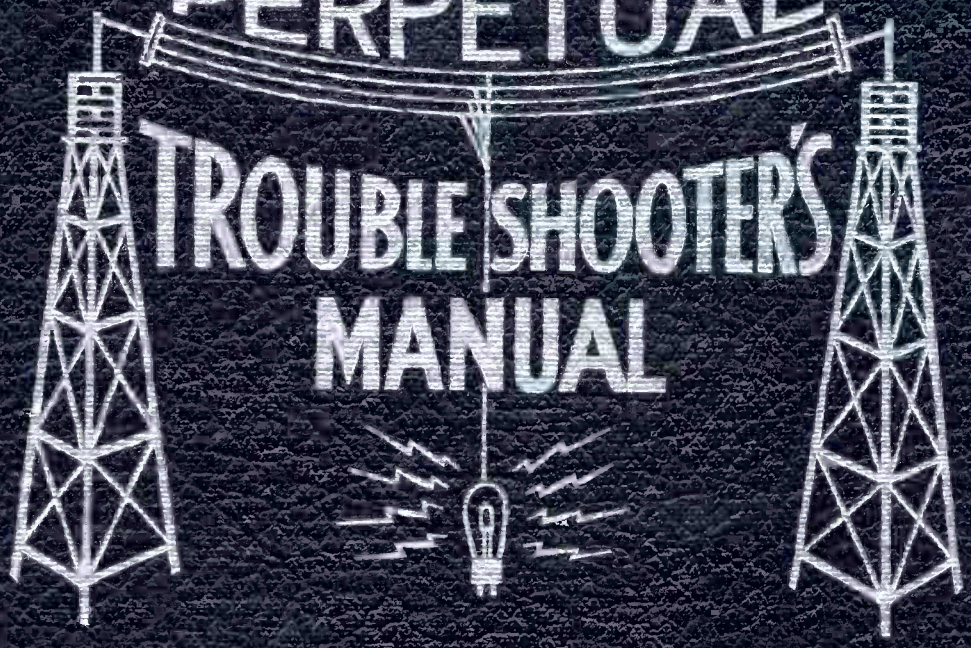
VOLUME IV

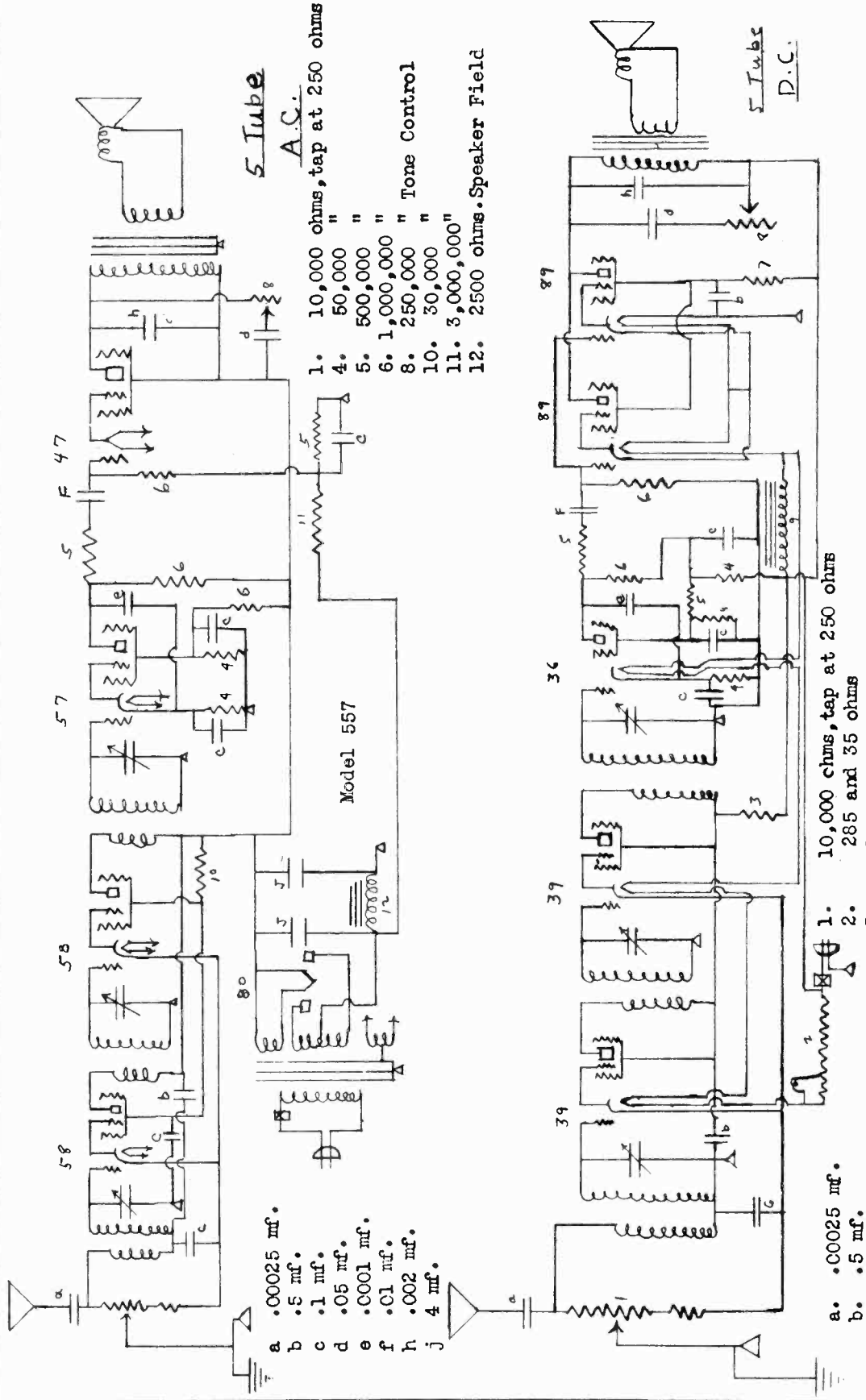
PERPETUAL TROUBLE SHOOTER'S MANUAL



JOHN F. RIDER

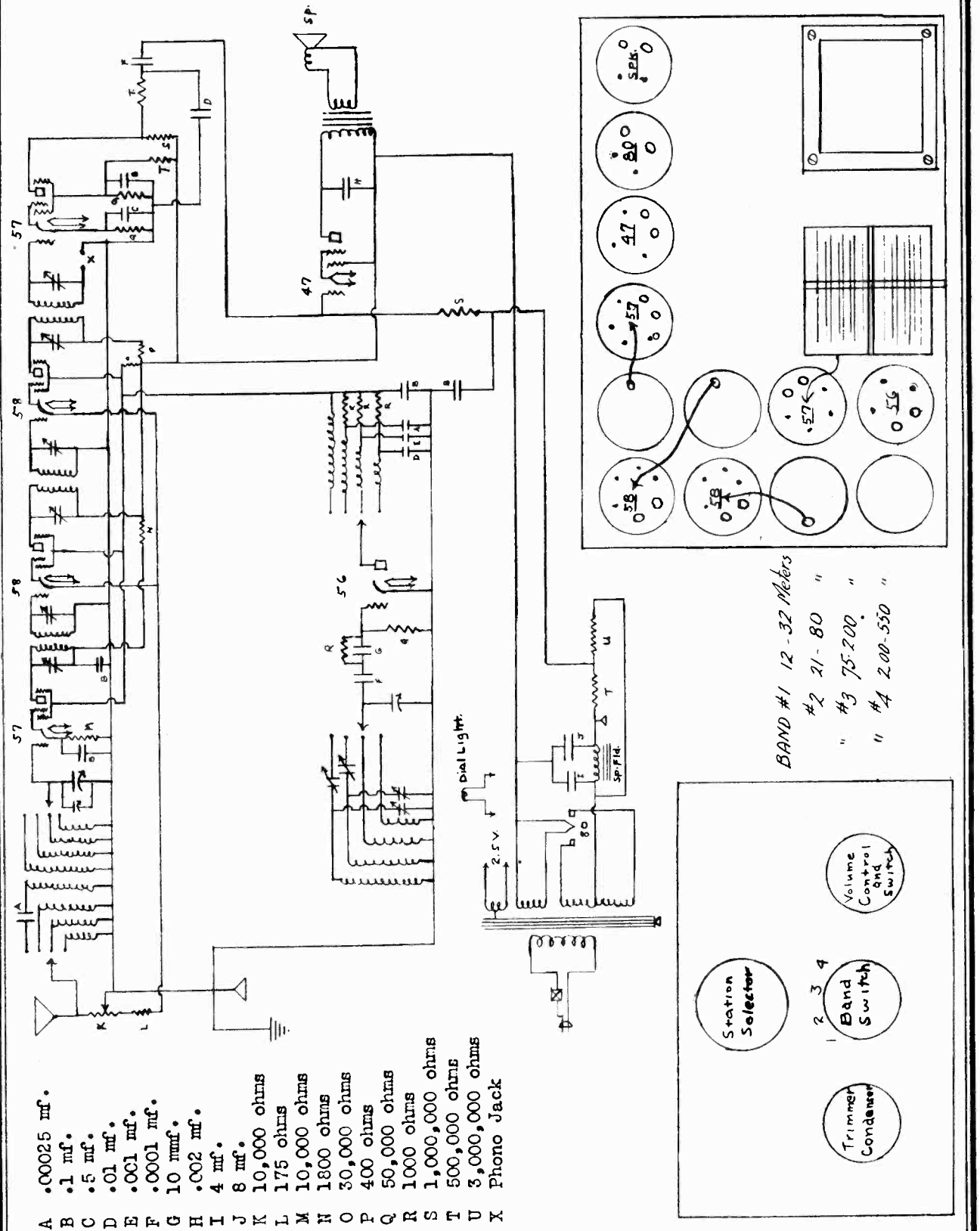
SAVIL RADIO ENGINEERING CORP.

MODEL 557
Schematic
MODEL 589
Schematic



MODEL 715
Schematic

SAVIL RADIO ENGINEERING CORP.



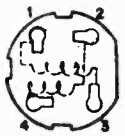
SEARS-ROEBUCK & CO.

MODEL 1700,7062
Voltage,Socket
Data

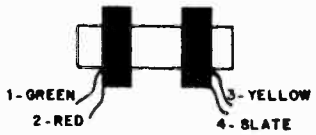
R-8077 I.F. OUTPUT TRANSF.

1-RED-TO C10 & PLATE OF 6B7
2-RED-TO C10 & R12
3-YELLOW-TO VOL. CONTRDL & L4
4-WHITE-TO VOL. CONTROL

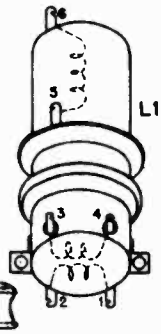
R-8051 OSC. COIL

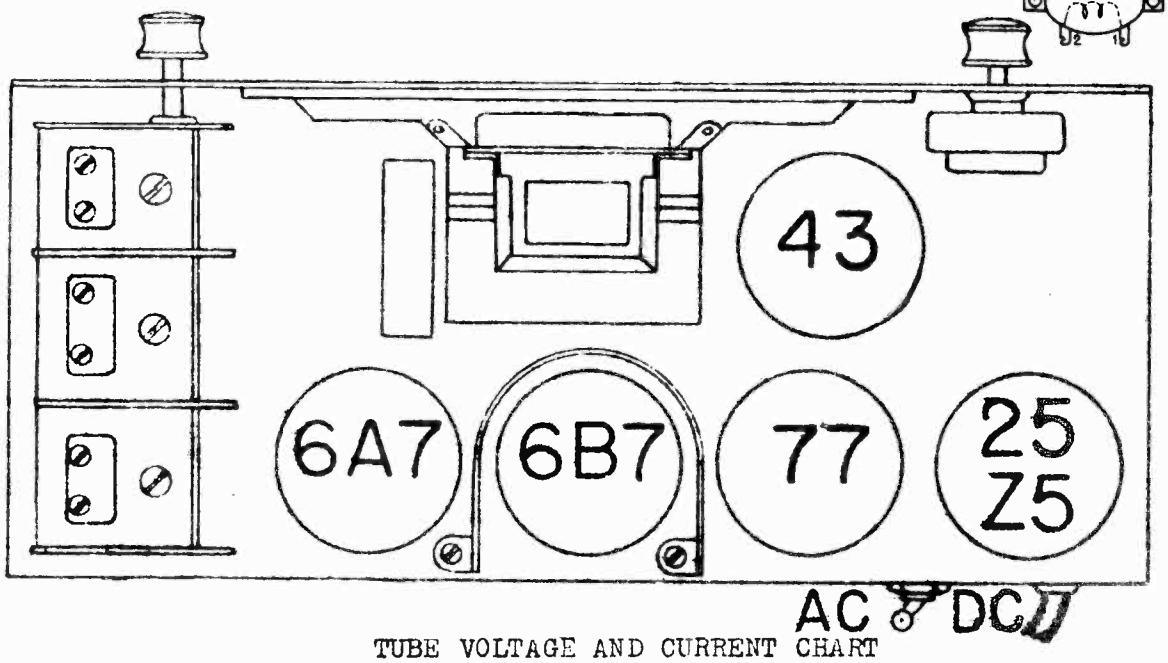


R-8039 I.F. INPUT TRANSF.



R-8050 PRE-SELECTOR





TUBE VOLTAGE AND CURRENT CHART

MODELS 1700 - 7062

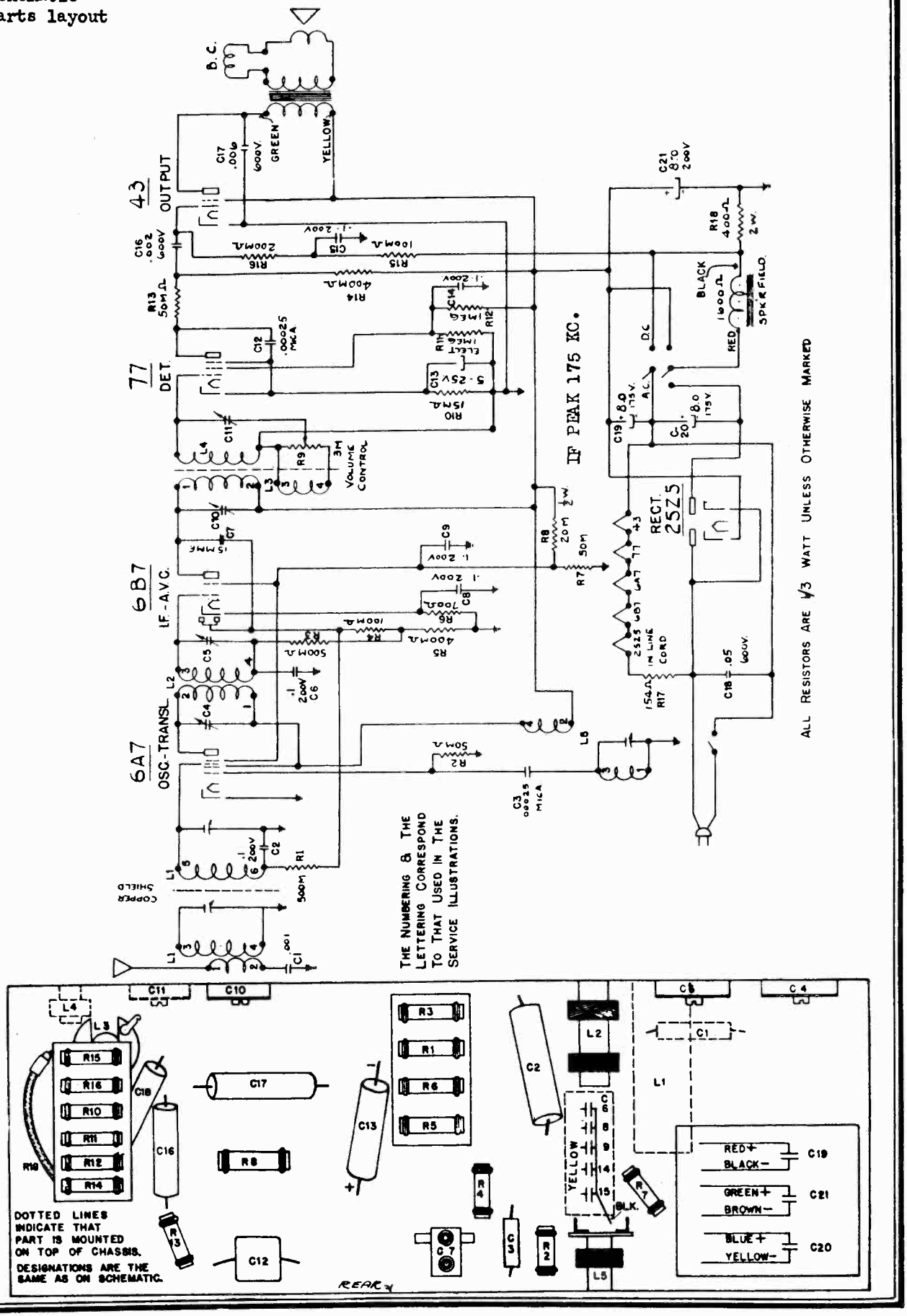
TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE MA	SCREEN M
6B7 - IF-AVC	110	55	-7*	.4	.2
77 - Detector	50	22	-1.5	.1	.04
43 - Output	100	120	-10*	26	5
6A7 - Osc-Transl	Ep=105v; Ip=2ma	EG#1=-5v; Ig#2=1.3ma;	EG#2=105v; EG#3&5=55v; EG#4=*; Ig-#3&5=1.2ma.		
25Z5- Rectifier	Plate Current - 40 M.A.per plate				

Eg=Grid Voltage Ip=Plate Current
Ep=Plate Voltage Ig=Grid Current

Speaker Field Voltage = 70 v.
*= Indicates high series resistor
Tube heaters are in series so that if one burns out, none will light.
These measurements were made with a 500 volt, 1000 ohms per volt meter.
Power supply 118 volts A.C. Measurements made with set detuned, and speaker field hot. Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation.

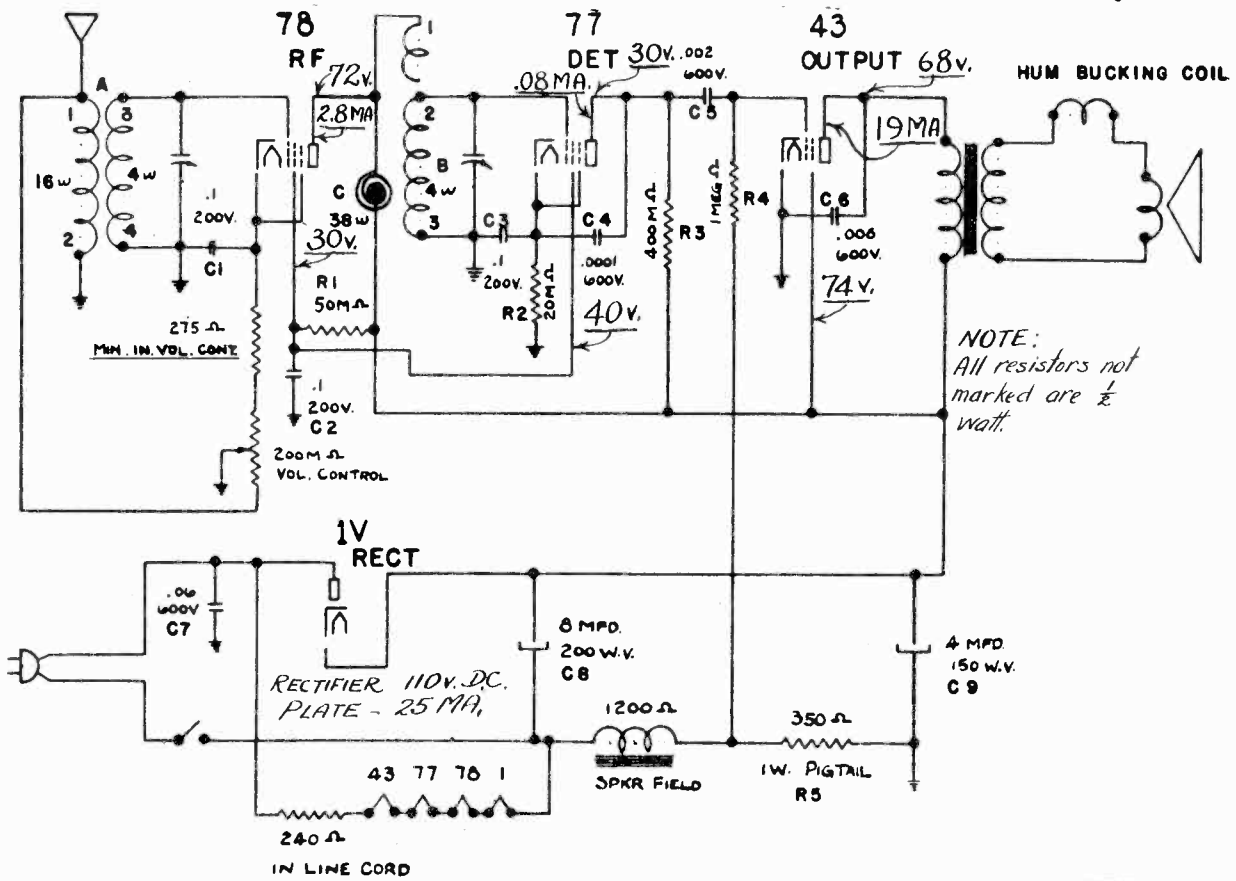
MODEL 1700,7062
Schematic
Parts layout

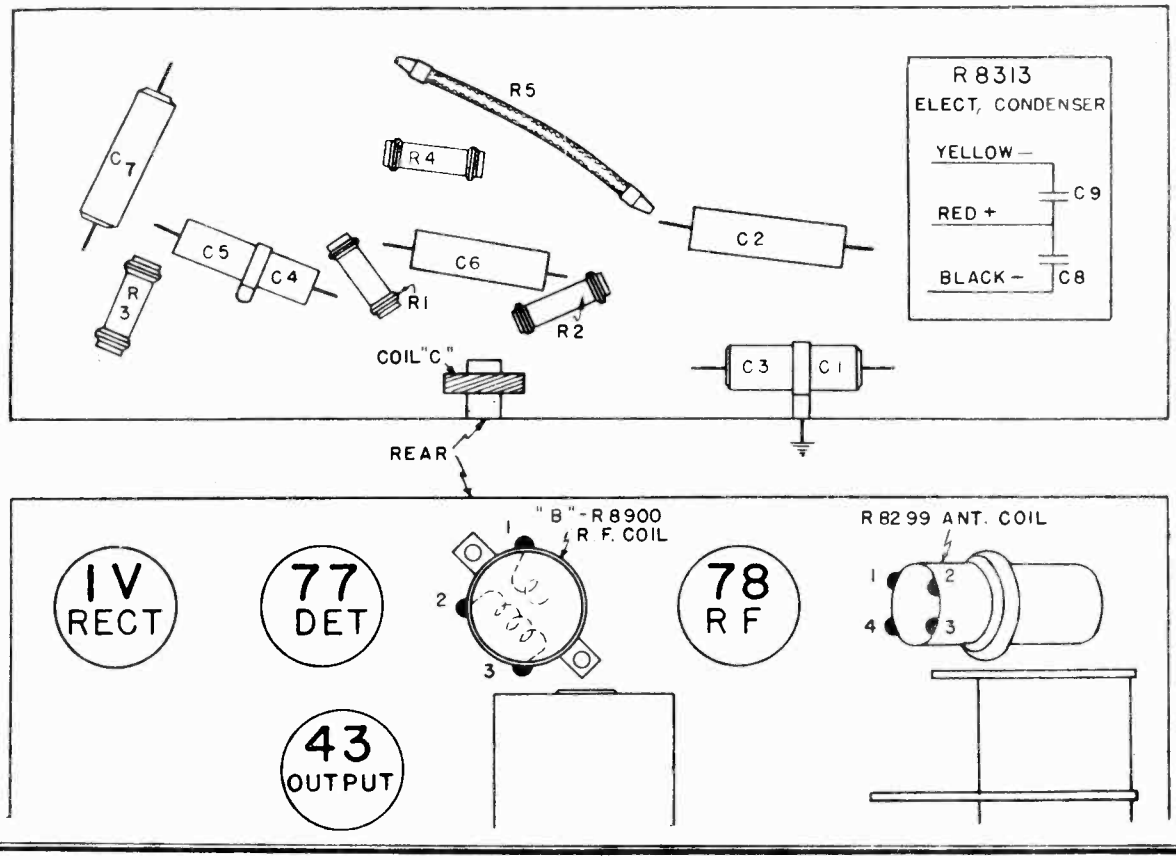
SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

