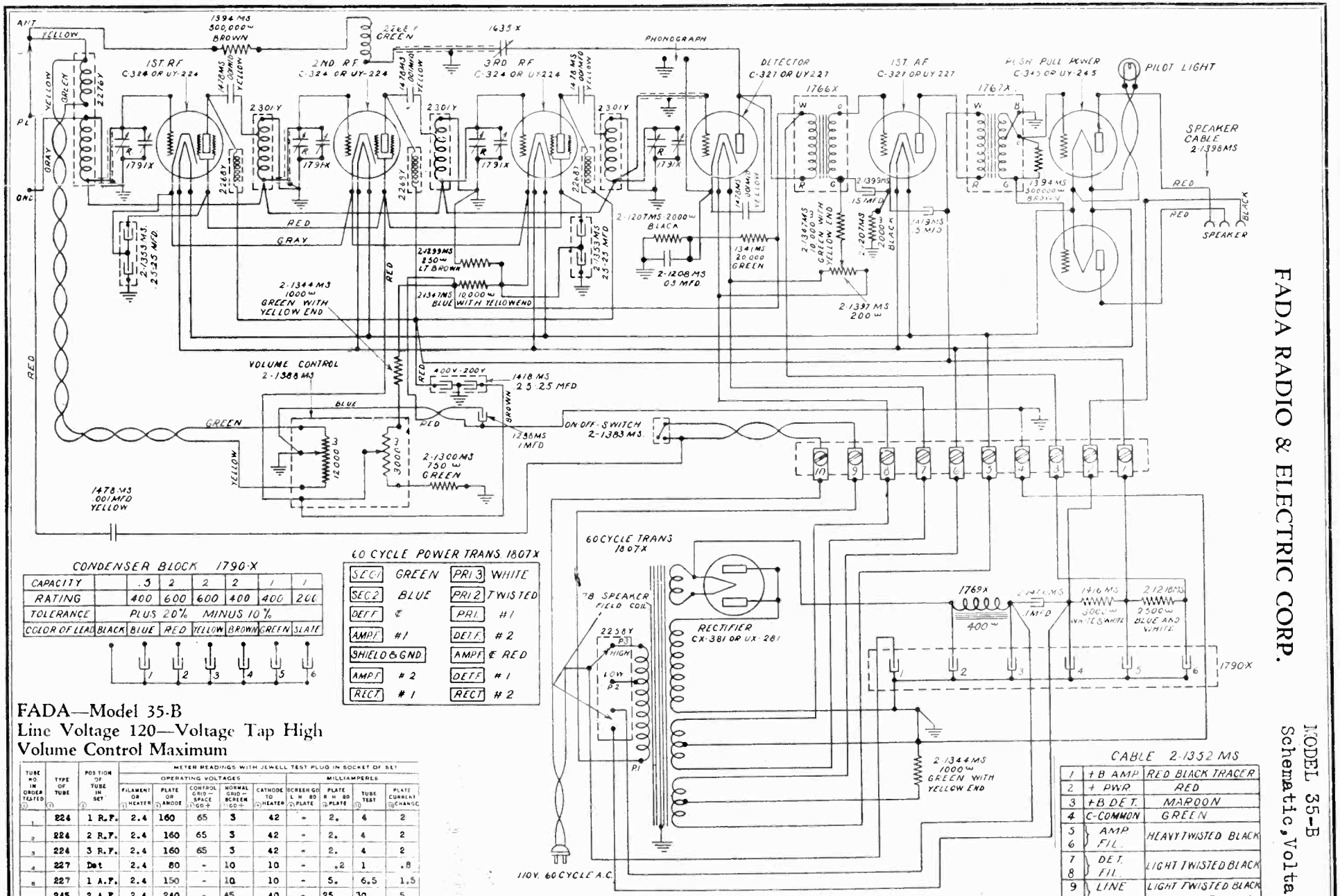
Line Voltage 115—Set on High Volt Tap—Volume Control Position Max
Note: When taking screen grid tube readings control grid should be grounded.

MODEL 25 and 25Z
M-250 and M-250Z units FADA RADIO & ELECTRIC CORP.



FADA RADIO & ELECTRIC CORP.

MODEL 35-B
Schematic, Voltage



CONDENSER BLOCK 1790-X

CAPACITY		.5	2	2	2	1	1
RATING		400	600	600	400	400	200
TOLERANCE	PLUS 20% MINUS 10%						
COLOR OF LEAD	BLACK	BLUE	RED	YELLOW	BROWN	GREEN	SLATE

60 CYCLE POWER TRANS. 1807X

SEC1	GREEN	PRI 3	WHITE
SEC2	BLUE	PRI 2	TWISTED
DETF	℄	PRI	#1
AMPI	#1	DETF	#2
SHIELD & GND		AMPF	℄ RED
AMPF	#2	DETF	#1
RECT	#1	RECT	#2

CABLE 2-1352 MS

1	+B AMP	RED BLACK TRACER
2	+ PWR	RED
3	+B DET.	MAROON
4	C-COMMON	GREEN
5, 6	AMP FIL.	HEAVY TWISTED BLACK
7, 8	DET. FIL.	LIGHT TWISTED BLACK
9, 10	LINE SWITCH	LIGHT TWISTED BLACK WITH RED TRACER

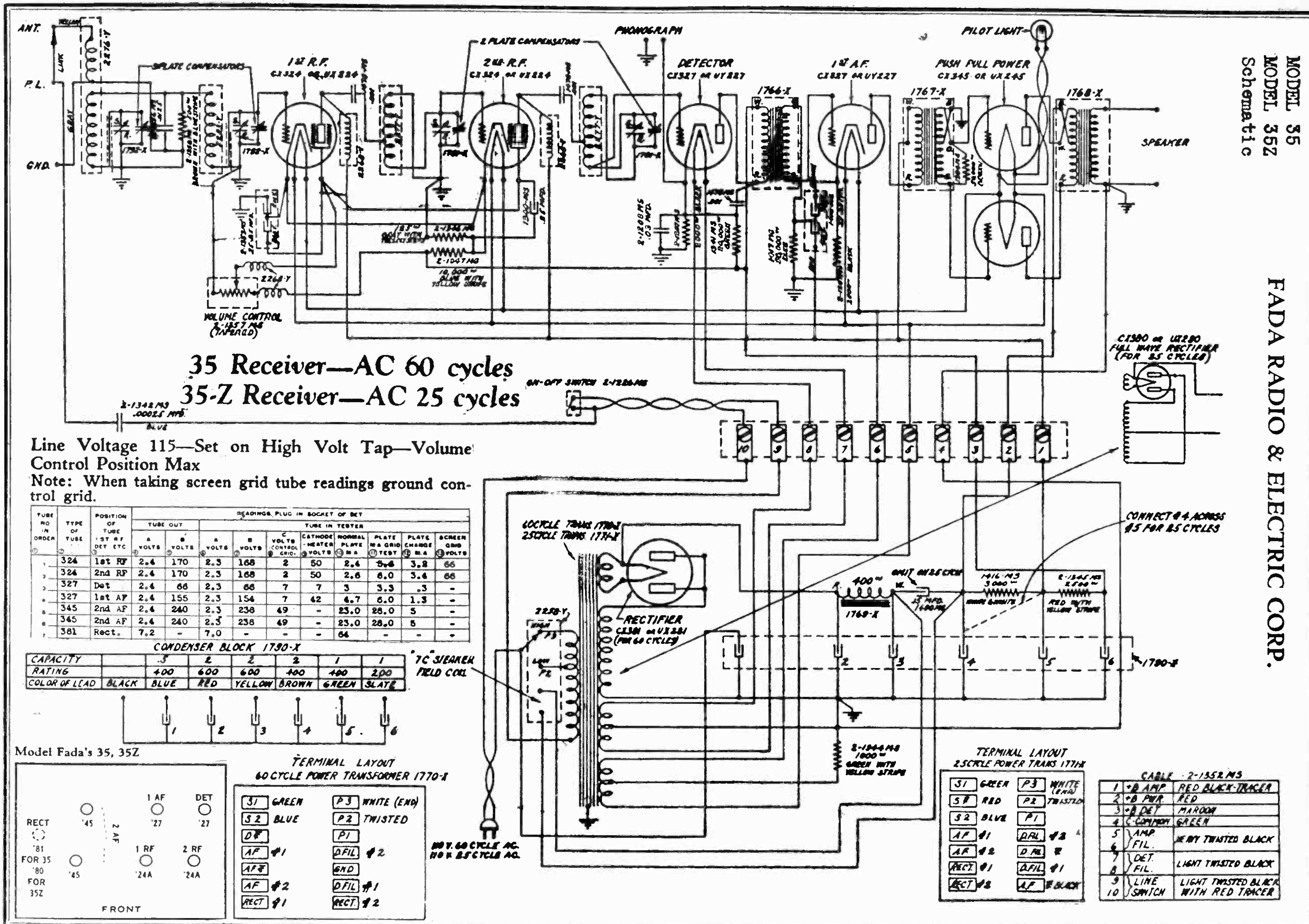
FADA—Model 35-B
Line Voltage 120—Voltage Tap High
Volume Control Maximum

TUBE NO IN ORDER TESTED	TYPE OF TUBE	POSITION OF TUBE IN SET	METER READINGS WITH JEWELL TEST PLUG IN SOCKET OF SET								
			OPERATING VOLTAGES					MILLIAMPERES			
			FILAMENT OR HEATER	PLATE OR ANODE	CONTROL GRID—SPACE GO+	NORMAL GRID—SCREEN GO+	CATHODE TO HEATER	SCREEN GO L N SO PLATE	PLATE R N SO PLATE	TUBE TEST	PLATE CURRENT CHANGE
1	224	1 R.F.	2.4	160	65	3	42	-	2.	4	2
2	224	2 R.F.	2.4	160	65	3	42	-	2.	4	2
3	224	3 R.F.	2.4	160	65	3	42	-	2.	4	2
4	227	Det	2.4	80	-	10	10	-	.2	1	.8
5	227	1 A.F.	2.4	150	-	10	10	-	5.	6.5	1.5
6	245	2 A.F.	2.4	240	-	45	40	-	25.	30.	5
7	245	2 A.F.	2.4	240	-	45	-	-	25.	30	5
8	280	Rect.	7.1	-	-	-	-	32.5	32.5	-	-

Wiring Diagram 35-B

MODEL 35
MODEL 35Z
Schematic

FADA RADIO & ELECTRIC CORP.



35 Receiver—AC 60 cycles
35-Z Receiver—AC 25 cycles

Line Voltage 115—Set on High Volt Tap—Volume Control Position Max

Note: When taking screen grid tube readings ground control grid.

Tube No. in Order (1)	Type of Tube (2)	Position of Tube 1st RF Det etc (3)	Readings, Plug in Socket of Set — Tube Out: A Volts (4)	Tube Out: B Volts (5)	Tube in Tester: A Volts (6)	B Volts (7)	C Volts Control Grid (8)	Cathode-Heater Volts (9)	Normal Plate mA (10)	Plate mA Grid Test (11)	Plate Change mA (12)	Screen Grid Volts (13)
1	324	1st RF	2.4	170	2.3	168	2	50	2.4	5.6	3.2	66
2	324	2nd RF	2.4	170	2.3	168	2	50	2.6	6.0	3.4	66
3	327	Det	2.4	66	2.3	66	7	7	3	3.3	.3	-
4	327	1st AF	2.4	155	2.3	154	7	42	4.7	6.0	1.3	-
5	345	2nd AF	2.4	240	2.3	238	49	-	23.0	28.0	5	-
6	345	2nd AF	2.4	240	2.3	238	49	-	23.0	28.0	5	-
7	381	Rect.	7.2	-	7.0	-	-	-	64	-	-	-

CONDENSER BLOCK 1790-X

CAPACITY		.5	2	2	2	1	1
RATING		400	600	600	400	400	200
COLOR OF LEAD	BLACK	BLUE	RED	YELLOW	BROWN	GREEN	SLATE

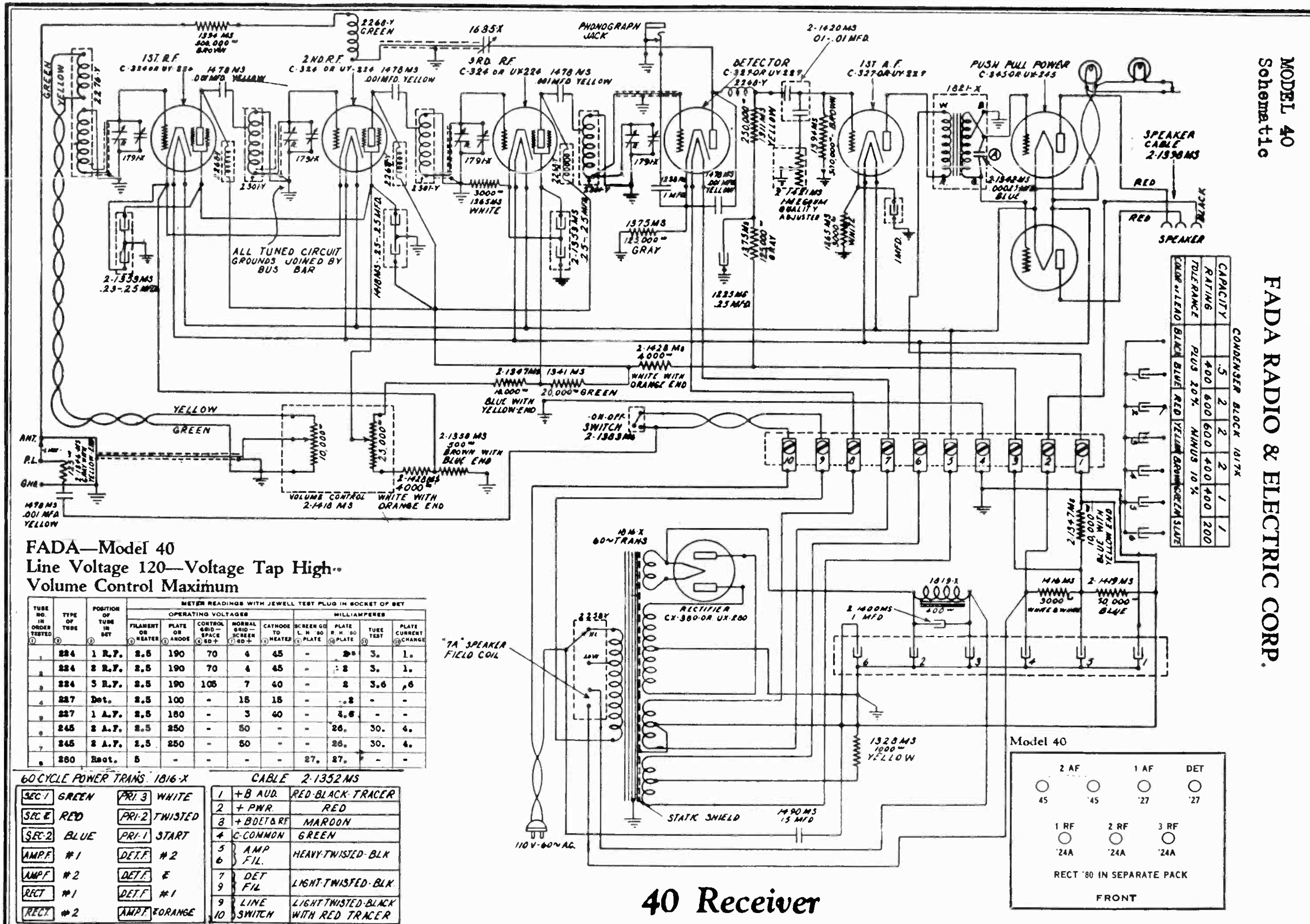
Model Fada's 35, 35Z

MODEL 40
Schematic

FADA RADIO & ELECTRIC CORP.

CONDENSER BLOCK 1817X

CAPACITY	.5	2	2	2	1	1
RATING	400	600	600	400	400	200
TOLERANCE	PLUS 20%		MINUS 10%			
COLOR of LEAD	BLACK	BLUE	RED	YELLOW	BROWN	GREEN	SLATE



FADA—Model 40
Line Voltage 120—Voltage Tap High
Volume Control Maximum

Tube No. in Order Tested (1)	Type of Tube (2)	Position of Tube in Set (3)	Filament or Heater (4)	Plate or Anode (5)	Control Grid—Space Gd+ (6)	Normal Grid—Screen Gd+ (7)	Cathode to Heater (8)	Screen Gd L. H. '80 Plate (9)	Plate R. H. '80 Plate (10)	Tube Test (11)	Plate Current Change (12)
			Meter Readings with Jewell Test Plug in Socket of Set — Operating Voltages					Milliamperes			
1	224	1 R.F.	2.5	190	70	4	45	-	2.	3.	1.
2	224	2 R.F.	2.5	190	70	4	45	-	2	3.	1.
3	224	3 R.F.	2.5	190	105	7	40	-	2	3.6	.6
4	227	Det.	2.5	100	-	15	15	-	.2	-	-
5	227	1 A.F.	2.5	180	-	3	40	-	3.6	-	-
6	245	2 A.F.	2.5	250	-	50	-	-	26.	30.	4.
7	245	2 A.F.	2.5	250	-	50	-	-	26.	30.	4.
8	280	Rect.	5	-	-	-	-	27.	27.	-	-

60 CYCLE POWER TRANS. 1816-X

SEC-1	GREEN	PRI. 3	WHITE
SEC E	RED	PRI-2	TWISTED
SEC-2	BLUE	PRI-1	START
AMP.F	#1	DET.F	#2
AMP.F	#2	DET.F	E
RECT	#1	DET.F	#1
RECT	#2	AMP.F	E ORANGE

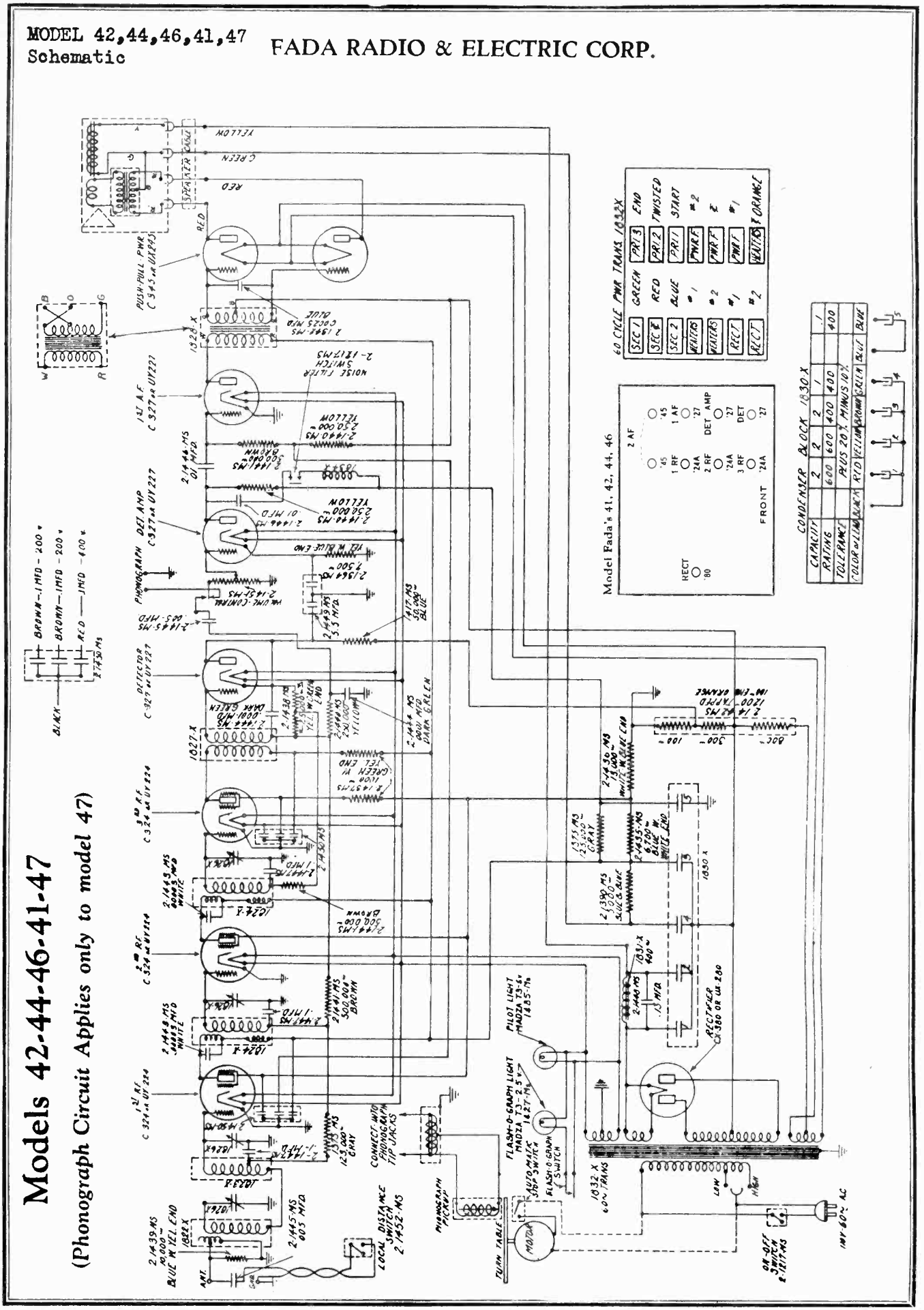
CABLE 2-1352 MS

1	+B AUD.	RED-BLACK-TRACER
2	+PWR.	RED
3	+B DET & RF	MAROON
4	C-COMMON	GREEN
5, 6	AMP FIL.	HEAVY-TWISTED-BLK
7, 8	DET FIL.	LIGHT-TWISTED-BLK
9, 10	LINE SWITCH	LIGHT TWISTED BLACK WITH RED TRACER

40 Receiver

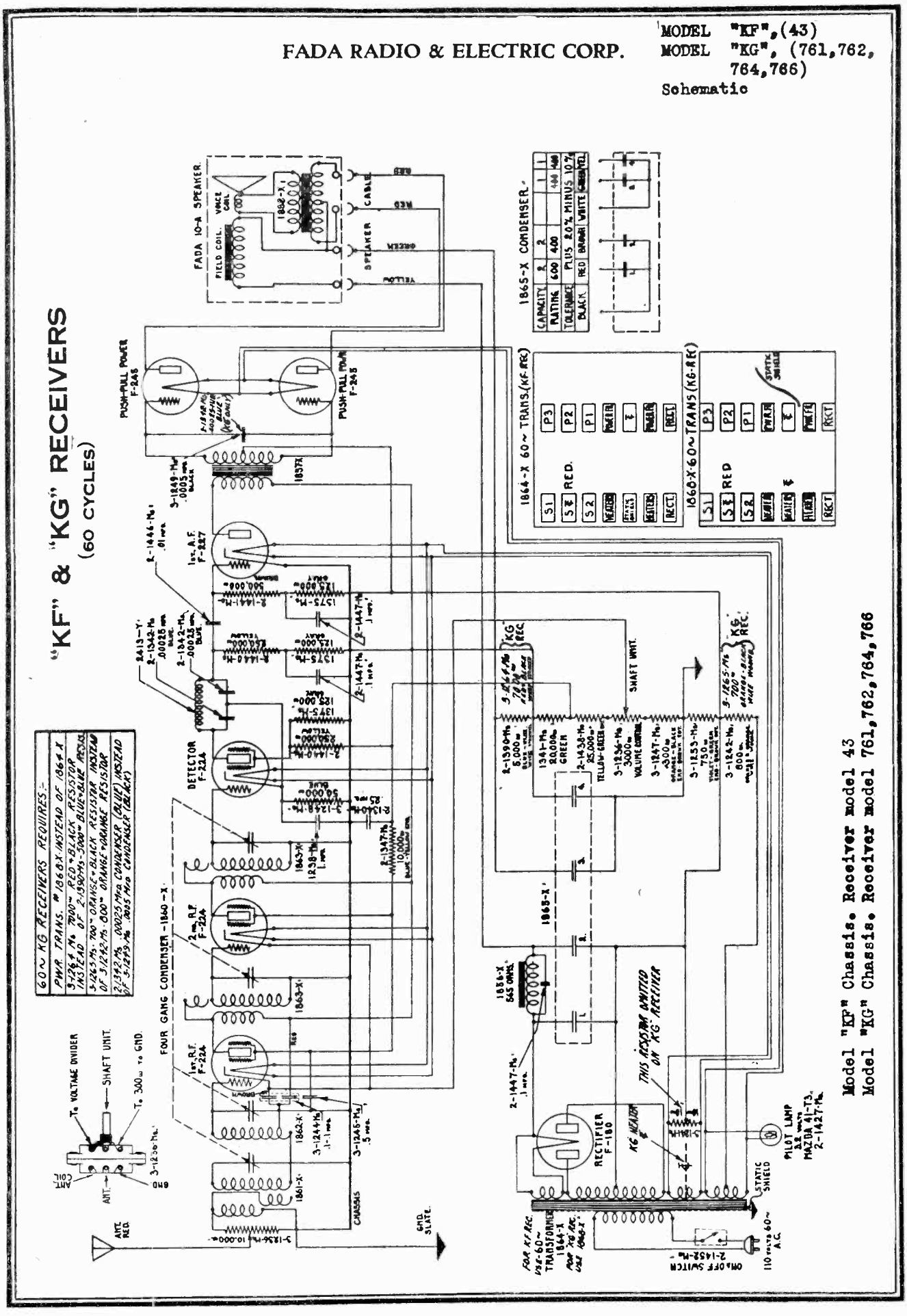
MODEL 42,44,46,41,47
Schematic

FADA RADIO & ELECTRIC CORP.



FADA RADIO & ELECTRIC CORP.

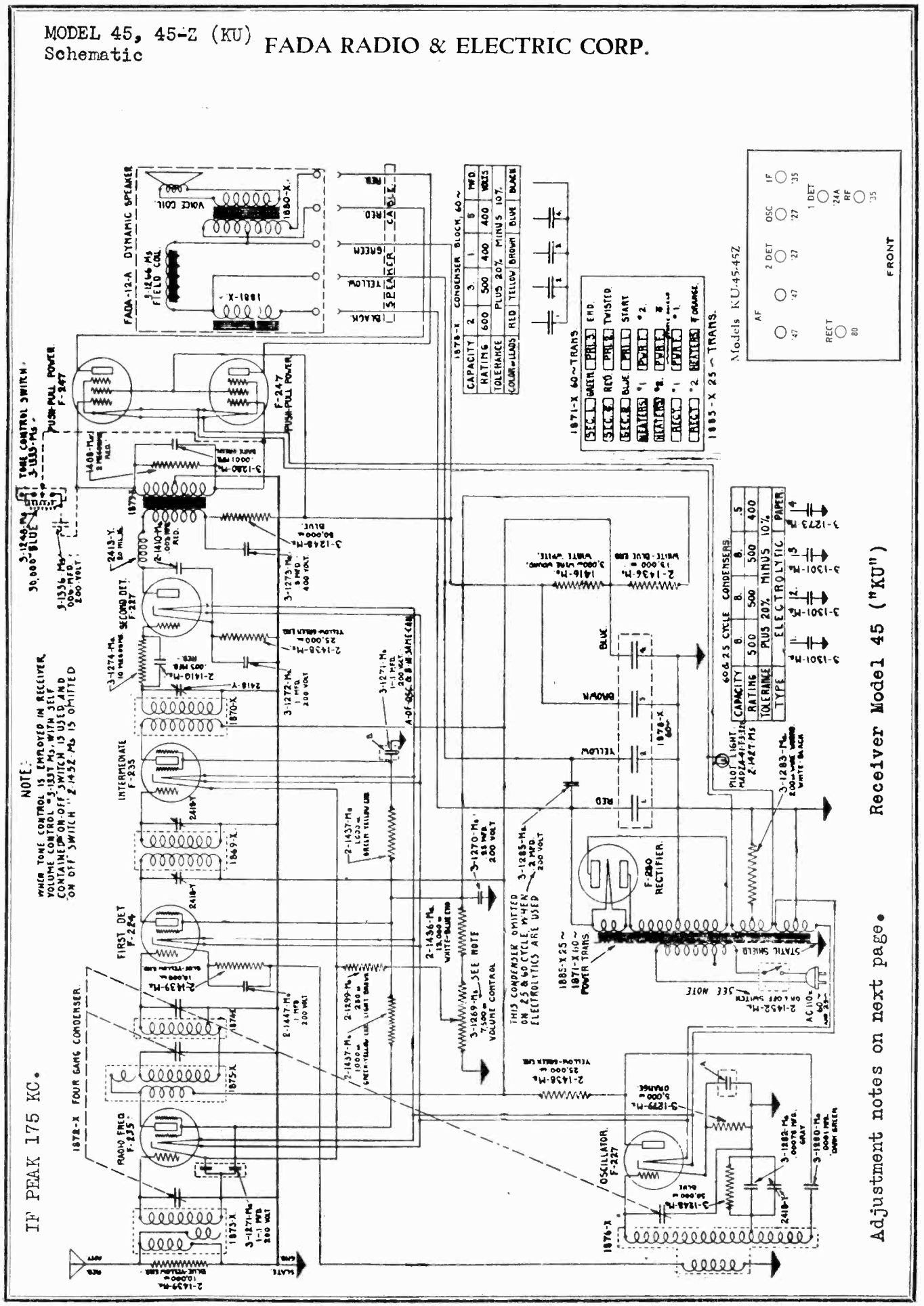
MODEL "KF",(43)
MODEL "KG", (761,762, 764,766)
Schematic



Model "KF" Chassis. Receiver model 43
Model "KG" Chassis. Receiver model 761,762,764,766

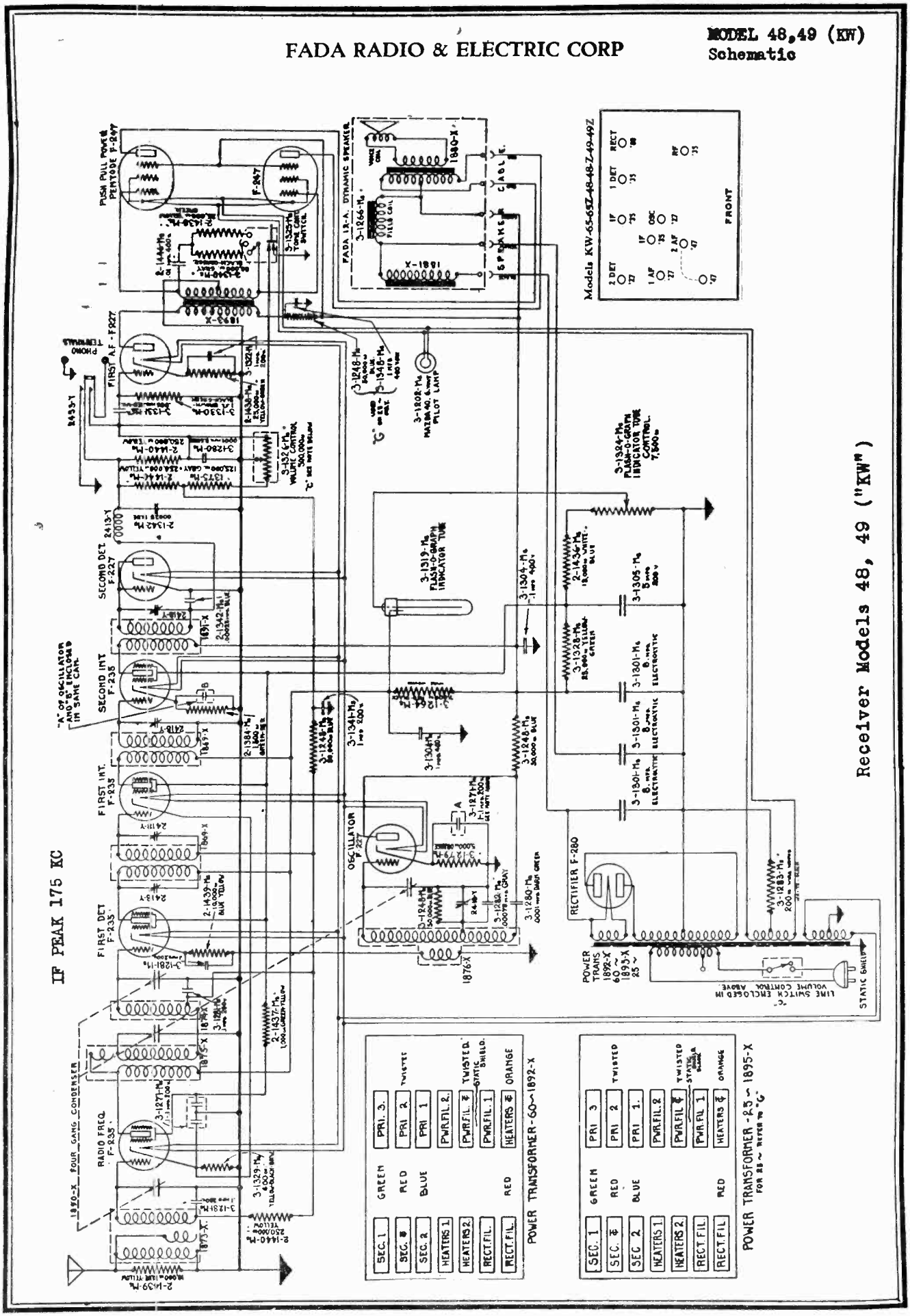
MODEL 45, 45-Z (KU)
Schematic

FADA RADIO & ELECTRIC CORP.



FADA RADIO & ELECTRIC CORP

MODEL 48,49 (KW)
Schematic



MODEL 45,48,49
Service Notes

FADA RADIO & ELECTRIC CORP.

SPECIAL DATA FOR MODELS 45, 48 and 49 RECEIVERS

Trimmer adjustment frequencies are 175 KC, 600 KC and 1400 KC. The trimmer condensers on the model 45 receiver are located in the rear right hand corner of the chassis looking at the chassis from the front. Two of the IF trimmers are on the right hand side, near the rear and the third trimmer condenser (IF) is that most distant from the right hand rear corner of the chassis. The trimmer upon the rear of the chassis, near the right hand corner is the oscillator series condenser.

In the models 48 and 49, the oscillator series condenser control is accessible from the top of the chassis, on the left end of the chassis to the left of the shields. The four IF trimmers are accessible through the rear of the chassis, one the left end, looking at the chassis from the front.

The suggested output meter is of the type suitable for connection across the speaker voice coil. The 1st detector control grid must be disconnected for the IF trimmer adjustments and the oscillator "A" lead is connected to the 1st detector control grid cap upon the tube.

The variable gang condenser compensators for the model 45 are located on top of their respective tuning condenser sections. They can be adjusted with a screw driver. The compensator adjusting screws are at ground potential. The adjustment is made at 1400 KC without disturbing the main tuning sections. The suggestion is made to connect the antenna circuit of the receiver through a dummy antenna or a 250 mmfd condenser. The oscillator series condenser is adjusted at 600 KC

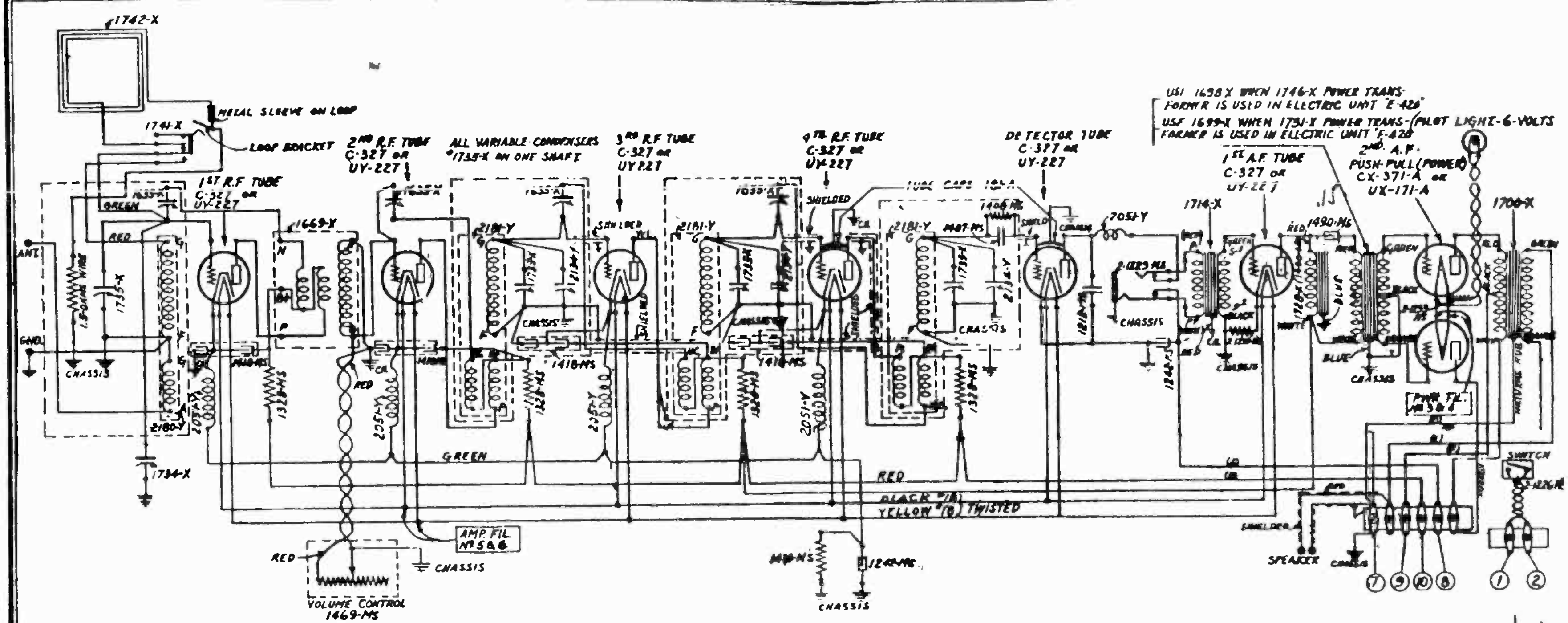
The main tuning condenser compensators are located at the top of their main tuning sections in the 48 and 49 models. They can be adjusted with a screw driver and since the screws are at ground potential and insulated screw driver is not required. There are four holes in the overall condenser and tube housing cover. The screw driver is inserted through these holes.

The tuning condenser compensators are adjusted at 1400 KC. The oscillator series condenser is adjusted at 600 KC. The intermediate trimmers are adjusted at 175 KC. Due to the physical location of the oscillator series condenser it is permissible to remove the overall condenser and tube shield housing cover to permit the insertion of the standard #4 socket wrench for adjustment purposes.

The suggestion is made to check the 175 KC adjustment of the test oscillator by beating that signal against one of its harmonics represented by the carrier frequency of a broadcasting station of correct frequency which is tuned in with the receiver operated in normal manner. Some of the harmonics of a 175 KC signal are 1400 KC., 1225 KC., 1050 KC., 875 KC., and 700 KC.

FADA RADIO & ELECTRIC CORP.

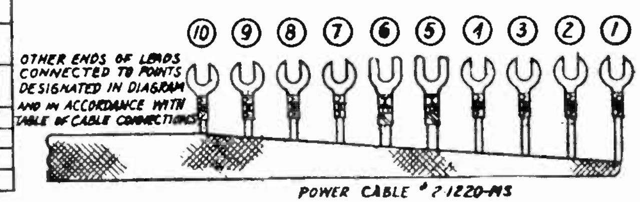
MODEL 50,70,71,72
50-Z,70-Z
Schematic
Voltage



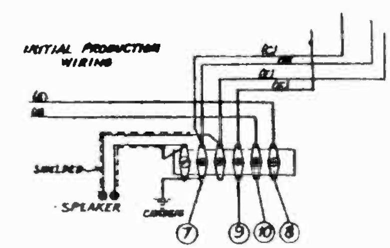
Nº		COLOR	
1	LINE	BLACK WITH RED TRACER	LIGHT TWISTED
2	SWITCH	BLACK " "	
3	PWR. FIL.	BLACK	LIGHT TWISTED
4		BLACK	
5	AMP. FIL.	BLACK	HEAVY TWISTED
6		BLACK	
7	C (COMMON)	GREEN	
8	+B DET.	MAROON	
9	+B PWR.	RED	
10	+B 90	RED WITH BLACK TRACER	

TABLE OF CABLE CONNECTIONS

50, 70, 71 and 72 Receivers



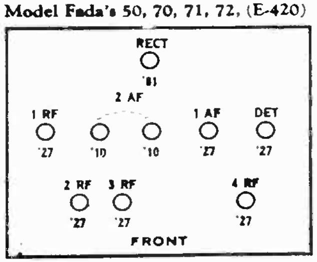
POWER CABLE #21220-MS



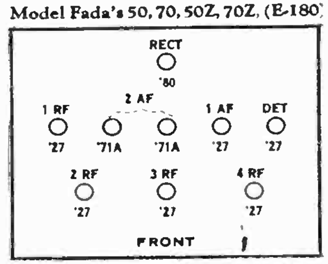
FADA—Models 50-70 with E-180 Electric Unit
Line Voltage 120—110-130 Volt Tap

Tube No. in Order	Type of Tube	Position of Tube 1st RF Det. etc.	Tube Out: A Volts	Tube Out: B Volts	Tube in Tester: A Volts	B Volts	C Volts	Cathode Volts	Normal Plate MA	Plate MA Grid Test	Plate MA Change
1	227	1st. R.F.			2.5	95	5	12.5	[illegible]	7.0	3.0
2	227	2nd. R.F.			2.5	95	5	12.5	4.0	7.0	3.0
3	227	3rd. R.F.			2.5	95	5	12.5	4.0	7.0	3.0
4	227	4th. R.F.			2.5	95	5	12.5	4.0	7.0	3.0
5	227	DETECTOR			2.5	35	0	16.0	2.2	2.2	0.0
6	227	1st. A.F.			2.5	90	5	12.5	4.0	6.0	[illegible]
7	171A	2nd. A.F.			5.0	190	45	-	18.0	55.0	[illegible]
8	171A	2nd. A.F.			5.0	190	45	-	18.0	55.0	37.0
9	280	RECTIFIER			5.0	-					

Model Fada's 50, 70, 71, 72, (E-420)



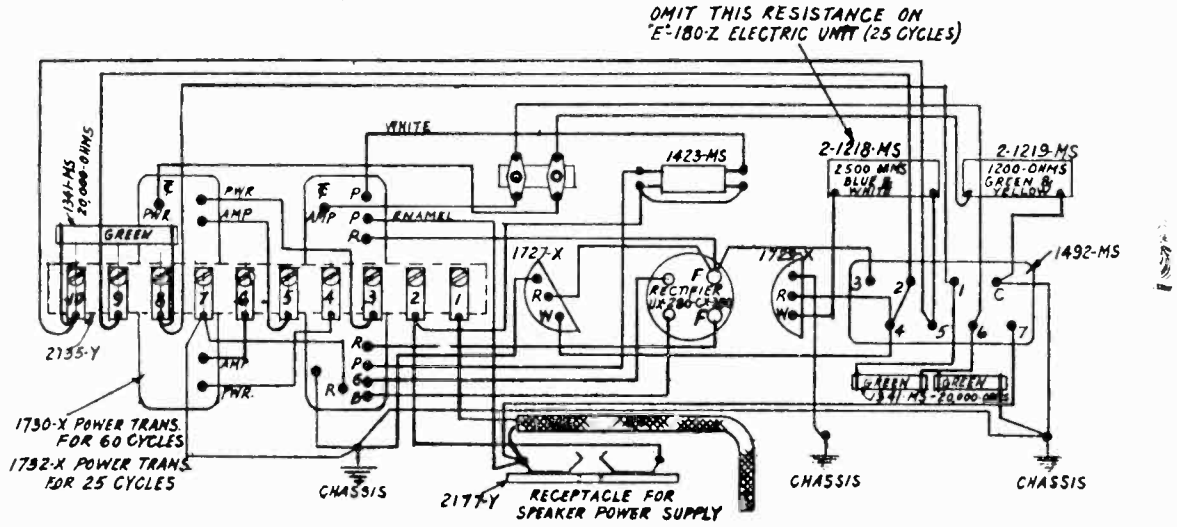
Model Fada's 50, 70, 50Z, 70Z, (E-180)



Model E-180, E-180Z E-420, E-420Z power packs are shown on pages following.

