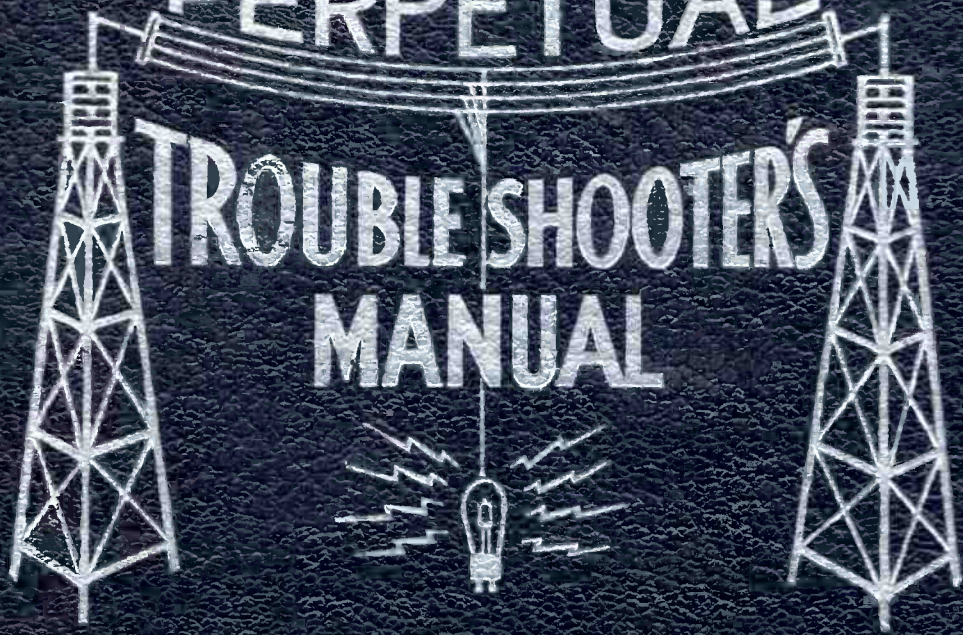


**VOLUME III**

**PERPETUAL**

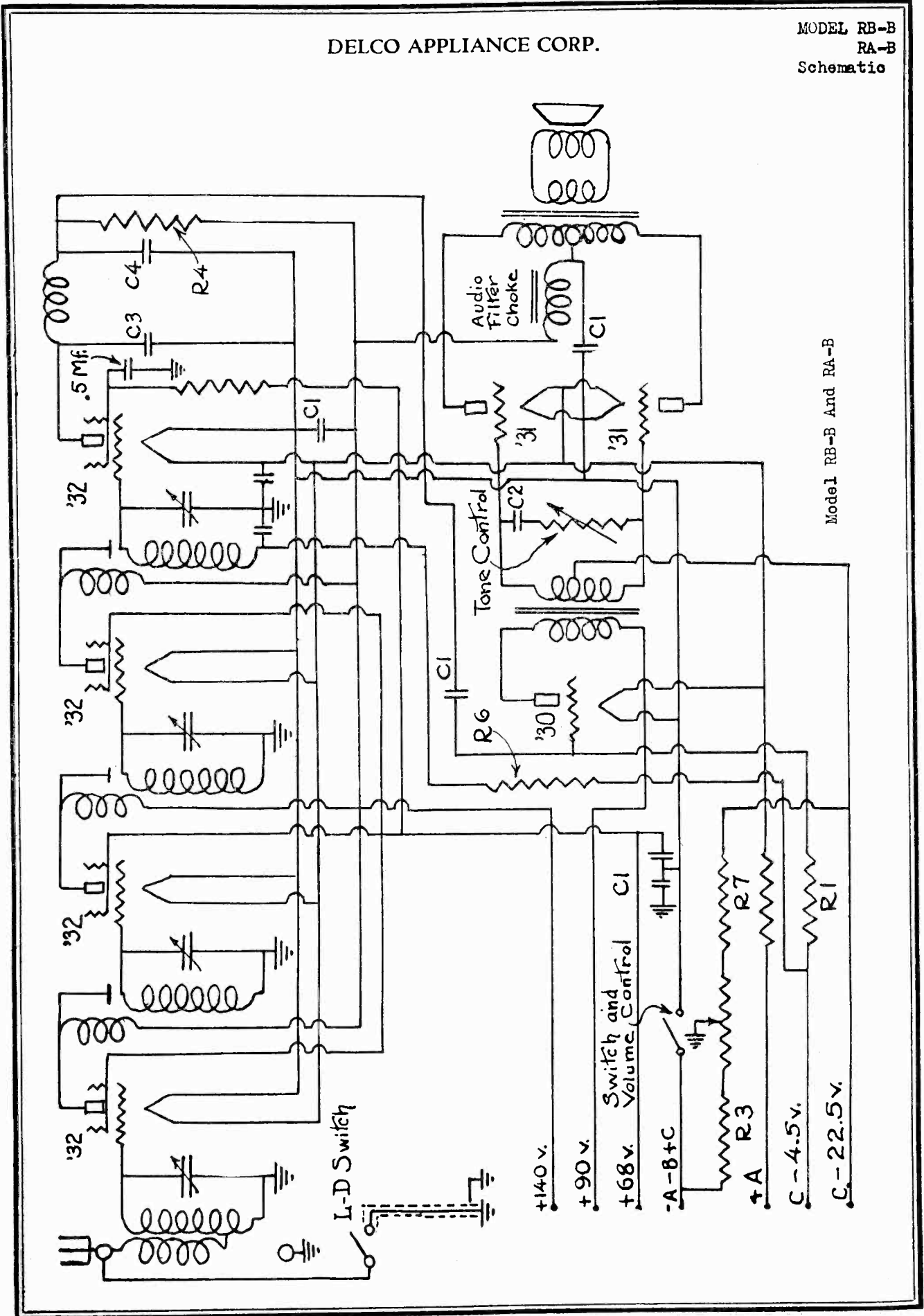


**TROUBLE SHOOTER'S  
MANUAL**

**JOHN F. RIDER**

DELCO APPLIANCE CORP.

MODEL RB-B  
RA-B  
Schematic



Model RB-B And RA-B

MODEL RB-B  
RA-B

DELCO APPLIANCE CORP.

Voltage  
Values

RESISTORS

<u>NO</u>	<u>BODY</u>	<u>END</u>	<u>HAND</u>	<u>RESISTANCE</u>
R 1	Red	Black	Green	2,000,000
R22	Green	Black	Yellow	500,000
R 3	Brown	Green	Yellow	150,000
R 4	Brown	Black	Yellow	100,000
R 5	Red	Green	Orange	25,000
R 6	Brown	Black	Orange	10,000
R 7	Lead from Terminal Strip to Det.Fil.			.75

CONDENSERS

<u>NUMBER</u>	<u>CAPACITY</u>
C-1	1 - .25 - .1 - .1 - .01
C-2	.002
C-3	.0005
C-4	.0001
C-5	.1

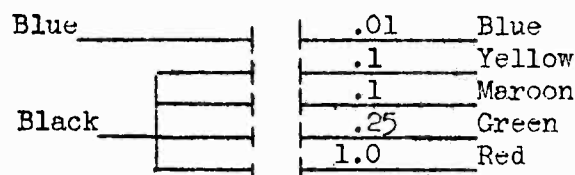
Capacities of C-1 Condenser are arranged as follows:

VOLTAGE TESTS

The following chart shows the approximate readings that should be obtained with any of the more reliable makes of Set Analyzers:

<u>Type of Tube</u>	<u>Position of Tube</u>	<u>"A" Fil. Volts</u>	<u>"B" Plate Volts</u>	<u>"C" Control Grid Volts</u>	<u>Screen Volts</u>	<u>Normal Plate MA</u>	<u>Grid Change</u>
232	1st R.F.	2	143	2	72	2	2.5
232	2nd R.F.	2	143	2	72	2	2.5
232	3rd R.F.	2	143	2	72	2	2.5
232	Detector	2	10	1	35	.2	.1
230	1st A.F.	2	90	---	--	2	3.5
231	2nd A.F.	2	135	19	--	5	20
231	2nd A.F.	2	135	19	--	5	20

Capacities of C-1 Condenser are arranged as follows:

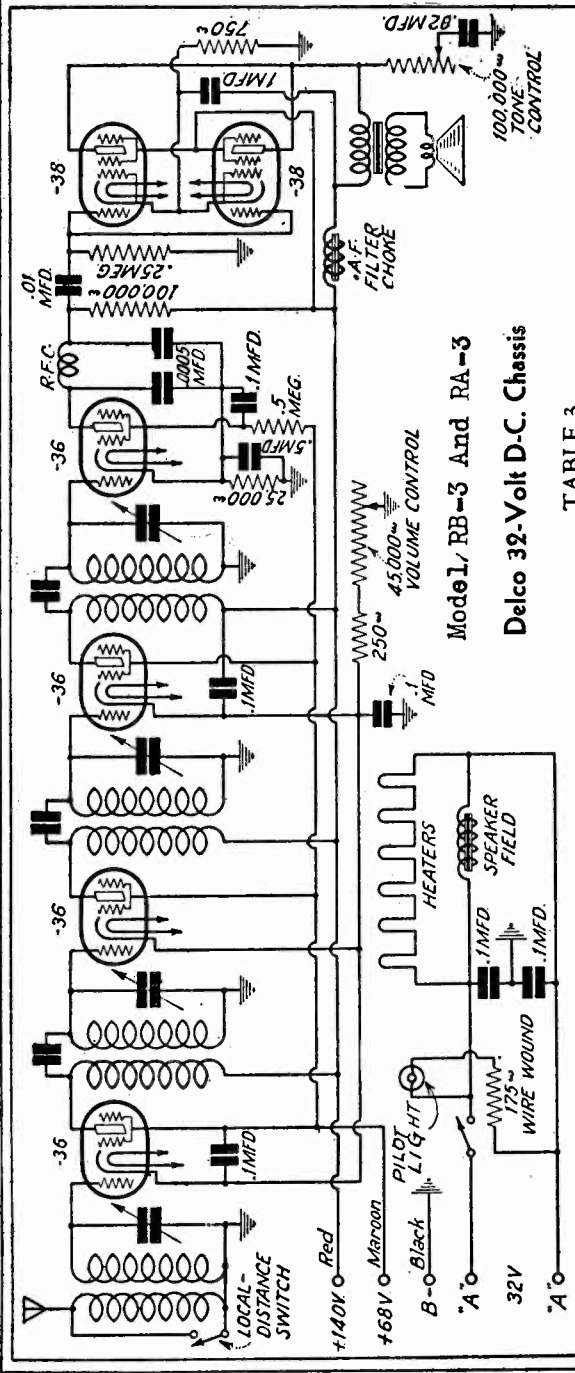


DELCO APPLIANCE CORP.

MODEL RB-3  
RA-3  
Schematic  
Notes

TABLE 1

No.	Body	End	Spot	Ohms	Watts
R-1	Red	Green	Brown	250	0.5
R-2	Violet	Green	Brown	750	0.5
R-3	Red	Green	Orange	25,000	0.5
R-4	Brown	Black	Yellow	100,000	1.0
R-5	Red	Green	Yellow	250,000	0.5
R-6	Green	Black	Yellow	500,000	0.5
R-7	(Wire-wound resistor)			175	6.0



Model RB-3 And RA-3  
Delco 32-Volt D.C. Chassis

TABLE 3

Tube	Fil.	Plate	Grid	Screen	Pentode	Plate M.A.
1st R-F.	6.2	125	1.8	62	..	2.0
2nd R-F.	6.2	125	1.8	62	..	2.0
3rd R-F.	6.2	125	1.8	62	..	2.0
Det.	6.2	75	1.0	8	..	.1
Pentodes	6.0	50	.6	40	10	7.0

TABLE 2

No.	Capacity
C-1	.0005
C-2	.02
C-3	.1-1
C-4-A	.5
C-4-B	1.
C-4-C	.1
C-4-D	.1
C-4-E	.01

SELECTOR DIAL ADJUSTMENT

If the pointers on the dial window do not indicate the frequency of the stations correctly, the dial may be rotated to the correct position. To do this it will be necessary to remove the chassis from the cabinet.

After the chassis is removed, measure the vertical distance from the bottom of the cabinet to the indicating points on the dial window (inside the cabinet). Tune in a station of known frequency, loosen the two square head set screws which hold the dial and hub assembly to the tuning condenser shaft. Hold the condenser rotor stationary and turn the selector dial on the condenser shaft until the frequency shown on the selector dial of that particular station is the same vertical distance from the bottom of the chassis as that previously measured from the bottom of the cabinet to the indicating points on the dial window inside the cabinet.

The dial light bulb is rated at 6 volts and has a standard flashlight base. It can be removed or replaced easily by lifting the dial light, socket and bracket assembly, up and off of the dial light mounting bracket.

TRIMMER CONDENSER ADJUSTMENT

A small condenser is located on the top of

The resistors used in the receiver are color-coded. The corresponding values and wattage ratings are given in Table 1. The condensers carry numbers. The corresponding values are given in Table 2. Condensers C-4-A to C-4-E inclusive, are contained in the by-pass condenser pack.

The voltage readings which may be expected on test are given in Table 3. These are based on a line voltage of 36, and with the volume control on full. Cathode voltage is zero in every case.

of the gang condenser shield.

To adjust the trimmers, tune in a station broadcasting on a frequency of approximately 1,400 kc. Adjust the volume by means of the volume control unit until the station can be faintly but clearly heard.

Starting at the front, adjust each trimmer in order from front to rear.

each of the four tuning condensers. If the selectivity is not normal, it may be necessary to re-align.

The trimmer condensers are adjusted by means of nuts or studs which may be turned with a socket wrench or screwdriver having an insulated handle. They are accessible for adjustment through the four holes in the top



DELCO APPLIANCE CORP.

MODEL RB-1  
RC-1  
Voltage Values

VOLTAGE DATA

Type of Tube	Position of Tube	Fil Volts	Plate Volts	Control Grid Volts	Screen Grid Volts	Cathods Volts	Pentode Screen Volts	Normal Plate MA
224	1st Det.	2.1	225	2.0	85	7	--	1
235	1st I.F.	2.1	225	3.3	79	5	--	14
235	2nd I.F.	2.1	225	3.3	75	5	--	13
227	Oscillator	2.15	75	0	--	0	--	5
227	2nd Det.	2.15	125	15.0	--	15	--	1
247	A.F.	2.15	210	1.0	--	--	200	3.5
280	Rect.	4.5	300	---	--	--	--	25-25

Line Volts 110. Volume Control on Full

RESISTORS

NO.	BODY	END	SPOT	RESISTANCE	WATTS
R1	Yellow	Green	Red	4,500	1/2
R2	Red	Green	Orange	25,000	1/2
R3	Yellow	Black	Orange	40,000	1/2
R4	Brown	Black	Yellow	100,000	1/2
R5	Green	Black	Yellow	500,000	1/2
R6	In Metal Cover			400	1/2

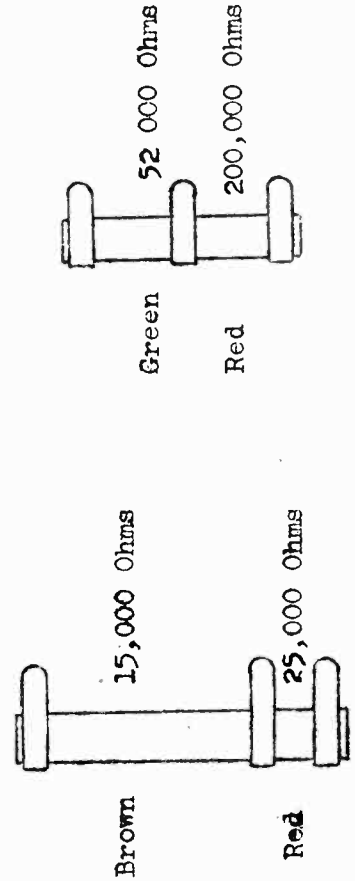
CONDENSERS

NO.	CAPACITY	NO.	CAPACITY	LEAD COLOR
C1	.00001 Mfd.	C7A	.25	Green
C2	.0005 Mfd.	C7B	.25	Green
C3	.002 Mfd.	C7C	.1	Brown
C4	.01 Mfd.	C7D	.25	Terminal
C5	.1-.1 Mfd.	C7E	.006	Red
C6	.1 Mfd.	C7F	.25	Green
		C7G	.03	Blue
		C7H	.03	White-White
	C8 4-4 Mfd. (Electrolytic)			
	C9 8 Mfd. (Electrolytic)			

Condensers C7A to C7H, inclusive, are included in the By-Pass Condenser Pack.

Pentode Bias

Voltage Divider





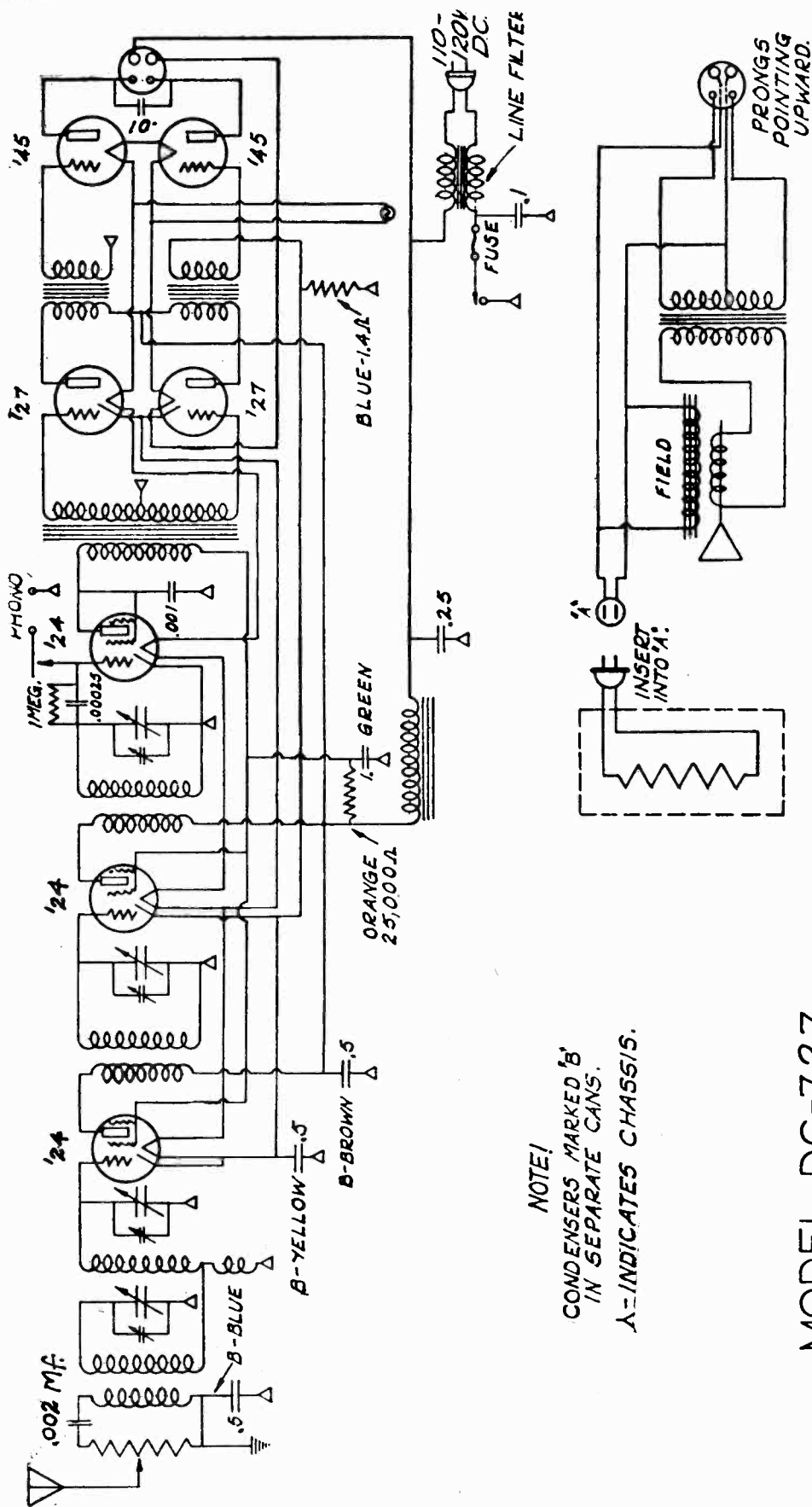




MODEL DC 727

DEWALD RADIO

Schematic



NOTE!  
 CONDENSERS MARKED 'B'  
 IN SEPARATE CANS.  
 A=INDICATES CHASSIS.

MODEL D.C.-727  
 CIRCUIT DIAGRAM

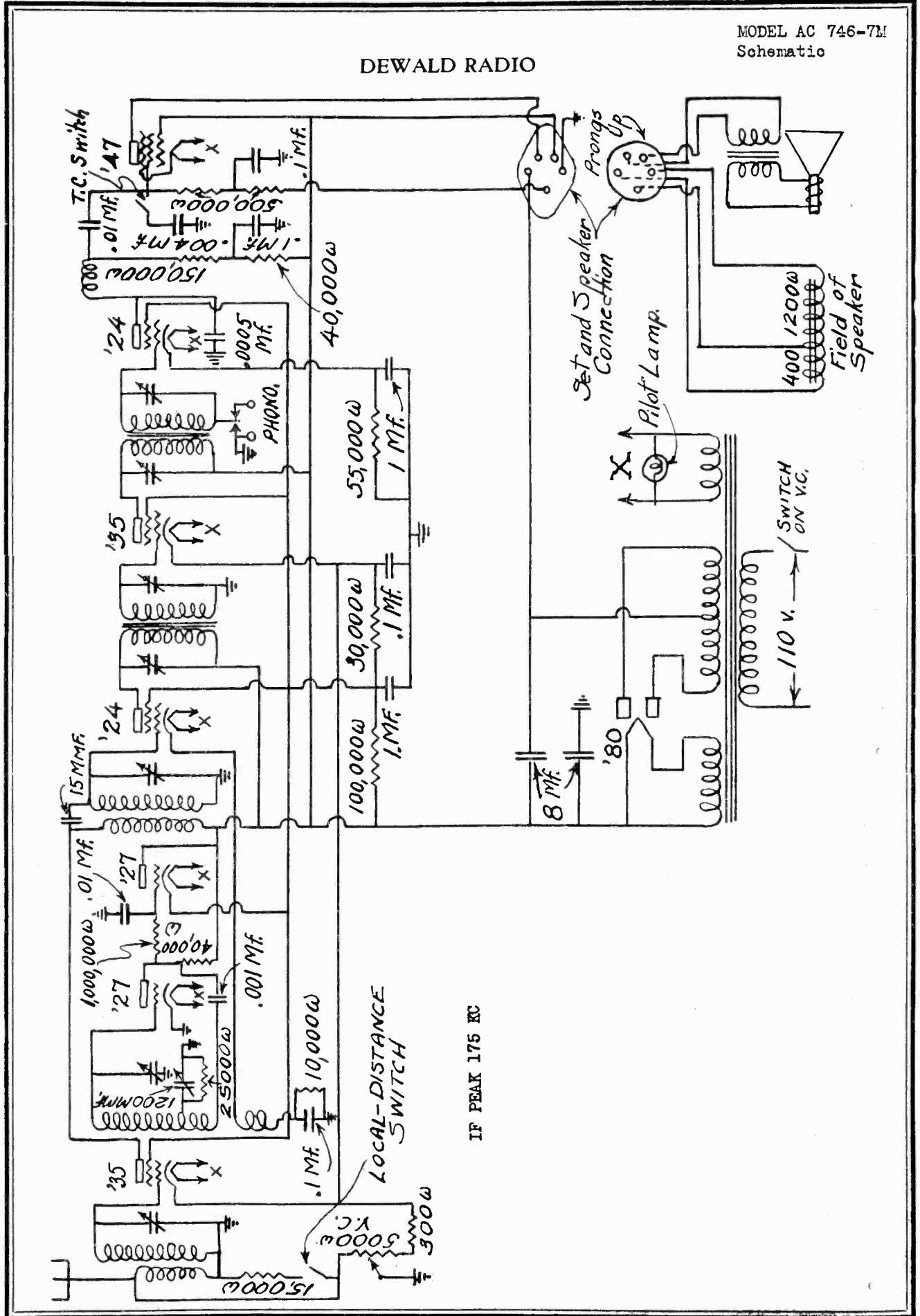
RESISTOR UNIT  
 64A-200W.

MODEL-727  
 DYNAMIC SPEAKER.

PRONGS  
 POINTING  
 UPWARD.

MODEL AC 746-7M  
Schematic

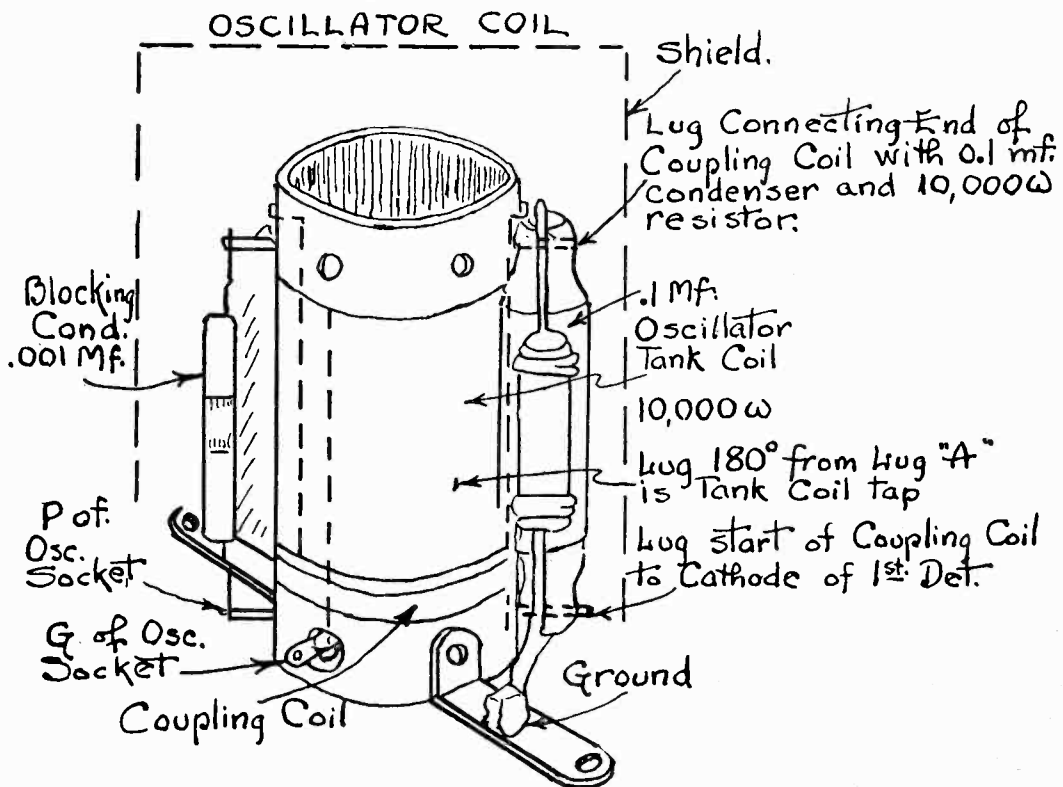
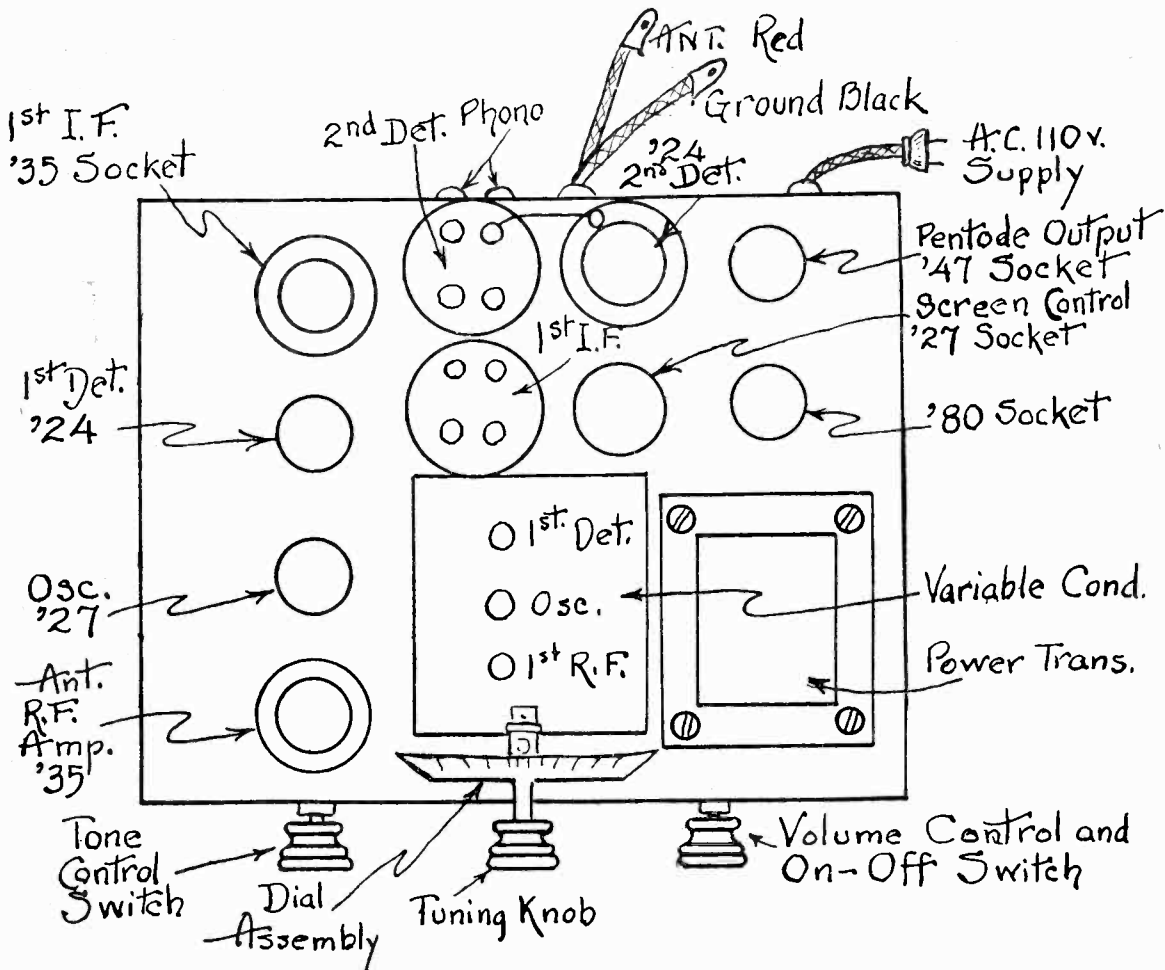
DEWALD RADIO



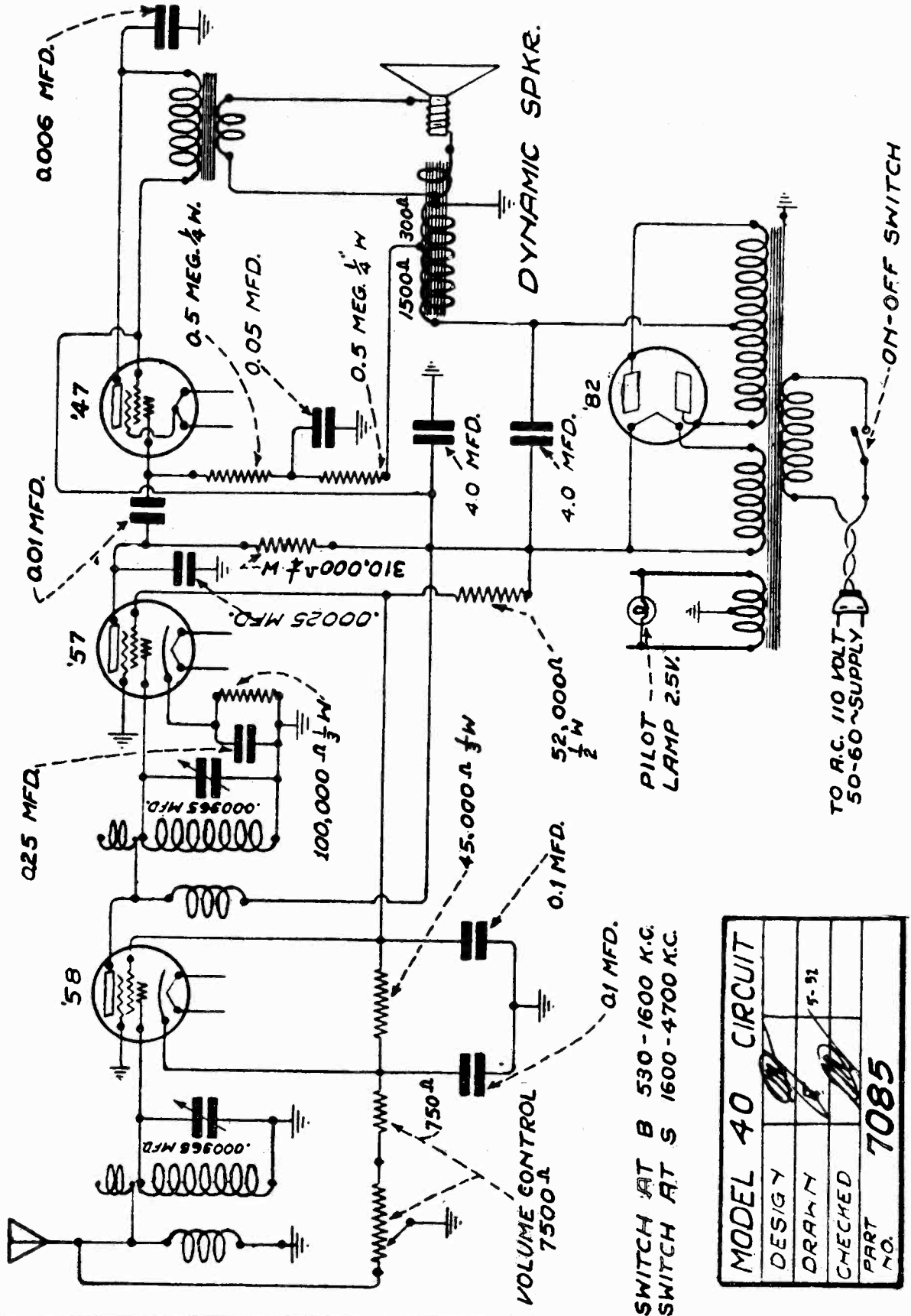
IF PEAK 175 KC

MODEL AC 746-7M  
Notes

DEWALD RADIO



DEWALD RADIO



MODEL 40 CIRCUIT	
DESIGN	
DRAWN	1-32
CHECKED	
PART NO.	7085

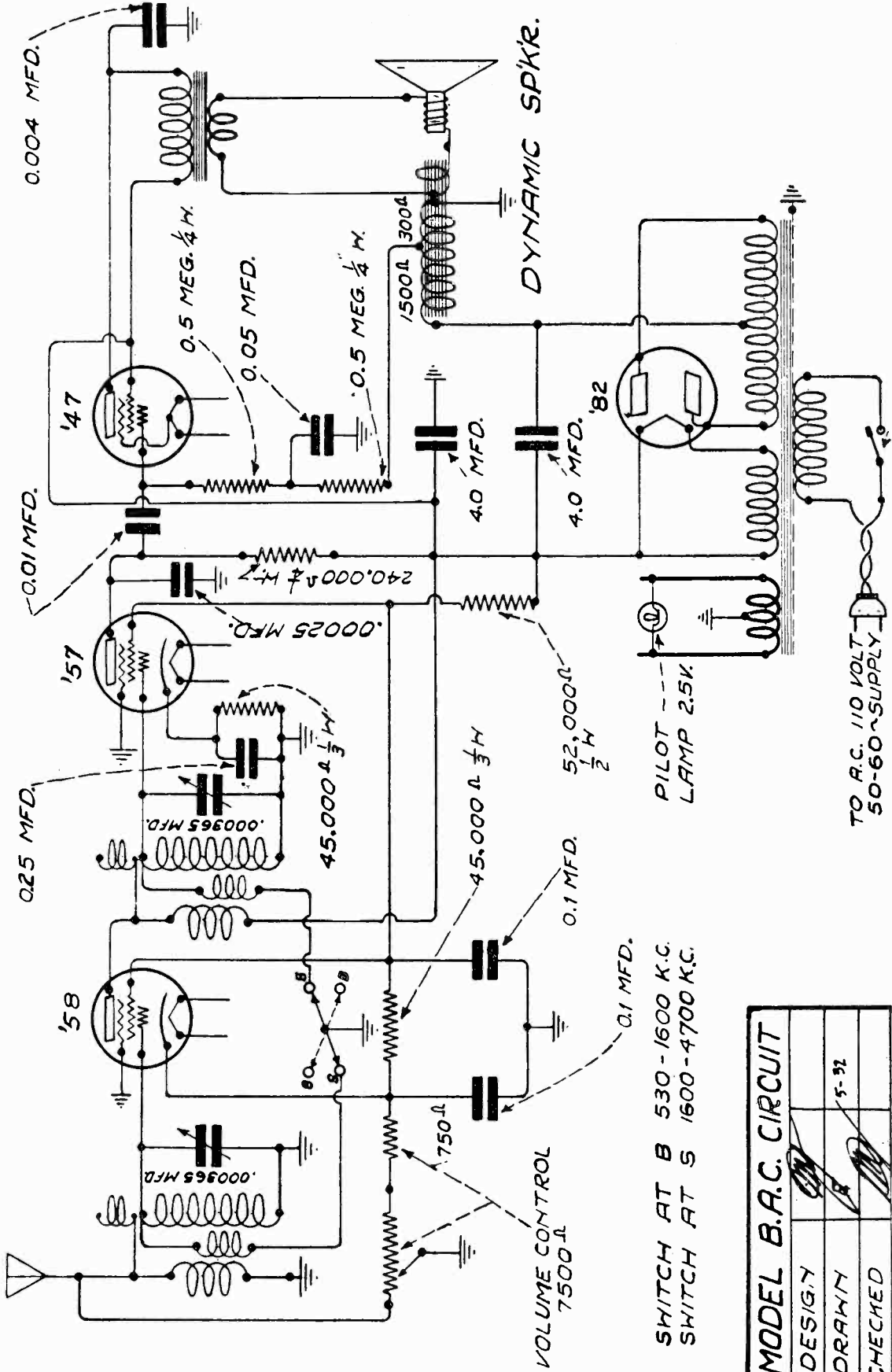




MODEL B-A-C

DEWALD RADIO

Schematic

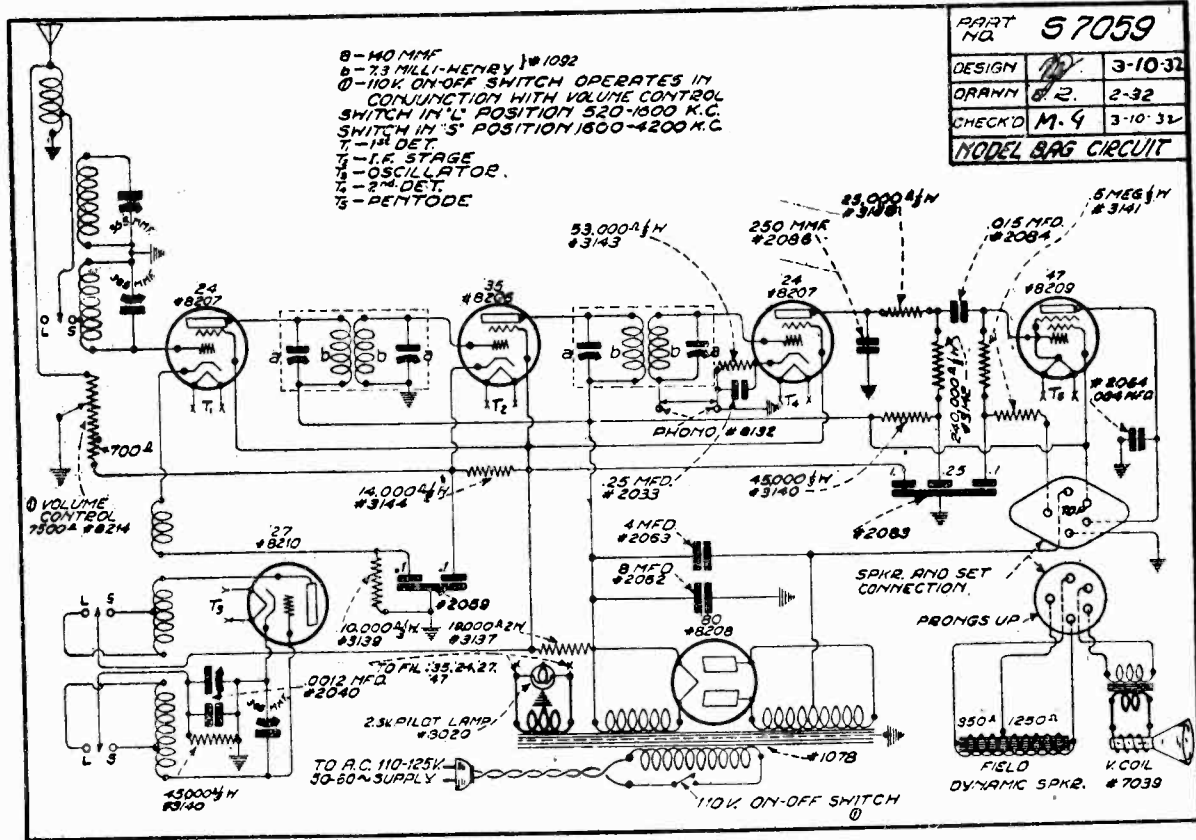


SWITCH AT B 530 - 1600 K.C.  
SWITCH AT S 1600 - 4700 K.C.