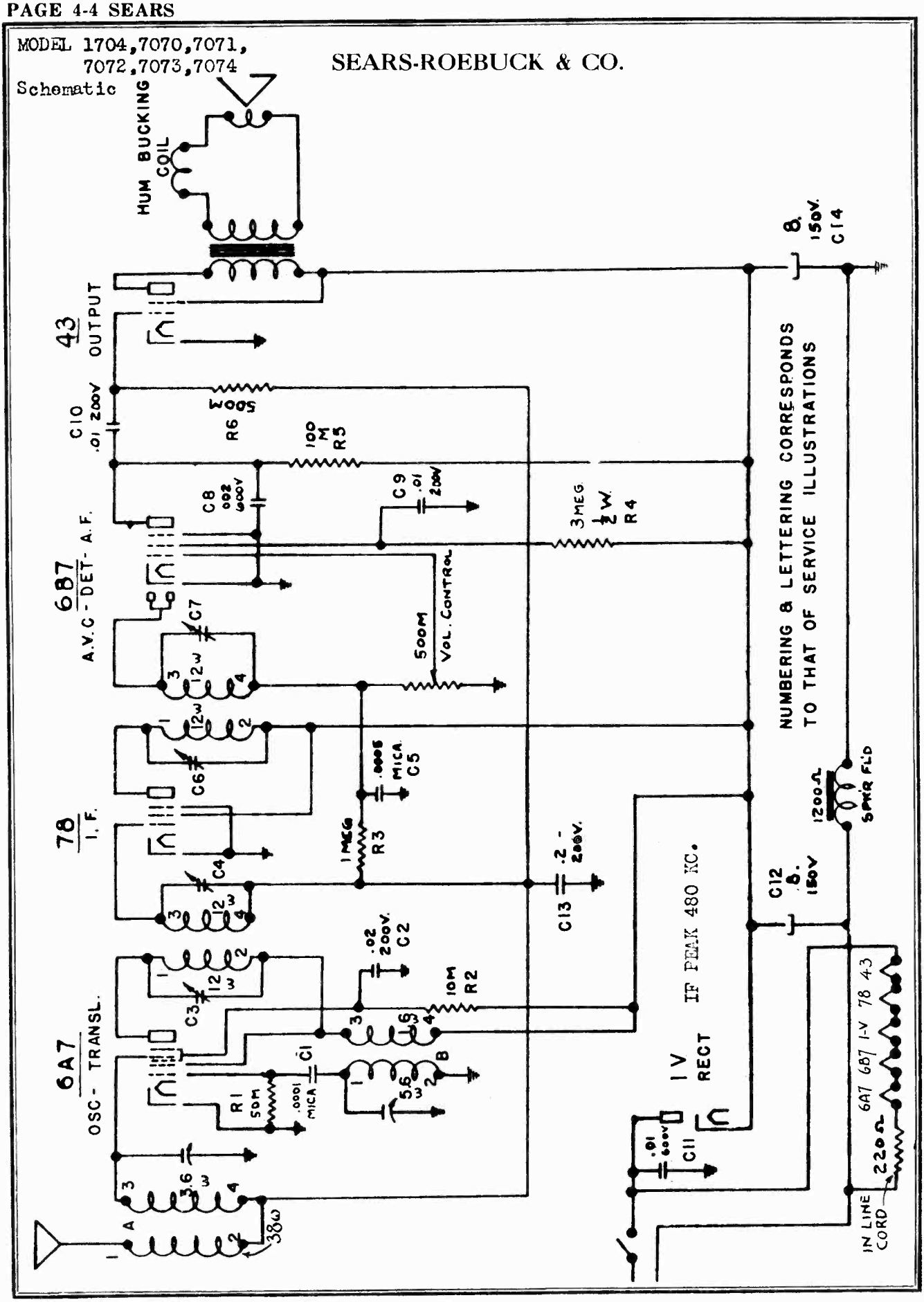
MODEL 1703, 7064
Schematic, Socket
Parts layout





MODEL 1704,7070,7071,
7072,7073,7074
Schematic

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODEL 1704,7070,7071, 7072,7073,7074

Voltage,Socket Parts layout

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	50	50	1	1
6B7 - AVC-Det-AF	25*		.07	
43 - Output	45	50	20	3.75
6A7 - Osc-Transl	Ep=50v; Eg#2=50v; Eg#3&#5=35v; Ip=1m.a.; Ig#2=1.1m.a.; Ig#3&#5=1.5m.a.			
1-V - Rect.	Dc voltage=90v; Plate current = 32m.a.			

Speaker field voltage =40v.

* - Indicates high series resistor

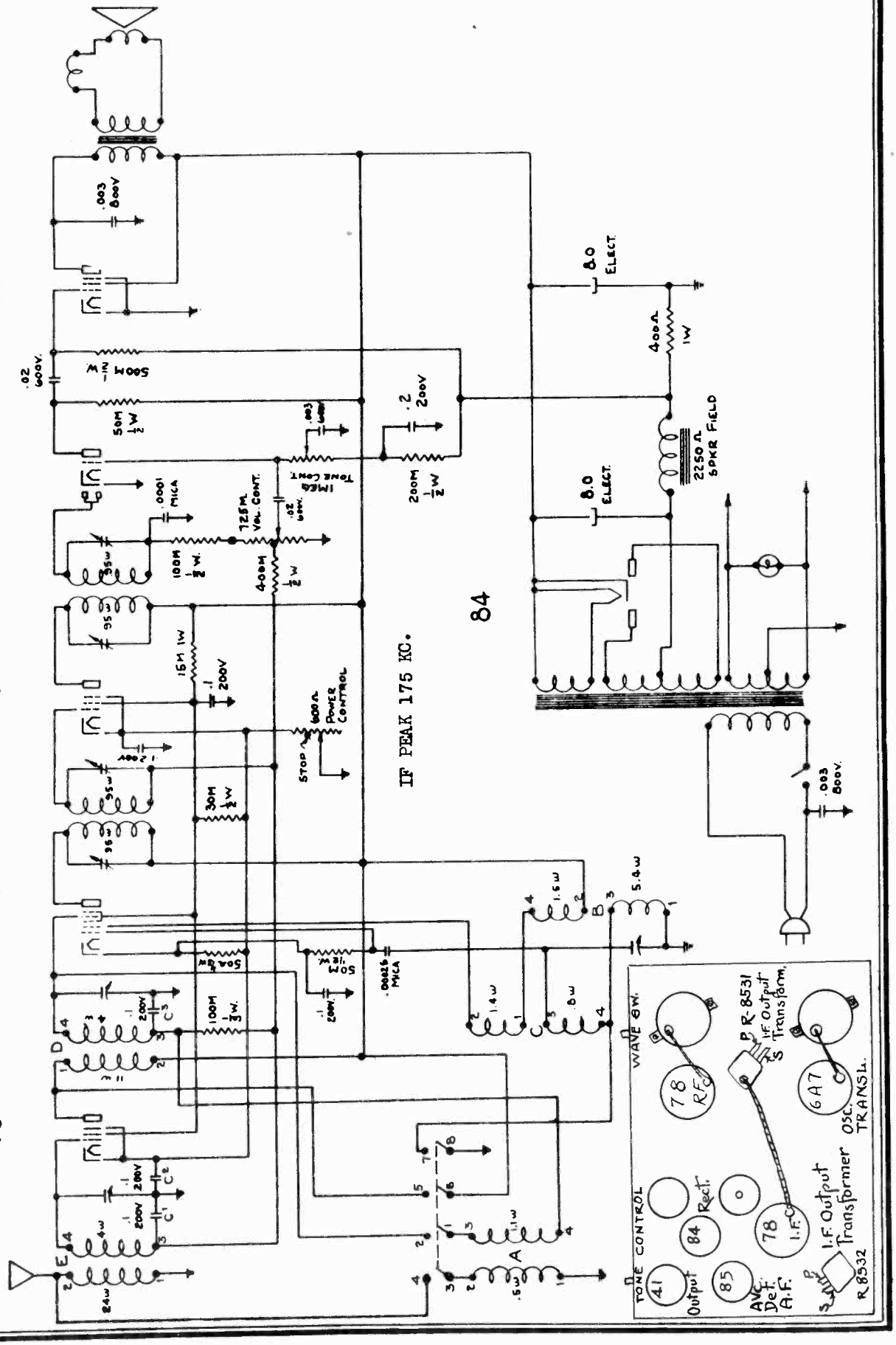
Readings taken with 1000 ohms per volt meter. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, voltage readings can be made from cathode to the respective elements of each tube.

	Condenser - .0005 mfd. mica	R-6760
	Control - Volume 500 M ohm	R-8433
	Cord - Power	R-8434
	Escutcheon - Station Selector	R-8289
	Escutcheon - Volume Control	R-8288
	Instruction leaflet	R-8440
	Knob	R-8278
	Pin - Escutcheon	R-8319
	Resistor - 1 megohm, 1/3 watt carbon	R-7585
	Resistor - 500 M ohms, 1/3 watt carbon	R-7228
	Resistor - 500 M ohms, 1/2 watt carbon	R-6179
	Resistor - 100 M ohms, 1/3 watt carbon	R-7586
	Resistor - 30 M ohms, 1/2 watt carbon	R-6156
	Resistor - 10 M ohms, 1/3 watt carbon	R-7587
	Socket - 4 prong	R-8315
	Socket - 6 prong	R-8092
	Socket - 7 prong	R-8072
	Speaker - 1200 ohm, 5"	S-8309
	Sticker - Tube layout & license	R-8437
	Sticker - NRA	R-9182
	Transformer - IF input	R-8439-A
	Transformer - IF output	R-8438

Condenser - Dry electrolytic	R-8431
Condenser - Variable tuning	R-8430
Condenser - .2 mfd. 200v.	R-6380
Condenser - .1 mfd. 200v.	R-6444
Condenser - .02 mfd. 200v.	R-6629
Condenser - .01 mfd. 200v.	R-8432
Condenser - .01 mfd. 600v.	R-7070
Condenser - .002 mfd. 600v.	R-6933

MODEL 1705
Schematic

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

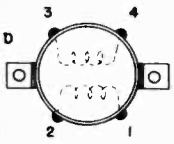
MODEL 1705
Voltage, Socket
Coil data

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M. A.	SCREEN M. A.
78 - RF	155	70	*	4.25	1
78 - IF	155	85	*	5	1.25
85 - AVC-Det-AF	120		*	.75	
41 - Output	155	160	*	12	1.75
6A7 - Osc-Transl	Ep=155v; Eg #2=155v; Eg#3&5=65v; Eg #4=*; Ip=2ma; Ig #2=3.5 ma; Ig #3&5=2.5 ma.				
84 - Rect	Plate current = 17m.a. per plate				

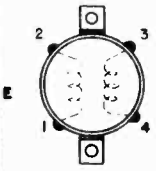
* - Indicates high series resistance.

The 78 RF stage is not used in the short wave position. The signal is fed, by coil A, directly to the 6A7 tube control grid. The primary of the 78 RF output transformer, coil D is shorted by contacts 5 and 6 of the wave switch. Contacts 7 and 8 short out the broadcast range oscillator coil B, leaving only the short wave oscillator coil C in the circuit.

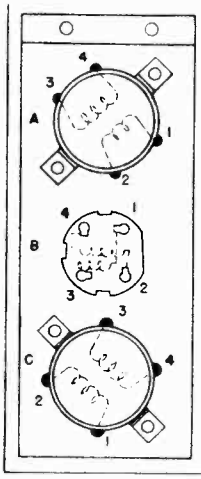
COILS MOUNTED ON TOP OF CHASSIS



D - R 8505 TRANSLATOR COIL - BROADCAST
LUG 1 - TO SWITCH LUG 5 & PLATE OF 78 TUBE
LUG 2 TO SWITCH LUG 6
LUG 3 - TO 100M OHM RESISTOR & .1 MFD. COND.
LUG 4 - TO #4 GRID OF 6A7



E - R 8504 ANTENNA COIL - BROADCAST
LUG 1 - TO GND.
LUG 2 - TO ANT & SWITCH LUG 4.
LUG 3 - TO 100M OHM RESISTOR & .1 MFD. COND
LUG 4 - TO CONTROL GRID OF 78 & STATOR, REAR SECTION OF VARIABLE TUNING COND.

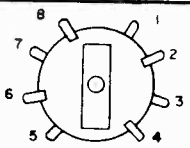


A - R 8507 ANTENNA COIL SHORT WAVE
LUG 1 - TO COIL B LUG 1
LUG 2 - TO SWITCH LUG 3
LUG 3 - TO SWITCH LUG 1
LUG 4 - TO 100M RESISTOR & .1 MFD. COND.

B - R 8506 OSCILLATOR COIL BROADCAST
LUG 1 - TO SWITCH LUG 8 & GND.
LUG 2 - TO SWITCH LUG 6
LUG 3 - TO COIL C LUG 4
LUG 4 - TO COIL C LUG 1

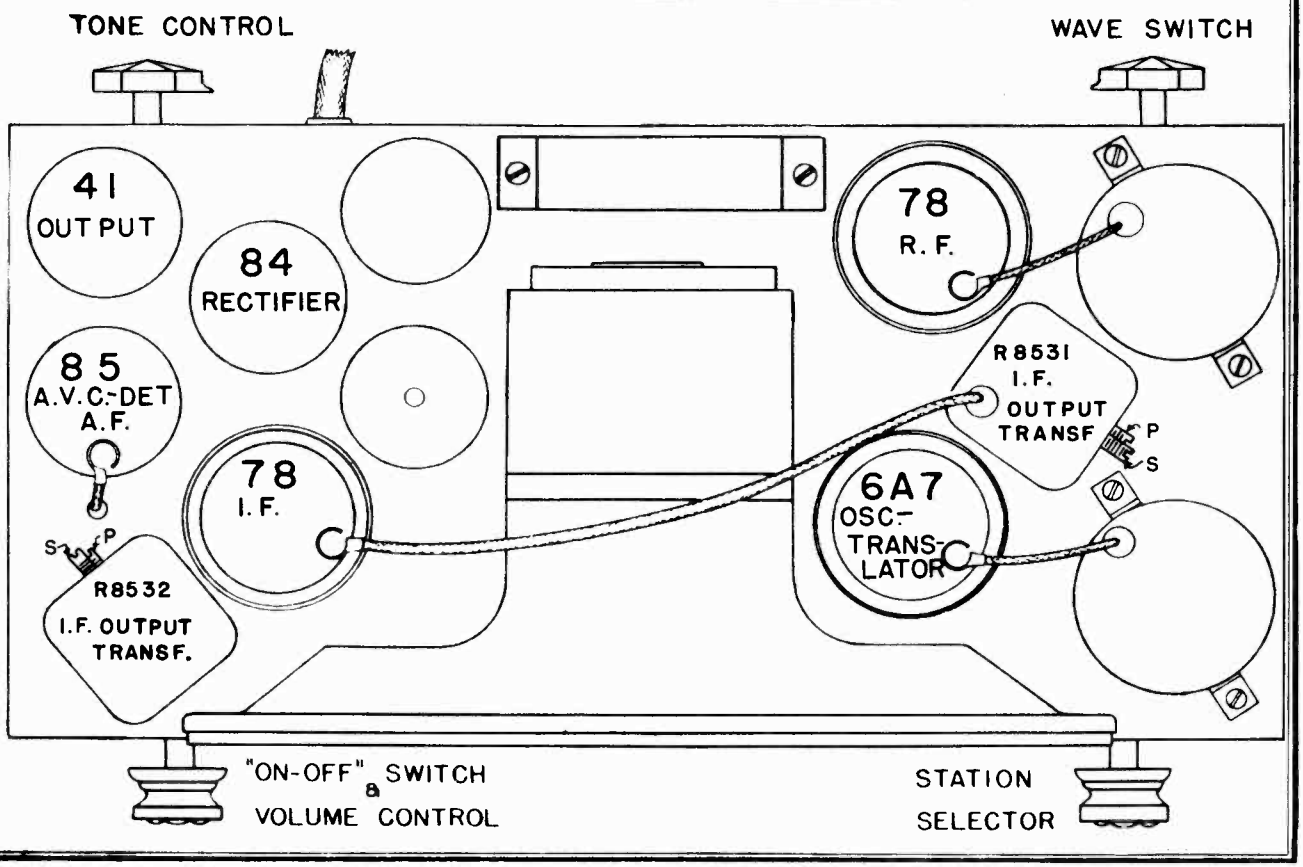
C - R 8508 OSCILLATOR COIL SHORT WAVE
LUG 1 - TO COIL B LUG 4
LUG 2 - TO 6A7 GRID 2
LUG 3 - TO .00025 COND. & STATOR OF FRONT SECTION OF VARIABLE TUNING CONDENSER
LUG 4 - TO COIL B LUGS 8 SWITCH LUG 7

BOTTOM OF CHASSIS



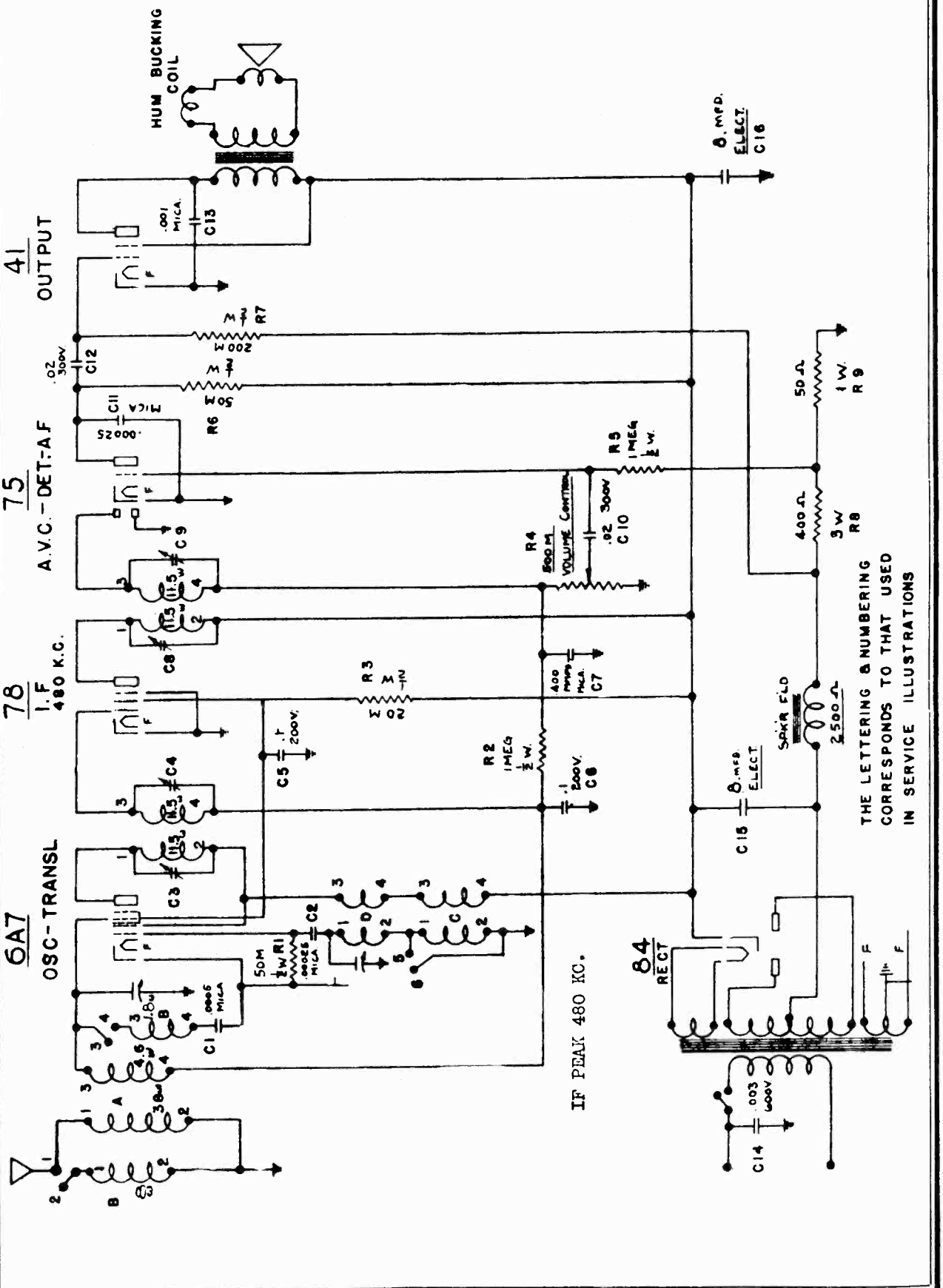
R 8529 - WAVE SWITCH

LUG 1 - TO COIL A LUG 3
LUG 2 - TO STATOR, MIDDLE SECTION OF VARIABLE COND.
LUG 3 - TO COIL A LUG 2
LUG 4 - TO ANT. & COIL E LUG 2.
LUG 5 - TO COIL D, LUG 1 & PLATE OF 78 TUBE
LUG 6 - TO COIL D LUG 2, COIL B LUG 2 B+ OF I.F. INPUT TRANSFORMER & B+
LUG 7 - TO COIL C LUG 4 & COIL B LUG 3
LUG 8 - TO GND & COIL B LUG 1



MODEL 1706,170
Schematic

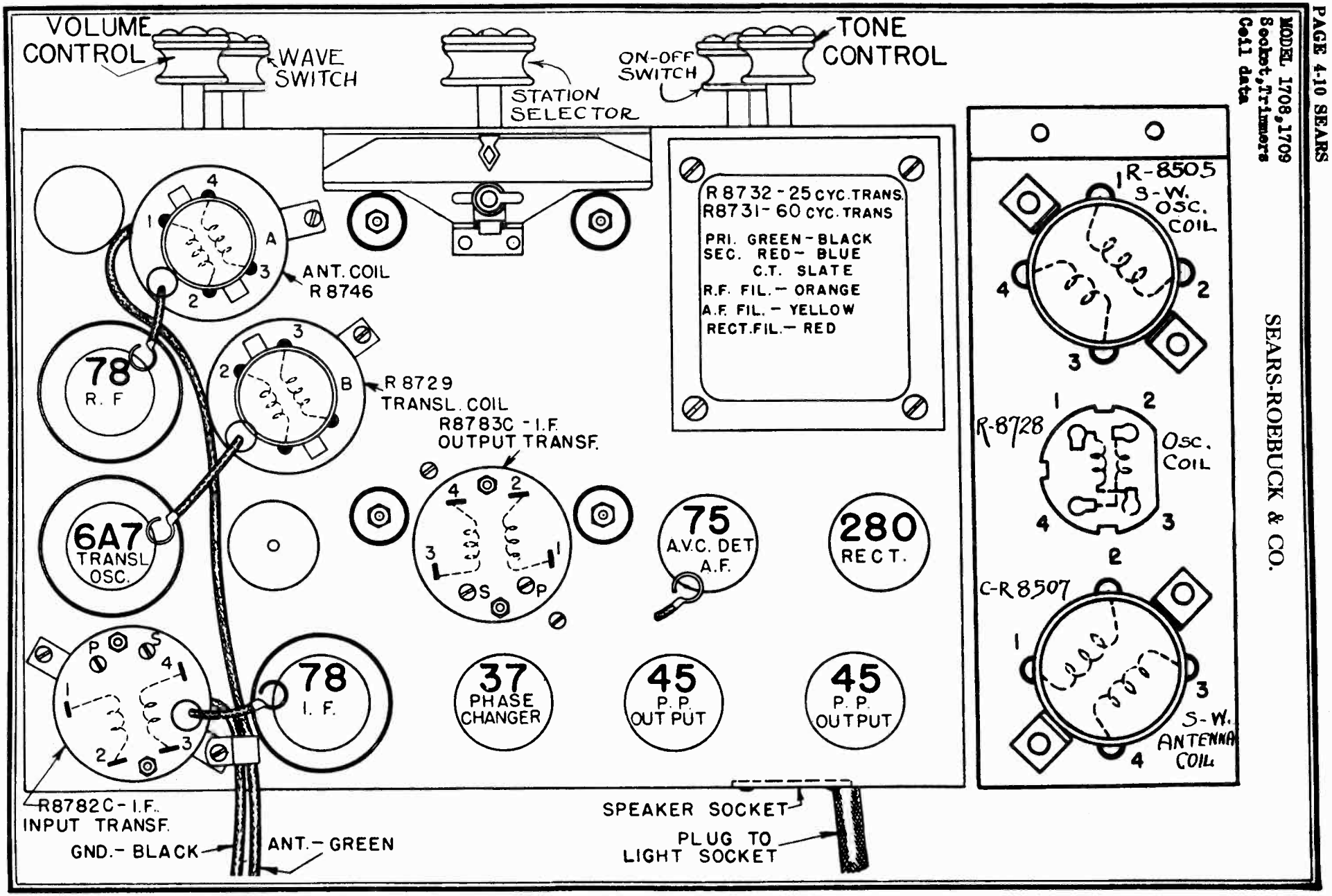
SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODEL 1706,1707
Socket, Trimmers
Parts layout
Voltage

		Plate Screen Volts	Plate Volts	Screen MA	Plate MA
78	IF	170	85	4	1
75	AVC-Det-AF	140	-	.5	-
41	Output	165	170	11.5	2.25
6A7	Osc-Transl.	Ep=170v. Eg#2=170v. Eg#3=#5=85v. Ip=3.4 ma. Ig#2=2.8 ma. Ig#3=#5=2.5 ma.			
84	Rect.	Max. DC=270 v. Plate current=18 ma. per plate			
84	Rect.				