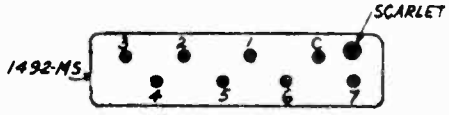
MODEL E-180, E-180Z
Electric Unit
for 50, 70, 71, 72

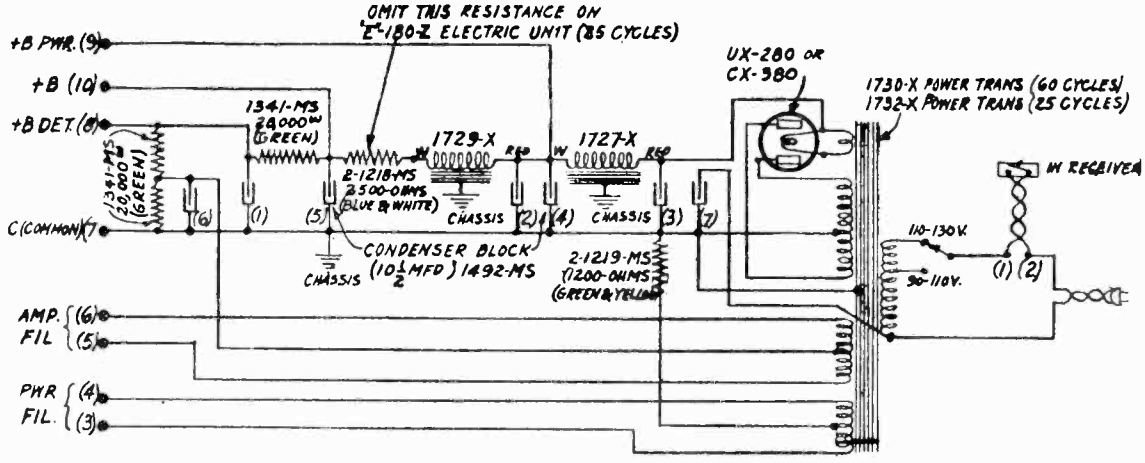
FADA RADIO & ELECTRIC CORP.



ACTUAL WIRING DIAGRAM OF "E"-180 & "E"-180-Z ELECTRIC UNIT

Nor should it be a difficult matter to keep in mind that all "E-180" sets can be identified by their having two round cans in the "rear row" (the power pack) This immediately identifies the set as requiring a 280 rectifier tube and type 171-A amplifier tubes.





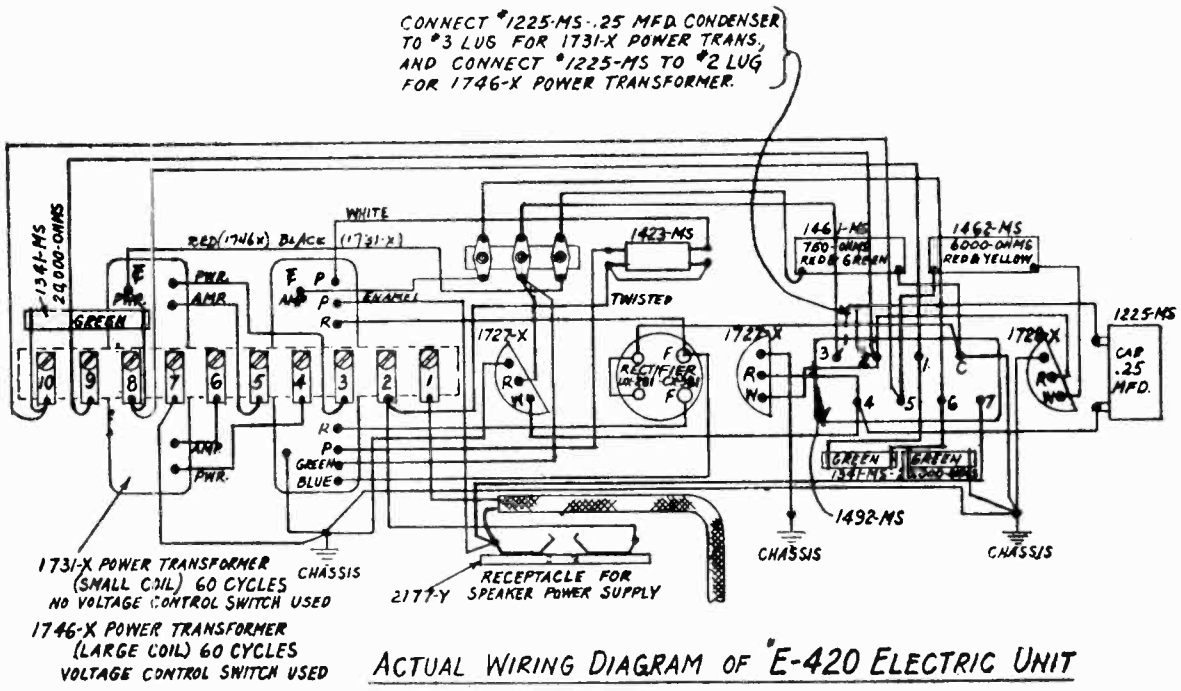
SCHEMATIC WIRING DIAGRAM OF "E"-180 & "E"-180-Z ELECTRIC UNIT

ELECTRICAL VALUES
ELECTRIC UNIT TYPE E- 180

1225-MS	.25 mfd 400 volts
1341-MS	carbon 20,000 ohms (green)
1461-MS	wire 750 ohms red-green
1462-MS	wire 6000 ohms red-yellow
1492-MS	condenser block 10.5 mfd
2-1218-MS	wire 2500 ohms blue-white
2-1219-MS	wire 1200 ohms green-yellow
1727-X	choke 600 ohms
1729-X	choke 3500 ohms

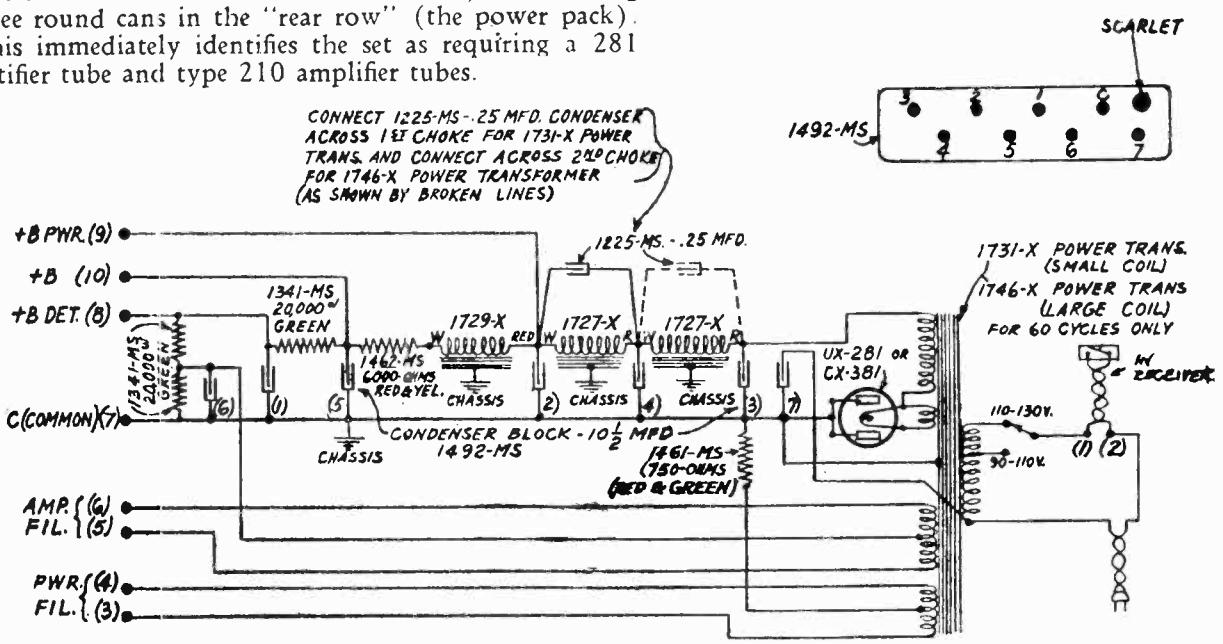
FADA RADIO & ELECTRIC CORP.

MODEL E-420, E-420Z
Electric Unit
for 50, 70, 71, 72



ACTUAL WIRING DIAGRAM OF "E-420 ELECTRIC UNIT

Now it should not be a difficult matter to keep in mind that all "E-420" sets can be identified by their having three round cans in the "rear row" (the power pack). This immediately identifies the set as requiring a 281 rectifier tube and type 210 amplifier tubes.



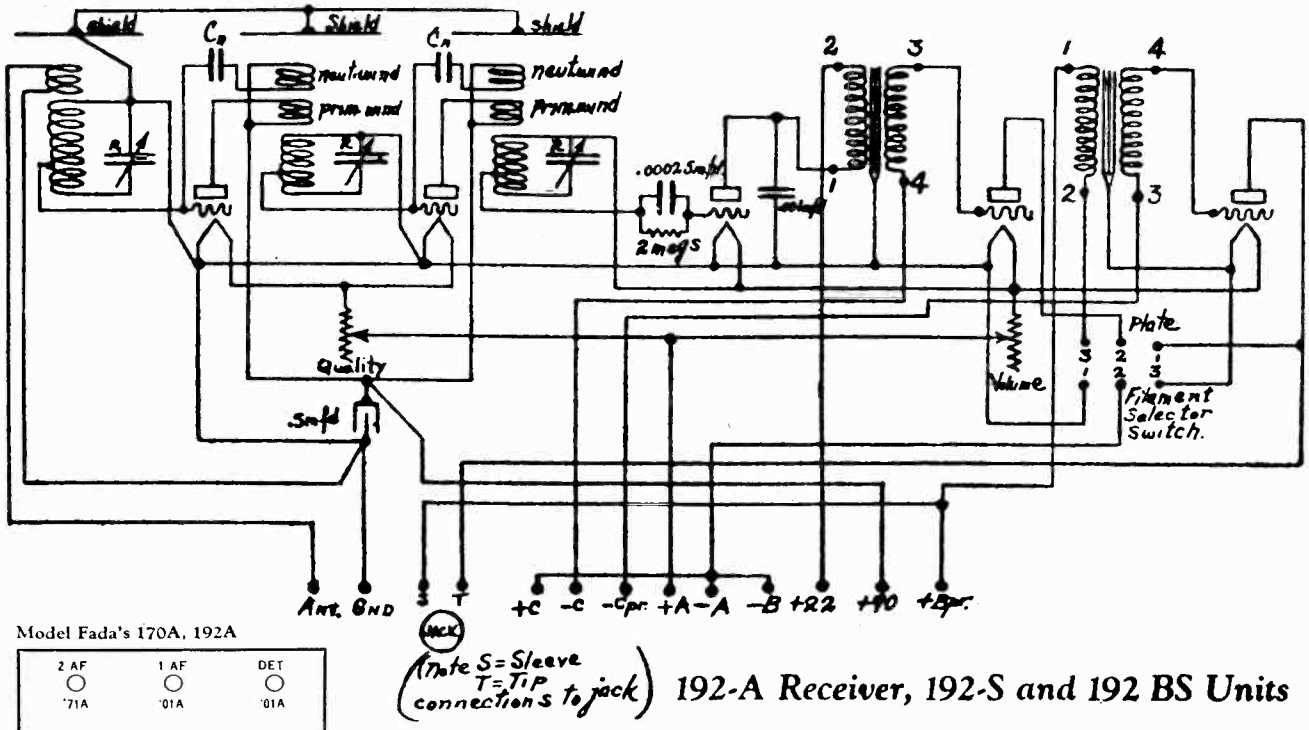
SCHEMATIC WIRING DIAGRAM OF "E-420" ELECTRIC UNIT.

ELECTRICAL VALUES
ELECTRIC UNIT TYPE E-420

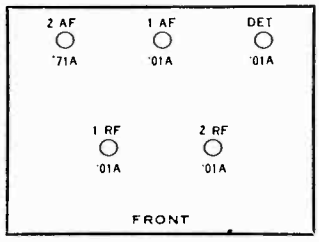
1225-MS	.25 mfd	400 volts	2-1218-MS	wire 2500 ohms	blue-white
1341-MS	carbon	20,000 ohms green	2-1219-MS	wire 1200 ohms	green-yellow
1461-MS	wire	750 ohms red-green	1727-X	choke	600 ohms
1462-MS	wire	6000 ohms red-yellow	1729-X	choke	3500 ohms
1492-MS	condenser block	10.5 mfd			

MODEL 192-A Receiver
192-S
192-BS Units
MODEL 160 Neutrodyne

FADA RADIO & ELECTRIC CORP.



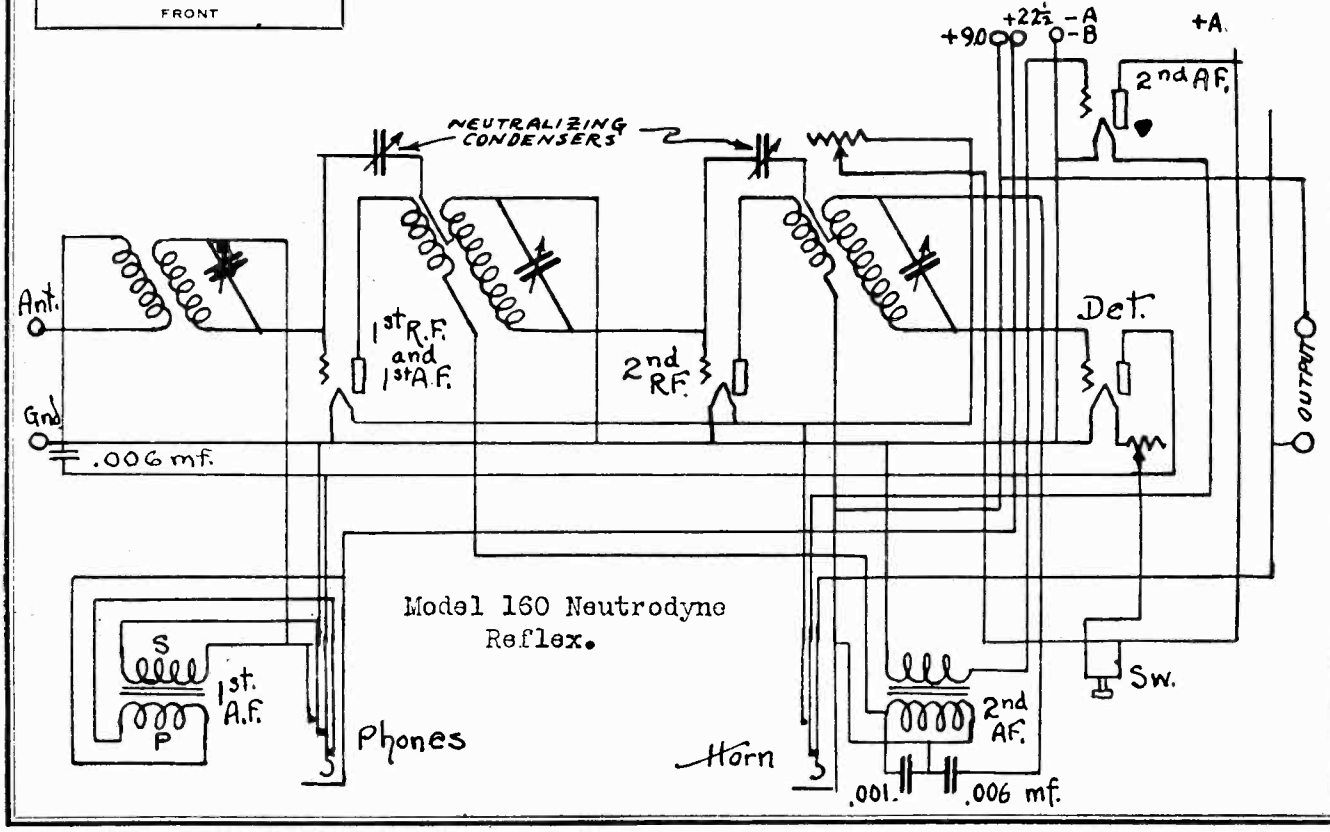
Model Fada's 170A, 192A



(Note S=Sleeve T=Tip connections to jack)

192-A Receiver, 192-S and 192 BS Units

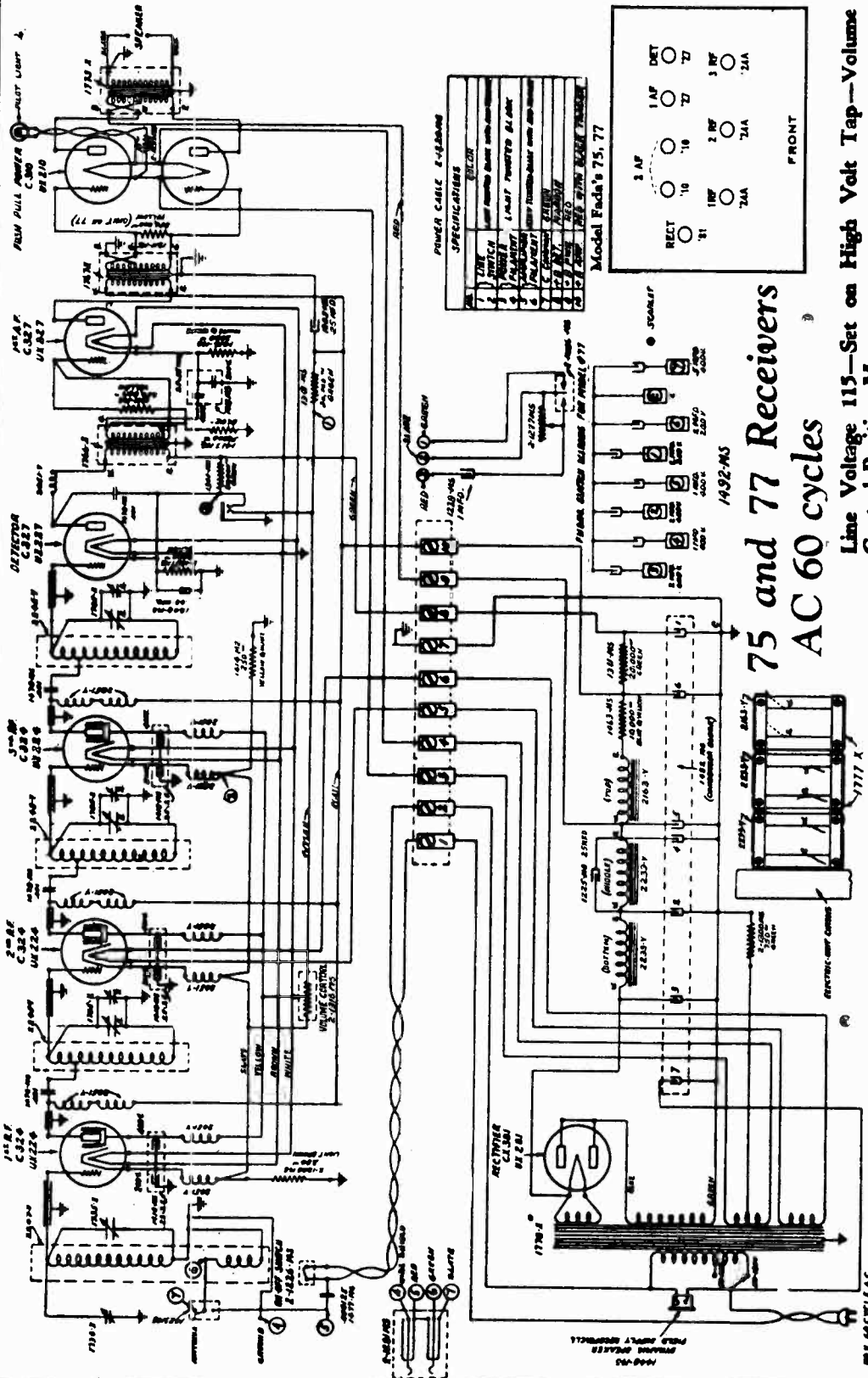
Model 192-A Receiver, 192-S and 192-BS Units



Model 160 Neutrodyne Reflex.

FADA RADIO & ELECTRIC CORP.

MODEL 75, 77
Schematic
Voltage
Notes



Line Voltage 115—Set on High Volt Tap—Volume Control Position Max

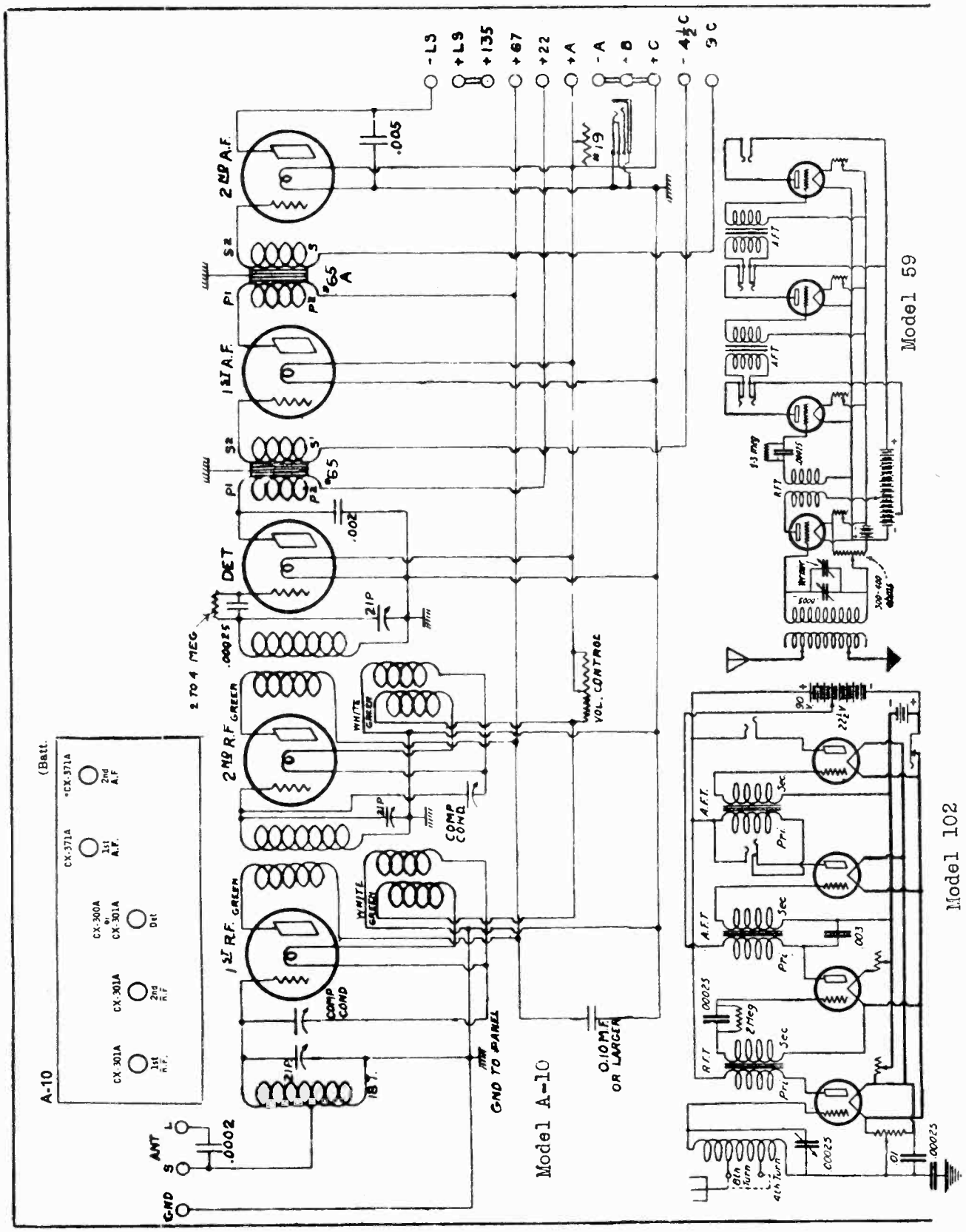
Note: When taking screen grid tube readings control grid should be grounded.

COMPENSATING INSTRUCTIONS FOR MODELS 75 AND 77

The compensating condenser is located beneath the small hole in the left side of each RF shield can (facing the front of the set) and may be adjusted with a screw driver. There is no compensating condenser in the shield can to the extreme left; its function being performed by the antenna vernier.

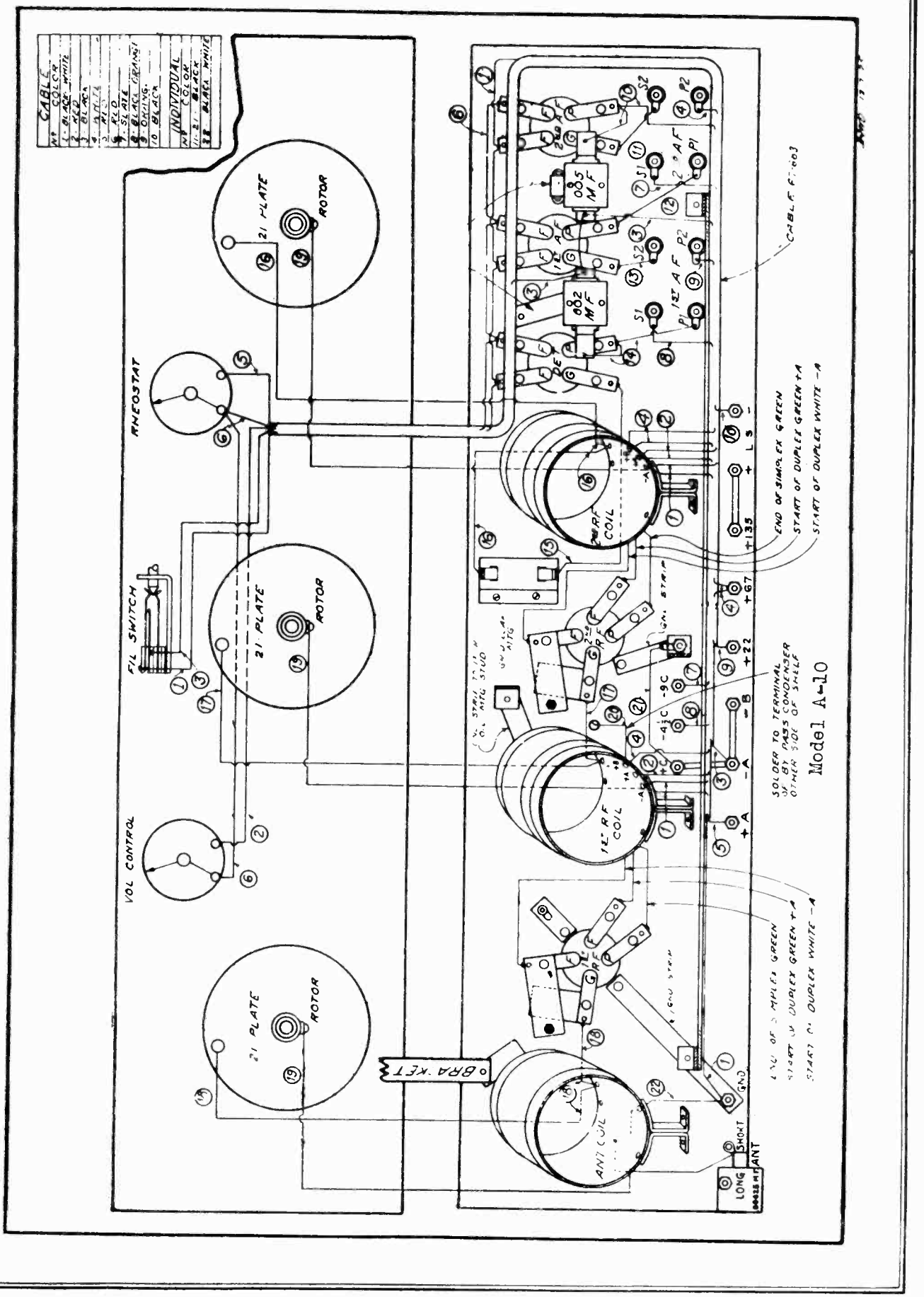
FEDERAL RADIO CORP.

MODELS A-10,59, 102
Schematic



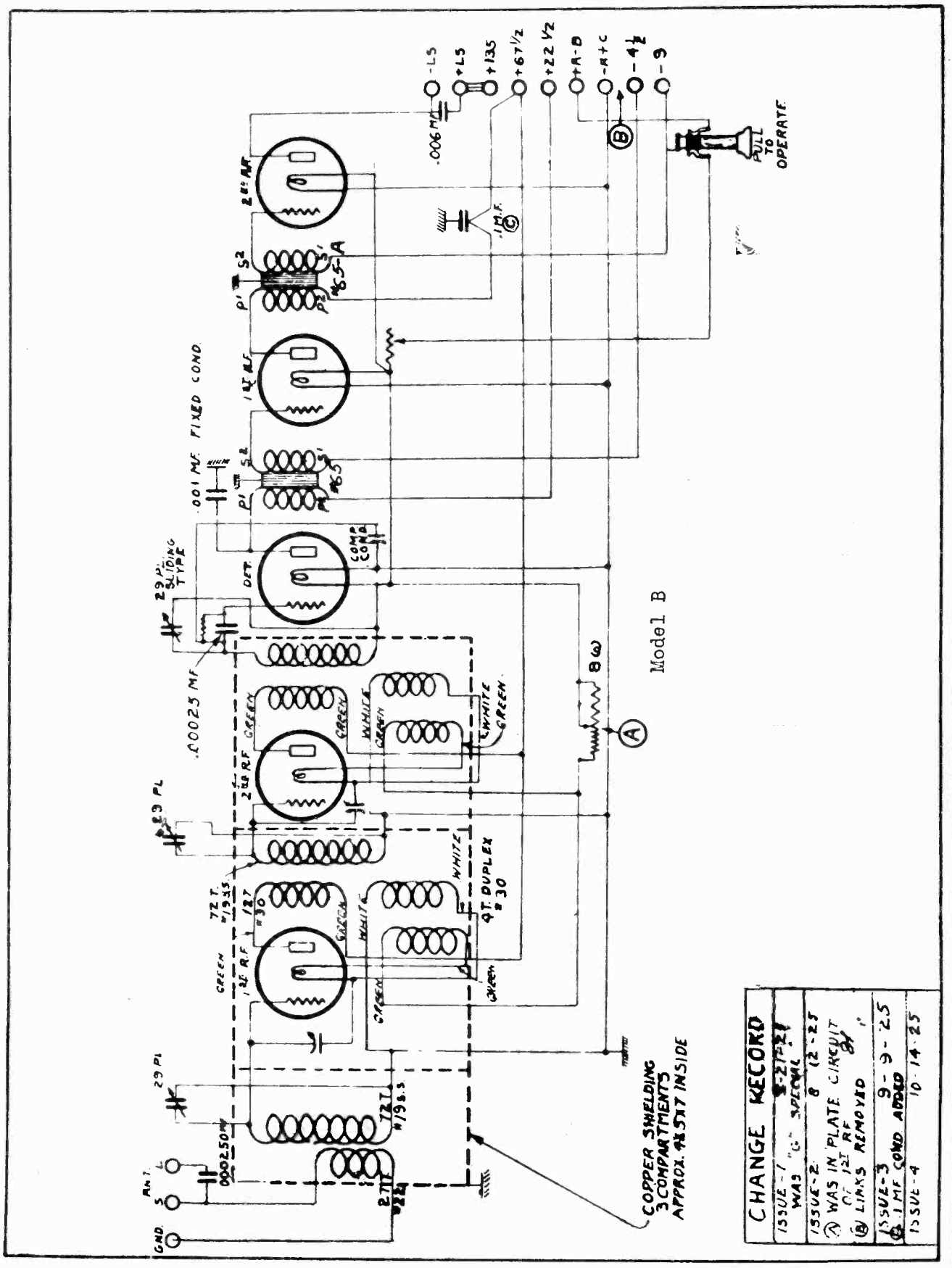
MODEL A-10
Wiring Diagram

FEDERAL RADIO CORP.



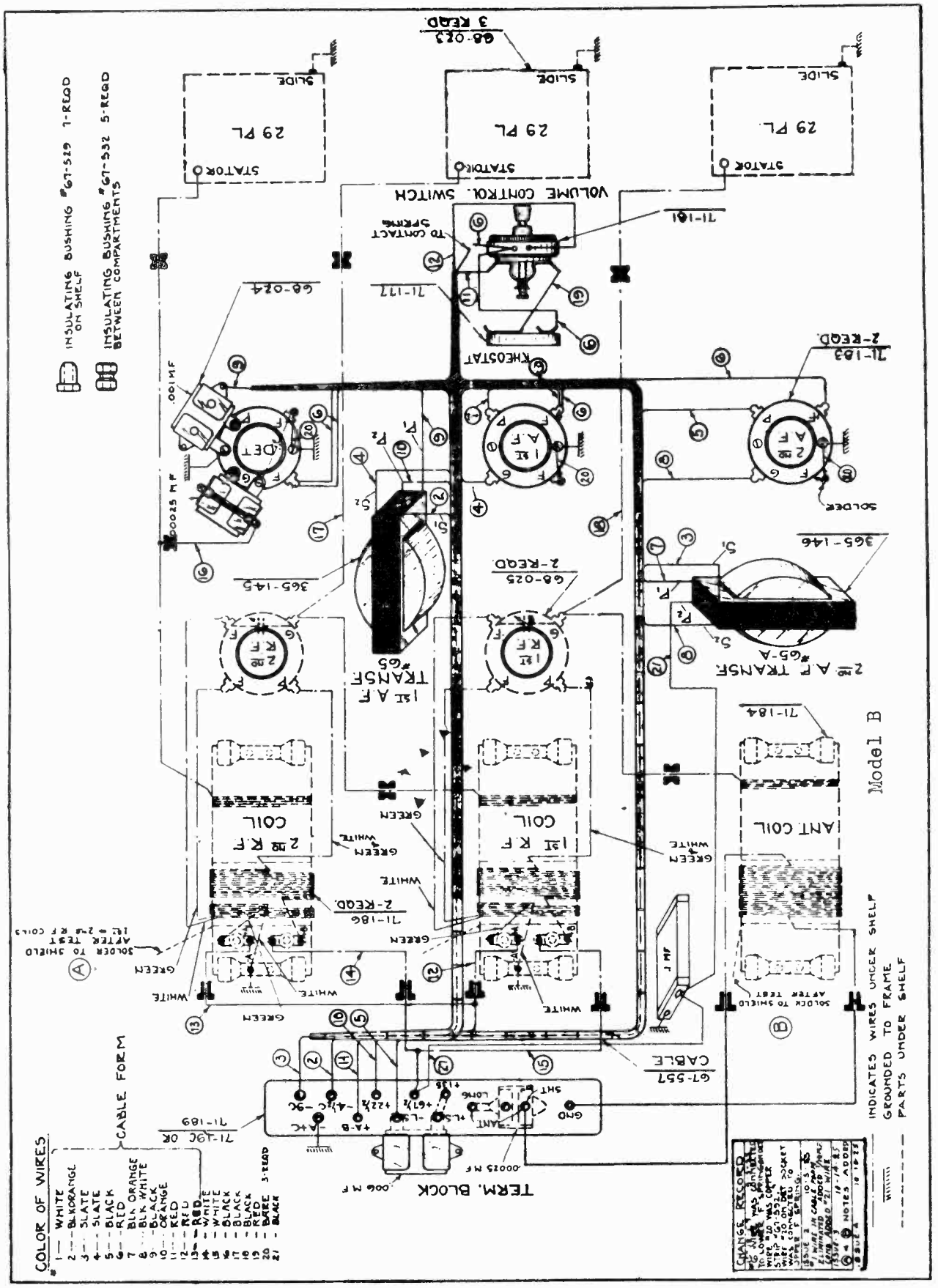
FEDERAL RADIO CORP.

MODEL B
Schematic



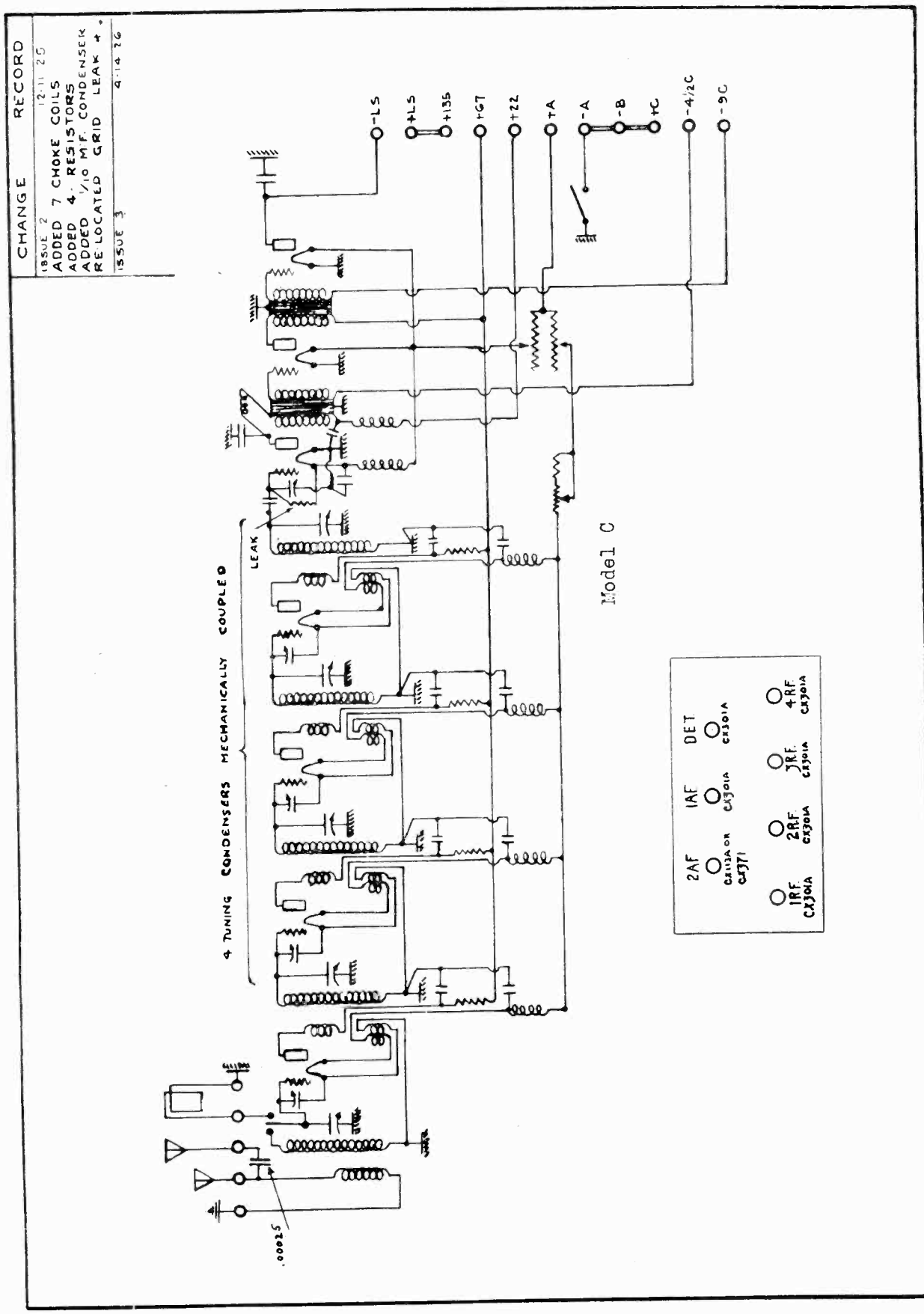
MODEL B
Wiring Diagram

FEDERAL RADIO CORP.



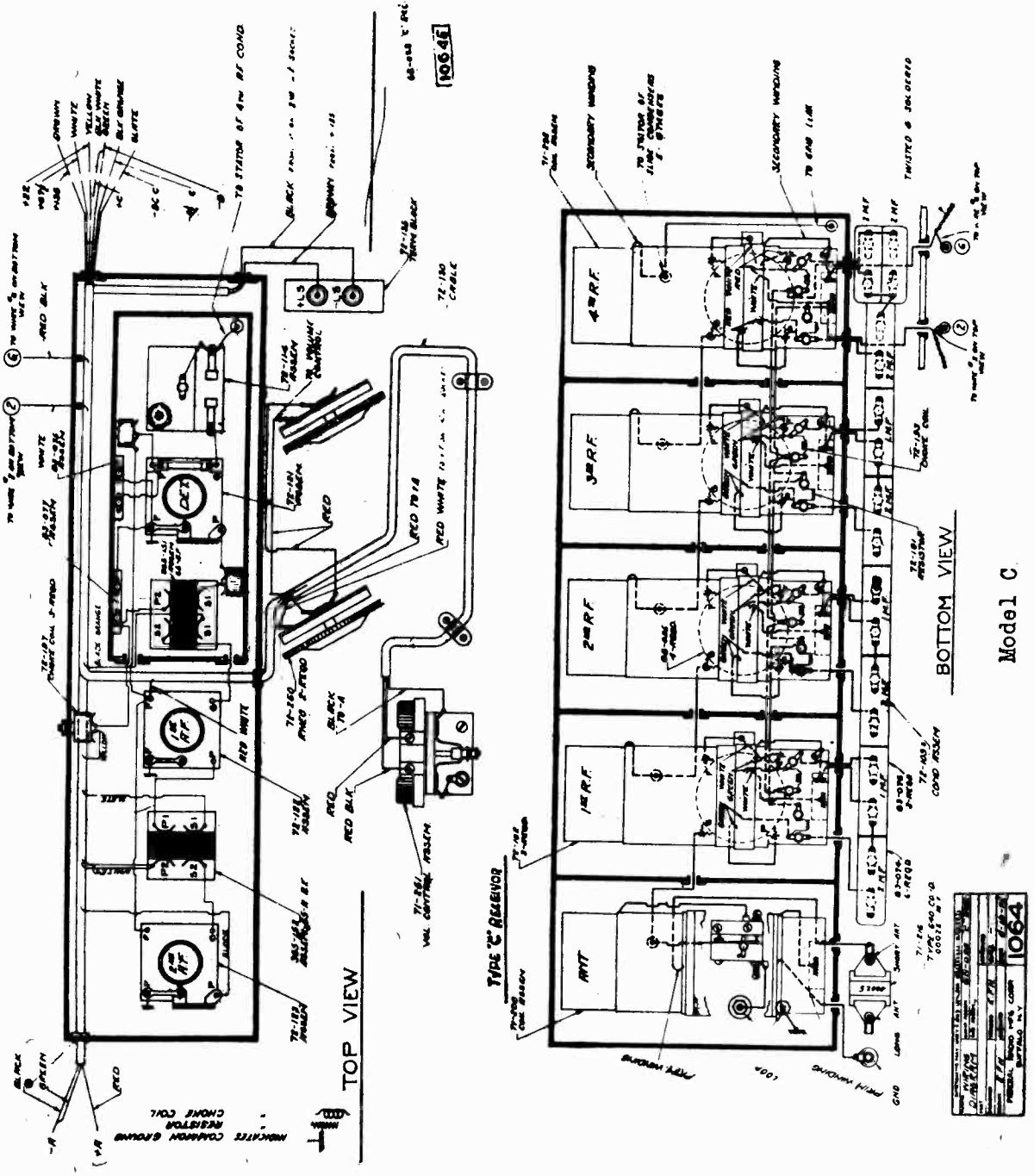
FEDERAL RADIO CORP.