MODEL B.A.C. CIRCUIT	
DESIGN	<i>[Signature]</i>
DRAWN	<i>[Signature]</i>
CHECKED	5-32

DEWALD RADIO

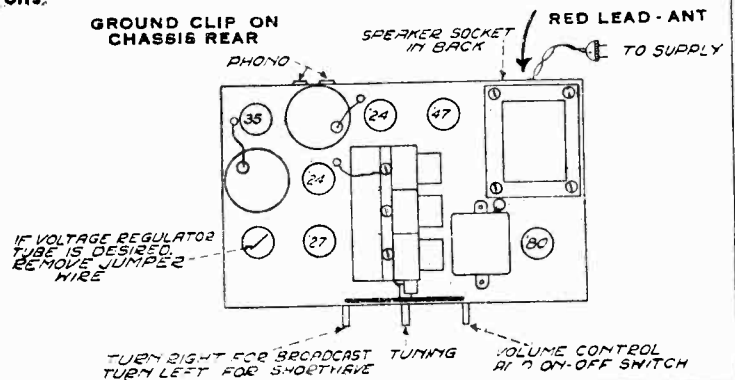
MODEL B-A-G  
Schematic



READINGS TAKEN WITH 1000 OHM PER VOLT D.C. VOLTMETER

Chassis to plate of T-1.....	220-250 Volts
Chassis to plate of T-2.....	220-250 Volts
Chassis to plate of T-3.....	70-120 Volts
Chassis to plate of T-4.....	70-100 Volts
Chassis to plate of T-5.....	220-250 Volts
Chassis to screen of T-1.....	70-120 Volts
Chassis to screen of T-2.....	70-120 Volts
Chassis to screen of T-3.....	70-120 Volts
Chassis to screen of T-4.....	70-120 Volts
Chassis to screen of T-5.....	220-260 Volts
Chassis to cathode of T-1.....	6- 10 Volts
Chassis to cathode of T-2..... (Depends on Volume Control Position)	4- 30 Volts
Chassis to cathode of T-3.....	0 Volts
Chassis to cathode of T-4.....	7- 10 Volts

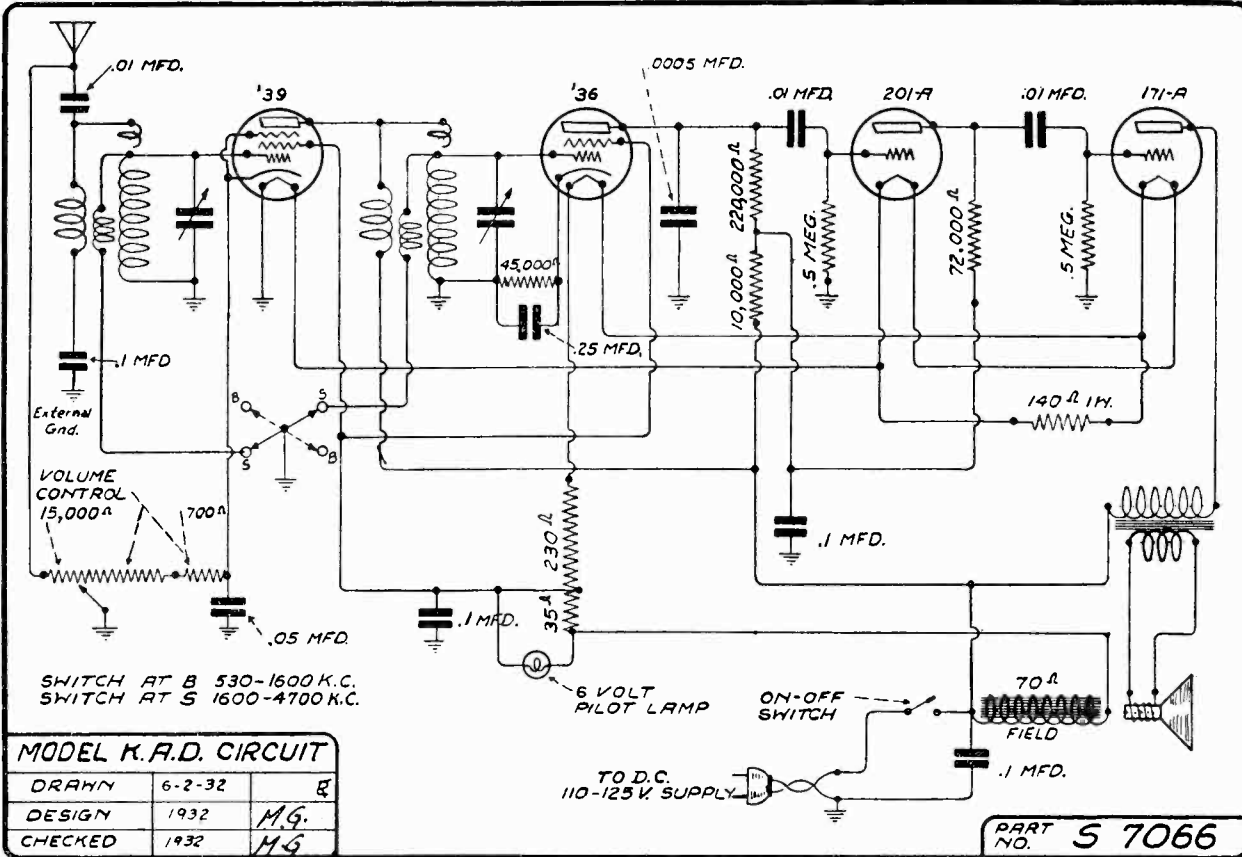
FILAMENTS: (a) T-1, 2, 3, 4, 5..... 2.25 to 2.5 Volts  
 (b) T-6..... 4.75 to 5.0 Volts.





**MODEL K-A-D  
MODEL B-A-H  
Schematic**

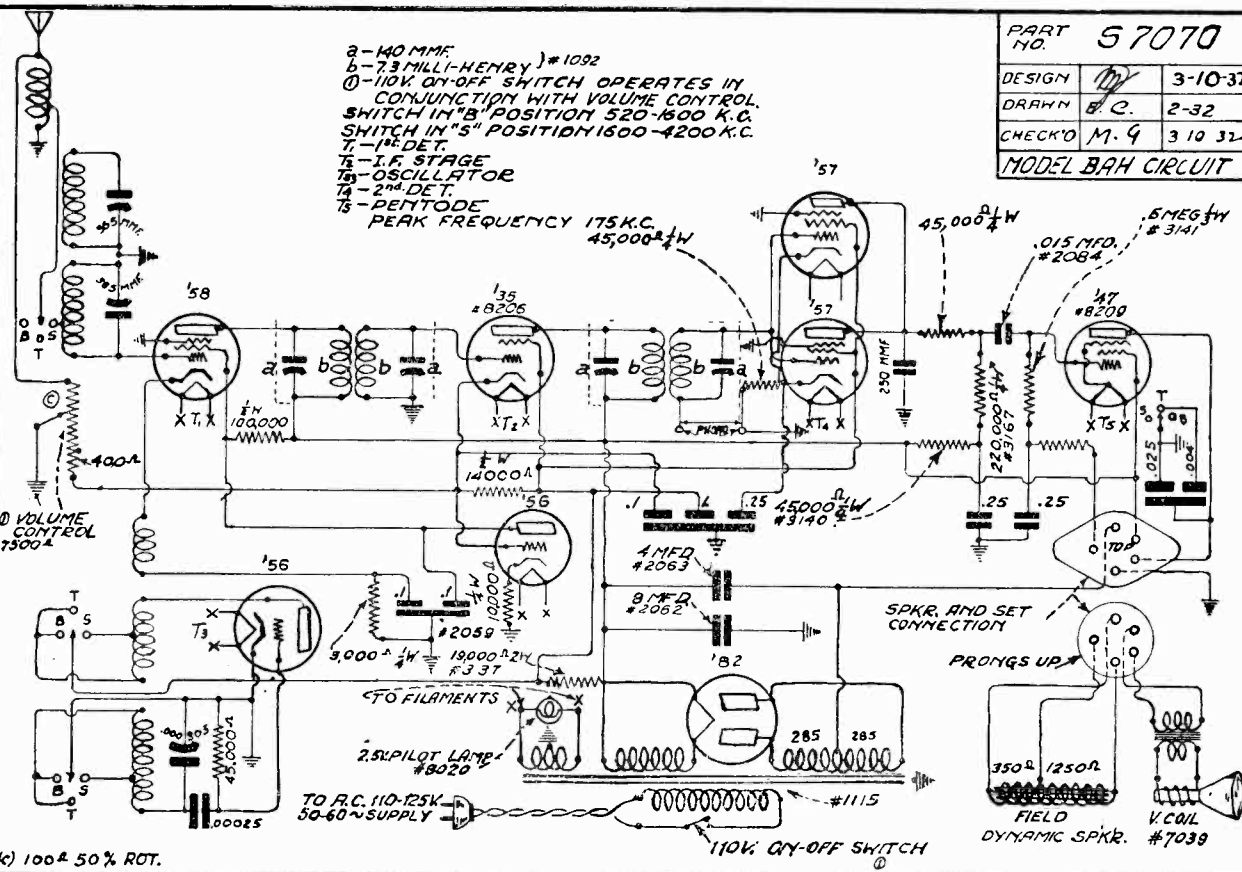
**DEWALD RADIO**



**MODEL K.A.D. CIRCUIT**

DRAWN	6-2-32	RG
DESIGN	1932	M.G.
CHECKED	1932	M.G.

PART NO. **5 7066**



**PART NO. 5 7070**

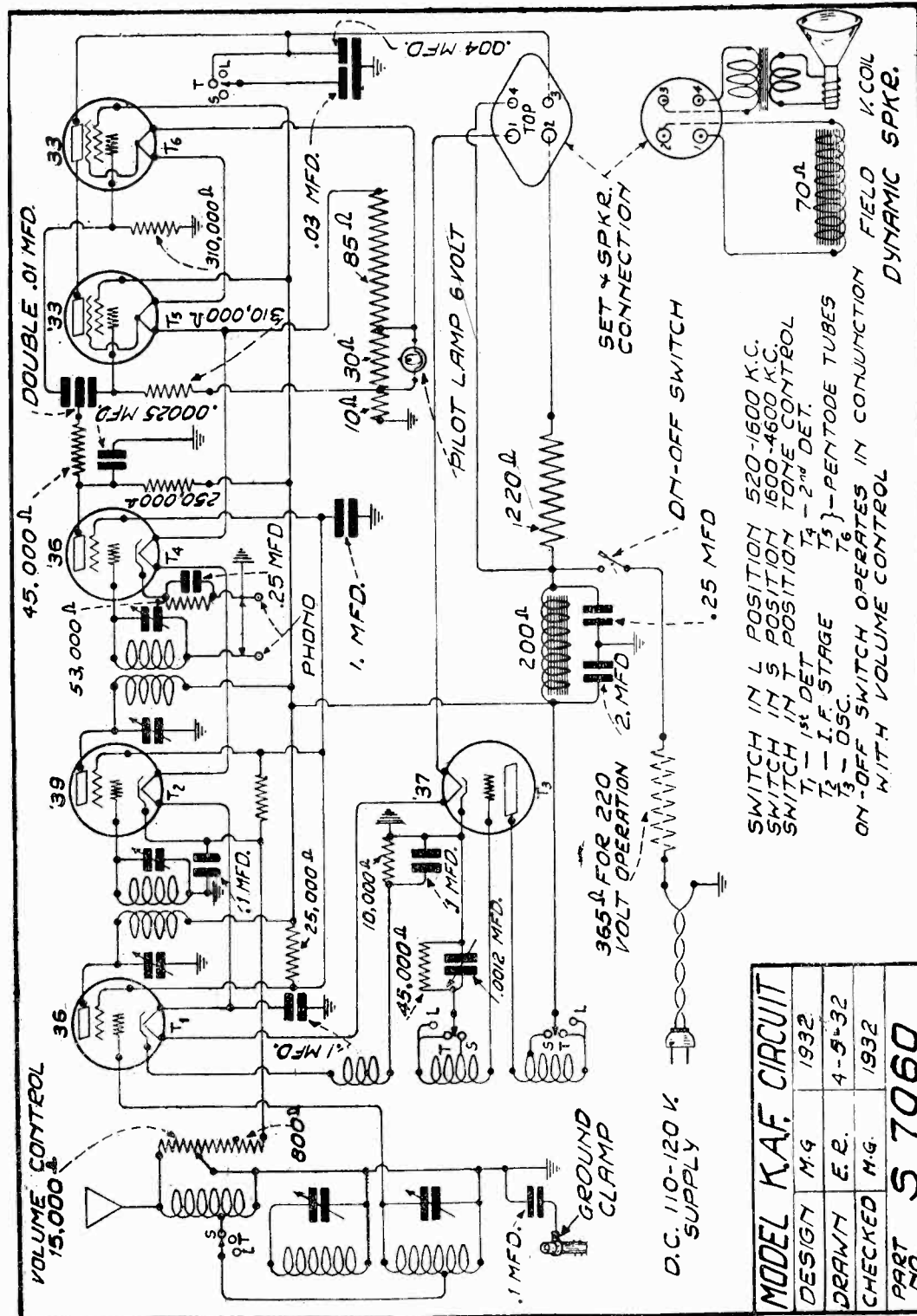
DESIGN	3-10-32	
DRAWN	2-32	B.C.
CHECKED	3-10-32	M.G.

**MODEL BAH CIRCUIT**

(c) 100% 50% ROT.

DEWALD RADIO

MODEL K-A-F  
Schematic



MODEL KAF. CIRCUIT		
DESIGN	M.G.	1932
DRAWN	E.R.	4-5-32
CHECKED	M.G.	1932
PART NO.	S 7060	

FILAMENTS: (a) T-1, 2, 3, 4 5.5 to 7 Volts  
(b) T-5, 6 1.85 to 2.1 Volts

- 1. Chassis to plate of T-1 85-110 Volts
- 2. Chassis to plate of T-2 85-110 Volts
- 3. Chassis to plate of T-3 85-110 Volts
- 4. Chassis to plate of T-4 35-50 Volts
- 5. Chassis to plate of T-5 100-120 Volts

- 6. Chassis to plate of T-6 100-120 Volts
- 7. Chassis to screen of T-1 35-50 Volts
- 8. Chassis to screen of T-2 35-50 Volts
- 9. Chassis to screen of T-3 35-50 Volts
- 10. Chassis to screen of T-4 35-50 Volts
- 11. Chassis to screen of T-5 85-110 Volts
- 12. Chassis to screen of T-6 85-110 Volts

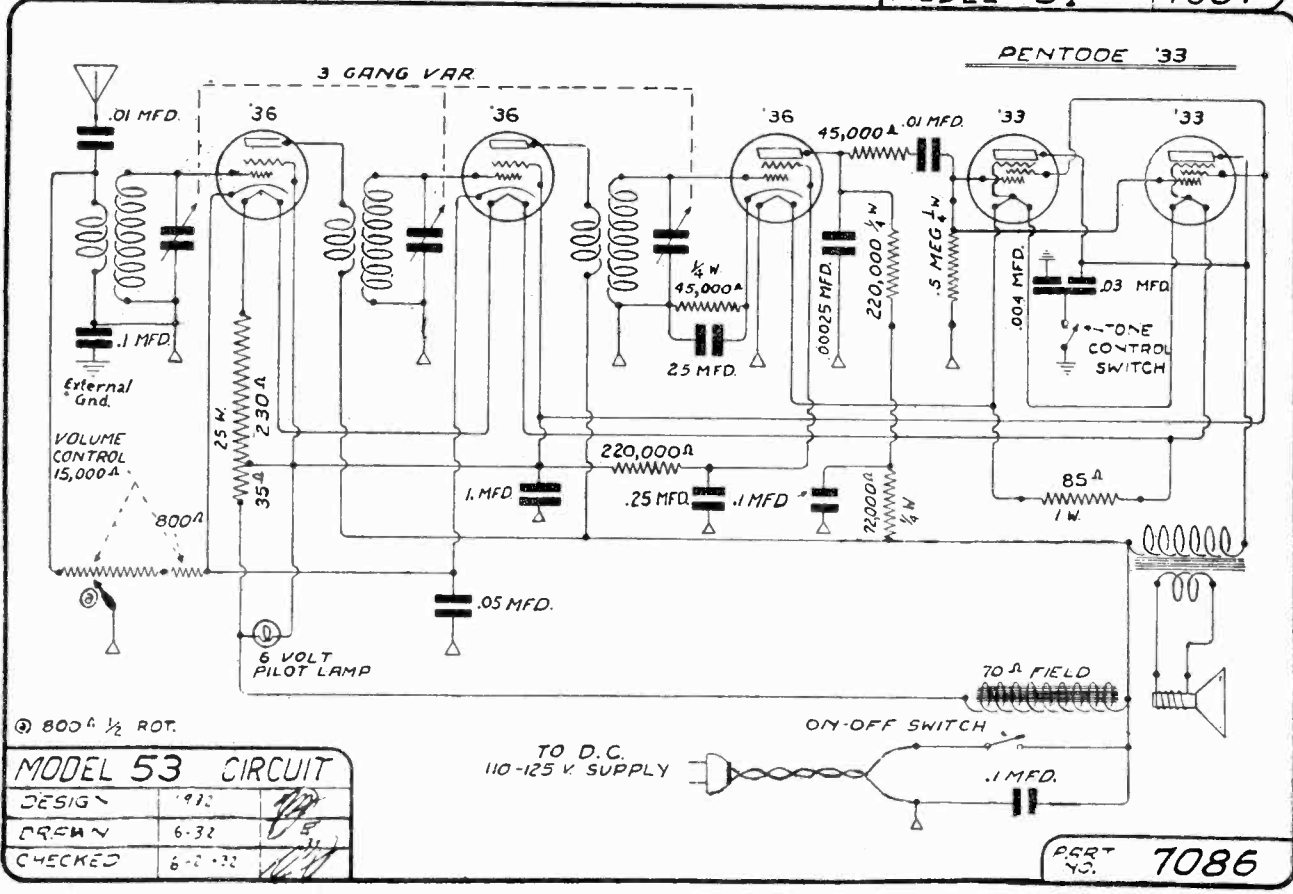
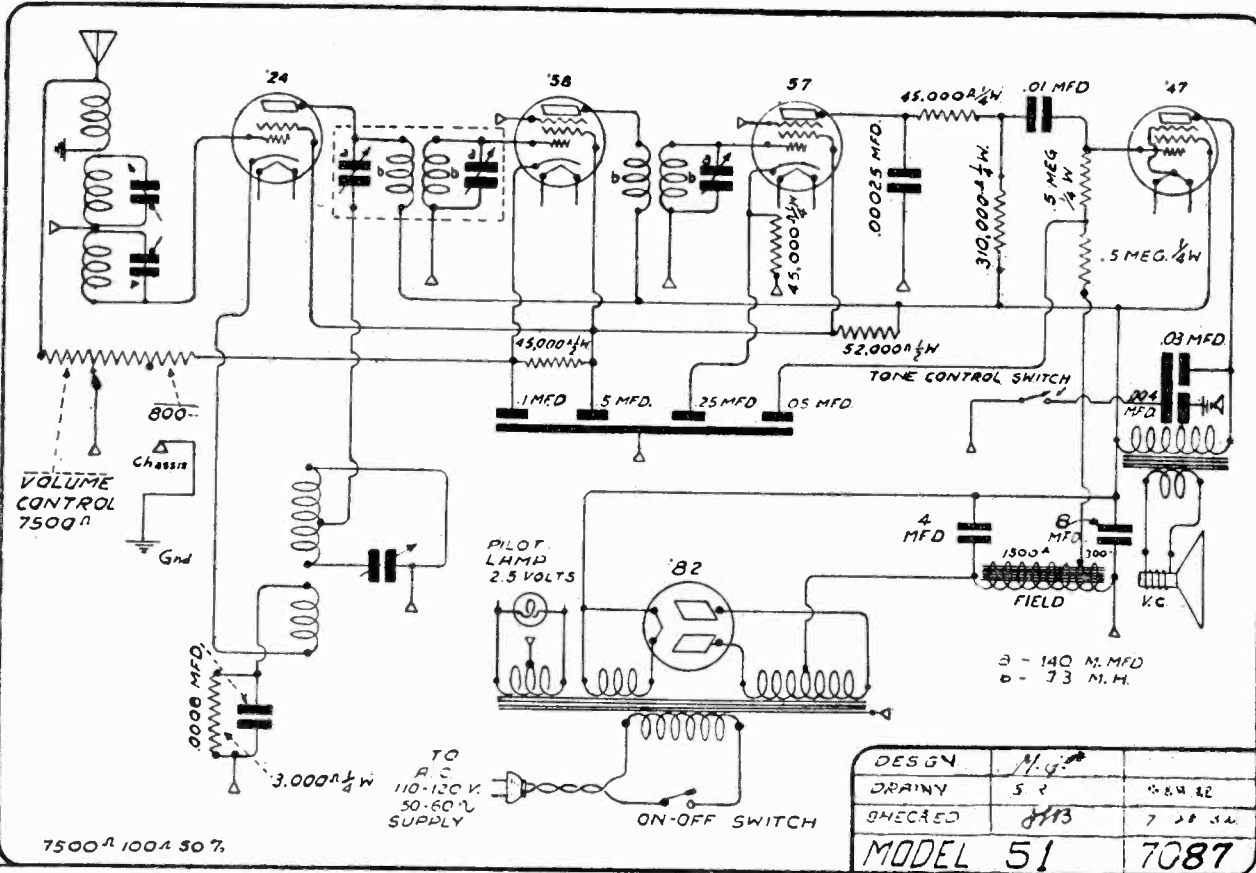
- 13. Chassis to cathode of T-1
- 14. Chassis to cathode of T-2 (Depends on Volume Control Position)
- 15. Chassis to cathode of T-3
- 16. Chassis to cathode of T-4

SWITCH IN L POSITION 520-1600 K.C.  
SWITCH IN S POSITION 1600-4600 K.C.  
SWITCH IN T POSITION TONE CONTROL  
T<sub>1</sub> - 1st DET T<sub>2</sub> - I.F. STAGE T<sub>3</sub> - OSC  
ON-OFF SWITCH OPERATES IN CONJUNCTION WITH VOLUME CONTROL

- 3- 6 Volts Do not allow Ground Lead to come in contact with any part of chassis.
- 2- 25 Volts Do not operate receiver without pilot lamp. If it burns out
- 0 Volts Do not operate receiver without pilot lamp. If it burns out
- 3- 6 Volts replace with 6 volt No. 40 Mazda.

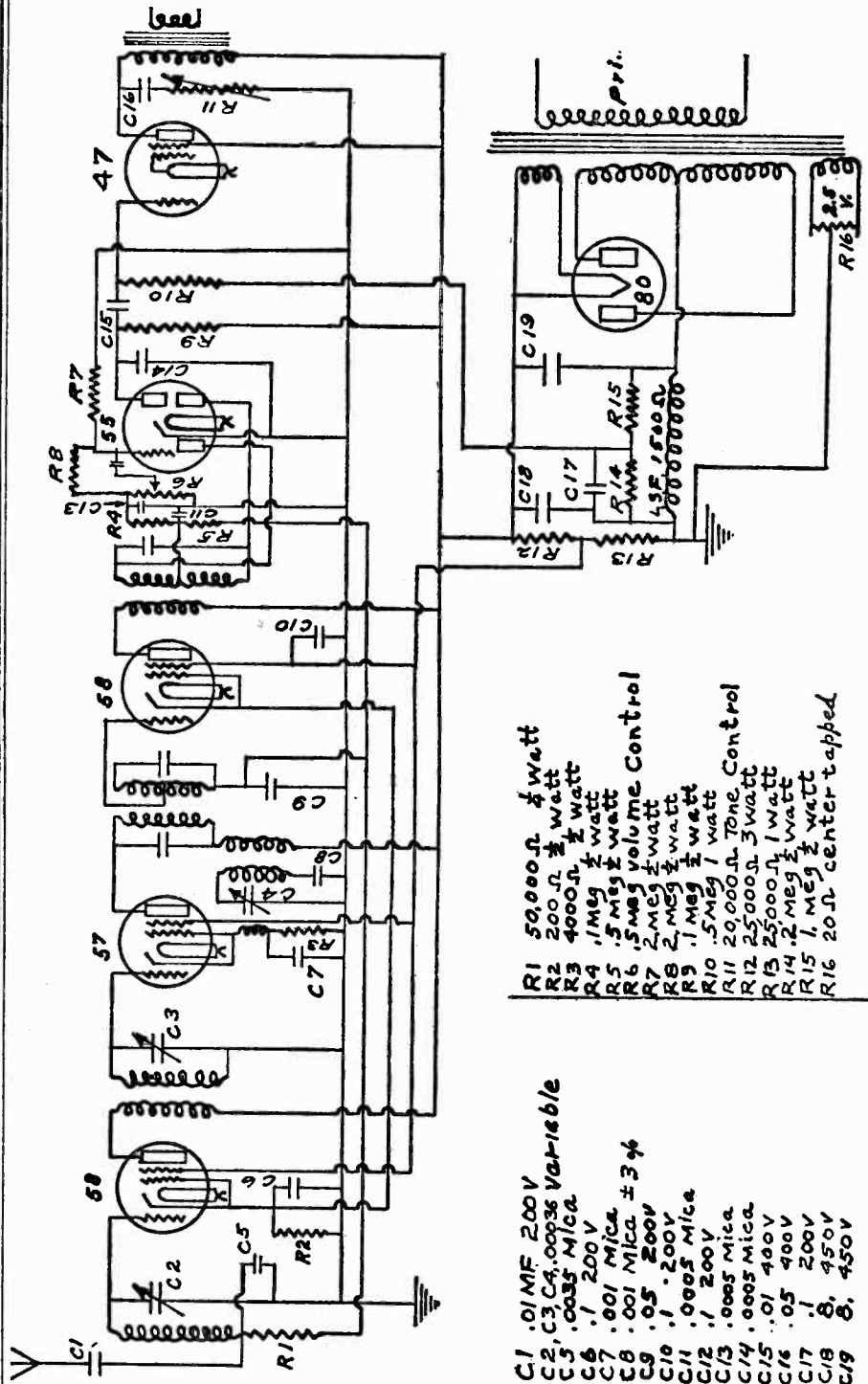
MODEL 51  
MODEL 53

DEWALD RADIO



ECHOPHONE RADIO MFG. CO.

MODEL 5  
Schematic  
Voltage

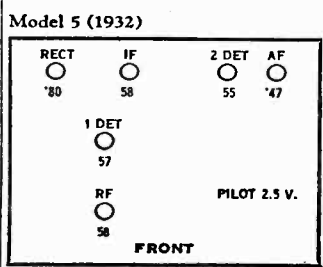


- C1 .01MF 200V
- C2, C3 C4, .0036 Variable
- C5 .0035 Mica
- C6 .1 200V
- C7 .001 Mica ± 3%
- C8 .001 Mica ± 3%
- C9 .05 200V
- C10 .1 200V
- C11 .0005 Mica
- C12 .1 200V
- C13 .0005 Mica
- C14 .0005 Mica
- C15 .01 400V
- C16 .05 400V
- C17 .1 200V
- C18 8, 450V
- C19 8, 450V
- R1 50,000Ω ½ watt
- R2 200Ω ½ watt
- R3 4000Ω ½ watt
- R4 .1Meg ½ watt
- R5 .5Meg ½ watt
- R6 .5Meg Volume Control
- R7 2Meg ½ watt
- R8 2Meg ½ watt
- R9 .1Meg ½ watt
- R10 .5Meg 1 watt
- R11 20,000Ω Tone Control
- R12 25,000Ω 3 watt
- R13 25,000Ω 1 watt
- R14 2Meg ½ watt
- R15 1Meg ½ watt
- R16 20Ω center-tapped

IF PEAK 175 KC

All Condensers & Resistors ± 10% unless otherwise Specified

Echophone—Model 5—Schematic Diagram



- Plates 58 tubes to ground
- Screen grids 58 tubes to ground
- Cathode 58 tubes to ground
- Plate 57 tube to ground
- Screen 57 tube to ground
- Cathode 57 tube to ground
- Audio plate of 55 tube to ground
- Plate 247 tube to ground

- 240-250 volts
- 90-110 volts
- 2-3 volts
- 240-250 volts
- 90-110 volts
- 4-6 volts
- 20-45 volts
- 235-245 volts
- 240-250 volts
- 2.4-2.6 volts
- 4.8-5.2 volts
- 350-370 volts AC
- 95-105 volts

MODEL 5  
Data  
MODEL 14  
Data

## ECHOPHONE RADIO MFG. CO.

### Models 5 and 14 Superheterodyne

#### CIRCUIT

The Echophone Model 5 is a six tube Superheterodyne employing triple grid Pentode and the new duplex diode-triode tubes and having automatic volume control. The circuit consists of one stage of R. F. amplification using a type 58 tube; a combined detector and oscillator using a type 57 tube; one stage of 175 KC I. F. amplification using a type 58 tube; a combined second detector, automatic volume control and first audio stage using a type 55 tube; an output stage using a type 247 tube and a power supply using a type 280 tube.

The first detector-oscillator circuit employs a plate coil in series with the primary of the first I. F. transformer, which is coupled to a coil in the cathode circuit of the oscillator tube. A third coil, coupled to both the plate and cathode coils is tuned by one section of the gang condenser and is made to track with the antenna and R. F. circuits by means of a fixed series condenser.

In lining up the circuits at the high frequency end of the band care must be used in adjusting the trimmer condenser on the R. F. Section. If this trimmer is tightened too much the reaction between the R. F. and oscillator circuits will cause the oscillator to stop oscillating or shift to the frequency of the R. F. tuned circuit. This shifting can readily be recognized by tuning to a lower frequency where it will be found that the dial calibration is far from right and all the tuned circuits are out of line with the oscillator.

The volume control acts on the audio circuit by varying the input to the audio portion of the 55 tube.

A type 55 tube is used as a full wave rectifier for the second detector. The rectified R. F. voltage developed across the input of this tube is fed back to the R. F. and I. F. tubes to provide the automatic volume control action. The grid, cathode and output plate of this tube are used as a triode to give audio amplification.

The filter circuit consists of two 8 MF electrolytic condensers and the 1500 ohm speaker field. The speaker field is in the negative lead and a part of the voltage drop across it is used to bias the grid of the power tube. A bucking coil is used in the speaker to keep the field ripple out of the voice coil.

The tone control consists of a variable resistor and fixed condenser in series across the plate of the power tube and ground.

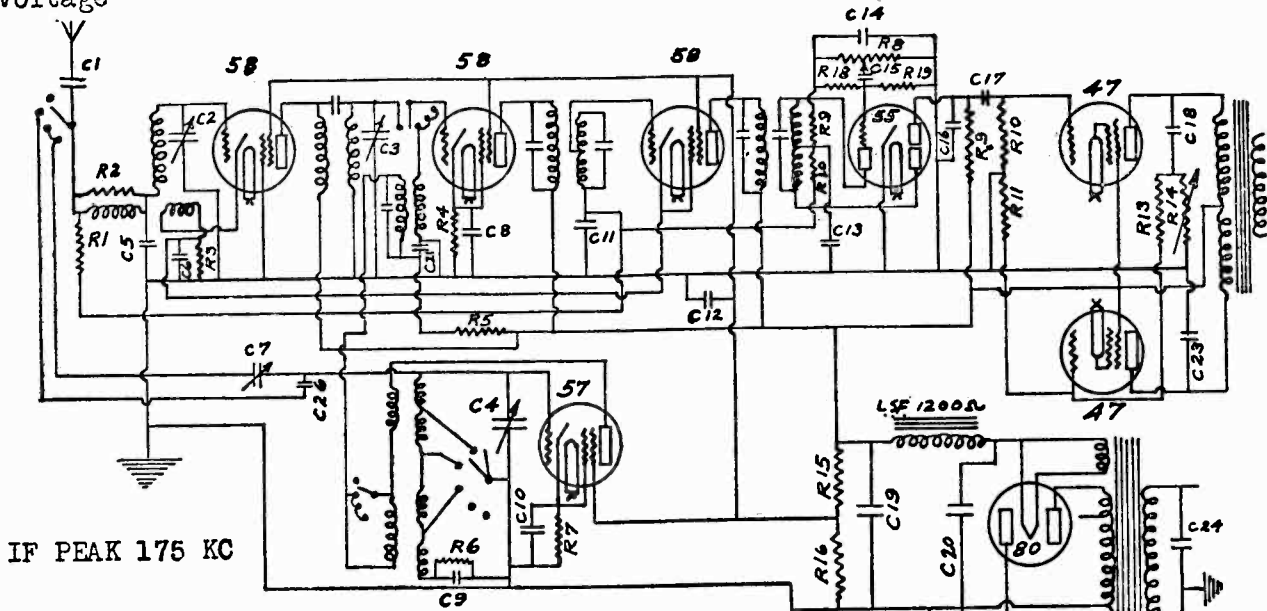
The model 14 is similar to the model 5 except that Shadowgraf tuning has been added. This device operates on the same principle as the more familiar meter tuning devices, excepting that a shadow of varying width instead of a meter band is used as the indicator.



MODEL 10, 15, 20  
Schematic  
Voltage

ECHOPHONE RADIO MFG. CO.

MODEL 16,17,18  
Voltage

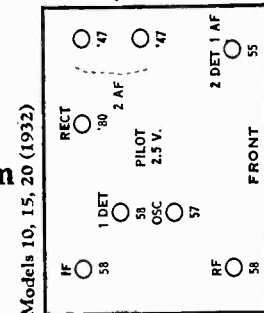


IF PEAK 175 KC

- C1 .01 MF 200 V. Cond.
- C2, C3, C4 .00036 Variable Cond.
- C5 .0035 Mica Cond.
- C6 .1 MF 200 V. Cond.
- C7 16 MMF Var Cond.
- C8 .1 MF 200 V. Cond.
- C9 .001 Mica Cond + - 3%
- C10 .1 MF 200 V. Cond.
- C11 .05 MF 200 V. Cond.
- C12 .1 MF 200 V. Cond.
- C13 .0005 Mica Cond.
- C14 .00025 Mica Cond.
- C15 .1 MF 200 V. Cond.
- C16 .0005 Mica Cond.
- C17 .01 MF 400 V. Cond.
- C18 .05 400 V. Cond.
- C19 8 MF 500 V. Cond.
- C20 8 MF 500 V. Cond.
- C21 .1 MF 400 V. Cond.
- C22 .1 MF 200 V. Cond.
- C23 .006 MF 400 V. Cond.
- C24 .01 MF 400 V. Cond.
- C25 .01 MF 400 V. Cond.
- C26 30 MMF Mica Cond.

- R1 50,000 Ohm 1/2 Watt Res.
- R2 5,000 Ohm 1/2 Watt Res.
- R3 100 Ohm .5 Watt Res.
- R4 1500 Ohm .5 Watt Res.
- R5 1500 Ohm .5 Watt Res.
- R6 1,900 Ohm 1/2 Watt Res.
- R7 150 Ohm .5 Watt Res.
- R8 500,000 Ohm Volume Control.
- R9 100,000 Ohm .5 Watt Res.
- R10 .5 Meg .5 Watt Res.
- R11 10,000 Ohm .5 Watt Res.
- R12 400 Ohm .3 Watt Res.
- R13 .25 Meg .5 Watt Res.
- R14 20,000 Ohm Tone Control.
- R15 15,000 Ohm .3 Watt Res.
- R16 25,000 Ohm .1 Watt Res.
- R17 20 Ohm C. Tapped Res.
- R18 2 Meg .5 Watt Res.
- R19 2 Meg .5 Watt Res.

Note -  
Models 15 & 20 have 2 - 4000Ω speaker fields in parallel



Echophone—Model 10, 15, 20—Schematic Diagram

MODELS 10, 15, 16, 17, 18, 20 SUPERHETERODYNE

VOLTAGE TESTS

All voltage tests made with volume control on full and no signal in set.

	MODEL 10	MODELS 15-20
Plates of 58 tubes to ground	225-235 volts	240-250 volts
Screen grids of 58 tubes to ground	90-100 "	95-105 "
Cathodes RF and IF tubes to ground	1-2 "	1-2 "
Cathode 1st Detector tube to ground	6-8 "	6-8 "
Plate of Oscillator tube to ground	210-220 "	215-225 "
Screen grid Oscillator tube to ground	90-100 "	95-105 "
Cathode of Oscillator on broadcast to ground	1 volt	1 volt
Audio plate of 55 tube to ground	20-30 volts	20-30 volts
Plates of 47 tubes to ground	220-230 "	230-240 "
Across speaker field	120-130 "	170-180 "
All heaters	2.4-2.6 "	2.4-2.6 "
'80 filament	4.8-5.2 "	4.8-5.2 "
Center tap of heaters to ground	17-18 "	18-19 "
280 plate to ground	350-370 "AC	400-420 "AC





MODEL 10,15, 20

MODEL 16,17,18

Notes

## ECHOPHONE RADIO MFG. CO.

## Models 10, 15, 20—16, 17, 18

## Short and Standard Wave Superheterodyne

## CIRCUIT

The Echophone Models 10, 15 and 20 employ the same chassis, the only difference being in the cabinets, the speakers and the connection of the power transformer. The Model 10 has a single 8" speaker and Models 15 and 20 have dual 8" speakers.

The Echophone Model 10 is an 8 tube combination short and standard wave receiver employing triple grid, pentode and the new duplex diode-triode detector tube. The circuit consists of an R. F. stage using a type 58 tube; a first detector (which operates as an I. F. tube on the short wave bands) using a type 58 tube; an oscillator stage using a type 57 tube; a 175KC I. F. stage using a type 58 tube; a combined second detector, automatic volume control and first audio stage using a type 55 tube; a push pull output stage using two type 247 tubes; and a power supply using a type 280 tube.

The R. F. tube is not used on the three short wave bands, and the antenna is coupled to the grid of the oscillator tube through a small adjustable condenser. Should the oscillator stop oscillating on the shortest wave band, this condenser capacity should be decreased slightly. The oscillator coil is tapped for the three short wave bands and has two tickler coils in series. On the two shortest bands the larger of the two ticklers is short circuited.

The first detector and oscillator are inductively coupled and when operating on short waves the grid of the first detector tube is switched to an I. F. transformer having its primary connected in the plate circuit of the oscillator tube, there by providing an extra I. F. stage for short wave reception.

A type 55 tube is used as a full wave rectifier for the second detector. The rectified R.F. voltage developed across the input of this tube is fed back to the R. F. and I. F. tubes to provide the automatic volume control action. The grid, cathode and output plate of this tube are used as a triode to give audio amplification.

The output stage consists of two type 247 tubes in a resistance coupled push-pull circuit.

The filter circuit consists of the 1200 ohm speaker field (on the Model 10) and two 8 MF electrolytic condensers. A bucking coil is used in the speaker to keep the field ripple out of the voice coil.