SEARS-ROEBUCK & CO.

SEARS-ROEBUCK & CO.

MODEL 1708, Schematic

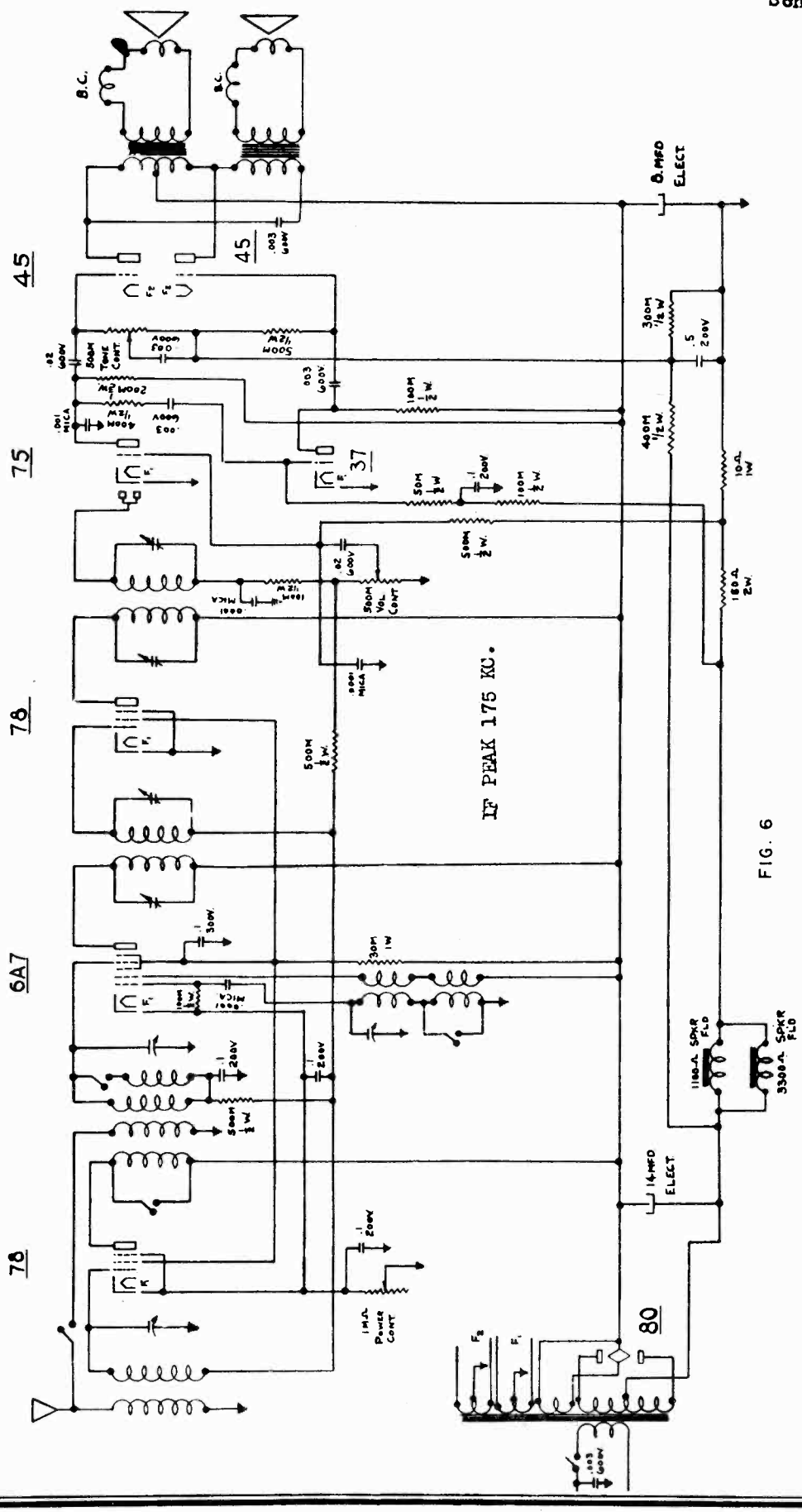
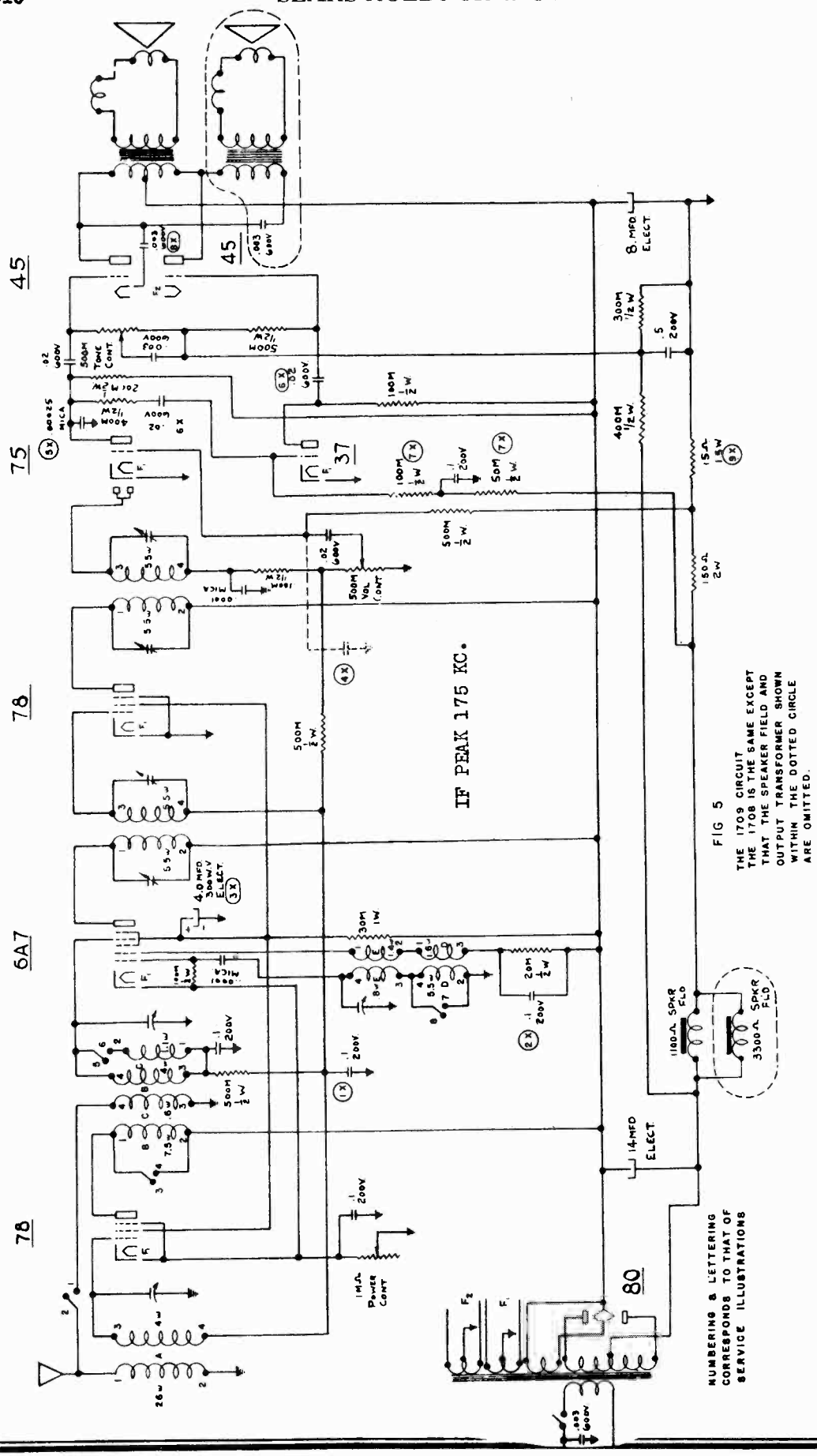


FIG. 6

MODEL 1709
Schematic

SEARS-ROEBUCK & CO.



The Models 1708 and 1709 have identical chassis. The 1708 uses a single 8 inch speaker; the 1709, an 8 inch and a 5 inch one.

The majority of this model have been built with the circuit shown in Fig. 5. Some have the circuit of Fig. 6. Any that may be found with this circuit should be changed to the circuit of Fig. 5. The changes are indicated in Fig. 5, with "X" marks. They are:

1. RF translator and IF grid returns were returned to cathode through the .1 Mfd. condenser instead of to ground.

2. A 20 M ohm resistor shunted by a .1 Mfd. 200 v condenser put in eries with the #2 grid of the 6A7. Lack of this resistor and condenser may cause the receiver to stop playing suddenly because of the oscillator's stopping. If the receiver is turned off and then turned on again it will play. This trouble is remedied when the 20 M ohm resistor is put in the 6A7 #2 grid lead. The #2 grid prong is the one directly opposite the heater prongs.

3. The .1 Mfd. condenser from ground to grids #3 and #5 of the 6A7 changed to 4 Mfd. electrolytic (R-9237).

4. The .0001 Mfd. mica condenser from the 75 grid to ground, removed.

5. The .001 Mfd. mica condenser from the 75 plate to ground has been replaced by a .00025 (R-4592).

6. The .003 Mfd. condenser in the 37 grid lead has been changed to .02 (R-6761).

7. The positions of the 100 M ohm and 50 M ohm resistors in the 37 grid lead have been interchanged.

8. A .003 Mfd. 600 volt condenser (R-7681) has been added from plate to filament of one of the 45 tubes.

9. The 10 ohm biasing resistor in the b - lead has been changed to a 15 ohm, 1.5 watt flexohm(R-9238).

The 78 RF tube is used only in the broadcast position. For the short wave range the antenna is coupled directly to the 6A7 tube through coil C.

In the short wave position, coil D is shorted out, leaving only the low inductance coil, E.

TUBE VOLTAGE AND CURRENT CHARTS

MODEL 1708

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	235	80	*volume -10 con.off	1-vol.off 5-vol. on	.25-vol.off 1.5-vol. on
78 - IF	235	80	*	1.5	1
75 - AVC-Det-AF	110		*	.54	
'37 -Phase changer	135		*	5.5	
'45 - Output	235		*	30	
6A7 - Osc-transl	Ep=235v; Eg#2=180v; Eg#3&#5=80v; Ip=4.9m.a.; Ig#2=1.6m.a.; Ig#3&#5=1.7m.a.				
280 - Rectifier	Max. d.c. volts-355. Plate current-42m.a.perplate				

MODEL 1709

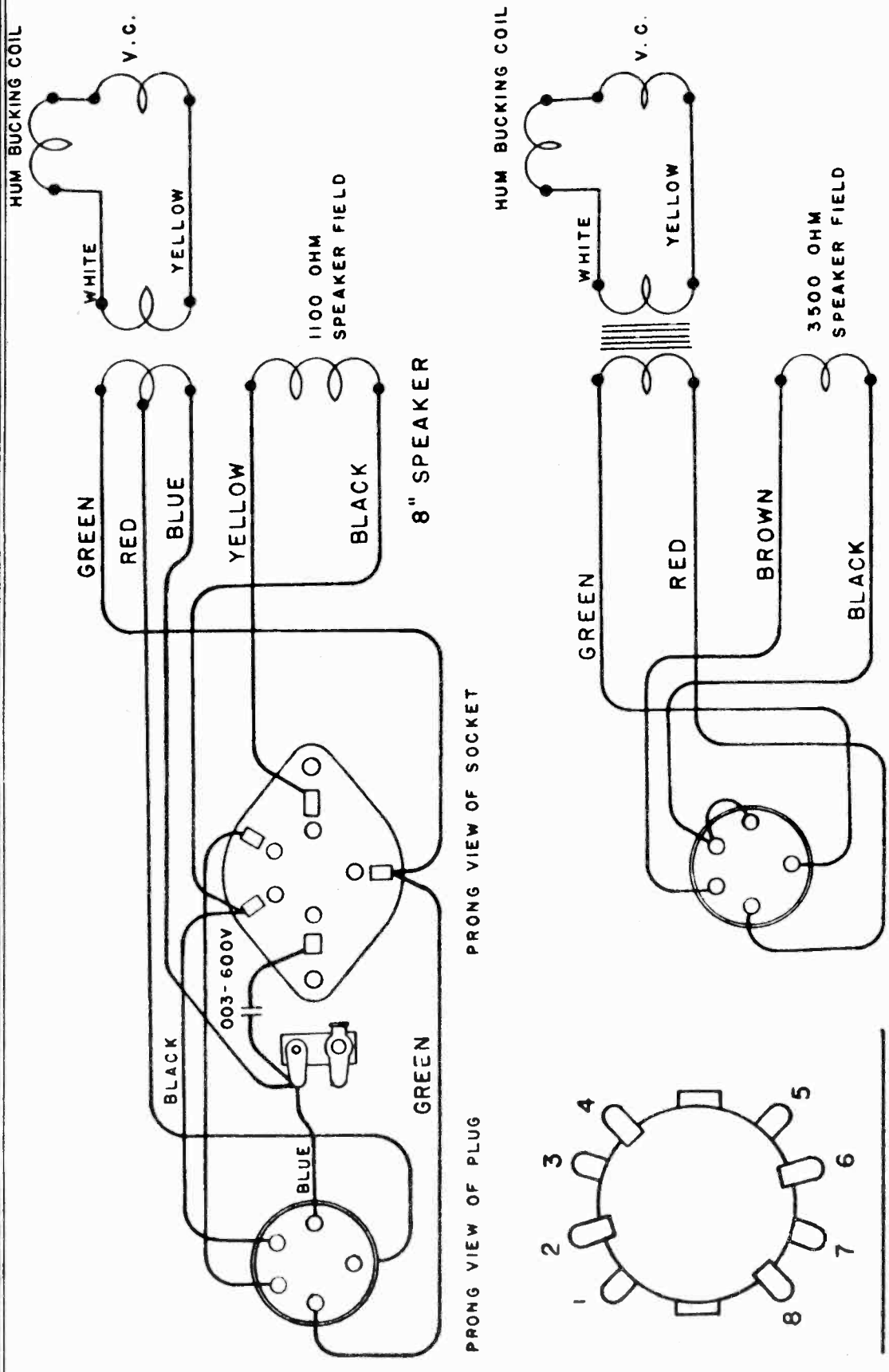
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	235	80	*volume -10 con.off	1-vol.off 5-vol. on	.25-vol.off 1.5-vol. on
78 - IF	235	80	*	1.7	.85
75 - AVC-Det-AF	115		*	.45	
'37-Phase changer	145		*	.9	
'45 - Output	230		*	37	
6A7 - Osc-Transl	Ep=235v; Eg#2=180v; Eg#3&#5=80v; Ip=4.9m.a.; Ig#2=1.6m.a.; Ig#3&#5=1.7m.a.;				
280 - Rectifier	Max. d.c. volts=345. Plate current=50m.a. per plate				

* - Indicates high series resistance.

Readings taken with a 1000 ohms per volt meter. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, voltage readings can be made with a 1000 ohms per volt meter connected from cathode to the respective element of each tube.

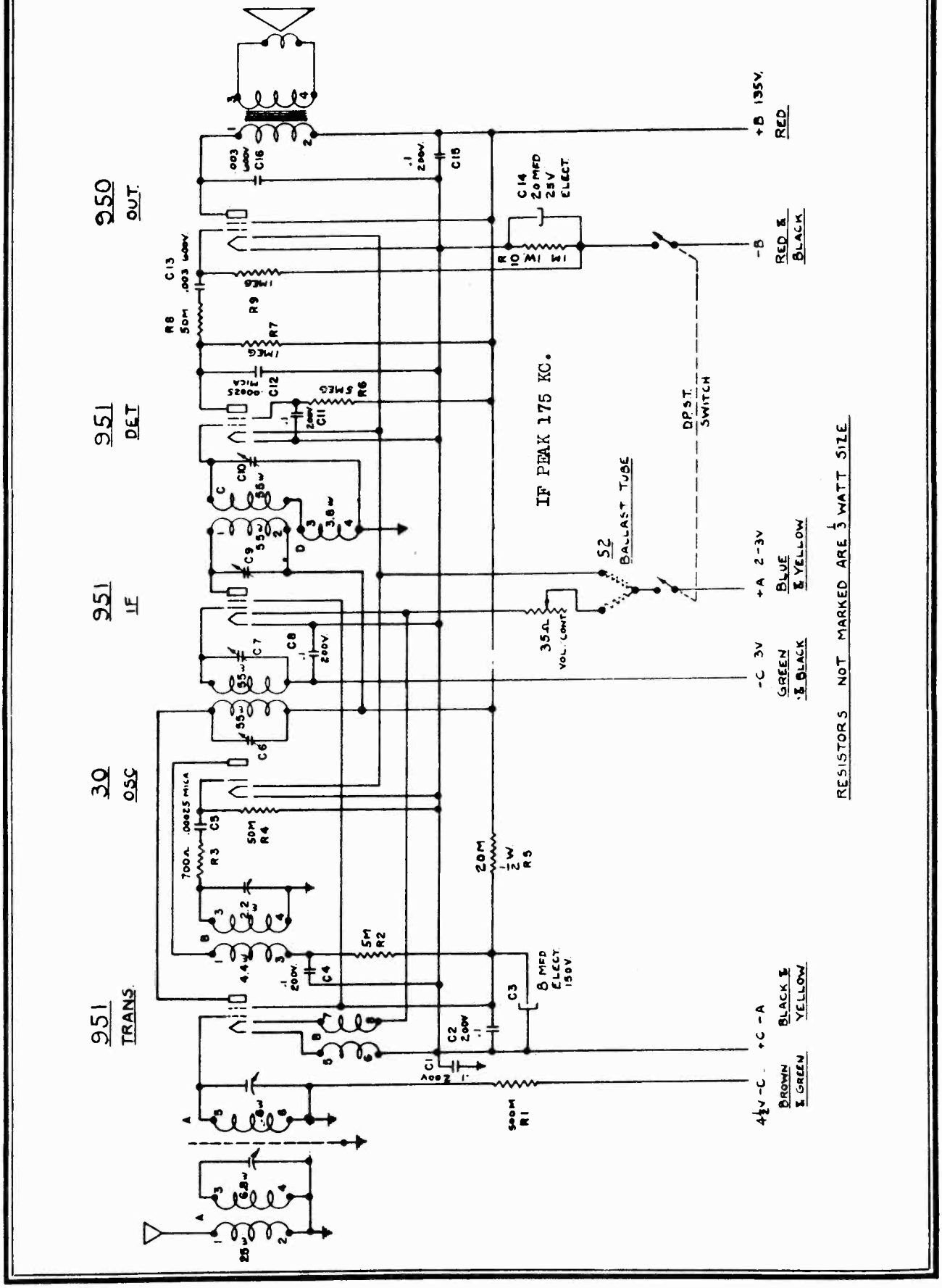
MODEL 1708,1709
Speaker data

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODEL 1710
Schematic



MODEL 1710

Notes, Socket Voltage, Parts

SEARS-ROEBUCK & CO.

A type 951 translator tube creates a 175 kc signal in its plate circuit by mixing the incoming broadcast signal with the signal created by the type 230 oscillator. This 175 kc signal is amplified by the 951 IF stage and coupled to the 951 detector. The audio output of the detector is fed to the 950 output tube and then to the permanent magnet dynamic loudspeaker.

Volume is controlled by a 35 ohm rheostat in the IF and translator filament circuit. A type 52 ballast tube automatically adjusts the filament voltage to the proper value (2 volts) even though the A supply has a value anywhere between two and three volts. Always turn the set off before removing or inserting tubes.

If the chassis is removed from the cabinet, this procedure should be followed, when replacing it, in order to maintain the dial calibration:

1. Turn the Volume Control shaft all the way to the right.

2. Tighten the Volume Control knob on its shaft, with the pointer of the knob facing the head of the arrow on the escutcheon. Do not let the shaft turn during the process.

3. Replace and tighten the Station Selector knob, paying no attention to the position of the pointer with respect to the Station Selector dial markings.

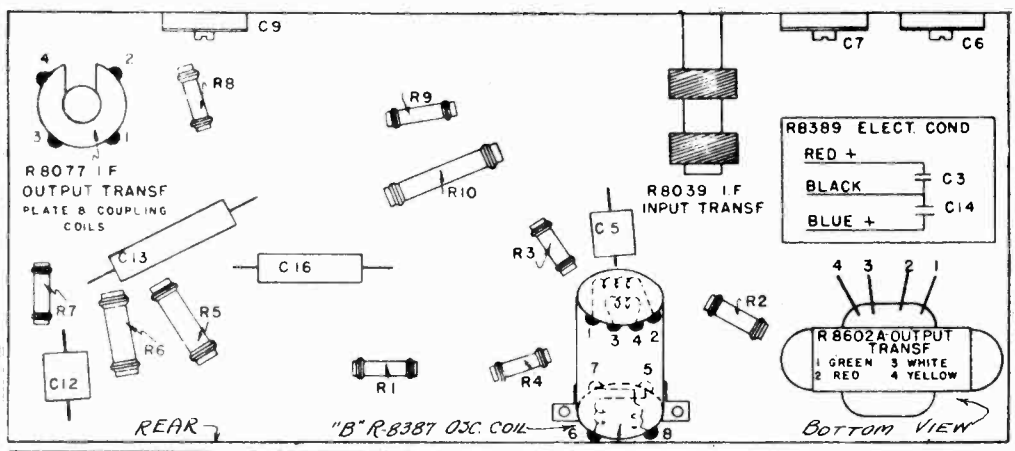
4. Turn the receiver on and tune in some station of known frequency of approximately 1000 kc. If none is known, tune in some station at about the middle of the tuning range (the middle can be located by turning the knob all the way in both directions and then turning it back half way) and wait for the station to announce its call letters. Its frequency can then be determined from the listing on the radio program page of your local newspaper or from a radio "log".

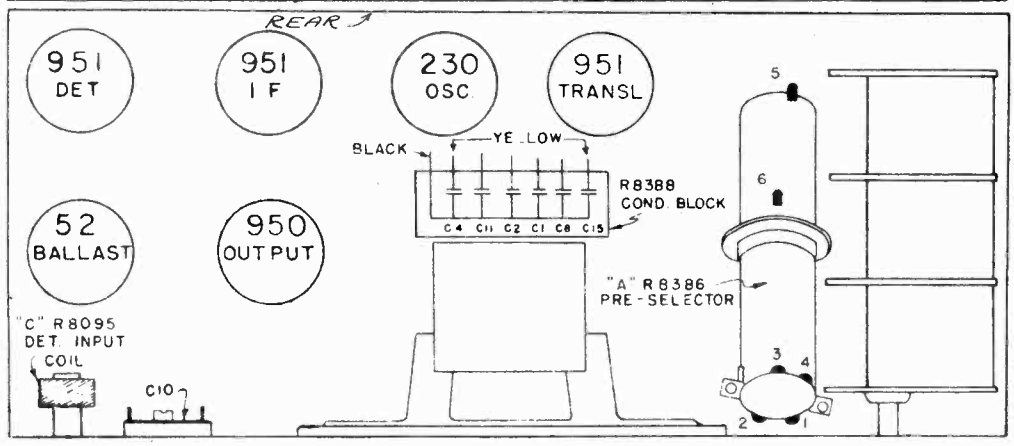
5. Then loosen the Station Selector knob set screw, being very careful not to move the Station Selector shaft. (Leave the station tuned in as a check of this.)

6. Turn the knob until the pointer is at a dial marking which is the same as the station's frequency.

7. Tighten the set screw.

As an example, suppose a 900 kc station has been tuned in. The knob setscrew would be loosened, the knob turned until the pointer was at 9 on the dial, and the setscrew then retightened. In this way the accuracy of the dial calibration is maintained.