MODEL C
Schematic



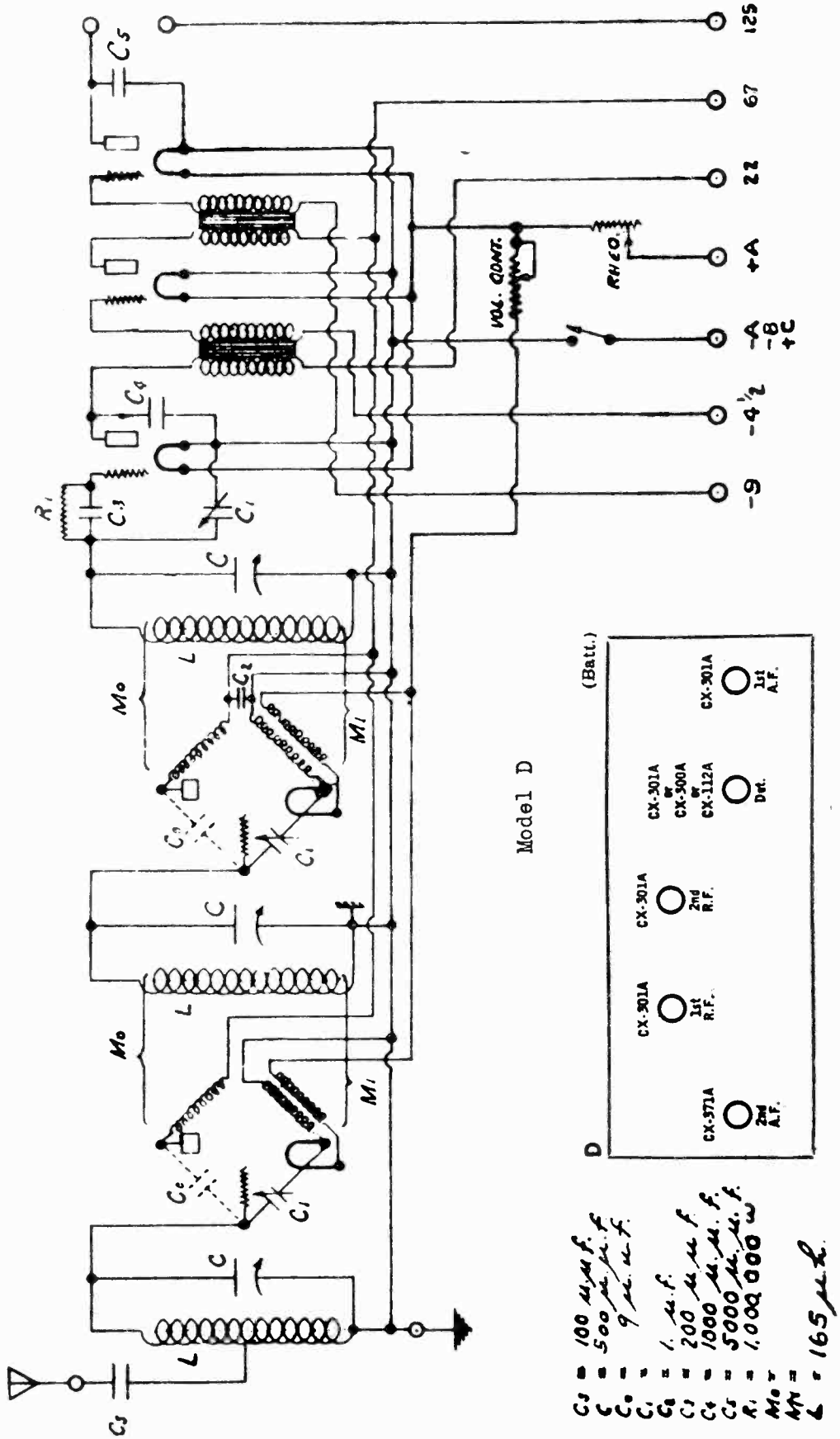
MODEL C
Wiring Diagram

FEDERAL RADIO CORP.



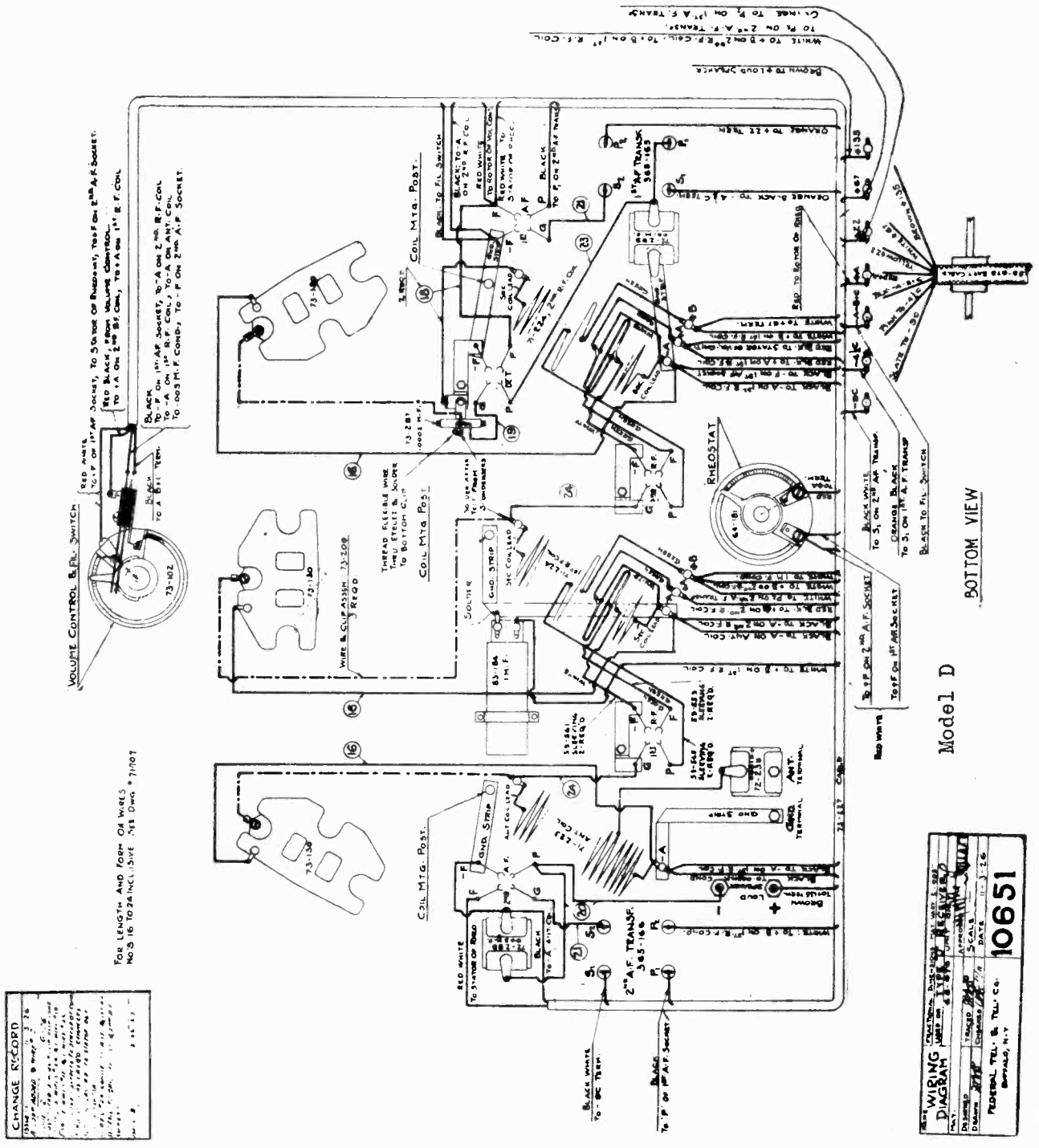
FEDERAL RADIO CORP.

MODEL D, CODE 68-070
Schematic



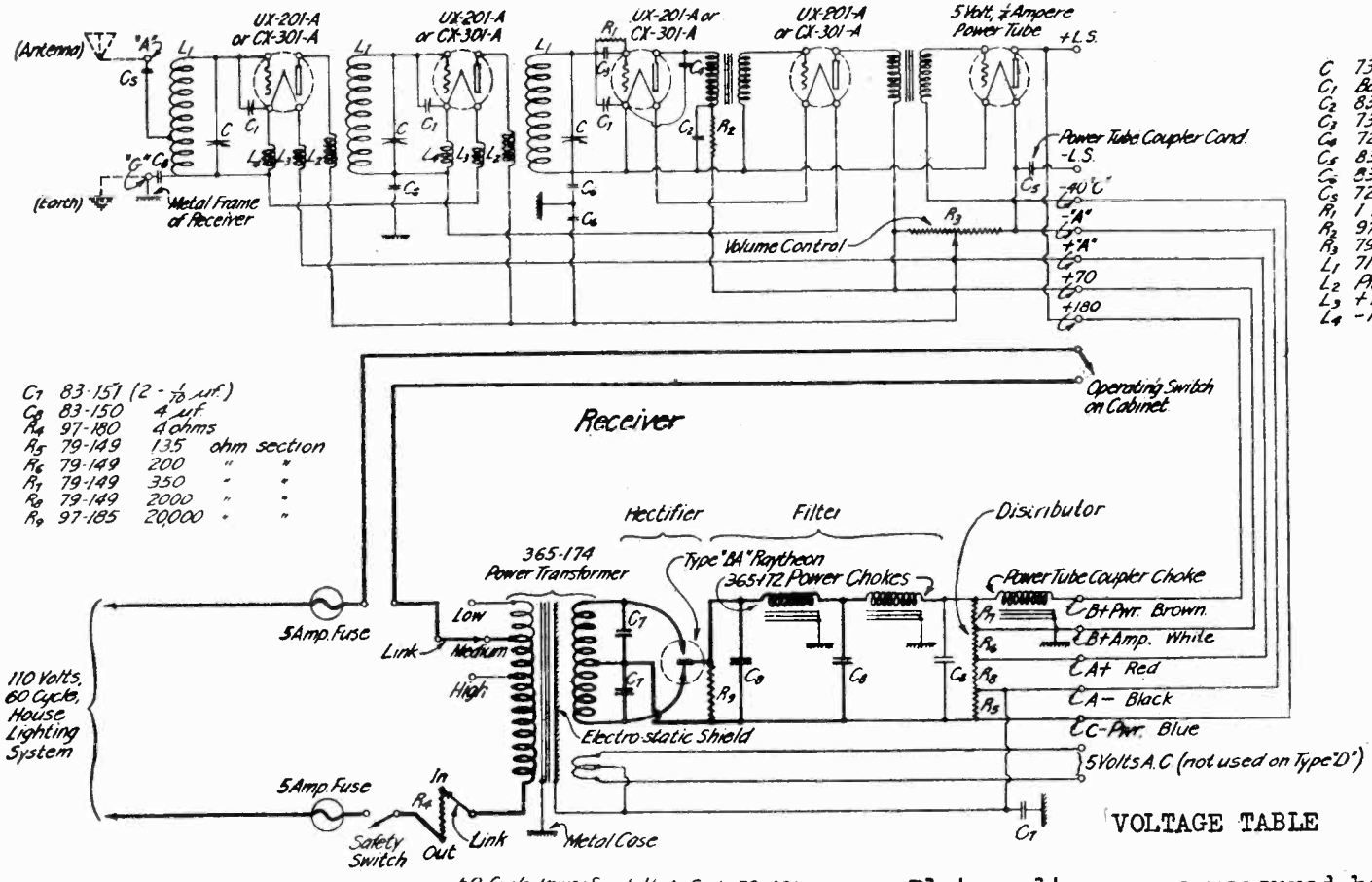
MODEL D, Battery
Wiring Diagram

FEDERAL RADIO CORP.



FEDERAL RADIO CORP.

MODEL D CODE 79-070
Schematic



60 Cycle Power Supply Unit, Code 79-001

C_1	83-151	(2 - 1/10 mf.)	
C_8	83-150	4 mf.	
R_4	97-180	4 ohms	
R_5	79-149	135	ohm section
R_6	79-149	200	" "
R_7	79-149	350	" "
R_8	79-149	2000	" "
R_9	97-185	20,000	" "

C	73-130
C_1	Balance Cond
C_2	83-184. 1 mf.
C_3	73-287. .0002 mf.
C_4	72-299. .001 "
C_5	83-195. 4 mf.
C_6	83-189 and 83-190 .5 mf. each.
C_7	72-238. .0001 mf.
R_1	1 Meg ohm (not shown on 10667)
R_2	97-176. 160,000 ohms.
R_3	79-155 50,000 ohms.
L_1	71-223 and 79-124
L_2	Plate Coil, (Green, Single Winding)
L_3	+F Coil, (Green, Double Winding)
L_4	-F Coil, (White, Double Winding)

VOLTAGE TABLE

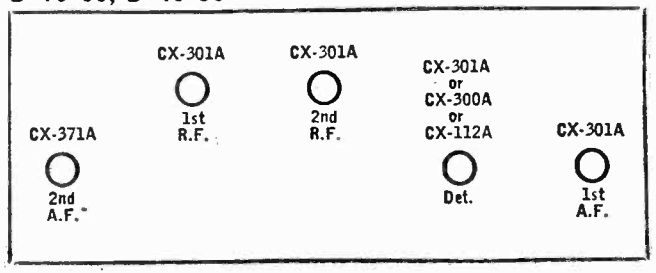
Plate voltages are measured between -F and the tube elements.

1st RF Plate	60 volts
2nd RF Plate	65 volts
Detector Plate	21*volts
1st AF Plate	70 volts
Output Plate	187 volts

Measured with low resistance voltmeter. When high resistance meter is used, voltage may be 50 volts.

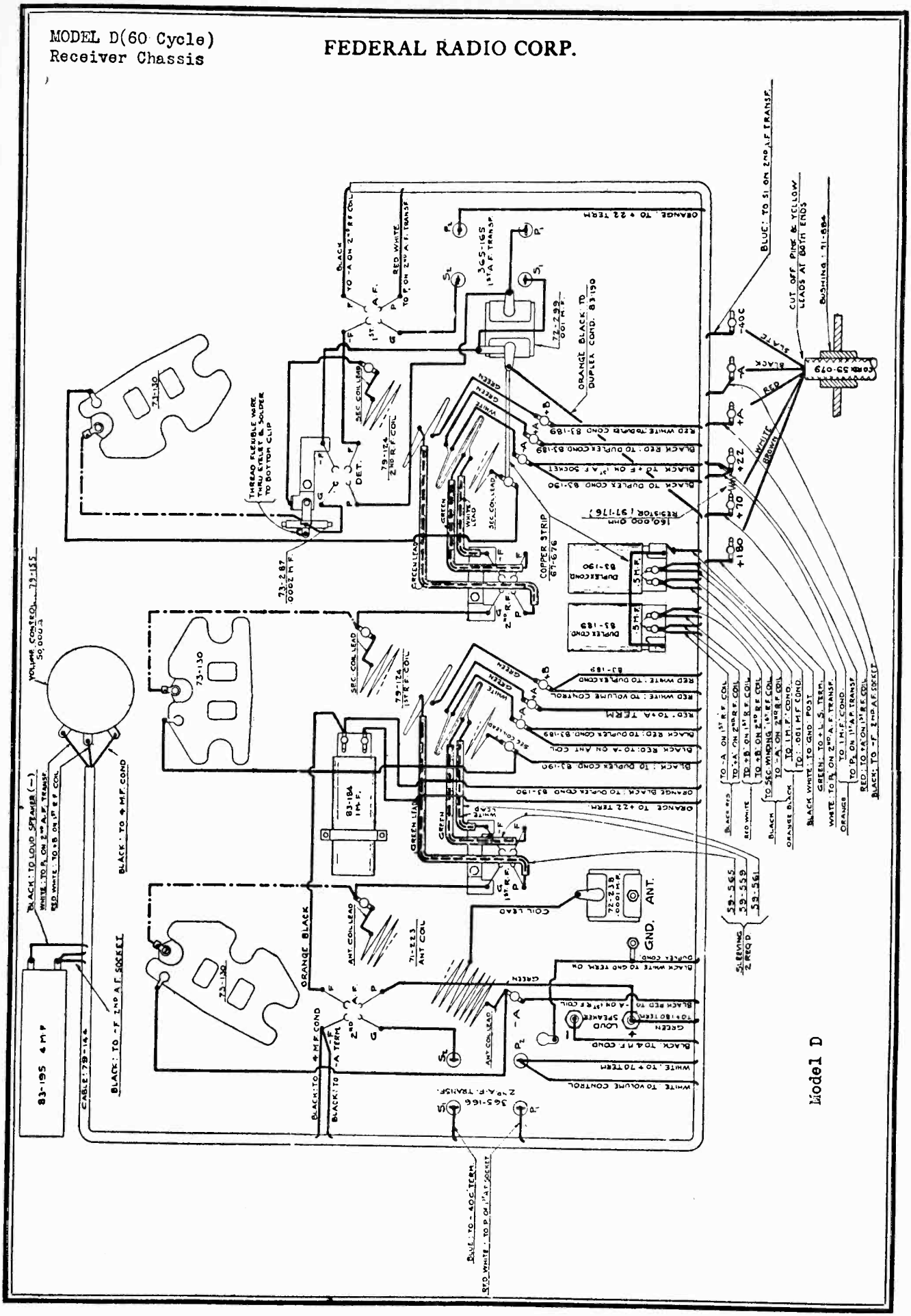
D-10-60, D-40-60

Model D



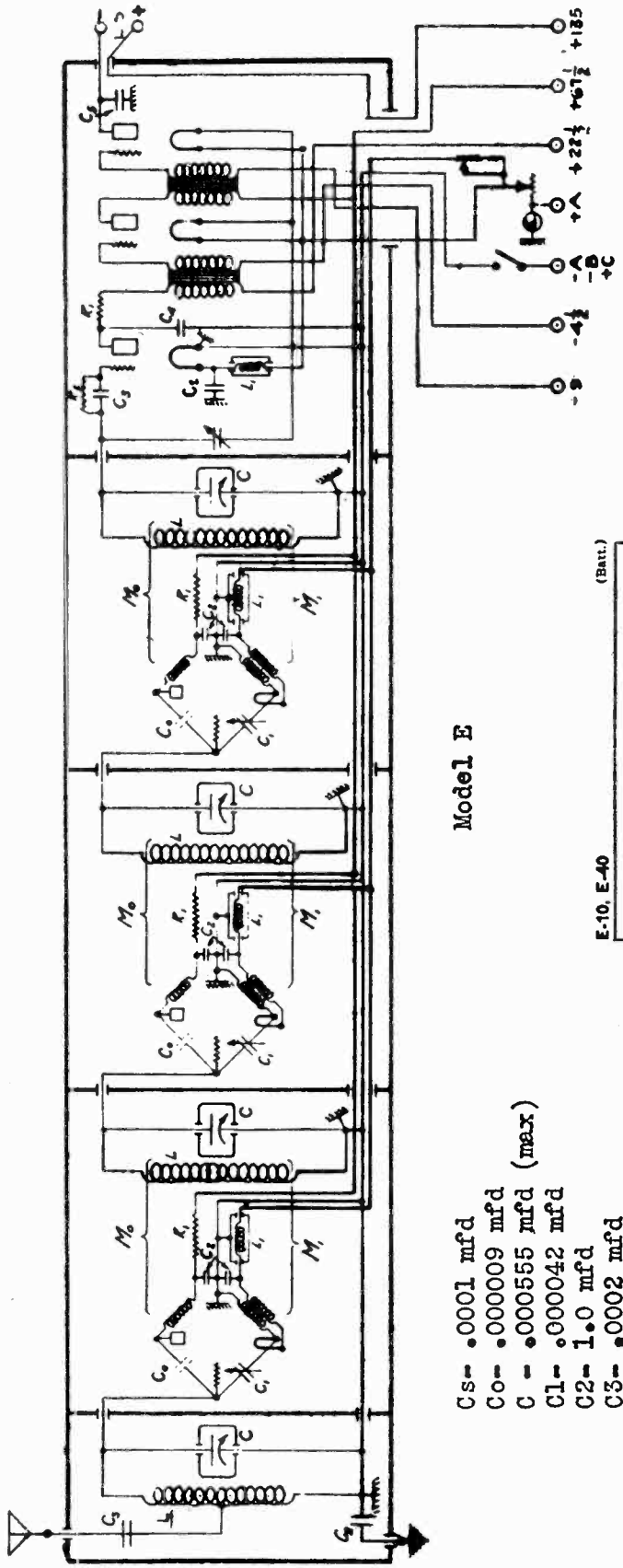
MODEL D(60 Cycle)
Receiver Chassis

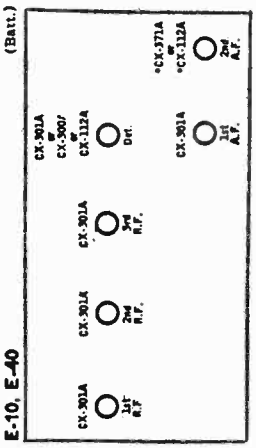
FEDERAL RADIO CORP.



FEDERAL RADIO CORP.

MODEL E CODE 68-060
Schematic

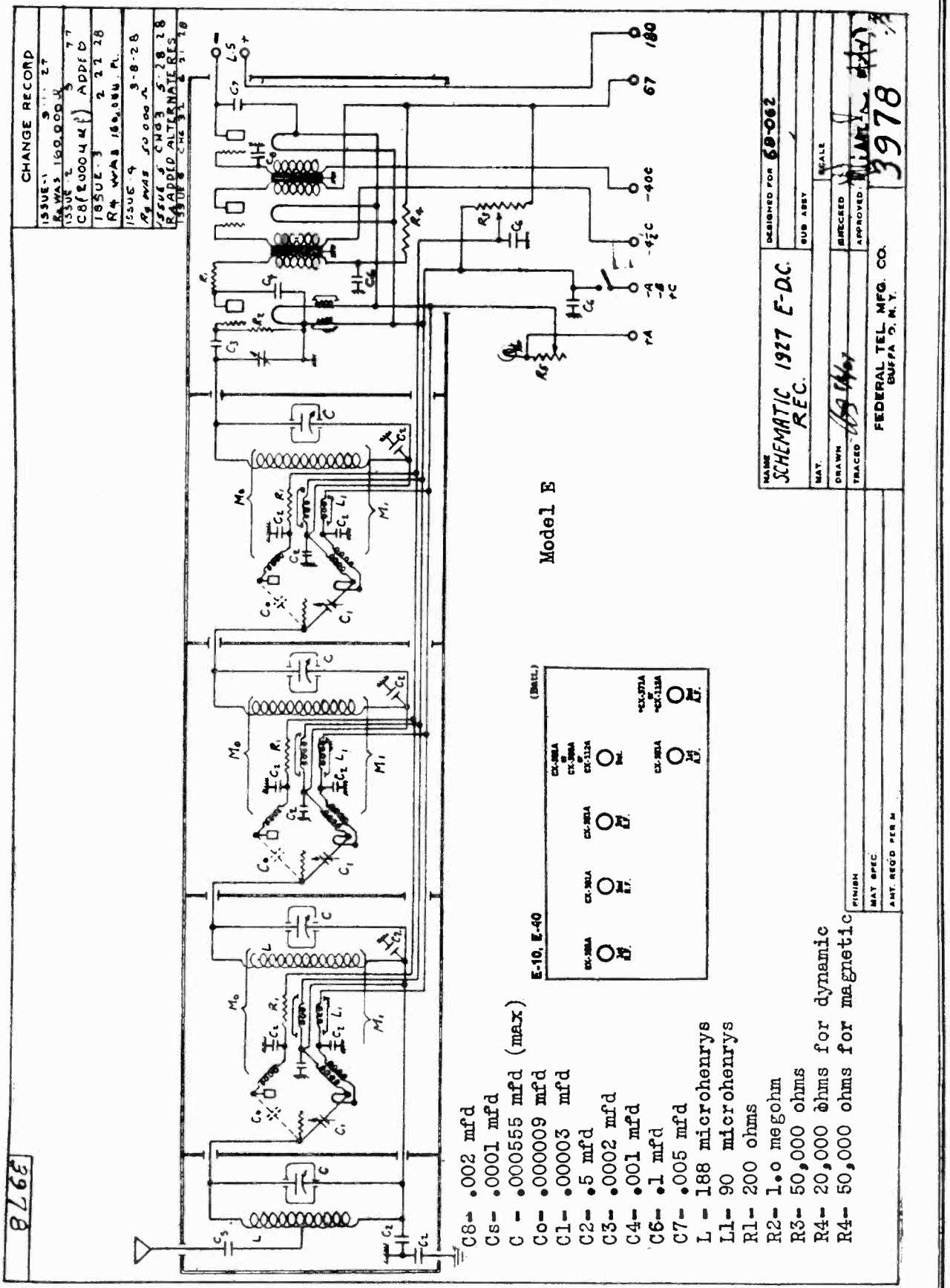




Cs- .0001 mfd
Co- .000009 mfd
C - .000555 mfd (max)
C1- .000042 mfd
C2- 1.0 mfd
C3- .0002 mfd
C4- .001 mfd
C5- .005 mfd
Mo- 25.5 microhenrys
M1- 5.25 microhenrys
R1- 200 ohms (low capacity)
R2- 1.0 megohm
L - 100 microhenry
L1- 360 microhenry

MODEL E DC
Schematic

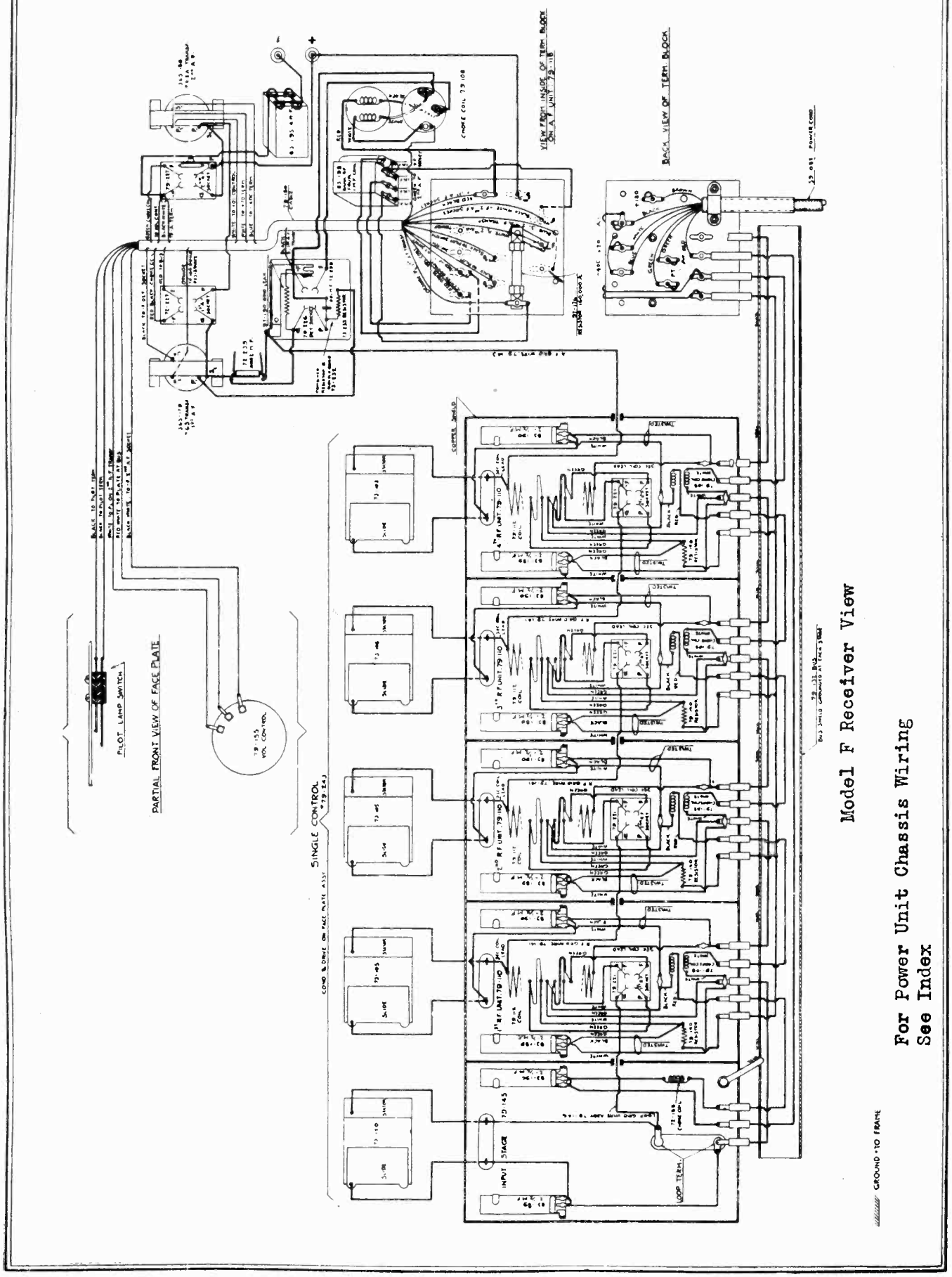
FEDERAL RADIO CORP.



C8- .002 mfd
Cs- .0001 mfd
C - .000555 mfd (max)
Co- .000009 mfd
C1- .00003 mfd
C2- .5 mfd
C3- .0002 mfd
C4- .001 mfd
C6- .1 mfd
C7- .005 mfd
L - 188 microhenrys
L1- 90 microhenrys
R1- 200 ohms
R2- 1.0 megohm
R3- 50,000 ohms
R4- 20,000 ohms for dynamic
R4- 50,000 ohms for magnetic

FEDERAL RADIO CORP.

MODEL F, CODE 79-080
Receiver Chassis

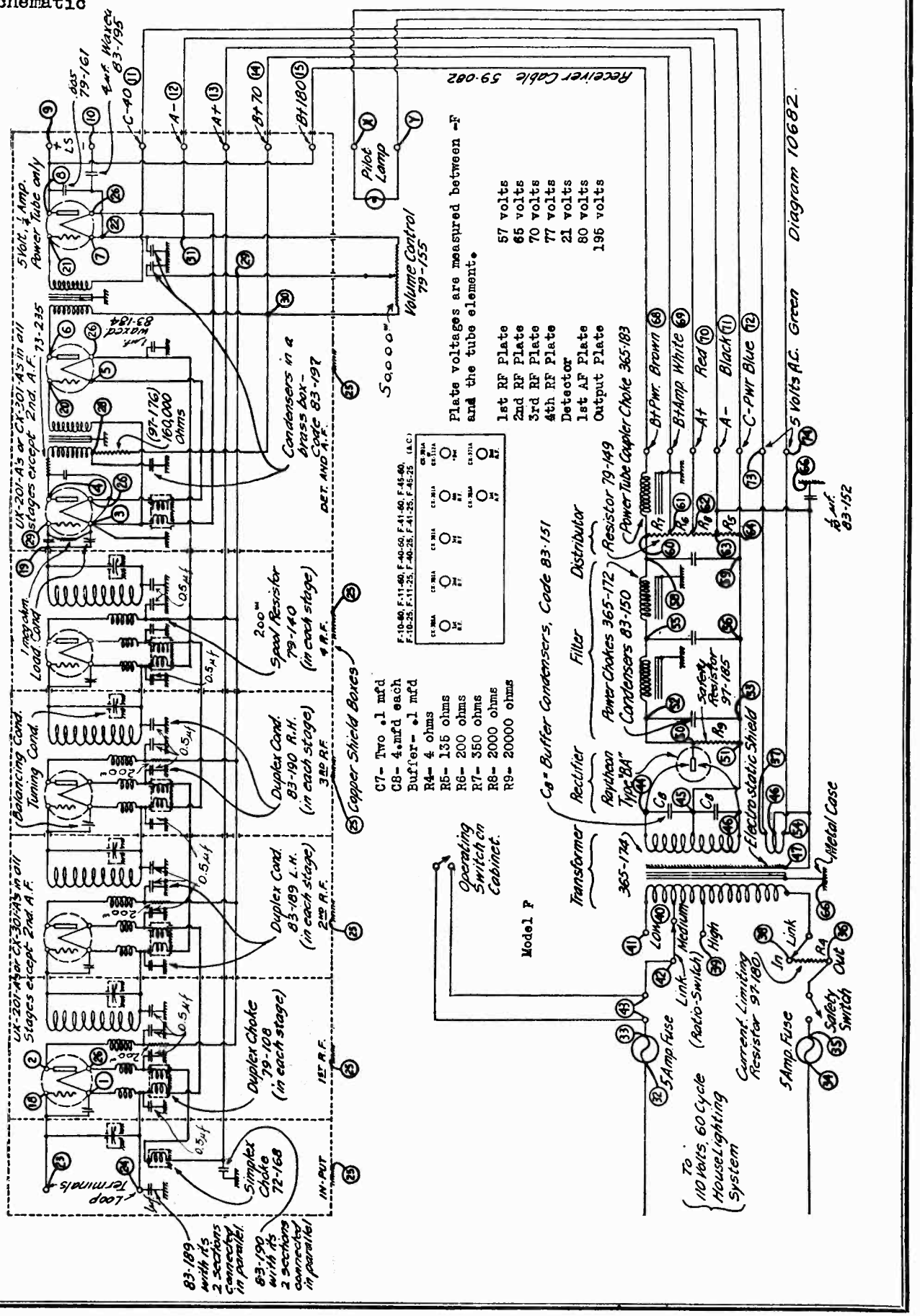


Model F Receiver View

For Power Unit Chassis Wiring
See Index

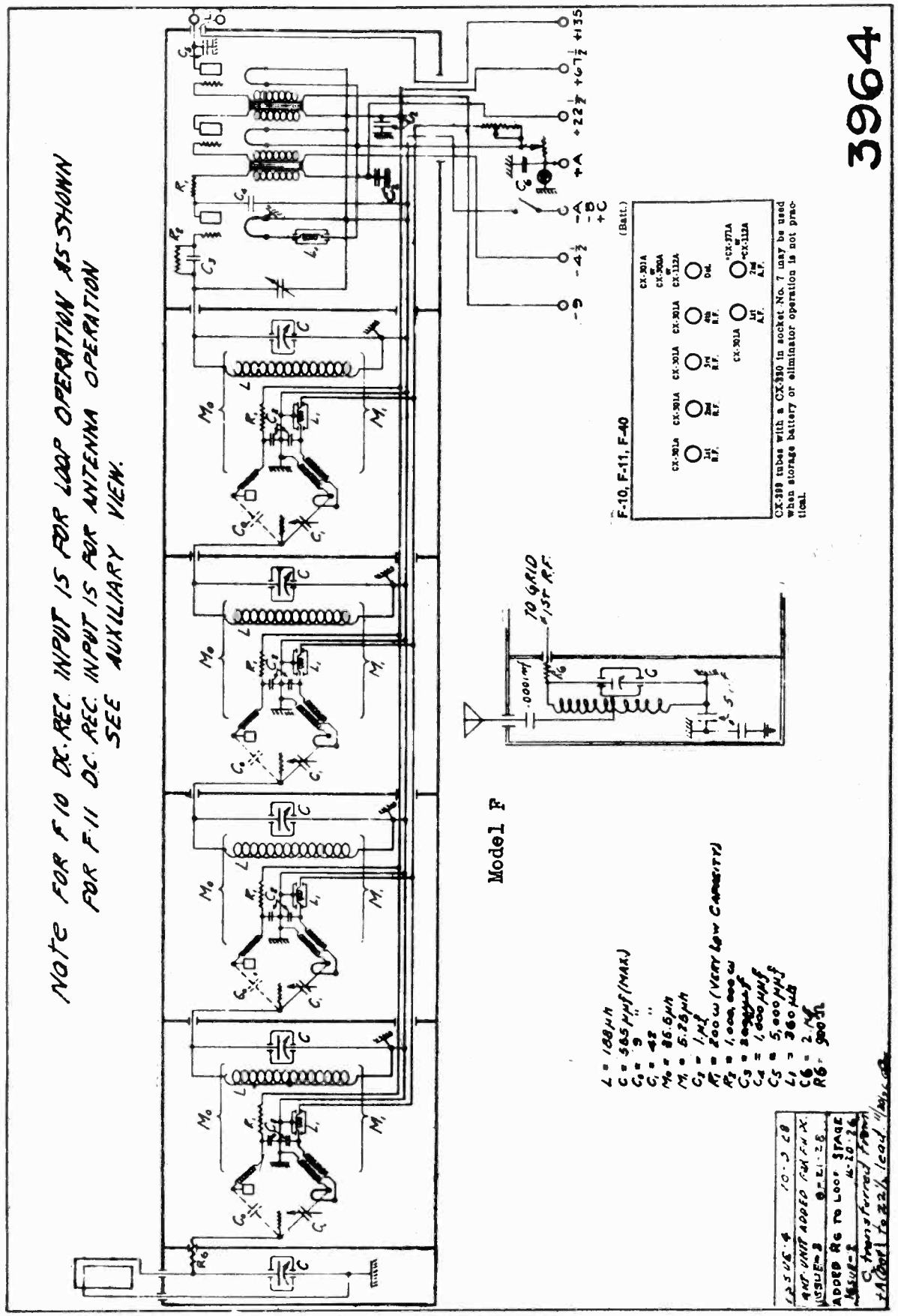
MODEL F, CODE 79-080
Schematic

FEDERAL RADIO CORP.



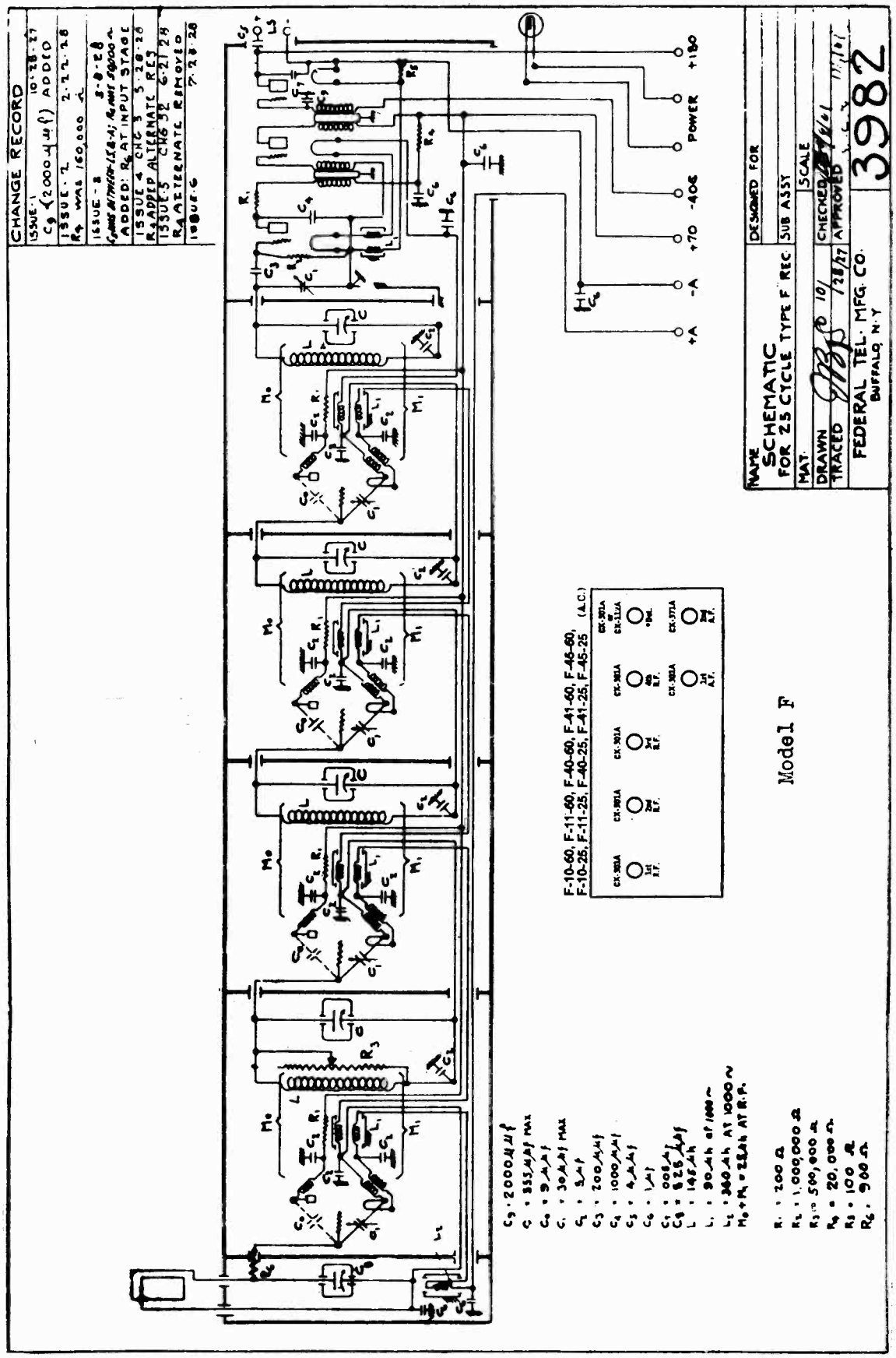
FEDERAL RADIO CORP.