The Model 15 and 20 chassis employ dual speakers with fields of 4000 ohms each connected in parallel. The power transformers in the Models 10, 15 and 20 are the same, the high voltage plate supply winding being tapped. The tapped portion of the winding being used on the Model 10 chassis and the full winding is used on the Models 15 and 20 to provide the extra voltage necessary to excite the dual speaker fields.

NOTE: The voice coils of the dual speakers are connected in parallel and must bear the proper relation to each other. To check this connection, disconnect the voice coil of the speaker without the transformer mounted on it. An increase in volume with this coil disconnected indicates that the voice coils are reversed, and should be corrected by inter-changing the red and green wires leading to the speaker without the transformer.

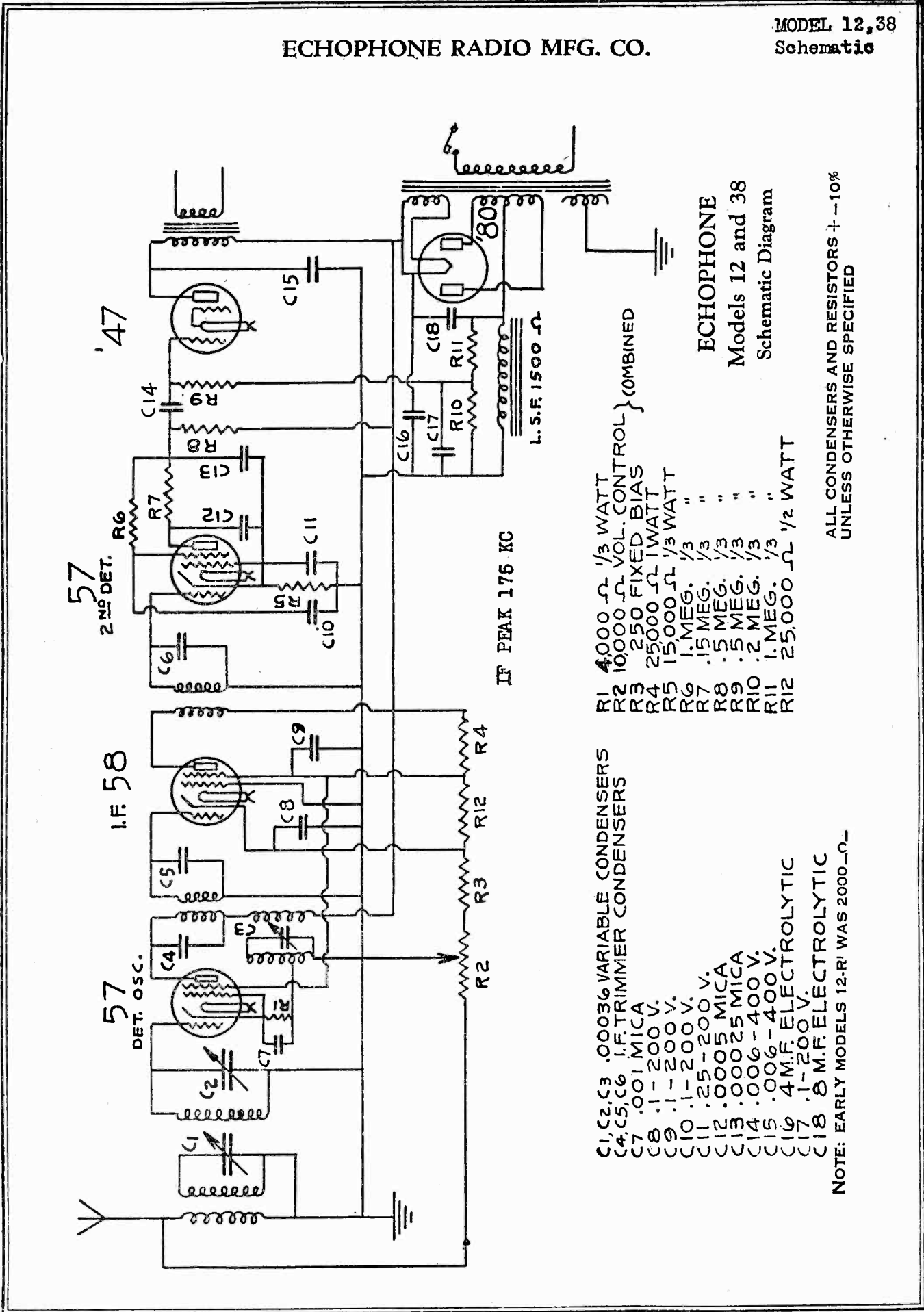
## Models 16, 17, 18

These models are similar to the Models 10, 15 and 20, excepting that they are not designed for short wave reception and that Shadowgraf tuning has been added.

The oscillator and R. F. Coils are different from the coils used in the Models 10, 15 and 20, and the oscillator tube is a 56 instead of a 57. The first detector was changed from a 58 to a 57 tube. The Shadowgraf tuning device works on the same principle as the more familiar meter tuning devices, excepting that a shadow of varying width instead of a meter band is used as the indicator.

ECHOPHONE RADIO MFG. CO.

MODEL 12,38  
Schematic



- IF PEAK 176 KC
- R1 4000 Ω 1/3 WATT
  - R2 10,000 Ω VOL. CONTROL } (COMBINED)
  - R3 250 Ω FIXED BIAS
  - R4 25,000 Ω 1/3 WATT
  - R5 15,000 Ω 1/3 WATT
  - R6 1. MEG. 1/3 " "
  - R7 .15 MEG. 1/3 " "
  - R8 .5 MEG. 1/3 " "
  - R9 .5 MEG. 1/3 " "
  - R10 .2 MEG. 1/3 " "
  - R11 1. MEG. 1/3 1/2 WATT
  - R12 25,000 Ω 1/2 WATT

- C1, C2, C3 .00036 VARIABLE CONDENSERS
- C4, C5, C6 I.F. TRIMMER CONDENSERS
- C7 .001 MICA
- C8 .1 - 200 V.
- C9 .1 - 200 V.
- C10 .1 - 200 V.
- C11 .25 - 200 V.
- C12 .0005 MICA
- C13 .00025 MICA
- C14 .006 - 400 V.
- C15 .006 - 400 V.
- C16 4 M.F. ELECTROLYTIC
- C17 .1 - 200 V.
- C18 8 M.F. ELECTROLYTIC

ECHOPHONE  
Models 12 and 38  
Schematic Diagram

ALL CONDENSERS AND RESISTORS + -10%  
UNLESS OTHERWISE SPECIFIED

NOTE: EARLY MODELS 12-R1 WAS 2000 Ω-

**MODEL 12, 38**  
**Voltage**

**ECHOPHONE RADIO MFG. CO.**

## **Model 12 Superheterodyne**

### **CIRCUIT DESCRIPTION**

The Echophone Model 12 is a 5-tube Superheterodyne employing the new types 57 and 58 tubes. The circuit consists of a pre-selector; combined first detector and oscillator, employing a type 57 tube; a 175 KC I. F. stage employing a type 58 tube; a second detector employing a type 57 tube; an output stage employing a type 247 tube and a rectifier and filter system employing a type 280 tube.

The oscillator is tuned by a special section of the three gang condenser and no series padding condenser is used. The I.F. stage is single tuned, the plate coil being made self resonant at 175 KC. The second detector is a resistance coupled power detector obtaining its screen grid voltage from its plate thru a 1 Meg. resistor.

The filter circuit consists of an 8 MF and a 4 MF electrolytic condenser and the speaker field. Part of the drop across the field, which is in the negative side of the filter circuit, is used to bias the grid of the 247 tube.

The volume control operates by varying the bias on the 58 tube and by limiting the antenna in-put to the pre-selector.

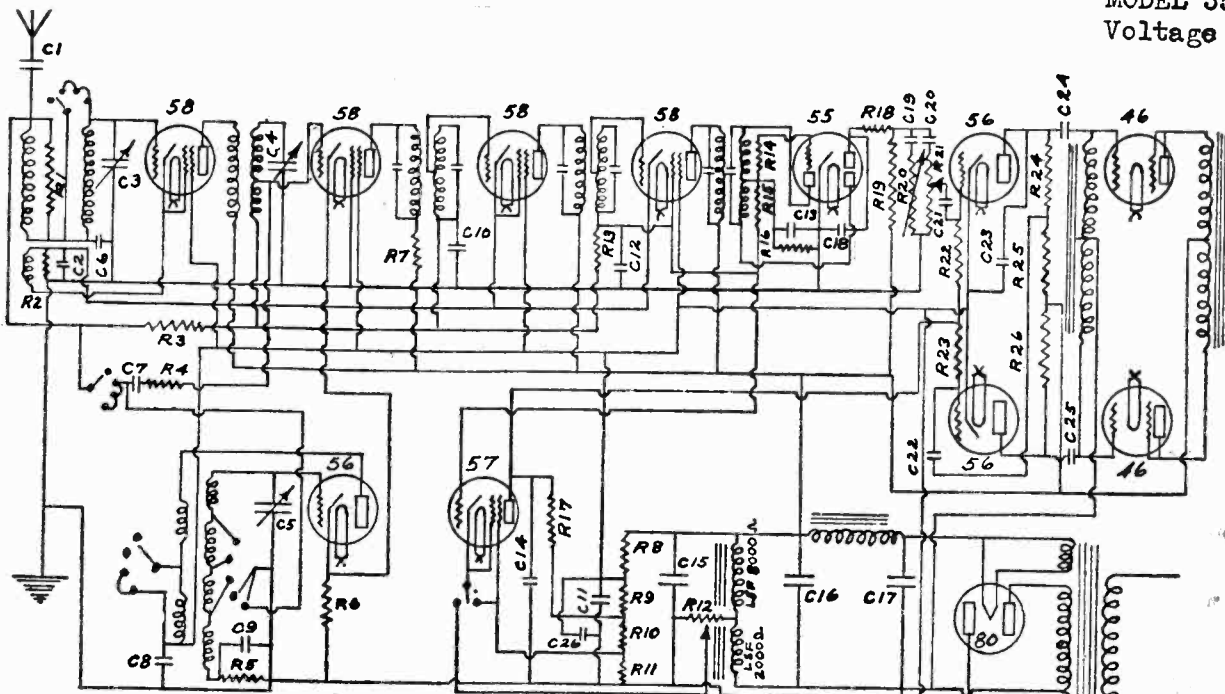
### **VOLTAGE TESTS**

All D. C. voltages given were tested on 250V scale of a 1000 ohms per volt meter with volume on full and no signal in the receiver, line voltage 115.

Fil. 280 tube to ground	240-250V
Plate oscillator and I. F. tubes to ground	240-250V
Screen oscillator and I. F. tubes to ground	90-100
Cathode I. F. tube to ground	2-3
Cathode oscillator tube to ground	4-10
Plate of second detector to ground	30-45
Screen of second detector to ground	20-30
Cathode of second detector to ground	5-10
Across speaker field	90-100
Plates 280 to center tap of high voltage	350-370V AC
All heaters	2.4-2.6V AC
Fil. 280 tube	4.9-5.1V AC

ECHOPHONE RADIO MFG. CO.

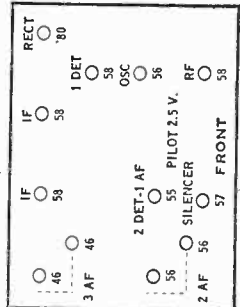
MODEL 35  
Schematic  
MODEL 35,36  
Voltage



- C1 .01 MF 200V. Cond.
- C2 .1 MF 200V. Cond.
- C3, C4, C5 .00036 Var Cond.
- C6 .05 Mica Cond.
- C7 .20 MF 200V. Cond.
- C8 .1 MF 200V. Cond.
- C9 .001 Mica Cond. ± 5%
- C10 .1 MF 200V. Cond.
- C11 .8 MF 200V. Cond.
- C12 .05 MF 200V. Cond.
- C13 .00025 Mica Cond.
- C14 .02 MF 200V. Cond.
- C15 .8 MF 500V. Cond.
- C16 .8 MF 500V. Cond.
- C17 .8 MF 500V. Cond.
- C18 .0005 Mica Cond.
- C19 .02 400V. Cond.
- C20 .1 MF 400V. Cond.
- C21 .02 MF 400V. Cond.
- C22 .02 MF 400V. Cond.
- C23 .001 Mica Cond.
- C24 .05 MF 100V. Cond.
- C25 .05 MF 100V. Cond.
- C26 .1 MF 200V. Cond.

- R1 1000 Ohm .5 Watt Res.
- R2 200 Ohm .5 Watt Res.
- R3 50,000 Ohm .5 Watt Res.
- R4 100 Ohm .5 Watt Res.
- R5 15,000 Ohm 1 Watt Res.
- R6 700 Ohm 1 Watt Res.
- R7 Voltage Divider R7 1500 Ohm
- R8 10,000 Ohm R9 500 Ohm R10 7500 Ohm
- R11 2500 Ohm
- R12 100 Ohm 1 Watt Res.
- R13 100,000 Ohm 1 Watt Res.
- R14 100,000 Ohm 1 Watt Res.
- R15 .5 MΩ 1 Watt Res.
- R16 .5 MΩ 1 Watt Res.
- R17 100,000 Ohm .5 Watt Res.
- R18 50,000 Ohm 1 Watt Res.
- R19 50,000 Ohm 1 Watt Res.
- R20 500,000 Ohm Control
- R21 500,000 Ohm 1 Watt Res.
- R22 100,000 Ohm 1 Watt Res.
- R23 100,000 Ohm 1 Watt Res.
- R24 50,000 Ohm 1 Watt Res.
- R25 50,000 Ohm .5 Watt Res.
- R26 50,000 Ohm 1 Watt Res.
- R27 1000 Ohm 3 Watt Res.
- R28, R29, R30 20 Ohm C.T. Res.

46 Tubes  
1st. Audio  
2- 56 Tubes  
Remainder  
of 2.5V. Tubes



IF PEAK 175 KC Echophone—Model 35—Schematic Diagram

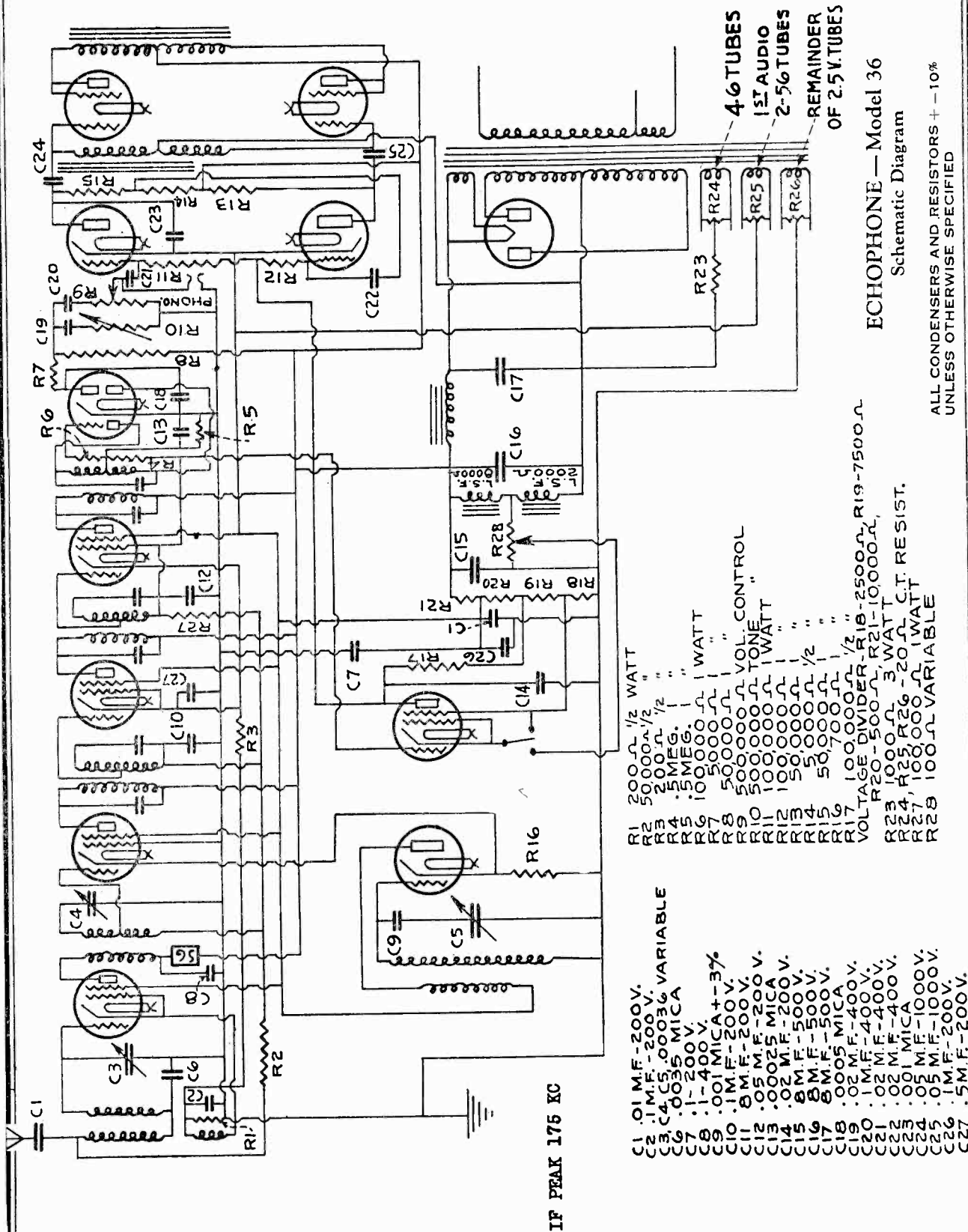
MODELS 35 AND 36 SUPERHETERODYNE  
VOLTAGE TESTS

All voltage tests made with volume control on full and no signal

Plates of RF.-IF. and 46 tubes to ground	245-255 volts
Screen grids of RF. and IF. tubes to ground	85-95 "
Cathodes of RF. and IF. tubes to ground	1-2 "
Plate of 1st Detector to ground	245-255 "
Cathode of 1st Detector to ground	4-6 "
Screen grid of 1st Detector to ground	85-95 "
Plate of Oscillator tube to ground	85-95 "
Cathode of Oscillator tube to ground	4-6 "
Plates of 56 audio tubes to ground	155-165 "
Bias on 56 audio tubes is the voltage across the two middle taps on voltage divider	3.75 "
Bias on 46 tubes (across 1000-ohm, 3-watt resistor)	40-45 "
Plate to ground of 57 tube	45-55 "
Drop across filter choke	25 "
Plate of 280 tube to ground	425 " AC
Drop across series speaker field	135-145 "

MODEL 36  
Schematic

ECHOPHONE RADIO MFG. CO.



IF PEAK 175 KC

- C1 01 M.F.-200V.
- C2 01 M.F.-200V.
- C3 C4 C5 .00036 VARIABLE
- C6 .0035 MICA
- C7 .1-200V.
- C8 .01 MICA +-3%
- C9 .1-400V.
- C10 .1 M.F.-200V.
- C11 .05 M.F.-200V.
- C12 .0025 MICA
- C13 .02 M.F.-200V.
- C14 .02 M.F.-500V.
- C15 .02 M.F.-500V.
- C16 .02 M.F.-500V.
- C17 .005 MICA
- C18 .02 M.F.-400V.
- C19 .02 M.F.-400V.
- C20 .02 M.F.-400V.
- C21 .02 M.F.-400V.
- C22 .01 MICA
- C23 .01 M.F.-1000V.
- C24 .05 M.F.-1000V.
- C25 .1 M.F.-200V.
- C26 .1 M.F.-200V.
- C27 .5 M.F.-200V.
- R1 200 ohm 1/2 WATT
- R2 50000 ohm 1/2 " "
- R3 200 ohm 1/2 " "
- R4 .5 MEG. " " "
- R5 .5 MEG. " " " WATT
- R6 100000 ohm 1/2 " "
- R7 50000 ohm " "
- R8 50000 ohm " "
- R9 50000 ohm VOL. CONTROL
- R10 50000 ohm TONE
- R11 50000 ohm " "
- R12 100000 ohm 1/2 " "
- R13 50000 ohm " "
- R14 50000 ohm " "
- R15 50000 ohm " "
- R16 100000 ohm 1/2 " "
- R17 100000 ohm " "
- R18 VOLTAGE DIVIDER R18-25000 ohm R19-7500 ohm
- R19 500 ohm " "
- R20 500 ohm " "
- R21 100000 ohm " "
- R22 1000 ohm 3 WATT C.T. RESIST.
- R23 100000 ohm " "
- R24 100000 ohm " "
- R25 100000 ohm " "
- R26 100000 ohm " "
- R27 100000 ohm " "
- R28 100000 ohm VARIABLE

4-6 TUBES  
1st AUDIO  
2-5-6 TUBES  
REMAINDER  
OF 2.5V. TUBES

ECHOPHONE — Model 36  
Schematic Diagram

ALL CONDENSERS AND RESISTORS + -10%  
UNLESS OTHERWISE SPECIFIED

ECHOPHONE RADIO MFG. CO.

MODEL 35, 36  
Notes

## Models 35 and 36

### Short and Standard Wave Superheterodyne

#### CIRCUIT

The Echophone Model 35 is a twelve tube combination short and standard wave receiver having automatic volume control and silent tuning and employing triple grid, duplex diode-triode and the new type 46 output tubes. The circuit consists of a stage of high gain R. F. amplification using a type 58 tube; a first detector stage using a type 58 tube; an oscillator stage using a type 56 tube; two stages of 175KC I. F. amplification using type 58 tubes; a combined detector, automatic volume control and first audio stage using a type 55 tube; a second audio stage employing two type 56 tubes in push pull; an output stage using two type 46 tubes in push pull; a silent tuning control using a type 57 tube, and a power supply using a type 280 tube. The R. F. tube is used as an antenna coupling tube on short waves, all the rest of the tubes performing the same functions on both standard and short waves.

The oscillator coil is tapped for the three short wave bands and has two tickler coils, the largest being short circuited on the two shortest wave bands.

The first detector and oscillator tubes are coupled by means of a common cathode resistor.

A type 55 tube is used as a full wave rectifier for the second detector. The rectified R. F. voltage developed across the input of this tube is fed back to the R. F., first detector and I. F. tubes to provide the automatic volume control action. The grid, cathode and output plate of this tube are used as a triode to give audio amplification.

The second audio stage consists of two type 56 tubes in a resistance coupled push pull circuit.

The output stage consists of two type 46 tubes in an impedance coupled push pull circuit working into the two 12" dual speakers.

The volume control operates by varying the input to the push pull type 56 tubes in the second audio stage.

The filter circuit consists of a choke, three 8 MF electrolytic condensers and the 2000 ohm series speaker field.

The silent tuning control consists of a type 57 tube so arranged that when the set is tuned off a carrier wave it causes the bias on the type 56 second audio stage tubes to increase to a point where the tube cuts off there by silencing the whole audio system. When the set is tuned across a carrier wave the control tube causes the bias to drop to normal and a signal is heard. When the volume control knob is pulled out the cathode and screen grid of the control tube are connected together causing the silent control to be in-operative.

An adjustable control for varying the sensitivity of the silent tuning control is provided on the back of the chassis. This control varies the bias on the silent tuning control tube, the type 57 tube) which tube in turn varies the bias on the second audio stage tubes. The lower the bias on the audio tubes, the weaker the carrier wave necessary to cause the audio system to operate. This variable control should be adjusted so that stations which are used mostly will cause the silent control to operate properly. When receiving weak distant stations or when operating on the short wave bands the volume control knob should be pulled out.

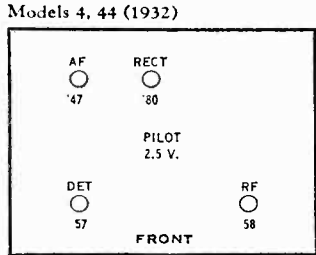
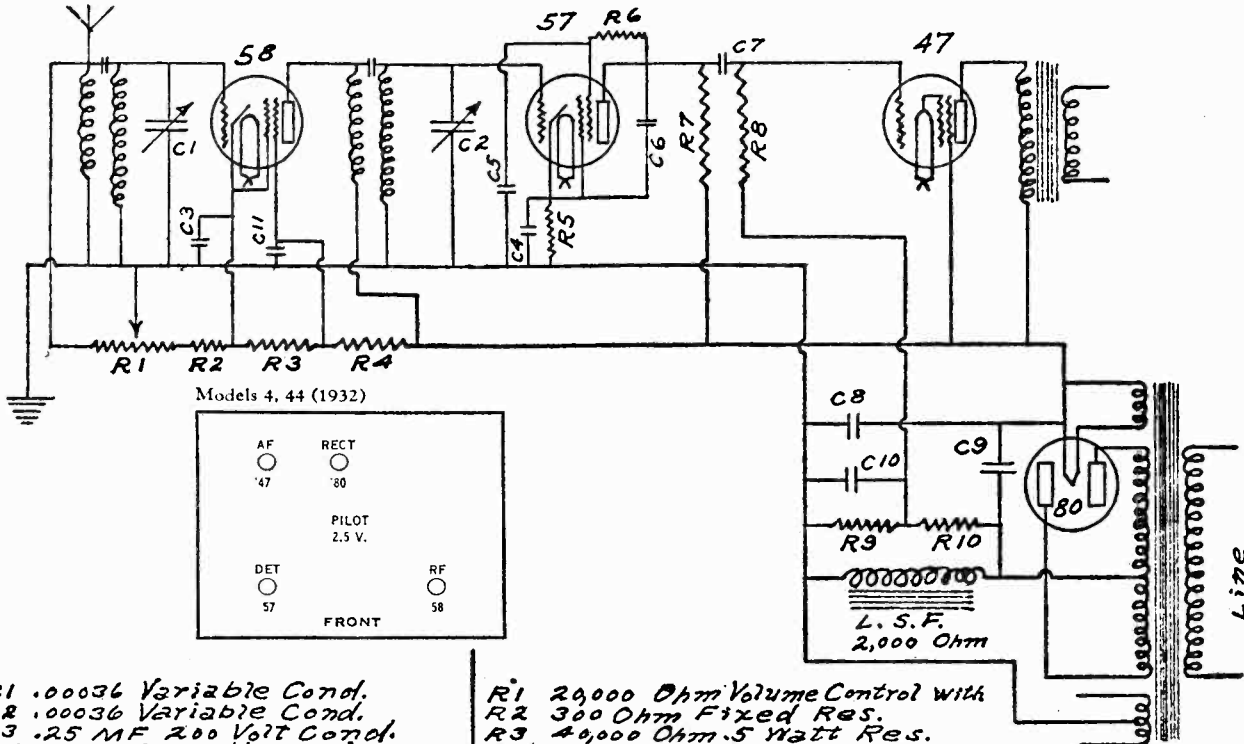
The tone control consists of a variable resistor and fixed condenser in series connected across the audio plate of the second detector and ground.

NOTE: The voice coils of the dual speakers are connected in parallel and must bear the proper relation to each other. To check this connection, disconnect the voice coil of the speaker without the transformer mounted on it. An increase in volume with this coil disconnected indicates that the voice coils are reversed, and should be corrected by inter-changing the red and green wires leading to the speaker without the transformer.

The Model 36 is similar to the Model 35 excepting that it is not designed for short wave reception. There is no short wave switch and the oscillator and R. F. coils are different from the coils used in the Model 35. These changes are self evident by comparing the Model 35 and 36 circuits. Shadowgraf tuning is incorporated in the Model 36. This device operates on the same principle as the more familiar meter tuning devices, excepting that a shadow of varying width instead of a meter band is used as the indicator. ♪

MODEL 4,44  
Schematic  
Voltage

ECHOPHONE RADIO MFG. CO.



- C1 .00036 Variable Cond.
- C2 .00036 Variable Cond.
- C3 .25 MF 200 Volt Cond.
- C4 .25 MF 200 V. Cond.
- C5 .1 MF 200 V. Cond.
- C6 .001 Mic2 Cond.
- C7 .01 MF 400 V. Cond.
- C8 4 MF 400 V. Cond.
- C9 8 MF 400 V. Cond.
- C10 .1 MF 200 V. Cond.
- C11 .1 MF 200 V. Cond.

- R1 20,000 Ohm Volume Control with
- R2 300 Ohm Fixed Res.
- R3 40,000 Ohm .5 Watt Res.
- R4 50,000 Ohm 1 Watt Res.
- R5 15,000 Ohm .5 Watt Res.
- R6 1 Meg. .5 Watt Res.
- R7 .5 Meg. .5 Watt Res.
- R8 .5 Meg. .5 Watt Res.
- R9 200,000 Ohm .5 Watt Res.
- R10 1 Meg. .5 Watt Res.

All Resistors & Condensers  $\pm 10\%$

Echophone—Model 4 and 44—Schematic Diagram

The R. F. stage is impedance coupled and there is a small coupling condenser fastened on the lower end of the R. F. coil. If the set is weak or oscillates at the high frequency end of the band a slight adjustment of this condenser will remedy the trouble. After adjusting this condenser the gang condenser should be checked for alignment with the rotor plates nearly open.

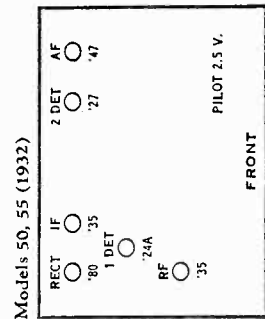
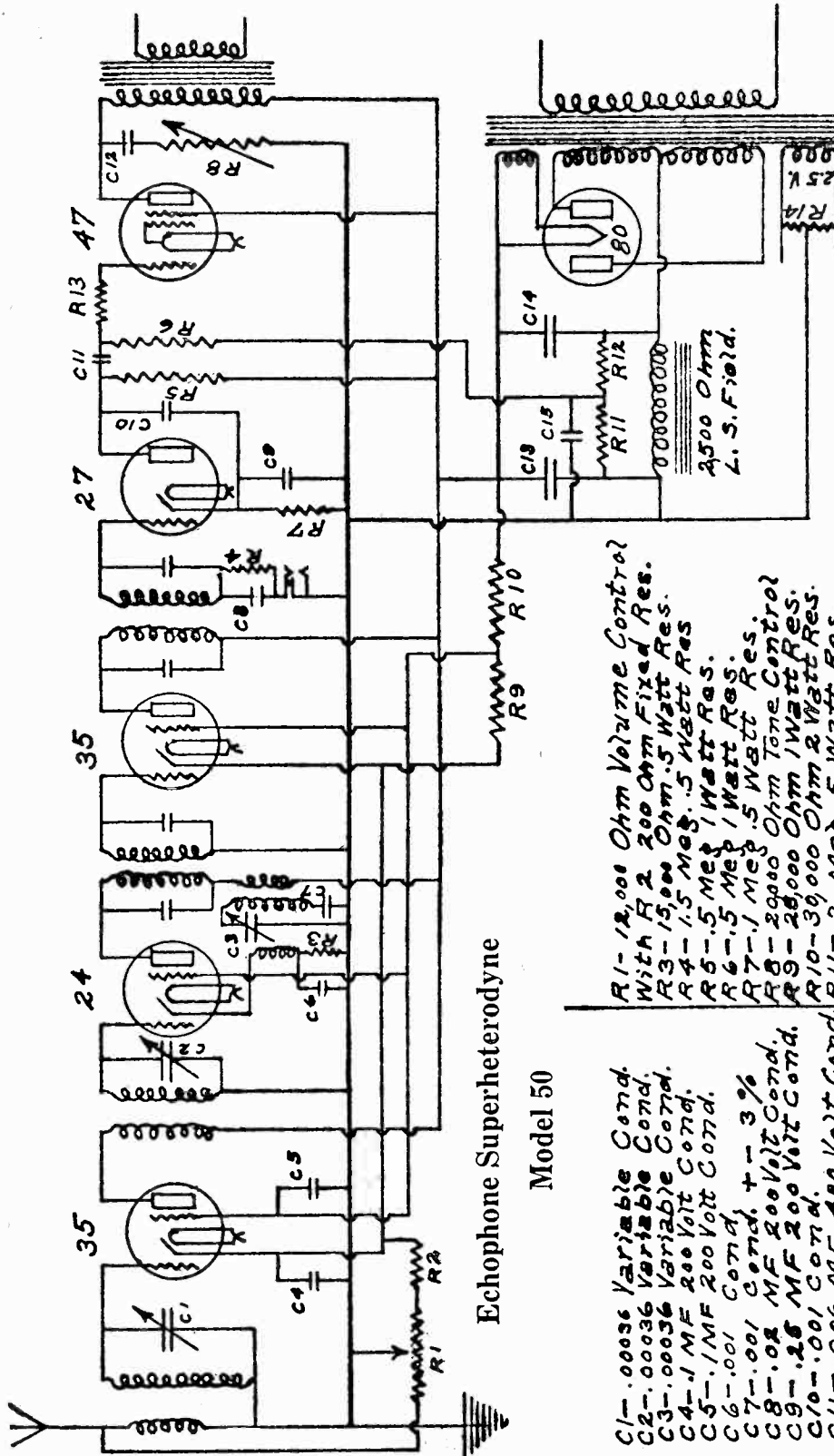
VOLTAGE TESTS

All voltage tests made with volume control on full and no signal in set.

Plate of 58 tube to ground	245-250 volts
Screen grid of 58 tube to ground	85-95 "
Cathode of 58 tube to ground	2-3 "
Plate of 47 tube to ground	235-245 "
Screen grid of 47 tube to ground	245-250 "
Plate of 57 tube to ground	50-75 "
Screen grid of 57 tube to ground	20-40 "
Cathode of 57 tube to ground	2-5 "
Across speaker field	85-95 "
All heaters	2.4-2.6 "
'80 filament	4.8-5.2 "
Plate '80 tube to ground	340-360 "AC

ECHOPHONE RADIO MFG. CO.

MODEL 50  
Schematic



Models 50, 55 (1932)

Echophone Superheterodyne  
Model 50

- C1-.00036 Variable Cond.
- C2-.00036 Variable Cond.
- C3-.00036 Variable Cond.
- C4-.1 MF 200 Volt Cond.
- C5-.1 MF 200 Volt Cond.
- C6-.001 Cond.
- C7-.001 Cond. +- 3%
- C8-.02 MF 200 Volt Cond.
- C9-.25 MF 200 Volt Cond.
- C10-.006 MF 400 Volt Cond.
- C11-.06 MF 400 Volt Cond.
- C12-.8 MF 450 Volt Cond.
- C13-.8 MF 450 Volt Cond.
- C14-.8 MF 450 Volt Cond.
- C15-.1 MF 200 Volt Cond.
- R1-12,000 Ohm Volume Control  
With R2, 200 Ohm Fixed Res.
- R2-200 Ohm Fixed Res.
- R3-15,000 Ohm .5 Watt Res.
- R4-1.5 Meg. .5 Watt Res.
- R5-.5 Meg. 1 Watt Res.
- R6-.5 Meg. 1 Watt Res.
- R7-.1 Meg. .5 Watt Res.
- R8-20,000 Ohm Tone Control
- R9-20,000 Ohm 1 Watt Res.
- R10-30,000 Ohm 2 Watt Res.
- R11-.2 Meg. .5 Watt Res.
- R12-1.1 Meg. .5 Watt Res.
- R13-.15 Meg. .5 Watt Res.
- R14-20 Ohm Center Tapped Res.

All Condensers And Resistors +- 10 %  
Unless Otherwise Specified.

IF PEAK 175 KC

FRONT



MODEL 50  
Notes  
Voltage

## ECHOPHONE RADIO MFG. CO.

### Model 50 Superheterodyne

#### CIRCUIT

The Echophone Model 50 is a six tube Superheterodyne, employing screen grid, variable MU and Pentode tubes. The circuit consists of one stage of R. F. amplification using a type 235 tube; a combined first detector and oscillator using a type 224 tube; one stage of I. F. amplification working at 175 KC and using a type 235 tube; a second detector using a type 227 tube; a single audio stage using a type 247 Pentode tube, and a power supply system using a type 280 tube.

The first detector-oscillator circuit employs a plate coil in series with the primary of the first I. F. transformer, which is coupled to a coil in the cathode circuit of the oscillator tube. A third coil, coupled to both the plate and cathode coils is tuned by one section of the gang condenser and is made to track with the antenna and R. F. circuits by means of a fixed series condenser.

In lining up the circuits at the high frequency end of the band care must be used in adjusting the trimmer condenser on the R. F. section. If this trimmer is tightened too much the reaction between the R. F. and oscillator circuits will cause the oscillator to stop oscillating or shift to the frequency of the R. F. tuned circuit. This shifting can readily be recognized by tuning to a lower frequency where it will be found that the dial calibration is far from right and all the tuned circuits are out of line with the oscillator.

The volume control acts as a dual control by varying the bias on the R. F. and I. F. tubes and by varying the antenna input to the antenna stage.

The filter circuit consists of two 8 MF electrolytic condensers and the 1500 ohm speaker field. The speaker field is in the negative lead and a part of the voltage drop across it is used to bias the grid of the power tube. A bucking coil is used in the speaker to keep the field ripple out of the voice coil.

The tone control consists of a variable resistor and fixed condenser in series across the plate of the power tube and ground.

#### MODEL 50 VOLTAGE TESTS

All D. C. Voltages given were tested on 250 V scale of a 1000 ohms per volt meter with volume on full and no signal in the receiver, line voltage 115.

Fil. 280 tube to ground	240-250V
Screen grid—R. F. and I. F. tubes to ground	90-110V
Across speaker field	90-100V
Cathode R. F. and I. F. tubes to ground	2-3V
Plate detector oscillator tube to ground	240-250V
Plate of second detector to ground	20-45V
Cathode of second detector to ground	3-5V
All heaters	2.4-2.6V AC
Plates 280 tube to center tap of high voltage	350-370 AC
Cathode detector oscillator tube to ground	5-10V
Fil. 280 tube	4.9-5.1V AC

ECHOPHONE RADIO MFG. CO.

MODEL 70 DC  
Notes

## Model 70 Superheterodyne FOR DIRECT CURRENT CIRCUIT

The Echophone Model 70 is an eight tube Superheterodyne, employing variable MU tubes.

The circuit consists of one stage of high gain R.F. amplification using an NY 65 tube; a first detector using an NY 65 tube; one stage of I.F. amplification using an NY 65 tube and working at 175 K.C.; a second detector using an NY 67 tube; a first audio stage using an NY 67 tube; a second audio stage using two type 171 tubes in push-pull and an oscillator using an NY 67 tube. The first detector is of the grid biased type. The second detector is a resistance coupled power detector having a phonograph pick-up jack incorporated in its grid return circuit.

The oscillator circuit is of the conventional tuned grid type, employing plate feed back and is coupled to the first detector tube by means of a common bias resistor.

The R.F. stage is a high gain impedance coupled type with capacity coupling condenser mounted on the coil. This condenser should require no adjustment after leaving the factory.

The intermediate frequency amplifier has a total of four tuned circuits, adjusted to 175 K.C.

The first audio stage is resistance coupled. The second audio stage is transformer coupled push-pull. The bias for the last audio stage is obtained by operating the negative side of the 171A filaments 19 volts positive in respect to "B—"

The volume control acts as a dual control by varying the bias on the R.F. and I.F. tubes and by varying the antenna input to the antenna coil.

The filter circuit consists of two paper condensers and an iron core choke in the positive side of the supply line.

The speaker is a 1500 ohm dynamic with the field connected across the supply line. The negative side of the supply line is connected to the chassis and all the grid returns are also brought to the chassis.

As the negative side of most supply lines is grounded care should be exercised to prevent the ground wire from coming in contact with any part of the chassis except the ground post. No harm will be done if the ground wire touches the chassis **providing the service cord is plugged in the light socket in the proper direction.** However if the service plug is reversed, a short circuit will result if the ground wire touches the chassis.