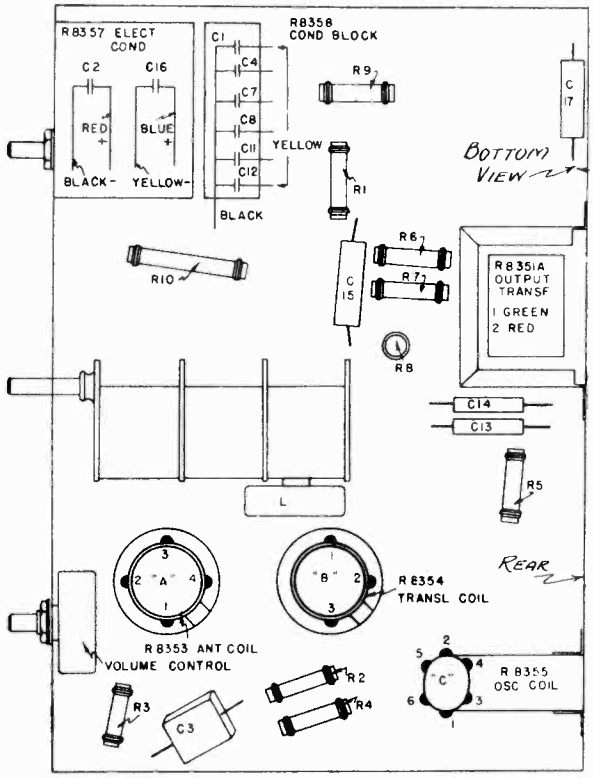


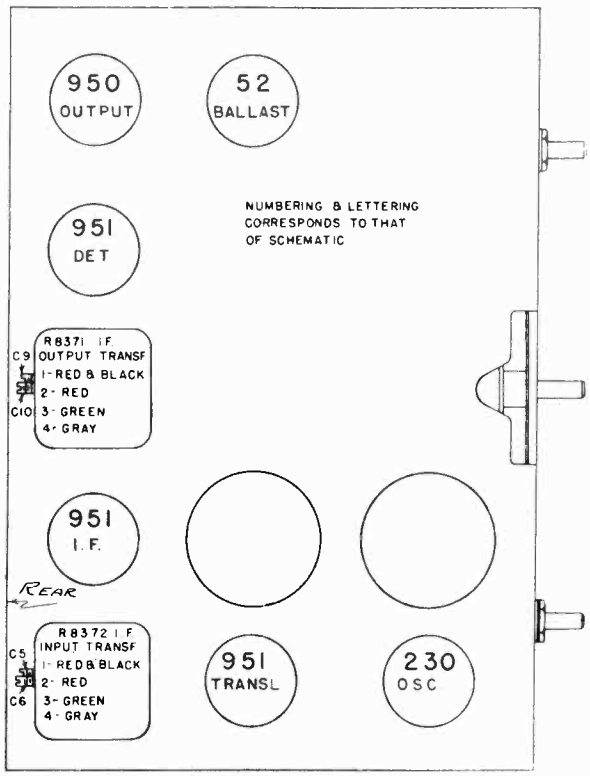


TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
951 - Translator	135	65	.85	.2
230 - Oscillator	50		2.6	
951 - IF	135	65	1.5	1.7
951 - Detector	25*	10*	.03	.02
950 - Output	135	135	6	1.5

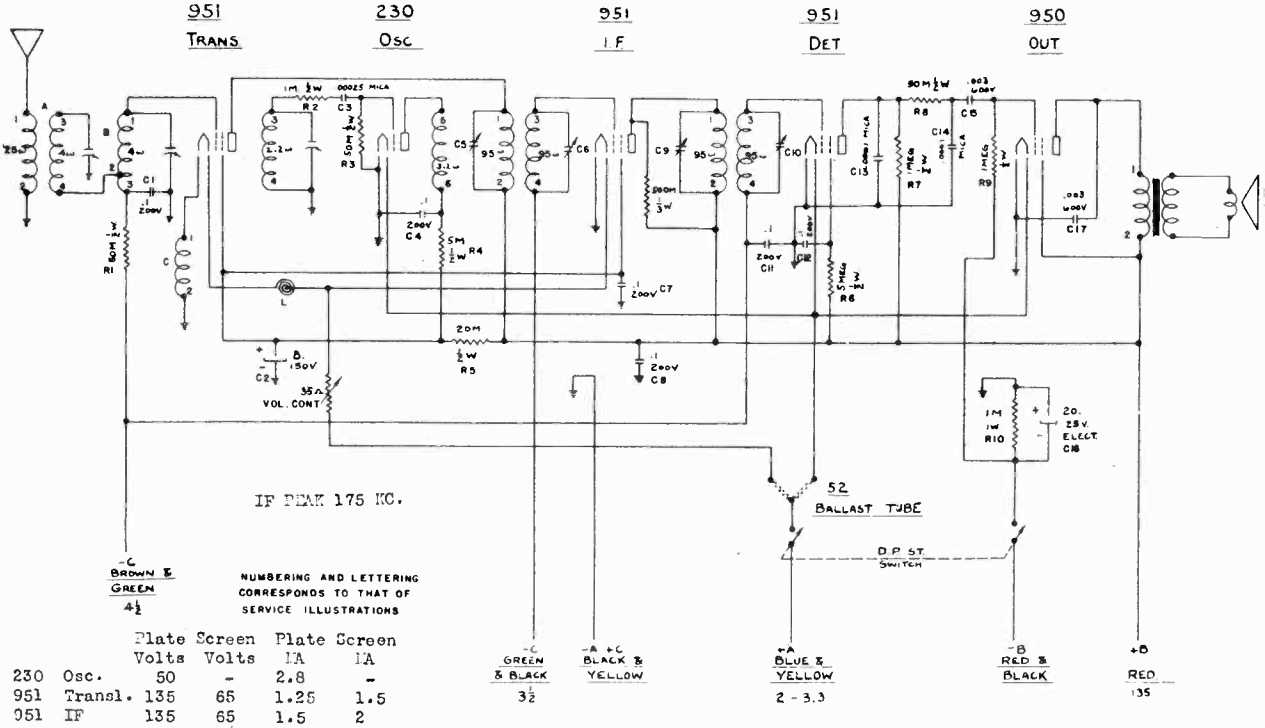
SEARS-ROEBUCK & CO.

MODEL 1711,7090
Schematic, Socket
Parts layout
Voltage





951 Trans | 230 Osc | 951 I.F | 951 Det | 950 Out

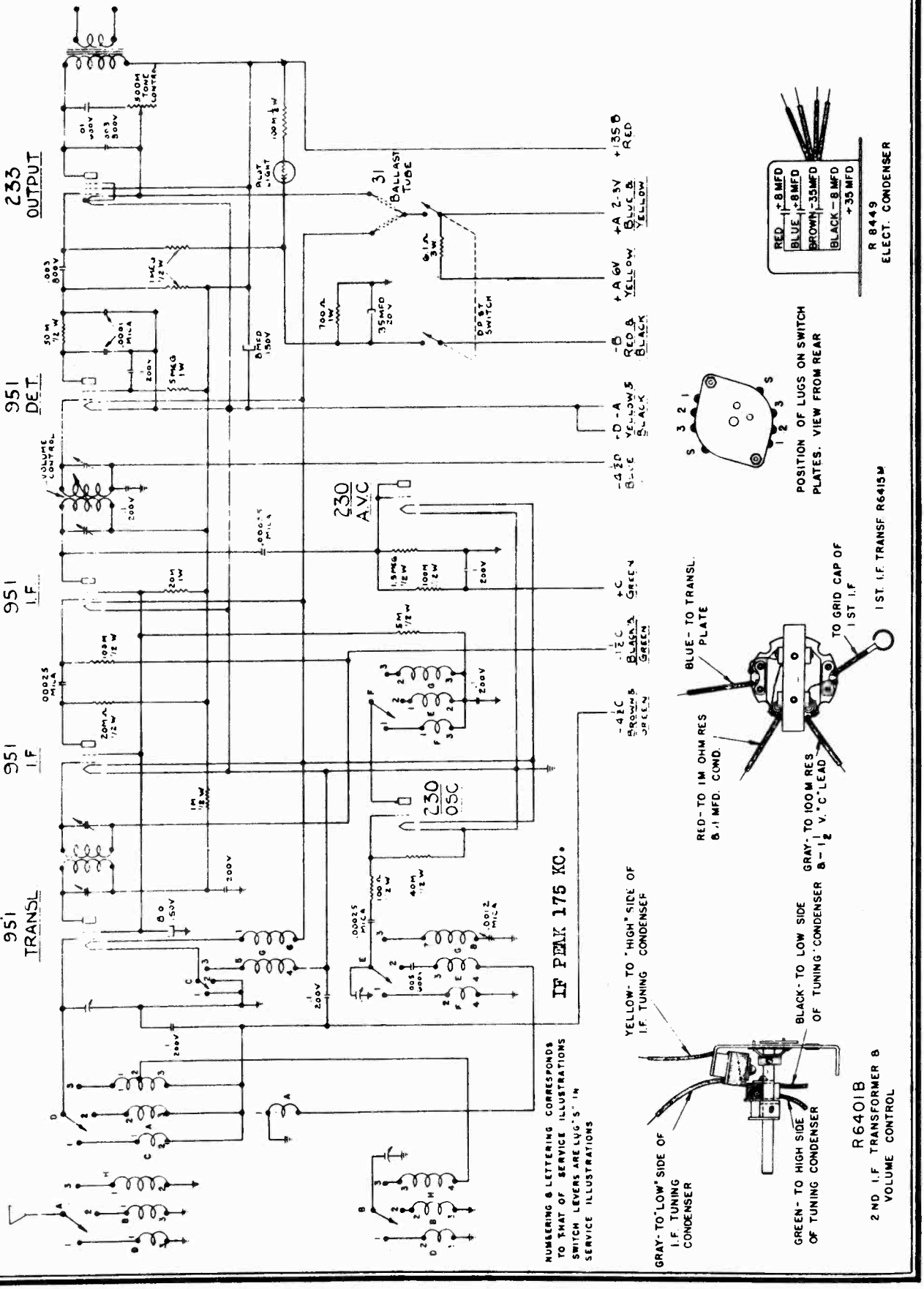


NUMBERING AND LETTERING CORRESPONDS TO THAT OF SERVICE ILLUSTRATIONS

		Plate Volts	Screen Volts	Plate MA	Screen MA
230	Osc.	50	-	2.8	-
951	Transl.	135	65	1.25	1.5
951	IF	135	65	1.5	2
951	Det.	25	5	.03	.01
950	Output	135	135	5.	1

MODEL 1712,1713
Schematic
Coil data

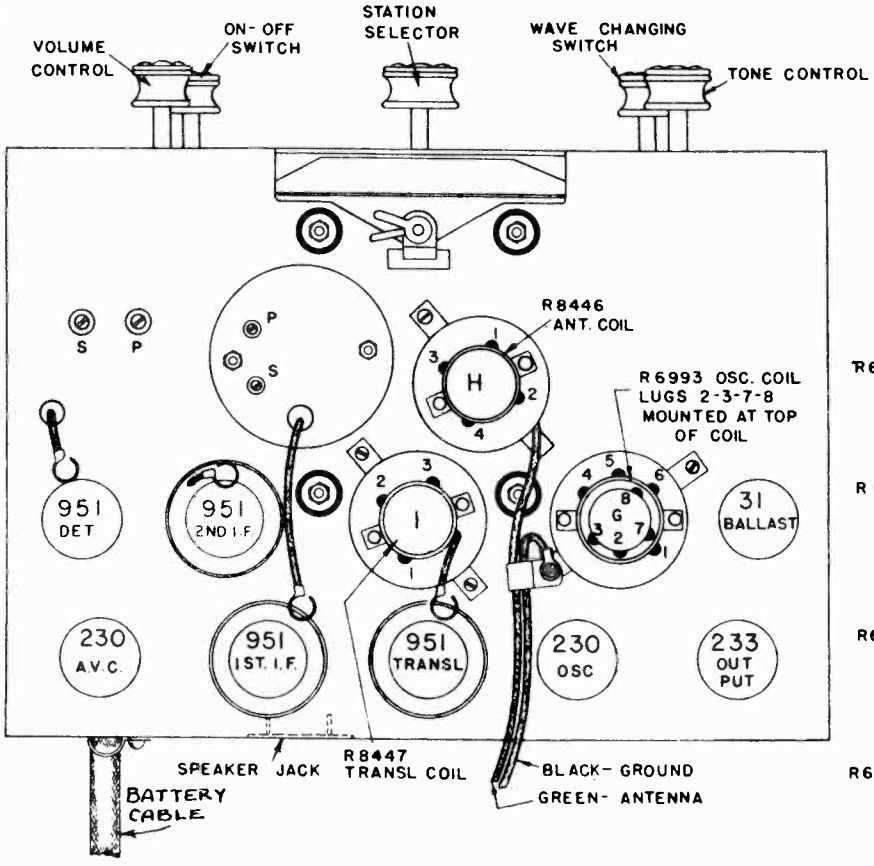
SEARS-ROEBUCK & CO.

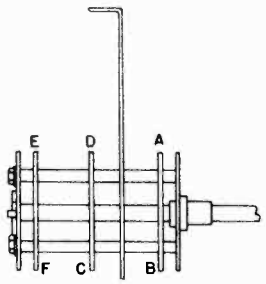


SEARS-ROEBUCK & CO.

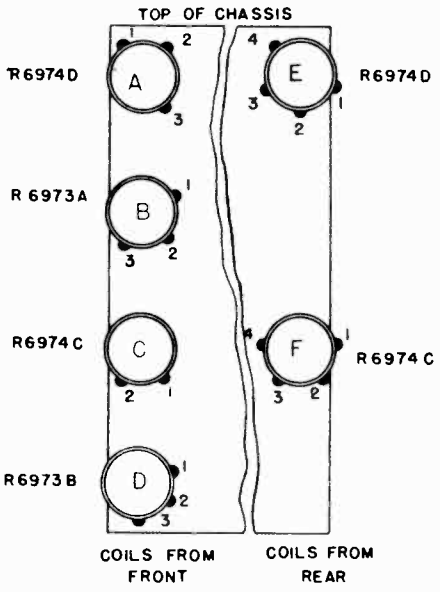
MODEL 1712,1713
Voltage,Socket
Trimmers

In order to properly peak the i-f stages short out the AVC system by connecting C plus to the chassis





WAVE CHANGING SWITCH R6962



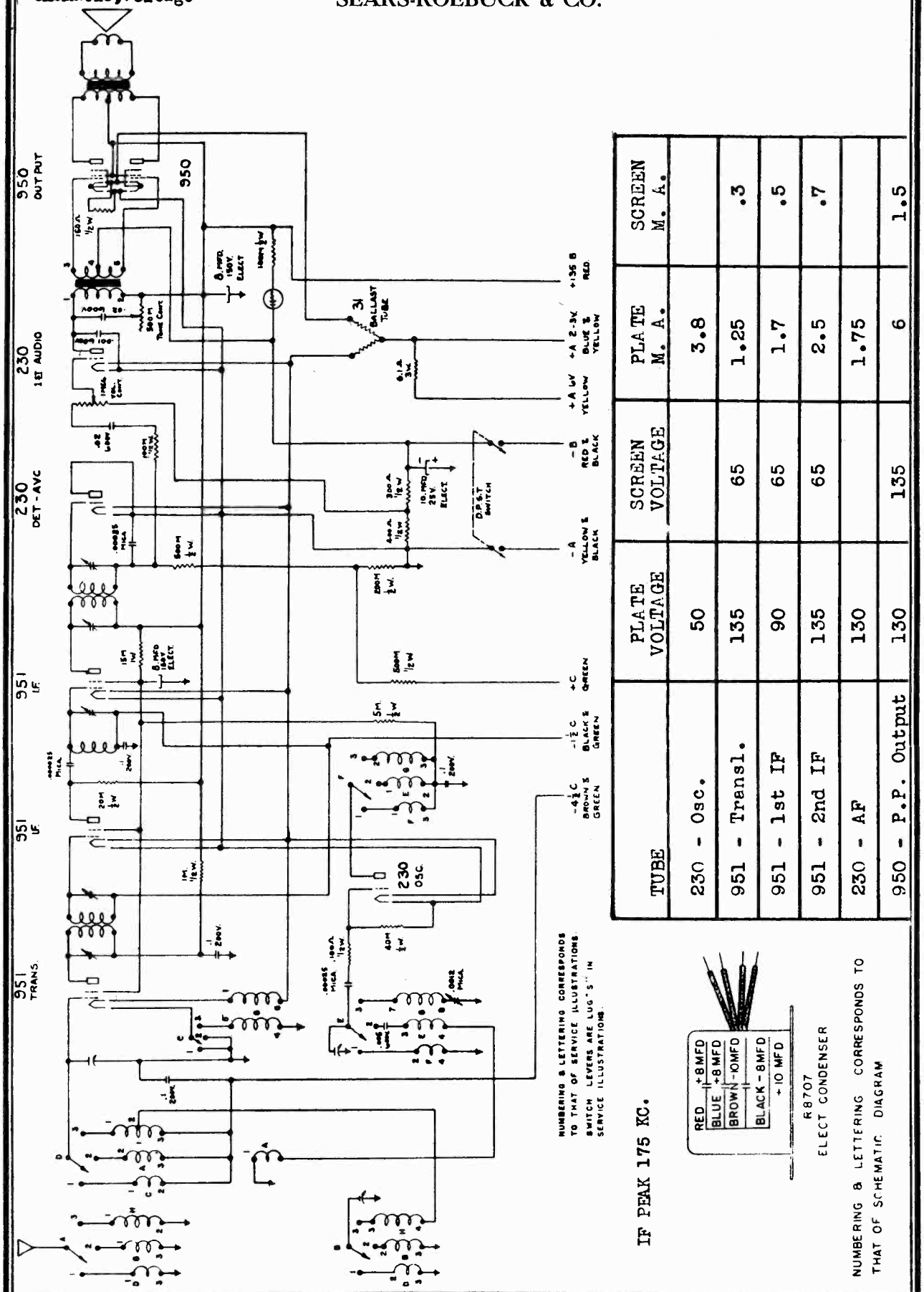
TUBE VOLTAGE AND CURRENT CHART

Models 1712 & 1713

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
230 - Oscillator	45		2.25	
951 - Translator	135	55	.65	.08
951 - 1st IF	85	55	2	.5
951 - 2nd IF	135	55	2.5	.6
951 - Detector	25*	10*	.06	.02
233 - Output	130	135	10	2.5
230 - AVC	Used as rectifier with no applied DC potential			

MODEL 1714
Schematic, Voltage

SEARS-ROEBUCK & CO.

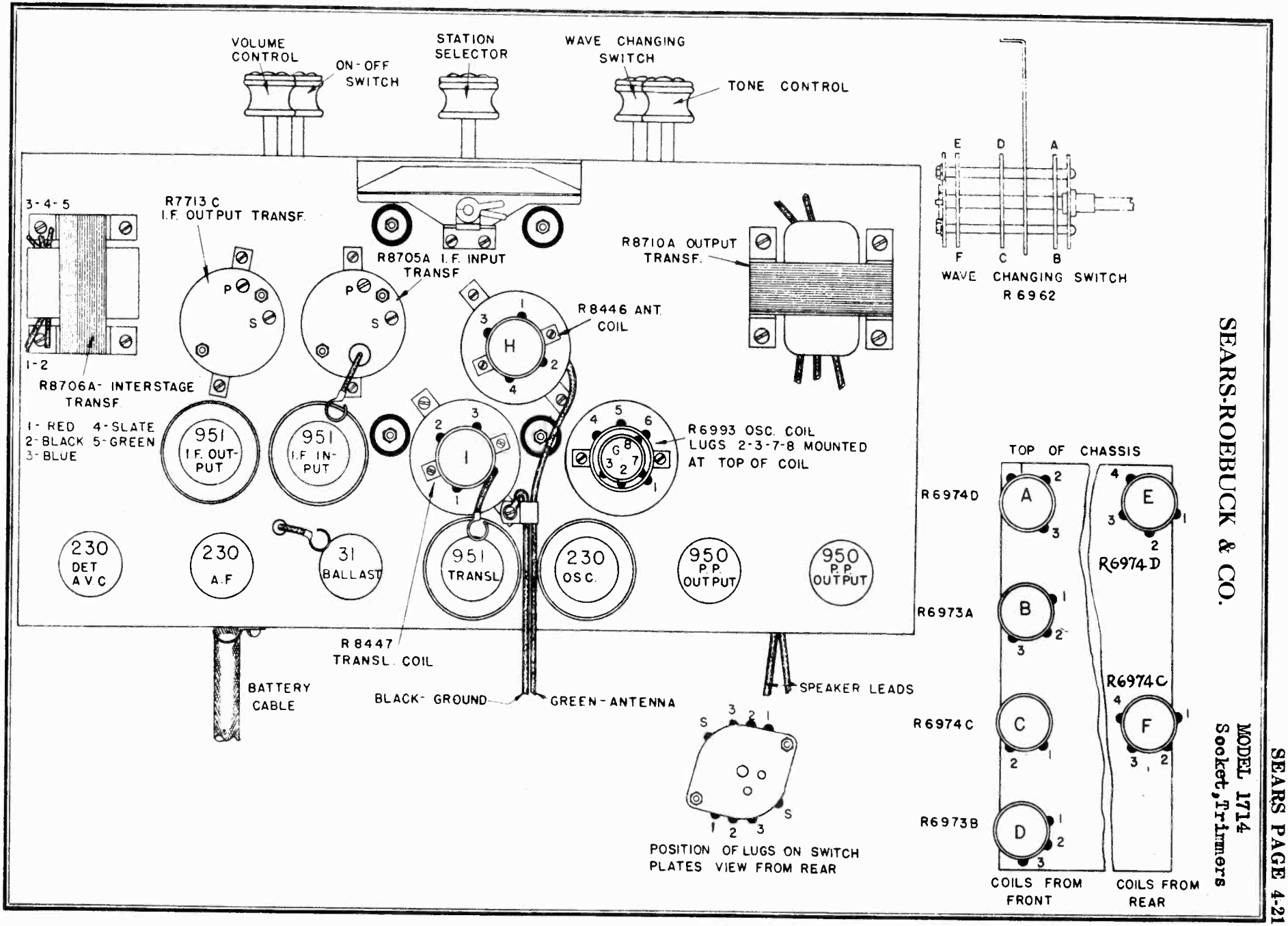


TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
230 - Osc.	50		3.8	
951 - Transl.	135	65	1.25	.3
951 - 1st IF	90	65	1.7	.5
951 - 2nd IF	135	65	2.5	.7
230 - AF	130		1.75	
950 - P.P. Output	130	135	6	1.5

IF PEAK 175 KC.

R8707
ELECT CONDENSER

NUMBERING & LETTERING CORRESPONDS TO THAT OF SCHEMATIC DIAGRAM

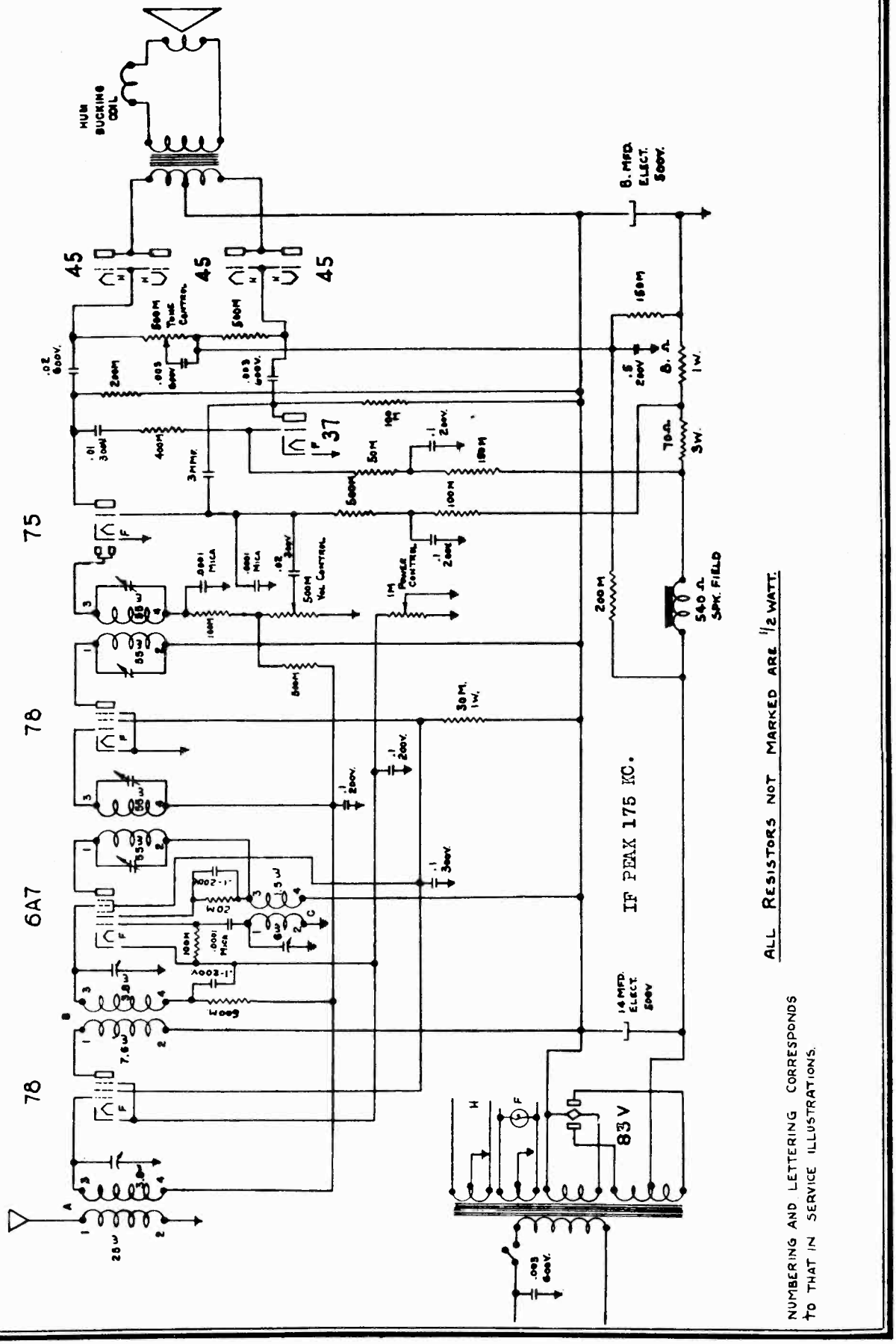


SEARS-ROEBUCK & CO.