MODEL F-10 DC
F-11 DC



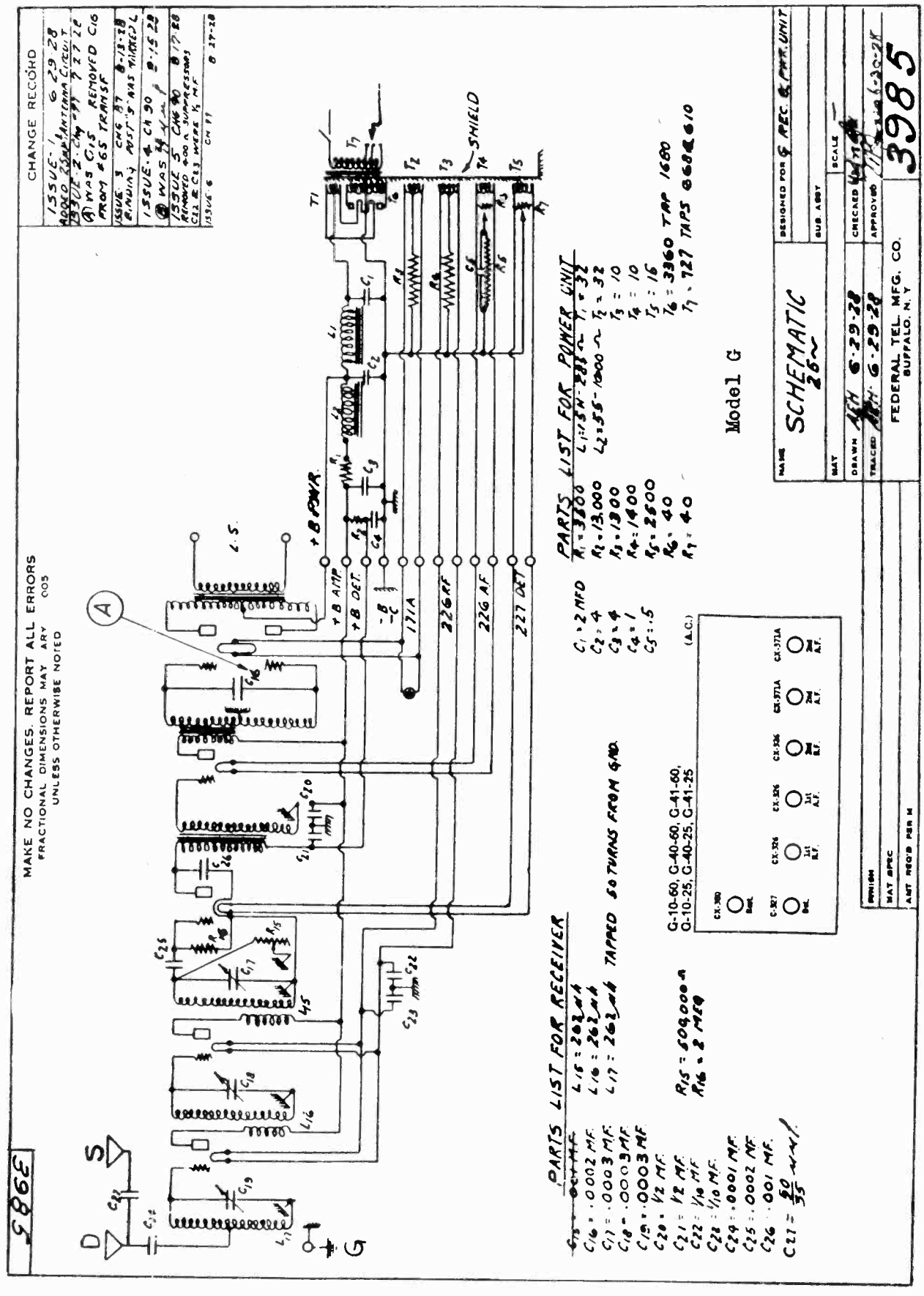
MODEL F (25 Cycle)

FEDERAL RADIO CORP.



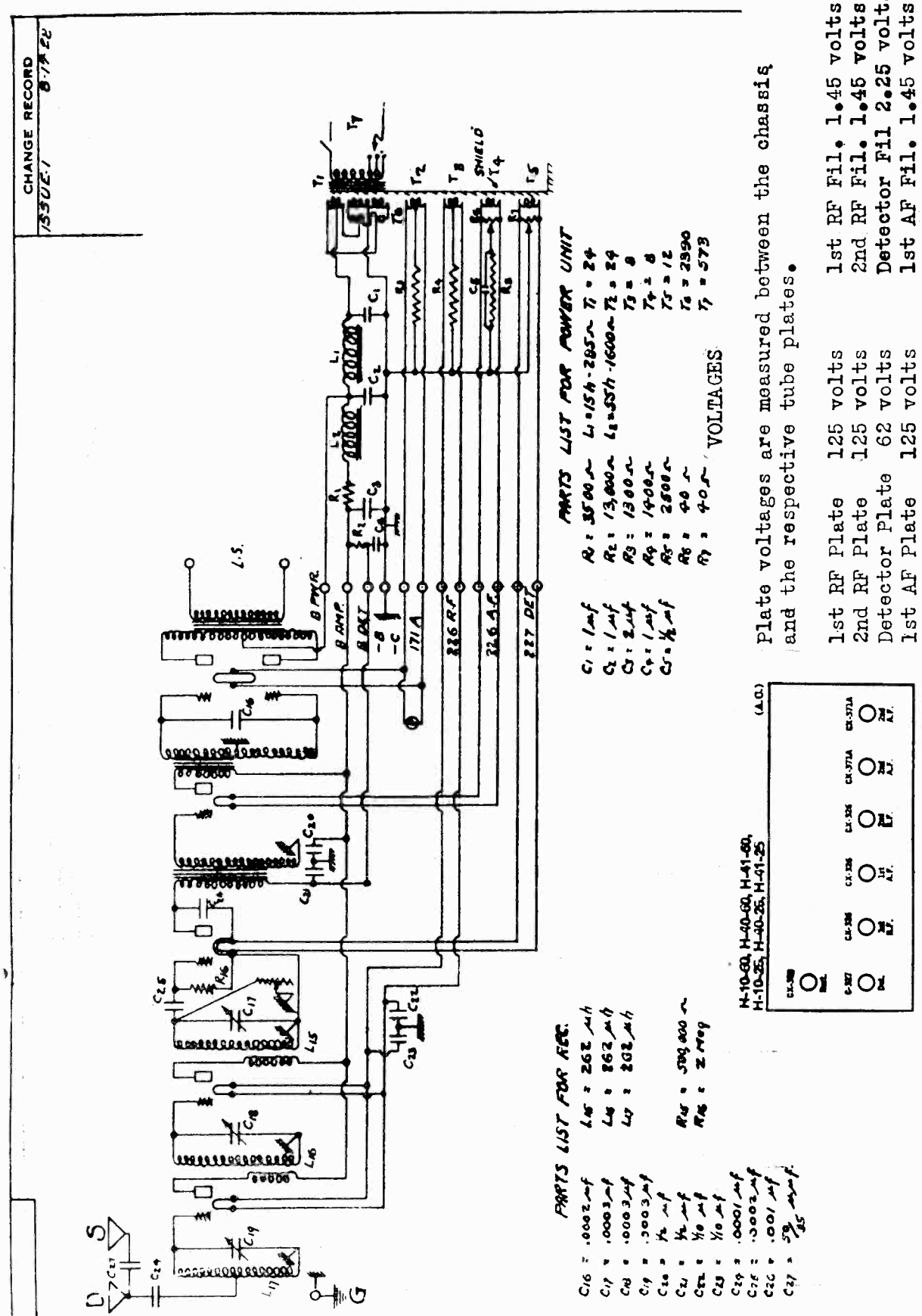
FEDERAL RADIO CORP.

MODEL G (25 Cycle)



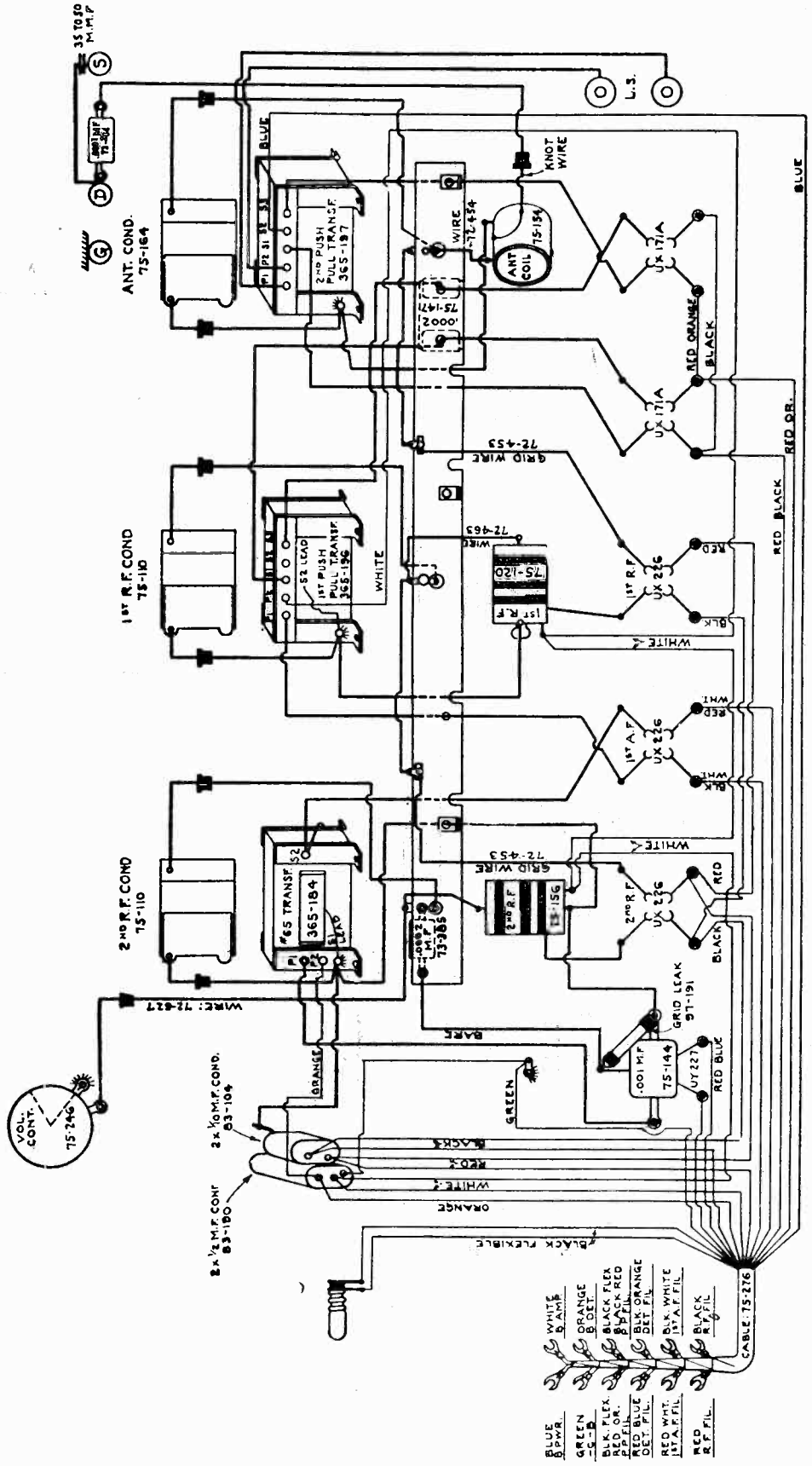
MODEL H CODE 71-030

FEDERAL RADIO CORP.



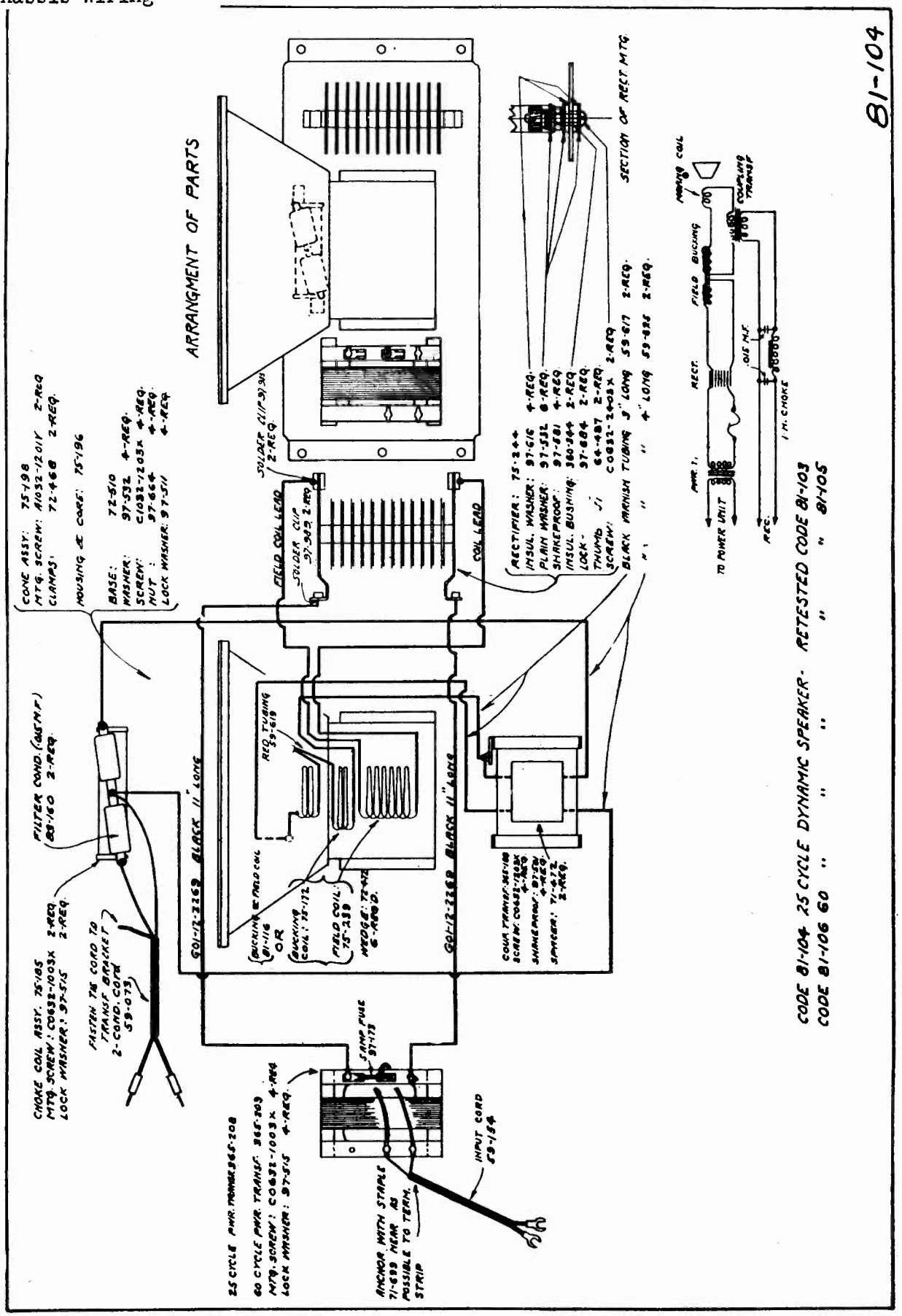
FEDERAL RADIO CORP.

MODEL H Receiver
Chassis Wiring



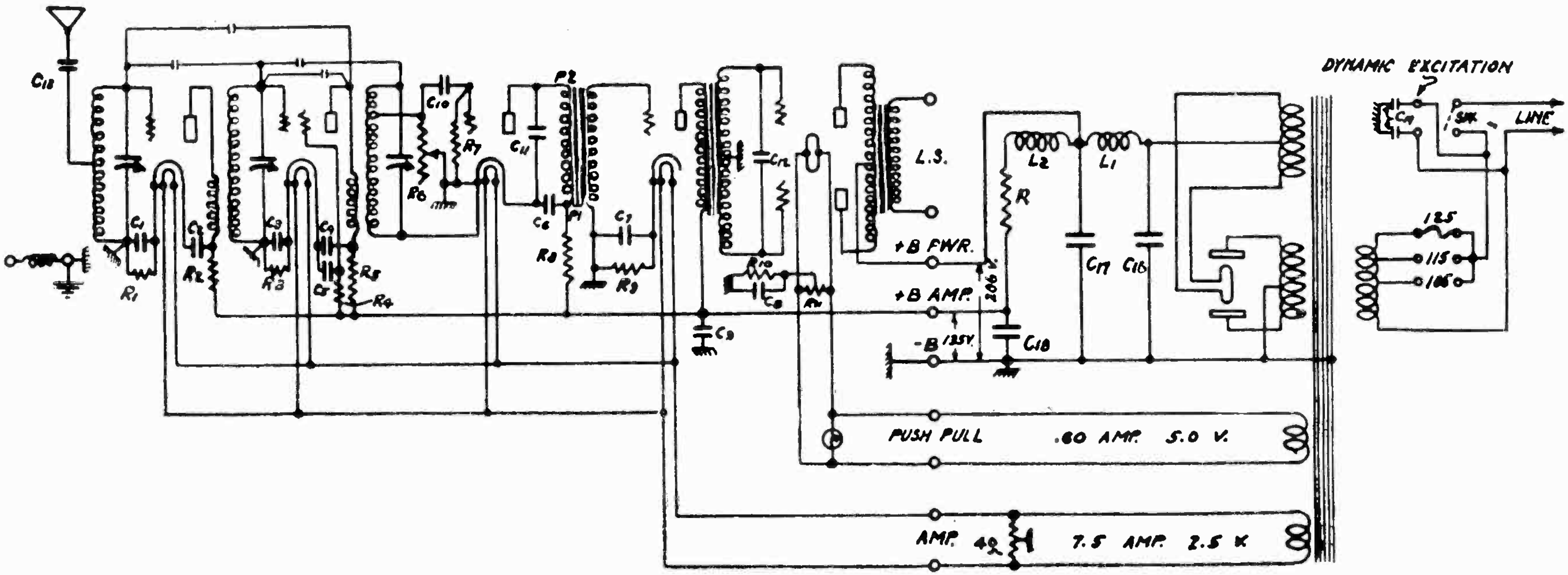
MODEL H Power Unit
Chassis Wiring

FEDERAL RADIO CORP.



FEDERAL RADIO CORP.

MODEL K



Model K

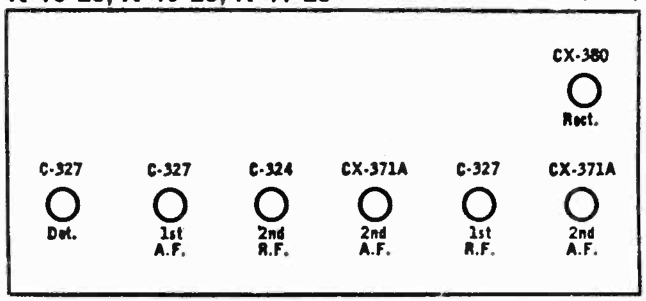
C_1	.25 mf
C_2	.25
C_3	.25
C_4	.25
C_5	.25
C_6	.25
C_7	.25
C_8	.25
C_9	.25
C_{10}	.0002
C_{11}	.001
C_{12}	.0002
C_{18}	.0001

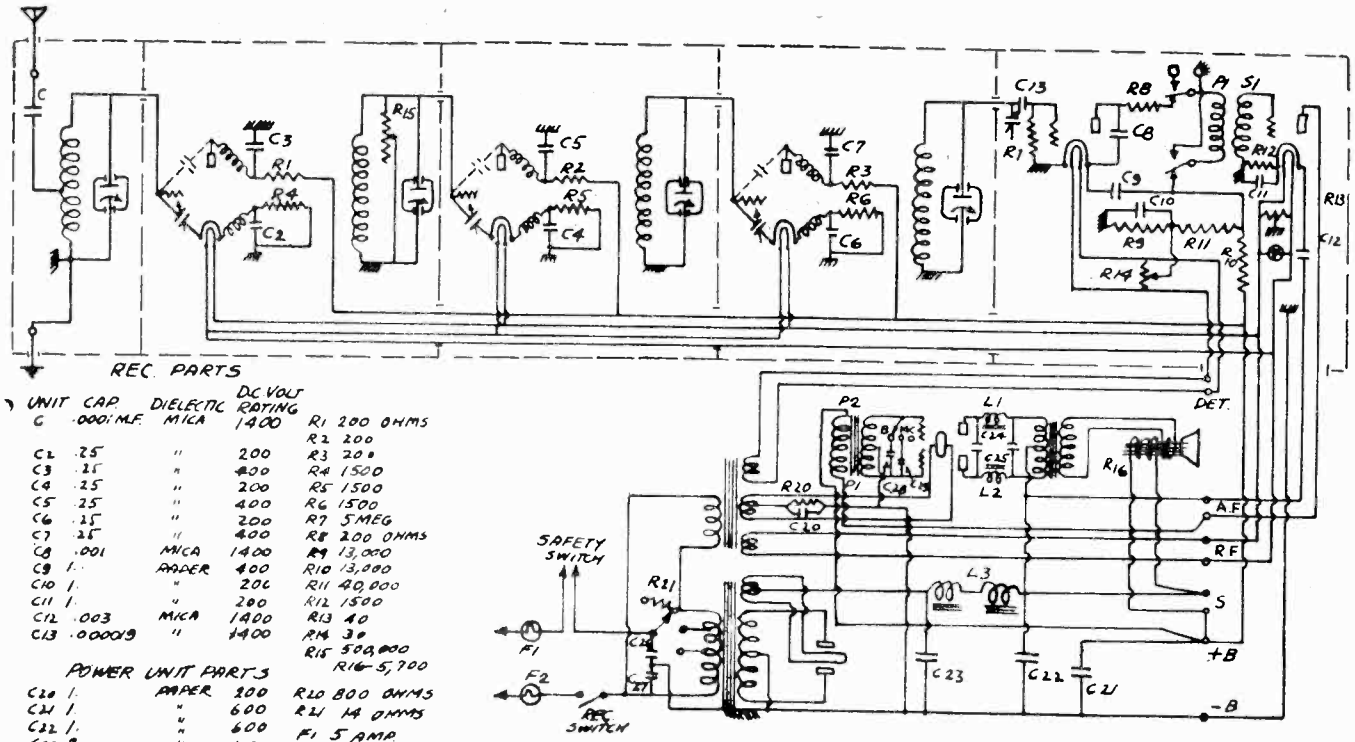
R_1	1500 Ω
R_2	6000 Ω
R_3	300 Ω
R_4	40,000 Ω
R_5	6,000 Ω
R_6	700,000 Ω
R_7	2 MEG
R_8	12,000 Ω
R_9	1500 Ω
R_{10}	1500 Ω
R_{11}	40 Ω

	25 CYCLE	60 CYCLE
R	1300 Ω	1300 Ω
L_1	15 H. 285 Ω	15 H. 285 Ω
L_2	60 H. 1570 Ω	60 H. 1570 Ω
C_{16}	2 M.F.	1 M.F.
C_{17}	4 M.F.	1 M.F.
C_{18}	4 M.F.	2 M.F.
C_{19}	0.1 M.F.	0.1 M.F.

K-10-60, K-40-60, K-41-60,
K-10-25, K-40-25, K-41-25

(A.C.)





REC. PARTS

UNIT	CAP.	DIELECTIC	DC VOLT RATING
C	.0001 MF.	MICA	1400
C1	.25	"	200
C3	.25	"	400
C4	.25	"	200
C5	.25	"	400
C6	.25	"	200
C7	.25	"	400
C8	.001	MICA	1400
C9	/	PAPER	400
C10	/	"	200
C11	/	"	200
C12	.003	MICA	1400
C13	.00009	"	1400

R1	200 OHMS
R2	200
R3	200
R4	1500
R5	1500
R6	1500
R7	5 MEG
R8	200 OHMS
R9	13,000
R10	13,000
R11	40,000
R12	1500
R13	40
R14	30
R15	500,000
R16	5,700

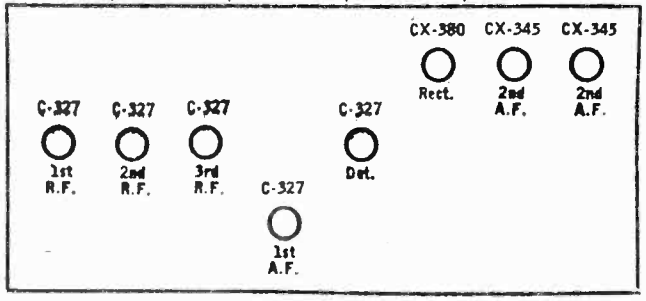
POWER UNIT PARTS

C20	/	PAPER	200
C21	/	"	600
C22	/	"	600
C23	2.	"	600
C24	.015	"	1400
C25	.020	"	1400
C26	.015	"	1400
C27	.015	"	1400
C28	.003	"	1400
C29	.0015	"	1400

R10	800 OHMS
R21	14 OHMS
F1	5 AMP
F2	5 AMP
L1	
L2	
L3	

Type M

M-35-60, M-40-60, M-41-60, M-45-60, M-46-60,
M-35-25, M-40-25, M-41-25, M-45-25, M-46-25 (A.C.)



FEDERAL—Type M
Line Voltage 113—Set on 113 Volt Tap—Volume Control Position Off

TYPE NO. IN ORDER	TYPE OF TUBE	POSITION OF TUBE (BY R.F., DET., ETC.)	READINGS, PLUG-IN SOCKET OF SET: TUBE OUT A VOLTS	TUBE OUT B VOLTS	TUBE IN TESTER A VOLTS	TUBE IN TESTER B VOLTS	B VOLTS CONTROL GRID	CATHODE - HEATER VOLTS	NORMAL PLATE M A.	PLATE M.A. GRID TEST	PLATE CHANGE M A.	SCREEN GRID VOLTS
1	327	1st RF	2.7	160	2.5	116	0	-	13	16	3	
2	327	2nd RF	2.7	160	2.5	116	0	-	16	16	3	
3	327	3rd RF	2.7	160	2.5	116	0	-	13	16	3	
4	327	Det.	2.9	180	2.5	118	0	16	1	1	0	
5	327	1st AF	2.6	160	2.5	114	0	-	11	18	1	
6	245	1st P	2.7	276	2.5	258	48	-	30	34	4	
7	245	2nd P	2.7	276	2.5	258	48	-	30	34	4	
8	280	Rect.	5.8	-	4.9	-	-	-	180	-	-	
9												
10												

MODEL 35, 40
Data
MODEL "Cathedral Tone"
Schematic

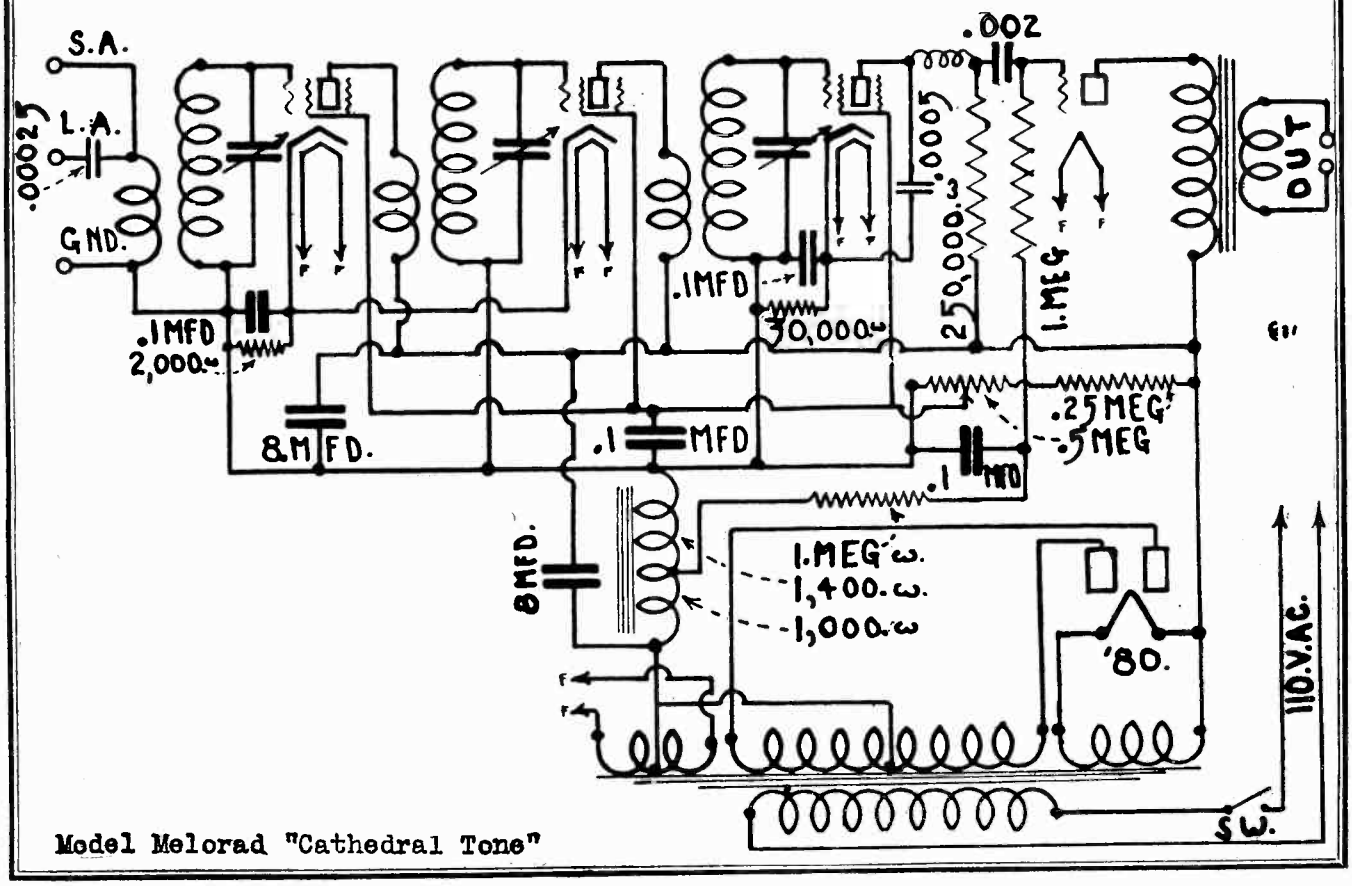
FEDERATED PURCHASER

Model 35, 40

ADJUSTMENTS The 175 kc. oscillator must be accurately tuned to 175 kc. and only 175 kc. If this precaution is not observed it will be impossible to align the oscillator to the rest of the set and the set will not operate correctly as the oscillator is designed for exact 175 kc. operation.

The second intermediate frequency amplifier transformer shield can is removed and one side of the small variator condenser is disconnected from the primary coil. This coil is connected so that it still is in the plate circuit of the tube but the tuning condenser is not connected in the circuit. Now remove the grid cap from the intermediate amplifier tube and connect a 3 megohm resistor from the control grid to ground. Now connect the output from the 175 kc. oscillator to the grid of the intermediate frequency amplifier tube and tune the secondary for maximum deflection of the output meter. (Low voltage alternating current meter, 0 to 3 volts, connected across the voice coil of speaker). Now remove the shield can and connect the small tuning condenser that was previously removed back across the primary coil. With the 175 kc. oscillator connected the same as before, tune the primary for a maximum deflection of the output meter. (Caution: Do not under any circumstances try to retune the secondary after having tuned the primary. **This is important.**) After having tuned this stage proceed to the next intermediate frequency:

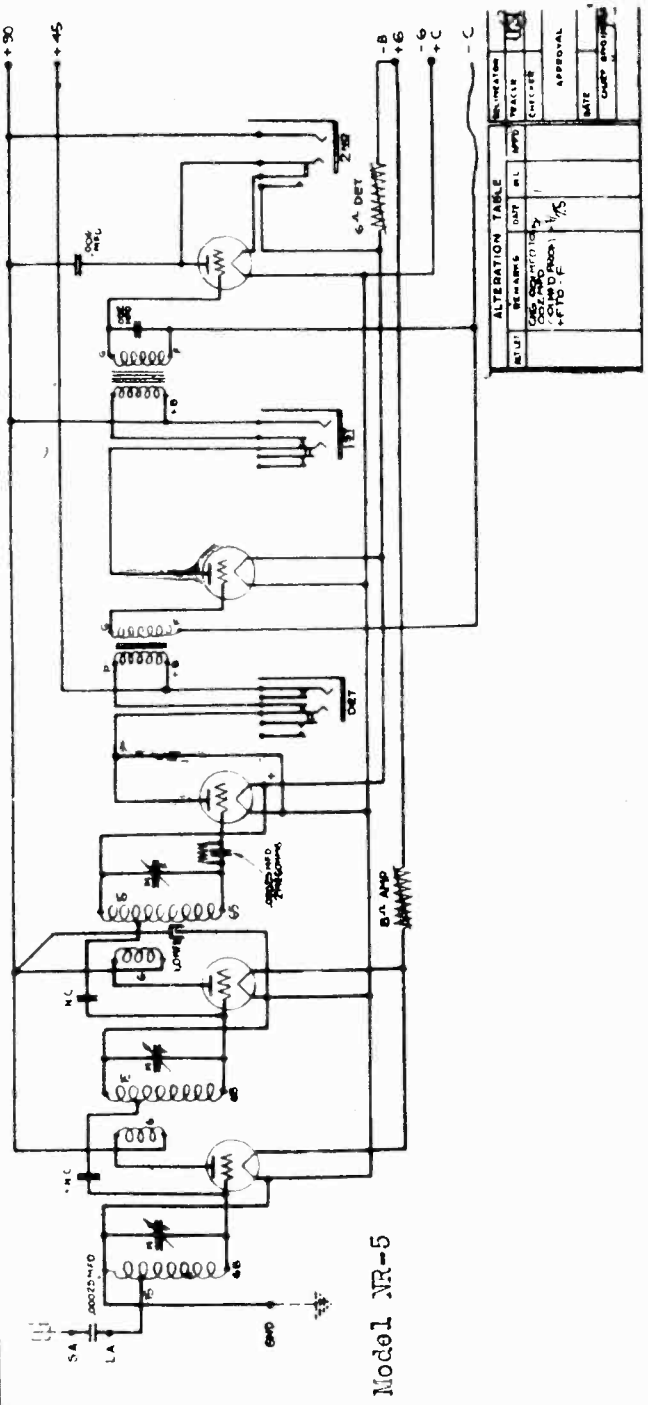
(b) Replace the grid cap on the intermediate frequency amplifier and proceed to the first detector tube. Remove this tube cap and connect the 175 kc. oscillator as before, being sure to connect the 3 megohm resistor from control grid to ground. Now proceed to tune the intermediate frequency transformer by tuning the secondary first for maximum deflection of the output meter and then tuning the primary for maximum deflection. Tuning this transformer must be done very carefully as the selectivity of the whole receiver depends entirely on the tuning of this transformer.

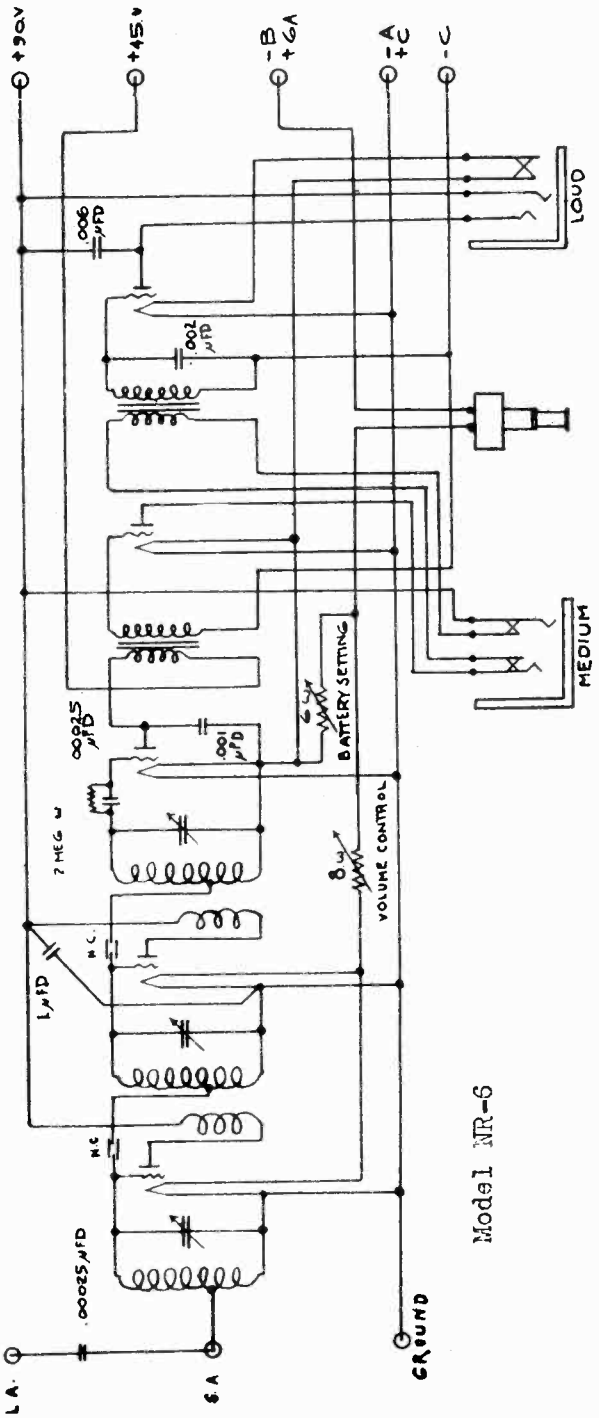


Model Melorad "Cathedral Tone"

FREED RADIO AND TELEVISION CORP.

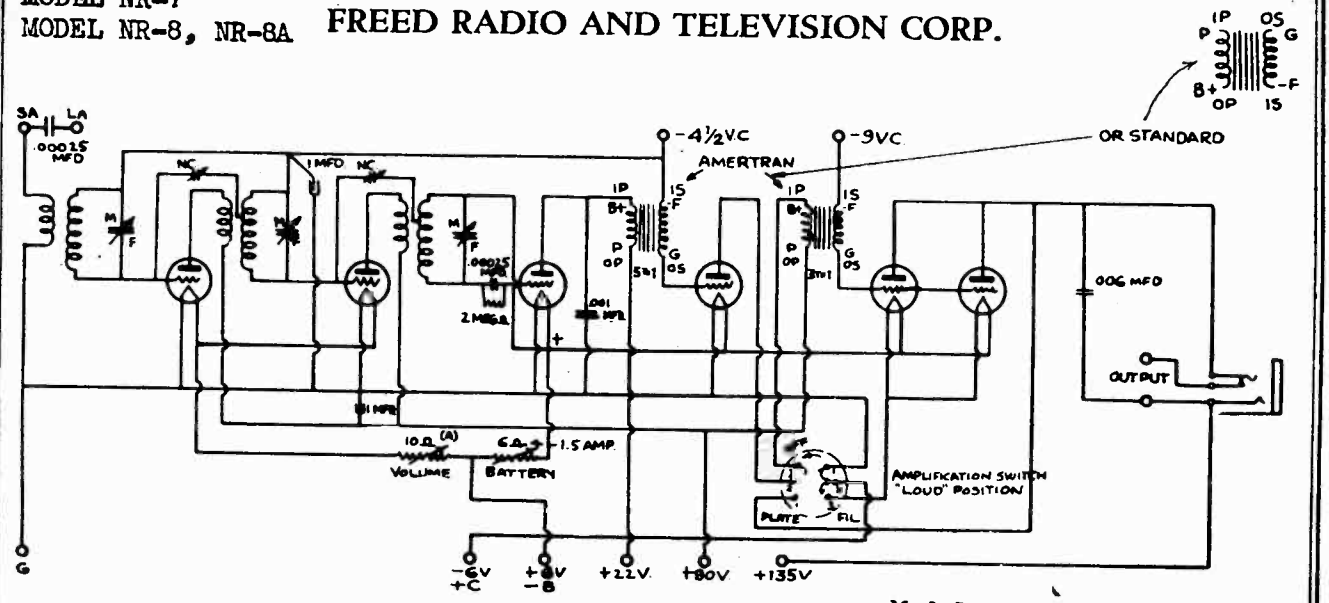
MODEL NR-5
MODEL NR-6





MODEL NR-7
MODEL NR-8, NR-8A

FREED RADIO AND TELEVISION CORP.



Model NR-7

NR-7 (Batt.)

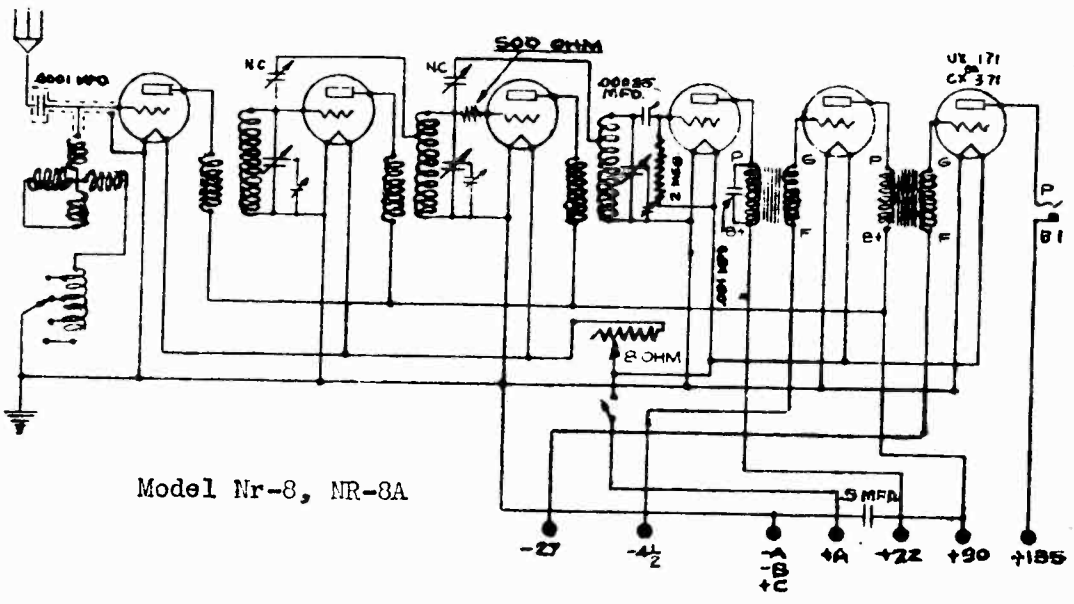
CX-301A	CX-301A	CX-301A	CX-301A	*CX-301A or *CX-112A or *CX-371A
1st R.F.	2nd R.F.	Det.	1st A.F.	†2nd A.F.

*CX-301A or *CX-112A or *CX-371A — 2nd A.F.

† If CX-301A's are used, use both stages in parallel. If power tubes are used, one tube in either 2nd A. F. socket is sufficient.

NR-8, (Batt.)

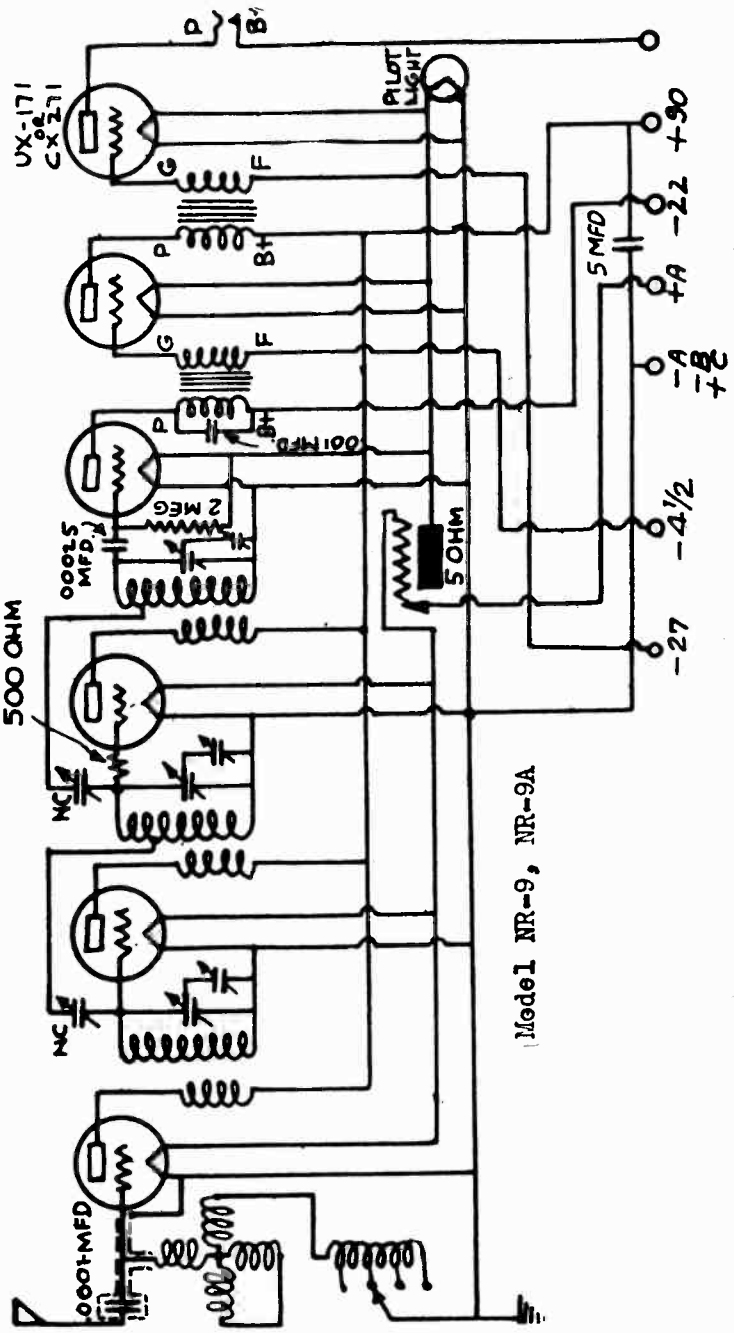
CX-301A	CX-301A	CX-371A	CX-301A	CX-301A	CX-301A or CX-300A or CX-112A
1st R.F.	2nd R.F.	2nd A.F.	3rd R.F.	1st A.F	Det.