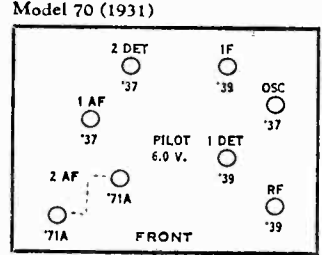
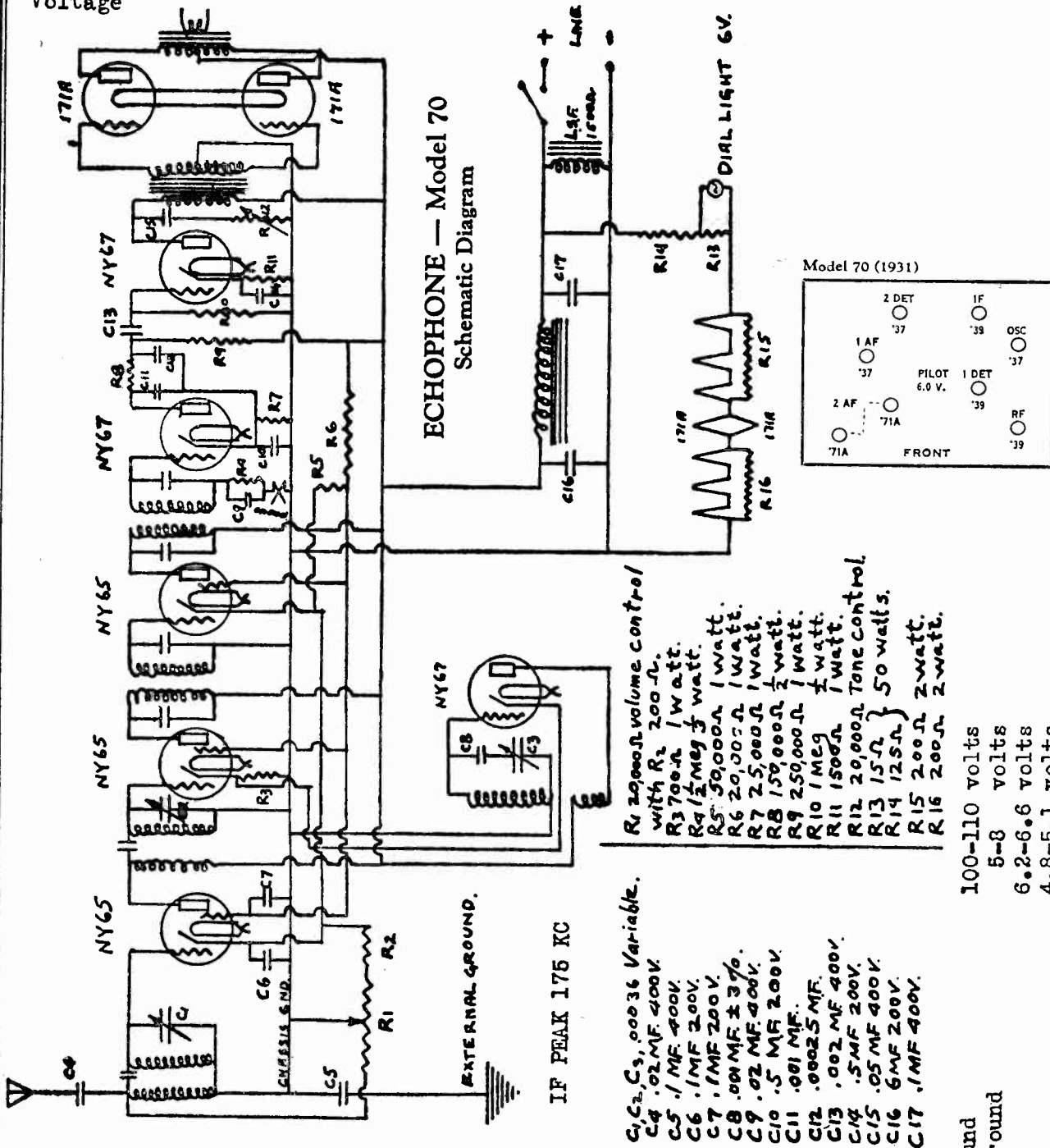
This set is designed to operate on line voltages of 105 to 125 volts. However on line voltages of over 115 a line voltage regulator or Amperite line ballast tube is recommended to insure long life of tubes.

The filaments of the heater type tubes (NY 65 and NY 67) are connected in series and the filaments of the 171A tubes are connected in parallel to each other and in series with the heater tubes, the filament resistor and dial lamp. Therefore if any one of the heater tubes is burned out or is removed from the set none of the remaining tubes will light. If one of the 171A tubes is removed an extra load will be thrown on the remaining 171A tube which will probably cause it to burn out. **No tube should be removed while set is turned on.**

A resistor is connected across the dial lamp so that the set will operate without the dial lamp. However, the lamp should be replaced as soon as convenient because when it is out an extra load is thrown on the resistor which is in parallel with it.

MODEL 70 DC  
Schematic  
Voltage

ECHOPHONE RADIO MFG. CO.



- IF PEAK 175 KC**
- C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, .00036 Variable.
  - C<sub>4</sub> .02 MF 400V.
  - C<sub>5</sub> .1 MF 400V.
  - C<sub>6</sub> .1 MF 200V.
  - C<sub>7</sub> .1 MF 200V.
  - C<sub>8</sub> .001 MF ± 3%.
  - C<sub>9</sub> .02 MF 400V.
  - C<sub>10</sub> .5 MF 200V.
  - C<sub>11</sub> .001 MF.
  - C<sub>12</sub> .00025 MF.
  - C<sub>13</sub> .002 MF 400V.
  - C<sub>14</sub> .5 MF 400V.
  - C<sub>15</sub> .05 MF 400V.
  - C<sub>16</sub> 6 MF 200V.
  - C<sub>17</sub> .1 MF 400V.
- 100-110 volts**
- R<sub>1</sub> 20,000Ω volume control with R<sub>2</sub> 200Ω.
  - R<sub>2</sub> 200Ω 1 watt.
  - R<sub>3</sub> 700Ω 1 watt.
  - R<sub>4</sub> 1/2 meg 1 watt.
  - R<sub>5</sub> 50,000Ω 1 watt.
  - R<sub>6</sub> 20,000Ω 1 watt.
  - R<sub>7</sub> 25,000Ω 1 watt.
  - R<sub>8</sub> 150,000Ω 1/2 watt.
  - R<sub>9</sub> 250,000Ω 1 watt.
  - R<sub>10</sub> 1 meg 1/2 watt.
  - R<sub>11</sub> 1500Ω 1 watt.
  - R<sub>12</sub> 20,000Ω tone control.
  - R<sub>13</sub> 15Ω 50 watts.
  - R<sub>14</sub> 125Ω 50 watts.
  - R<sub>15</sub> 200Ω 2 watt.
  - R<sub>16</sub> 200Ω 2 watt.

MODEL 70  
VOLTAGE TESTS

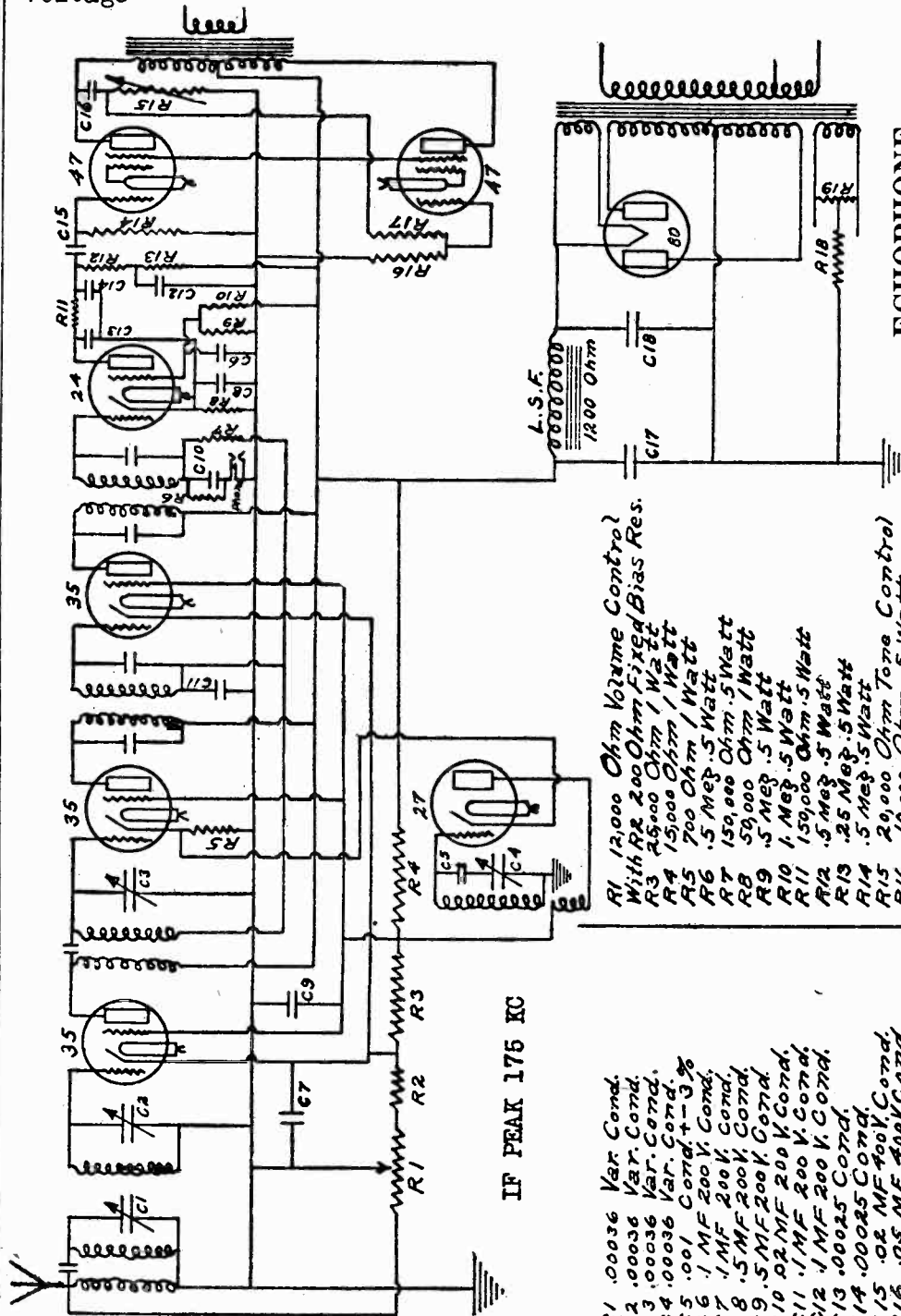
Line voltage 115, volume on full, no signal on set.

171-A plate to ground	100-110 volts
RF. and IF plate to ground	100-110 volts
RF and IF screen to ground	50-60 volts
RF and IF cathode to ground	2.5-3.5 volts
1st Detector plate to ground	100-110 volts
1st Detector screen to ground	50-60 volts
1st Detector and Oscillator cathode to ground	4-6 volts
2nd Detector plate to ground	35-45 volts
2nd Detector cathode to ground	4-6 volts

1st Audio plate to ground  
1st Audio cathode to ground  
Filament heaters  
171-A filament

MODEL 90 (Rev.)  
Schematic  
Voltage

ECHOPHONE RADIO MFG. CO.



**ECHOPHONE**  
Model 90  
Schematic Diagram  
Revised

- All Resistors + 10% Unless Otherwise Specified.*
- C1 .00036 Var. Cond.
  - C2 .00036 Var. Cond.
  - C3 .00036 Var. Cond.
  - C4 .00036 Var. Cond.
  - C5 .001 Cond. + 3%
  - C6 .1 MF 200 V. Cond.
  - C7 .1 MF 200 V. Cond.
  - C8 .5 MF 200 V. Cond.
  - C9 .5 MF 200 V. Cond.
  - C10 .02 MF 200 V. Cond.
  - C11 .1 MF 200 V. Cond.
  - C12 .1 MF 200 V. Cond.
  - C13 .00025 Cond.
  - C14 .00025 Cond.
  - C15 .02 MF 400 V. Cond.
  - C16 .05 MF 400 V. Cond.
  - C17 .8 MF 450 V. Cond.
  - C18 12 MF 450 V. Cond.
  - All Cond. + 10% Unless Otherwise Specified*
  - R1 12,000 Ohm Volume Control
  - With R2 200 Ohm Fixed Bias Res.*
  - R3 25,000 Ohm 1 Watt
  - R4 15,000 Ohm 1 Watt
  - R5 700 Ohm 1 Watt
  - R6 .5 Meg. 5 Watt
  - R7 150,000 Ohm 5 Watt
  - R8 50,000 Ohm 1 Watt
  - R9 .5 Meg. 5 Watt
  - R10 1 Meg. 5 Watt
  - R11 150,000 Ohm 5 Watt
  - R12 .5 Meg. 5 Watt
  - R13 .25 Meg. 5 Watt
  - R14 .5 Meg. 5 Watt
  - R15 20,000 Ohm Tone Control
  - R16 10,000 Ohm .5 Watt
  - R17 .25 Meg. 5 Watt
  - R18 250 Ohm 2 Watt
  - R19 20 Ohm C.T. Res.

MODEL 90  
VOLTAGE TESTS

Line voltage 114, volume on full, no signal on set.

247 Plate to ground	230-240 volts
247 Screen to ground	235-250 volts
247 Bias-Center tap resistor to ground	13- 18 volts
Second Detector plate to ground	30- 40 volts
Second Detector screen to ground	25- 35 volts
Second Detector cathode to ground	7- 9 volts
R.F. and I.F. plate to ground	235-250 volts
R.F. and I.F. screen to ground	70- 80 volts

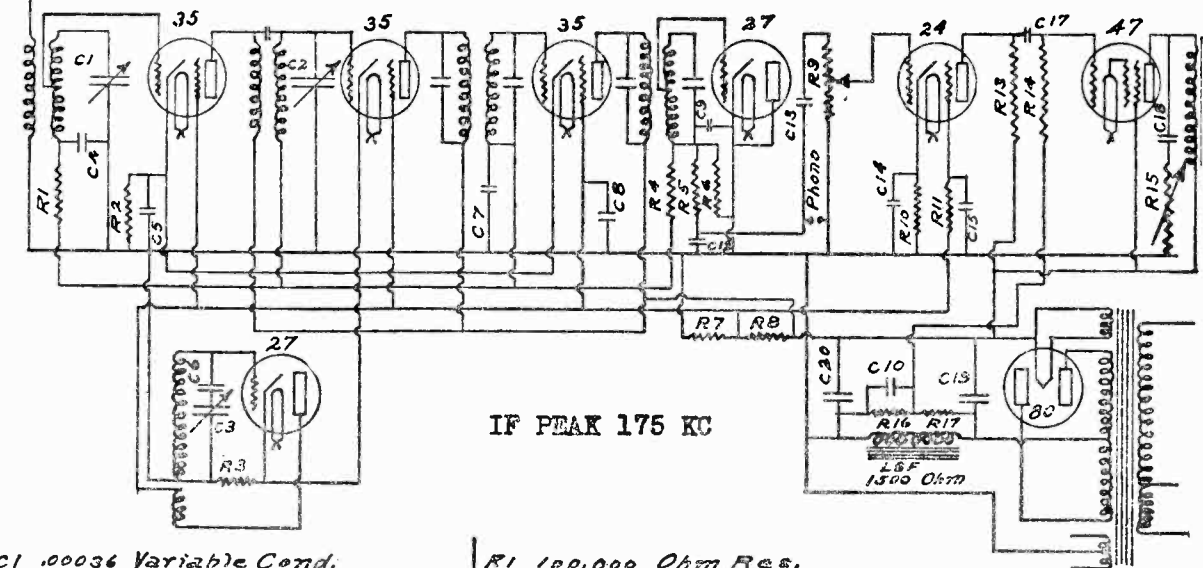
*All Resistors + 10% Unless Otherwise Specified.*

The following applies to Model 90 receivers having the R.F. and oscillator coils separated and mounted at right angles to each other.

2.5-3.5 volts	Oscillator plate to ground	70- 90 volts
235-250 volts	Voltage drop across field	95-110 volts
70- 80 volts	Filament voltage all 2.5 volt tubes	2.4-2.6 volts
4- 6 volts	Filament voltage 280 tube	4.8- 5 volts

MODEL 81  
Schematic  
Voltage

ECHOPHONE RADIO MFG. CO.

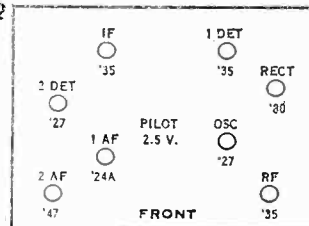


IF PEAK 175 KC

- C1 .00036 Variable Cond.
- C2 .00036 Variable Cond.
- C3 .00036 Variable Cond.
- C4 .1 MF 200 V. Cond.
- C5 .1 MF 200 V. Cond.
- C6 .001 Mica Cond. + - 3%
- C7 .1 MF 200 V. Cond.
- C8 .1 MF 200 V. Cond.
- C9 .0001 Mica Cond.
- C10 .1 MF 400 V. Cond.
- C12 .001 Mica Cond.
- C13 .01 200 V. Cond.
- C14 .5 MF 200 V. Cond.
- C15 .1 MF 200 V. Cond.
- C16 .006 MF. 450 V. Cond.
- C18 .05 MF 450 V. Cond.
- C19 .5 MF 450 V. Cond.
- C20 .5 MF 450 V. Cond.

- R1 100,000 Ohm Res.
- R2 100 Ohm Res.
- R3 700 Ohm Res.
- R4 .25 Meg. Res.
- R5 100,000 Ohm Res.
- R6 .25 Meg. Res.
- R7 20,000 Ohm 2 Watt Res.
- R8 50,000 Ohm Res.
- R9 50,000 Ohm Volume Control
- R10 20,000 Ohm Res.
- R11 10,000 Ohm Res.
- R12
- R13 .5 Meg. Res.
- R14 .5 Meg. Res.
- R15 20,000 Ohm Tone Control
- R16 200,000 Ohm Res.
- R17 1 Meg. Res.

Model 81 (1932)



All Condensers & Resistors + - 10% Unless Otherwise Specified

Echophone—Model 81—Schematic Diagram

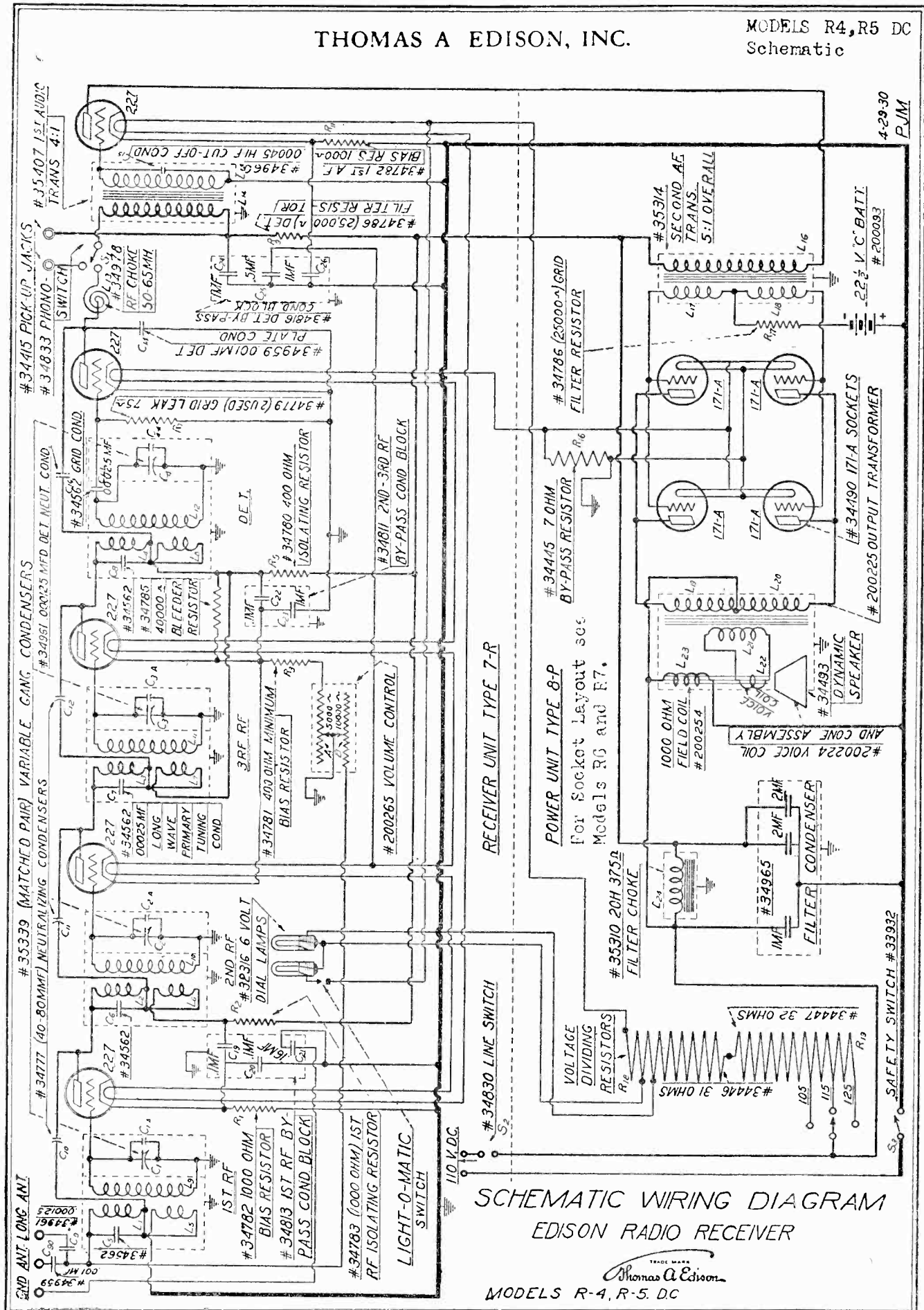
MODEL 81 VOLTAGE TESTS

All D. C. voltages given were tested on 250V scale of a 1000 ohms per volt meter with volume on full and no signal in the receiver, line voltage 115.

Filament 280 tube to ground	240-250V
Screen grid R. F. and I. F. tubes to ground	90-100V
Plate oscillator tube to ground	90-100V
Across speaker field	90-100V
Cathode R. F. and I. F. tubes to ground	2-3V
Plate second detector to ground	0-V
Cathode second detector to ground	0-V
Cathode of oscillator and first detector to ground	5-10V
Plate 280 to center tap of high voltage	360-380V AC
All heaters	2.4-2.6V AC
Filament 280 tube	4.9-5.1V AC
Plate first detector, R.F., and I.F. tubes to ground	240-250V
Plate first audio tube to ground	30-50V
Cathode first audio tube to ground	3-6V
Screen grid first audio to ground	50-75V

THOMAS A EDISON, INC.

MODELS R4, R5 DC Schematic



SCHMATIC WIRING DIAGRAM  
EDISON RADIO RECEIVER

THOMAS A. EDISON  
MODELS R-4, R-5. DC

THOMAS A. EDISON, INC.

MODELS R6,R7  
Resistance Data

BOTTOM VIEW OF RECEIVER UNIT SHOWING FILTER UNIT TERMINALS AND RESISTORS

- R-30 TONE BALANCE RESISTOR
- R-31 HUM BUCK
- R-32 2ND R.F. BIAS
- R-33 2ND R.F. BIAS
- R-34 LOW POTENTIAL END S.S. VOLTAGE DIVIDER
- R-35 1ST A.F. BIAS RESISTOR
- R-36 GRID LEAK

- R-20 1ST + 2ND R.F. PLATE ISOLATING RESISTOR
- R-21 2ND + 3RD " BIAS
- R-22 HIGH POTENTIAL END S. G. VOLTAGE DIVIDER
- R-23 3RD R.F. BIAS
- R-24 1ST R.F. BIAS
- R-25 1ST SCREEN GRID ISOLATING "

- R-10 AUTOMATIC VOLUME CONTROL VOLTAGE DIVIDER
- R-11 DETECTOR OUTPUT FILTER RESISTOR
- R-12 3RD R.F. PLATE ISOLATING
- R-13 " " GRID
- R-14 1ST + 2ND R.F. GRID

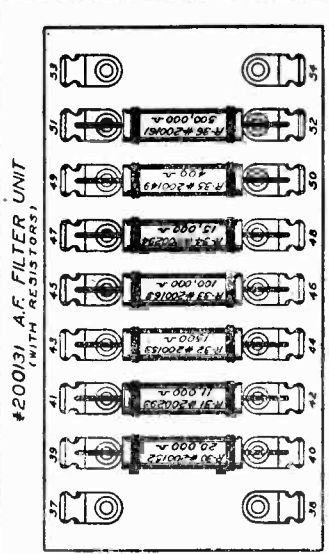


FIG. 3

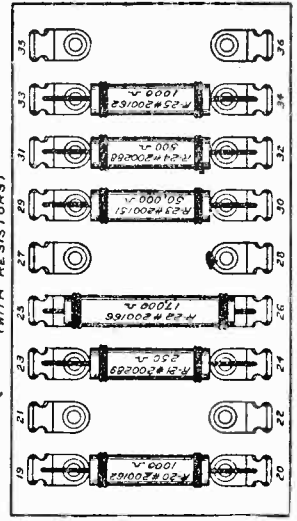


FIG. 2

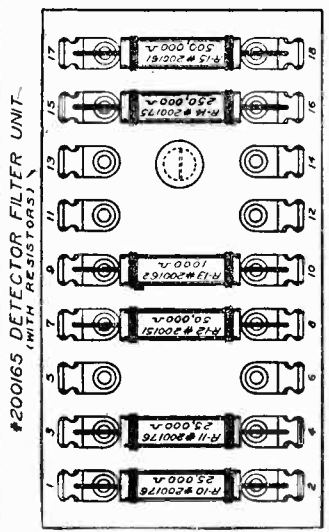


FIG. 1

SCHEMATIC DIAGRAM FOR FILTER UNITS (RESISTORS NOT SHOWN)

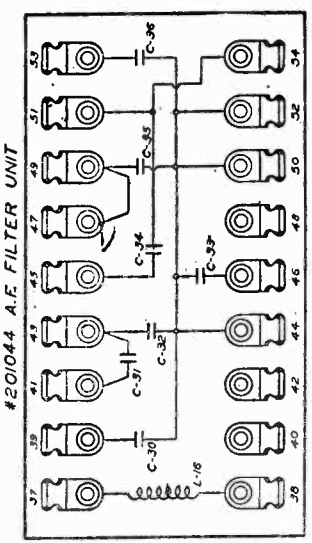


FIG. 3A

- C-30 0.05 MF TONE BALANCE CONDENSER #1
- C-31 0.5 " HUM BUCK
- C-32 1.0 " 2ND R.F. BIAS BY-PASS CONDENSER
- C-33 1.0 " 1ST " " PLATE "
- C-34 0.25 " " " PLATE COUPLING
- C-35 1.0 " " " BIAS BY-PASS
- C-36 .0005 " " " TONE CONTROL
- L-16 #200167 R.F. CHoke

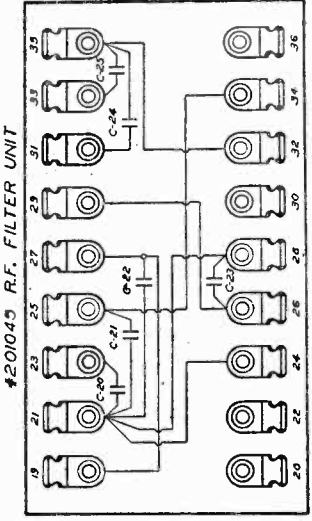


FIG. 2A

- C-20 0.5 MF 2ND + 3RD R.F. BIAS
- C-21 1.0 " " " SCREEN GRID
- C-22 1.0 " " " 1ST + 2ND R.F. PLATE
- C-23 1.0 " " " 1ST R.F. BIAS
- C-24 0.1 " " " SCREEN GRID
- C-25 0.1 " " " SCREEN GRID

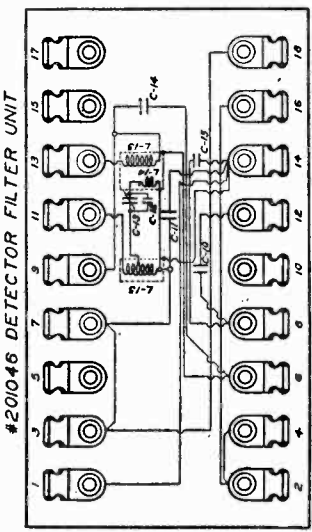


FIG. 1A

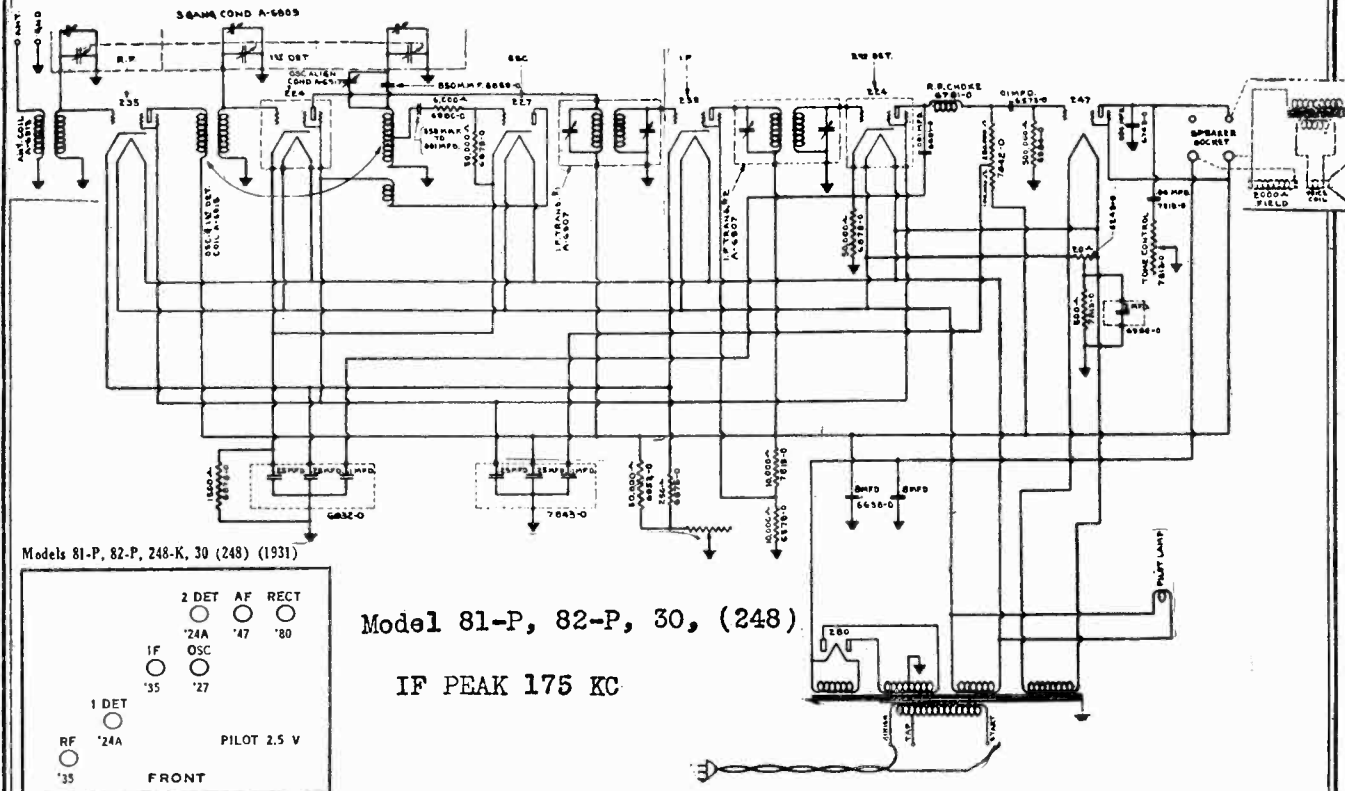
- C-10 0.25 MF #200130 DETECTOR COUPLING
- C-11 .0005 " #200165 AUTO. VC. RES. BY-PASS
- C-12 40 MMF #201000 FIXED COUPLING
- C-13 80 MMF #200378 ADJUSTABLE
- C-14 .03 MF #200069 3RD R.F. PLATE BY-PASS
- C-15 .0005 " #200172 1ST R.F. BIAS
- L-14 #200180 AUTO TRANSFORMER
- L-15 #200172 COUPLING
- L-16 #200172



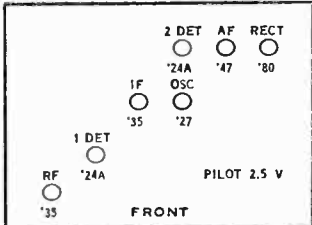


MODEL 81-P, 82-P, 30, (248)  
 MODEL 61, 62, 63 (250)  
 Schematic

ELECTRICAL  
 RESEARCH LABORATORIES, Inc.

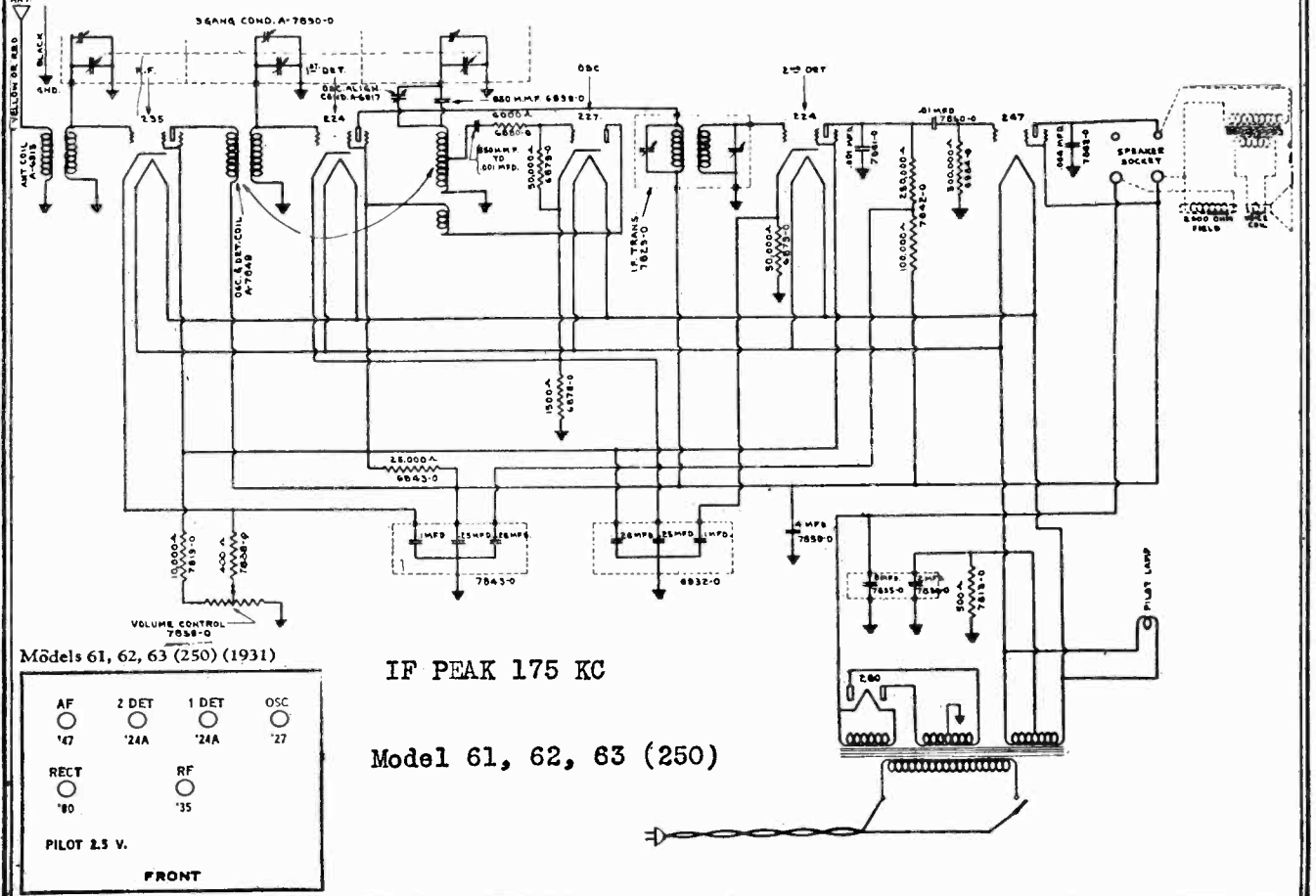


Models 81-P, 82-P, 248-K, 30 (248) (1931)

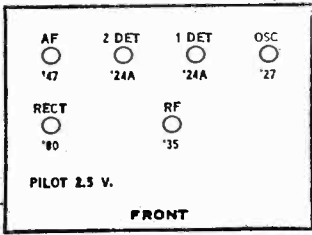


Model 81-P, 82-P, 30, (248)

IF PEAK 175 KC



Models 61, 62, 63 (250) (1931)

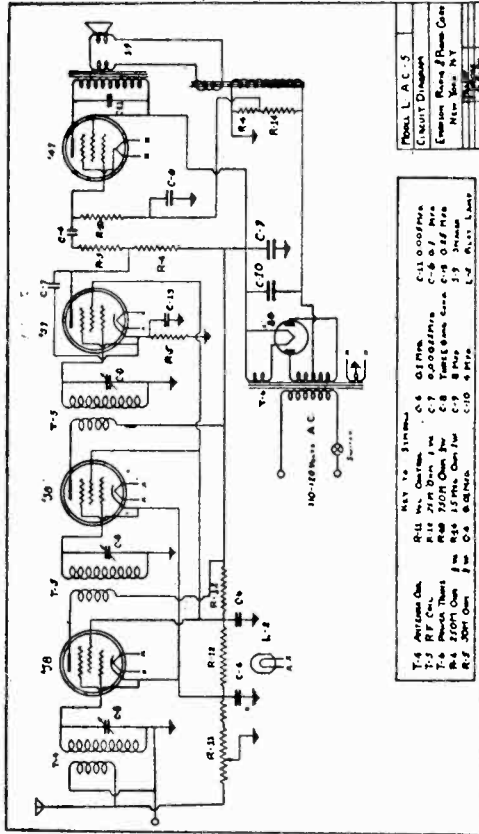


IF PEAK 175 KC

Model 61, 62, 63 (250)

# EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL L-AC-4  
MODEL L-AC-5  
Schematic  
Voltage



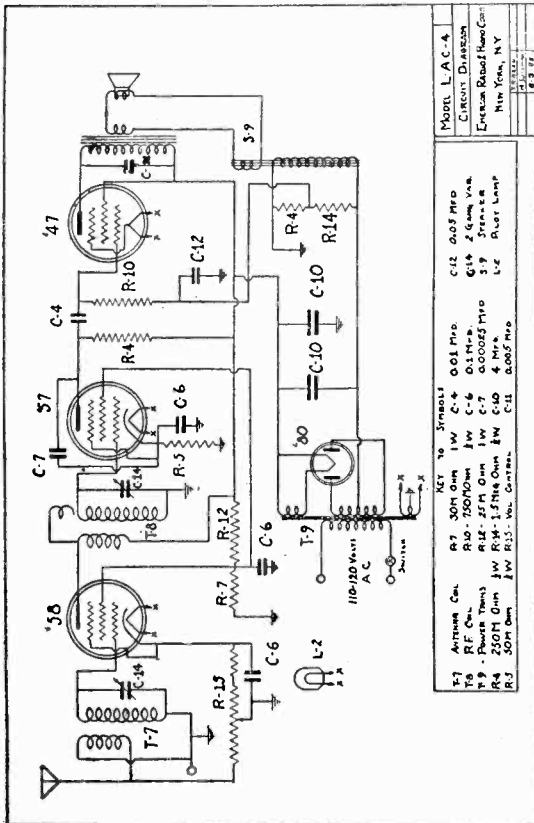
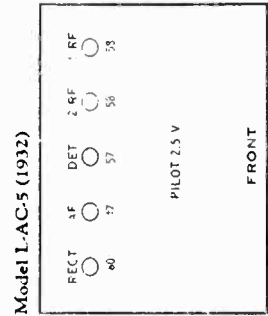
MODEL L-AC-5	
Circuit Diagram	
Emerson Radio & Phonograph Corp. New York, N.Y.	
NET TO 312volts	
T-7 Antenna Coil	0.6 0.15 Mc. P.F.
T-8 Power Trans.	0.6 0.15 Mc. P.F.
T-9 R.F. Coil	0.6 0.15 Mc. P.F.
R-1 500 Ohm	1/2 W. 5% Tol.
R-2 500 Ohm	1/2 W. 5% Tol.
R-3 500 Ohm	1/2 W. 5% Tol.
R-4 150 Ohm	1/2 W. 5% Tol.
R-5 150 Ohm	1/2 W. 5% Tol.
R-6 150 Ohm	1/2 W. 5% Tol.
R-7 150 Ohm	1/2 W. 5% Tol.
R-8 150 Ohm	1/2 W. 5% Tol.
R-9 150 Ohm	1/2 W. 5% Tol.
R-10 150 Ohm	1/2 W. 5% Tol.
R-11 150 Ohm	1/2 W. 5% Tol.
R-12 150 Ohm	1/2 W. 5% Tol.
R-13 150 Ohm	1/2 W. 5% Tol.
R-14 150 Ohm	1/2 W. 5% Tol.
C-1 0.001 Mfd.	50 V.
C-2 0.001 Mfd.	50 V.
C-3 0.001 Mfd.	50 V.
C-4 0.001 Mfd.	50 V.
C-5 0.001 Mfd.	50 V.
C-6 0.001 Mfd.	50 V.
C-7 0.001 Mfd.	50 V.
C-8 0.001 Mfd.	50 V.
C-9 0.001 Mfd.	50 V.
C-10 0.001 Mfd.	50 V.
C-11 0.001 Mfd.	50 V.
C-12 0.001 Mfd.	50 V.
L-1 0.15 H.	100 Ohm
L-2 0.15 H.	100 Ohm
S-1 2.5 V.	Pilot Lamp

Model L-AC-5	Plate	Screen	Cathode
347 Pentode Tube ground to	220	240	none
58 First R. F. Tube ground to	240	90	4.5
58 Second R. F. Tube ground to	240	90	4.5
57 Detector Tube ground to	114	90	4.5

Line Voltage .....119

The bias on the 347 cannot be read with the volt meter.