MODEL 1714
Socket, Trimmers

MODEL 1720,1725,7065
Schematic

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODEL 1720,1725,7065
Socket,Trimmers
Voltage

REPLACEMENT PARTS LIST

MODEL 1720-7065

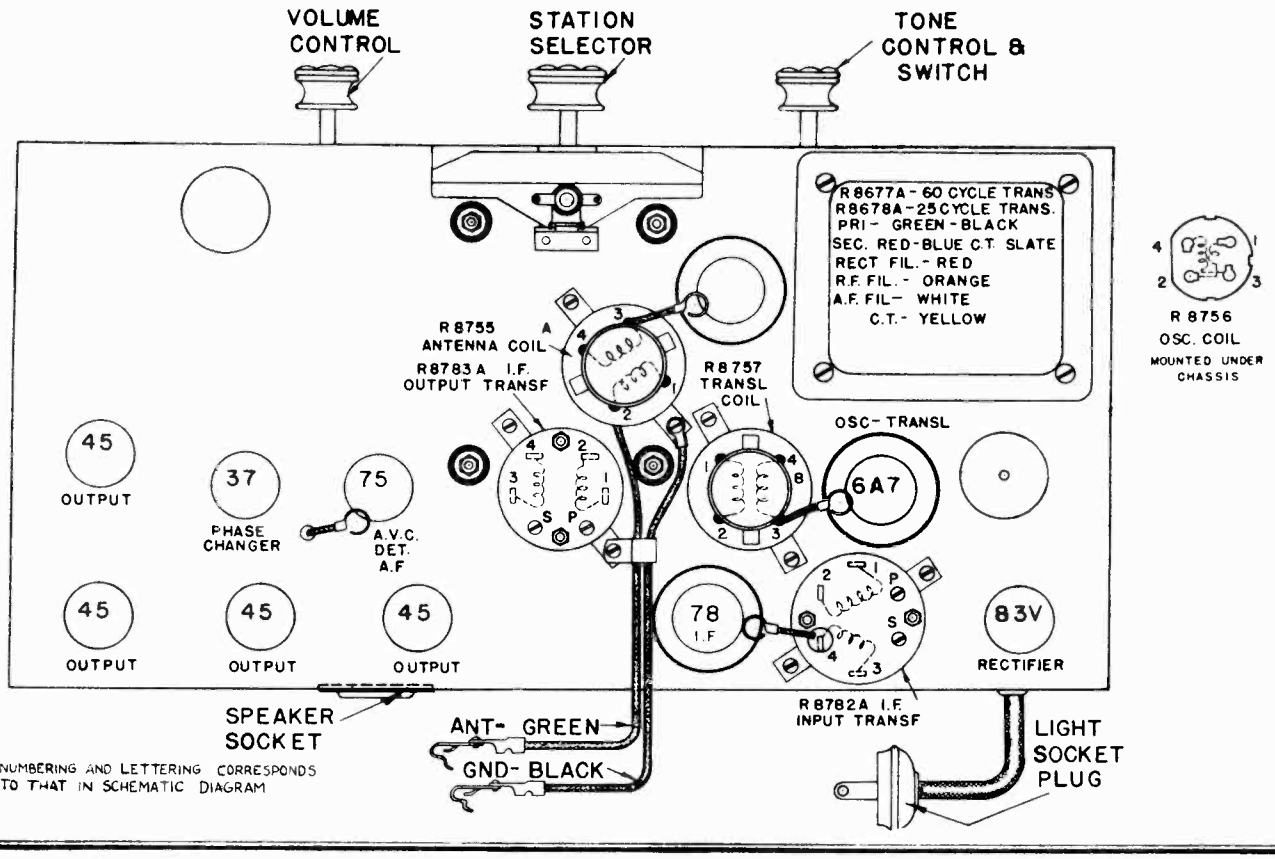
PART NO.	DESCRIPTION
R-6179	Resistor - 500M ohm, 1/2 watt carbon
R-5822	Resistor - 400M ohm, 1/2 watt carbon
R-5830	Resistor - 200M ohm, 1/2 watt carbon
R-8683	Resistor - 150M ohm, 1/2 watt carbon
R-5819	Resistor - 100M ohm, 1/2 watt carbon
R-6445	Resistor - 50M ohm, 1/2 watt carbon
R-6689	Resistor - 30M ohm, 1 watt carbon
R-8685	Resistor - 70 ohms, 3 watt flexohm
R-8684	Resistor - 8 ohms, 1 watt flexohm
R-7236	Condenser - 14 mfd. electrolytic
D-4758-P	Condenser - 8 mfd. electrolytic
R-6451	Condenser - .5 mfd. 200 volts
R-6444	Condenser - .1 mfd. 200 volts
R-6138	Condenser - .1 mfd. 300 volts
R-7680	Condenser - .02 mfd. 300 volts
R-6761	Condenser - .02 mfd. 600 volts
R-6462	Condenser - .01 mfd. 300 volts
R-7681	Condenser - .005 mfd. 600 volts
R-4303	Condenser - .0001 mica
R-8677-A	Transformer - Power, 60 cycle
R-8678-A	Transformer - Power, 25 cycle

TUBE VOLTAGE AND CURRENT CHART

MODELS 1720 - 7065 - 1725

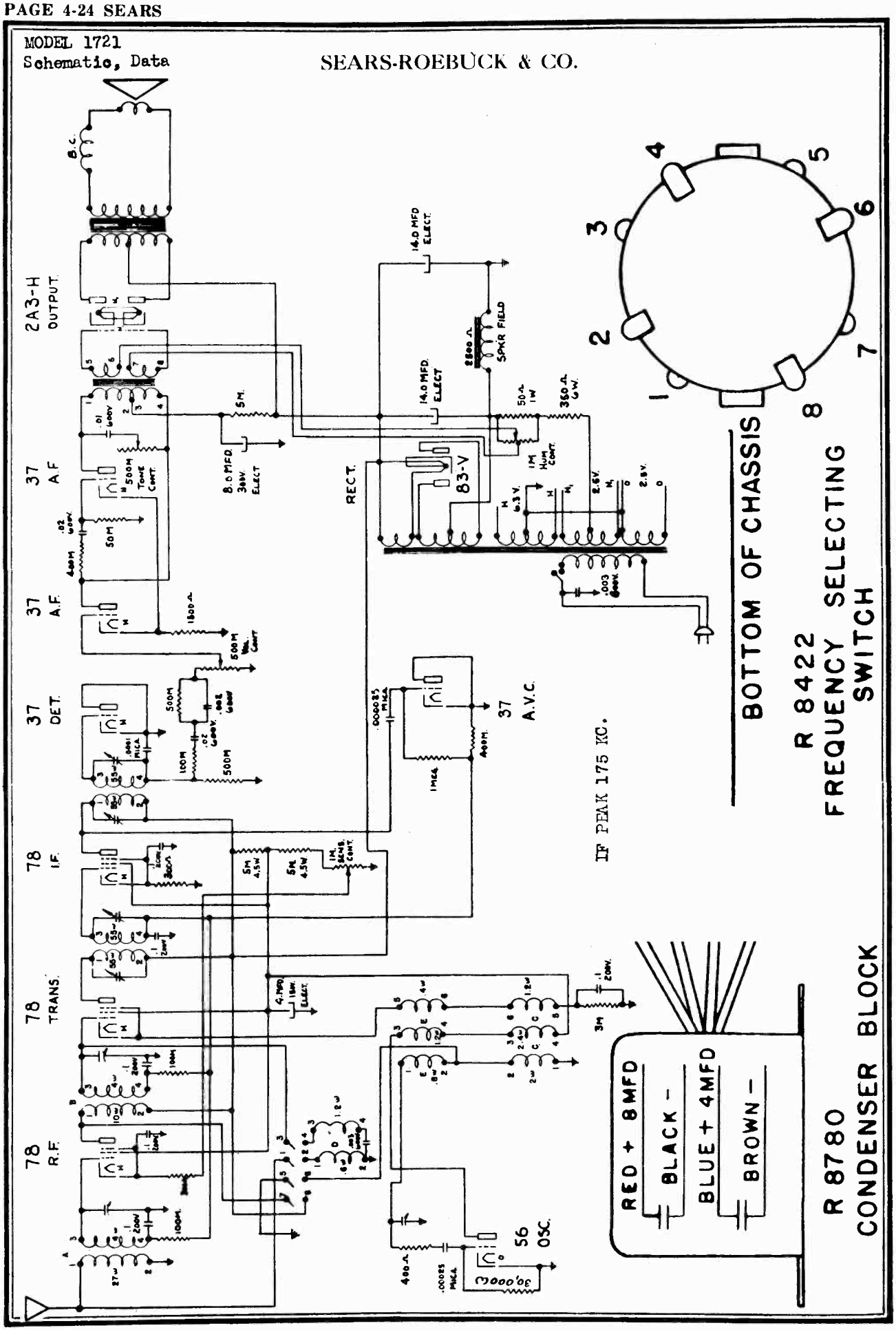
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - R F	255	100	*	8	2
78 - I F	255	100	*	8	2
75 - AVC-DET-AF	125		*	.5	
'37 - Phase Changer	190		*	1.5	
'45 - Output	245		*	32	
6A7 - Osc-Transl	Ep=255v; Eg #1=-10v; Eg #2=200v; Eg #3&#5=82v; Ip=3.75m.a.; Ig #2=3.5m.a.; Ig #3&#5=2.25m.a.				
83-V - Rect.	Maximum d.c. volts=390v. Plate current=84m.a.per plate				

* - Indicates high series resistor



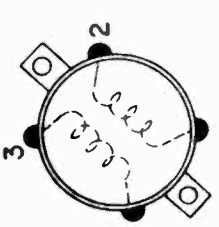
MODEL 1721
Schematic, Data

SEARS-ROEBUCK & CO.

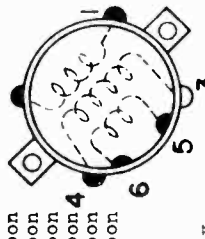


SEARS-ROEBUCK & CO.

MODEL 1721
Socket, Trimmers
Voltage, Coils



D-R 9046
SHORT-WAVE
ANTENNA COIL



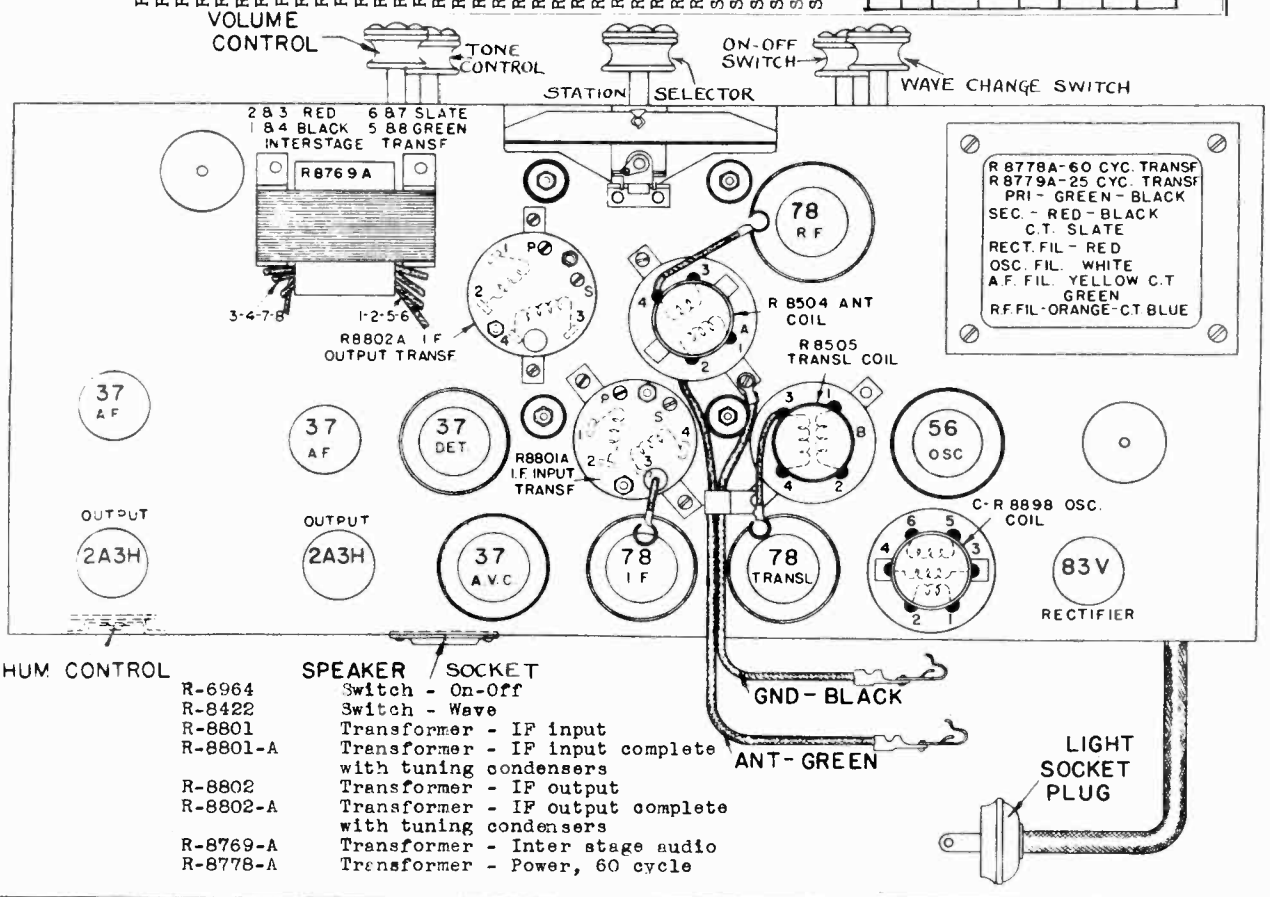
E-R 8902
OSCILLATOR COIL
LUGS 5 and 6 are
at top of coil.

Condenser - Variable tuning	R-8734					
Condenser - IF tuning	R-6565					
Condenser - 14 mfd. electrolytic	R-7236					
Condenser - 4 x 8 mfd. electrolytic	R-8780					
Condenser - .1 mfd. 200 volt	R-6444					
Condenser - .02 mfd. 600 volt	R-6761					
Condenser - .01 mfd. 600 volt	R-7070					
Condenser - .003 mfd. 800 volt	R-6461					
Condenser - .003 mfd. 600 volt	R-7681					
Condenser - .002 mfd. 600 volt	R-6933					
Condenser - .00025 mfd. mica	R-4592					
Condenser - .0001 mfd. mica	R-4303					
Condenser - .000025 mfd. mica	R-8711					
Control - Tone	R-6570					
Control - Volume & Sensitivity	R-8934					
Resistor - 1 megohm, 1/2 watt carbon	R-5823					
Resistor - 500 M ohm, 1/2 watt carbon	R-6179					
Resistor - 400 M ohm, 1/2 watt carbon	R-5822					
Resistor - 100 M ohm, 1/2 watt carbon	R-5819					
Resistor - 50 M ohm, 1/2 watt carbon	R-6445					
Resistor - 30 M ohm, 1/2 watt carbon	R-6156					
Resistor - 5 M ohm, 1/2 watt carbon	R-6510					
Resistor - 3 M ohm, 1/2 watt carbon	R-6153					
Resistor - 1500 ohms, 1/2 watt carbon	R-8829					
Resistor - 400 ohms, 1/2 watt carbon	R-6436					
Resistor - 300 ohms, 1/2 watt carbon	R-6447					
Resistor - 600 ohm, hum adjuster	R-9062					
Resistor - Candohm, tapped	R-8886					
Resistor - Candohm	R-8901					
Speaker - 12", 2500 ohm	S-8766-S					
Speaker - Cone & Voice Coil Assembly	S-7606-A					
Speaker - field coil	S-7175					
Speaker - Hum bucking coil	S-8815					
Speaker - transformer	S-8794-A					
Speaker - plug, 5 prong	S-7415					

TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE V.	SCREEN V.	GRID V.	PLATE ma	SCRE
56 - Osc.	95		-7	7	
78 - RF	200	85	*	.3 vol off	
78 - Transl.	210	82	*	2	.4
78 - IF	220	92	*	5	1
37 - AF	165		-12	4.5	
2A3-H - Output	270		-44	60	
83 - Rect.	330 v. dc. Plate m.a. = 85 m.a. per plate				

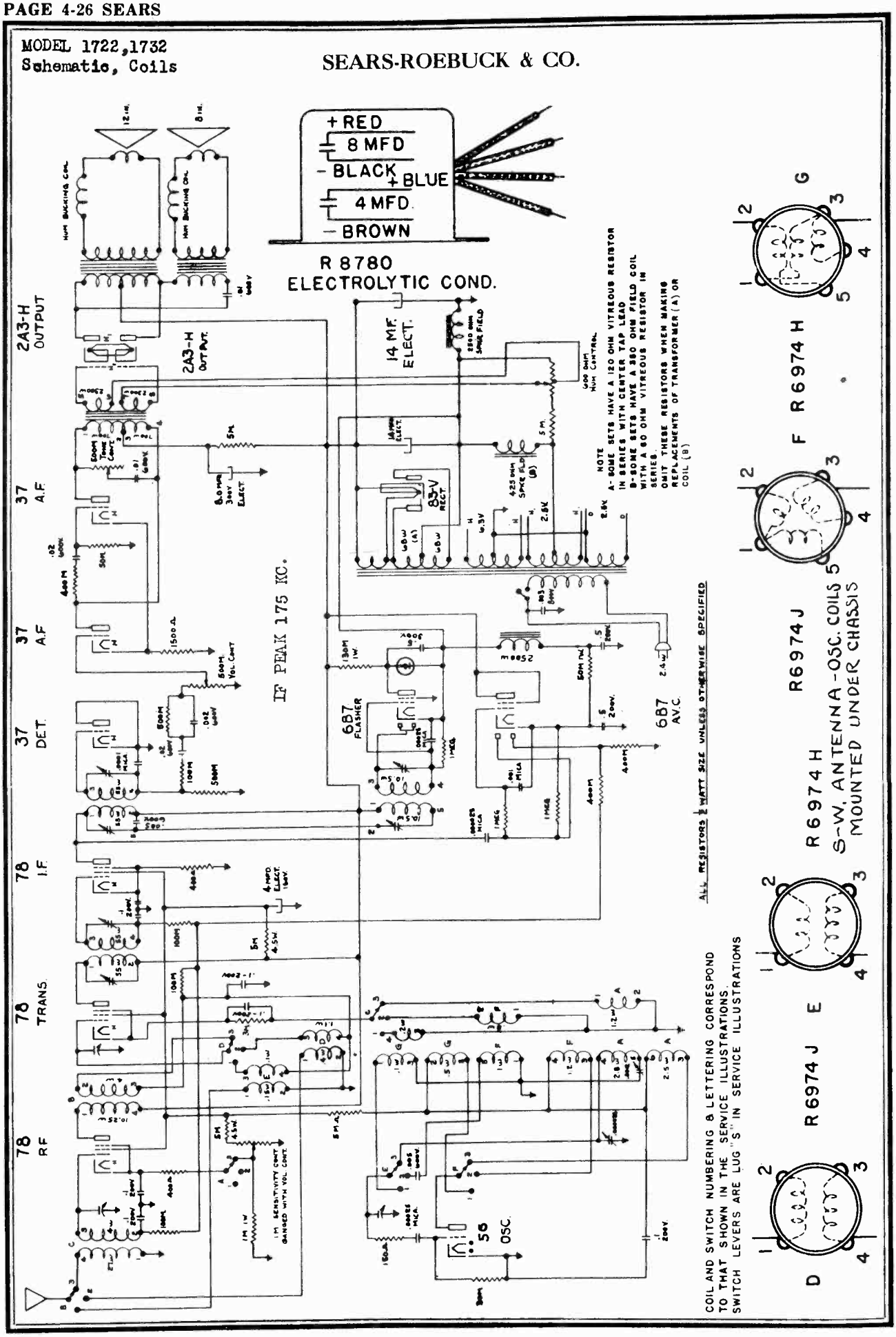
* - Indicates high series resistance.
Speaker field voltage = 110 volts.



R-6964	Switch - On-Off
R-8422	Switch - Wave
R-8801	Transformer - IF input
R-8801-A	Transformer - IF input complete with tuning condensers
R-8802	Transformer - IF output
R-8802-A	Transformer - IF output complete with tuning condensers
R-8769-A	Transformer - Inter stage audio
R-8778-A	Transformer - Power, 60 cycle

MODEL 1722,1732
Schematic, Coils

SEARS-ROEBUCK & CO.

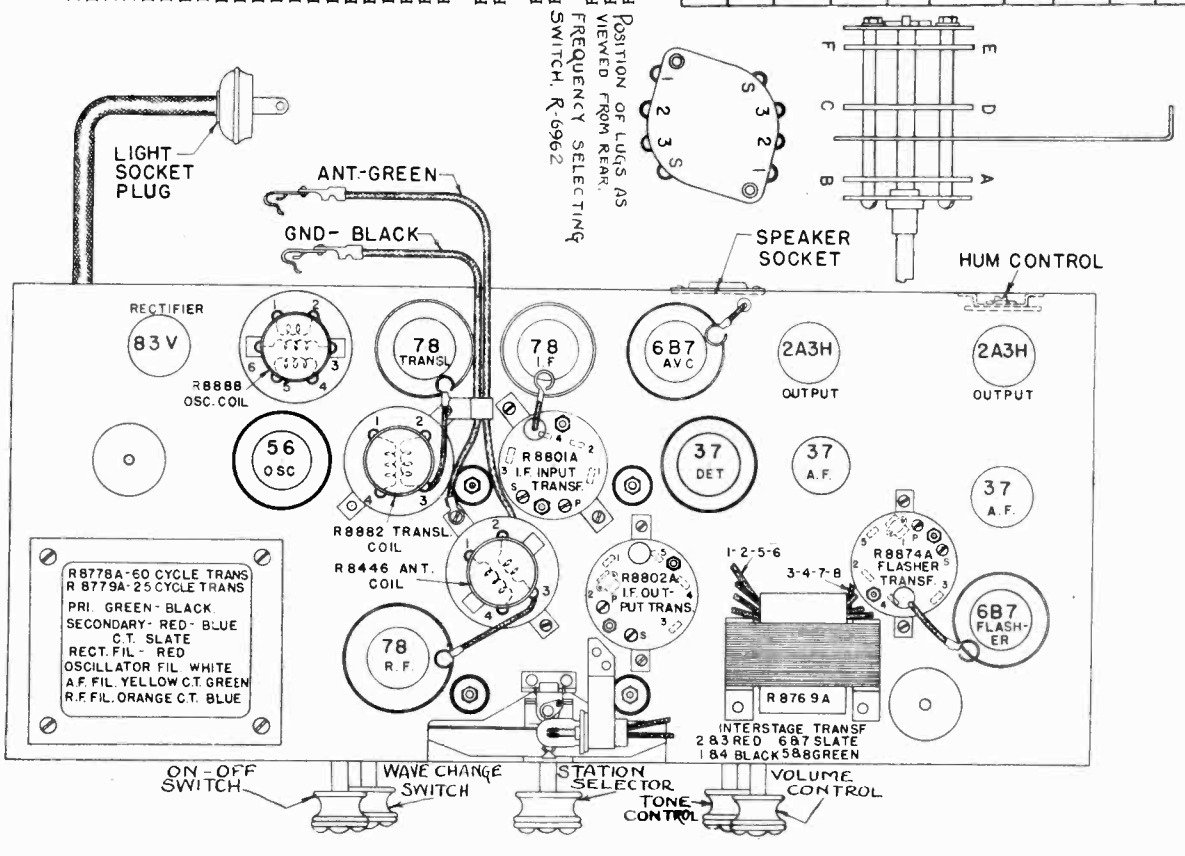


SEARS-ROEBUCK & CO.