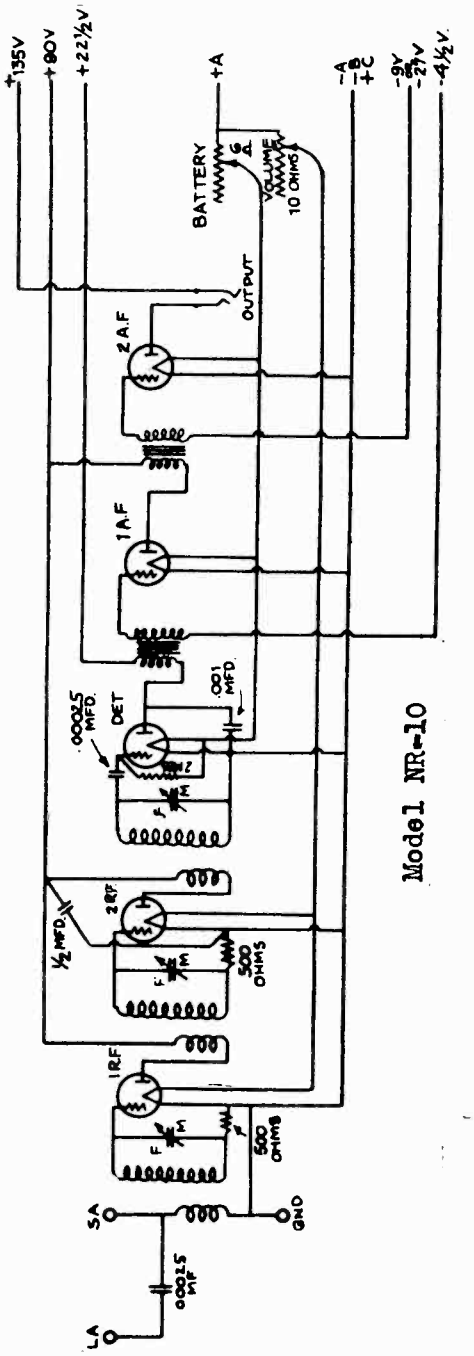


Model Nr-8, NR-8A

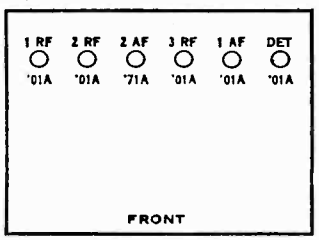
FREED RADIO AND TELEVISION CORP.

MODEL NR-9, NR-9A
MODEL NR-10

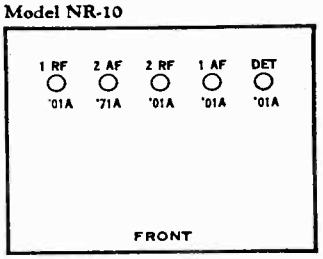




Models NR-9

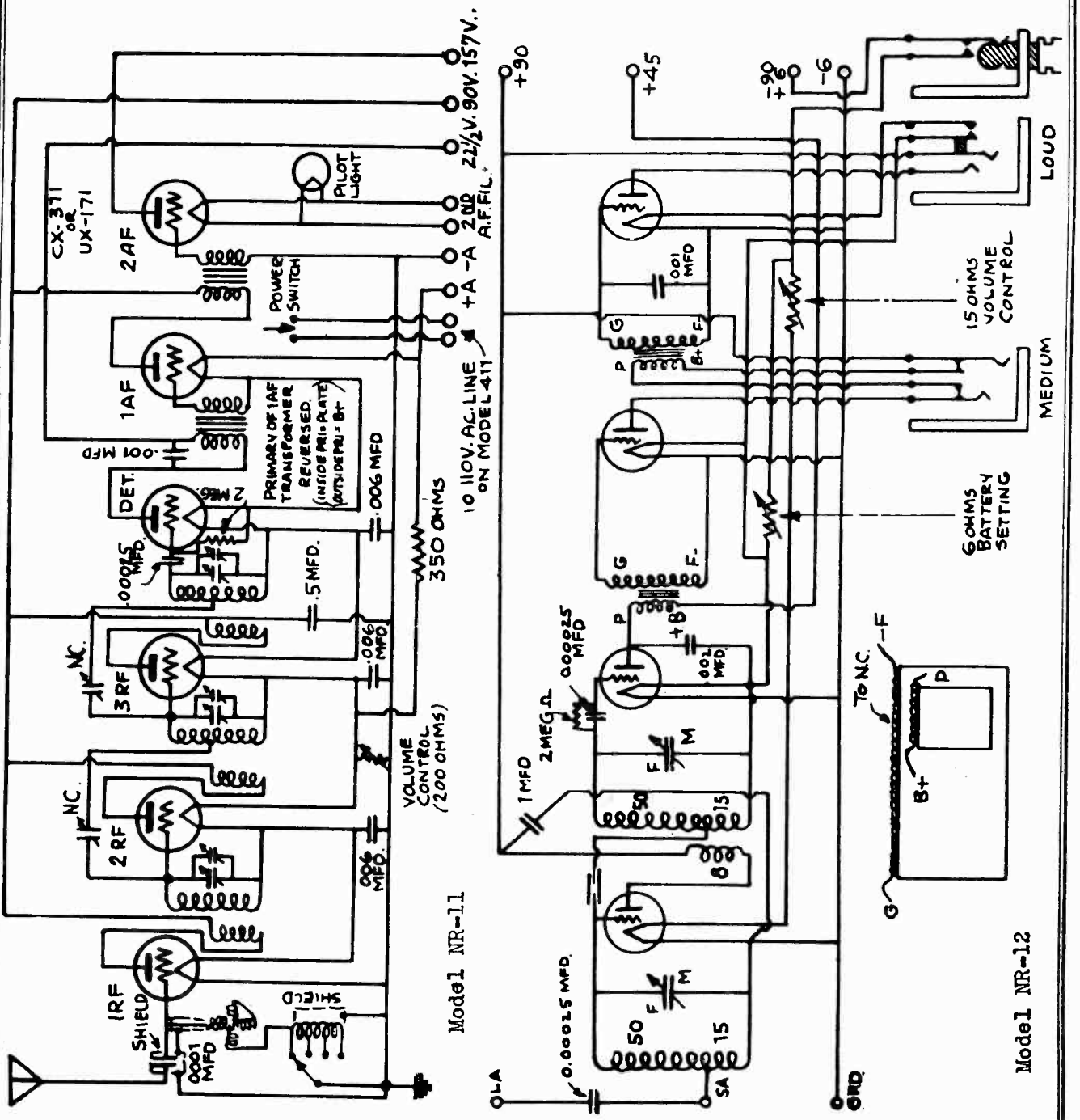


Model NR-10



MODEL NR-11
MODEL NR-12

FREED RADIO AND TELEVISION CORP.



Power Pack For NR-11 On Next Page

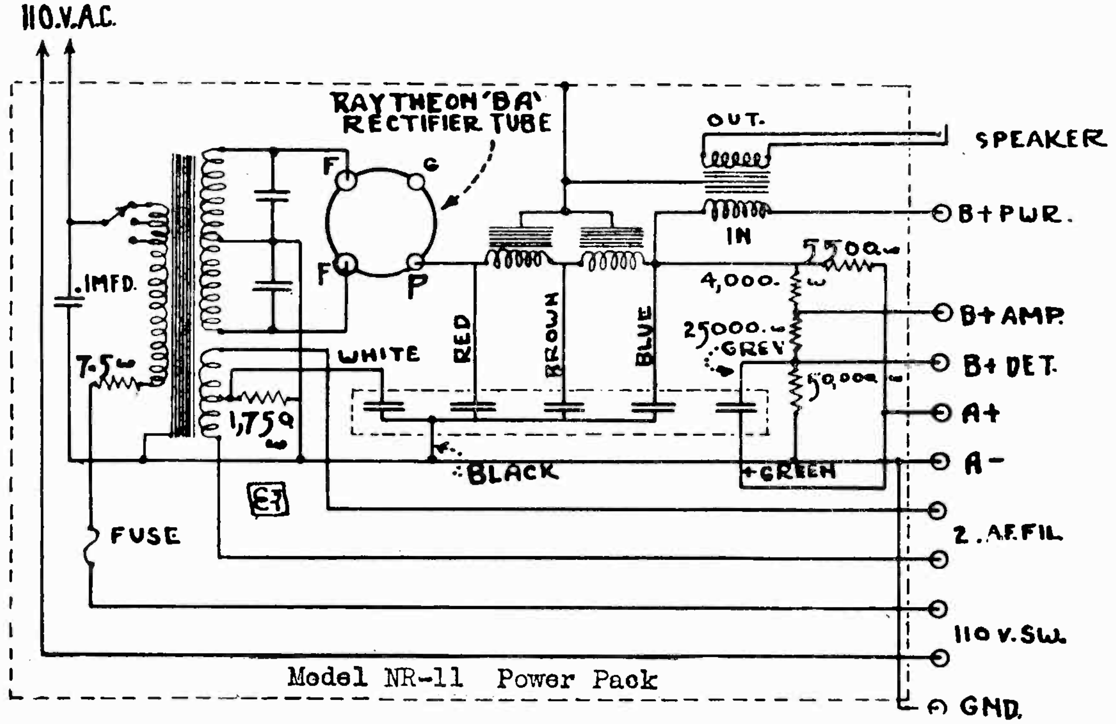
NR-11

CX-301A	CX-301A	CX-371A	CX-301A	CX-301A	CX-301A or CX-300A or CX-112A
1st R.F.	2nd R.F.	2nd A.F.	3rd R.F.	1st A.F.	Det.

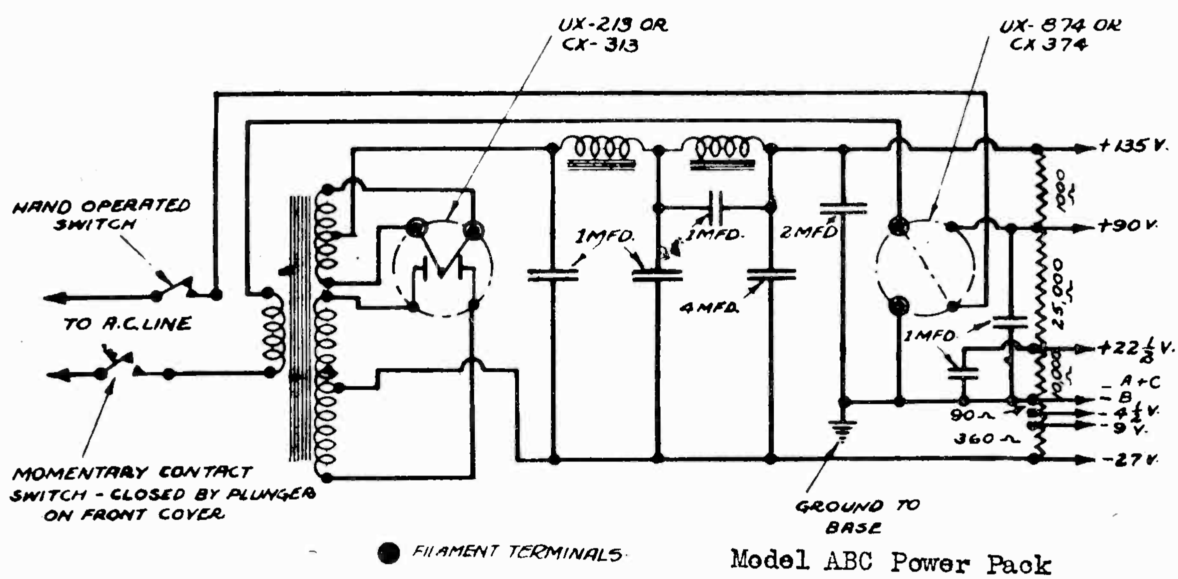
This is an A.C. series filament receiver. All tubes except the 2nd A.F. stage tube must be ¼ ampere tubes.

FREED RADIO AND TELEVISION CORP.

MODEL NR-11 Power Pack
MODEL ABC Power Pack



Model NR-11 Power Pack



Model ABC Power Pack

ALTERATION TABLE				
ALT. LET	REMARKS	DATE	IN'L	APP'D
C	REDRAWN	10-6		

DELINEATOR
TRACER
CHECKER
APPROVAL
DATE
CHIEF ENGINEER

Freed-Eisemann
SPERRY BUILDING — BROOKLYN NEW YORK

SCHEMATIC CIRCUIT DIAGRAM
~OF~
"B" AND "C" ELIMINATOR

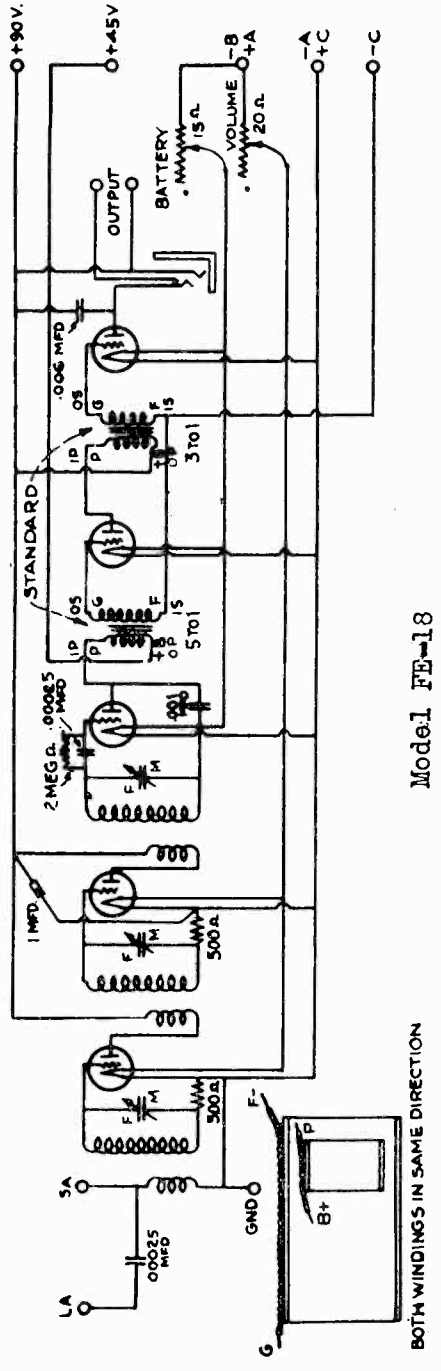
SCALE — DATE 4-12-27

949

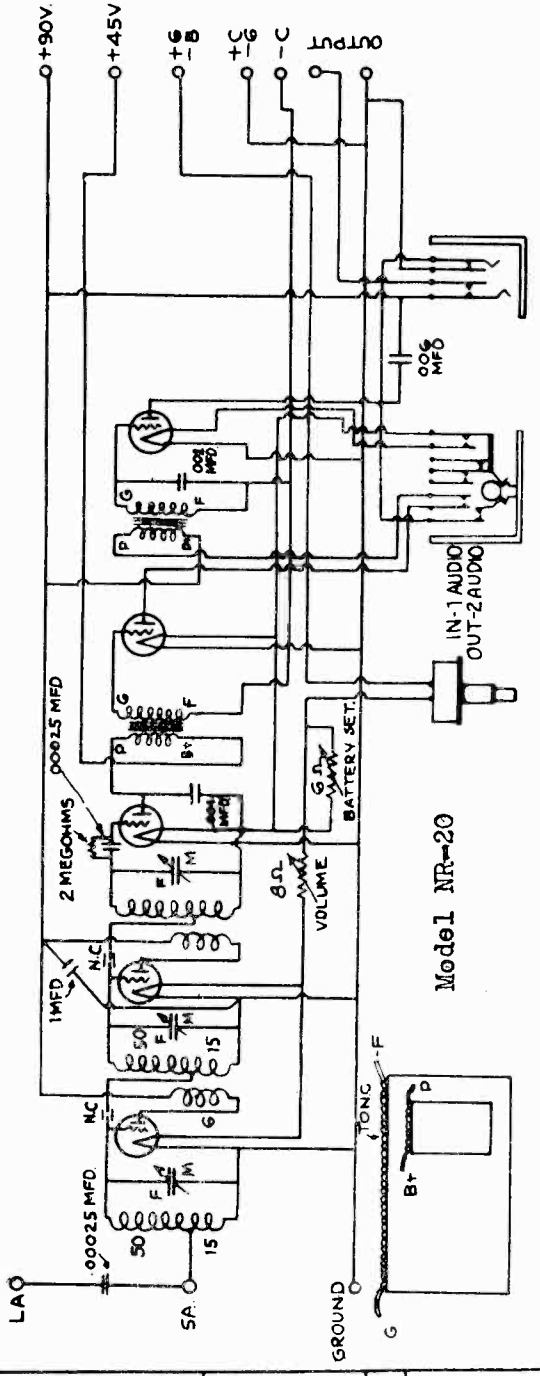
DRAWING NUMBER W.D.-16

MODEL FE-15
MODEL FE-18
MODEL NR-20

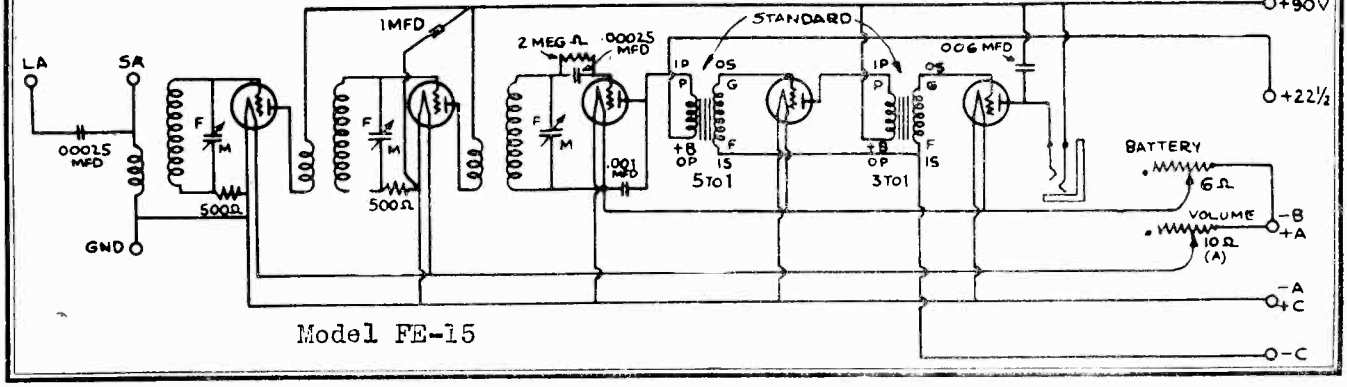
FREED RADIO AND TELEVISION CORP.



Model FE-18



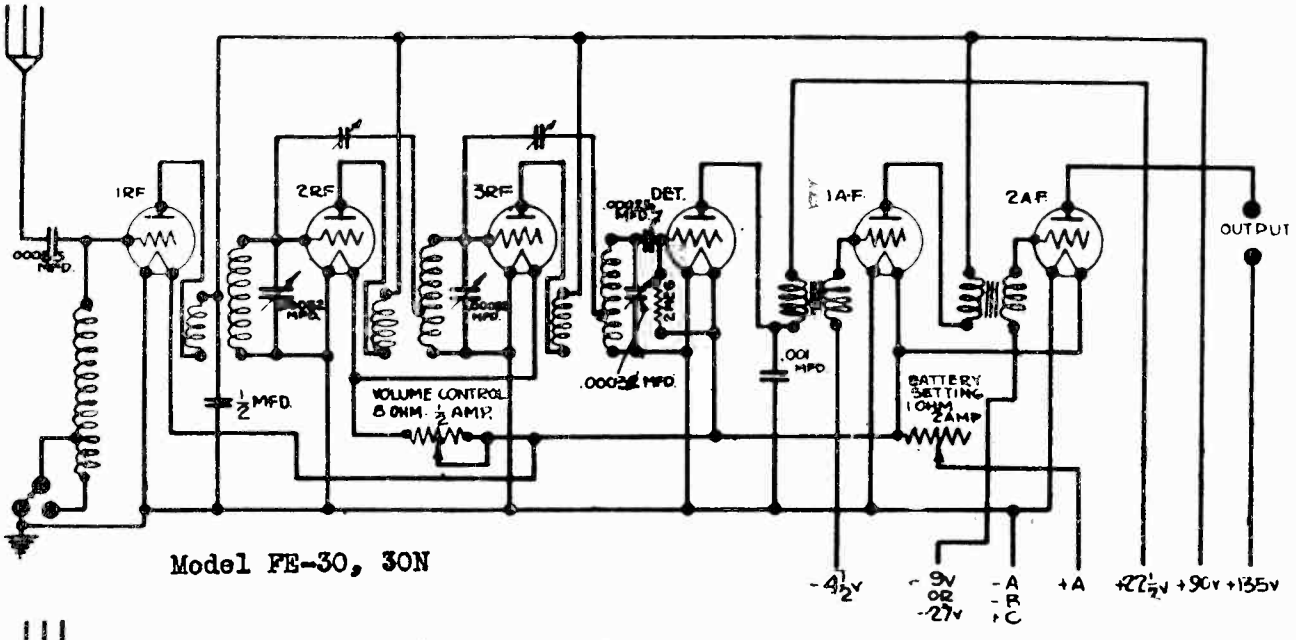
Model NR-20



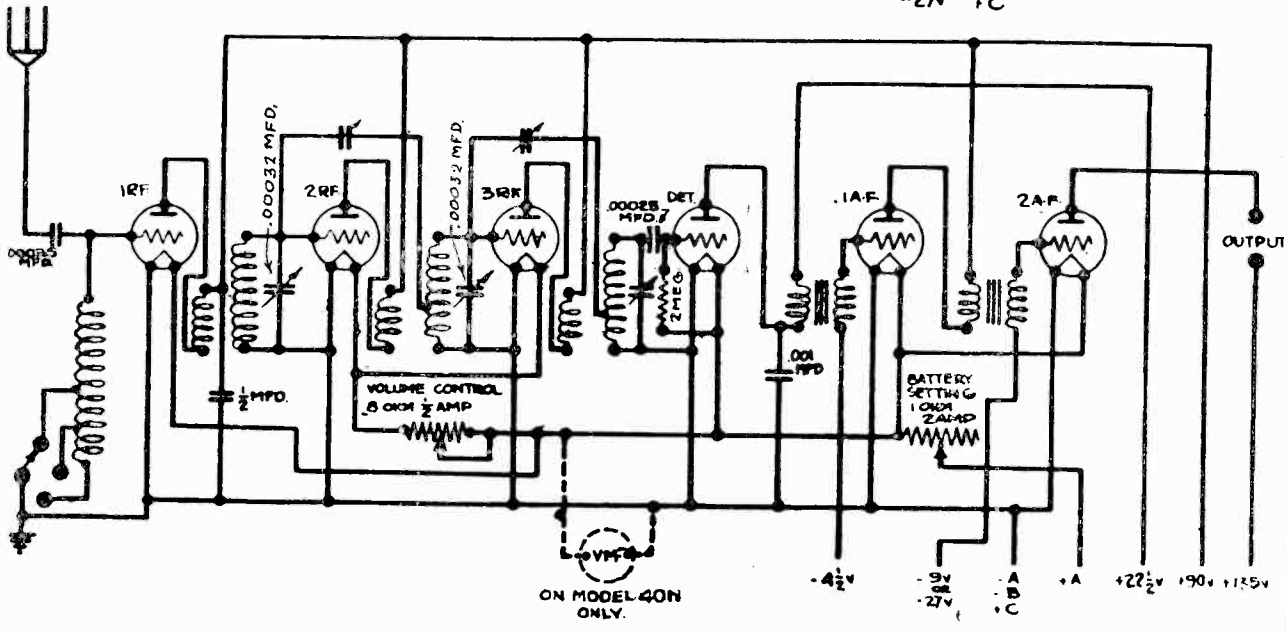
Model FE-15

FREED - EISEMANN RADIO CORP.

MODEL FE-30, 30N
MODEL 40N, 48N



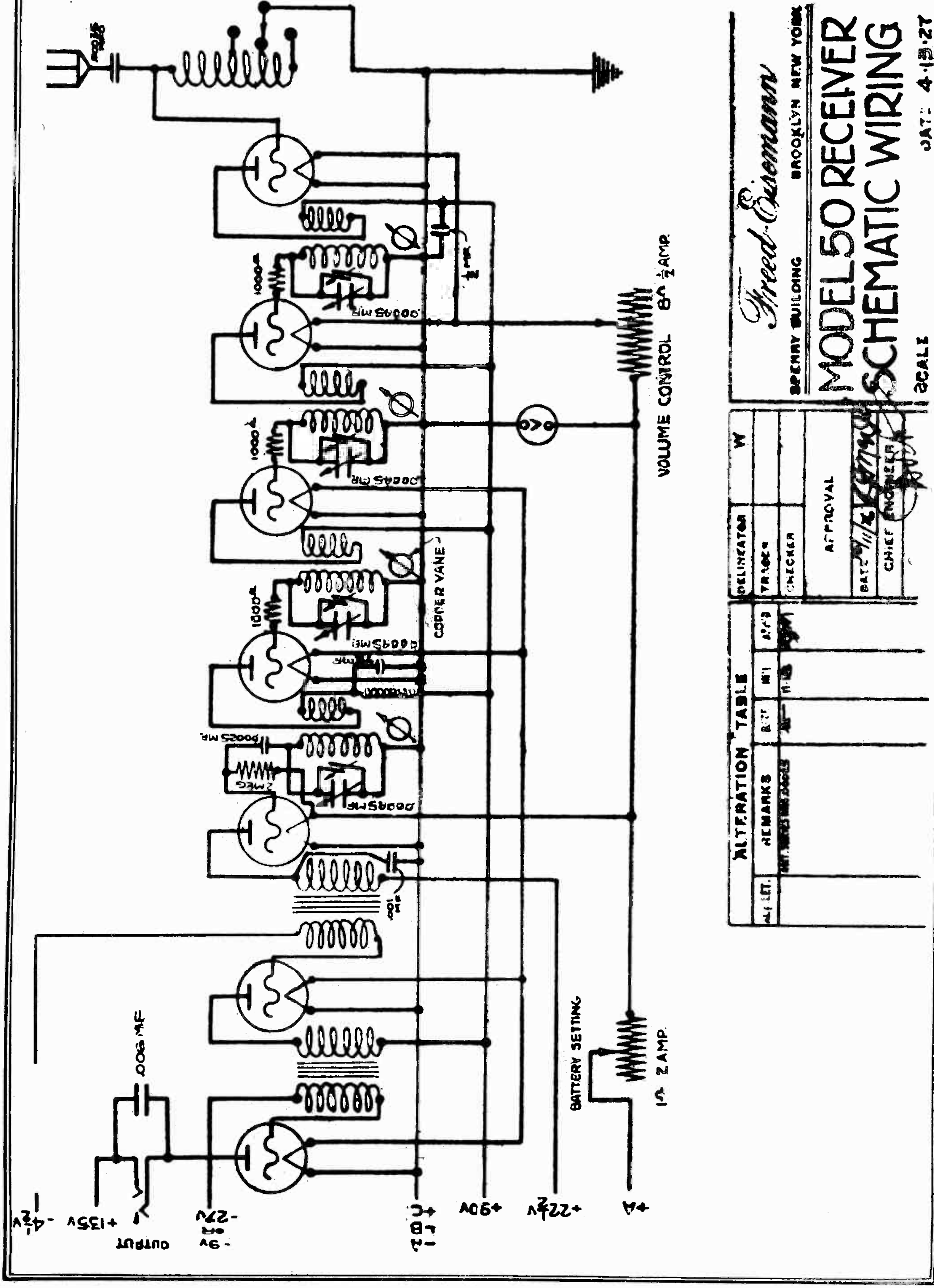
Model FE-30, 30N



Model 40N, 48N

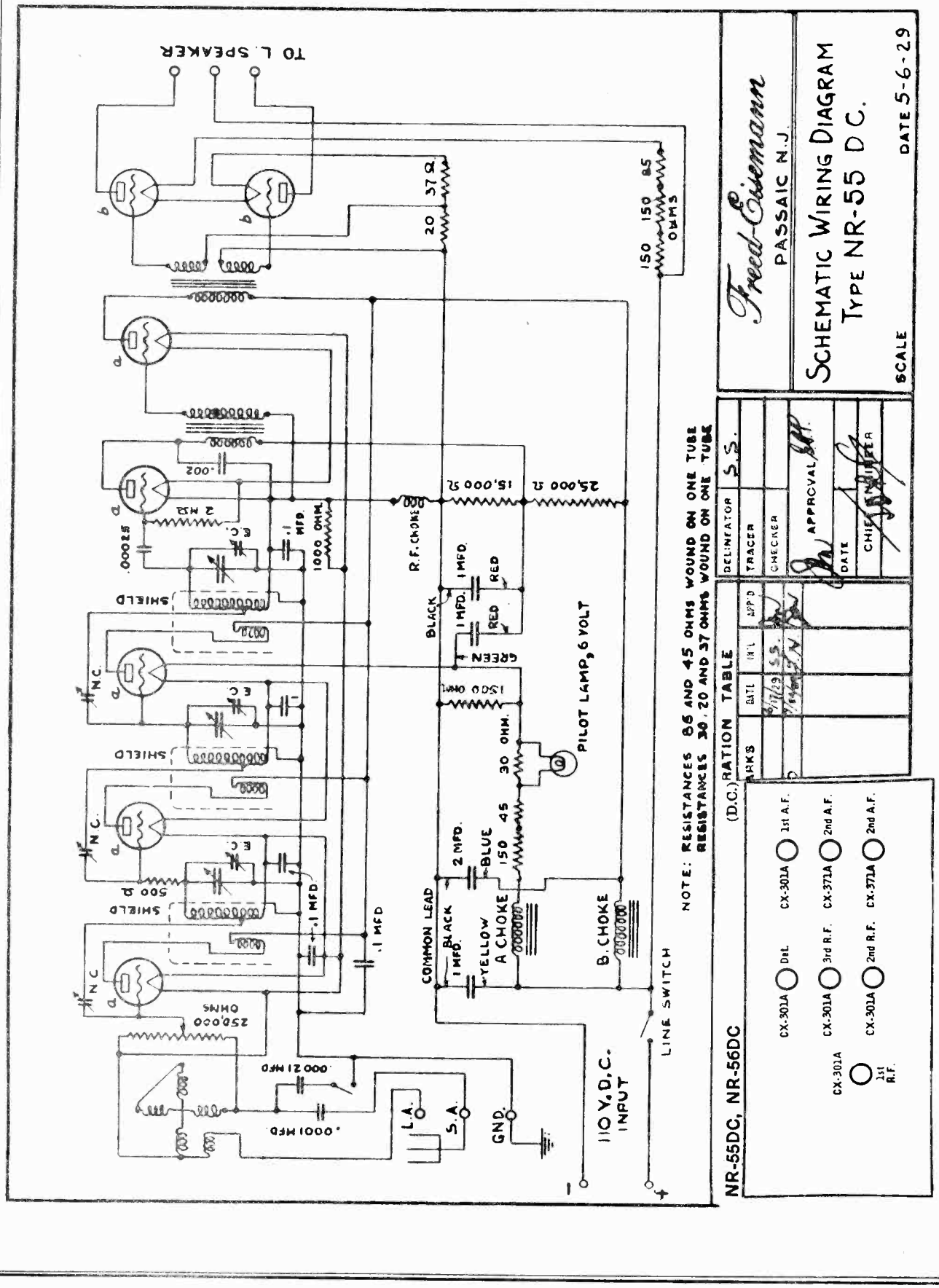
MODEL 50

FREED RADIO AND TELEVISION CORP.

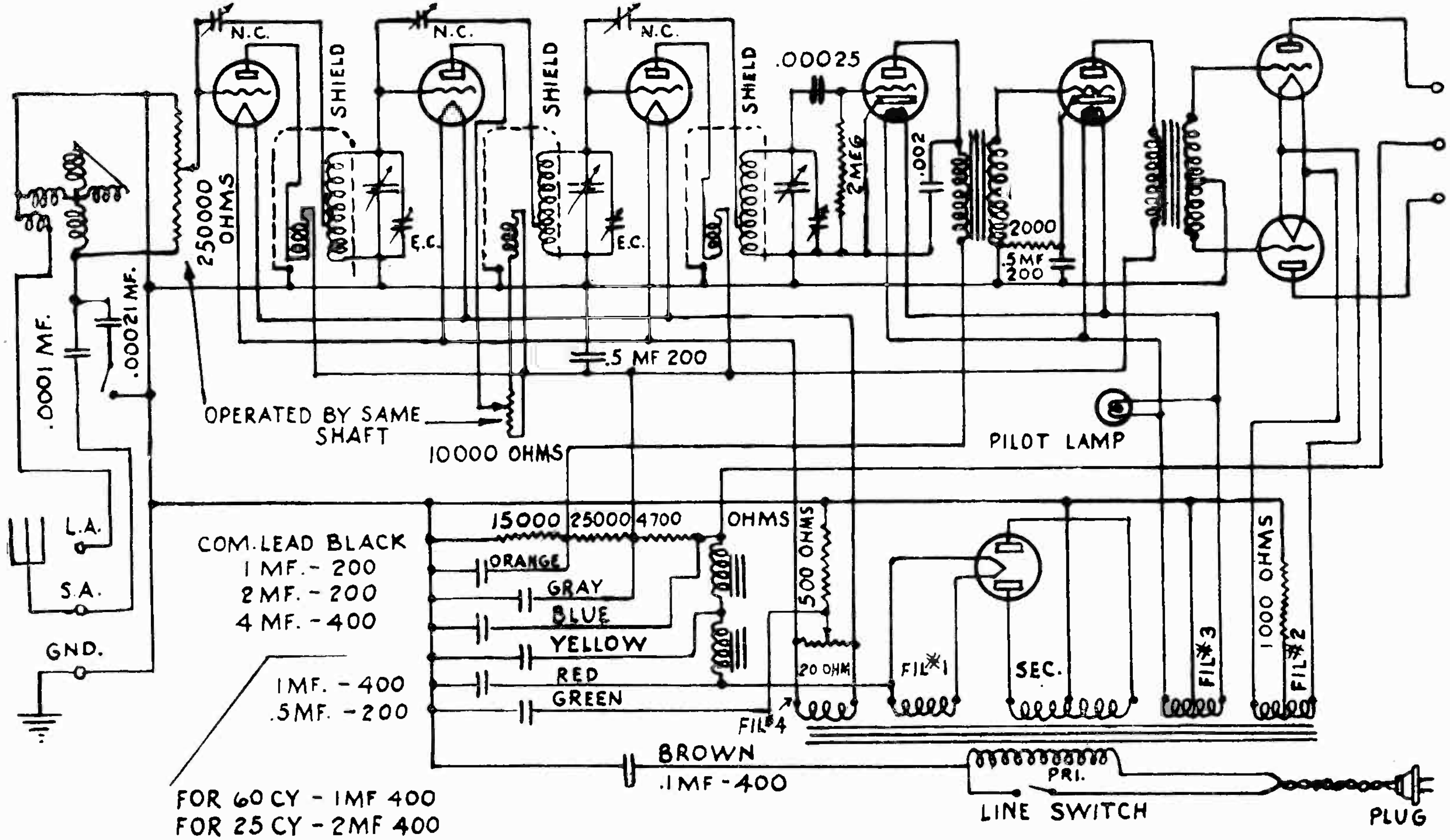


FREED RADIO AND TELEVISION CORP.

MODEL NR-55 DC



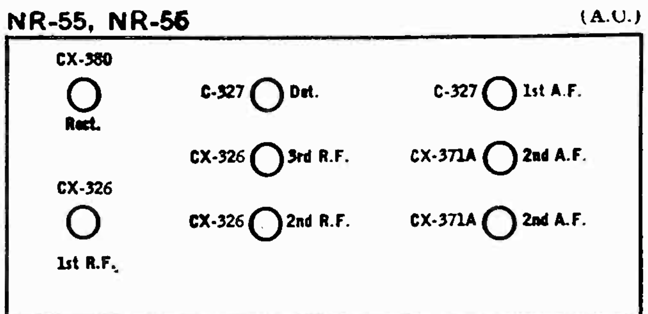
MODEL NR-55, NR-56 AC FREED RADIO AND TELEVISION CORP.



FREED-EISEMANN—Model 55
Line Voltage 116—Volume Control Position Full On

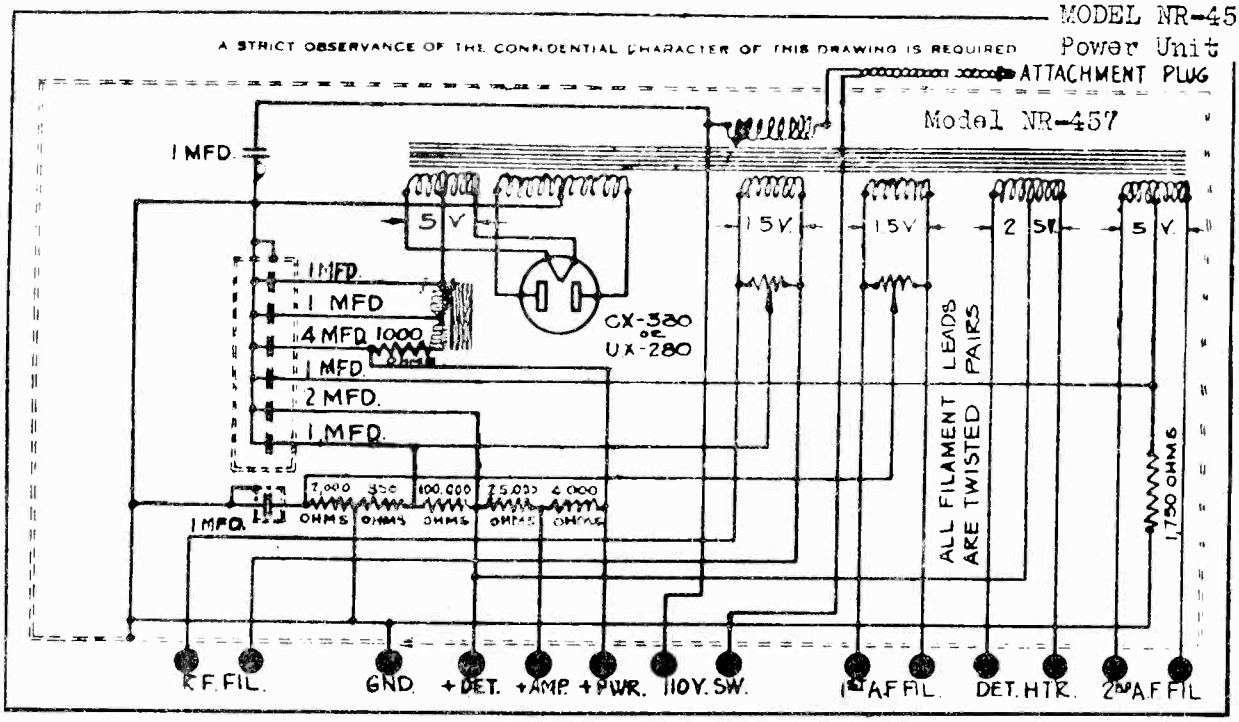
Tube No. in Order	Type of Tube	Position of Tube 1st RF Det. etc.	Readings, Plug in Socket of Set — Tube Out: A Volts	Tube Out: B Volts	Tube in Tester: A Volts	B Volts	C Volts (Control Grid)	Cathode-Heater Volts	Normal Plate M.A.	Plate M.A. Grid Test	Plate Change M.A.	Screen Grid Volts
1	226	1st RF	1.5	80	1.46	76	5	-	2.4	4.6	2.2	
2	226	2nd RF	1.5	80	1.46	76	5	-	2.4	4.6	2.2	
3	226	3rd RF	1.5	80	1.47	76	5	-	2.4	4.6	2.2	
4	227	Det.	2.14	32	1.9	30	-	-	1.0	1.0	0.0	
5	227	1st A	2.15	92	1.97	72	4.5	5	2.5	5.0	2.5	
6	171A	2nd A	5.0	135	4.85	125	29	-	13.4	36	22	
7	171A	2nd A	5.0	135	4.85	125	29	-	13	35	22	
8	280	Rect.	5.6	-	5.4	-	-	-	40	-	-	
9												
10												

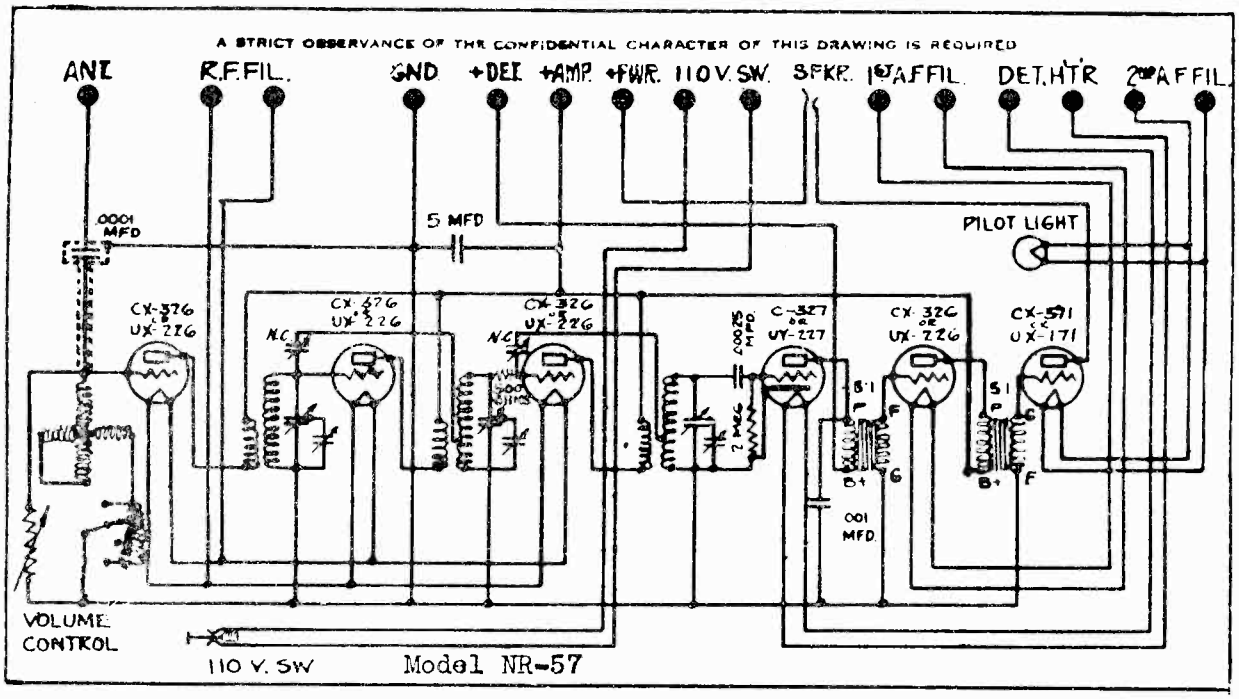
NR-55, NR-56 (A.U.)