These readings are approximate and will vary slightly with tubes, set, etc.



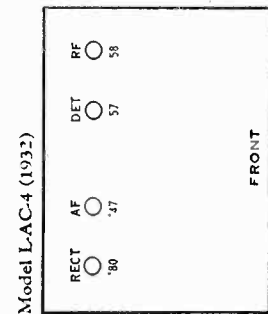
MODEL L-AC-4	
Circuit Diagram	
Emerson Radio & Phonograph Corp. New York, N.Y.	
NET TO 312volts	
T-7 Antenna Coil	0.6 0.15 Mc. P.F.
T-8 Power Trans.	0.6 0.15 Mc. P.F.
T-9 R.F. Coil	0.6 0.15 Mc. P.F.
R-1 500 Ohm	1/2 W. 5% Tol.
R-2 500 Ohm	1/2 W. 5% Tol.
R-3 500 Ohm	1/2 W. 5% Tol.
R-4 150 Ohm	1/2 W. 5% Tol.
R-5 150 Ohm	1/2 W. 5% Tol.
R-6 150 Ohm	1/2 W. 5% Tol.
R-7 150 Ohm	1/2 W. 5% Tol.
R-8 150 Ohm	1/2 W. 5% Tol.
R-9 150 Ohm	1/2 W. 5% Tol.
R-10 150 Ohm	1/2 W. 5% Tol.
R-11 150 Ohm	1/2 W. 5% Tol.
R-12 150 Ohm	1/2 W. 5% Tol.
R-13 150 Ohm	1/2 W. 5% Tol.
R-14 150 Ohm	1/2 W. 5% Tol.
C-1 0.001 Mfd.	50 V.
C-2 0.001 Mfd.	50 V.
C-3 0.001 Mfd.	50 V.
C-4 0.001 Mfd.	50 V.
C-5 0.001 Mfd.	50 V.
C-6 0.001 Mfd.	50 V.
C-7 0.001 Mfd.	50 V.
C-8 0.001 Mfd.	50 V.
C-9 0.001 Mfd.	50 V.
C-10 0.001 Mfd.	50 V.
L-1 0.15 H.	100 Ohm
L-2 0.15 H.	100 Ohm
S-1 2.5 V.	Pilot Lamp

Model L-AC-4	Plate	Screen	Cathode
347 Tube-ground to	215	237	none
58 Tube-ground to	237	92	2
57 Tube-ground to	115	92	4.5

Line Voltage .....119

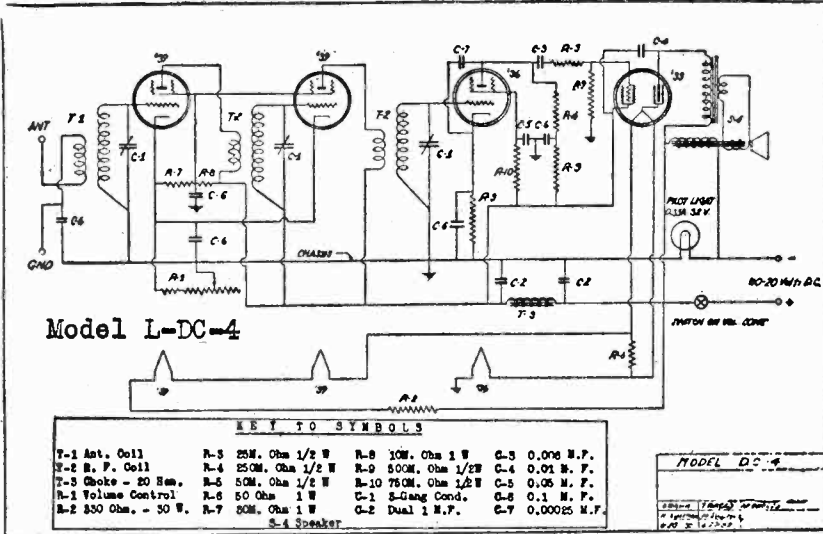
The bias on the pentode cannot be read on the volt meter.

These readings are approximate and will vary slightly with sets, tubes, etc.



**MODEL T, TS  
MODEL L-DC-4**  
Schematics  
Data

**EMERSON RADIO AND PHONOGRAPH  
CORPORATION**



	Approximate Voltages		
	Plate	Screen	Cathode
333 Pentode Tube to Chassis.....	105	110	none
339 R. F. Tubes to Chassis.....	110	80	3
336 Detector Tube .....	75	20	5

The bias on the pentode is obtained by reading from pentode filament to Chassis and should be about 9 volts.

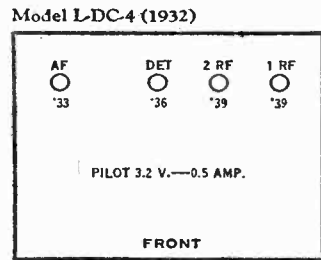
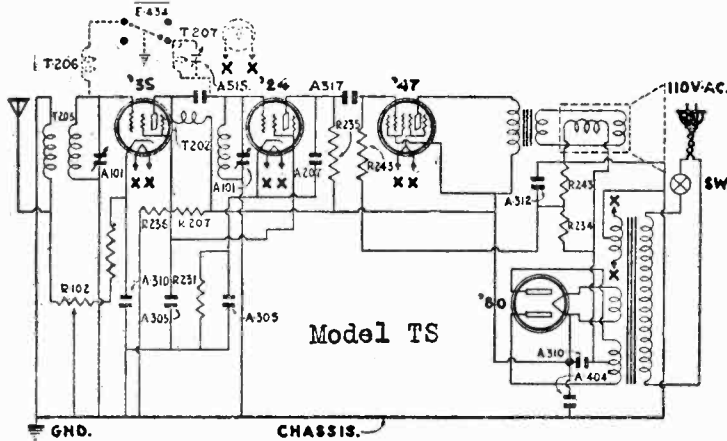
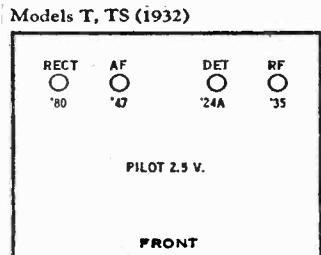
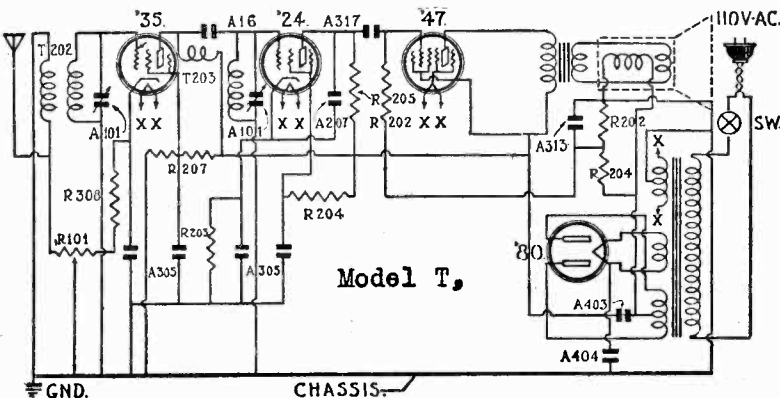
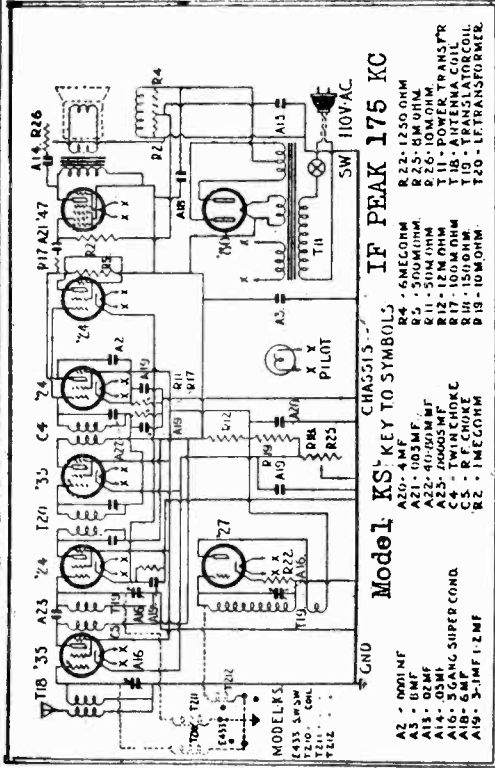


	Plate	Screen	Cathode
Detector tube —ground to	80 V	80 V	7 V
1st R. F. tube —ground to	240 V	80 V	2.0 V
Pentode tube —ground to	235 V	240 V	None



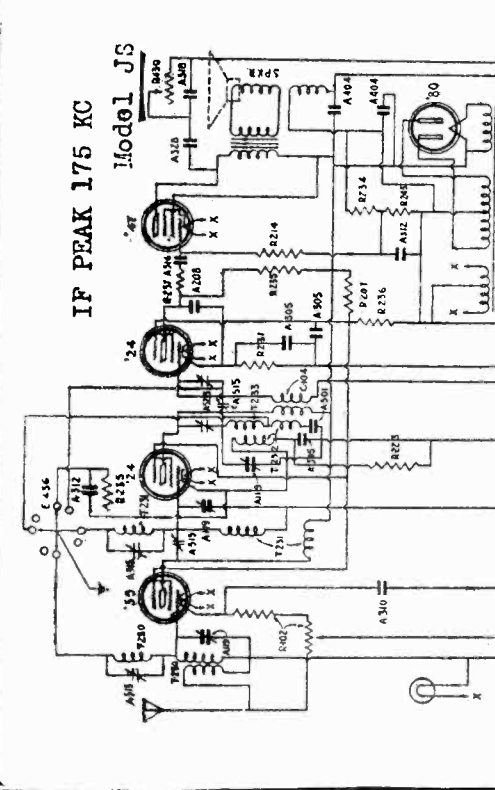
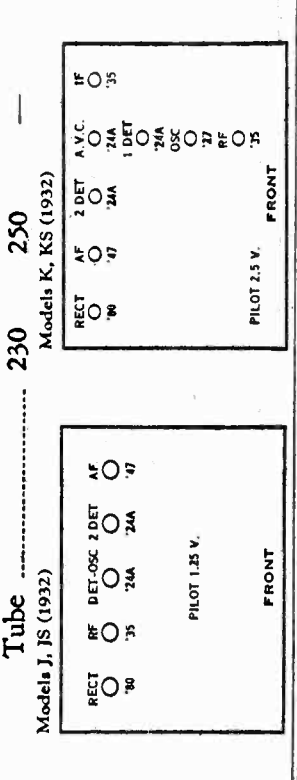
# EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL JS  
MODEL KS  
Schematic  
Data



Test Voltages: Measured with volume control on full position measured with D. C. voltmeter having at least 1000 ohms per volt. Line voltage 115.

	Ground to	Plate	Screen	Cathode
'35 R. F. Tube	250	75	75	3
'27 Oscillator Tube	75	—	—	12
'24 1st. Detector Tube	250	75	75	9
'35 I. F. Tube	250	75	75	3
'24 Automatic Volume Control Tube	—	—	—	9
'24 2nd. Detector Tube	85	75	75	7
'47 Audio Amplifier Tube	230	250	—	—



The following are average voltages taken on 118 volts 60 cycle A. C. line. A slight variation is allowable for variation in meters and line voltage.

	Plate	Screen	Cathode
Pentode tube —ground to	240	245	None
235 R. F. tube —ground to	245	70	2.5
224 1st. Detector tube —ground to (center tube)	245	70	7
224 2nd. Detector —ground to	75	70	10

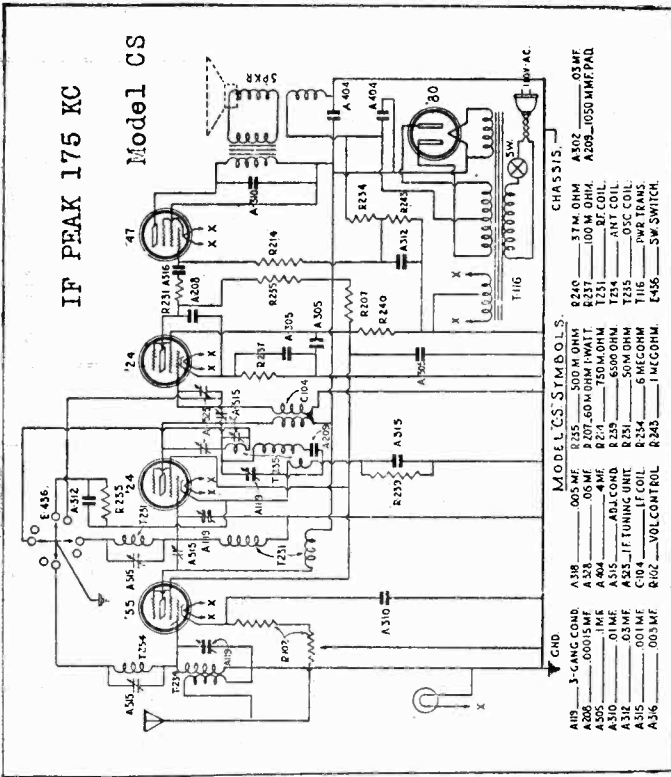
The grid of the Pentode is biased through such high resistance that only an indication of negative bias can be read with an ordinary high resistance meter.

**Voltage Readings:**

NOTE: Voltages should be measured with volume control all the way "ON" and the band selector switch at the "long" wave position using zero to 250 volt D. C. voltmeter with resistance of 1,000 ohms per volt.

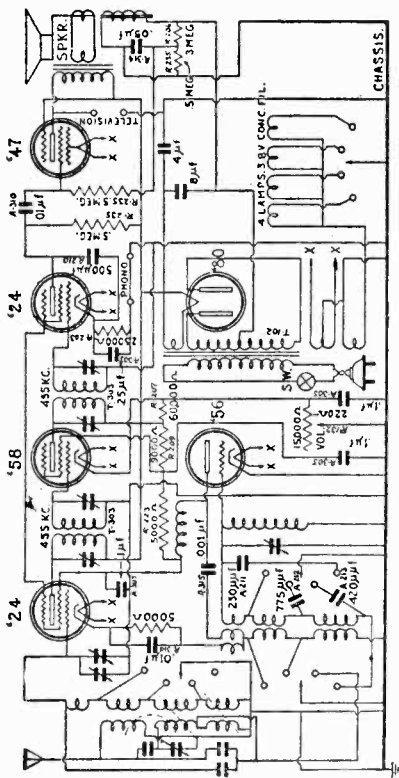
MODEL AW-55  
MODEL CS  
Schematic  
Data

# EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL CS SYMBOLS

A18	3-GANG COND.	A18	0.05 MF
A19	500 OHM	A19	500 OHM
A20	500 OHM	A20	500 OHM
A21	500 OHM	A21	500 OHM
A22	500 OHM	A22	500 OHM
A23	500 OHM	A23	500 OHM
A24	500 OHM	A24	500 OHM
A25	500 OHM	A25	500 OHM
A26	500 OHM	A26	500 OHM
A27	500 OHM	A27	500 OHM
A28	500 OHM	A28	500 OHM
A29	500 OHM	A29	500 OHM
A30	500 OHM	A30	500 OHM
A31	500 OHM	A31	500 OHM
A32	500 OHM	A32	500 OHM
A33	500 OHM	A33	500 OHM
A34	500 OHM	A34	500 OHM
A35	500 OHM	A35	500 OHM
A36	500 OHM	A36	500 OHM



Model AW-55 5.

IF PEAK 445 KC

**VOLTAGE READINGS:**

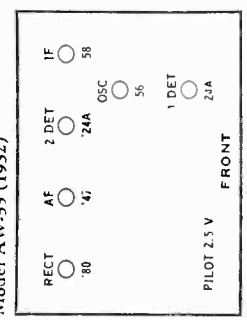
NOTE: Voltages should be measured with volume control all the way "ON" and the range selector in position 3 (broadcast). Use a 250-volt D. C. meter with a resistance of 1000 ohms per volt.

The following are average voltages measured on 118 volt 60 cycle A. C. line. A slight variation is allowable for variations in meters, tubes, and line voltage.

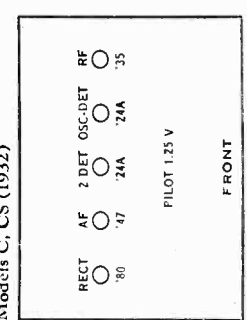
	Plate	Screen	Cathode
'47 Tube —ground to	235	245	6
'24 Tube —ground to (Tube next to '47)	70	40	
58 Tube —ground to	240	100	3
'24 Tube —ground to	240	40	8
56 Tube —ground to	40		0

The grid of the '47 is biased through such high resistances that only an indication of negative bias can be read with an ordinary meter.

Model AW-55 (1932)



Models C, CS (1932)



**Voltage Readings:**

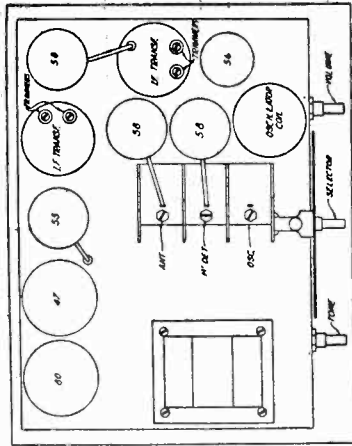
NOTE: Voltages should be measured with volume control all the way "ON" and the band selector switch at the "long" wave position using zero to 250 volt D. C. voltmeter with resistance of 1,000 ohms per volt.

The following are average voltages taken on 118 volts 60 cycle A. C. line. A slight variation is allowable for variation in meters and line voltage.

	Plate	Screen	Cathode
Pentode tube —ground to	240	245	None
235 R. F. tube —ground to	245	70	2.5
224 1st. Detector tube —ground to (center tube)	245	70	7
224 2nd. Detector —ground to	75	70	10

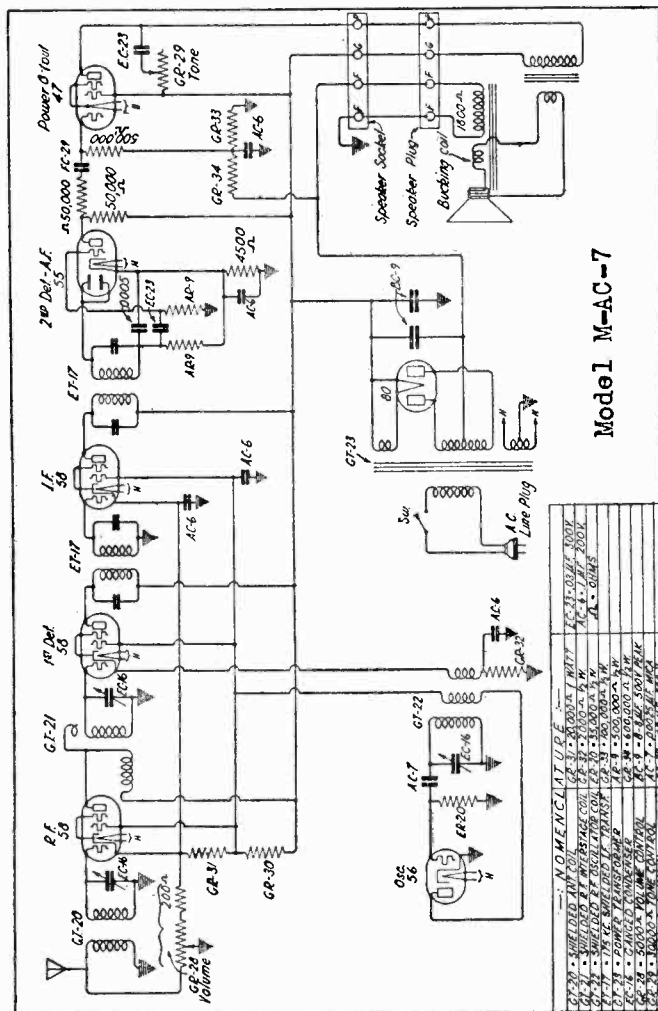
# EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL M-AC-7  
Schematic  
Data



### Minor reasons for failure of Set to function

1. Defective Tubes
2. Grid Clips off Tubes
3. Volume Control not fully on
4. Tubes not in sockets securely
5. Aerial disconnected or grounded
6. Defective A.C. plug or poor plug connection



The receiver is accurately adjusted at the factory and no adjustment should be changed except by an experienced serviceman. The intermediate frequency is 175 K.C.

### Voltage Readings:

Readings should be taken with the Volume Control fully on and the Station Selector set for 550 K.C.

Use a high resistance D.C. voltmeter.

	Ground to -Plate	Screen	Cathode
56 Oscillator	80-100	—	—
58 R.F. Amplifier	235-250	90-110	3-5
58 1st Detector	235-250	90-110	5-7
58 I.F. Amplifier	235-250	90-110	3-4
55 Second Detector	125-135	—	8-11
47 Output Pentode	215-225	235-250	—

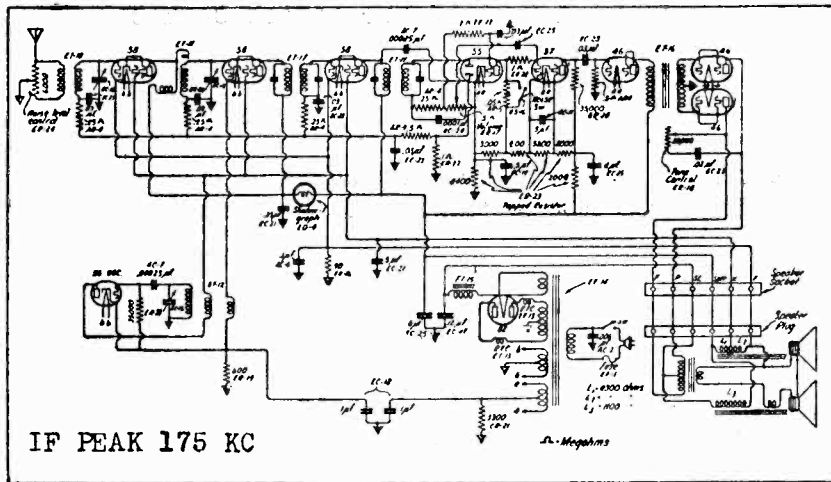
Line Voltage—115

The bias on the 47 cannot be read with the voltmeter



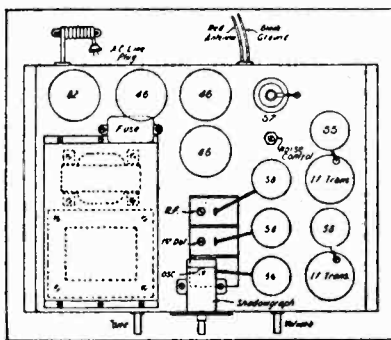
# EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL B-AC-10  
Schematic  
Data



## Voltage Readings

(Antenna and Ground Shorted—Noise Suppression 'off'.)



	<u>Plate</u>	<u>Screen</u>	<u>Cathode</u>
58—R. F. ....	230-250	95-115	3-5
58—Det. ....	230-250	95-115	5-7
56—Osc. ....	95-115	.....	5-7
58—I. F. ....	230-250	95-115	3-5
55—Duo-diode triode .....	75-90	.....	40-50
46—Driver .....	230-250	.....	30-35
46 } Amplifiers .....	310-330	.....	.....

Line Voltage—117

## Operation:

Turn the right-hand control knob ('on-off' switch and volume control combined) clockwise. Adjust the center knob (station selector) to the desired station. It will be noted that as the station is tuned in the shadow above the numbers on the dial gets narrower. The point of minimum shadow is the point where the station is exactly tuned in. The dial is calibrated in frequency to simplify tuning for a desired station.

Re-adjust the volume control if necessary for the desired output.

The tone control may be set for the type of output desired.

When the set is first used it may be desirable to adjust the noise suppression control. For most localities no adjustment is necessary, but where the noise level is very high adjustment is advisable. With the noise suppression switch set to suppression, tune between stations. Adjust the control on the chassis by means of a screw driver until the noise just about disappears. This adjustment should be permanent and require no revision unless local conditions change or increased sensitivity is desired.

If it is desired to receive distant stations, the noise suppression switch should be turned 'off'. If the noise control has been adjusted a further increase of sensitivity can be secured by turning the control clockwise (to the right) as far as it will go.



## EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 65  
Voltage  
Data

### Average Voltage Readings

Filament	280	4.85 v. A.C.	Measure across socket
"	245	2.45 v. A.C.	" " "
"	1st A.F.	2.45 v. A.C.	" " "
"	Det. & 224's	2.35 v. A.C.	" " "

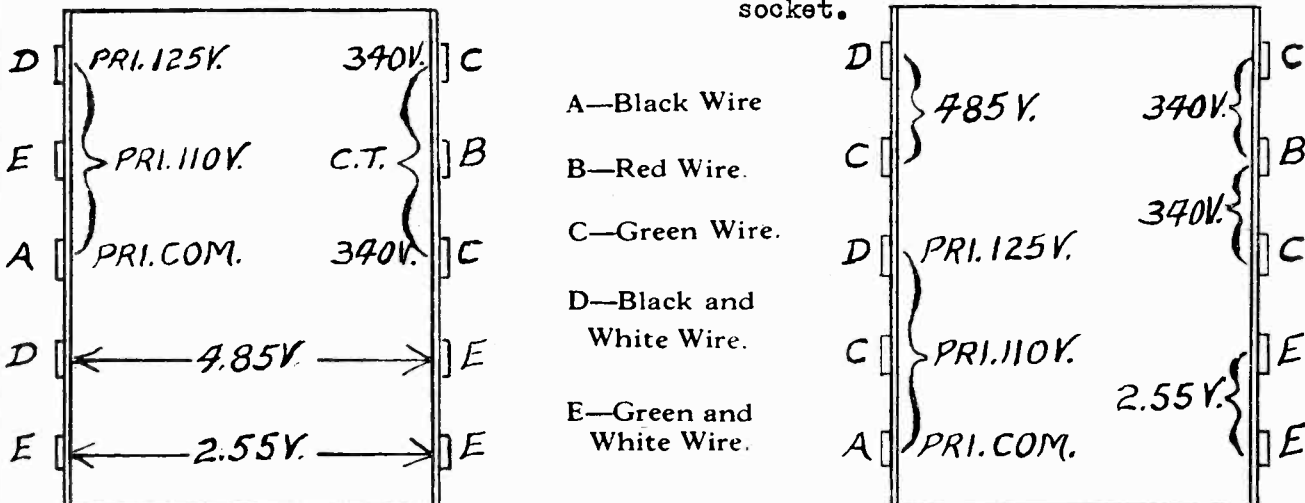
When all tubes light, measurement H-II (2.35 v.) as shown in drawing above, is ordinarily sufficient and can be taken without removal of set from cabinet.

245 plate	240 v. D.C.	As shown above, plate to chassis
245 grid	-50 v. D.C.	As shown above, field to chassis
1st A.F. plate	65 v. D.C.	Plate to cathode
1st A.F. grid	$-3\frac{1}{2}$ v. D.C.	Cathode to chassis
Det. plate	vary widely with different meters	Plate to cathode
	approximately 45 volts.	
Det. grid	vary widely with different meters	Cathode to chassis

Note:- In taking readings, have all tubes in place, and the speaker connected; place the Hi-Lo switch in proper position to agree with your line voltage.

All D.C. voltages must be measured with a voltmeter having 800 to 1000 ohms per volt, otherwise the readings will not be correct.

224 plate	160v	Plate to cathode
224 grid (control)	1.5 v. to 20 v. according to position of volume control.	Cathode to grid clip
224 grid (screen)	0-75 v.	Cathode to grid contact of socket.

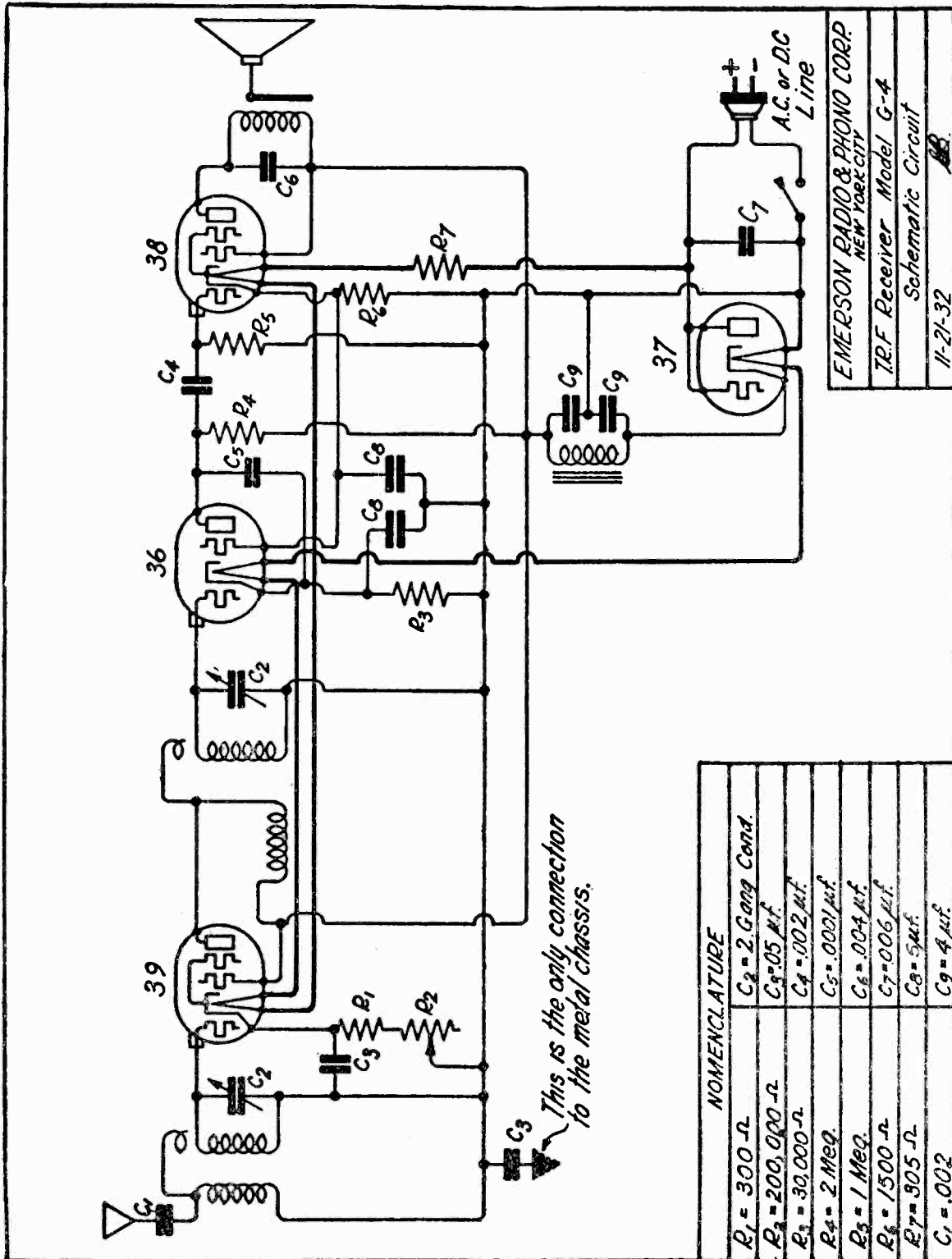


### Power Transformer Wiring Connections

No. 1 and 2—as used with Dynamic Speaker.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 20-A, 25-A



EMERSON RADIO & PHONO CORP.  
NEW YORK CITY  
I.F. Receiver Model G-4  
Schematic Circuit  
11-21-32

NOMENCLATURE	
R <sub>1</sub> = 300 Ω	C <sub>2</sub> = 2 Gang Cond.
R <sub>2</sub> = 200,000 Ω	C <sub>3</sub> = 0.5 μf.
R <sub>3</sub> = 30,000 Ω	C <sub>4</sub> = 0.02 μf.
R <sub>4</sub> = 2 Meg.	C <sub>5</sub> = 0.001 μf.
R <sub>5</sub> = 1 Meg.	C <sub>6</sub> = 0.04 μf.
R <sub>6</sub> = 1500 Ω	C <sub>7</sub> = 0.006 μf.
R <sub>7</sub> = 305 Ω	C <sub>8</sub> = 5 μf.
C <sub>1</sub> = 0.02	C <sub>9</sub> = 4 μf.

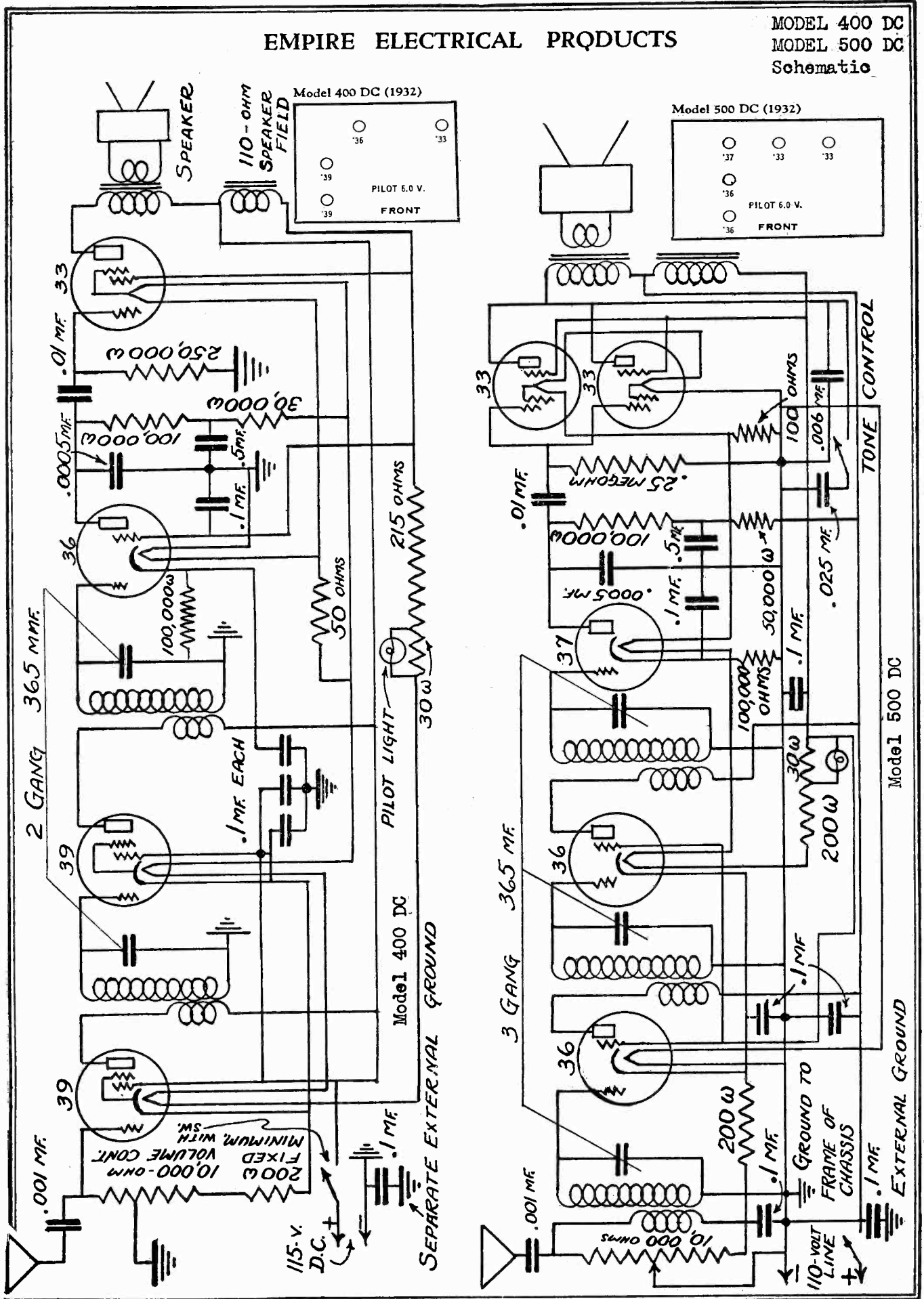
Tube	Cathode	Screen	Plate
39	*	10.5	---
36	2.5	110.	110
38	10.5	110.	110

Volume control full on. Tuning dial set at 550 KC. Antenna outside of cabinet. \* Circuit structure interferes with accurate reading.