MODEL 1722,1732
Socket, Trimmers
Voltage, Parts

R-8817	Condenser - .000035 Trimmer	R-6156	Resistor - 30 M Ohm 1/2 watt				
R-7137-A	Condenser - .0012 padding	R-6510	Resistor - 5 M ohm 1/2 watt				
R-8448-B	Condenser - Variable tuning	R-6153	Resistor - 3 M ohm 1/2 watt				
R-8711	Condenser - .000025 mfd. mica	R-8629	Resistor - 1500 ohm 1/2 wat				
R-4303	Condenser - .0001 mfd. mica	R-6436	Resistor - 400 ohm 1/2 watt				
R-4592	Condenser - .00025 mfd. mica	R-6155	Resistor - 150 ohm 1/2 watt				
R-6759	Condenser - .001 mfd. mica	R-8886	Resistor - Candohm				
R-6933	Condenser - .002 mfd. 600 volt	R-9062	Resistor - Variable 600 ohm				
R-6461	Condenser - .003 mfd. 800 volt	R-7293	Resistor - 60 ohm vitreous				
R-6954	Condenser - .005 mfd. 600 volt	R-8835	Resistor - 120 ohm vitreous				
R-7070	Condenser - .01 mfd. 600 volt	R-5823	Resistor - 1 megohm 1/2 watt				
R-6761	Condenser - .02 mfd. 600 volt	R-6179	Resistor - 500 M ohm 1/2 watt				
R-6444	Condenser - .1 mfd. 200 volt	R-5822	Resistor - 400 M ohm 1/2 watt				
R-8826	Condenser - .5 mfd. 300 volt	R-8828	Resistor - 130 M ohm 1 watt				
R-8780	Condenser - Dry electrolytic dual	R-5819	Resistor - 100 M ohm 1/2 wa				
R-8825	Condenser - Dual .5 mfd, 200 v.	R-8445	Resistor - 50 M ohm 1 watt				
R-7236	Condenser - Electrolytic 14 mfd.	R-4354	Resistor - 50 M ohm 1/2 wa				
R-6570	Control - Tone 500 M ohm	R-7011-A	Clip - Ant. & Gnd. lea				
R-8934	Control - Volume & sensitivity	R-6381	Clip - Grid				
R-8801	Transformer - IF input	R-6381-W	Clip - Grid with 7½" l				
R-8801-A	Transformer - IF input with tuning	R-8446	Coil - Antenna				
	Condensers	R-6974-J	Coil - Ant. - Osc. Int				
R-8802	Transformer - IF output	R-6974-H	Coil - Ant. - Osc. Hi				
R-8802-A	Transformer - IF output with tuning	R-8776-A	Coil - Choke				
	Condensers	R-8888	Coil - Oscillator				
R-8887	Transformer - Tuning flasher	R-8882	Coil - Translator				
R-8887-A	Transformer - Tuning flasher with						
	Condensers						
R-8769-A	Transformer - AF interstage						
R-8778-A	Transformer - Power, 60 cycle						
R-8779-A	Transformer - Power, 25 cycle						

Tube	Plate Voltage	Screen Voltage	Grid Voltage	Plate mA	Screen mA
78 - R F	225	100	*	7	1.5
56 - Oscillator	70		-8	5	
78 - Translator	215	90	-6	2	.5
78 - I F	220	110	-3	8	1.5
37 - 1st A F	165		(Volume) -12.5(control) (off)	4	
37 - 2nd A F	165		-9*	4	
2A3H - Output	265		-44	58	
6B7 - AVC	60	60		4	1
6B7 - Flasher	7-No signal 90-With signal	Cathode is approximately 100 volts below ground.			
83V - Rectifier	DC volts = 350 Plate Current = 87 m.a. per plate				



MODEL 1722,1732
Adjustment data

SEARS-ROEBUCK & CO.

COIL E

MOVE THIS SINGLE TURN OF GREEN SILK COVERED WIRE AS CLOSE AS POSSIBLE TO THE OTHER ENAMELLED WIRE TURNS OF THE COIL.

SPREAD THESE TURNS APART APPROX. AS SHOWN. START WITH RATHER SLIGHT SPREADING OF ONLY TWO OR THREE TURNS AND TUNE THE SET THROUGHOUT ITS RANGE (I.E. WITH WAVE CHANGING SWITCH IN THE SHORTEST WAVE POSITION) NOTE THE SENSITIVITY BY THE NUMBER AND VOLUME OF STATIONS PICKED UP. THEN TRY SPREADING A COUPLE OF MORE TURNS AND TUNE THE SET THROUGH ITS RANGE AGAIN. AFTER A FEW TRIALS THE AMOUNT OF SPREADING NECESSARY FOR MAXIMUM SENSITIVITY WILL BE FOUND

USE THE FINGER NAIL, A BAKELITE ROD OR A PIECE OF WOOD TO MOVE THE TURNS. DO NOT USE A SCREWDRIVER AS IT WILL SCRAPE THE ENAMEL, A PENCIL WOULD LEAVE LEAKAGE PATHS. SECURE THE WIRE WITH COLLODION OR AMBROID AFTER THE PROPER SPACING HAS BEEN DETERMINED.

DO NOT TOUCH THE TRIMMER CONDENSERS (OR DO ANYTHING ELSE) IN ALIGNING THE SHORT WAVE COIL.

RUN AN ADDITIONAL GROUND CONNECTION FROM LUG 2 TO THE LOW SIDE OF TRIMMER CONDENSER MOUNTED ON THE WAVE CHANGING SWITCH FRAME. (THERE IS ONE GROUND CONNECTION FROM LUG 2 TO THE VARIABLE TUNING CONDENSER FRAME. THIS CONNECTION SHOULD NOT BE DISTURBED.)

There has been complaint of insufficient short wave sensitivity in some instances. The following suggestions should prove helpful:

1. A GOOD outdoor antenna MUST be used for satisfactory short wave reception.

2. There is considerable variation in the efficiency of the type 56 tubes as short wave oscillators. Trial of a few will probably show one up as better than the rest.

3. Increase the coupling of the short wave antenna coil. This is Coil E (Part R-6974H in the service manual illustration. Winding 1-2, consisting of a single turn of green silk covered wire, should be moved as close as possible to the other winding on the coil (3-4), as referred to in attached diagram.

4. Run an ADDITIONAL ground connection from Coil E, lug 2, to the low side of the trimmer condenser mounted on the wave changing switch frame. (There is one ground connection from Coil E, lug 2, to the variable tuning condenser frame. This connection should not be disturbed.)

5. Try re-aligning by turning in a station of about 6000 kc, on the short wave range, and spreading the turns of Coil E (3-4), the enamelled wire winding, apart until maximum volume is secured. Then fasten the turns in place with a touch of collodion, ambroid or similar substance.

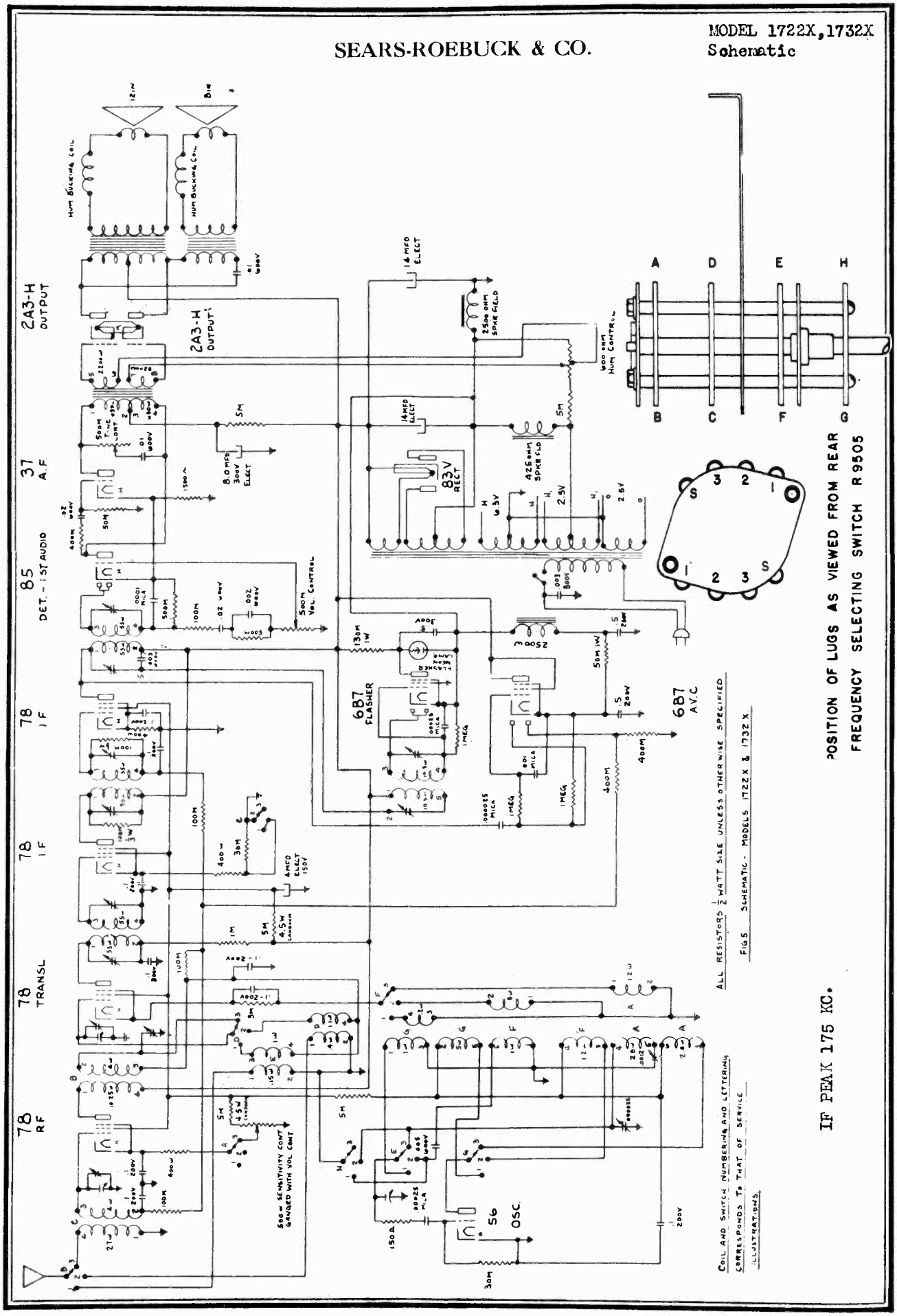
Hum which cannot be eliminated with the hum balancing adjustment is due to poorly matched 2A3H tubes. Try others until a combination is found which permits a hum balance. The plate currents of the tubes must be very nearly equal in order to obtain this balance.

Examination of the output tubes sometimes discloses particles of white hot carbon on the grid or plate. Hum balance cannot be obtained with such tubes and they should be replaced.

Some trouble has been experienced with power transformers burning up. In almost all instances this is due to an inter-element short in the 2A3 or 2A3H tubes. These tubes are very much more prone to such trouble because of the very close spacing of their elements.

SEARS-ROEBUCK & CO.

MODEL 1722X, 1732X
Schematic



MODEL 1722X, 1732X
Voltage, Socket Trimmer data

SEARS-ROEBUCK & CO.

R-5509-A Board - Terminal
R-8297-A Board - Terminal
R-8791 Card - Operating
R-7243 Bushing - Fibre, Wave Switch
R-4715 Clamp - Ant. & Gnd. lead
R-7011-A Clip - Ant. & Gnd. lead
R-6381 Clip - Grid
R-6381-W Clip - Grid with 7-1/2" lead
R-8446 Coil - Antenna
R-6974-J Coil - Ant. - Osc. Intermediate
R-6974-H Coil - Ant. - Osc. Hi-range
R-8776-A Coil - Choke
R-8888 Coil - Oscillator
R-8882 Coil - Translator
R-8817 Condenser - .000035 Trimmer
R-7137-A Condenser - .0012 padding
R-8448-B Condenser - Variable tuning
*R-8711 Condenser - .000025 mfd. mica
*R-4303 Condenser - .0001 mfd. mica
*R-4592 Condenser - .00025 mfd. mica
R-6759 Condenser - .001 mfd. mica
R-6933 Condenser - .002 mfd. 600 volt
*R-6461 Condenser - .003 mfd. 800 volt
R-6954 Condenser - .005 mfd. 600 volt
R-7070 Condenser - .01 mfd. 600 volt
*R-6761 Condenser - .02 mfd. 600 volt
R-6138 Condenser - .1 mfd. 300 volt
*R-6444 Condenser - .1 mfd. 200 volt
R-8826 Condenser - .5 mfd. 300 volt
*R-8780 Condenser - Dry electrolytic dual
R-8825 Condenser - Dual .5 mfd. 200 V.
*R-7236 Condenser - Electrolytic 14 mfd.
*R-6570 Control - Tone 500 M ohm
R-8934 Control - Volume and sensitivity
R-6989 Cord - Extension
*R-8959-A Dial & Indicator
R-8855 Escutcheon - Silvertone
R-7173 Folder - Short Wave
*R-8893 Knob - Large
*R-8896 Knob - Medium
R-8914 Knob - Medium, with dot
R-2288 Lamp - Pilot
R-8830 Lamp - Neon tuning flasher
*R-5346-B Lead - Antenna with clip
R-5346-D Lead - Ground with clip
*R-5823 Resistor - 1 megohm 1/2 watt carbon
*R-6179 Resistor - 500 M ohm 1/2 watt carbon
*R-5822 Resistor - 400 M ohm 1/2 watt carbon
*R-8828 Resistor - 130 M ohm 1 watt carbon
*R-5819 Resistor - 100 M ohm 1/2 watt carbon
*R-6445 Resistor - 50 M ohm 1 watt carbon
*R-4364 Resistor - 50 M ohm 1/2 watt carbon
*R-6156 Resistor - 30 M ohm 1/2 watt carbon
*R-6510 Resistor - 5 M ohm 1/2 watt carbon
*R-6153 Resistor - 3 M ohm 1/2 watt carbon
R-8829 Resistor - 1500 ohm 1/2 watt carbon
*R-6154 Resistor - 1000 ohm 1/2 watt carbon
*R-6436 Resistor - 400 ohm 1/2 watt carbon
*R-6155 Resistor - 150 ohm 1/2 watt carbon
R-8886 Resistor - Candohm
*R-9062 Resistor - Variable 600 ohm
R-7293 Resistor - 60 ohm vitreous
R-8835 Resistor - 120 ohm vitreous

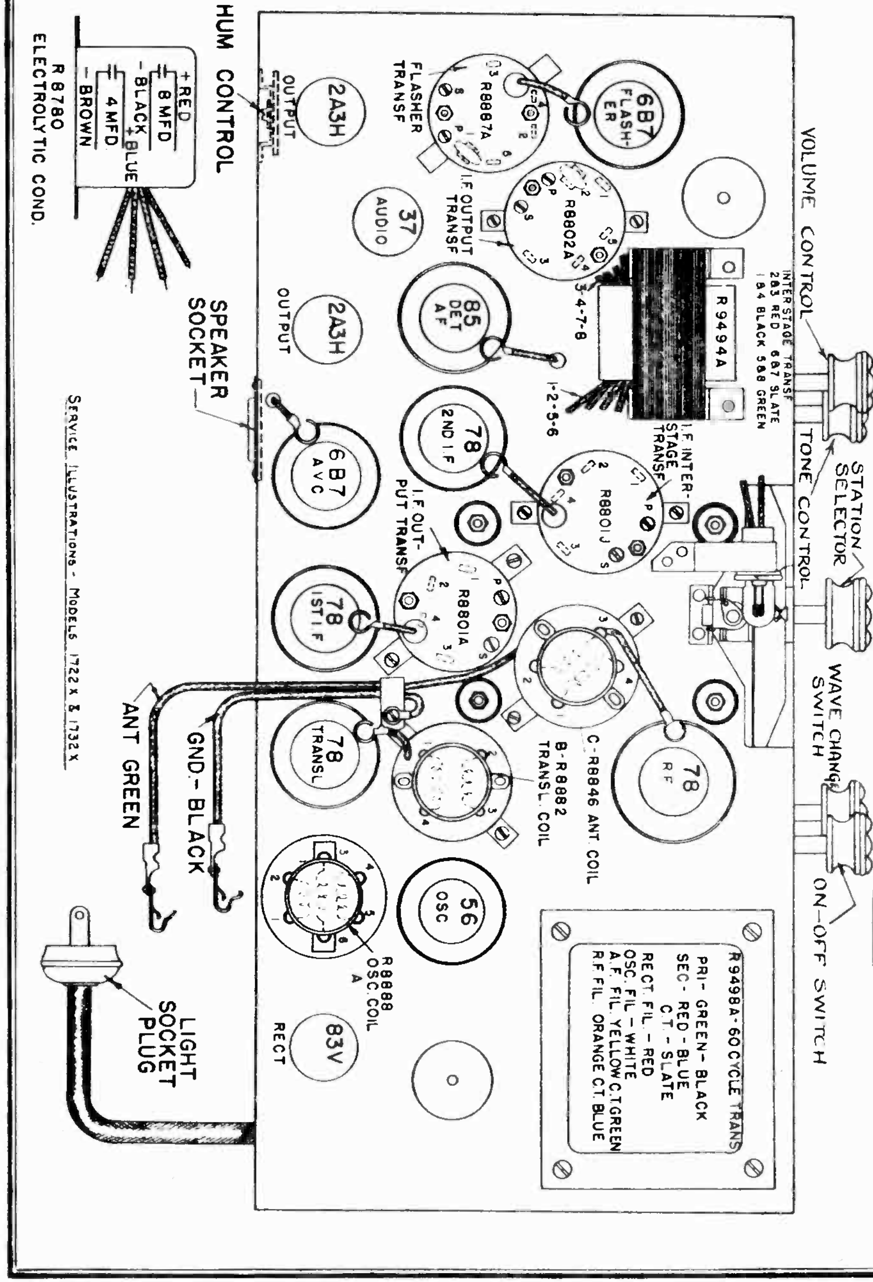
*R-6652-A Shaft - Dial Drive
*R-6018-A Shield - Ant. & Transl. coil
R-8803-A Shield - IF & flasher transf.
R-8687-A Shield - Oscillator coil
R-8947-A Shield - Tuning flasher reflector
R-6748-A Shield - Tube, bottom
R-6749 Shield - Tube, top
R-7235 Shield - Electrolytic condenser
*R-7320 Shield - Chassis bottom
R-8366 Socket - 4 Prong
R-8367 Socket - 5 prong
R-8368 Socket - 6 prong
*R-8369 Socket - 7 prong
R-8917 Socket - Flasher lamp
S-8763-S Speaker - 8",2250 ohm field
S-7776-C Speaker - 8",cone & voice coil
S-8569 Speaker - 8", field coil
S-8798-AS Speaker - 8", transformer
*S-8762-S Speaker - 12",410 ohm
S-7606-A Speaker - 12", cone & voice coil
S-8792 Speaker - 12", field coil
S-8793-A Speaker - 12", transformer
R-8788 Sticker - Tube & license, 60 cycle
R-8789 Sticker - Tube & license, 25 cycle
*R-6962 Switch - Frequency selecting
*R-6964 Switch - on-off
R-8801 Transformer - IF input
R-8801-A Transformer - IF input with tuning
R-8801-J Transformer - IF interstage
R-8802 Transformer - IF output
R-8802-A Transformer - IF output with tuning
R-8887 Transformer - Tuning Flasher
R-8887-A Transformer - Tuning Flasher with o
R-9494-A Transformer - AF interstage
R-9498-A Transformer - Power, 60 cycle

		Plate Volts	Screen Volts	Grid Volts	Plate MA	Screen MA
78	RF	225	100		7	1.5
56	Osc.	70	-	-6	5	--
78	Transl.	215	90	-6	2	.5
78	1st IF	220	110	-3	8	1.5
78	2nd IF	220a	110a	-3a	8a	1.5a
		209b	99b	-14b	.4b	.06b
37	1st AF	165	-	-12.5°	4	
37	2nd AF	165	-	-9	4	
2A3H	Output	265	-	-44	58	
6B7	AVC	60	60	—	4	1
6B7	Flasher					

7* Cathode is approximately
90** 100 volts below ground.

83V Rect. D-C.volts=350 Plate MA=87 per plate

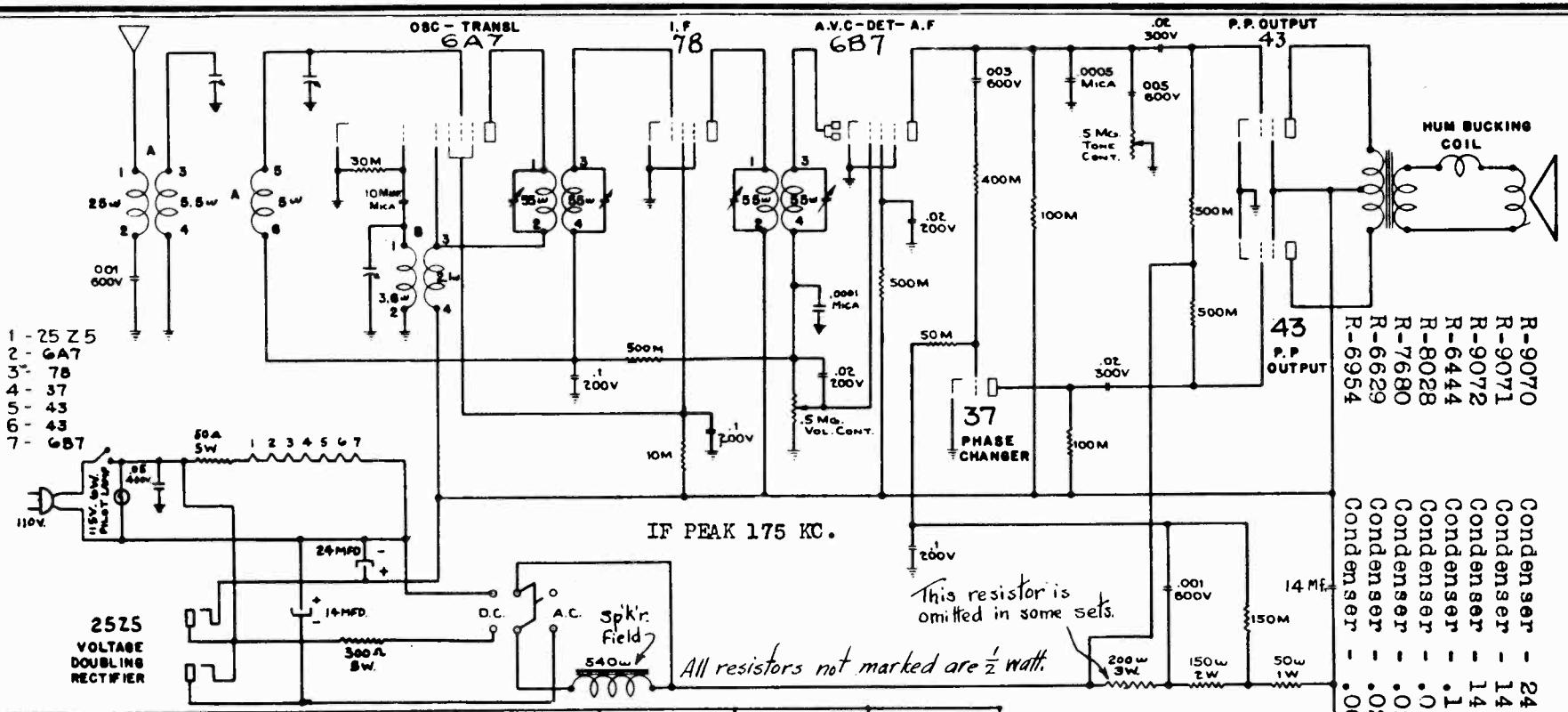
a= Wave Selecting Switch in Broadcast position
b= Wave Selecting Switch in Short Wave position
°= Volume Control Off.
*= No Signal **= With Signal.



SERVICE ILLUSTRATIONS - MODELS 1722X & 1732X

SEARS-ROEBUCK & CO.

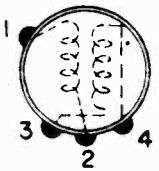
MODEL 1750
Schematic, Voltage



R-9070 Condenser - 24 mfd. electrolytic
R-9071 Condenser - 14 mfd. electrolytic
R-9072 Condenser - 14 mfd. electrolytic
R-6444 Condenser - .1 mfd, 200 volt
R-8028 Condenser - .05 mfd. 400 volt
R-7680 Condenser - .02 mfd. 300 volt
R-6629 Condenser - .02 mfd. 200 volt
R-6954 Condenser - .005 mfd. 600 volt

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	150	85	*	2	1.25
6B7 - Det-AVC-AF	40*		*	1	
37 - Phase Changer	40*		*	1	
43 - Output	145	150	*	24	5
6A7 - Osc-Transl.	Ep=150v; Eg#2=150v; Eg#3&#5=85v; Ip=6m.a. Ig#2=5m.a.; Ig#3&#5=5m.a.				
2525 - Rectifier	Max. d.c. volts=225. Plate current =80m.a.				