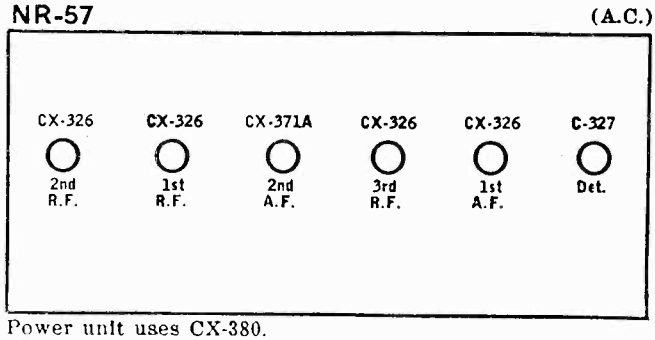
FREED RADIO AND TELEVISION CORP.

MODEL NR-57
Schematic
MODEL NR-457
Power Unit





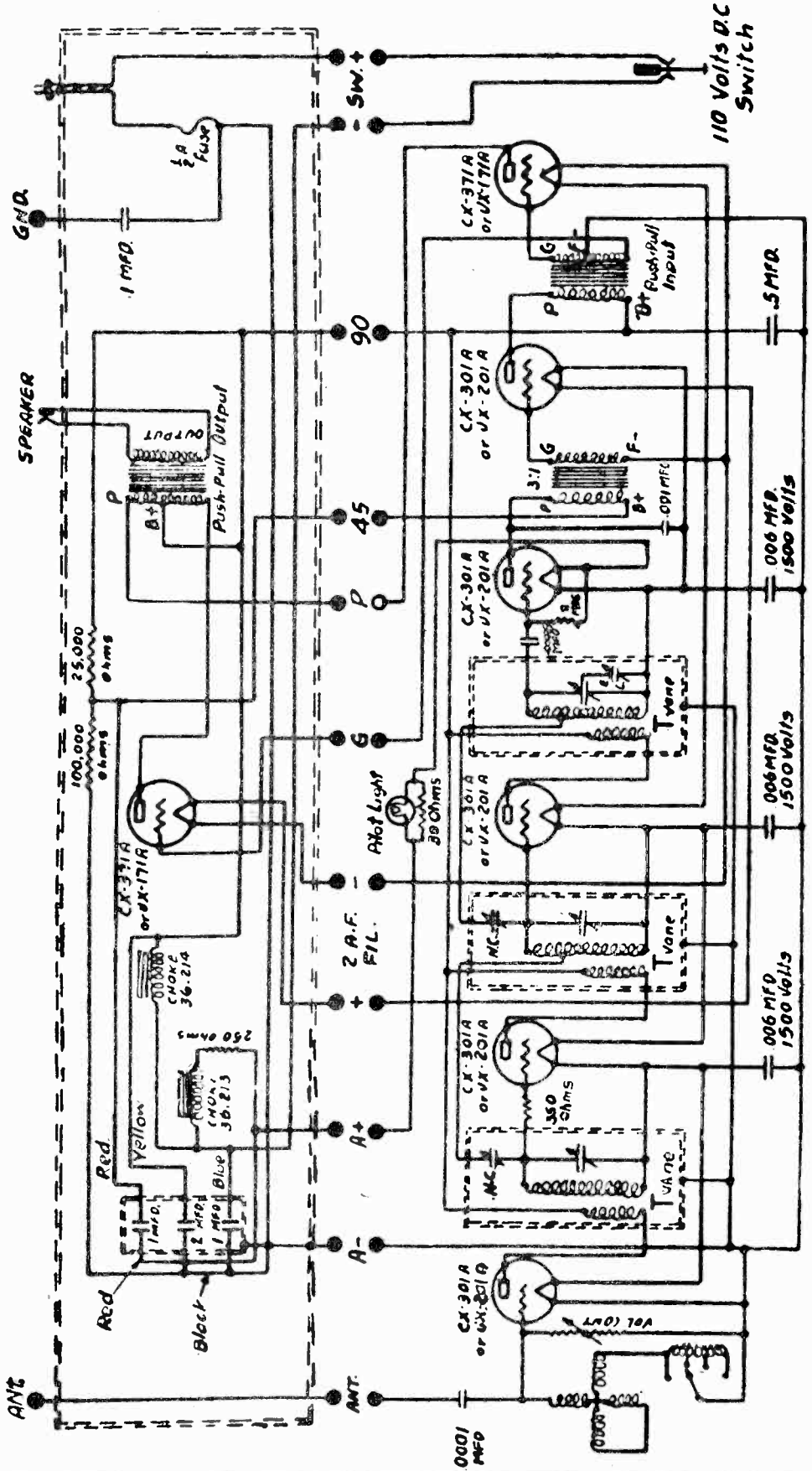
NR-57 (A.C.)



Power unit uses CX-380.

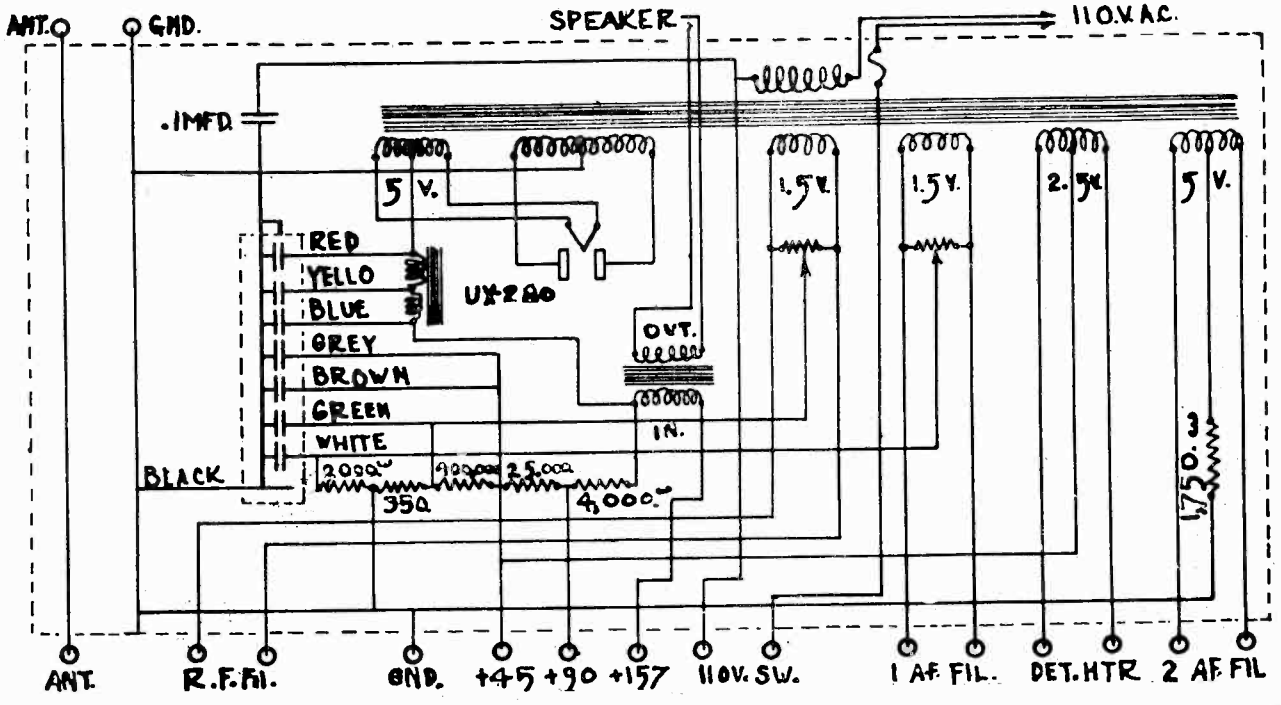
MODEL NR-60 DC

FREED RADIO AND TELEVISION CORP.

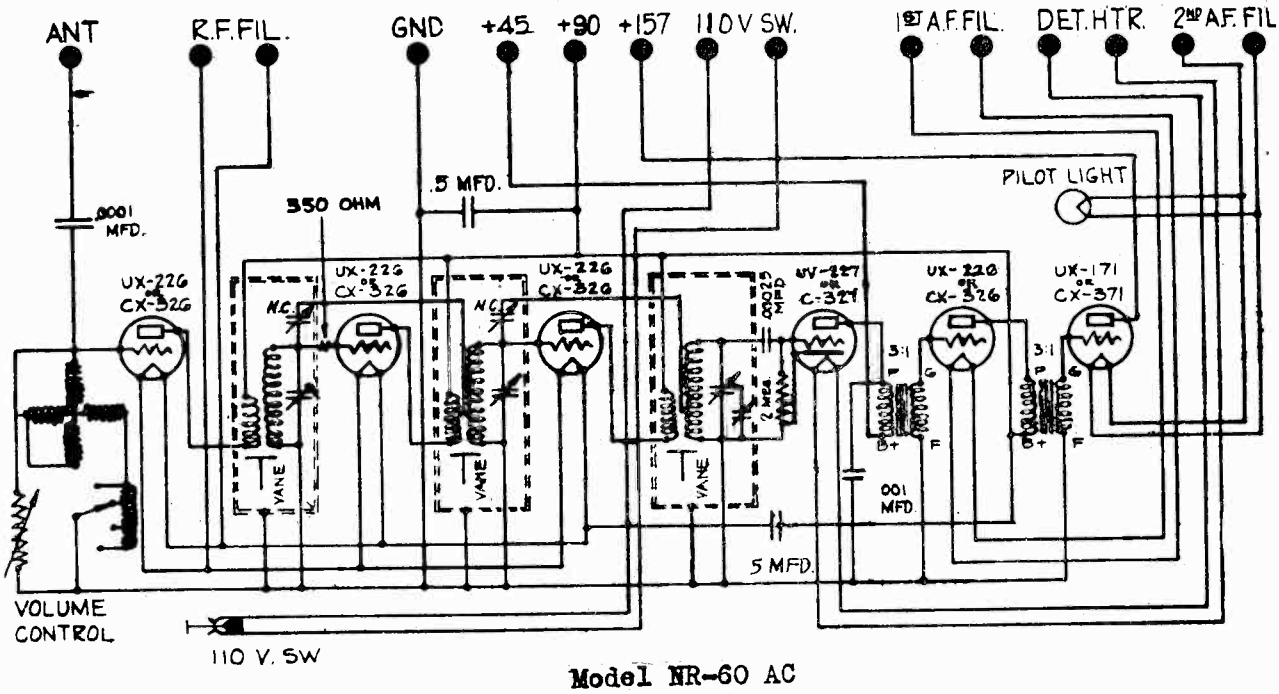


FREED RADIO AND TELEVISION CORP.

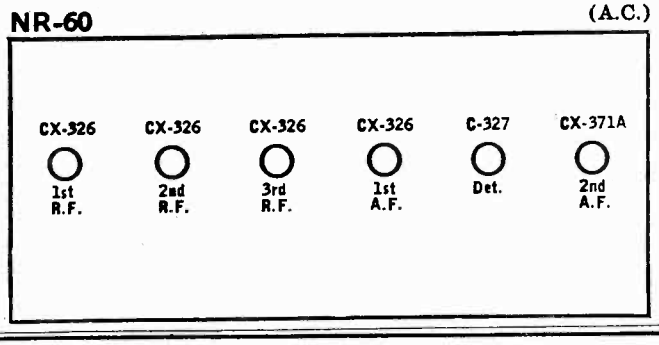
MODEL NR-60 AC
Schematic
MODEL NR-460 AC
Power Pack



Model NR-460 AC.

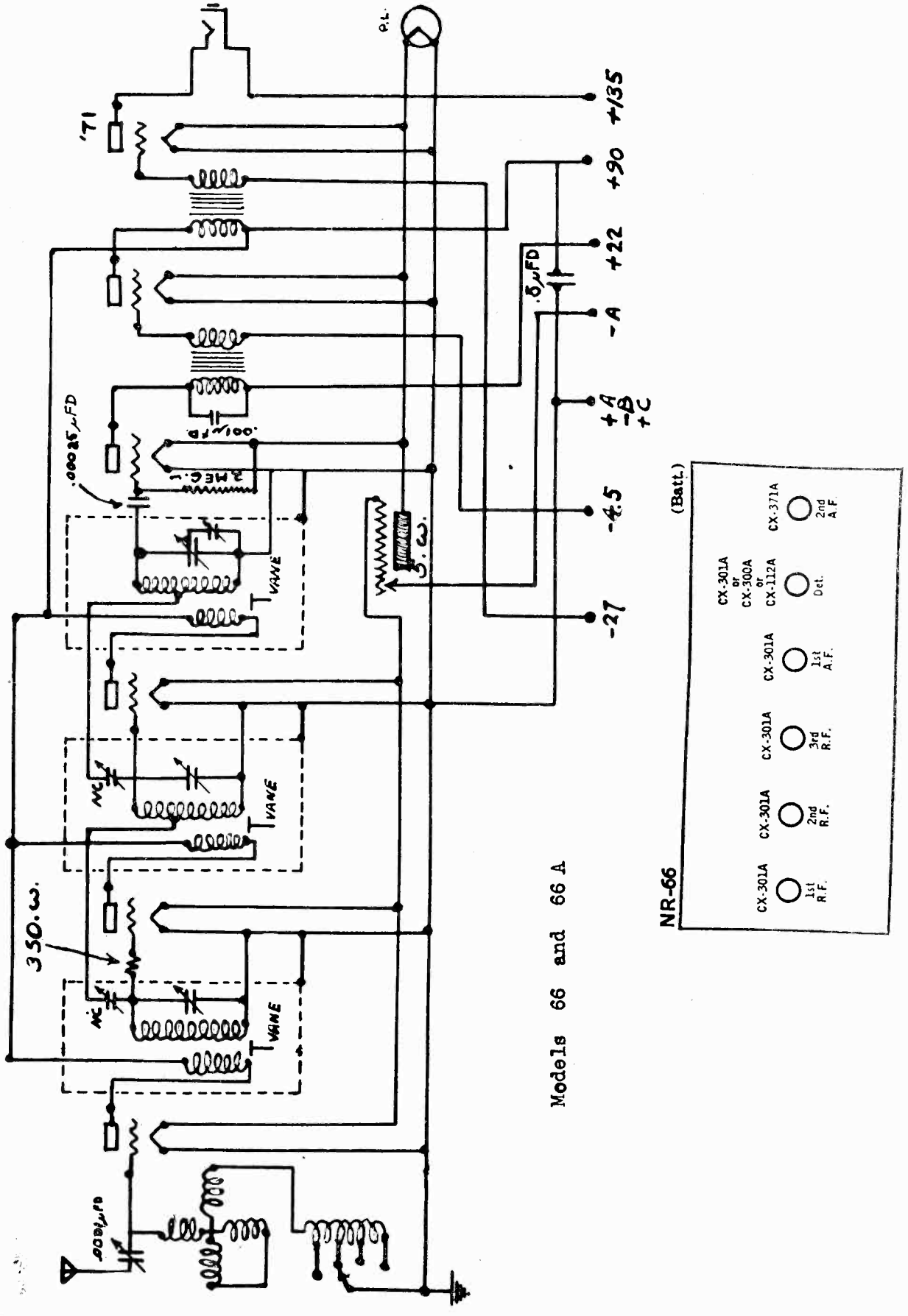


Model NR-60 AC

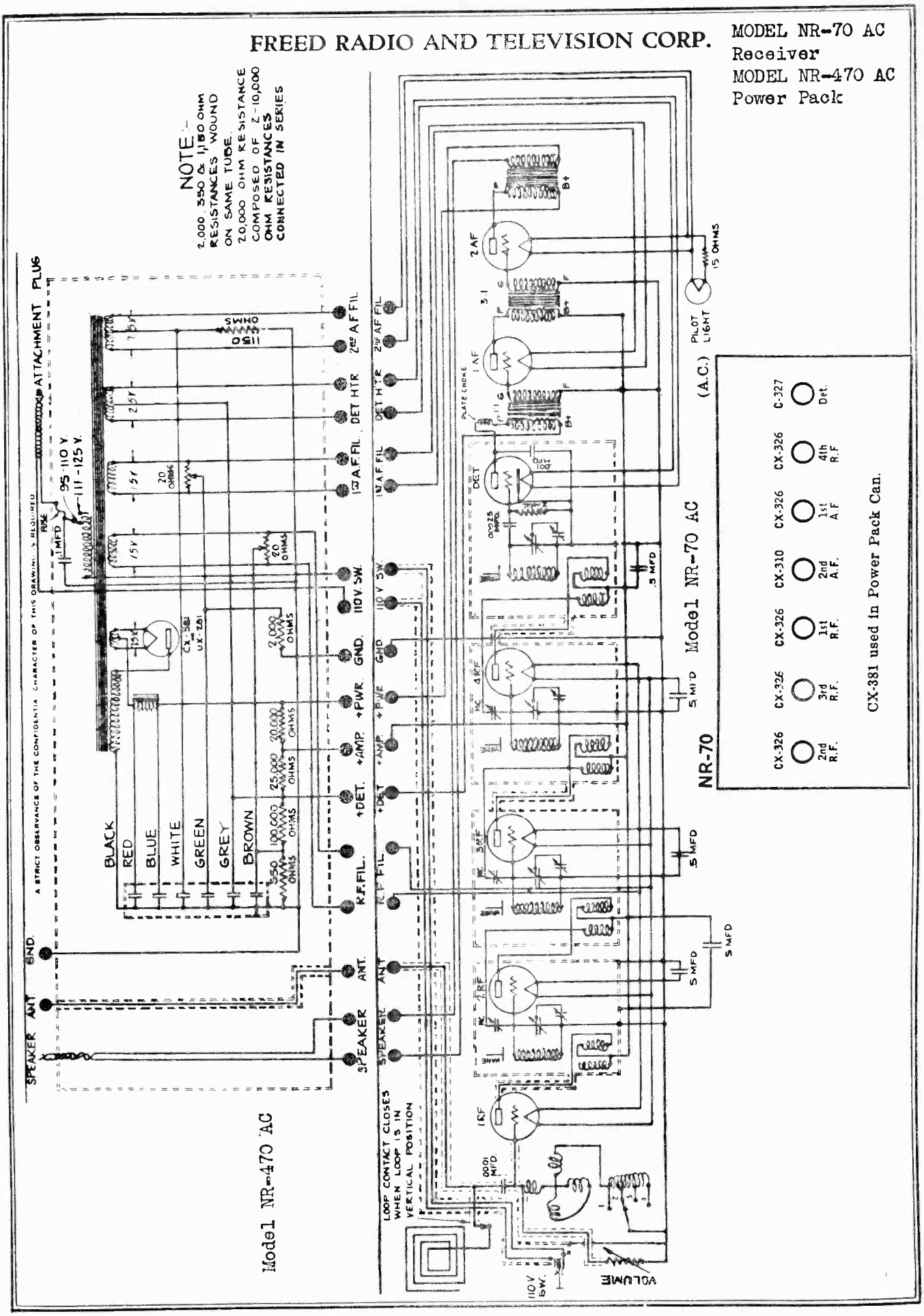


MODEL NR-66, 66A

FREED RADIO AND TELEVISION CORP.

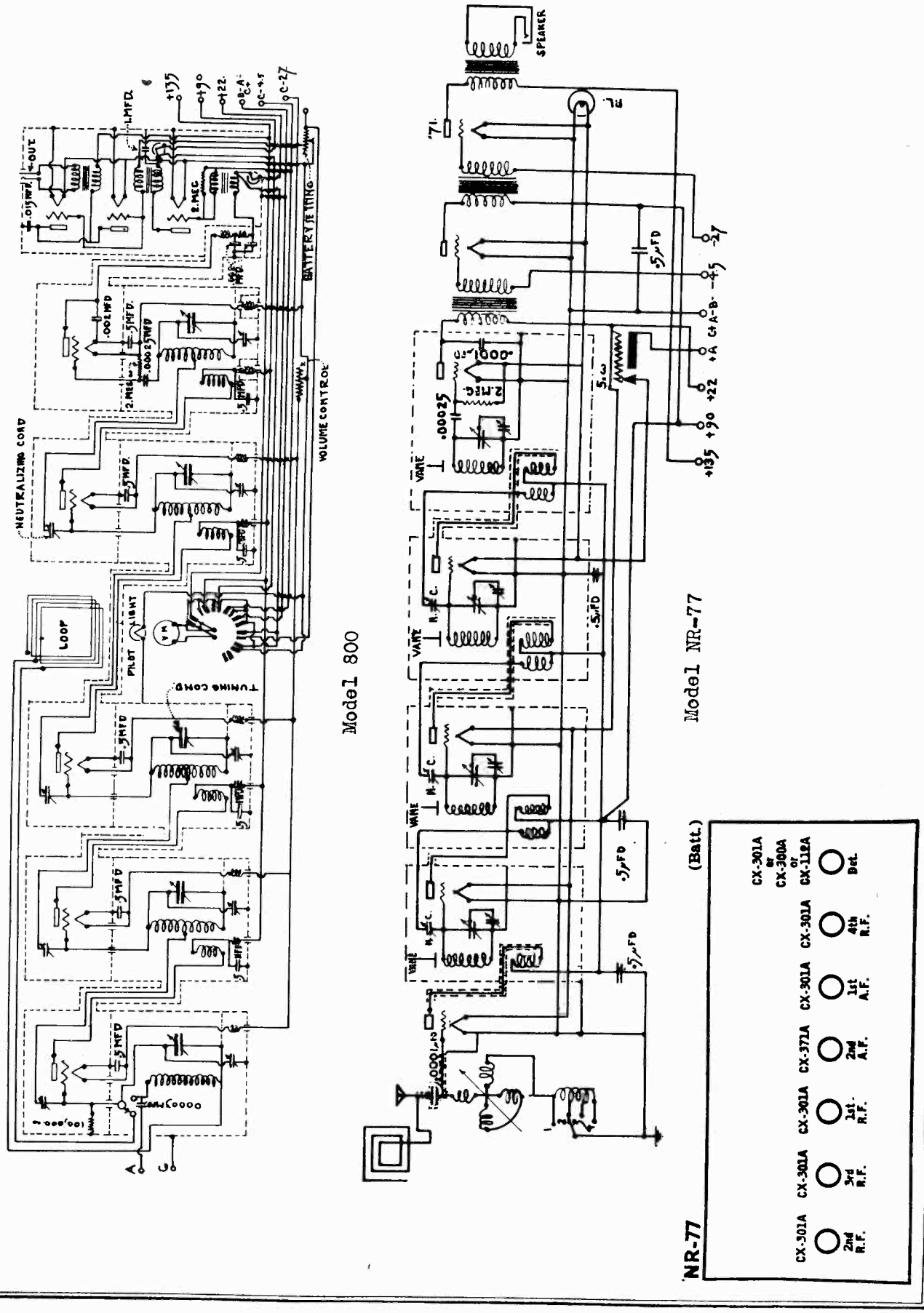


Models 66 and 66 A



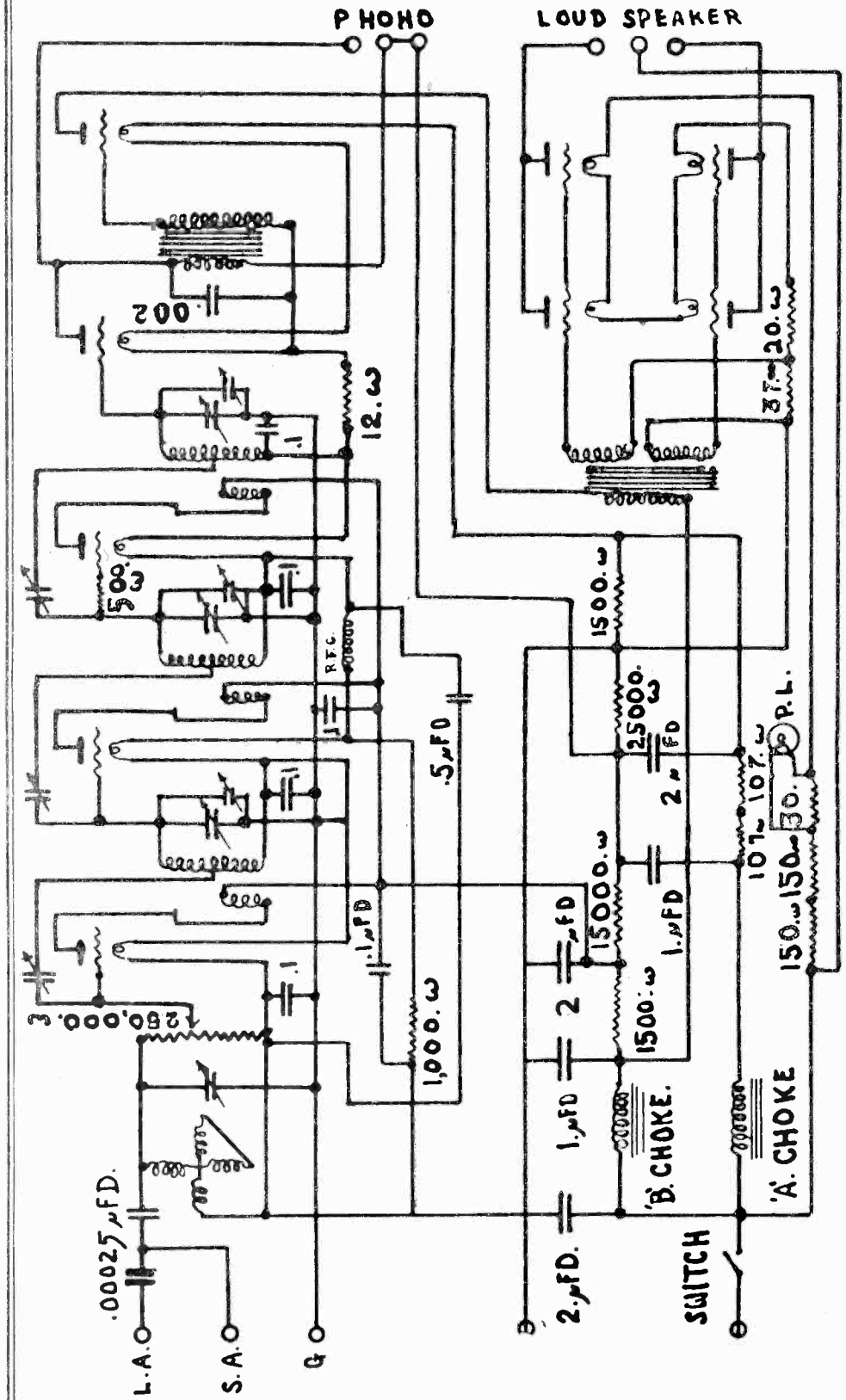
MODEL NR-77
MODEL 800

FREED RADIO AND TELEVISION CORP.



FREED RADIO AND TELEVISION CORP.

MODEL NR-78 DC
NR-79 DC

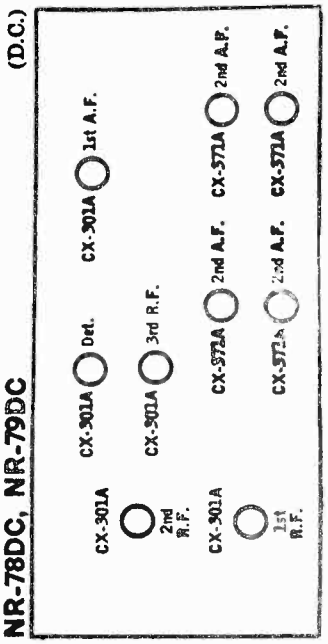


FREED-EISEMANN—Model 78 D. C.
Line Voltage 110 D. C.—Set on D. C. Volt Tap—Volume Control Position Full On

READINGS, PLUG IN SOCKET OF SET

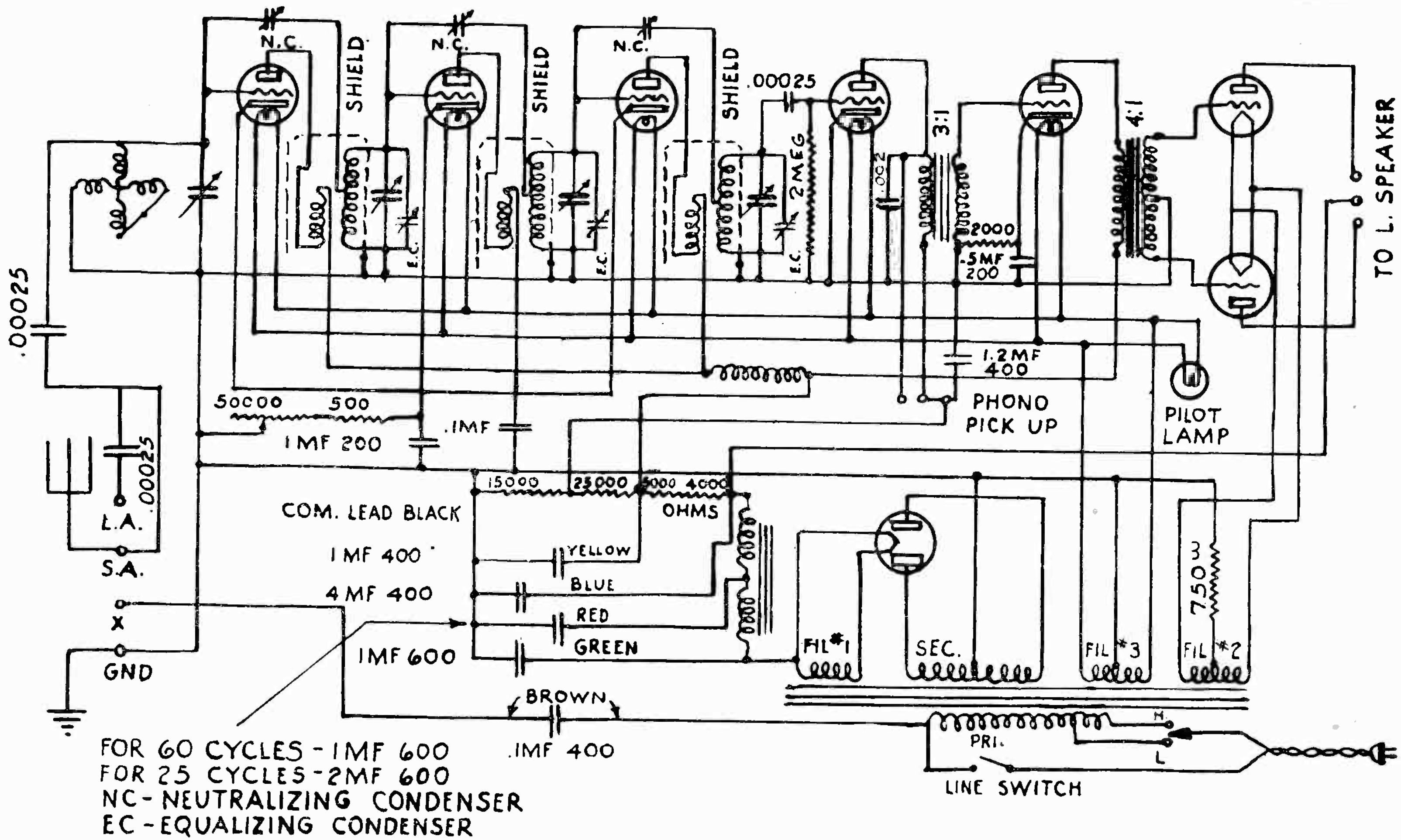
TUBE NO. IN CIRCUIT	TYPE OF TUBE	POSITION OF TUBE (1st R.F. 2nd DET. ETC)	TUBE OUT A (VOLTS)	TUBE OUT B (VOLTS)	A (VOLTS)	B (VOLTS)	C (VOLTS GRID)	CATHODE HEATER (VOLTS)	NORMAL PLATE M.A.	PLATE M.A. GRID TEST	PLATE CHANGE M.A.	SCREEN GRID (VOLTS)
1	201A	1st RF	-	-	4.5	75	4.5	-	3.7	4.0	.3	
2	201A	2nd RF	-	-	4.5	75	4.2	-	3.7	4.0	.3	
3	201A	3rd RF	-	-	4.5	75	0	-	3.7	4.0	.3	
4	201A	Det.	-	-	4.5	31	3.5	-	0.5	2.9	2.4	
5	201A	1st A	-	-	4.5	75	4.0	-	1.0	3.5	2.5	
6	171A	2nd A	-	-	4.5	75	15	-	6.0	24	18.0	
7	171A	2nd A	-	-	4.5	75	15	-	6.0	24	18.0	
8	171A	2nd A	-	-	4.5	75	15	-	6.0	24.6	18.0	
9	171A	2nd A	-	-	4.5	75	15	-	6.0	24	18.0	
10												

NR-78DC, NR-79DC (D.C.)

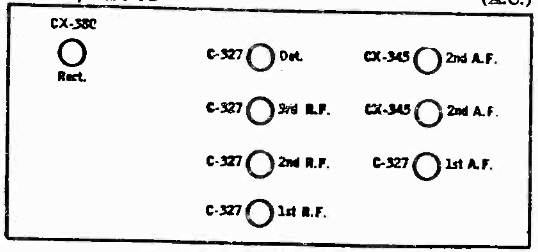


MODEL NR-78 AC
NR-79 AC

FREED RADIO AND TELEVISION CORP.

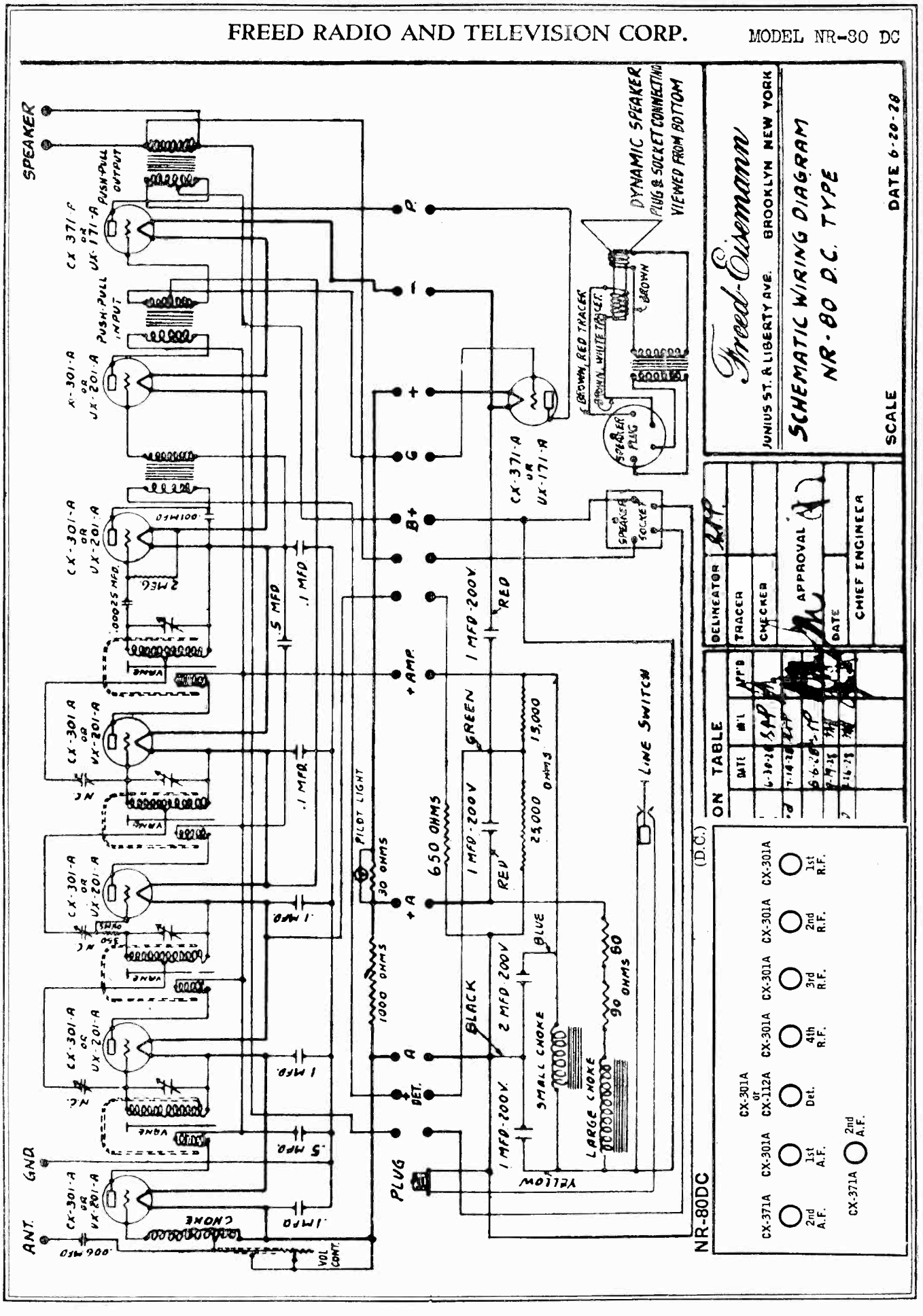


NR-78, NR-79 (A.C.)



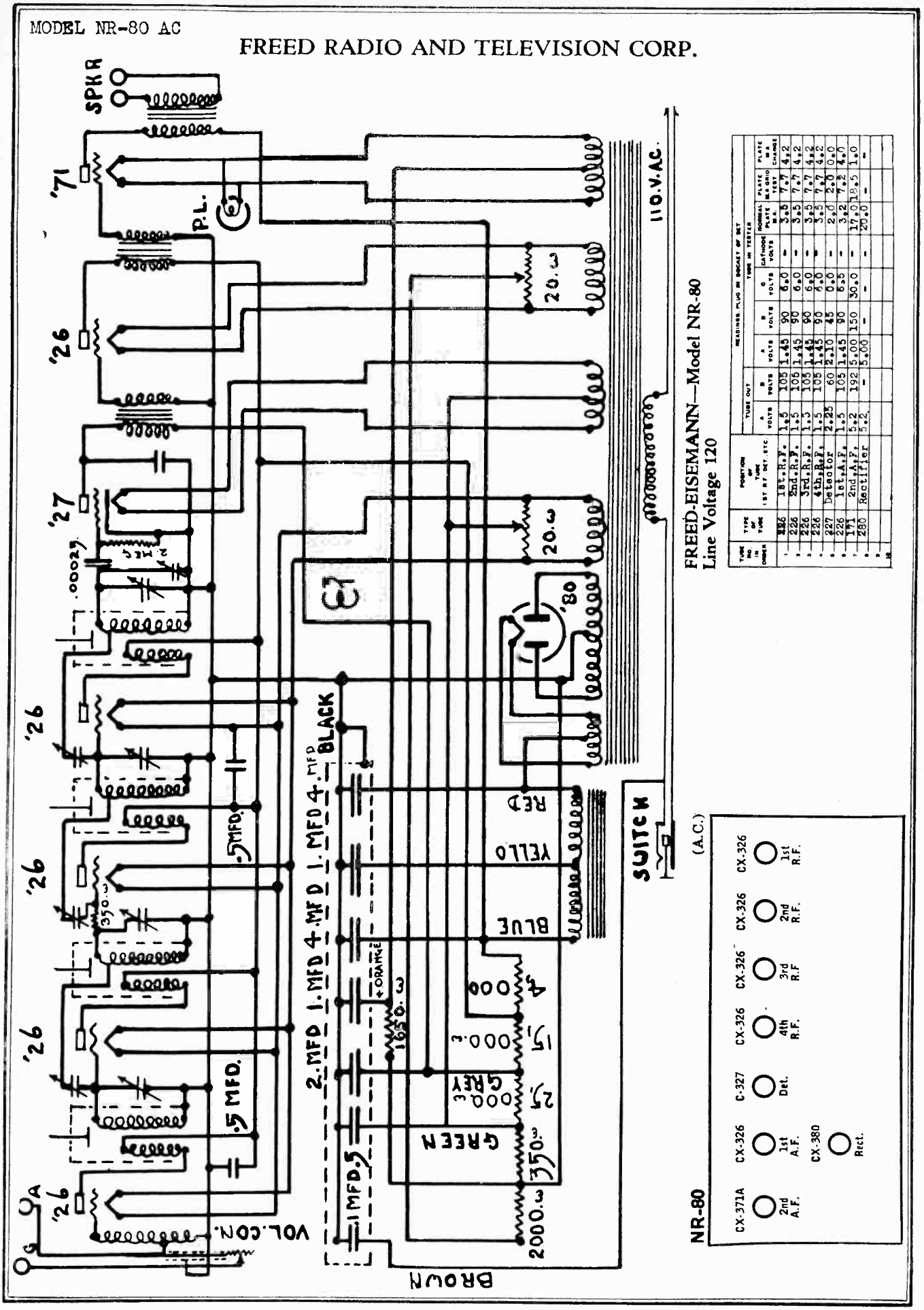
FREED-EISEMANN—Model 78-79
Line Voltage 116—Set on High Volt Tap—Volume Control Position Full On

Tube No. in Order	Type of Tube	Position of Tube (1st RF, Det. etc.)	Tube Out: A Volts	Tube Out: B Volts	Tube in Tester: A Volts	Tube in Tester: B Volts	Tube in Tester: C Volts (Control Grid)	Cathode-Heater Volts	Normal Plate MA	Plate MA Grid Test	Plate Change MA	Screen Grid Volts
1	227	1st RF	2.18	92	2.07	86	5	5	3.3	7.8	4.5	
2	227	2nd RF	2.18	92	2.07	86	5	5	3.3	7.8	4.5	
3	227	3rd RF	2.18	92	2.07	86	5	5	3.3	7.8	4.5	
4	227	Det.	2.18	36	2.07	81	0.5	-	0.9	-0.9	0	
5	227	1st A	2.22	100	2.07	81	5	5	2.8	5.6	2.8	
6	245	2nd A	2.45	220	2.33	196	37	-	25	62	4	
7	245	2nd A	2.45	220	2.33	195	37	-	25	62	4	
8	280	Rect.	5.4	-	4.85	-	-	-	60	-	-	
9												
10												



MODEL NR-80 AC

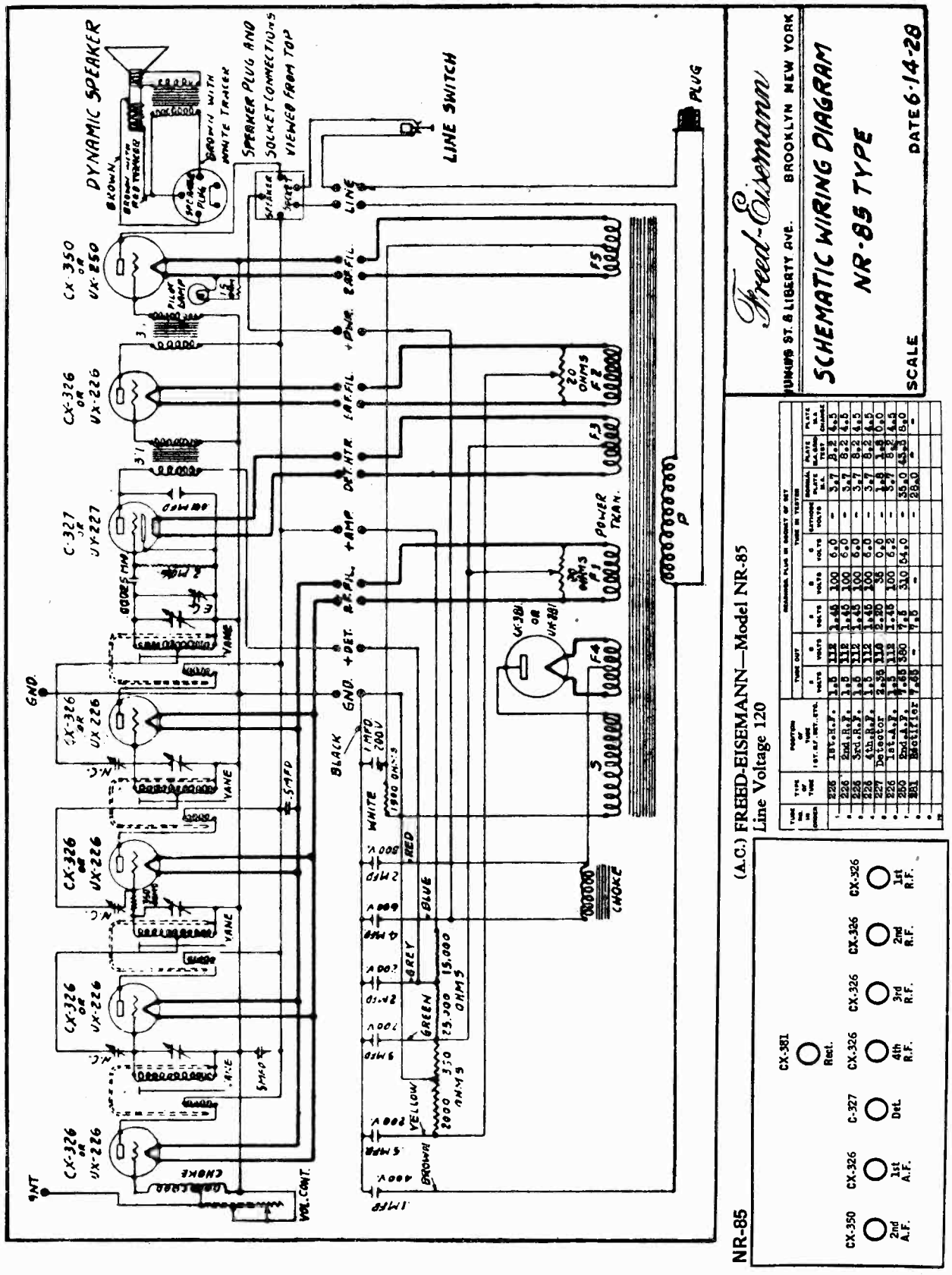
FREED RADIO AND TELEVISION CORP.