EMPIRE ELECTRICAL PRODUCTS

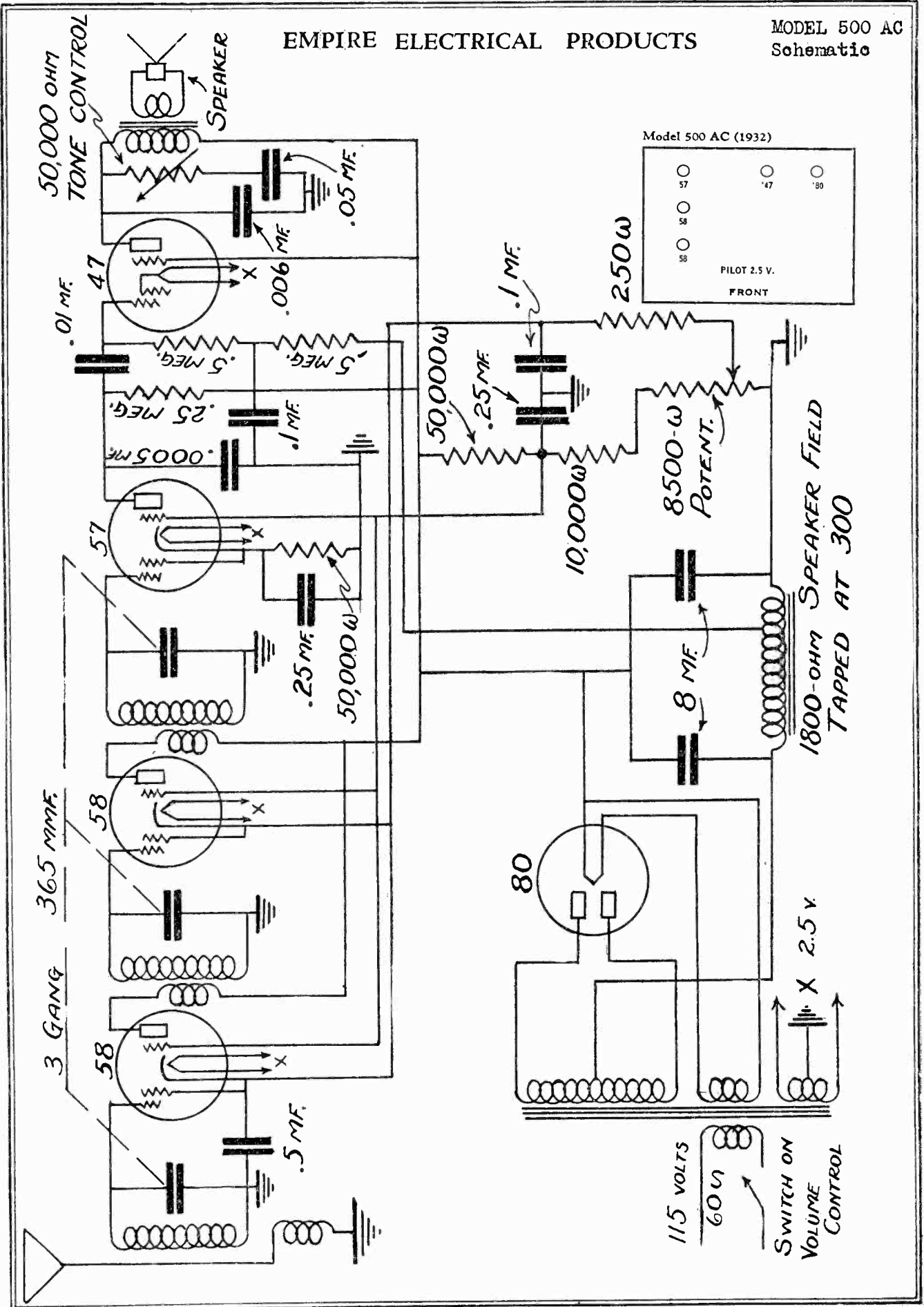
MODEL 400 DC  
MODEL 500 DC  
Schematic





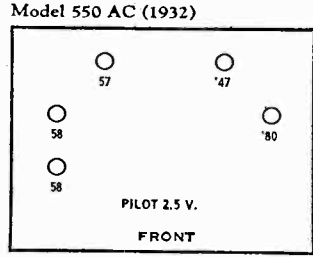
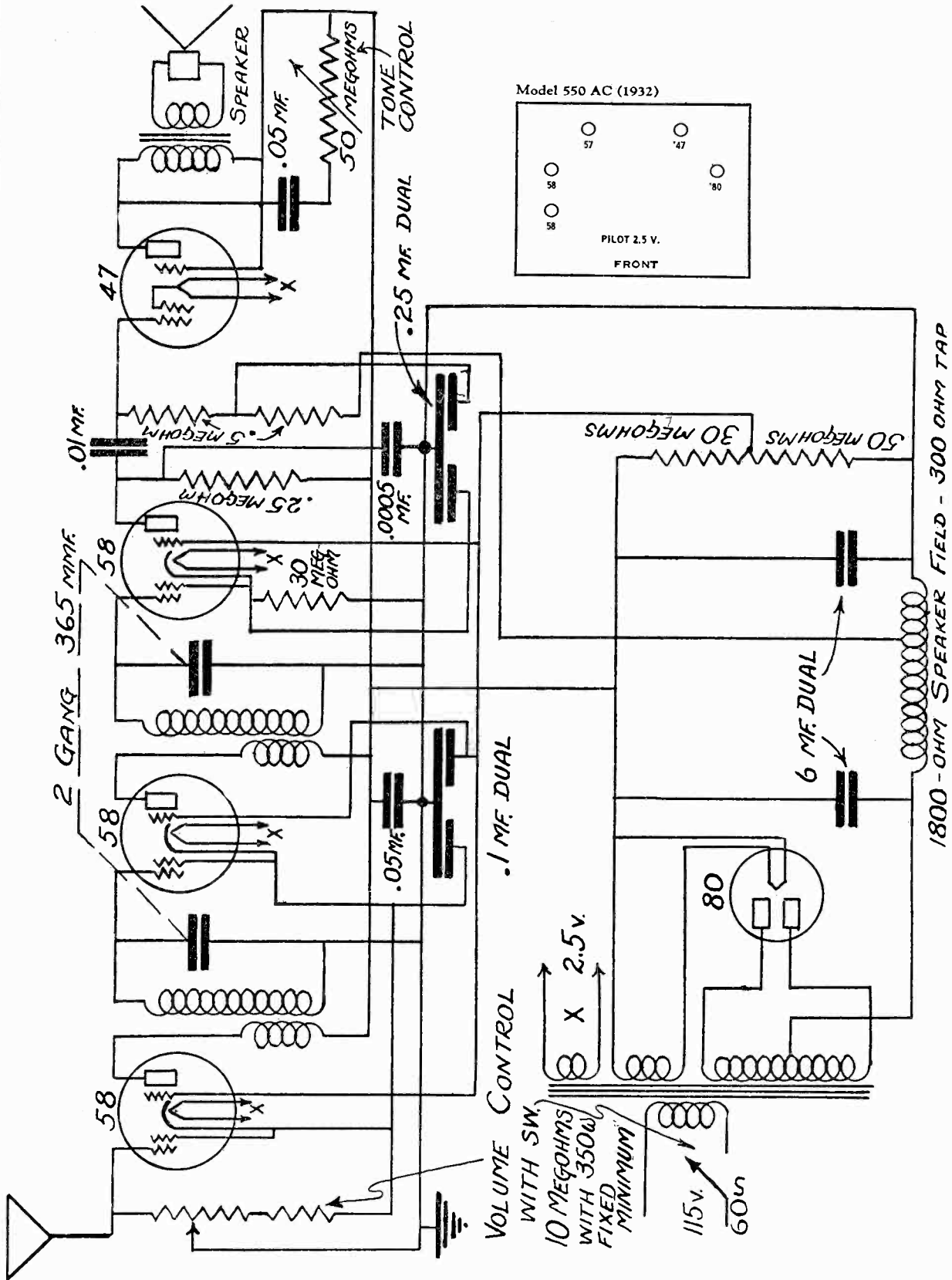
EMPIRE ELECTRICAL PRODUCTS

MODEL 500 AC  
Schematic



MODEL 550 AC  
Schematic

EMPIRE ELECTRICAL PRODUCTS



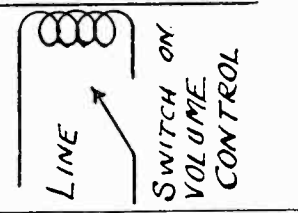
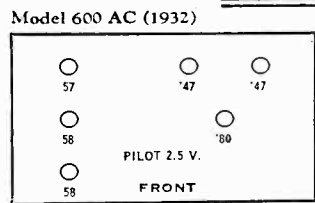
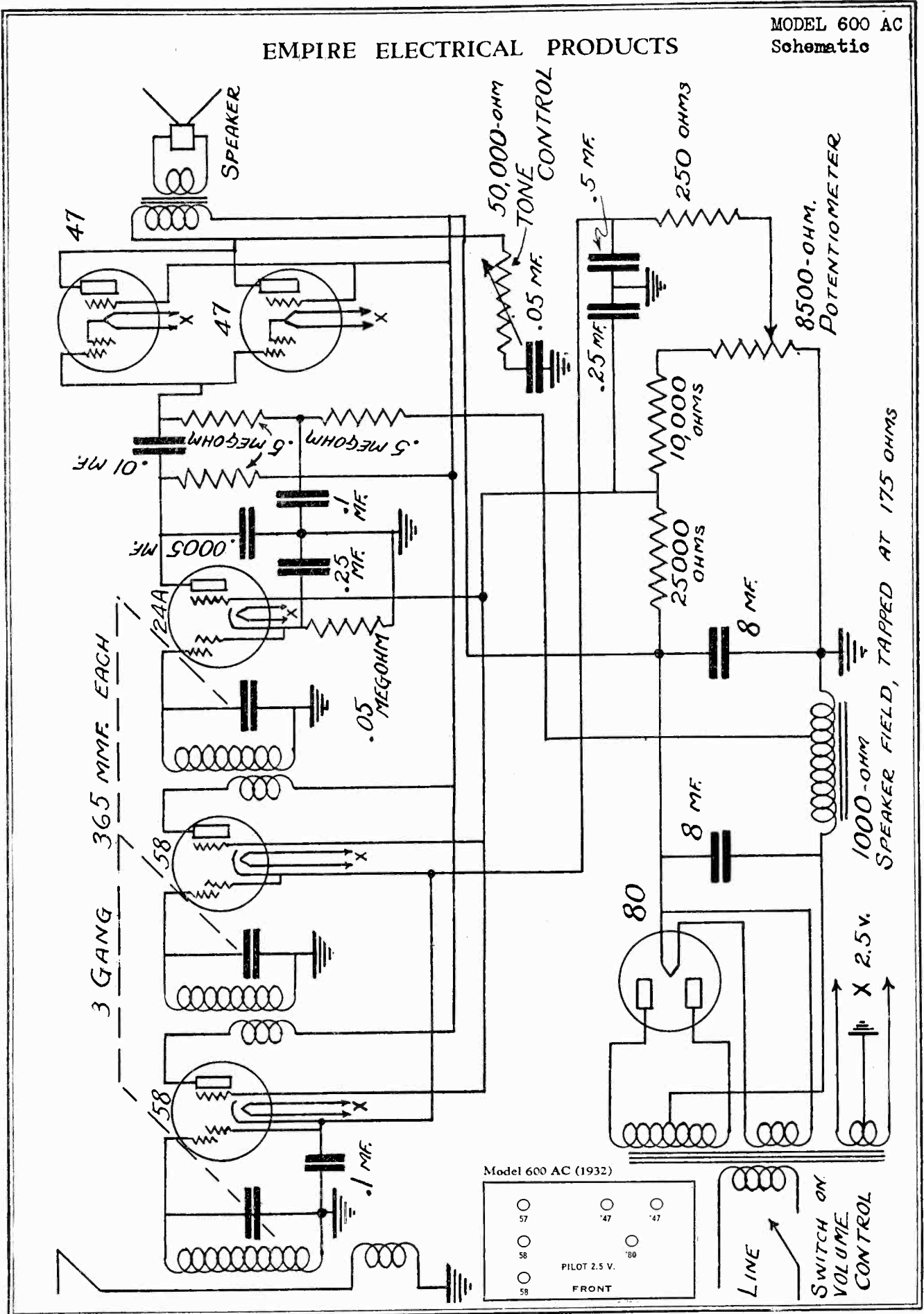
VOLUME CONTROL  
WITH SW  
10 MEGOHMS  
WITH 350w  
FIXED  
MINIMUM

115v  
60s

1800-OHM SPEAKER FIELD - 300 OHM TAP

EMPIRE ELECTRICAL PRODUCTS

MODEL 600 AC  
Schematic







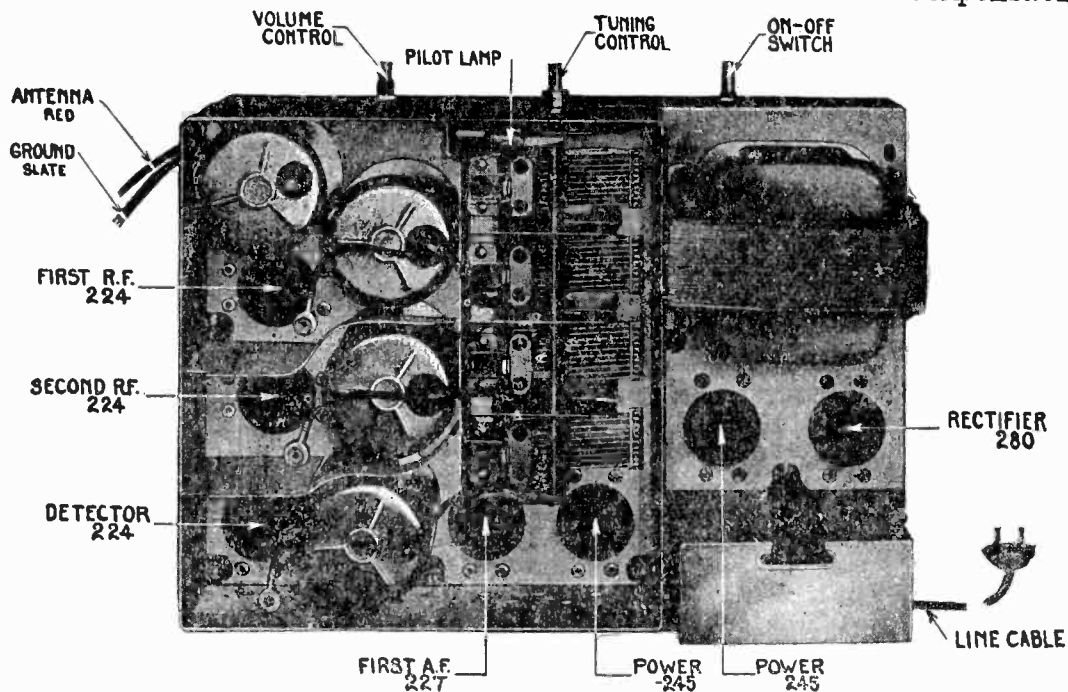
## FADA RADIO &amp; ELECTRIC CORP.

MODEL 43,761,764

766,767

Chassis View

Compensating Data



COMPENSATING INSTRUCTIONS  
 Fada 43,761,762,764,766 and 767  
 inclusive of all KF and KG  
 chassis.

The compensating condensers are located on their respective tuning condensers. They are adjusted by the use of a screw driver. Since the adjusting screws are at ground potential, it is not necessary to insulate the screw driver. There are four holes in the tube and condenser housing cover which permit insertion of the screw driver for compensating purposes.

To compensate receiver:-

- 1st. Carefully tune the receiver to a broadcast station or local oscillator, at approximately 225 meters. Turn the volume control down so that each compensator adjustment will be apparent in the change in volume.
- 2nd. Beginning with the antenna compensator, carefully adjust each compensator in turn for MAXIMUM SIGNAL. Do not disturb the main tuning condenser.
- 3rd. After the receiver has been compensated in accordance with these instructions, carefully retune the receiver to the correct dial setting of the station being received and repeat the process of compensation so as to assure accuracy.

Special Note.

When compensating the receiver, or before and during the compensation process, be certain that the tube and overall condenser housing is firmly in place. If not, the compensating adjustments will not be accurate.

MODEL 43 (KF)  
 MODEL 761,762,764,766,767 FADA RADIO & ELECTRIC CORP.  
 (KG)

Voltages.

VOLTAGE READINGS ON 60 CYCLE "KG" RECEIVER

The following voltage readings are to be taken at points beneath the chassis. Be sure that the overall condenser and tube shield housing cover is fastened in place or else oscillation will occur which will affect voltage readings. The speaker field coil must remain connected in the circuit and all tubes must be in their correct sockets, otherwise excessive voltages will develop which may tend to break down sections of the condenser block.

1. General Information  
 Volume Control Set for minimum volume.

Line Volts	Line Watts	Filament Volts			Line Amps.	Plate-Cath. Volts			Screen Volts	
		Rect.	Pwr.	Det.		Pwr.	R.F.	Det.	Det.	R.F.
				R.F. Aud.			AUD.			
100	-	4.2	2.05	1.92	.678					
105	-	4.5	2.2	2.15	.72					
110	-	4.68	2.3	2.25	.75					
115	86.5	4.9	2.41	2.38	.79	255	180	136	32	90.5
120	-	5.1	2.5	2.48	.82					
125	-	5.35	2.62	2.58	.85					
130	-	5.55	2.74	2.69	.89					

VOLTAGE READINGS ON 60 CYCLE "KF" RECEIVER

1. General Information  
 Volume Control Set for minimum volume.

Line Volts	Line Watts	Filament Volts.			Plate-Cath. Volts	Screen Volts			
		Rect.	Power	Det.	1st Aud.	Pwr.	R.F. Det.	Det.	R.F.
				R.F. Aud.					
100	57.0	4.4	2.0	2.1					
105	62.0	4.6	2.13	2.22					
110	68.5	4.8	2.25	2.35					
115	75.0	5.0	2.35	2.48		210	170	118	20 80
120	81.5	5.2	2.45	2.58					
125	88.0	5.4	2.55	2.7					
130	95.0	5.6	2.65	2.8					

VOLTAGE READINGS ON 25 CYCLE "KF" RECEIVER

1. General Information  
 Volume Control Set for minimum volume.

Line Volts	Line Watts	Filament Volts			Line Amps.	Plate-Cath. Volts			Screen Volts	
		Rect.	Pwr.	Det.		Pwr.	R.F.	Det.	Det.	R.F.
				R.F. Aud.			Aud.			
100	54	4.4	1.95	2.0	.57					
105	59	4.6	2.5	2.1	.60					
110	65	4.8	2.15	2.2	.63					
115	71	5.1	2.25	2.3	.66	200	160	120	25	75
120	77	5.3	2.35	2.4	.70					
125	84	5.5	2.45	2.55	.74					
130	90	5.7	2.55	2.65	.77					



MODEL 48, 49, 65 (KW) FADA RADIO & ELECTRIC CORP.  
Voltage Data

CONTINUITY AND VOLTAGE READINGS ON  
KW RECEIVER - MODELS 65, 49, 48 (60 CYCLE)

Line Voltage 115 A.C. -- Wattage 115  
No signal - Flashograph tube dark - antenna & ground tied

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	CONTROL GRID VOLTS	PLATE CURRENT	SCREEN GRID VOLTS
F-235	R.F. & 1st I.F.	160	* 4.8	6	100
F-235	1st Det.	148	*16	1.1	88
F-227	Oscillator	96	*20	3.4	--
F-235	2nd I.F.	250	* 6.3	4.2	100
F-227	2nd Det.	--	-	-	--
F-227	1st A.F.	230	*25	.1	--
F-247	Pentodes	232	15	30	241
F-280	Rectifier			Total 109	

\*Bias readings, must be taken across each respective bias resistor. Correct readings cannot be obtained at control grids due to use of series resistors.

VOLTAGES ACROSS VOLTAGE DIVIDER AND BLEEDER RESISTORS

Voltage across	280 ohm AF filter choke (1881-X)	31 Volts
"	800 " Speaker field (3-1266-Ms)	100 "
"	7,000 " Resistor (3-1264-Ms)	93 "
"	25,000 " Resistor (3-1328-Ms)	136 "
"	13,000 " Resistor (2-1436-Ms)	76 "
"	7,500 " Neon control (3-1324-Ms)	40 "
"	400 " Bias resistor (3-1329-Ms)	4.8 "
"	1,500 " Bias resistor (2-1384-Ms)	6.3 "
"	25,000 " Bias resistor (2-1438-Ms)	25 "
"	200 " Bias resistor (3-1283-Ms)	.15 "

VOLTAGES ACROSS ELECTROLYTIC CONDENSERS

1st -- 388                      2nd -- 356                      3rd -- 256

DO RESISTANCE VALUES

PART NO.	DESCRIPTION	PRIMARY	SECONDARY
1873-X	Antenna coil	10 ohm	3.4
1875-X	R.F. coil	69 "	3.4
1876-X	Oscillator coil	.74 "	3.4
1869-X	I.F. transformer	100 "	100
1891-X	I.F. transformer	145 "	175
1893-X	Input pushpull transformer	2,860 "	6,660
1880-X	Output pushpull transformer	734 "	.75
1874-X	Post selector coil	- - - - -	3.4 ohm
1881-X	A.F. choke	- - - - -	280 "
3-1266-Ms	12-A speaker field	- - - - -	800 "
2413-Y	R.F. choke	- - - - -	134

FADA RADIO & ELECTRIC CORP. MODEL KO-KOC 51,53,57  
Voltage Data

CONTINUITY AND VOLTAGE READINGS ON  
KO - KOC RECEIVER - MODELS 51, 53, 57 (60 CYCLE)

Line Voltage 115 A.C. -- Wattage 75  
No signals - - - Volume control maximum

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	CONTROL GRID VOLTS	PLATE CURRENT	SCREEN GRID VOLTS
E-235	R.F.& I.F.	168	3.3	5.5	94
F-224	1st Det.	181	10	1	87
F-227	Oscillator	92	17	2.3	-
F-224	2nd Det.	* 86	* 8	-	* 12
F-247	Pentode	216	15	32	237
F-280	Rectifier			total 60	

\* Voltage readings are low due to current drain of voltmeter.

VOLTAGES ACROSS VOLTAGE DIVIDER AND BLEEDER RESISTORS

Voltage across	2,250 ohm	Speaker field	(3-1310-Ms)	135 volt
"	3,000 "	Resistor	(2-1330-Ms)	60 "
"	15,000 "	Resistor *	(2-1381-Ms)	89 "
"	15,000 "	Resistor *	(2-1381-Ms)	69 "
"	250,000 "	Resistor	(2-1440-Ms)	60 "
"	7,500 "	Volume control**	(3-1337-Ms)	34 "

\* 1st res. connected to 2-1330-Ms - 2nd res. connected to Vol con

\*\* Control listed is for KOC - use 3-1289-Ms (7,500 ohm) for KO.

VOLTAGES ACROSS ELECTROLYTIC CONDENSERS

1st -- 387

2nd -- 252

DC RESISTANCE VALUES

PART NO.	DESCRIPTION	PRIMARY	SECONDARY
1873-X	Antenna coil	10 ohm	3.4 ohm
1875-X	R.F. coil	69 "	3.4 "
1876-X	Oscillator coil	.74 "	3.4 "
1888-X	I.F. transformer	100 "	100 "
1870-X	I.F. transformer	100 "	100 "
1886-X	Output pushpull transformer	708 "	1.003 "
1874-X	Post selector coil - - -	- - -	3.4 ohm
2413-Y	R.F. choke - - -	- - -	134 "
3-1310-Ms	1C-B speaker field - - -	- - -	2250 "

I-F trimmers are located in the rear right hand corner of the chassis. When aligning disconnect the control grid lead from the 1st detector tube. The oscillator series condenser aligned at 600 kc is on the right side of the chassis, when viewed from the front. When adjusting the oscillator series condenser, adjust the test oscillator and receiver to 600 kc. Now tune the oscillator series condenser until maximum output is indicated. It will be necessary to "rock" the main tuning control during this adjustment. The regular tuning condenser compensators are adjusted at 1400 kc.

MODEL 55 (RG)  
Schematic

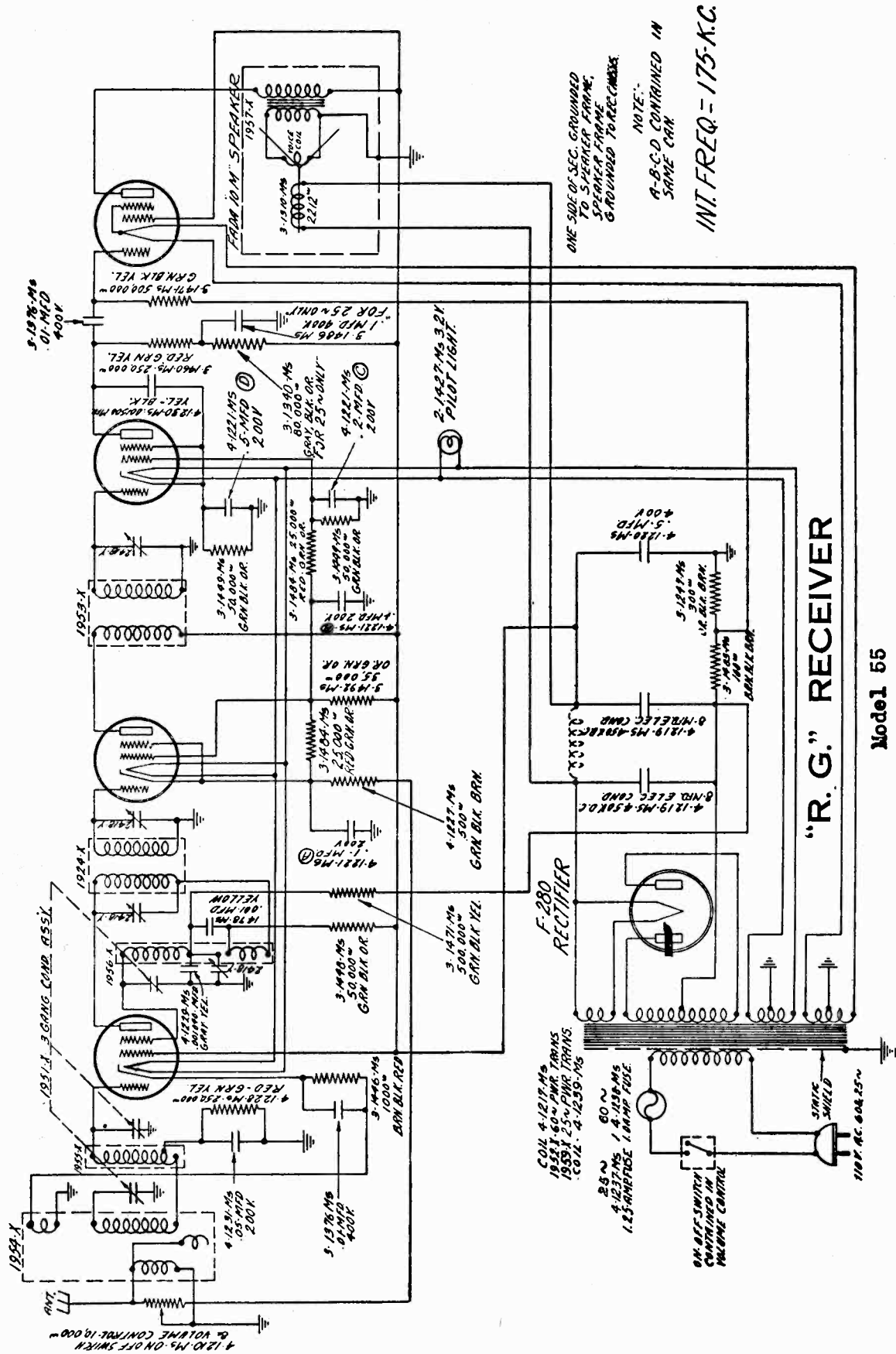
FADA RADIO & ELECTRIC CORP.

F-247  
POWER  
PENTODE

F-57  
2<sup>ND</sup> DET.

F-58  
INT.  
FREQ.

F-57  
OSC.  
MOD.



ONE SIDE OF SEC. GROUNDED TO SPEAKER FRAME. SPEAKER FRAME GROUNDED TO RECEPTACLE.

NOTE:  
A-B-C-D CONTAINED IN SAME CAN

INT. FREQ. = 175-K.C.

"R. G." RECEIVER

Model 55

FADA RADIO & ELECTRIC CORP.

MODEL 55 (RG)  
Voltage

CONTINUITY AND VOLTAGE READINGS ON  
RG RECEIVER - MODEL 55

Line voltage 115 volts AC - Input watts 52

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLTS
F-57	1st Det. Osc.	60*	3.3	6.0**	240
F-58	Int. Freq.	242	4.0	3.5	81
F-57	2nd Det.	131*	.1	---	47
F-47	Pwr. Pentode	224	30.0	16.0**	246
F-80	Rectifier	---	53.0 total	---	---

- \* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.
- \*\* Bias readings are to be taken across each respective bias resistor. Correct readings cannot be obtained at control grids due to series resistors.

VOLTAGES ACROSS VOLTAGE DIVIDER AND BLEEDER RESISTORS

Voltage across	Resistor Value	Location	Resistor Value	Voltage
	2,225 ohm	speaker field	{ 3-1310-Ms	135 volts
"	"	resistor	{ 3-1492-Ms	153 "
"	35,000 "	bias resistor	{ 3-1247-Ms	16. "
"	300 "	bias resistor	{ 3-1495-Ms	5.5 "
"	100 "	bias resistor	{ 4-1227-Ms	3.5 "
"	500 "	bias resistor	{ 4-1228-Ms	6. "
"	1,000 "	bias resistor		

\*\*\* This may be a 2-1358-Ms (brown with blue end) 500 ohm resistor.

VOLTAGES ACROSS ELECTROLYTIC CONDENSERS

1st - 400 volts                      2nd - 285 volts

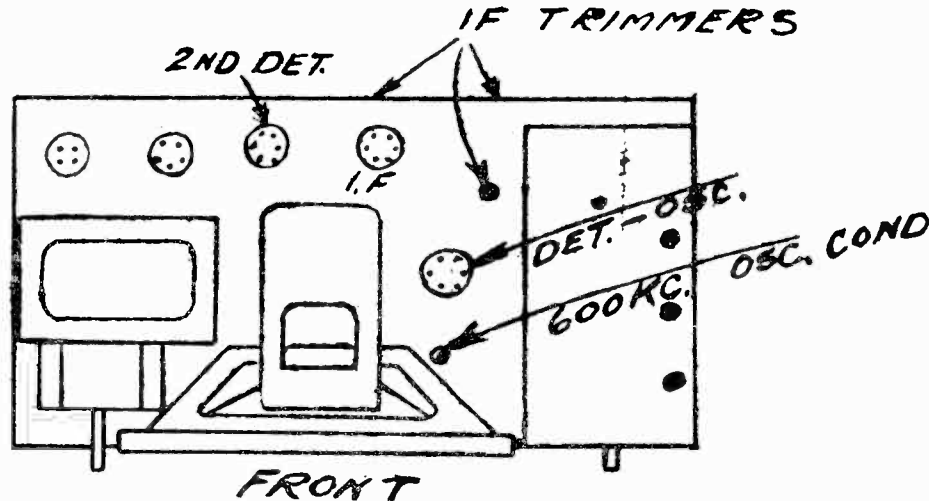
D.C. RESISTANCE VALUES

	PRIMARY	SECONDARY
1954-X Antenna coil	20. ohms	3.4 ohms
1955-X Post selector coil	--	3.4 "
1956-X Oscillator coil	.8 ohms	2.7 "
1924-X I.F. transformer	97. "	97. "
1953-X I.F. transformer	125. "	125. "
1957-X Output transformer	719. "	1.1 "
1952-X Power transformer primary winding		7.5 ohms
" " " high voltage	"	450. "
" " " rectifier	"	.24 "
" " " heater	"	.08 "
" " " power pentode	"	.137 "
Speaker field coil (3-1310-Ms)		2212. "
Speaker voice coil (1932-X)		5.6 "



**MODEL 55 (RG)  
Adjustments**

**FADA RADIO & ELECTRIC CORP.**



Now place the signal generator in operation and adjust the frequency output to 175 kc. Regulate the attenuator control so that the output meter is low enough to insure accuracy in adjusting the i-f. condensers of the receiver.

With the aid of a No. 4 socket wrench adjust the three i-f. condensers to resonance as indicated by the greatest swing of the needle on the output meter.

The compensators for the tuning condenser gang are located at the top of their respective tuning condensers and can be adjusted by the aid of a screw driver. To adjust, remove the lead wire which is connected to both the control grid of the detector-oscillator tube and also to the output system of the signal generator.

Now connect the antenna (red) wire of the receiver to the output system of the signal generator. The ground (slate) wire of the receiver is to remain connected to the ground post of the signal generator.

Adjust the carrier frequency output of the signal generator to 1400 kc. and set the tuning dial of the receiver to approximately 15. Starting with the compensator nearest the front of the receiver, adjust each compensator in turn for maximum signal output as indicated on the output meter. Do not disturb the setting of the gang condenser during these operations. Leave the volume control on full and regulate the signal output of the attenuator control of the signal generator.

The oscillator series condenser can be adjusted through the hole in the top of the chassis to the left of the speaker looking from the back. In this case adjust the carrier frequency of the signal generator to 600 kc. and pick up the signal at about 84 on the receiver tuning dial. With the No. 4 socket wrench adjust the condenser for maximum reading in output meter. To insure perfect adjustment it is necessary to "rock" the ganged condenser back and forth in order to follow the maximum signal output.

After the oscillator series condenser is properly adjusted, turn the tuning dial of the receiver to approximately 15 and adjust the signal generator to 1400 kc.; then repeat adjustment of all variable condenser compensators as heretofore outlined.

The Fada Model 55 is a five-tube super-heterodyne using the new "50" series tubes and the Fada 10-M dynamic speaker. The intermediate frequency employed is 175 kc.

If it is necessary to remove the chassis from the cabinet, the tuning and volume control knobs will have to be removed from their shafts, and the five speaker leads disconnected. After screws are removed from the bottom of the cabinet, the chassis will slide out.

**ADJUSTMENTS**

To accurately adjust the various trimmer condensers, it is necessary to use a shielded signal generator capable of giving a modulated carrier frequency which can be accurately attenuated at 175 kc., 600 kc., and 1400 kc. The receiver volume control should be turned to its maximum position and the signal output of the receiver controlled by the attenuator of the signal generator.

For test purposes on chassis removed from the cabinet it will be necessary to place a grounded metal shield between the second detector and i-f. tubes. The shield should project about one inch above the tops of the tubes—the same as the shield which is mounted on the speaker frame.

Shifting of control grid wires after adjustments have been made will throw the receiver out of alignment. It is therefore necessary to press these wires close to the tube shields before attempting any adjustments.

The three i-f. condensers are located in the rear and top of the chassis itself, and should be adjusted as follows:

Disconnect the outside antenna system from the receiver and connect a lead from the output of the signal generator to the control grid of the detector-oscillator tube. Do not disconnect the control-grid cap from the tube, nor remove the tube shield. Connect the ground (slate) lead of the receiver to the ground post of the signal generator. Connect a 250-mmfd. condenser in series with the lead wire of the signal generator.

Place an output meter across the secondary of the receiver output transformer (which is mounted on the speaker).

RECEIVER  
Specifications

## FADA R. IO &amp; ELECTRIC CORP.

## IDENTIFICATION OF RECEIVERS

These data should be of aid when seeking to identify the chassis.  
The shop code or number will be found at the end of the serial number on all receivers as far back as the KA.

SHOP CODE	SPEAKER	RECEIVER MODEL	TYPE	NO. OF TUBES
F	-	460/A and R-60	Battery	6
H	-	480/A, 50/80-A, R-80	Battery	8
A	-	265-A, RP-65	Battery	6
B	-	475-A, 45/75-A	Battery	7
C	-	480-B, 50/80-B	Battery	8
AP	-	265-CA, RP-65-CA	AC	7
BP	-	475-CA, 45/75-CA	AC	8
D	-	10, 11, 30, 31	AC	7
DC	-	12	DC	6
E	14-B	50, 70, 71, 72	AC	9
Rev. E	14-B	75, 77	AC	8
G	-	16, 17, RP-17	AC	8
GA	6	20	AC	8
GB	15-C	32	AC	8
GC	-	18	DC	7
K	7-C	35	AC	7
M	15-C	25, M-180, 15-M, 35-M	AC	8
O	-	22	Battery	6
Rev. K.	7-B	35-B	AC	8
P	7-A	40	AC	8
S	7-B	26, 36, 36-S	DC	7
KA	8-A, 8-B	41, 42, 44, 46, 47	AC	9
KB	9-A, 9-B	81, 82, 84, 86	DC	12
Rev. M.	7-C	28, M-250, 35-C, 7-MA	AC	8
KE	4-C	122	Air-Cell	7
KF	10-A	43	AC	7
KG	10-A	761, 762, 764, 766	AC	7
KO	10-B	51	AC	7
KOC	10-B	53, 57 (57 Phono Comb.)	AC	7
KU	12-A	45	AC	8
KW	12-A	48, 49	AC	10
KX*	10-F	61, 63 ( Long and normal wave.)	AC	5
KY	12-B	66 (Short and normal wave.)	AC	10
KOF	12-B	512, 532, 572 (220 volt AC.)	AC	7
KOC-110	10-E	171, 173	DC	8
KO-220*	10-C	251, 253, 257 ( 257 Phono Comb.)	DC	6
KOC-220*	10-G	Chassis		6
RA	12-E	74, 76, 73, 87, 88, 89, 97	AC	9
RC	12-E	78, 79	AC	11
RE	10-B	73, 85	AC	7
RF*	10-B	732, 852 (230 volts-50 cycles)	AC	7
RX*	10-F	93, 95 (Long and normal wave)	AC	7
RG	10-M	55	AC	5
RE-110	10-B	Chassis(110 volt)	DC	7
RE-220*	10-B	Chassis(220 volt)	DC	7





MODEL 66 (KY)  
Service Notes

## FADA RADIO &amp; ELECTRIC CORP.

GENERAL SERVICE NOTES ON  
KY RECEIVER - MODEL 66

It is sometimes necessary to install normal band Receivers on antenna systems having shielded lead-in wires, to minimize electrical interference, but it is unwise to use this type of installation on the KY Receiver because it will seriously affect reception on short waves.

Oscillation may be experienced on the short wave Receiver due to the selection of a first detector-oscillator tube. This oscillation may be cured by inserting a 400 ohm resistor (3-1329-Ms) in series with the control grid of the first detector-oscillator tube.

In any case where the short wave receiver oscillates when the 400 ohm resistor is already installed, it may be necessary to clean the contacts and the section of the band selector switch nearest the front of the chassis.

While on the subject of oscillation we wish to call attention to the three-quarter size shield used on the short wave oscillator tube. This shielding was designed to insure correct performance of the oscillator tube and under no circumstances should the shielding be substituted or altered.

In checking over the chassis be sure to avoid any possibility of disturbing the wiring, especially the bare ground wires directly beneath the short wave variable gang condensers which on their rubber shock mounting may come low enough to make contact with the wiring and cause considerable noise or microphonics to result.

In any case of an intermittent signal which is not directly traceable to defective tubes or shorted wiring, it is advisable to allow the chassis to play for about an hour so that the various integral parts can become fairly warm. Then allowing the chassis to continue to operate, turn it over on its side and gently tap with an insulated tool, the various by-pass condensers and resistors in an effort to locate one having an intermittent circuit. It may also be necessary to gently pull on condenser and resistor leads as well as lugs in order to locate an intermittent connection in a defective part. This method of trouble shooting is to be preferred over the "hit and miss" method of replacing parts at random until the trouble disappears.

It is assumed, of course, that the service man is familiar with the fact that a microphonic condition can be caused by allowing the control shafts and knobs of the gang condensers, volume controls and switches to touch the front panel of the cabinet.

On a sensitive Receiver such as the KY, there is a microphonic condition which may develop and which cannot be eliminated by the usual method of removing microphonic tubes, etc. In cases of this kind it is more than likely that the wire on the inside of the short wave oscillator or normal wave oscillator coils is flapping against the side of the tubing. This can readily be corrected by using wax or lacquer to secure the wires to the tubing.

## FADA RADIO &amp; ELECTRIC CORP.

MODEL 66 (KY)  
Trimmer NotesCOMPENSATING INSTRUCTIONS FOR  
KY RECEIVER - MODEL 66

In order to accurately adjust the various trimmer condensers of the Receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated signal which can be accurately attenuated at 175 K.C., 600 K.C., 1460 K.C., 3460 K.C., and 6000 K.C.

This Receiver is equipped with an automatic volume control, which necessitates setting the manual volume control of the Receiver, to its maximum position and controlling the volume of the signal with the aid of the attenuator control of the signal generator.

## ADJUSTMENT OF I.F. CONDENSERS

The three (3) I.F. condensers are located in the rear and side of the chassis itself, as indicated in the sketch.

- (1) Remove the overall condenser and tube shield housing cover so that a wire from the attenuator circuit of the signal generator can be attached to the control grid cap of the first detector - oscillator tube. Do not disconnect the control grid connector from the tube. The housing cover can be laid in place upside down if necessary.
- (2) Disconnect the outside antenna system from the Receiver during this operation.
- (3) Turn the rotar plates of the variable condensers on the normal bank Receiver so that all plates are meshed (maximum capacity).
- (4) Place an output meter across the speaker voice coil (secondary of the Receiver output transformer, which is mounted on speaker) so that the variations in signal intensity can be measured by eye as well as detected by ear. Output meters with a multi-range scale are generally supplied with good quality commercial signal generators.
- (5) Place the signal generator in operation and adjust the frequency indicator to 175 K.C. Regulate the attenuator control so that the output signal is weak enough to insure accuracy in adjusting the I.F. condensers of the Receiver.
- (6) With the aid of a #4 socket wrench, adjust the three (3) I.F. condensers to resonance as indicated by the loudest signal and greatest swing of the needle in the output meter.

ADJUSTMENT OF NORMAL BAND  
VARIABLE GANG CONDENSER COMPENSATORS

The compensating condensers are located at the top of their respective tuning condensers. They can be adjusted with a screw driver. There are three holes (see sketch) in the overall condenser and tube shield housing cover, which permit insertion of the screw driver for compensating purposes.

MODEL 66 (KY)  
Trimmer Notes

## FADA RADIO & ELECTRIC CORP.

- (1) Remove the wire from the attenuator circuit of the signal generator which was attached to the control grid of the first detector - oscillator tube and replace the overall condenser and tube shield housing cover.
- (2) Connect the red antenna wire of the Receiver to the signal generator.
- (3) Set the signal generator at 1460 K.C.
- (4) Set the calibrated dial of the normal bank Receiver to read 1460 K.C.
- (5) Turn the bank selector switch of the Receiver as far to the right as it will go - (normal wave setting).
- (6) Starting with the compensator nearest the back of the Receiver, adjust each compensator in turn for maximum signal output as indicated in the output meter. Do not disturb the setting of the gang condenser during these operations. Leave the volume control on full and regulate signal strength with the attenuator control of the signal generator.