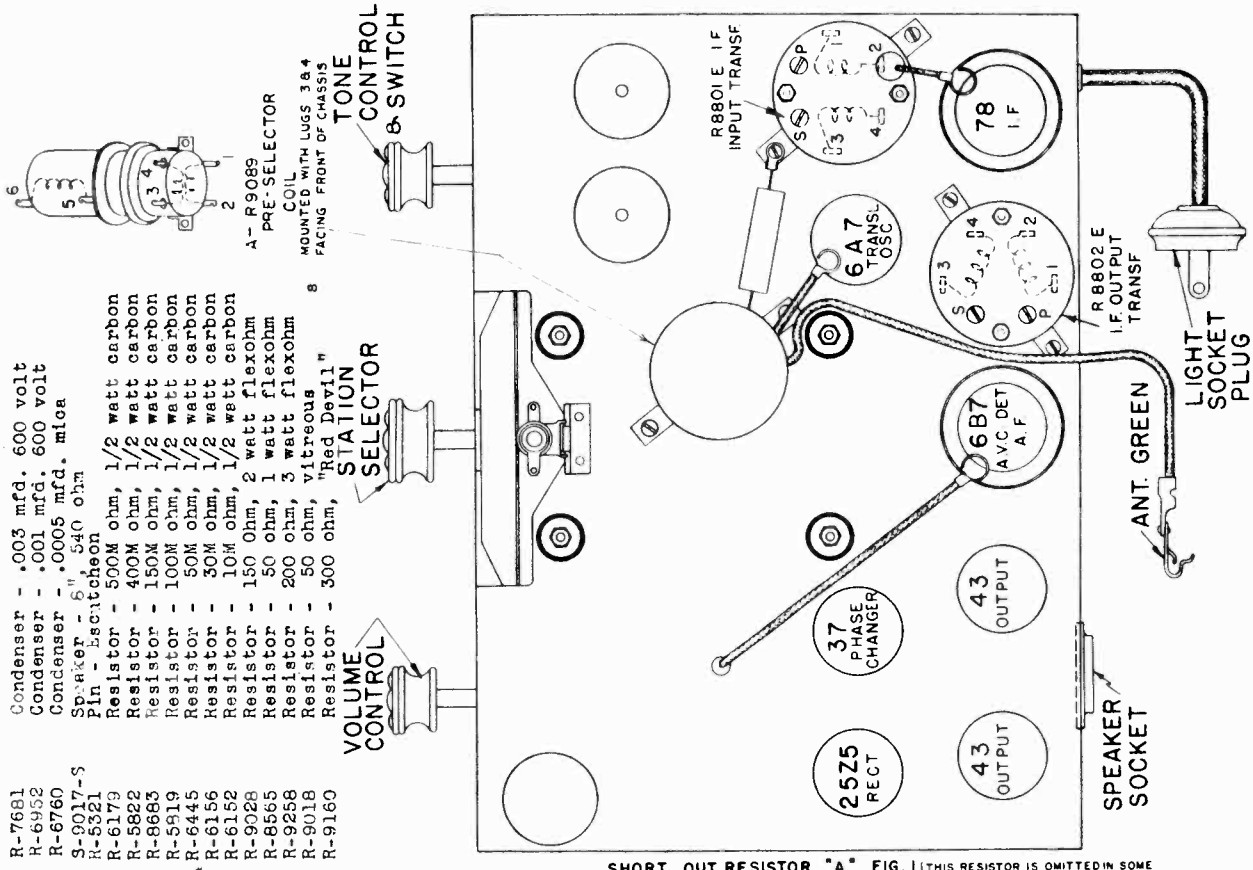
FOR CHANGES SEE INDEX



B- R 9021- OSCILLATOR COIL - MOUNTED UNDER CHASSIS

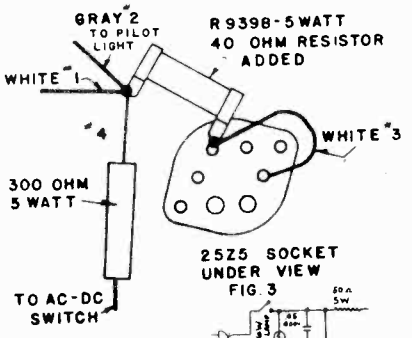
MODEL 1750
Socket, Trimmers
Chassis changes

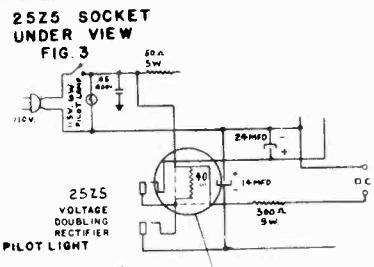
SEARS-ROEBUCK & CO.



R-7681	Condenser - .003 mfd. 600 volt	
R-6952	Condenser - .001 mfd. 600 volt	
R-6760	Condenser - .0005 mfd. mica	
S-9017-S	Speaker - 6" 540 ohm	
R-5321	Pin - Escutcheon	
R-6179	Resistor - 500M ohm,	1/2 watt carbon
R-5822	Resistor - 400M ohm,	1/2 watt carbon
R-8683	Resistor - 150M ohm,	1/2 watt carbon
R-5919	Resistor - 100M ohm,	1/2 watt carbon
R-6445	Resistor - 50M ohm,	1/2 watt carbon
R-6156	Resistor - 30M ohm,	1/2 watt carbon
R-6152	Resistor - 10M ohm,	1/2 watt carbon
R-9028	Resistor - 150 Ohm,	2 watt flexohm
R-8565	Resistor - 50 ohm,	1 watt flexohm
R-9258	Resistor - 200 ohm,	3 watt flexohm
R-9018	Resistor - 50 ohm,	vitreous
R-9160	Resistor - 300 ohm,	"Red Devil"

SHORT OUT RESISTOR "A" FIG. 1 (THIS RESISTOR IS OMITTED IN SOME SETS)
OPEN LEADS "1, "2, "4 FIG 2
CONNECT THEM TOGETHER AT ONE END
OF THE ADDED R 9398 RESISTOR.
MOUNT THE RESISTOR AS SHOWN IN FIG. 3





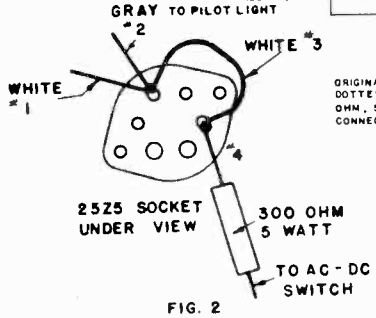
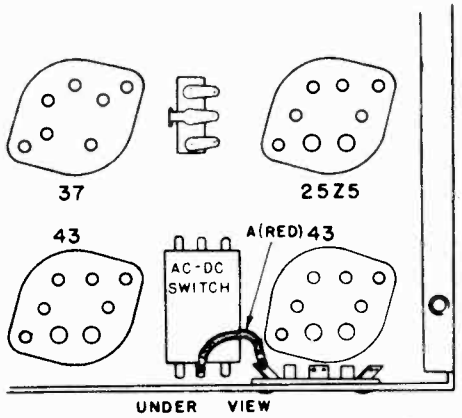
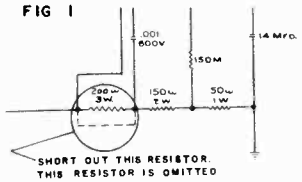


FIG. 2



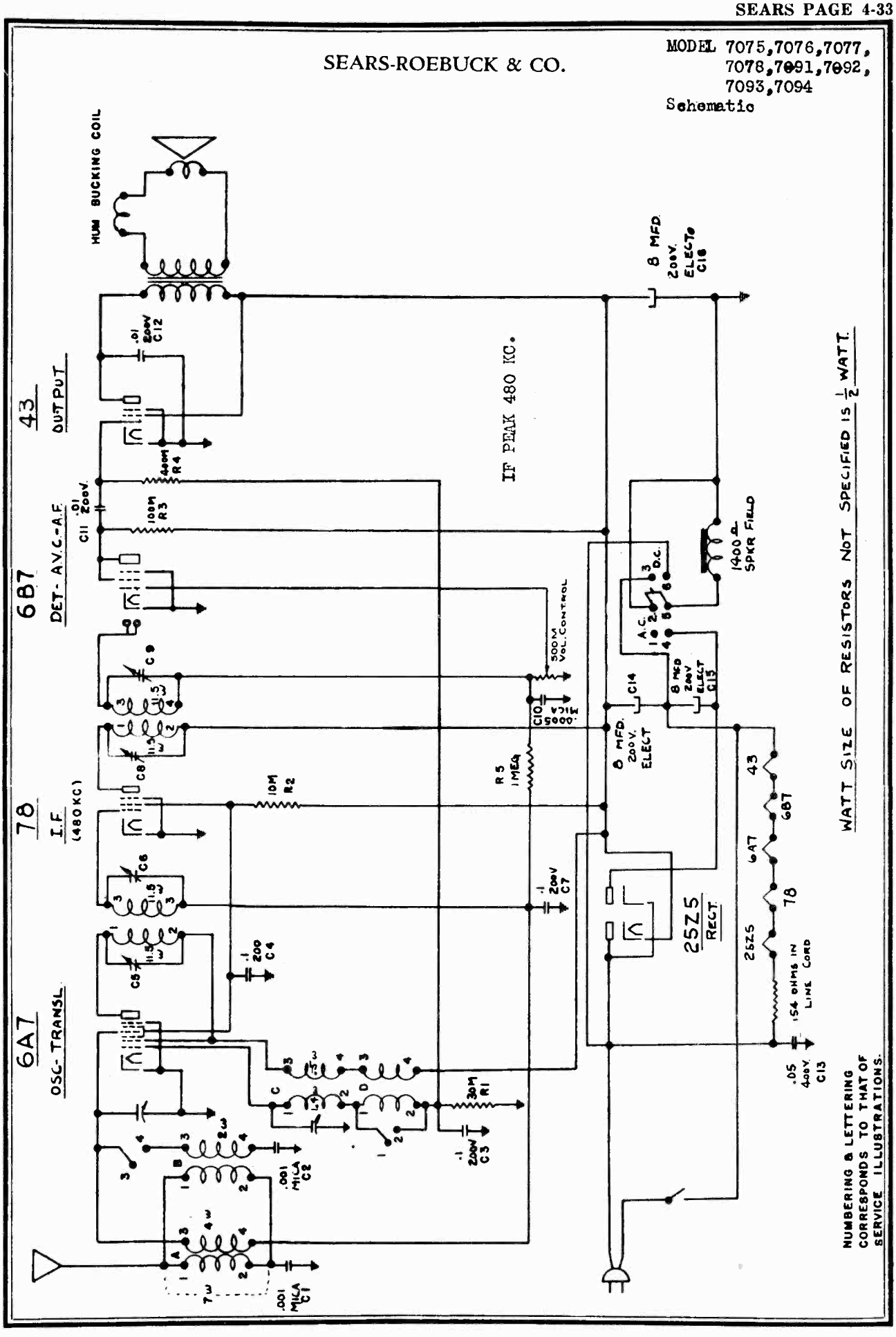
UNDER VIEW
FIG 1



SHORT OUT THIS RESISTOR. THIS RESISTOR IS OMITTED IN SOME SETS

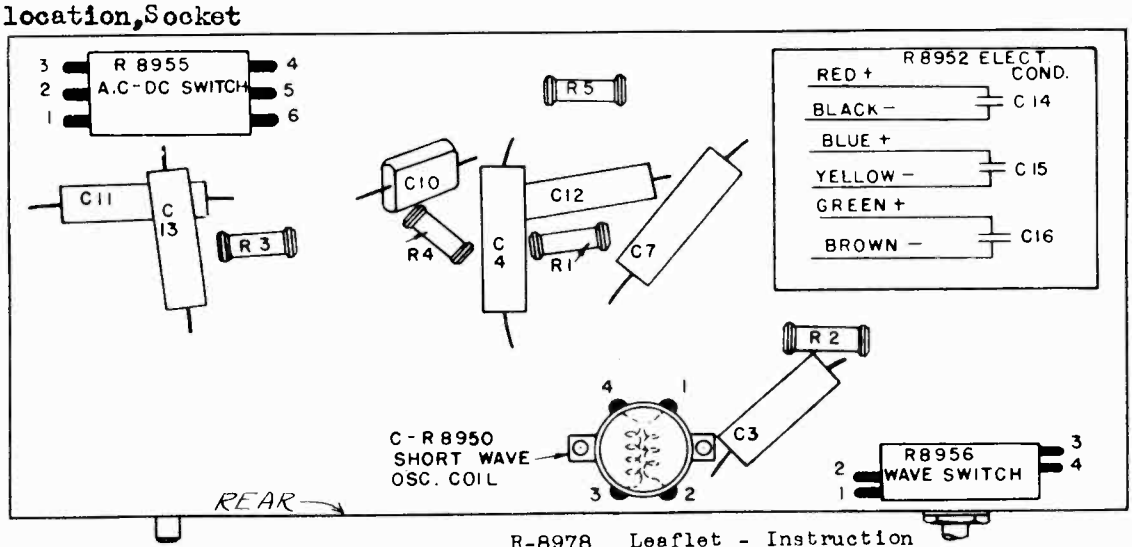
SEARS-ROEBUCK & CO.

MODEL 7075,7076,7077, 7078,7091,7092, 7093,7094
Schematic

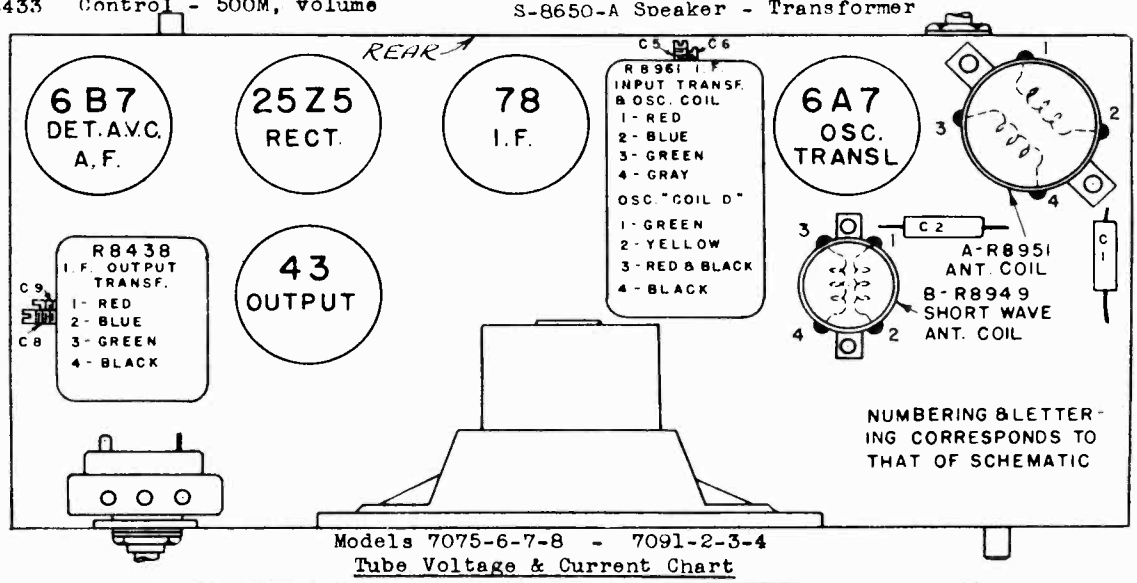


MODEL 7075,6,7 and 8
7091,2,3 and 4
Voltage,Trimmers
Parts location,Socket

SEARS-ROEBUCK & CO.



R-6381	Clip - Grid	R-8978	Leaflet - Instruction
R-6381-A	Clip - Grid with 6" lead	R-8319	Pin - Escutcheon
R-8951	Coil - Antenna	R-5823	Resistor - 1 Megohm - 1/2 watt
R-8949	Coil - Antenna, short wave	R-5822	Resistor - 400 M ohms,1/2 watt
R-8950	Coil - Oscillator, short wave	R-5819	Resistor - 100 M ohms,1/2 watt
R-8960	Condenser - Variable tuning	R-6156	Resistor - 30 M ohms,1/2 watt
R-8952	Condenser - Triple, dry electr	R-6152	Resistor - 10 M ohms,1/2 watt
R-6444	Condenser - .1 Mfd, 200 volt	R-8092	Socket - 6 prong
R-8028	Condenser - .05 Mfd, 400 volt	R-8072	Socket - 7 prong
R-8432	Condenser - .01 Mfd, 200 volt	S-8954	Speaker - 1400 ohm
R-6759	Condenser - .001 Mfd, mica	S-8643-A	Speaker - Cone & Voice Coil
R-6760	Condenser - .0005 Mfd, mica	S-8962	Speaker - Field Coil
R-8433	Control - 500M, volume	S-8674	Speaker - Hum Bucking Coil
		S-8650-A	Speaker - Transformer



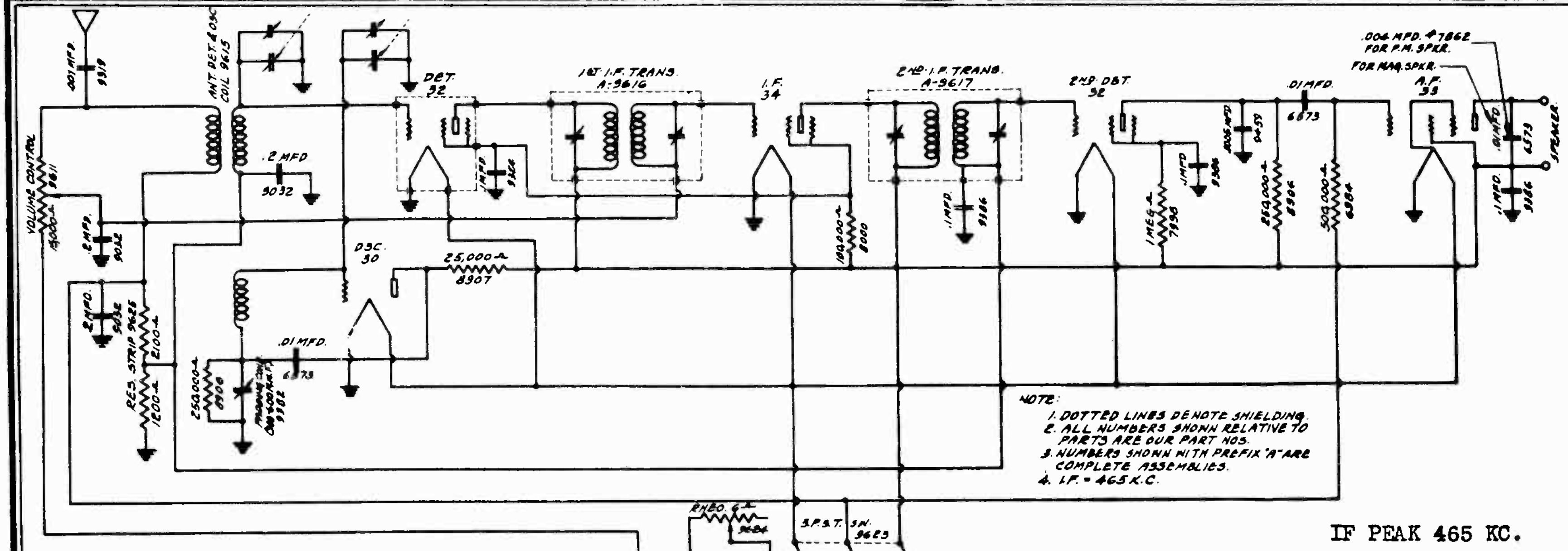
Models 7075-6-7-8 - 7091-2-3-4

Tube Voltage & Current Chart

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	115	80	3	1
6B7 - AVC-Det-AF	20	20	.6	.2
43 - Output	100	115	27	5.5
6A7 - Osc-Transl	Ep=84; EG#2 =84; EG #3 & #5=50; Ip=2; Ig#2 =2m.a. Ig#3 & #5=2m.a.			
25Z5 - Rect.	Max. d.c. volts=185. Plate current=46m.a.			

SENTINEL RADIO CORP.

MODEL 501,502
Schematic
Alignment,Parts



IF PEAK 465 KC.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output ofthe oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.

4. The second I.F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser,

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the chassis.

2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.

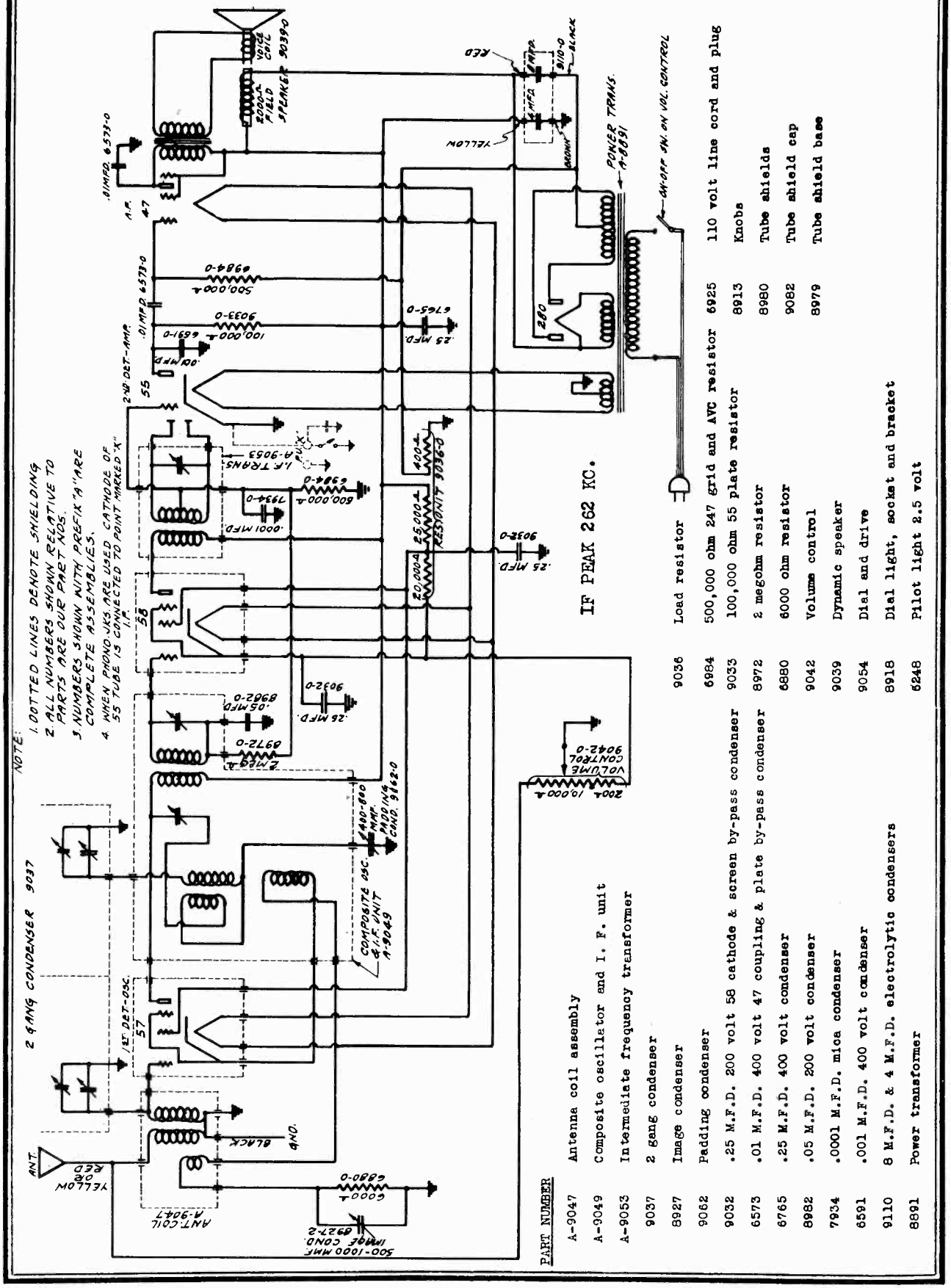
3. Adjust the variable condenser trimmer screws for maximum output reading.