TUBE NO. ON DIAGRAM	TYPE OF TUBE	POSITION OF TUBE 1ST R.F. DET. ETC	TUBE OUT		RESISTANCE PLUG IN BRIDGE OF SET TUBE IN TESTER					
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	C VOLTS	CATHODE VOLTS	NORMAL PLATE M.A.	PLATE M.A. CHANGE
1	226	1St.R.F.	1.5	105	1.445	90	6.0	-	3.5	7.7 4.2
2	226	2nd.R.F.	1.5	106	1.445	90	6.0	-	3.5	7.7 4.2
3	226	3rd.R.F.	1.5	105	1.445	90	6.0	-	3.5	7.7 4.2
4	226	4th.R.F.	1.5	105	1.445	90	6.0	-	3.5	7.7 4.2
5	227	Detector	2.25	60	2.10	45	0.0	-	2.0	2.0 0.0
6	226	1st.A.F.	1.5	105	1.45	90	6.5	-	3.2	7.2 4.0
7	171	2nd.A.F.	5.2	192	5.00	150	30.0	-	17.0	18.5 1.0
8	280	Rectifier	5.2	-	5.00	-	-	-	20.0	-
9										
10										

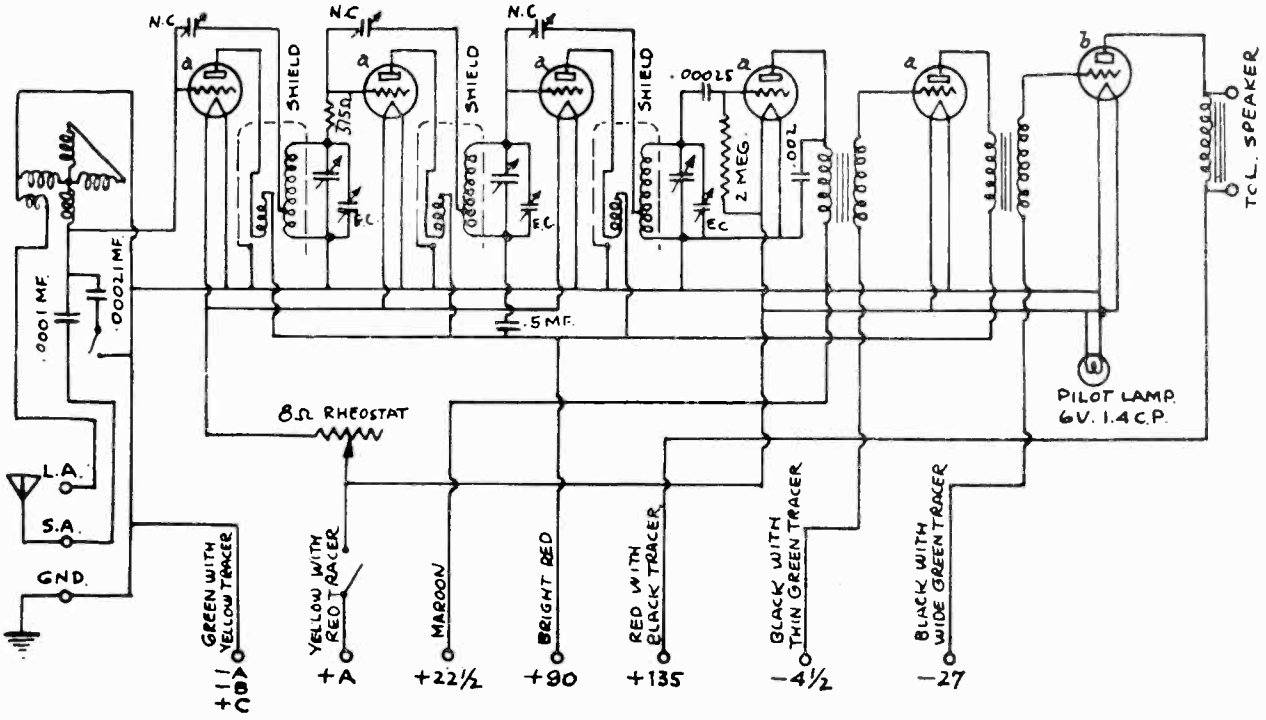
MODEL NR-85 AC

FREED RADIO AND TELEVISION CORP.

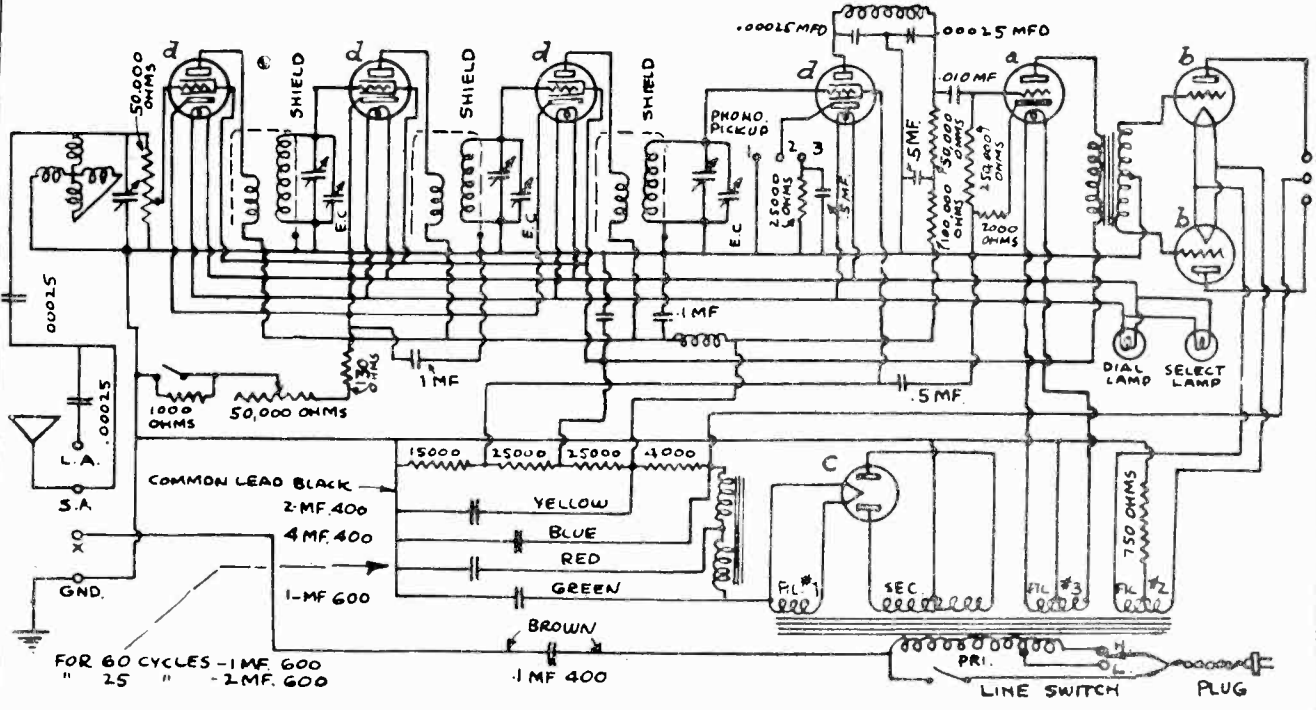


MODEL NR-53
MODEL NR-90-S

FREED RADIO AND TELEVISION CORP.



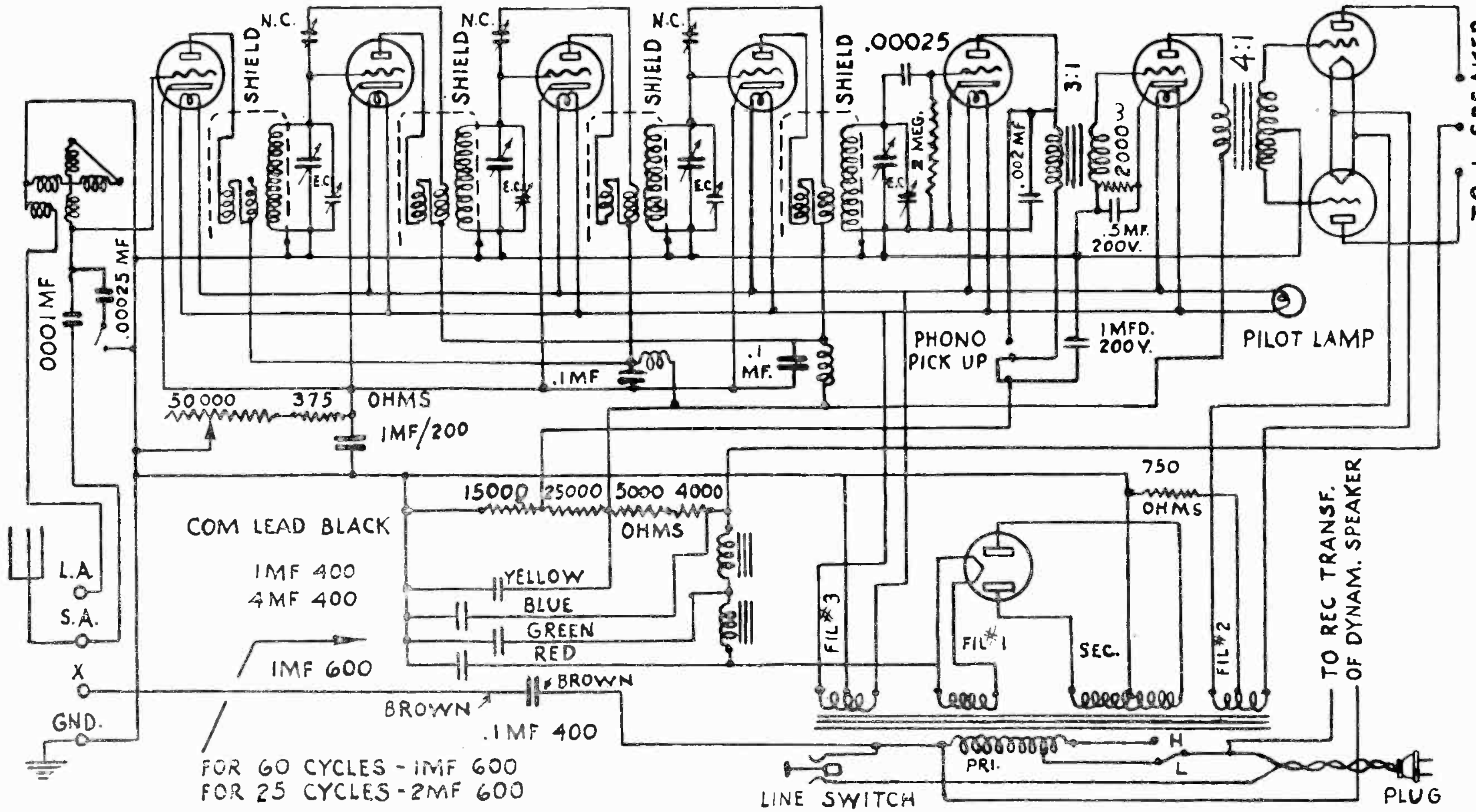
Model NR-53

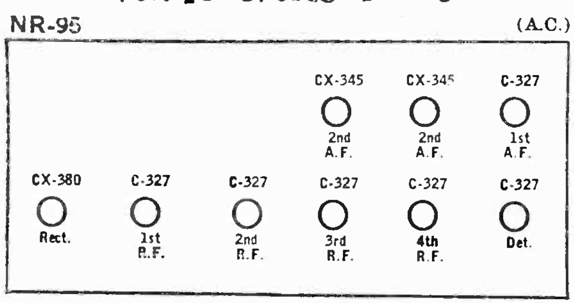


Model NR-90-S

FREED RADIO AND TELEVISION CORP.

MODEL NR-95 AC





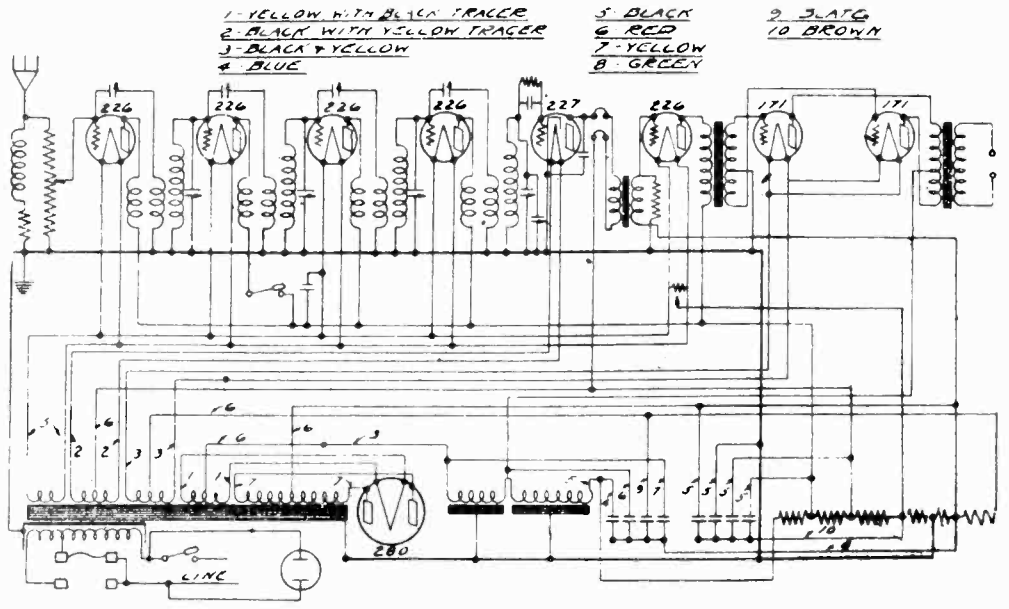
FREED-EISEMANN—Model 95

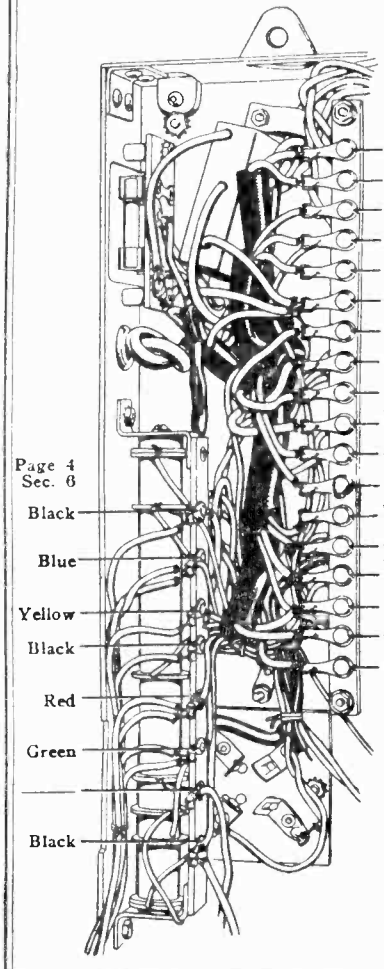
Line Voltage 116—Set on High Volt Tap—Volume Control Position Full On

Tube No. in Order	Type of Tube	Position of Tube 1st RF Det. etc.	Tube Out: A Volts	Tube Out: B Volts	Tube in Tester: A Volts	B Volts	C Volts Control Grid	Cathode-Heater Volts	Normal Plate MA	Plate MA Grid Test	Plate Change MA	Screen Grid Volts
1	227	1st RF	2.40	76	2.25	71	4	5	2.8	5.6	2.8	
2	227	2nd RF	2.40	76	2.25	71	4	5	2.8	5.6	2.8	
3	327	3rd RF	2.40	75	2.25	71	4	5	2.8	5.6	2.8	
4	227	4th RF	2.40	75	2.25	71	4	5	2.8	5.6	2.8	
5	227	Det.	2.40	26	2.25	15	1.5	-	1.0	1.7	.7	
6	227	1st A	2.40	82	2.35	67	4	5	2.4	4.8	2.4	
7	245	2nd A	2.57	208	2.37	183	35	-	22	26	4	
8	245	2nd A	2.57	208	2.37	183	35	-	22	26	4	
9	280	Rect.	5.5	-	4.8	-	-	-	64	-	-	
10												

JESSE FRENCH & SONS PIANO CO.

MODEL 8 Tube AC





Page 4
Sec. 6

Black
Blue
Yellow
Black
Red
Green
Black

Power Block Connections

- Black
- Black
- Black-Yellow Tracer
- Red
- Black-Yellow Tracer
- Black*
- Yellow-Braided Black Tracer
- Red
- Yellow-Braided Black Tracer
- Yellow-Black Tracer
- Red
- Yellow-Black Tracer
- Yellow
- Red
- Yellow
- Yellow-Black Tracer
- Red
- Black

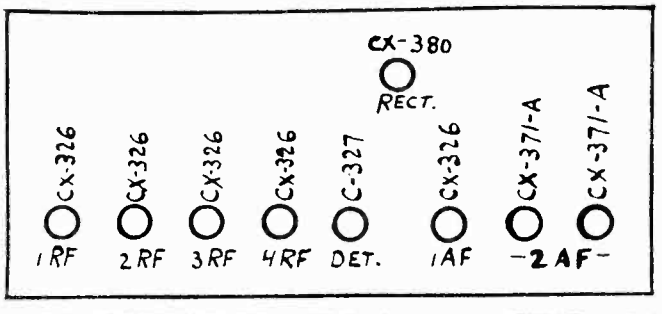
Note — Where two wires are same color they may be connected to either terminal marked that color. Red wire should connect between wires brought out of same large tubing.

JESSE FRENCH

8 - A.C. Power Set.

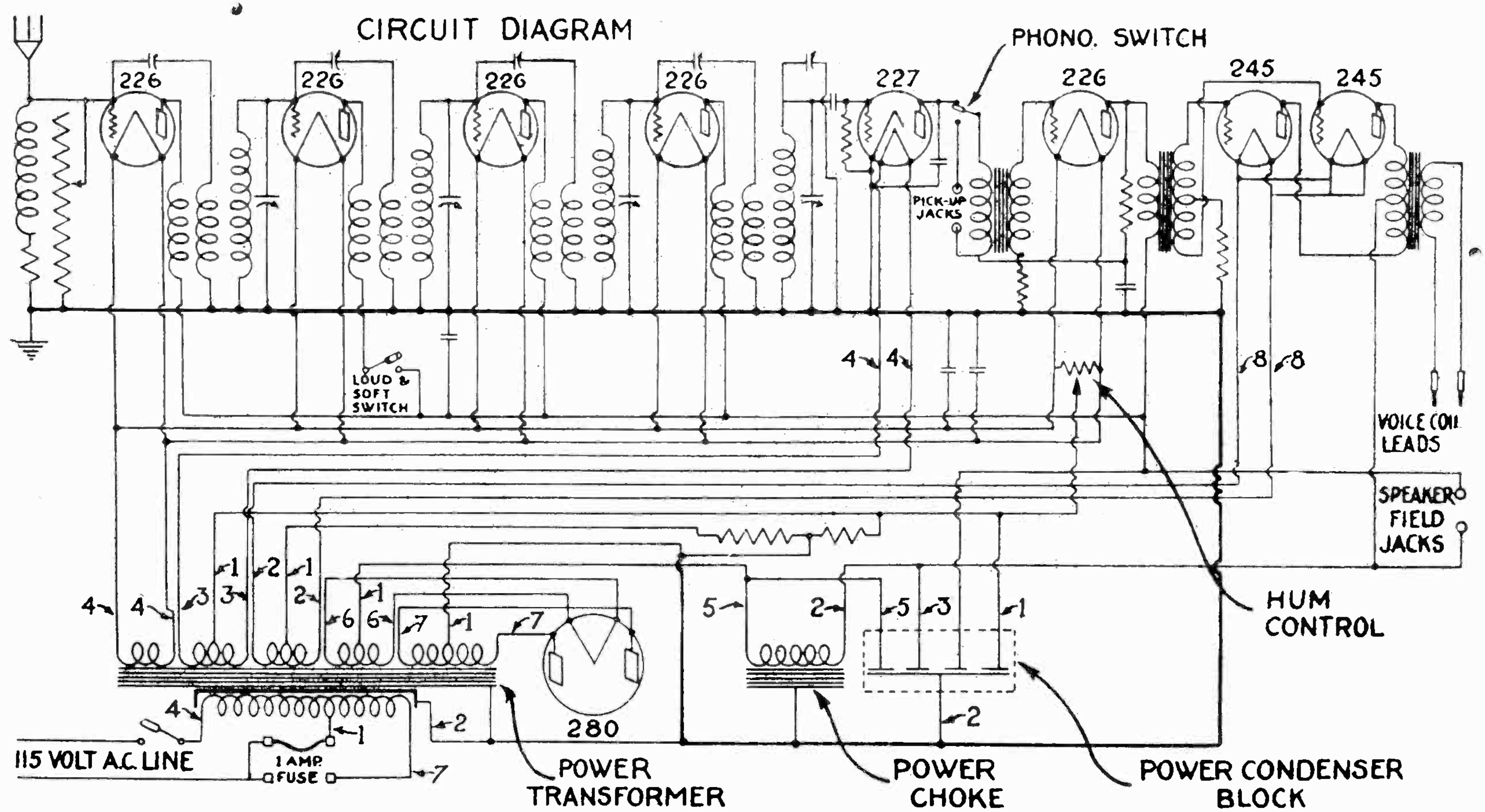
Line Voltage 116—2nd A. F. Stage—2 Tubes Push Pull

TUBE NO IN ORDER	TYPE OF TUBE	POSITION OF TUBE 1ST R.F. DET. ETC	READINGS PLUG IN SOCKET OF SET								
			TUBE OUT		TUBE IN TESTER						
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	C VOLTS	CATHODE VOLTS	NORMAL PLATE M A	PLATE M A GRID TEST	PLATE M A CHANGE
1	226	1st. R.F.	1.55	117	1.5	110	5.5	-	6.5	10.5	4.0
2	226	2nd. R.F.	1.55	117	1.5	110	5.5	-	6.5	10.5	4.0
3	226	3rd. R.F.	1.55	117	1.5	110	5.5	-	6.5	10.5	4.0
4	226	4th. R.F.	1.55	117	1.5	110	5.5	-	6.5	10.5	4.0
5	227	Detector	2.40	125	2.2	25	45	-	1.4	1.4	0.0
6	226	1st. A.F.	1.55	107	1.5	100	7.5	-	3.5	7.0	3.5
7	171A	2nd. A.F.	5.30	170	5.0	158	33	-	18.0	21.0	3.0
8	171A	2nd. A.F.	5.30	170	5.0	158	33	-	18.0	21.0	3.0



MODEL 5-093

JESSE FRENCH & SONS PIANO CO.



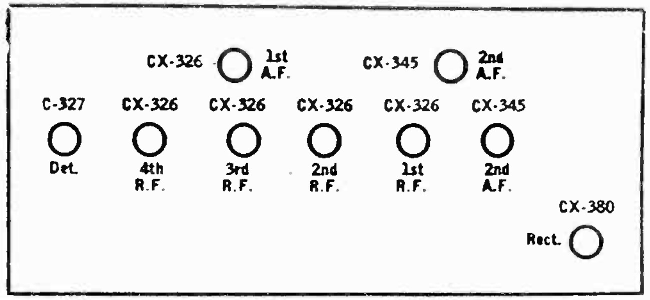
JESSE FRENCH

Model 5-093

Line Voltage 120—Set on 120 Volt Tap—Volume Control Position Max

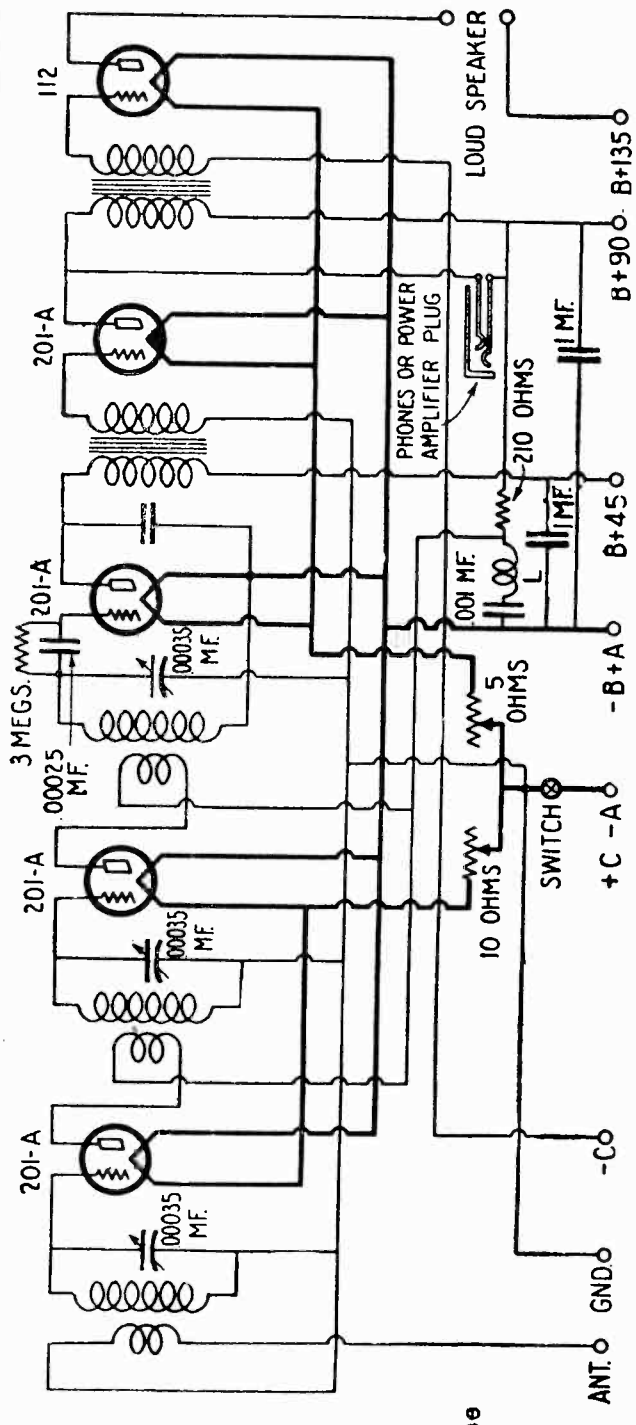
Note: "C" Bias Voltage Reading on Audio tubes is low due to the current draw of the set tester and high resistances in the set.

Tube No in Order ①	Type of Tube ②	Position of Tube 1st RF Det etc ③	Readings Plug in Socket of Set: Tube Out: A Volts ④	B Volts ⑤	Tube in Tester: A Volts ⑥	B Volts ⑦	C Volts (Control Grid) ⑧	Cathode-Heater Volts ⑨	Normal Plate MA ⑩	Plate MA Grid Test ⑪	Plate Change MA ⑫	Screen Grid Volts ⑬
1	226	1st RF	1.5	140	1.4	132	10	-	5	9	4	-
2	226	2nd RF	1.5	140	1.4	132	10	-	5	9	4	-
3	226	3rd RF	1.5	140	1.4	132	10	-	5	9	4	-
4	226	4th RF	1.5	140	1.4	132	10	-	5	9	4	-
5	227	Det.	2.6	112	2.3	30	0	10	2	2	0	-
6	226	1st AF	1.5	127	1.4	117	6.5	-	4.5	6.5	3	-
7	245	PP	2.6	260	2.4	245	11.5	-	25	29	4.5	-
8	245	PP	2.6	260	2.4	245	11.5	-	25	29	4.5	-
9	280	Rect.	5.8		4.9				90			

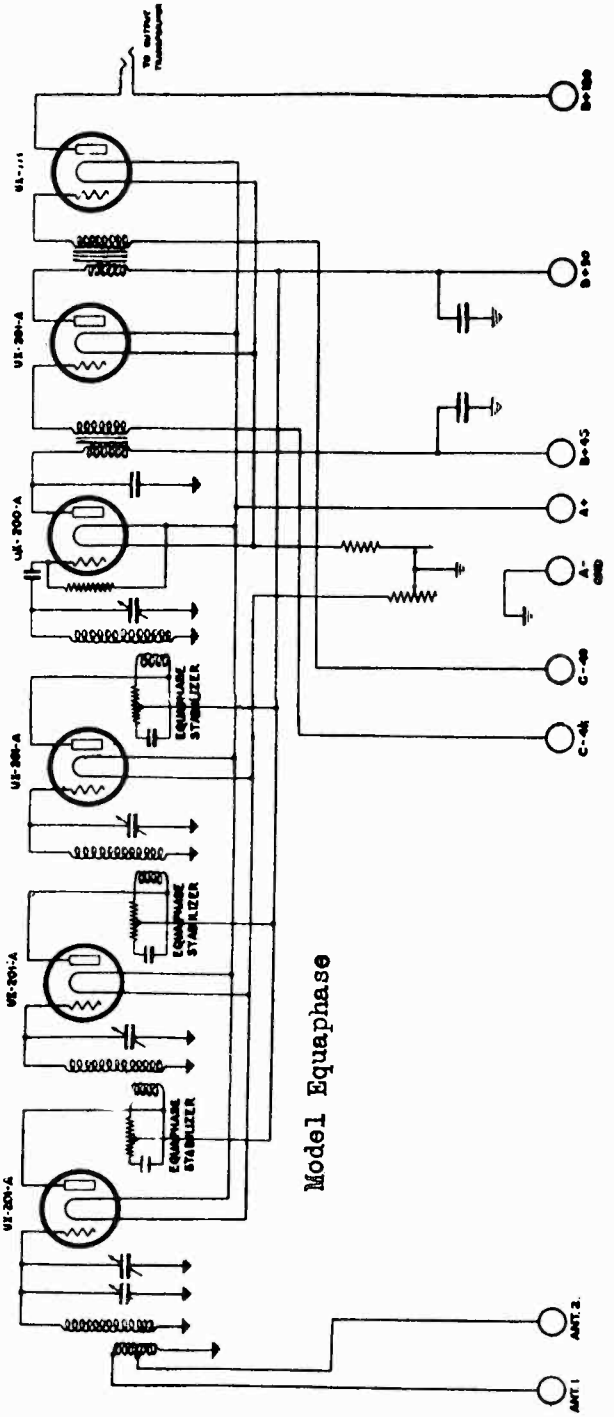


CHARLES FRESHMAN CO., INC.

MODEL Masterpiece
MODEL Equaphase



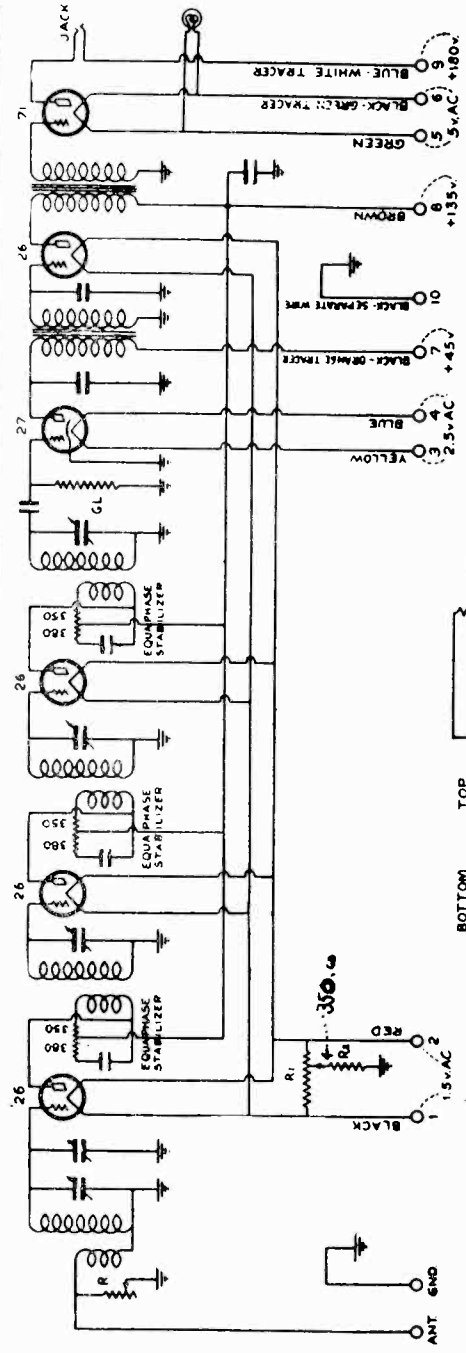
Model Masterpiece

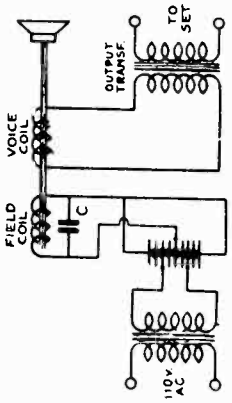


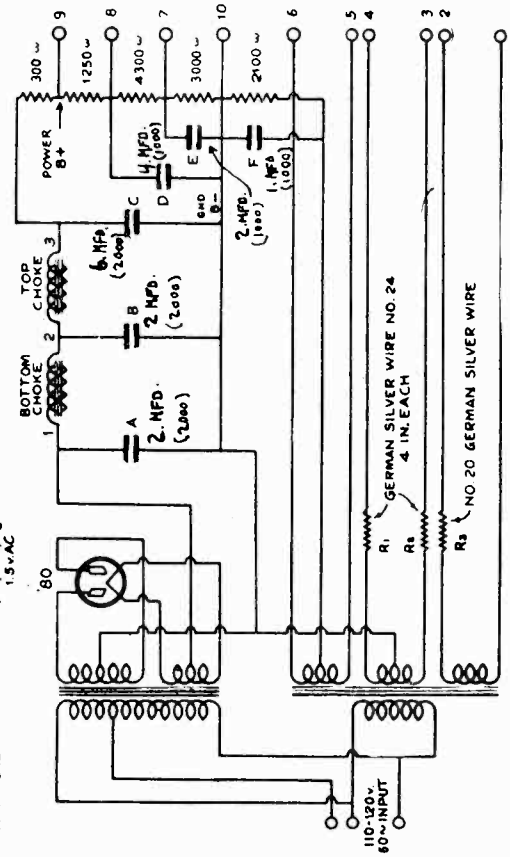
Model Equaphase

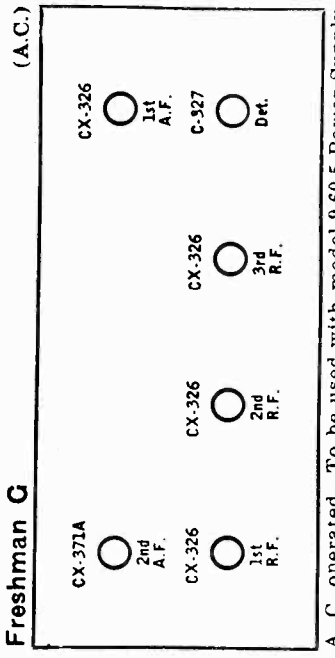
MODEL G

CHARLES FRESHMAN CO., INC.









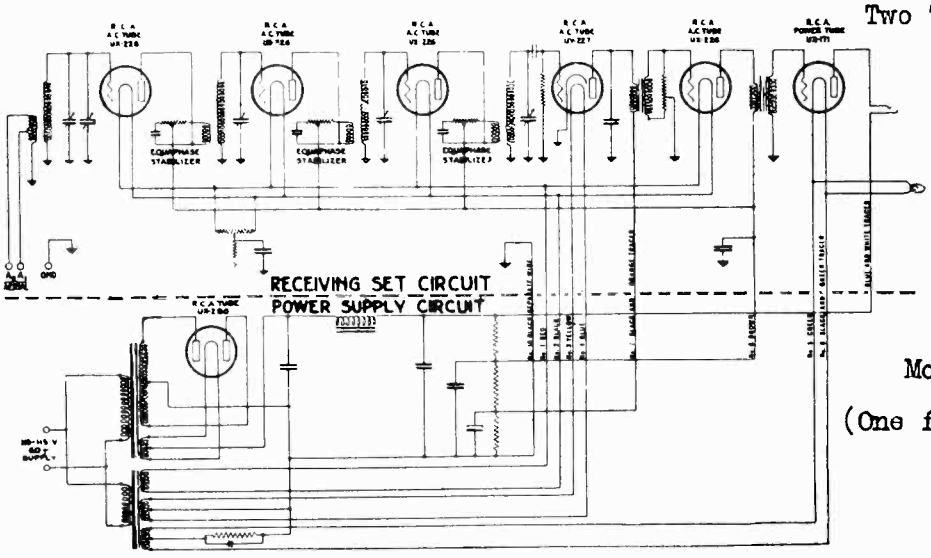
A. C. operated. To be used with model 9-60-5 Power Supply Unit using a CX-380.

FRESHMAN—Model "G"
Line Voltage 120—120 Volt Tap

TUBE NO. IN DIAGRAM	TYPE OF TUBE	POSITION OF TUBE 1ST R.F. DET. ETC	TUBE OUT				4-PRONG PLUG IN SOCKET OF SET				TUBE IN TESTER			
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	VOLTS	CATHODE VOLTS	NORMAL PLATE M.A.	PLATE M.A. GRID TEST	PLATE M.A. CHANGE	
1	226	1st. R.F.	1.45	140	1.35	135	9	-	5	9	4	
2	226	2nd. R.F.	1.45	140	1.35	135	9	-	5	9	4	
3	226	3rd. R.F.	1.45	140	1.35	135	9	-	5	9	4	
4	227	Detector	2.3	140	2.00	50	0	-	3	3.2	1	
5	226	1st. A.F.	1.45	140	1.35	135	9	-	5	9	4	
6	171A	2nd. A.F.	5.5	200	5.10	175	37	-	16.0	18.0	2.0	
7	280	Rectifier	-		5.10	-	-	-	20	-	-	

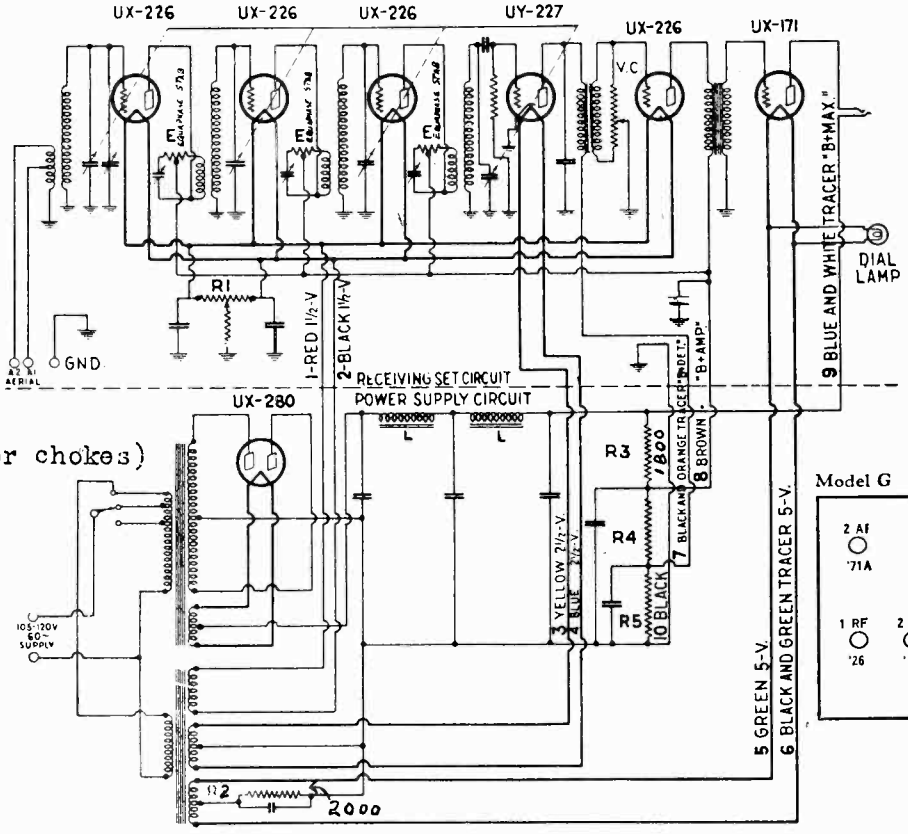
CHARLES FRESHMAN CO., INC.

MODEL G, with
G-60-S Power Unit
Two Types.

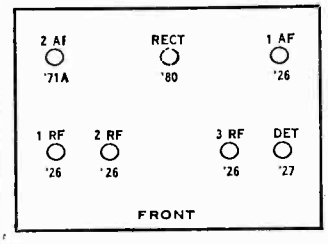


Model G.
(One filter choke)

Schematic diagram of Model "G" Chassis and Model G-60-S Power Supply.
Note the one choke coil in Power Supply Circuit.