### ADJUSTMENT OF OSCILLATOR SERIES CONDENSER

The oscillator series condenser can be adjusted through the hole nearest the rear on the right side of chassis (see sketch).

- (1) Tune the signal generator to a signal of 600 K.C.
- (2) Set the calibrated dial of the normal bank Receiver to 600 K.C.
- (3) With the aid of a #4 socket wrench adjust the oscillator series condenser until a maximum signal is indicated in the output meter. To insure perfect adjustment it is necessary to "rock" the variable gang condenser in order to follow the maximum signal output.
- (4) After oscillator series condenser is properly adjusted, turn the calibrated dial of the Receiver to 1460 K.C. and adjust the signal generator to the same frequency, then readjust all variable gang condenser compensators as outlined in the foregoing instructions.

### ADJUSTMENT OF THE SHORT WAVE VARIABLE GANG CONDENSER COMPENSATORS

The compensators are located at the top of their respective turning condensers and can be adjusted with the aid of a screw driver.

- (1) Turn the band selector switch to the 35/75 meter position.
- (2) Turn the normal bank variable gang condensers so that the indicator points to the red mark. Best results will no doubt be obtained when the indicator is pointing to about 99 degrees or the beginning of the red mark rather than the center or extreme end.
- (3) Adjust the signal generator to 6000 K.C.

## FADA RADIO &amp; ELECTRIC CORP.

MODEL 66 (KY)  
Trimmer Notes

- (4) Tune the short wave Receiver to pick up the 6000 K.C. signal at about 38 degrees on the dial.
- (5) Beginning with the compensator nearest the front of the Receiver, adjust the two compensators for maximum signal as indicated in the output meter.

ADJUSTMENT OF SHORT WAVE  
COUPLING CONDENSER

The hole through which the condenser is to be adjusted will be found in the chassis between the S.W. first detector and S.W. coupling tubes. (see sketch).

- (1) Leave the bank selector switch set at 35-75 meters.
- (2) Leave the signal generator tuned to 6000 K.C.
- (3) With the aid of a #4 socket wrench, adjust the short wave coupling condenser for maximum signal as indicated in the output meter.

## ADJUSTMENT OF OSCILLATOR SERIES CONDENSERS

The oscillator series condensers can be adjusted through the holes located in the front center of the chassis, between the short wave variable gang condenser and the overall condenser and tube shield housing.

- (1) Leave the band selector switch set at 35-75 meters.
- (2) Adjust the signal generator to a signal of 3460 K.C.
- (3) Turn the short wave variable gang condenser to 100 degrees so that all plates are meshed (maximum capacity).
- (4) Adjust the front series tracking condenser for maximum signal as indicated in the output meter.
- (5) Set the band selector switch to the 75-200 meter setting but leave the variable gang condensers as they are.
- (6) Adjust the signal generator to 1460 K.C.
- (7) With the aid of a #4 socket wrench, adjust the rear series tracking condenser for maximum signal as indicated in the output meter. It may become necessary to place the hand on the control grid of the short wave first detector tube to prevent oscillation during this adjustment.
- (8) After the above adjustments have been completed check for accuracy by immediately tuning in local broadcast stations especially on the short waves.

## I-F CONDENSERS

See Voltage Page for location  
of intermediate frequency  
trimmer condensers



MODEL 66 (KY)

FADA RADIO & ELECTRIC CORP.

Voltage

Socket

IF Condensers

Line voltage 115 A.C. -- 100 watts  
No signals -- Ant. & ground leads tied together

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	CONTROL GRID VOLTS	PLATE CURRENT	SCREEN GRID VOLTS
F-224	S.W. 1st Det.	28	-	1.2	28
F-235	S.W. Coupling	152	4	4.4	100
F-227	S.W. Osc.	59	-	5.3	-
F-235	R.F.	290	4	4.4	100
F-224	1st Det.Osc.	282	8	.8	92
F-235	Int. Freq.	290	4	4.4	100
F-227	2nd Det.	-	-	-	-
F-235	1st A.F.	48	-	1.4	34
F-247	2nd A.F.	250	17*	34.0	276
F-280	Rectifier			76.0 total	

\* True bias reading, taken across 400 ohms bias resistor

VOLTAGES ACROSS VOLTAGE DIVIDER AND BLEEDER RESISTORS

Voltage across	Resistor Value	Resistor	Voltage
1,400 ohm	Speaker field	(3-1407-Ms)	102 volts
"	25,000 "	resistor (3-1416-Ms)	193 "
"	10,000 "	resistor (2-1439-Ms)	70 "
"	50,000 "	resistor (2-1419-Ms)	232 "
"	400 "	resistor (3-1306-Ms)	17 "
"	300 "	resistor (3-1247-Ms)	4 "

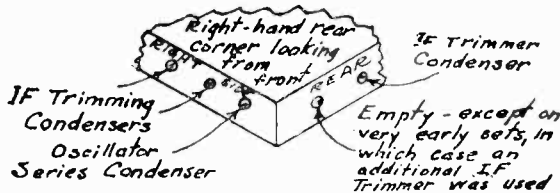
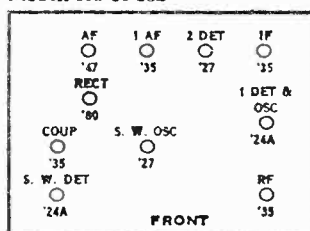
DC RESISTANCE VALUES

PRIMARY

SECONDARY

1919-X			
OR			
1914-X	R.F.Coil	70.9 ohms	3.4 ohms
1916-X	Short wave ant. coil	.19 "	.89 "
1869-X	I.F. transformer	100.00 "	100.00 "
1870-X	I.F. transformer	100.00 "	100.00 "
1886-X	Output transformer	708.00 "	1.003 "
1913-X	Antenna coil	- -	3.4 "
2-2005-Y	Image suppressor coil	15.5 "	1.47 "
2-2004-Y	Coupling coil	12.6 "	
3-1407-Ms	12-B speaker field	1400.00 "	
1915-X	Oscillator coil - Pick up coil	.59 ohms	
OR	Secondary	2.8 "	
1920-X	Tickler Coil	16.9 "	
1917-X	Short wave osc. coil - Pick up coil	.2 ohms	
	Secondary	.6 "	
	Tickler Coil	.2 "	

Models KY-66-66Z

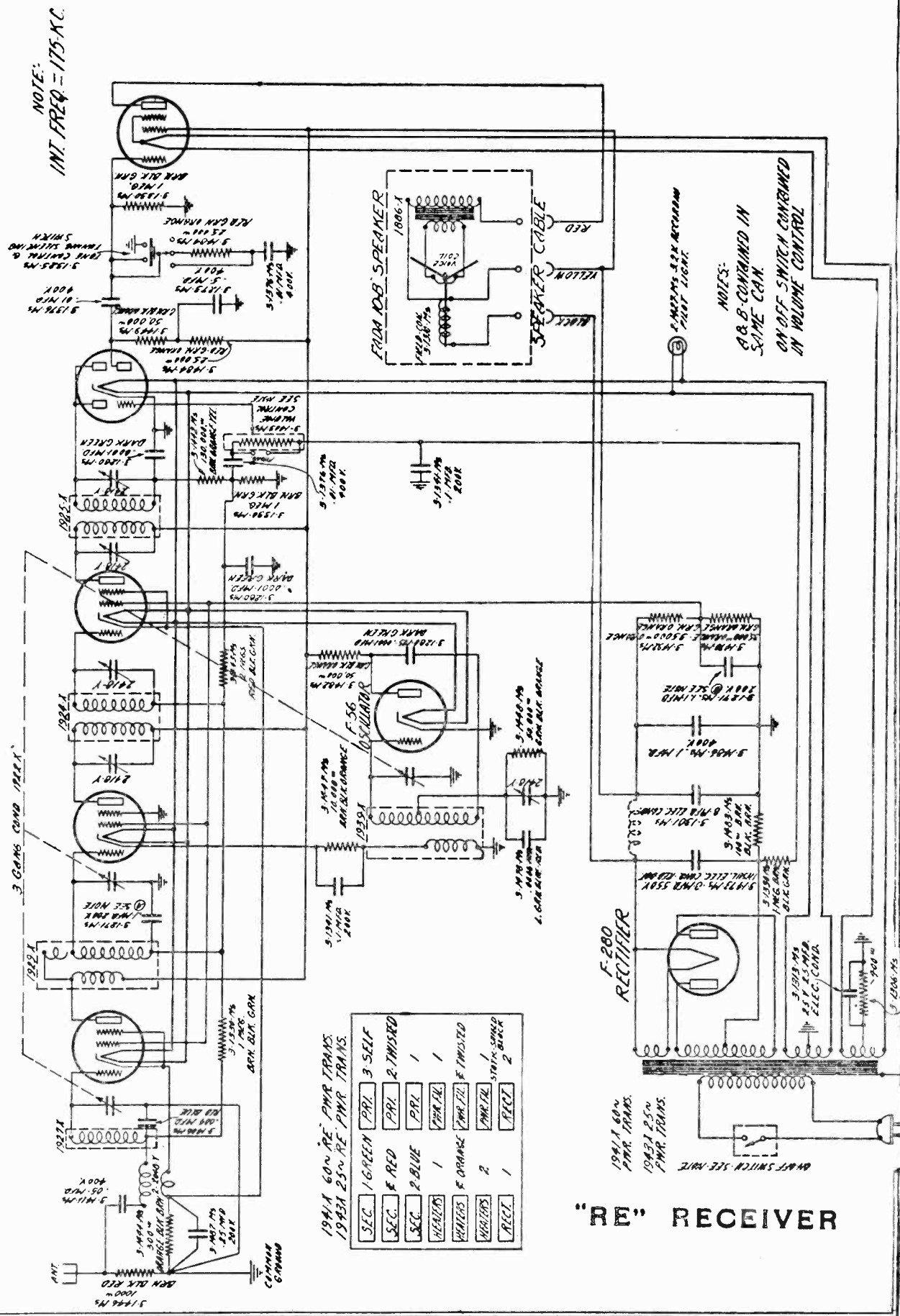




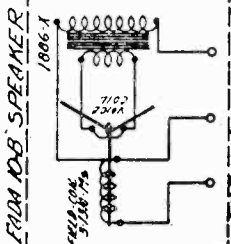
MODEL 73, 85 (RE)  
Schematic

FADA RADIO & ELECTRIC CORP.

F-247 POWER-PENTODE  
 F-55 DUO-DIODE-TRIODE  
 F-58 INT. FREQ.  
 F-58 1ST DEF.  
 F-58 R.F.



NOTE:  
INT. FREQ. = 175 K.C.



NOTES:  
A & B CONTAINED IN SAME CAN.  
ON OFF SWITCH CONTAINED IN VOLUME CONTROL.

1941A 60V RE. PWR TRANS.  
1943A 250V RE. PWR TRANS.

SEC.	1-GREEN	PR1	3-SELF
SEC.	2-RED	PR1	2-TWISTED
SEC.	3-BLUE	PR1	1
HEATERS	1	PR1, PR2	1
HEATERS	2	PR1, PR2	1
HEATERS	2	PR1, PR2	1
RECT.	1	RECT.	2

1941A 60V PWR TRANS.  
1943A 250V PWR TRANS.

F-200 RECTIFIER

"RE" RECEIVER



MODEL 73, 85 (RE)

Alignment Data

FADA RADIO & ELECTRIC CORP.

TABLE 1

The measurements below should be made with all tubes removed from their sockets, the speaker disconnected, silencing switch off and pilot light removed. Unless otherwise clearly indicated, all resistance values are measured between chassis and point stated.

Reference Points	Value in Ohms	Reference Points	Value in Ohms
Aerial to ground	1,000	2 Det. diode plate to plate	0
R-F. control grid	4 meg.	2 Det. diode plates	1,130,097
R-F. grid winding only	3.5	2 Det. input coil only	97
R-F. suppressor coil pri. only	15.5	2 Det. cathode	0
R-F. cathode	301.47	2 Det. control grid (V.C. all out)	1 meg.
R-F. suppressor coil sec. only	1.47	2 Det. triode plate to 47 screen	75,000
R-F. screen grid	35,000	Osc. control grid	50,000
R-F. plate to 47 screen	71	Osc. grid coil only (complete)	3.5
Suppressor grid to r-f. cathode	0	Osc. cathode	0
		Osc. plate to 47 screen	50,000
1 Det. control grid	3 meg.		
1 Det. grid coil only	3.5	47 control grid	1 meg.
1 Det. cathode	10,000.8	47 filament	400
1 Det. cathode-osc. coil only	.8	47 screen grid	70,000
1 Det. suppressor grid	0	47 plate to 80 fil.	3,208
1 Det. screen grid	35,000	47 plate to screen	708
1 Det. plate to 47 screen	97		
		80 filament	72,500
I-F. control grid	3 meg.	80 anode to anode	350-400
I-F. grid coil only	97	80 anode	225-250
I-F. cathode	301.47		
I-F. suppressor to i-f. cathode	0	Across speaker field only	2,500
I-F. screen grid	35,000		
I-F. plate to 47 screen	97	Across output trans. sec. only	1.003

2. Connect the antenna (red) wire of the receiver to the dummy antenna system of the signal generator. The ground (slate) wire of the receiver is to remain connected to the ground post of the signal generator.

3. Adjust the carrier frequency output of the signal generator to 1,400 kc., and set the calibrated dial of the receiver to read 1,400 kc.

4. Starting with the compensator nearest the rear of the receiver, adjust each compensator in turn for maximum signal output as indicated on the output meter. Do not disturb the setting of the gang condenser during these operations. Leave the manual volume control on full and regulate the signal output with the attenuator control of the signal generator as before.

ADJUSTMENT OF OSCILLATOR

The oscillator series condenser can be adjusted through the hole in the side of the chassis, near the first i-f. transformer. Proceed as follows:

1. Adjust the carrier frequency output of the signal generator to 600 kc., and set the calibrated dial of the receiver to read 600 kc.

2. With the aid of a No. 4 socket wrench adjust the oscillator series condenser until a maximum output signal is indicated on the output meter. To insure perfect adjustment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

3. After the oscillator series condenser is properly adjusted turn the calibrated dial of the receiver to 1,400 kc., and adjust the signal generator to the same frequency, then readjust all variable condenser compensators as outlined in the foregoing instructions.

The resistance measurement data for the Fada "RE" chassis is given in Table 1.

ADJUSTMENT OF I-F. CONDENSERS

The four i-f. condensers are located in the rear and side of the chassis itself. For adjustment, proceed as follows:

1. Disconnect the outside antenna system from the receiver and connect a lead wire from the dummy antenna system of the signal generator to the control grid of the first detector tube. Do not disconnect the control grid connector from the tube, nor remove the tube shield. Connect the ground (slate) lead of the receiver to the ground post of the signal generator. In the event that the signal generator being used does not have a dummy antenna system, connect a 250-mfd. condenser in series with the lead wire.

2. Remove the 56 oscillator tube from the receiver socket. Place an output meter across the secondary of the receiver output transformer (which is mounted on the speaker) so that the variations in signal output can be noted.

3. Place the signal generator in operation and adjust the frequency output to 175 kc. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the i-f. condensers of the receiver.

4. With the aid of a No. 4 socket wrench adjust the four i-f. condensers to resonance as indicated by the greatest swing of the output meter.

ADJUSTMENT OF GANGED CONDENSERS

The compensators for the ganged condensers are located at the top of their respective tuning condensers, and can be adjusted with the aid of a screw driver. For adjustment, proceed as follows:

1. Remove the lead wire which is connected to both the control grid of the first detector and also to the dummy antenna system of the signal generator.



MODEL 74,76,83,88,89

(RA)

FADA RADIO & ELECTRIC CORP.

Schematic

F-247  
PUSH PULL  
POWER AMPLIF.

F-56  
AUDIO FREQ.

F-56  
DIODE

F-58  
INT. FREQ.

F-58  
7-12 INJECTOR

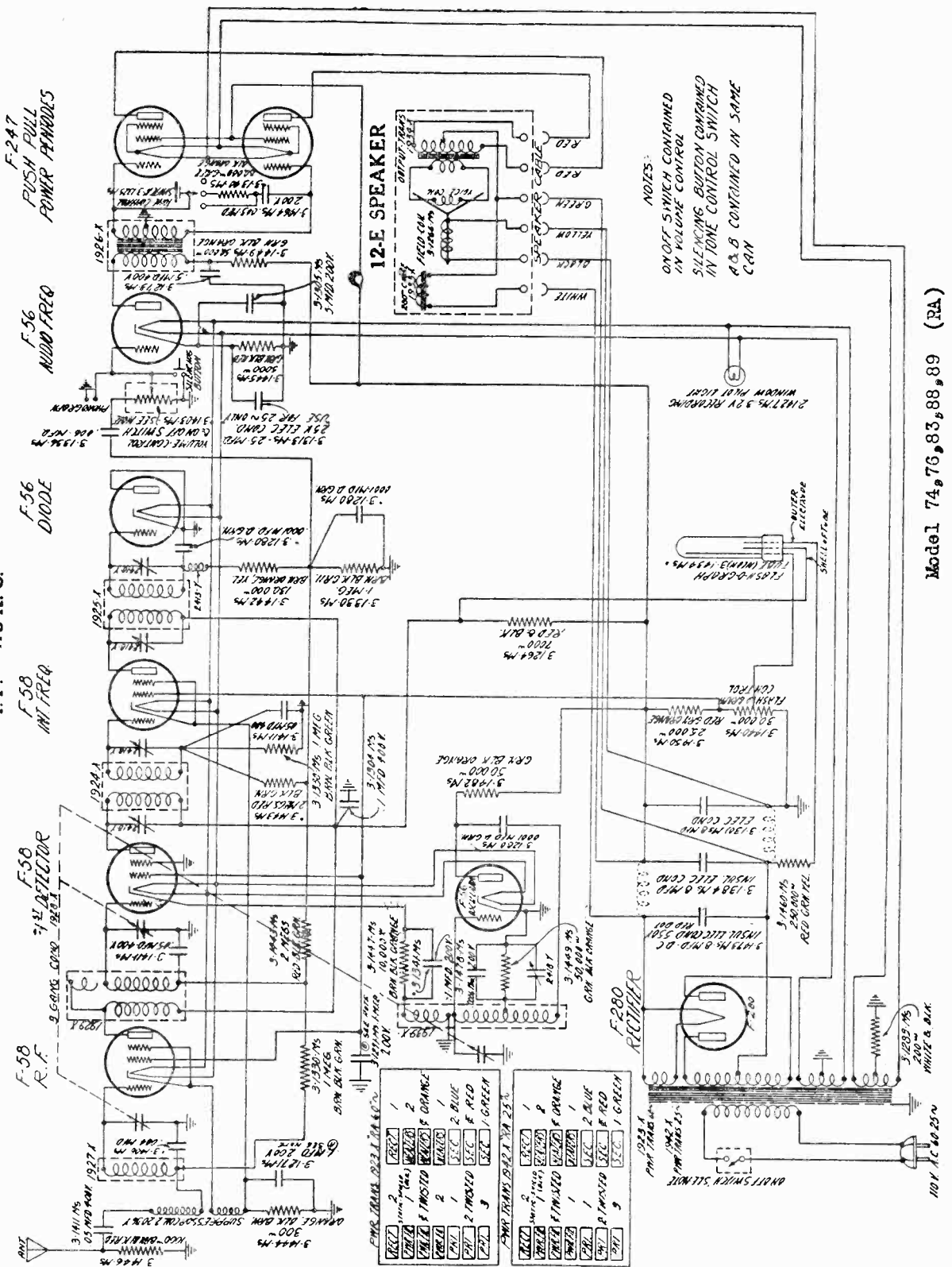
F-58  
R.F.

I.F. = 175 K.C.

12-E SPEAKER

NOTES:  
ON OFF SWITCH CONTAINED  
IN VOLUME CONTROL  
SILENCING BUTTON CONTAINED  
IN TONE CONTROL SWITCH  
A & B CONTAINED IN SAME  
CAN

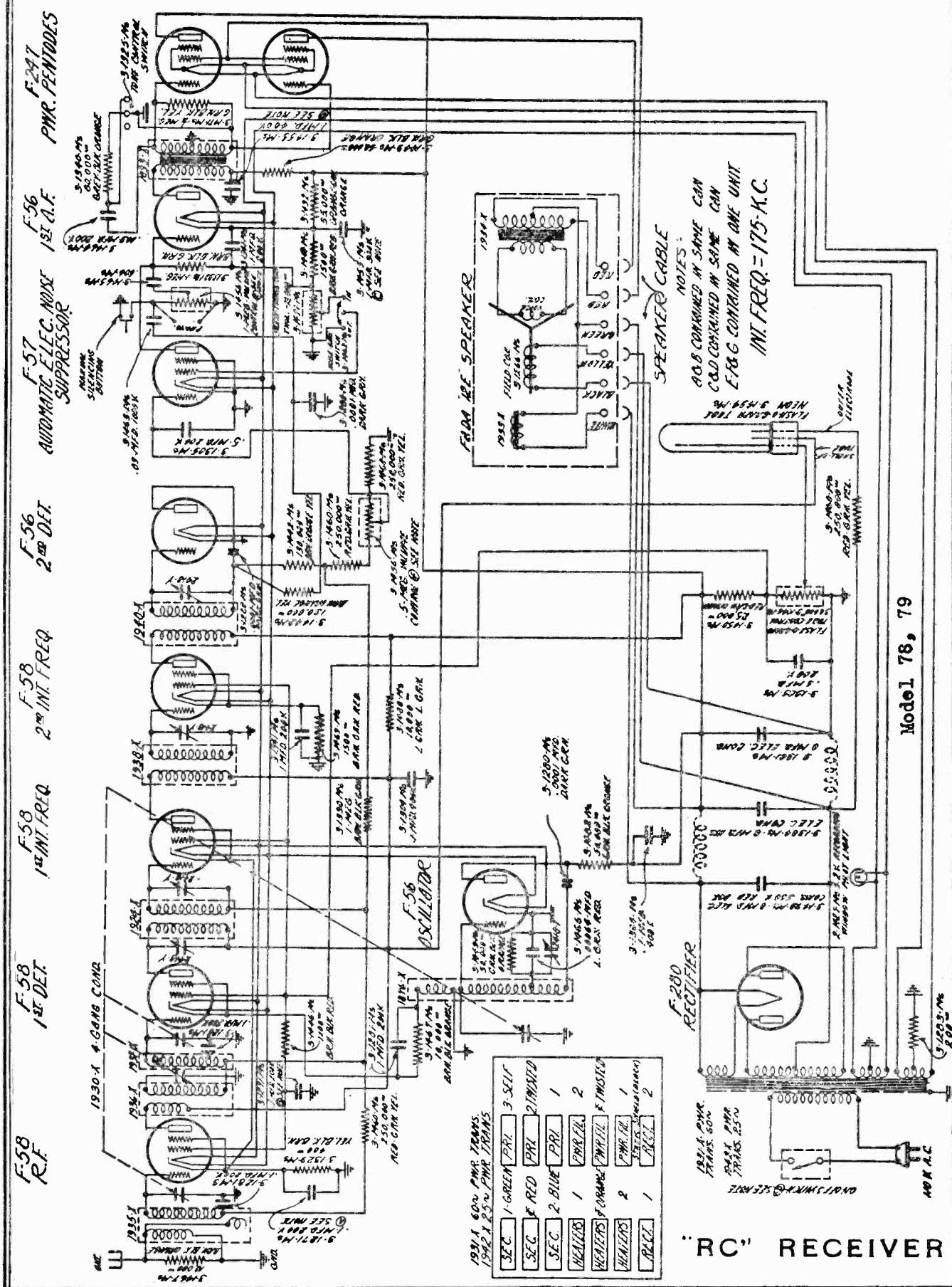
Model 74,76,83,88,89 (RA)



12B6	RECT.	1	RED
6X4	5Y5	1	RED
6X4	5Y5	2	RED
6X4	5Y5	3	RED
6X4	5Y5	4	RED
6X4	5Y5	5	RED
6X4	5Y5	6	RED
6X4	5Y5	7	RED
6X4	5Y5	8	RED
6X4	5Y5	9	RED
6X4	5Y5	10	RED
6X4	5Y5	11	RED
6X4	5Y5	12	RED
6X4	5Y5	13	RED
6X4	5Y5	14	RED
6X4	5Y5	15	RED
6X4	5Y5	16	RED
6X4	5Y5	17	RED
6X4	5Y5	18	RED
6X4	5Y5	19	RED
6X4	5Y5	20	RED
6X4	5Y5	21	RED
6X4	5Y5	22	RED
6X4	5Y5	23	RED
6X4	5Y5	24	RED
6X4	5Y5	25	RED
6X4	5Y5	26	RED
6X4	5Y5	27	RED
6X4	5Y5	28	RED
6X4	5Y5	29	RED
6X4	5Y5	30	RED
6X4	5Y5	31	RED
6X4	5Y5	32	RED
6X4	5Y5	33	RED
6X4	5Y5	34	RED
6X4	5Y5	35	RED
6X4	5Y5	36	RED
6X4	5Y5	37	RED
6X4	5Y5	38	RED
6X4	5Y5	39	RED
6X4	5Y5	40	RED
6X4	5Y5	41	RED
6X4	5Y5	42	RED
6X4	5Y5	43	RED
6X4	5Y5	44	RED
6X4	5Y5	45	RED
6X4	5Y5	46	RED
6X4	5Y5	47	RED
6X4	5Y5	48	RED
6X4	5Y5	49	RED
6X4	5Y5	50	RED

FADA RADIO & ELECTRIC CORP.

MODEL 78, 79 (RC)  
Schematic



F-58 1st DET. F-58 1st INT. FREQ. F-58 2nd INT. FREQ. F-56 2nd DET. F-57 AUTOMATIC F.E.L.C. NOISE SUPPRESSOR F-56 1st A.F. F-247 PWR. PENTODES

1931-A 60W PWR. TRANS.  
1942-X 25W PWR. TRANS.

SEC.	1-GREEN	PRI.	3-SELF
SEC.	1-RED	PRI.	2-1000Ω
SEC.	2-BLUE	PRI.	1
HEATERS	1	PWR. EL.	2
HEATERS	1	PWR. EL.	1
HEATERS	2	PWR. EL.	1
REGL.	1	REGL.	2

NOTES:  
 A0.8 CONTAINED IN SAME CAN  
 C.0.0 CONTAINED IN SAME CAN  
 F-18-G CONTAINED IN ONE UNIT  
 INT. FREQ. = 175-K.C.

Model 78, 79

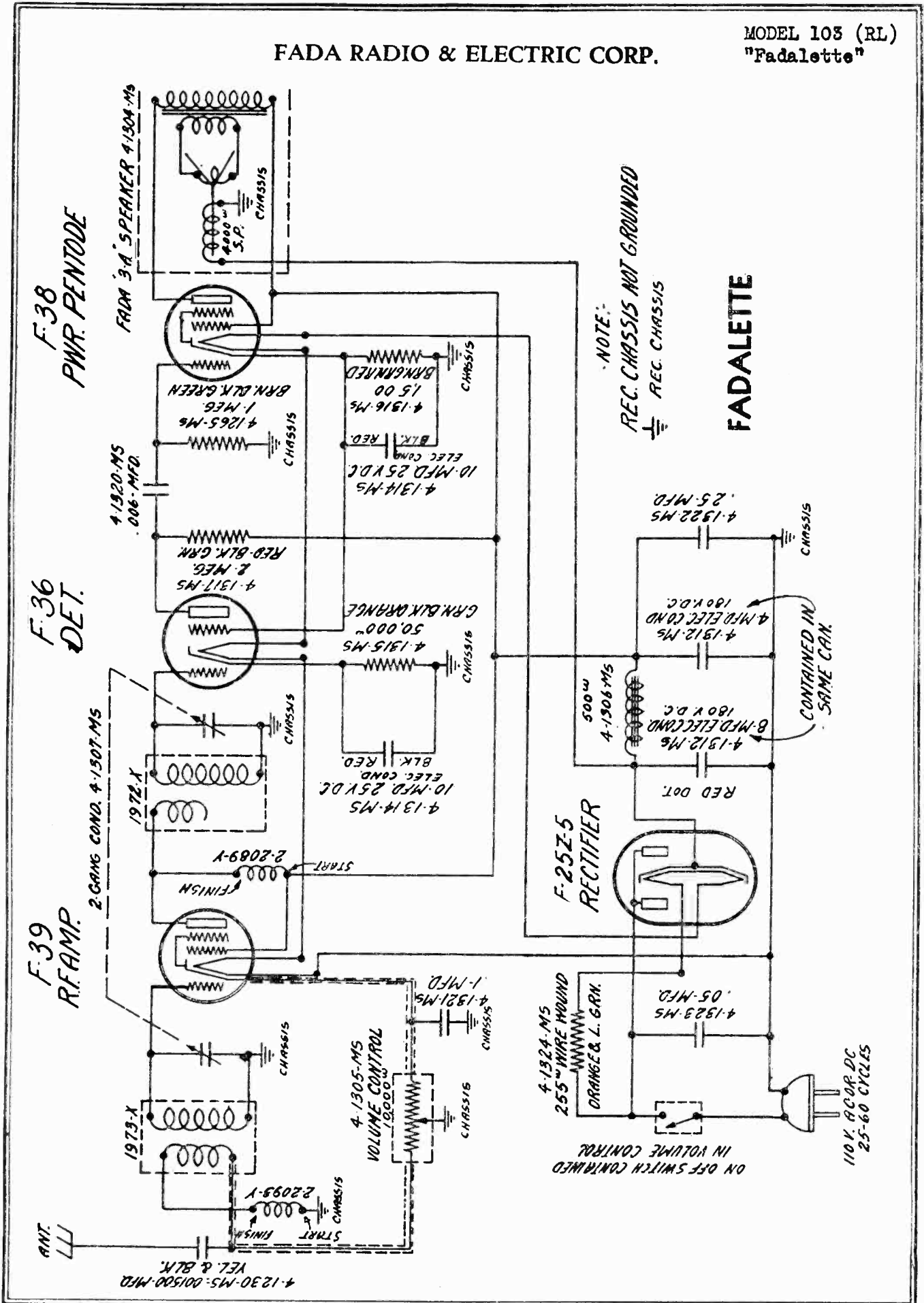
"RC" RECEIVER





FADA RADIO & ELECTRIC CORP.

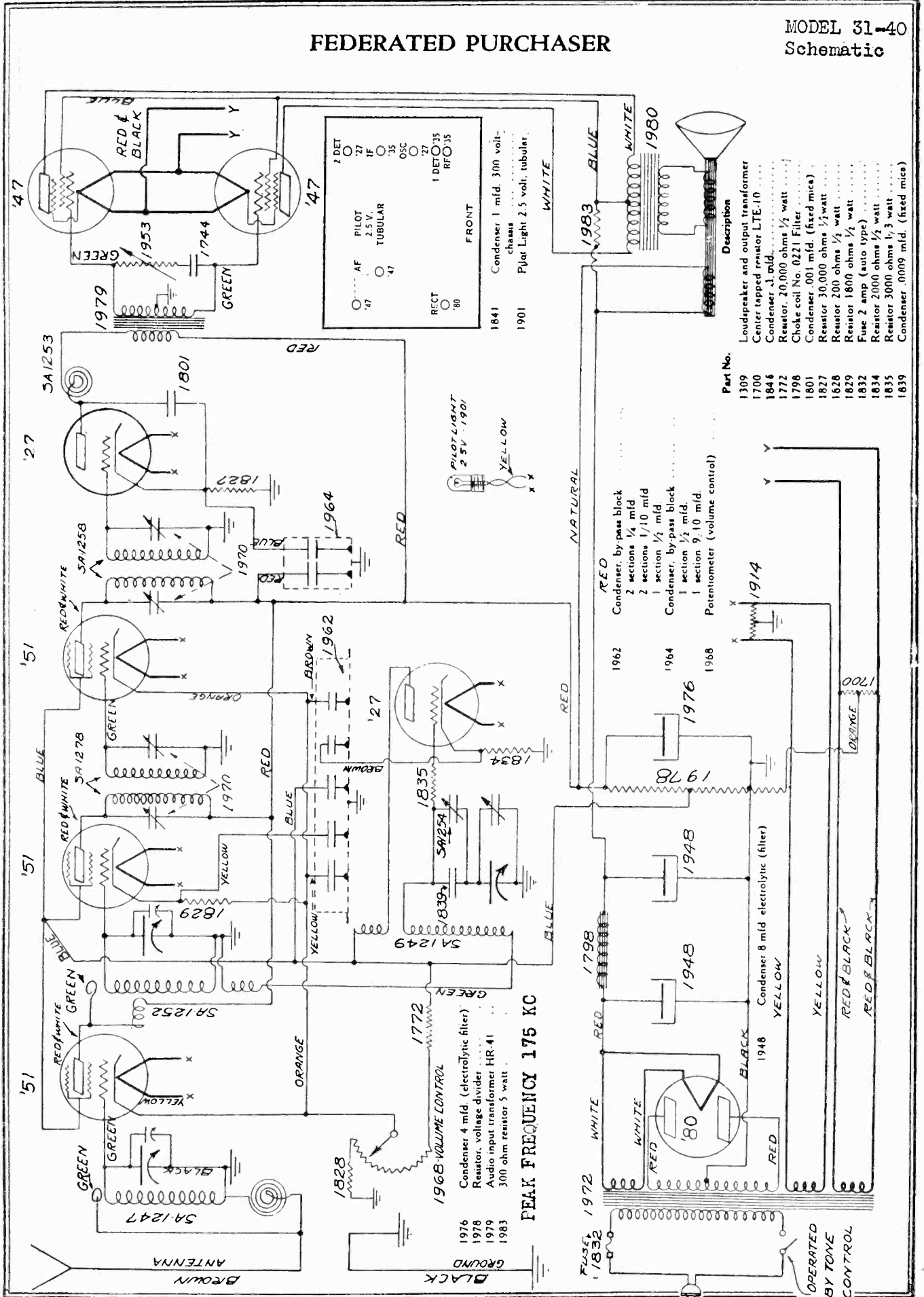
MODEL 103 (RL)  
"Fadalette"





# FEDERATED PURCHASER

MODEL 31-40  
Schematic



Part No.	Description
1309	Loudspeaker and output transformer
1700	Center tapped resistor LTE-10
1846	Condenser .1 mfd.
1772	Resistor 20,000 ohms 1/2 watt
1798	Choke coil No. 021 Filter
1801	Condenser .001 mfd. (fixed mica)
1827	Resistor 30,000 ohms 1/2 watt
1626	Resistor 200 ohms 1/2 watt
1829	Resistor 1800 ohms 1/2 watt
1832	Fuse 2 amp (auto type)
1834	Resistor 2000 ohms 1/2 watt
1835	Resistor 3000 ohms 1/2 watt
1839	Condenser .0009 mfd. (fixed mica)

**PEAK FREQUENCY 175 KC**

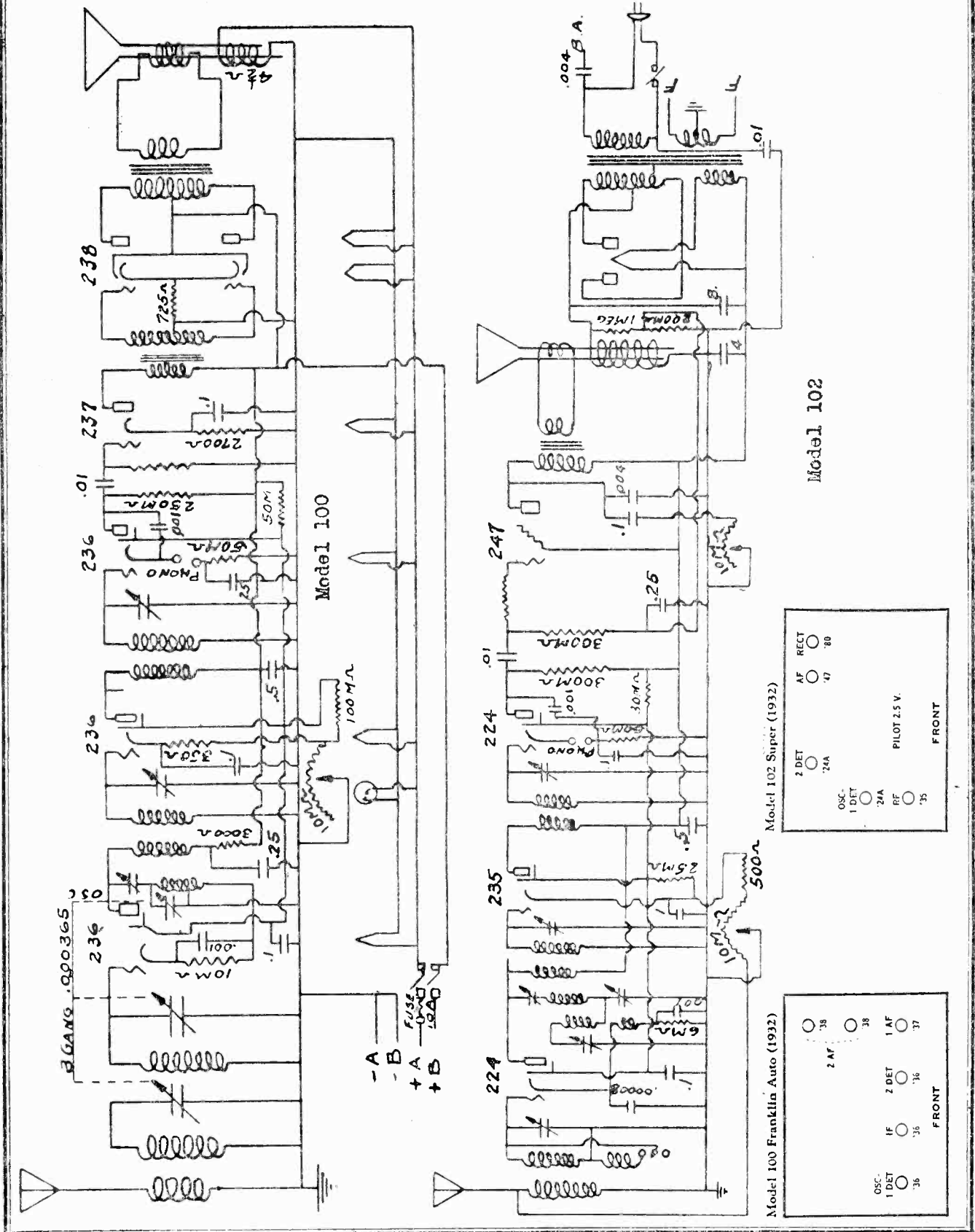
1976 Condenser 4 mfd. (electrolytic filter)  
 1978 Resistor, voltage divider  
 1979 Audio input transformer HR-41  
 1983 300 ohm resistor 5 watt

OPERATED BY TONE CONTROL



FRANKLIN RADIO CORP.

MODEL 100  
MODEL 102  
Schematics



MODEL 100  
Service Notes

## FRANKLIN RADIO CORP.

### CONNECTING "A" BATTERY

The "A" battery connections of the Franklin Auto Radio have no polarity. By this is meant, neither negative or positive, but the heavy green wire with tracer must always be connected to the "hot" side of the battery, (the ungrounded side of the storage battery). The sheath may be attached to any convenient ground connection such as any bolt passing into the frame of the car or direct to the grounded terminal of the storage battery.

We recommend that the heavy green wire with tracer be attached either directly to the "hot" side of the storage battery or to the heavy cable running to the starter switch. Never, under any circumstances, attach the heavy green wire with tracer to any of the ignition wires or light wires. Special warning is given against connecting this wire to the generator wire anywhere along its length.

### CONNECTING MODEL 100

Remove radio chassis from housing and fasten steering column mounting bracket to bottom of housing with machine screws that are furnished, or if steering column cannot be used, use the bolts that are furnished to fasten housing to bulkhead of car; drawing the three bolts through the three mounting holes in back of housing. In this case be sure to allow housing to extend about 3/4" to 1" away from bulkhead, by adjusting the series of nuts also furnished for this purpose. This will relieve any warping of housing and chassis, so as not to throw the radio set out of balance.

Now pass driving control cable through grommeted hole in front cover of housing. With radio chassis still removed from housing, set dial scale on remote control to 0. Now, using a small wrench or pair of pliers unscrew bushing headnut on variable condenser back plate about three fourths of the way, and pass control wire through hole in bushing until control cable sheath enters into hole of the bushing. Then tighten up the bushing headnut with dial scale at 0. Then grasp the condenser pulley in one hand and revolve same until condenser plates are all the way open and will not turn further in that direction. Holding condenser in this position, loosen clamp screw at top of the pulley and run control wire under clamp until all the slack is taken out of the wire. Then tighten clamp screw down on wire rather tight. Proceed to put chassis back into housing and bolt down as it was before removal from housing.

### DETERMINING PICKUP

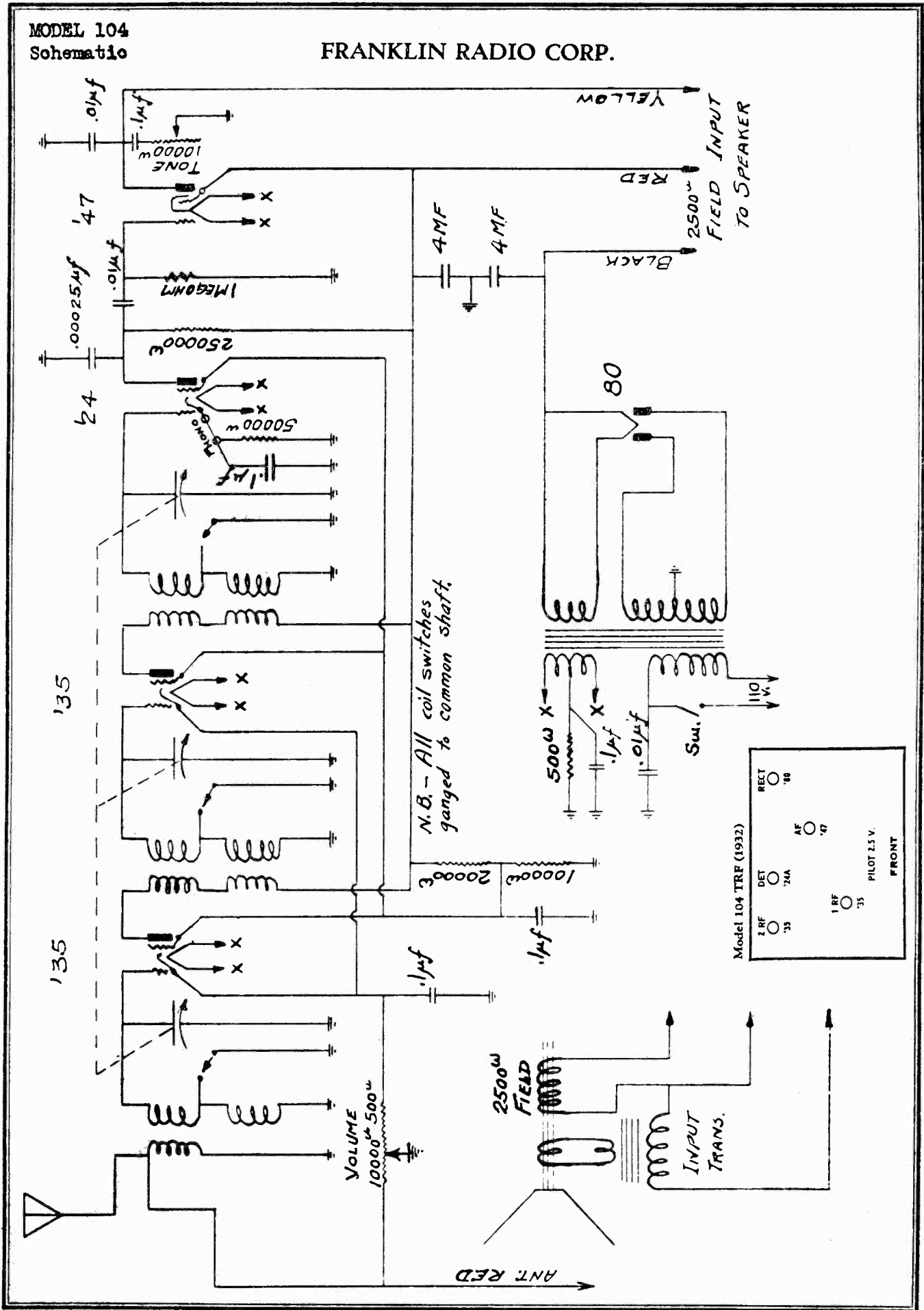
The first thing to do in the elimination of ignition noise is to determine whether it is being picked up by the antenna and antenna leadin, or by the set itself. To determine this, turn on the set and start the motor. Then disconnect the leadin at a point where it is connected with the shielded lead going to the receiver. If the noise stops, it naturally shows that the noise is being picked up somewhere in the antenna system. If the noise is still in evidence after disconnecting the leadin, the noise is presumably chassis pickup. Sometimes there is a combination of the two, and in this case, it is necessary to first eliminate the chassis noise and then the remaining noise can be removed using methods normally discussed in connection with ignition noise elimination.





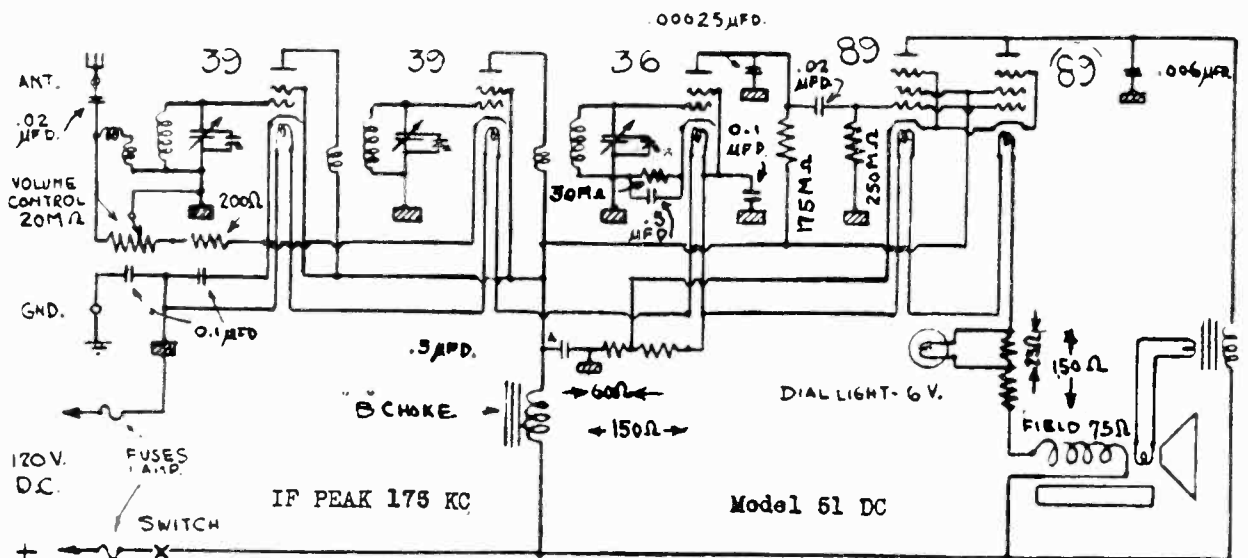
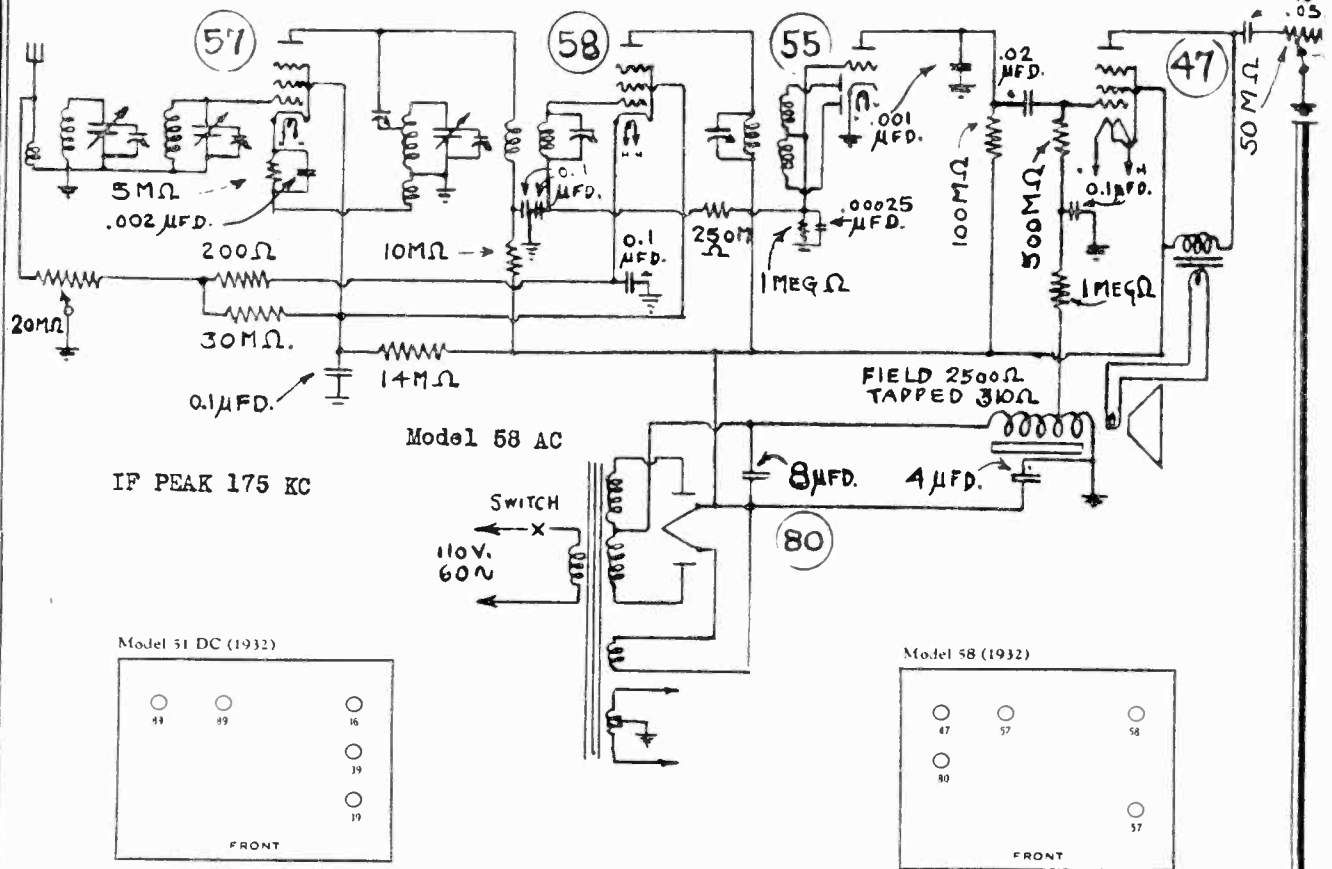
MODEL 104  
Schematic

FRANKLIN RADIO CORP.



MODEL 51 DC  
MODEL 58 AC

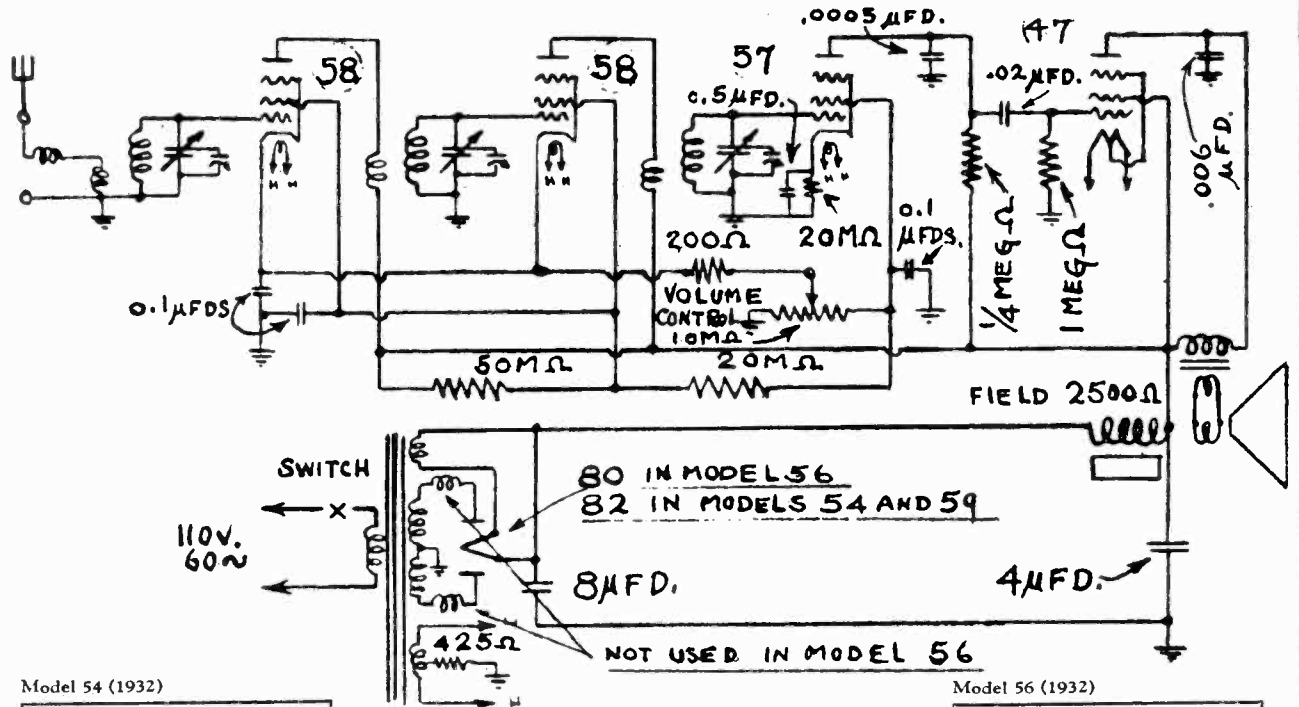
FREED RADIO AND TELEVISION CORP.



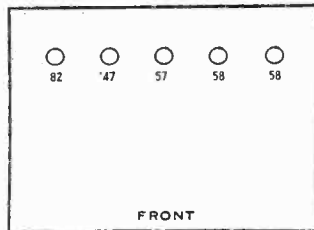


FREED RADIO AND TELEVISION CORP.

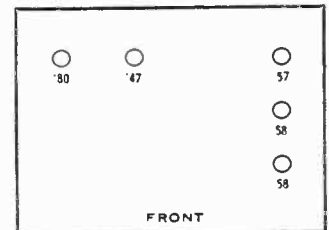
MODEL 54, 56, 59  
MODEL MB-5



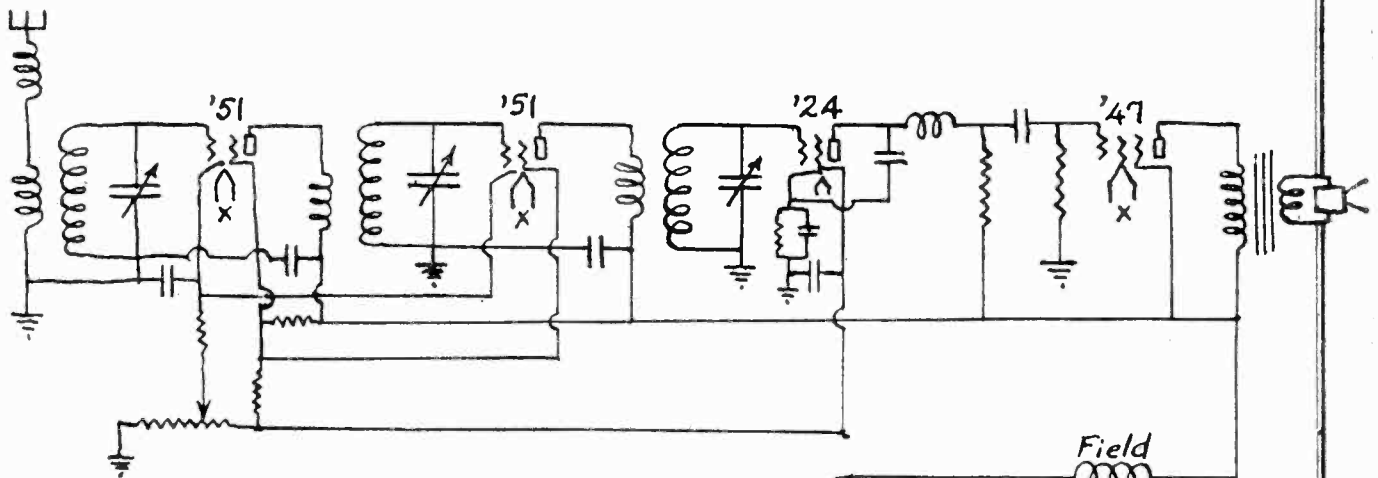
Model 54 (1932)



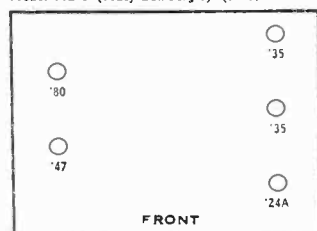
Model 56 (1932)



Model 54, 56, 59



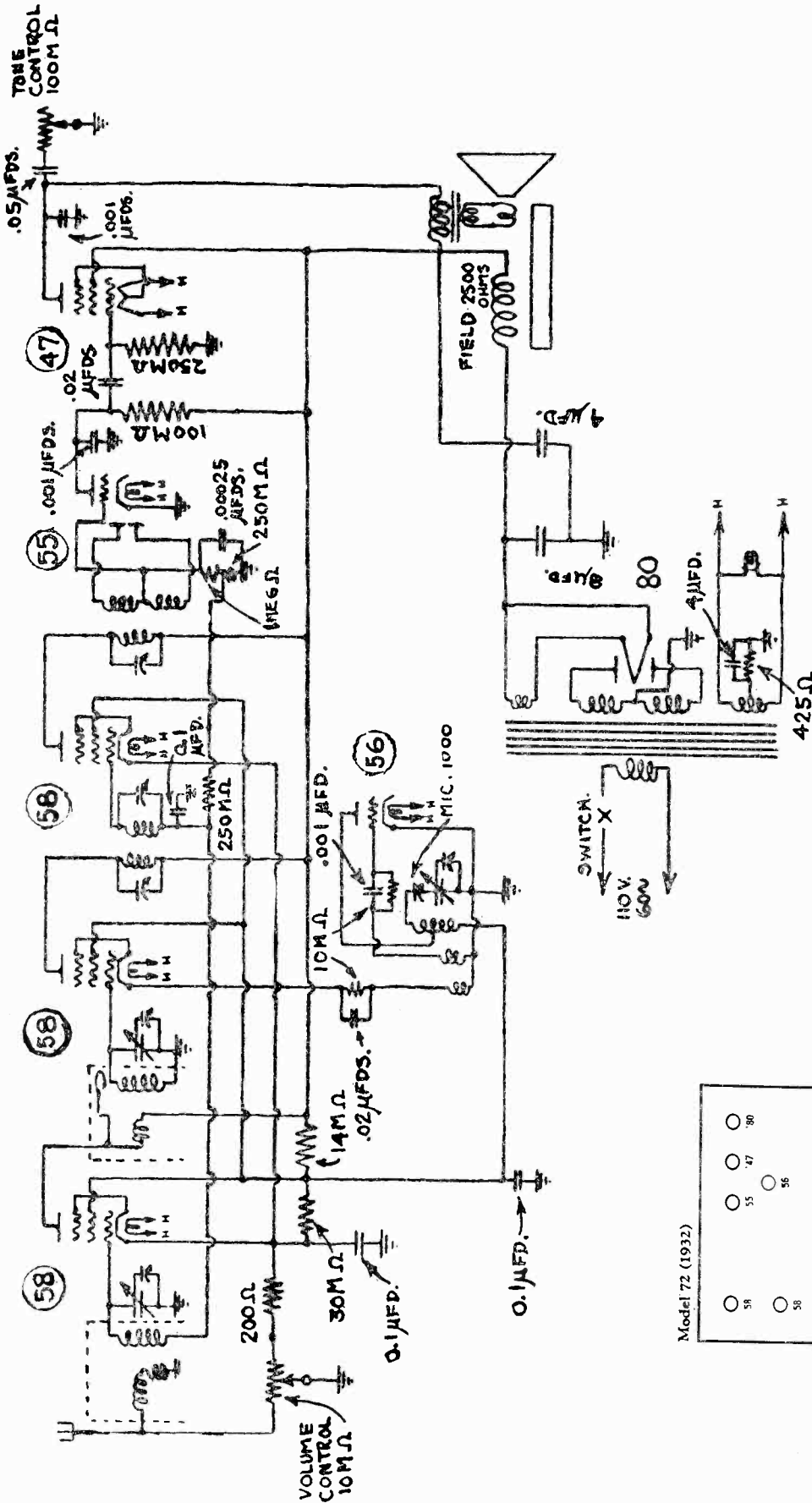
Model MB-5 (Macy-Bamberger) (1931)



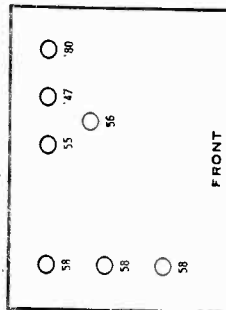
Model MB-5

MODEL 72, 74, MB-7 FREED RADIO AND TELEVISION CORP.

IF PEAK 175 KC



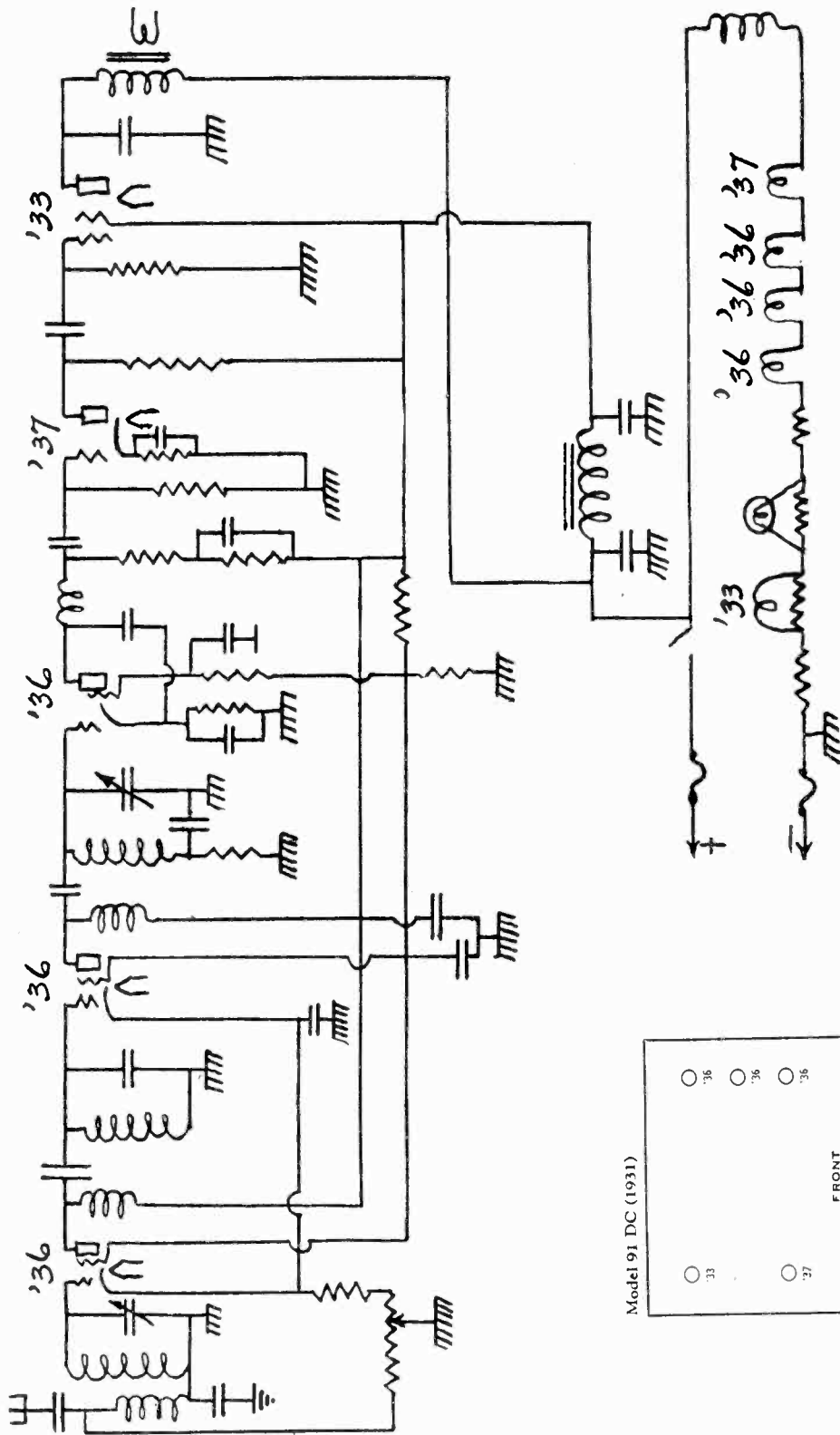
Model 72 (1932)



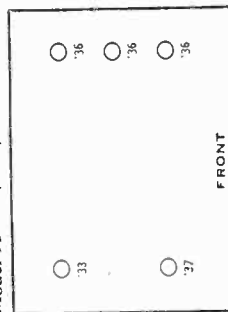


MODEL 91 DC

FREED RADIO AND TELEVISION CORP.



Model 91 DC (1931)

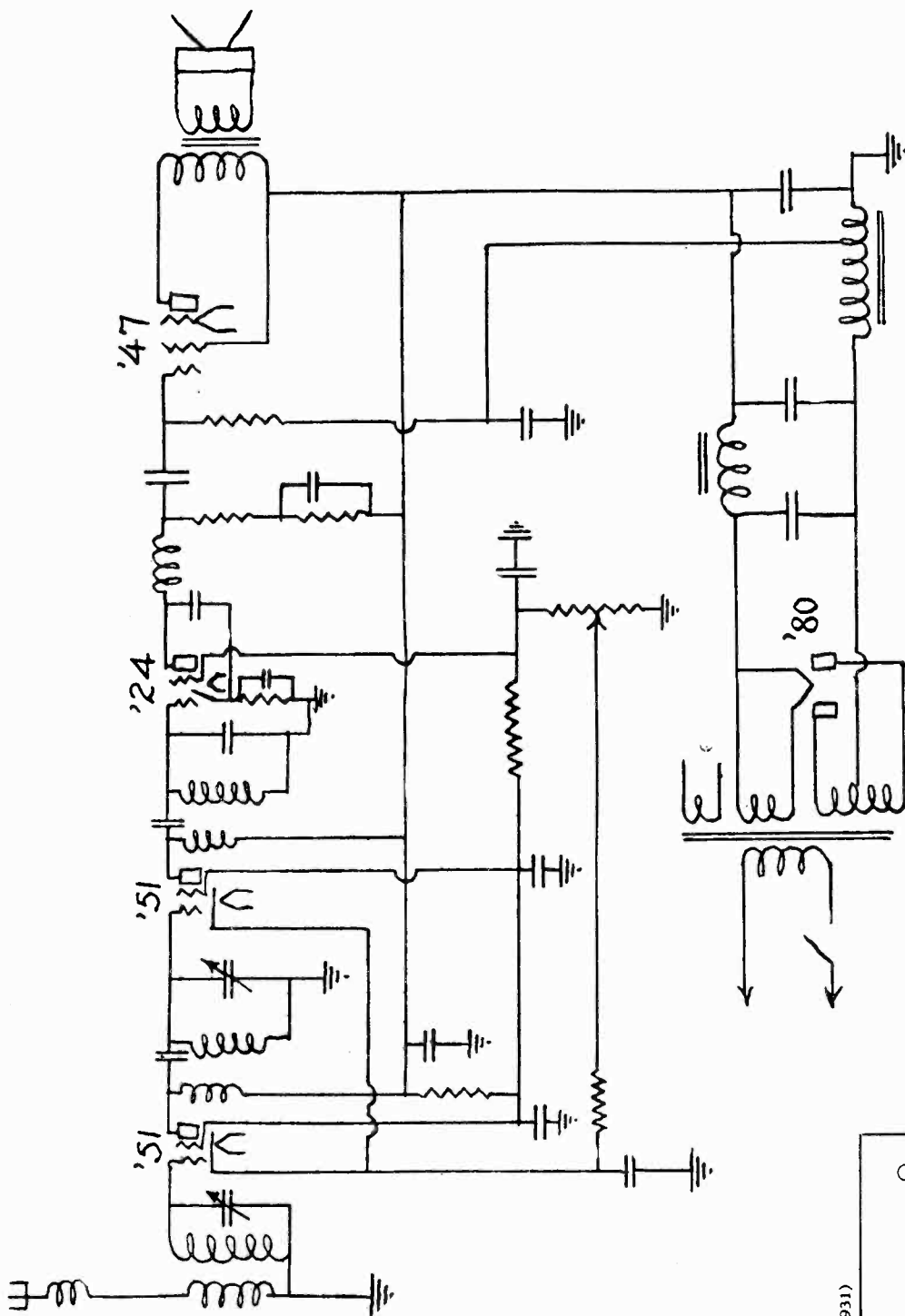


Antenna wire is green  
Ground wire is black

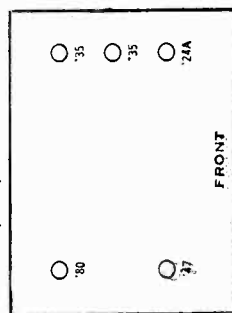
Make certain that the grid caps do not touch tube shields.

FREED RADIO AND TELEVISION CORP.

MODEL 92 AC



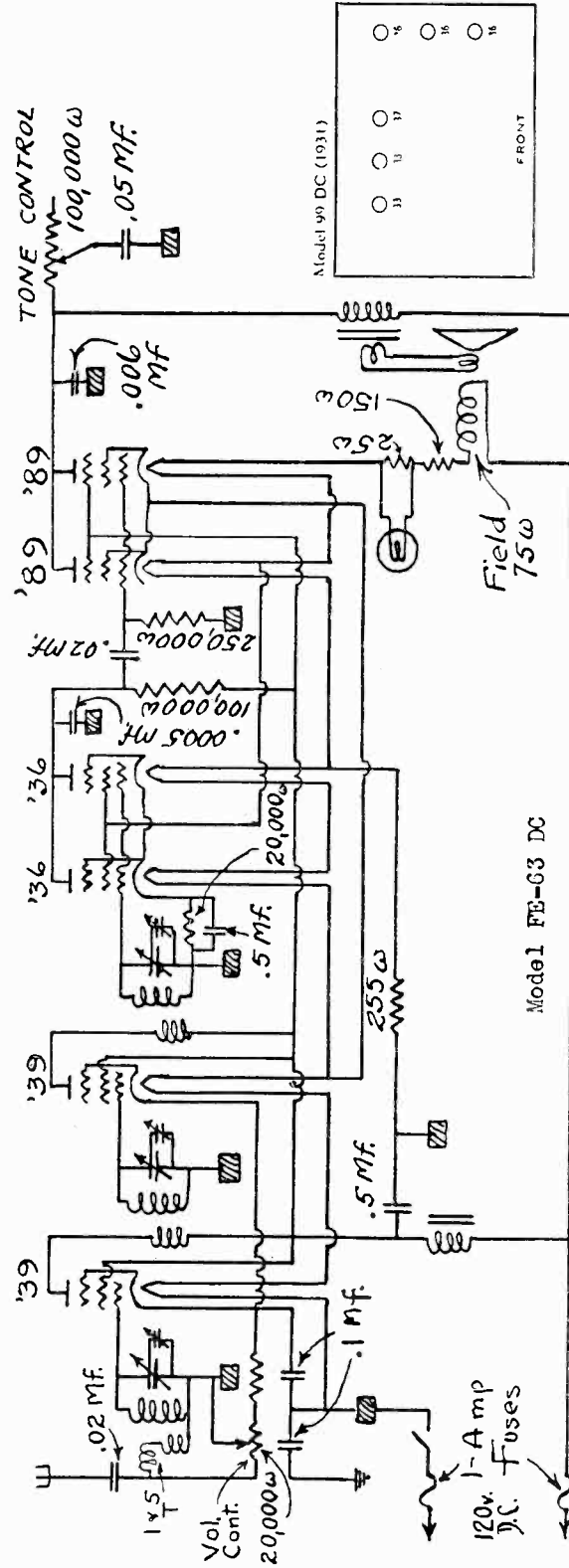
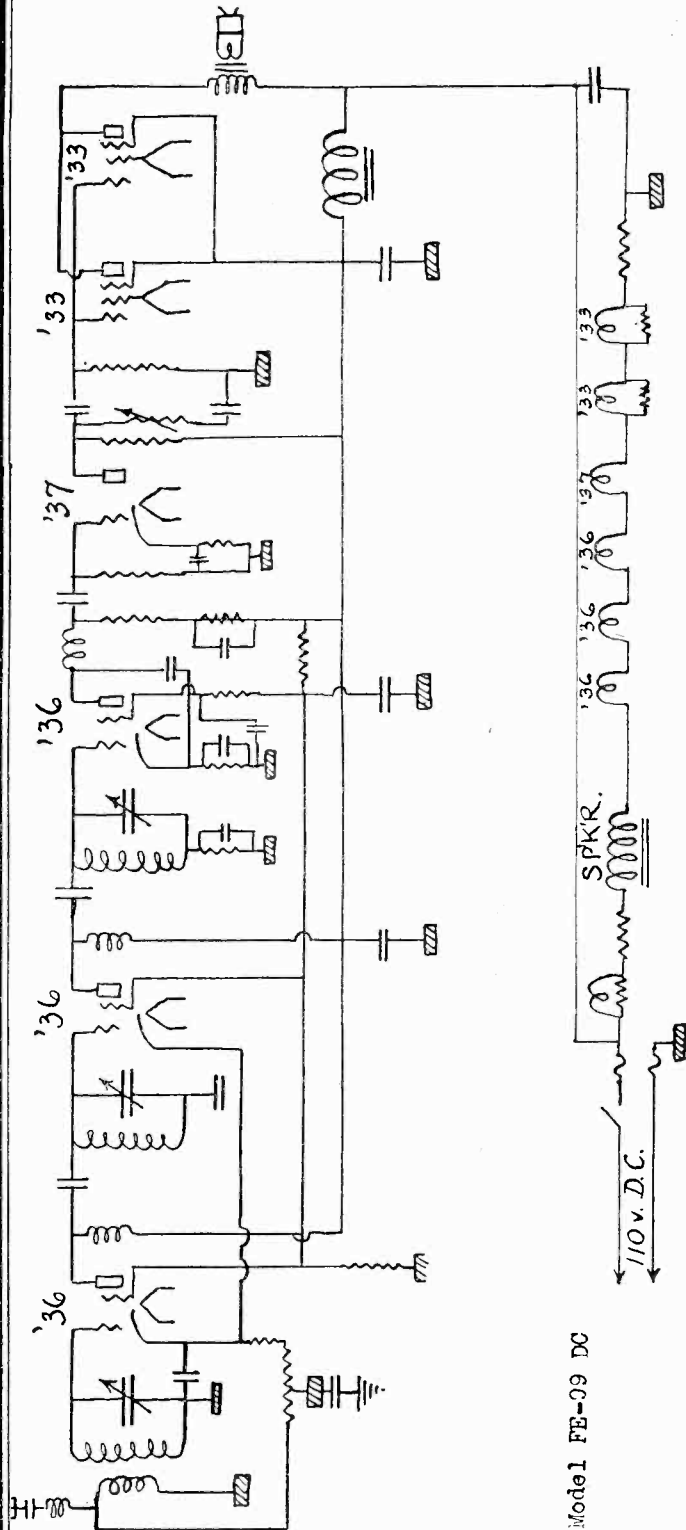
Model 92 (1931)





MODEL FE-99 DC  
MODEL FE-63 DC

FREED RADIO AND TELEVISION CORP.



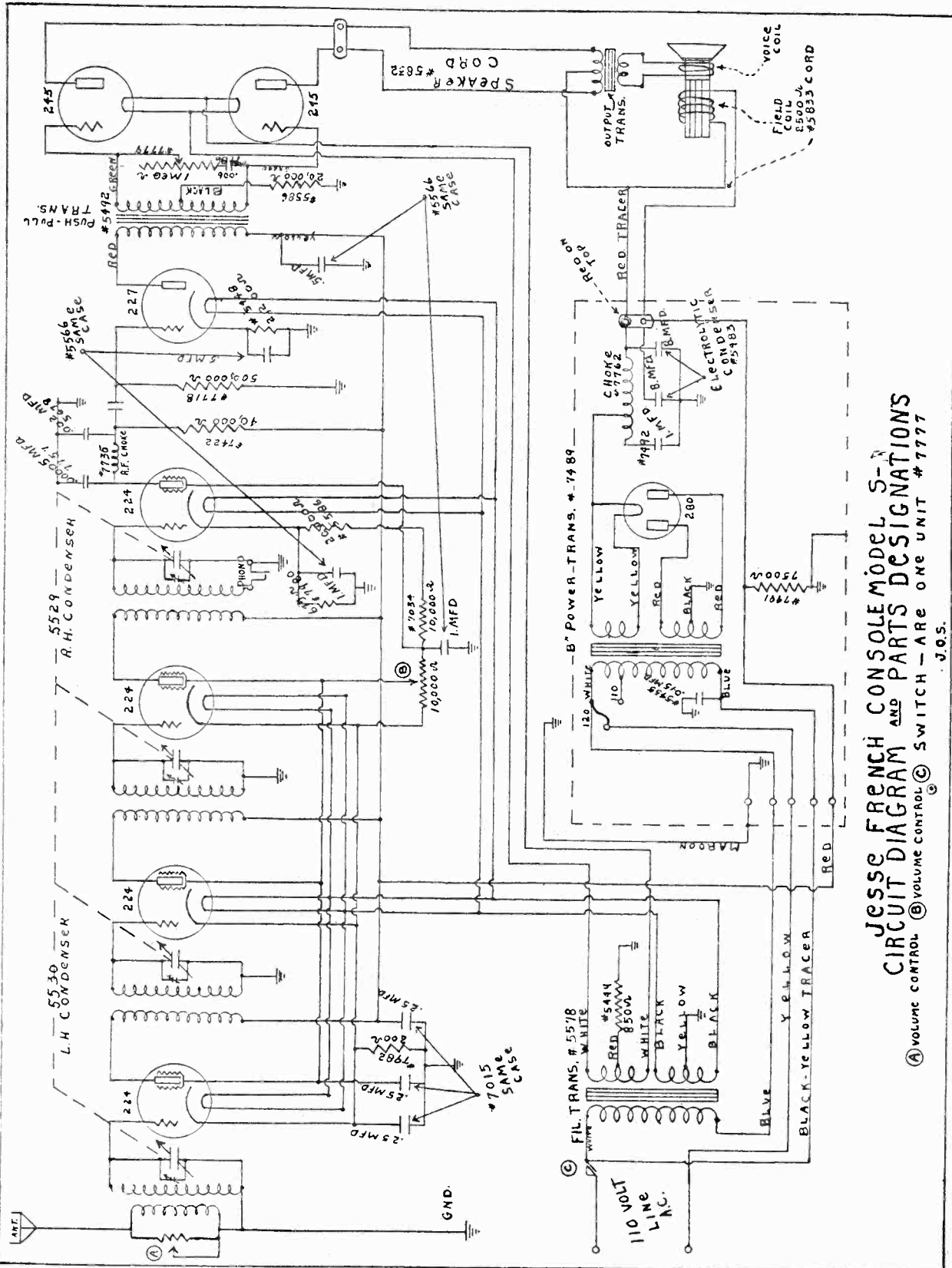






MODEL S-2

JESSE FRENCH & SONS PIANO CO.



JESSE FRENCH CONSOLE MODEL S-2  
CIRCUIT DIAGRAM AND PARTS DESIGNATIONS

Ⓐ VOLUME CONTROL Ⓑ VOLUME CONTROL Ⓒ SWITCH - ARE ONE UNIT #777  
J.F.S.