Model G.
(Two filter chokes)

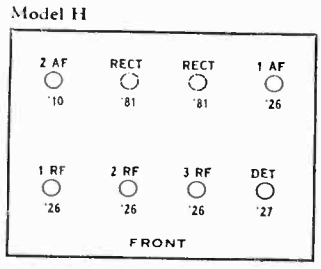


Circuits of the Freshman "Model G" Equaphase and the "Model G—60-S" Power Supply Unit.

Tube	Fil. Voltage.	Plate Voltage.	Grid Voltage
RF1	1.5	130	7.
RF2	1.5	130	7.
RF3	1.5	130	7.
Det.	2.5	50	0.
AF1	1.5	130	7.
AF2	5.0	180	40.

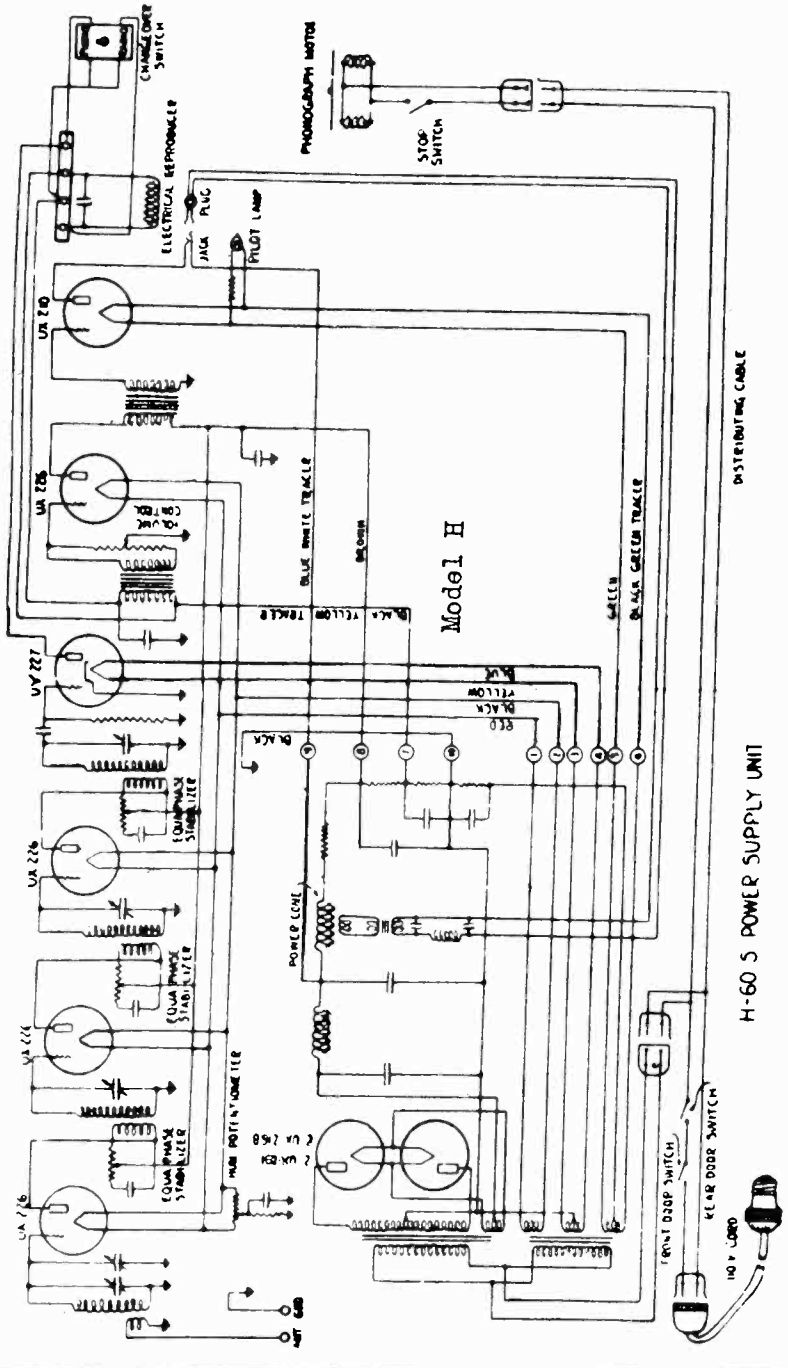
MODEL H
MODEL ABC Power Unit

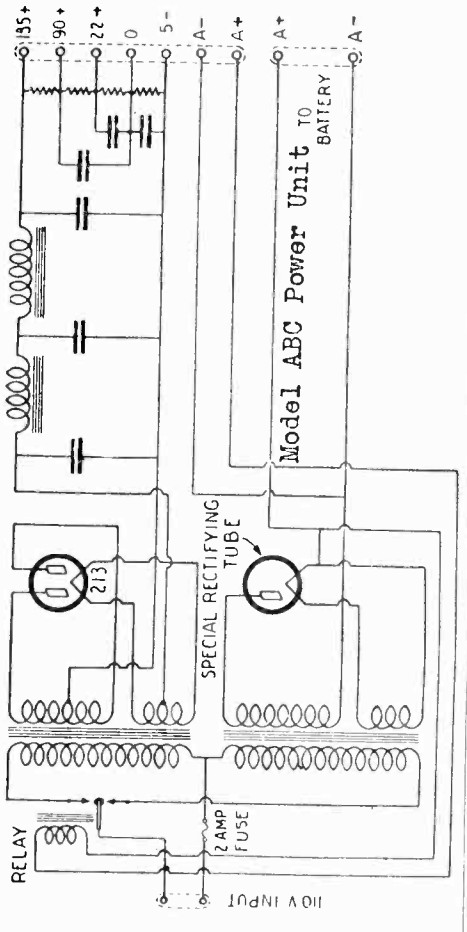
CHARLES FRESHMAN CO., INC.



FRESHMAN—Model "H"
Line Voltage 120—120 Volt Tap

TUBE NO IN ORDER	TYPE OF TUBE	POSITION OF TUBE (1ST RF DET ETC)	READINGS PLUG IN SOCKET OF SET TUBE IN TESTER									
			TUBE OUT									
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	C VOLTS	CATHODE VOLTS	NORMAL PLATE M.A.	PLATE M.A. GRID TEST	PLATE M.A. CHANGE
1	226	1st. R.F.	1.45	148	1.35	140	10	—	5.3	9.6	4.3
2	226	2nd. R.F.	1.45	148	1.35	140	10	—	5.3	9.6	4.3
3	226	3rd. R.F.	1.45	148	1.35	140	10	—	5.3	9.6	4.3
4	227	DETECTOR	2.35	140	2.00	50	0	—	2.75	6.75	4.0
5	226	1st. A.F.	1.45	148	1.35	140	10	—	5.3	9.6	4.3
6	210	2nd. A.F.	7.5	480	7.3	410	33	—	21.0	24.0	3.0
7	281	RECTIFIER	—	—	7.5	—	—	—	48.0	—	—
8											
9											
10											

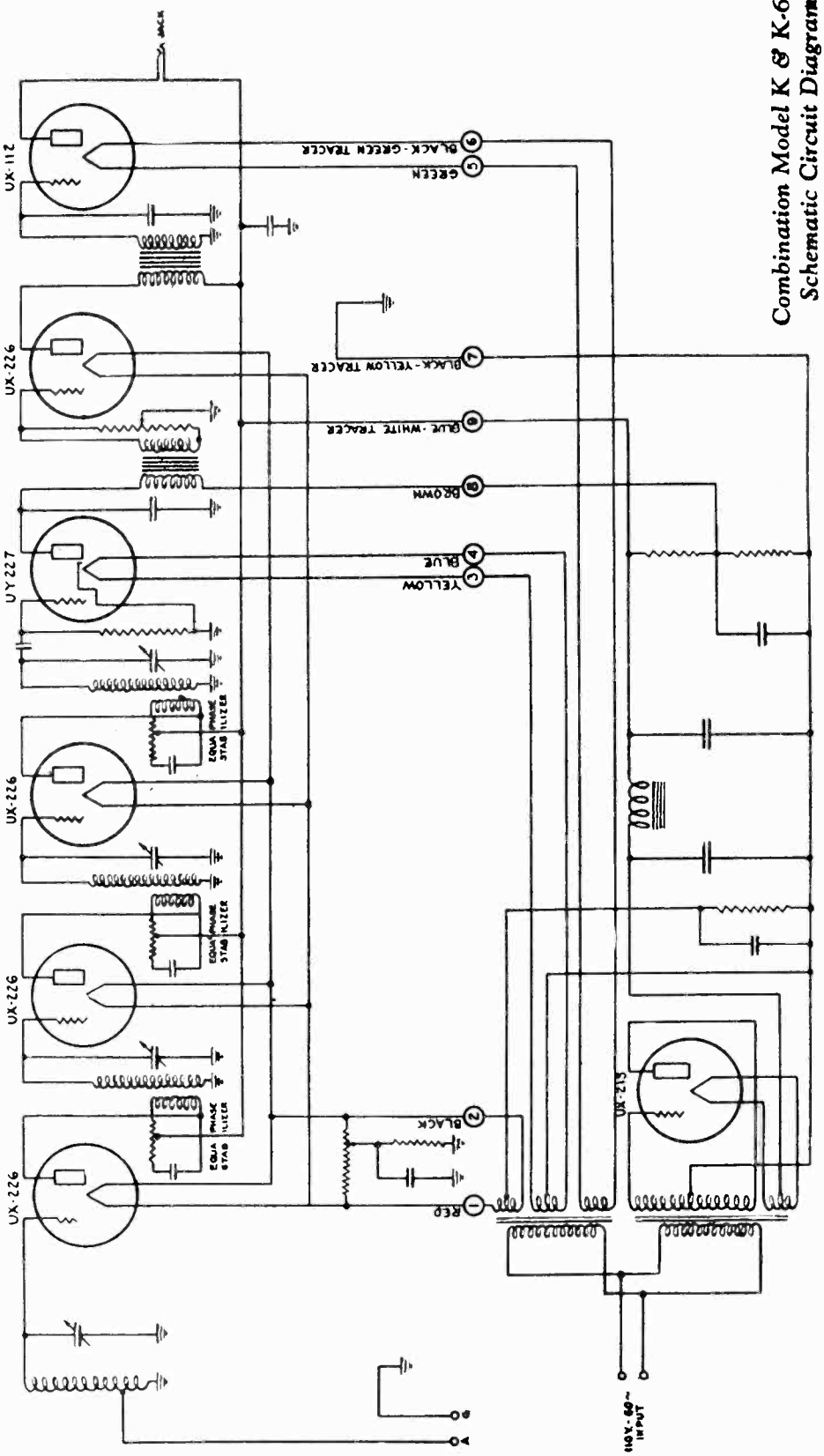




MODEL K

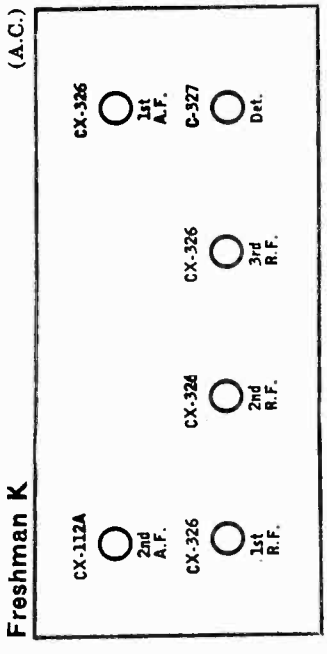
CHARLES FRESHMAN CO., INC.

Combination Model K & K-60-S Schematic Circuit Diagram.



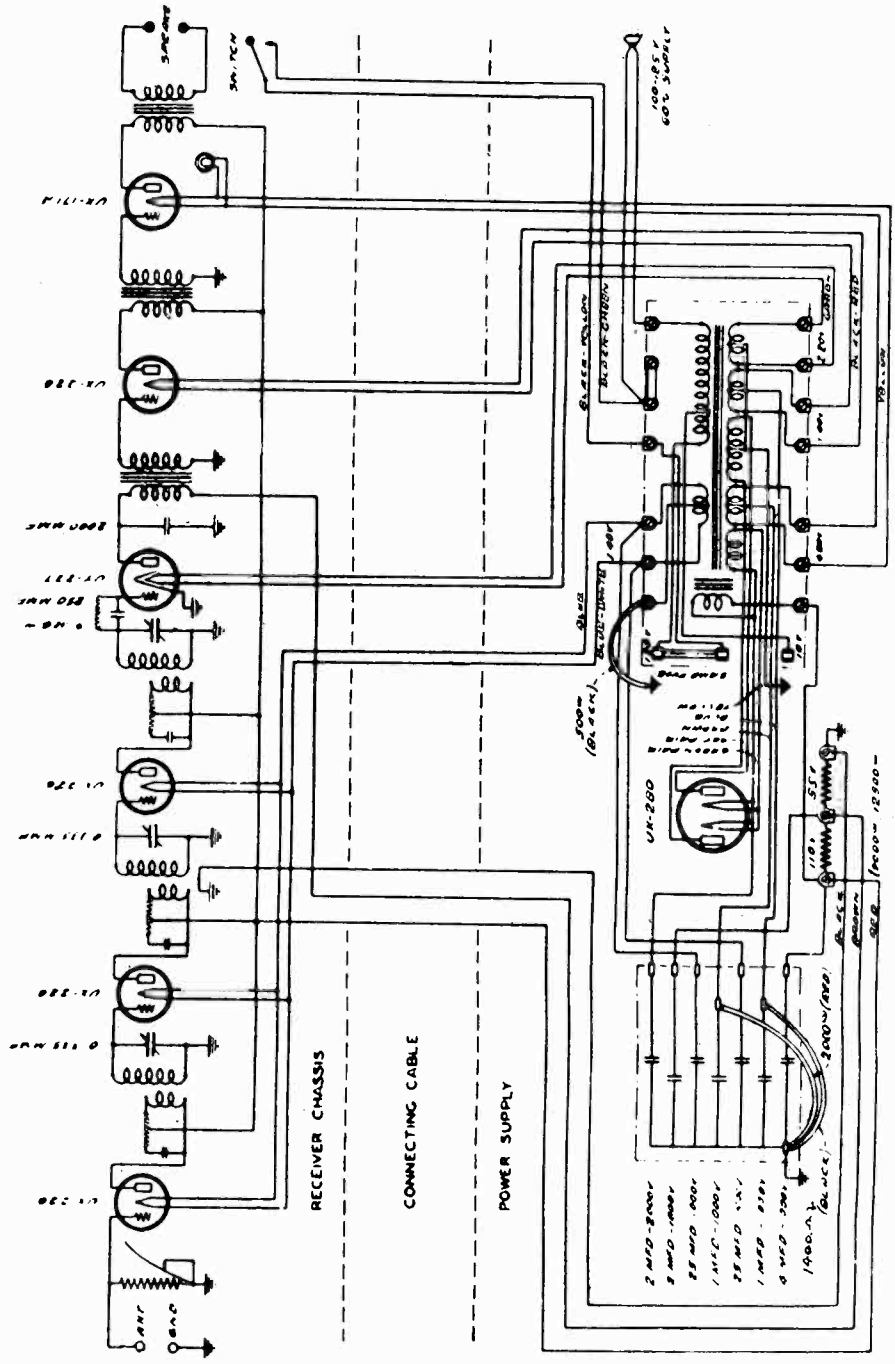
FRESHMAN—Model "K"
Line Voltage 120—120 Volt Tap

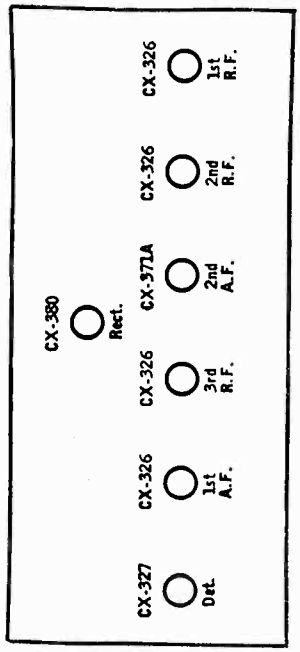
TUBE NO. IN DIAGRAM	TYPE OF TUBE	POSITION OF TUBE 1ST R.F. DET. ETC.	TUBE OUT A VOLTS	TUBE OUT B VOLTS	READINGS PLUG IN SOCKET OF SET TUBE IN TESTER A VOLTS	B VOLTS	C VOLTS	CATHODE VOLTS	NORMAL PLATE M.A.	PLATE M.A. GRID TEST	PLATE M.A. CHANGE
1	226	1st. R.F.	1.45	148	1.35	140	9	-	5.2	9.4	4.2
2	226	2nd. R.F.	1.45	148	1.35	140	9	-	5.2	9.4	4.2
3	226	3rd. R.F.	1.45	148	1.35	140	9	-	5.2	9.4	4.2
4	227	Detector	2.35	140	2.00	45	0	-	2.6	2.6	0.0
5	226	1st. A.F.	1.45	148	1.35	140	9	-	5.2	9.4	4.2
6	112A	2nd. A.F.	5.0	140	4.7	138	12	-	10.0	14.0	4.0
7	280	Rectifier	-	-	4.7	-	-	-	20.0	-	-



MODEL M

CHARLES FRESHMAN CO., INC.



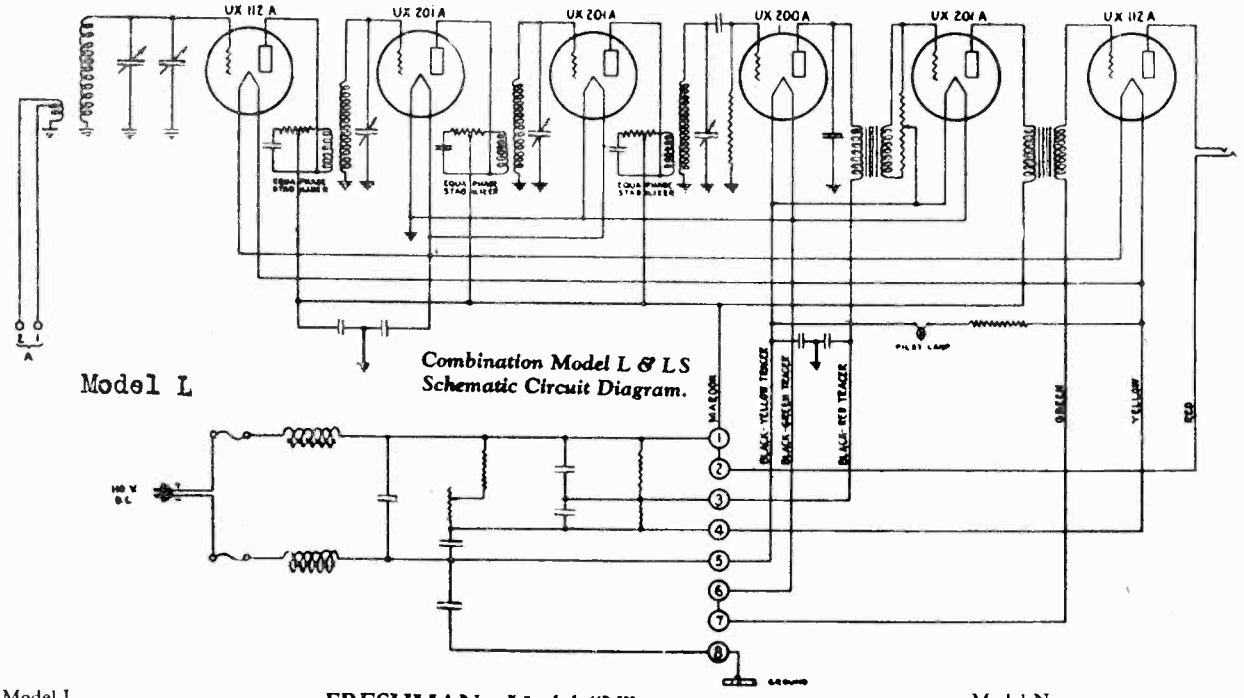


FRESHMAN—Model "M"
Line Voltage 120—120 Volt Tap

TUBE NO. IN SOCKET	TYPE OF TUBE	POSITION OF TUBE (1ST R.F., DET., ETC.)	TUBE OUT A VOLTS	TUBE OUT B VOLTS	READINGS, PLUG IN SOCKET OF SET, TUBE IN TESTER A VOLTS	B VOLTS	C VOLTS	CATHODE VOLTS	NORMAL PLATE M.A.	PLATE M.A. GRID M.A. TEST	PLATE M.A. CHANGE
1	226	1st R.F.	2.45	158	1.35	150	12	-	5.5	9.7	4.2
2	226	2nd R.F.	2.45	158	1.35	150	12	-	5.5	9.7	4.2
3	226	3rd R.F.	2.45	158	1.35	150	12	-	5.5	9.7	4.2
4	227	Detector	2.35	150	2.00	50	0	-	2.75	2.75	0.0
5	226	1st A.F.	2.45	158	1.35	150	10	-	5.5	9.7	4.2
6	171A	2nd A.F.	4.90	150	4.80	135	26	-	17.0	19.0	2.0
7	280	Rectifier	-	-	4.80	-	-	-	22.0	-	-
8											
9											
10											

MODEL L
MODEL N

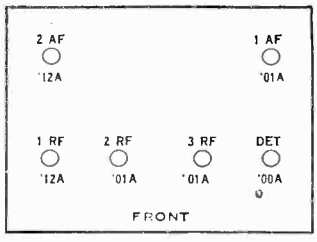
CHARLES FRESHMAN CO., INC.



Model L

Combination Model L & LS Schematic Circuit Diagram.

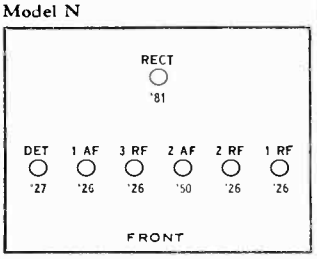
Model L

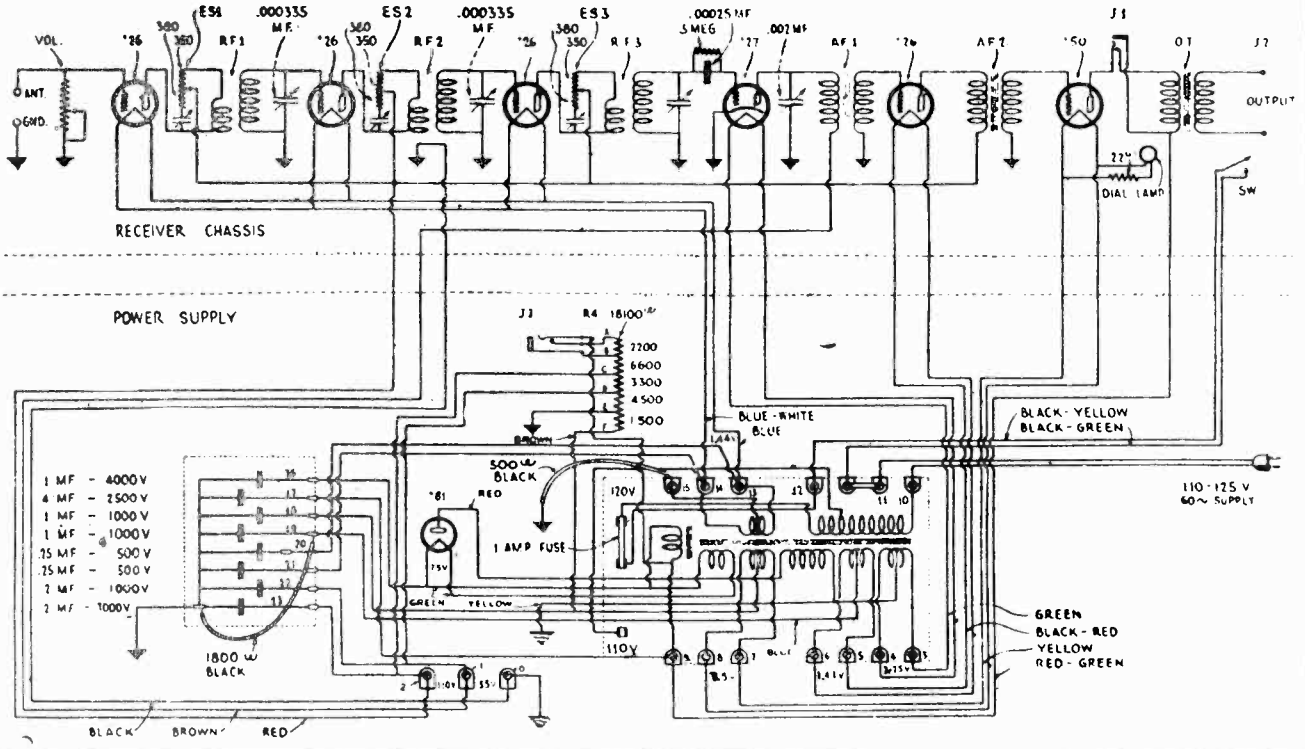


FRESHMAN—Model "N"
Line Voltage 119—120 Volt Tap

TUBE NO. IN ORDER	TYPE OF TUBE	POSITION OF TUBE (1ST R.F., DET., ETC.)	READINGS, PLUG IN SOCKET OF SET								
			TUBE OUT		TUBE IN TESTER						
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	C VOLTS	CATHODE VOLTS	NORMAL PLATE M A	PLATE M A GRID TEST	PLATE M A CHANGE
1	226	1st. R.F.	1.45	100	1.35	90	6	-	3.2	7.4	4.2
2	226	2nd. R.F.	1.45	100	1.35	90	6	-	3.2	7.4	4.2
3	226	3rd. R.F.	1.45	100	1.35	90	6	-	3.2	7.6	4.2
4	227	Detector	2.40	100	2.25	50	0	-	2.2	2.2	0.0
5	226	1st. A.F.	1.45	100	1.35	90	6	-	3.2	7.4	4.2
6	250	2nd. A.F.	7.4	350	7.2	300	50	-	36.0	43.5	7.5
7	281	Rectifier	-		7.2	-	-	-	46.0	-	-

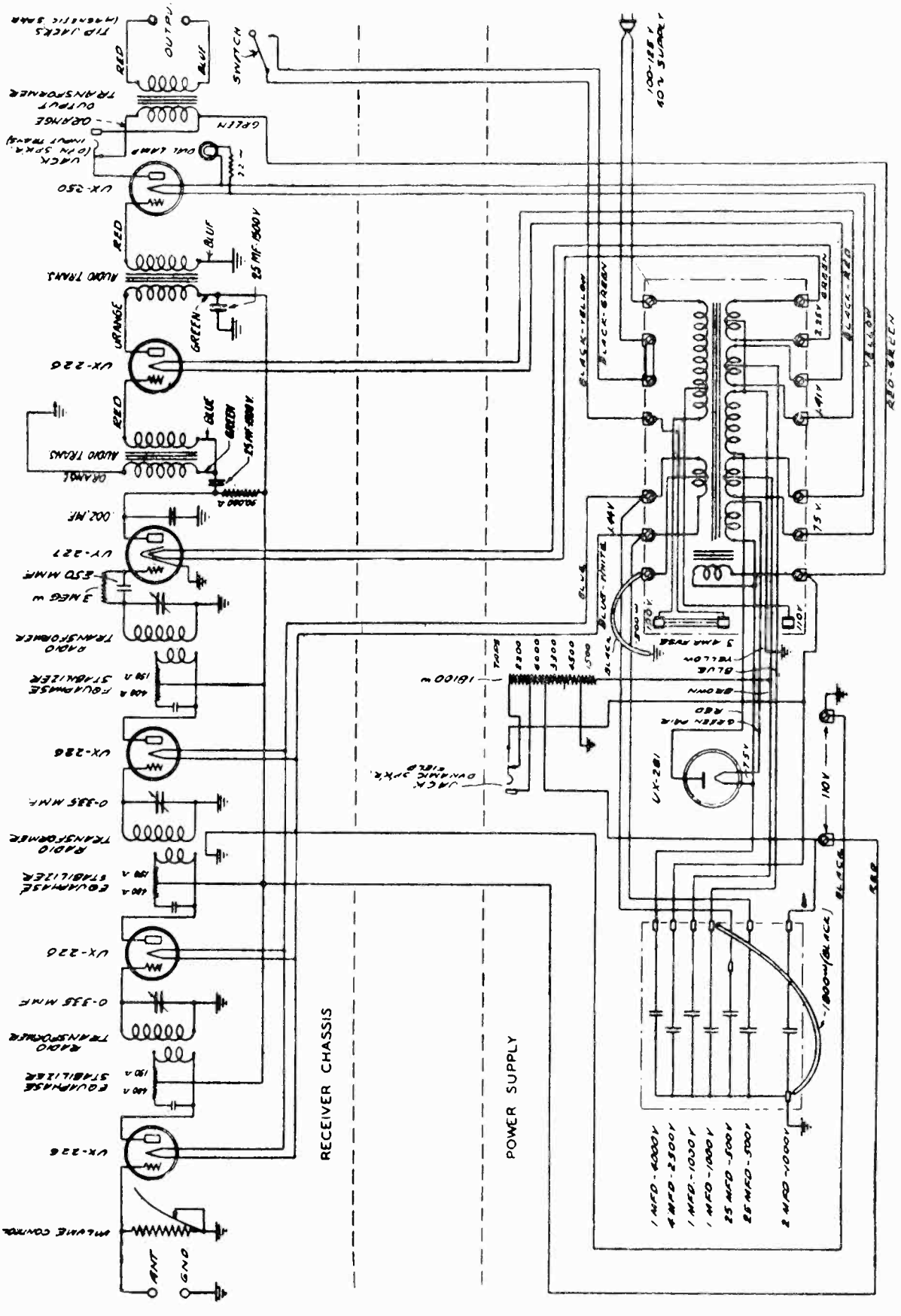
Model N





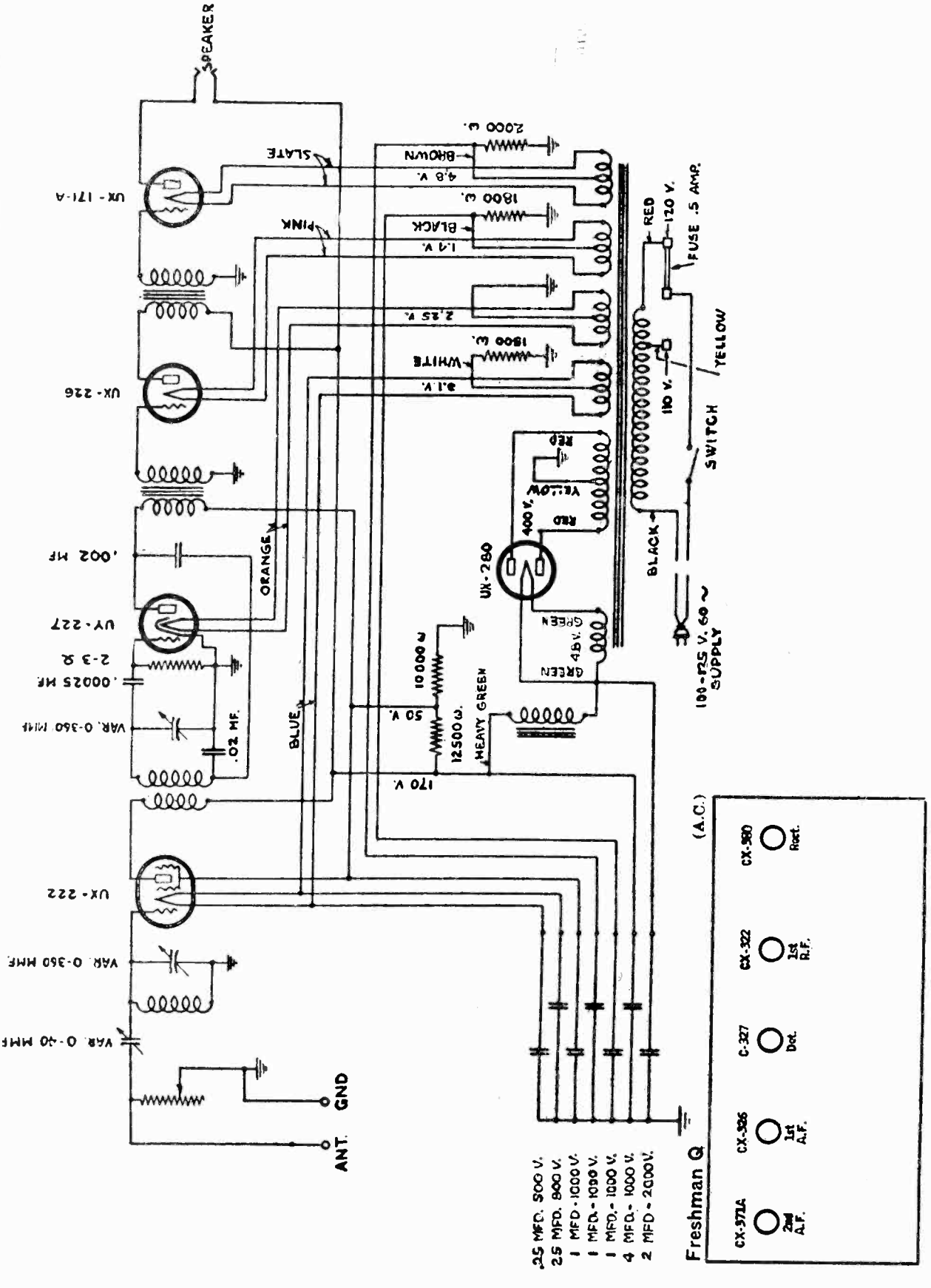
MODEL 2N with
2N-60-S Power Unit

CHARLES FRESHMAN CO., INC.



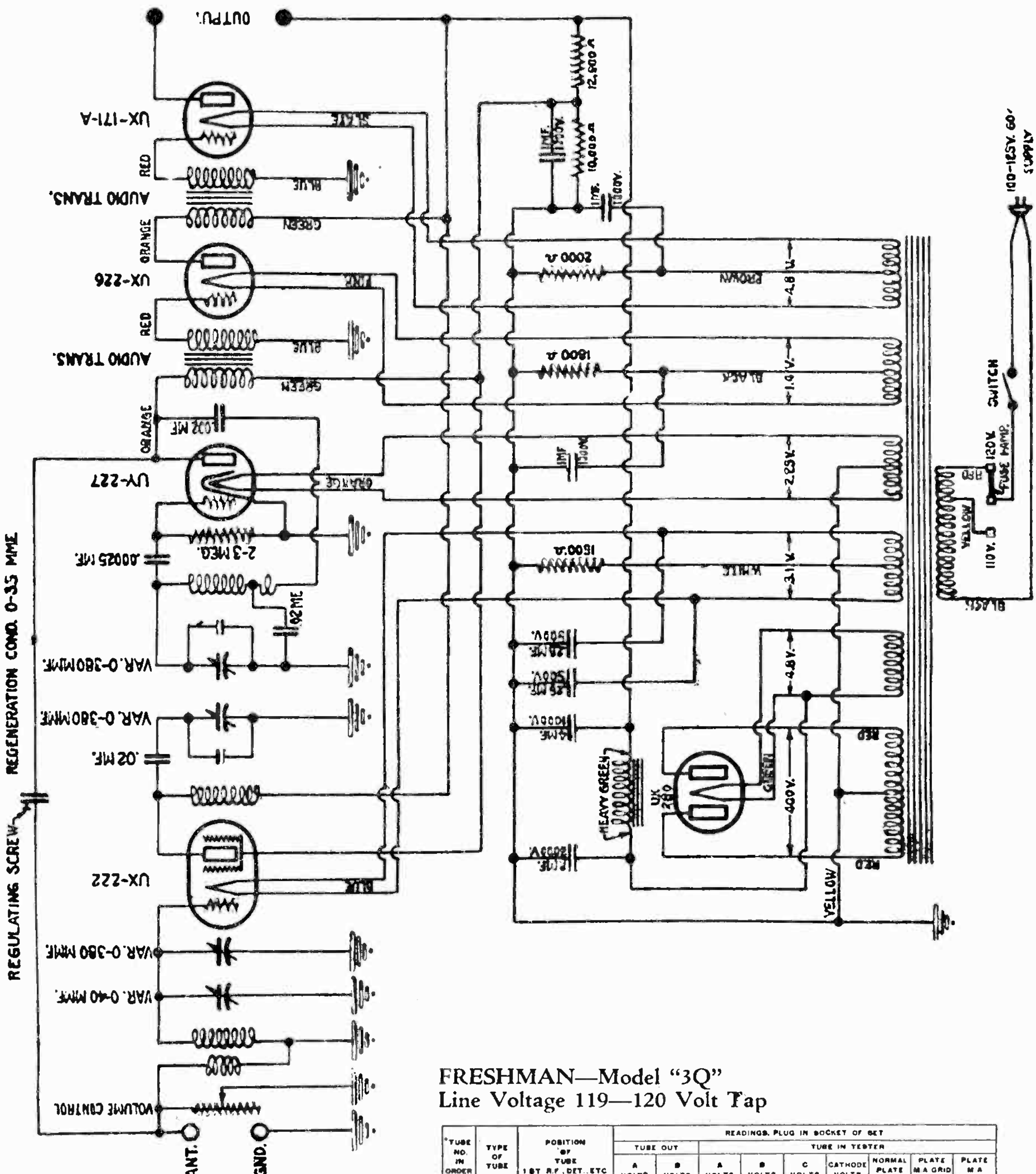
CHARLES FRESHMAN CO., INC.

MODEL Q-15, Q-16



MODEL 3-Q-15
3-Q-16

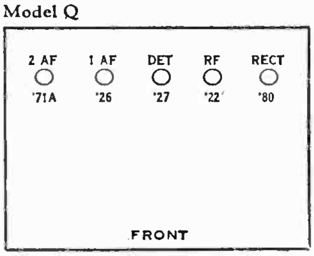
CHARLES FRESHMAN CO., INC.



FRESHMAN—Model "3Q"
Line Voltage 119—120 Volt Tap

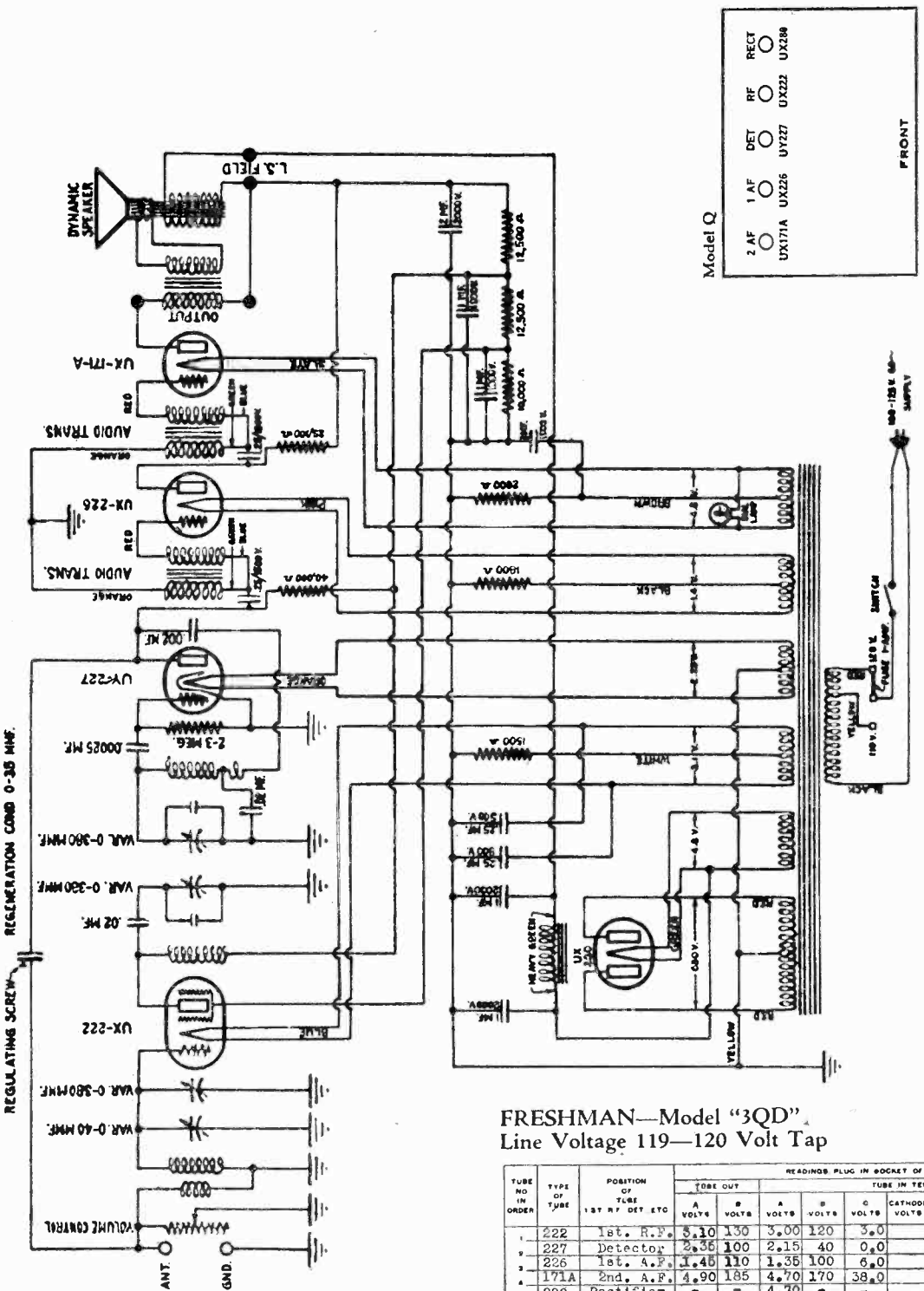
TUBE NO. IN ORDER	TYPE OF TUBE	POSITION OF TUBE 1ST R.F., DET., ETC	READINGS, PLUG IN SOCKET OF SET								
			TUBE OUT		TUBE IN TESTER						
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	C VOLTS	CATHODE VOLTS	NORMAL PLATE M.A	PLATE M.A GRID TEST	PLATE M.A CHANGE
1	222	1st. R.F.	3.10	162	3.00	150	3.0				
2	227	Detector	2.35	150	2.10	50	0.0		2.75	2.75	0.0
3	226	1st. A.F.	1.45	150	1.35	140	10		4.2	8.6	4.4
4	171A	2nd. A.F.	4.90	140	4.60	125	25		16.5	18.0	1.5
5	280	Rectifier	-	-	4.60	-	-		22.0	-	-
6											

Model Q



CHARLES FRESHMAN CO., INC.

MODEL QD-16-S



FRESHMAN—Model "3QD"
Line Voltage 119—120 Volt Tap

TUBE NO IN ORDER	TYPE OF TUBE	POSITION OF TUBE 1ST RF DET ETC	READINGS PLUG IN SOCKET OF SET								
			TUBE OUT		TUBE IN TESTER						
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	C VOLTS	CATHODE VOLTS	NORMAL PLATE MA	PLATE MA GRID TEST	PLATE MA CHANGE
1	222	1st. R.F.	3.10	130	3.00	120	3.0				
2	227	Detector	2.35	100	2.15	40	0.0		2.75	2.75	0.0
3	226	1st. A.F.	1.45	110	1.35	100	6.0		4.0	8.0	4.0
4	171A	2nd. A.F.	4.90	185	4.70	170	38.0		16.0	18.0	2.0
5	280	Rectifier	-	-	4.70	-	-		22.0	-	-
6											
7											
8											
9											
10											