4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

PART NUMBER	
9619	No. 30 Tube Socket
9620	No. 32 Tube Socket
9621	No. 34 Tube Socket
9622	No. 33 Tube Socket
9221	Tube Shield Base
9222	Tube Shield
9612	Two Gang Condenser
9615	Antenna, Detector & Oscillator Coil
9616	1st I. F. Transformer
9617	2nd I. F. Transformer
9382	Padding Condenser
9614	Tuning Dial
9611	Volume Control
9623	3 P. S. T. Switch
9624	6 Ohm Voltage Control Rheostat
9613	Battery Cable
9625	Wire Wound Resistor Strip
8906	250,000 ohm 1/3 Watt Resistor
8907	25,000 ohm 1/3 Watt Resistor
8000	100,000 ohm 1/3 Watt Resistor
7998	1 Meg ohm 1/3 Watt Resistor
6984	500,000 ohm 1/3 Watt Resistor
9319	.001 Mfd. Moulded Condenser
9459	.0005 Mfd. Moulded Condenser
9386	.1 Mfd. 200 Volt Condenser
6573	.01 Mfd. 200 Volt Condenser
9032	.2 Mfd. 200 Volt Condenser
7862	.004 Mfd. 400 Volt Condenser
9636	Knob with pointer for voltage control
9718	Knob
9717	Knob with arrow

MODEL 513
Schematic, Parts List

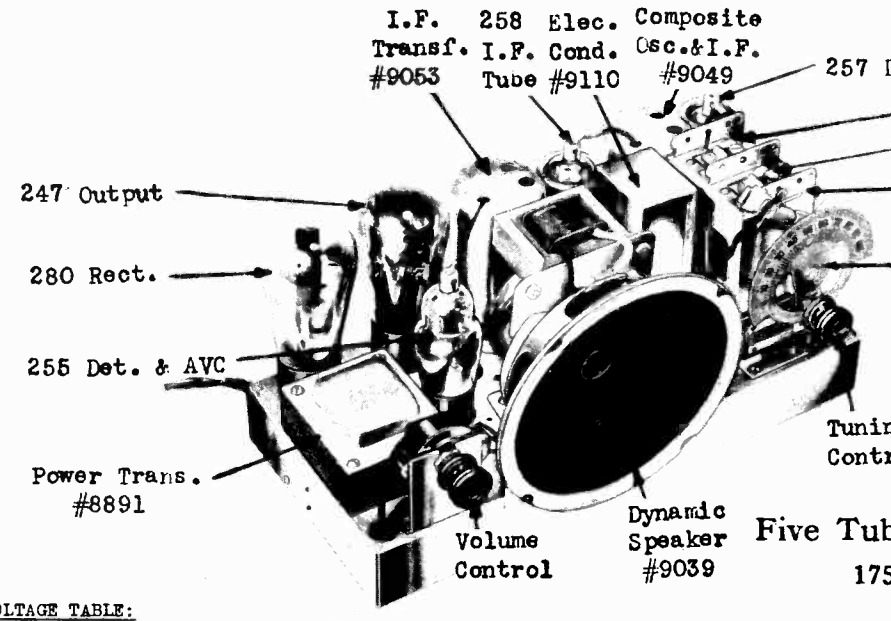
SENTINEL RADIO CORP.



PART NUMBER					
A-9047	Antenna coil assembly	9056	Load resistor	6925	110 volt line cord and plug
A-9049	Composite oscillator and I. F. unit	6954	500,000 ohm 247 grid and AVC resistor	8913	Knobs
A-9053	Intermediate frequency transformer	9033	100,000 ohm 55 plate resistor	8980	Tube shields
9037	2 gang condenser	8972	2 megohm resistor	9082	Tube shield cap
8927	Image condenser	6880	6000 ohm resistor	8979	Tube shield base
9062	Padding condenser	9042	Volume control		
9032	.25 M.F.D. 200 volt 58 cathode & screen by-pass condenser	9039	Dynamic speaker		
6573	.01 M.F.D. 400 volt 47 coupling & plate by-pass condenser	9054	Dial and drive		
6765	.25 M.F.D. 400 volt condenser	8918	Dial light, socket and bracket		
8982	.05 M.F.D. 200 volt condenser	6248	Pilot light 2.5 volt		
7934	.0001 M.F.D. mica condenser				
6591	.001 M.F.D. 400 volt condenser				
9110	8 M.F.D. & 4 M.F.D. electrolytic condensers				
8891	Power transformer				

SENTINEL RADIO CORP.

MODEL 513
Socket, Voltage
Alignment



Five Tube Superheterodyne

175 - 550 Meters

VOLTAGE TABLE:
Never check voltages until all tubes are fully warmed up to proper operating condition. The voltage table, given below, is taken at 115 volts line with volume control in the full on position. It must be remembered that the voltage readings vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10 percent plus, or minus, is permissible.

TUBE VOLTAGES

Type of Tube	Position of tube	Filament volts	Plate volts	C volts	Normal Plate-M.A.	Screen volts
257	Composite oscillator and modulator	2.4	240	6	3.5	85
258	Intermediate frequency	2.4	240	3	7	85
255	Detector and audio	2.4	30*			
247	Output	2.4	220	5**	32.5	240
280	Rectifier	4.9	30 M.A. each plate			

* These readings are only comparative and are not true voltages applied. The voltmeter, when readings are taken at these points, is in series with a very high resistance.
** To read 247 bias, read between 247 control grid and ground.

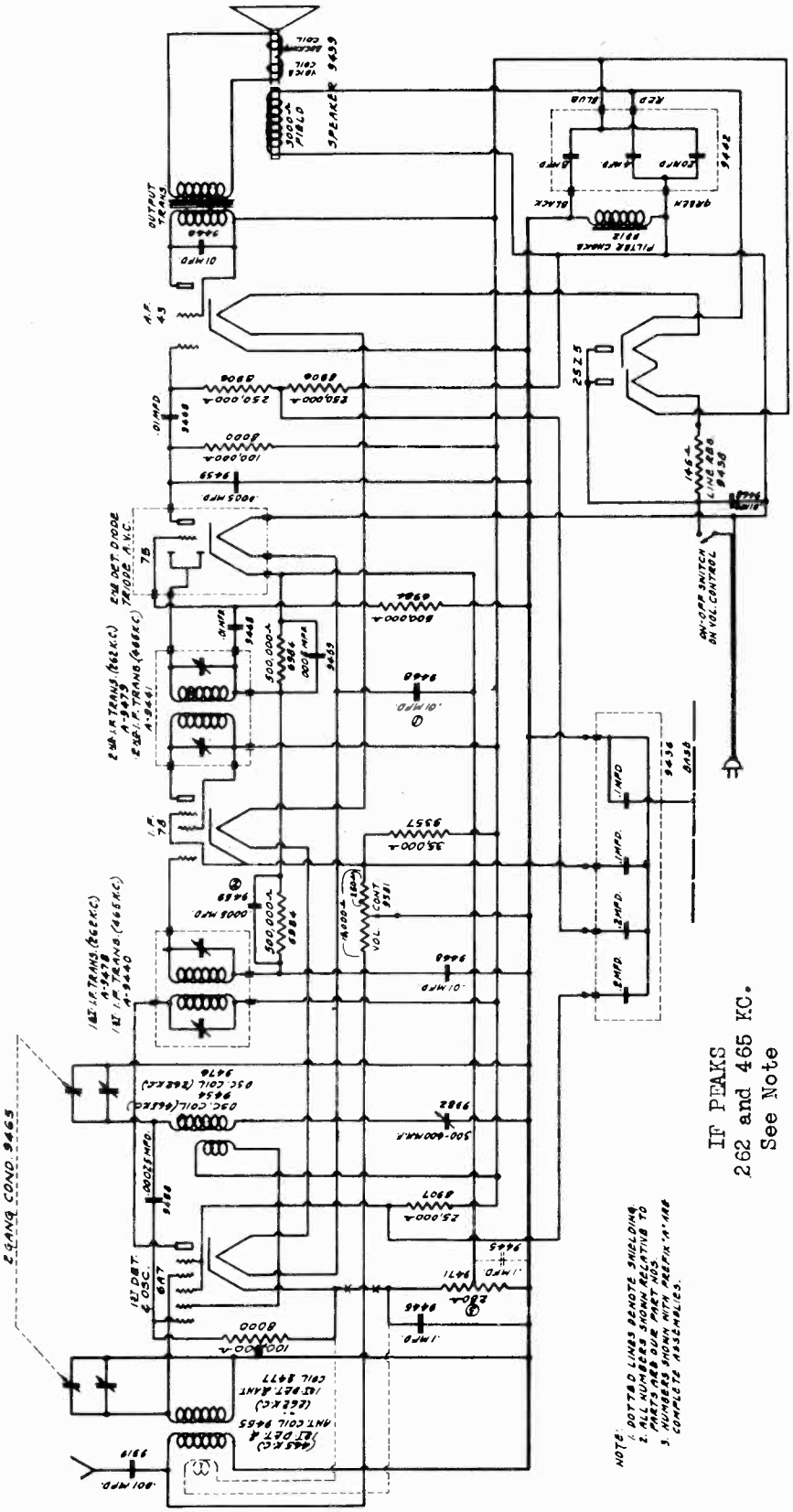
IMAGE ADJUSTMENT:
On the early models which used dials that were not calibrated in kilocycles, the location of the image and padding condensers were different than on the later models which have dials calibrated in kilocycles. On the first models the image condenser is located on the under side of the chassis (one end being connected to the terminal lug) and the padding condenser is on the back of, and accessible through the hole in the chassis. The image suppression condenser on the current models is located on the back of the chassis and the padding condenser on the right hand side of the chassis, both being accessible through the holes in the chassis. On either model the alignment procedure is the same. If an interfering station or whistle is noticed, tune the receiver to this interference and adjust the image suppression condenser until the interference disappears, or until the interference is at the minimum point.

INTERMEDIATE FREQUENCY ALIGNMENT:
Only when an intermediate coil has become defective, due to an open or burned out winding, should it be necessary to readjust the intermediate stages. Should this occur, it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate stage, connect the high side of the oscillator output to the control grid of the #57 oscillator modulator tube, leaving the grid cap disconnected from the tube. The ground side of the test oscillator should be connected to either the ground lead of the set or to the chassis. Set the oscillator at 262 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. If, during the alignment, the meter goes off scale, reduce the output of the oscillator or adjust the receiver volume control. It is always best to realign the set with tubes that are to be used with the receiver. Align the first intermediate transformer by turning the intermediate frequency trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by adjustment of the primary. The same procedure is followed in aligning the second intermediate transformer. After both intermediate transformers are adjusted the alignment of the intermediate stage is complete and they should not be further disturbed, and the grid cap should be connected to the grid of the #57 tube.

ANTENNA & OSCILLATOR ALIGNMENT:
If an antenna or oscillator coil requires replacement, it will be necessary to realign the variable condenser. The front section of the variable condenser (looking at the front of the receiver) is the oscillator section and the second section tunes the antenna stage. Tune the receiver to 1400 kilocycles and set the oscillator at this frequency and adjust the trimmer screws of the antenna and oscillator stages, which are mounted on top of the variable condenser, so as to obtain maximum output reading; then tune the receiver to approximately 600 kilocycles and set oscillator at this frequency; next, adjust the padding condenser, which is located at the right hand side of the chassis, and which is accessible through the hole in the chassis, to obtain maximum output reading. Note: It may be necessary to rock the condenser back and forth to peak correctly. After the above alignment is made, it is well to recheck the intermediate frequency trimmers with a weak signal tuned in.

MODEL 570
Schematic
Circuit notes

SENTINEL RADIO CORP.



These service notes are for two receivers which are practically identical but having different I.F. frequencies. Referring to the circuit diagram it will be noted that two part numbers are given for the first and second I.F. transformers, also for the first detector and antenna coil and oscillator coil. The receiver which uses an intermediate frequency of 265 K.C. can be readily identified by the red paint mark on top of each of the I.F. transformer shields. The additional parts used in the 265 K.C. I.F. receiver are the .1 MFD condenser, Part No. 9445, indicated by the dotted line in the drawing. The .1 MFD 9445 condenser shown by the unbroken lines, is replaced with a .05 MFD condenser, Part No. 9457, and the .0005 MFD condenser, Part No. 9459, by a .00025 MFD condenser, Part No. 9458. The only other circuit changes on the 265 K.C. I.F. receiver are indicated by the dotted line showing the image suppression coil, in which case the connections marked "X" are omitted in this type set. In the 465 K.C. I.F. receiver the image coil is not used, that is, the cathode of the 6A7 tube is connected directly to the 280 ohm resistor instead of to the image suppression winding as in the 465 K.C. receiver. The voltage table as given, and the alignment procedure, are the same for each receiver. When ordering parts be sure to specify the part number and the frequency of the I.F. transformer used in the receiver.

SENTINEL RADIO CORP.

		TUBE VOLTAGES								
TYPE	POSITION	Filament Volts	Plate Volts	Screen Volts	Cathode Volts	Grid #1	Grid #2	Grid #3	Grid #4	Grid #5
6A7	Osc-Mod.	5.2	128		2.0	1.5	125	76	2	76
78	I.F.	5.1	128	128	2.25					
75	2nd Det.AVC	5.0	82.5*		2.0					
43	Output	25	115	128	20.0**					
25Z5	Rect.	25								

* These readings are only comparative and not true voltages applied. The Voltmeter,when readings are taken at these points, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

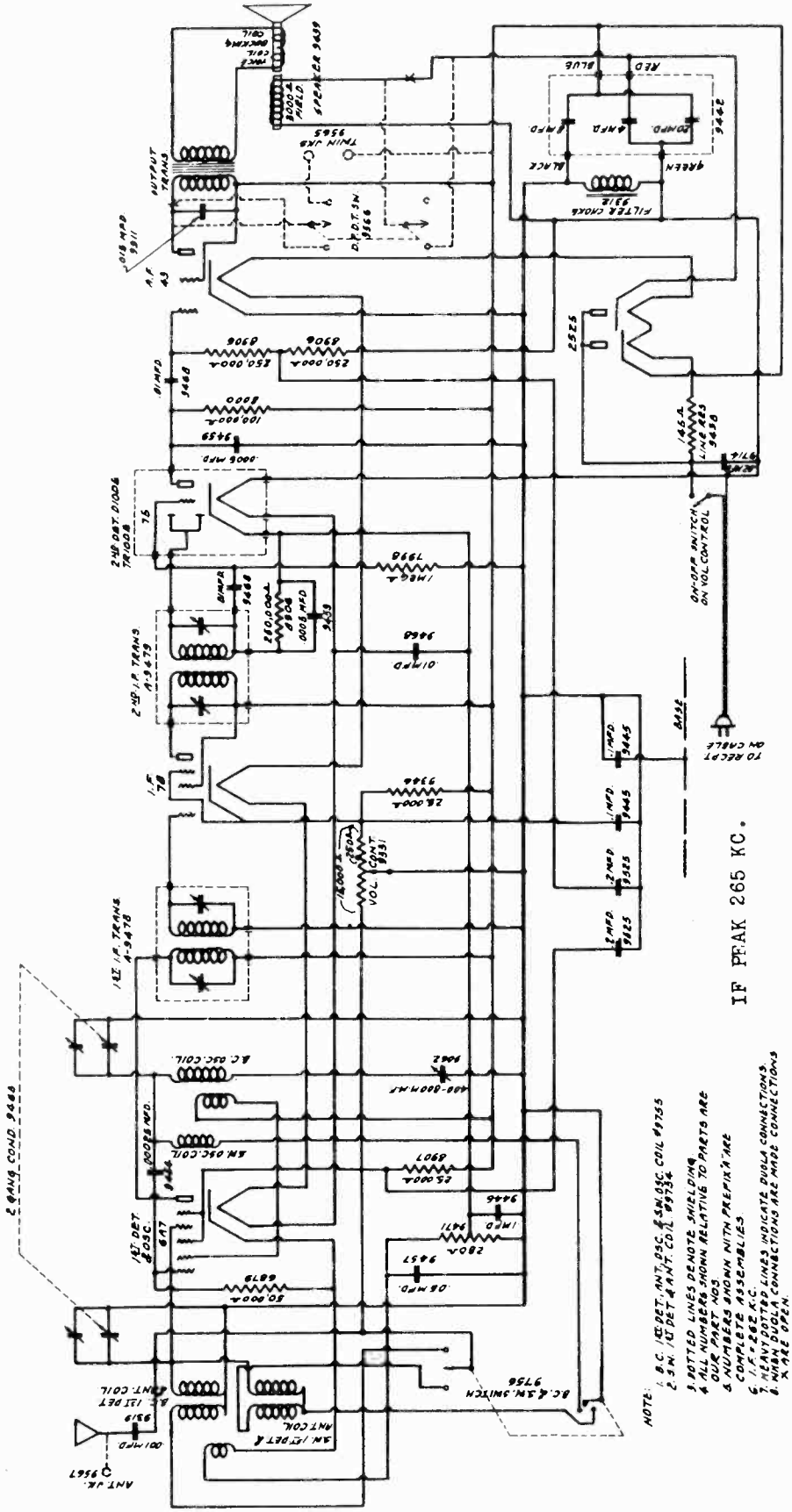
INTERMEDIATE FREQUENCY ALIGNMENT: Only when an intermediate transformer has become defective, due to an open or burned-out winding, should it be necessary to readjust the intermediate stages. Should this occur it is necessary that an oscillator be used with some type of output measuring device so as to tune the transformers correctly. To align the intermediate transformers connect the high side of the oscillator output to the control grid cap (Grid #4) of the 6A7 oscillator-modulator tube, leaving the grid cap disconnected from the control grid (Grid #4) of the 6A7 tube. CONNECT A 50,000-OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER AND PLACE A METAL SHIELD BETWEEN THE SECOND IF TRANSFORMERS AND THE 78 IF TUBE. FAILURE TO USE A SHIELD AND THE 50,000-OHM RESISTOR WILL CAUSE THE IF AMPLIFIER TO OSCILLATE AND THE ALIGNMENT WILL NOT BE CORRECT. The ground side of the test oscillator should be connected to the gang condenser frame and MUST NOT OTHERWISE BE GROUNDED. Set the oscillator for the proper IF signal frequency (265 or 465 KC., this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate transformer. After both intermediate transformers are adjusted, the alignment of the intermediate stage is complete. The trimmer should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and the metal shield removed from between the IF. transformer and the 78 tube.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if an antenna or oscillator coil requires replacement, it will be necessary to realign the variable condenser. The front section of the variable condenser (looking at the front of the receiver) is the oscillator section, the other section tunes the antenna stage. Tune the receiver to 1720 kilocycles on the dial (minimum capacity) and set the oscillator at this frequency. Next adjust the trimmer screws of the oscillator and antenna sections, which are mounted on top of the variable condensers, so as to obtain maximum output reading. It will be found that the oscillator section trimmer condenser will in most cases have to be adjusted to minimum capacity and in some instances it may be necessary to remove the trimmer screw entirely.

After the trimmers have been correctly adjusted at this frequency, tune the receiver to 600 kilocycles and adjust the oscillator to 600 kilocycles. Next, adjust the oscillator padding condenser (which is located directly below the variable condenser and is accessible through the hole in the front of the chassis) to obtain maximum reading on the output meter. If the above is correctly followed, the receiver will now track correctly over the entire band from 1720 KC. to 550 KC. It is always advisable to align the receiver, whenever possible, with the tubes that are to be used in the set.

MODEL 599
Schematic

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 599
Voltage,
Alignment

SERVICE NOTES
for the
110 VOLT AC/DC 25-60 CYCLE
FIVE TUBE SUPERHETERODYNE RECEIVER.
(70-550 METERS)

These service notes pertain to two receivers which are identical with the exception that one model had Duola connections incorporated in it. These connections are shown in the schematic drawing by the dotted lines. Where Duola provisions are provided connections marked "X" on the diagram are open. Receivers with Duola connections may be identified by the Duola switch and two tip jacks located on the back of the chassis. Receivers which do not have the Duola connections do not have the switch (Part #9566) or the tip jacks (Part #9565).

ALIGNMENT: Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE TRANSFORMER ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the grid clip disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. The ground side of the test oscillator should be connected to the gang condenser frame and must not be otherwise grounded.

2. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer trimmer shields.

4. The second IF transformer should next be adjusted in the same manner as the first intermediate transformer.

TO ALIGN THE VARIABLE CONDENSER:

1. Place the band selector switch for operation on the 1500-540 kilocycle band (right hand position) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Next, adjust the trimmer screws of the oscillator and antenna section of the variable condenser to obtain maximum output reading. These trimmers are mounted on the top of the variable condenser.

2. Tune the receiver and set the oscillator frequency to approximately 600 kilocycles. Adjust the 600 kilocycle padding condenser which is located on the rear of and accessible through the small hole in the chassis for maximum output. Be sure to rock the variable condenser slightly to the right and left so as to obtain the position of greatest output.

NOTE: There is no short wave adjustment. After alignment has been properly made in accordance with the instructions given, the dial calibration will be correct and the receiver will properly track on short wave band.

VOLTAGE TABLE

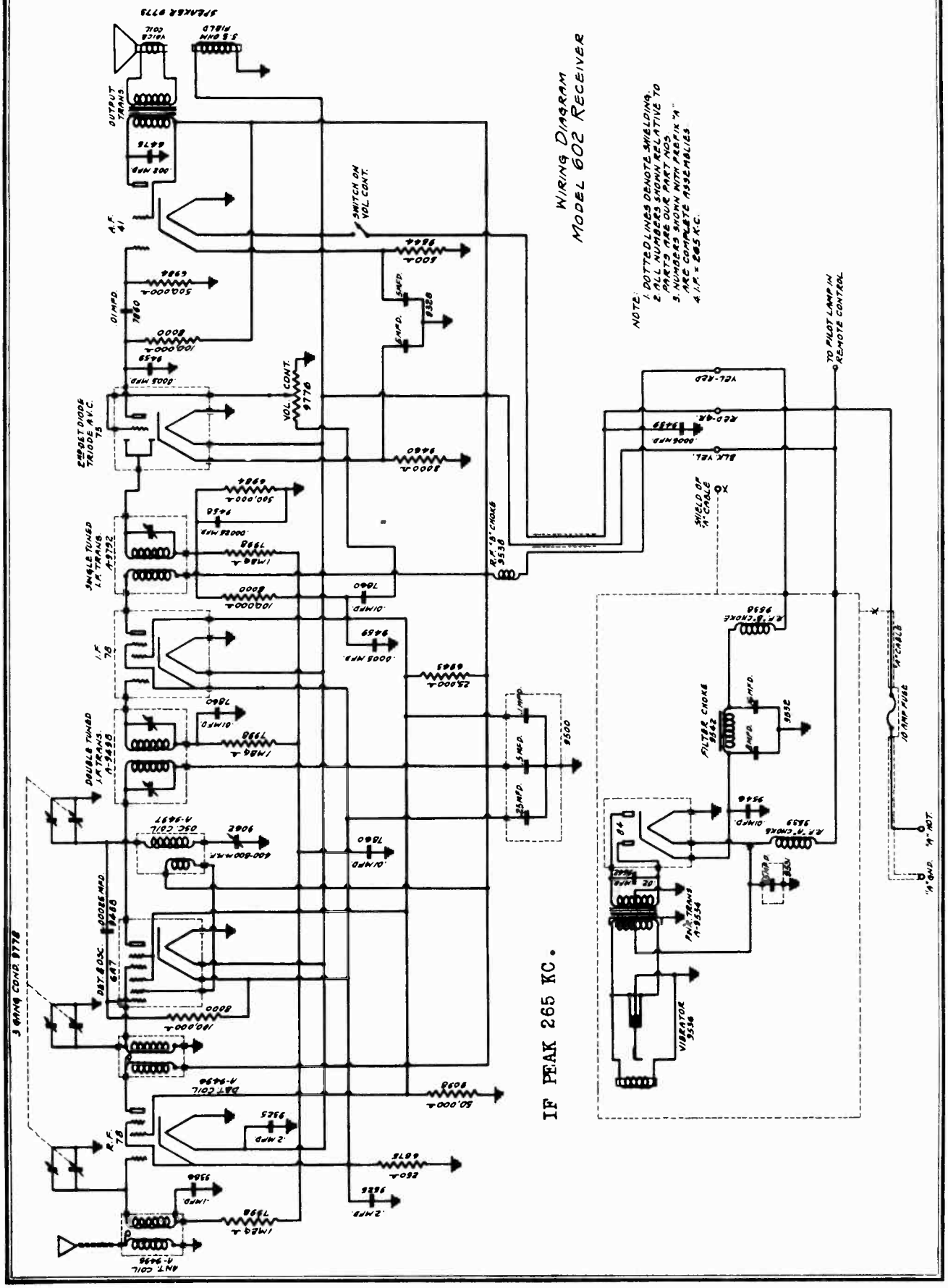
TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	OSC. GRID NO.1	ANODE GRID NO.2	SCREEN GRID NO.3 & 5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76
78	Intermediate Frequency	5.1	128	128	2.25			
75	2nd Detector Diode & AVC	5.0	82.5*		2.00			
43	Output	25	115	128	20**			
25Z5	Rectifier	25						

* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

MODEL 602
Schematic

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 602
Voltage
Alignment

TUBE VOLTAGES

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO.2	GRID NO.3	GRID NO.5
78	Radio Frequency	6	225	4	92				
6A7	Oscillator & Modulator	6	225	4		6.2	225	92	92
78	Intermediate Frequency	6	225	4	92				
75	2nd Detector Diode & AVC	6	135	1.5					
41	Output	6	218	13	225				
84	Rectifier	6	260*	235					

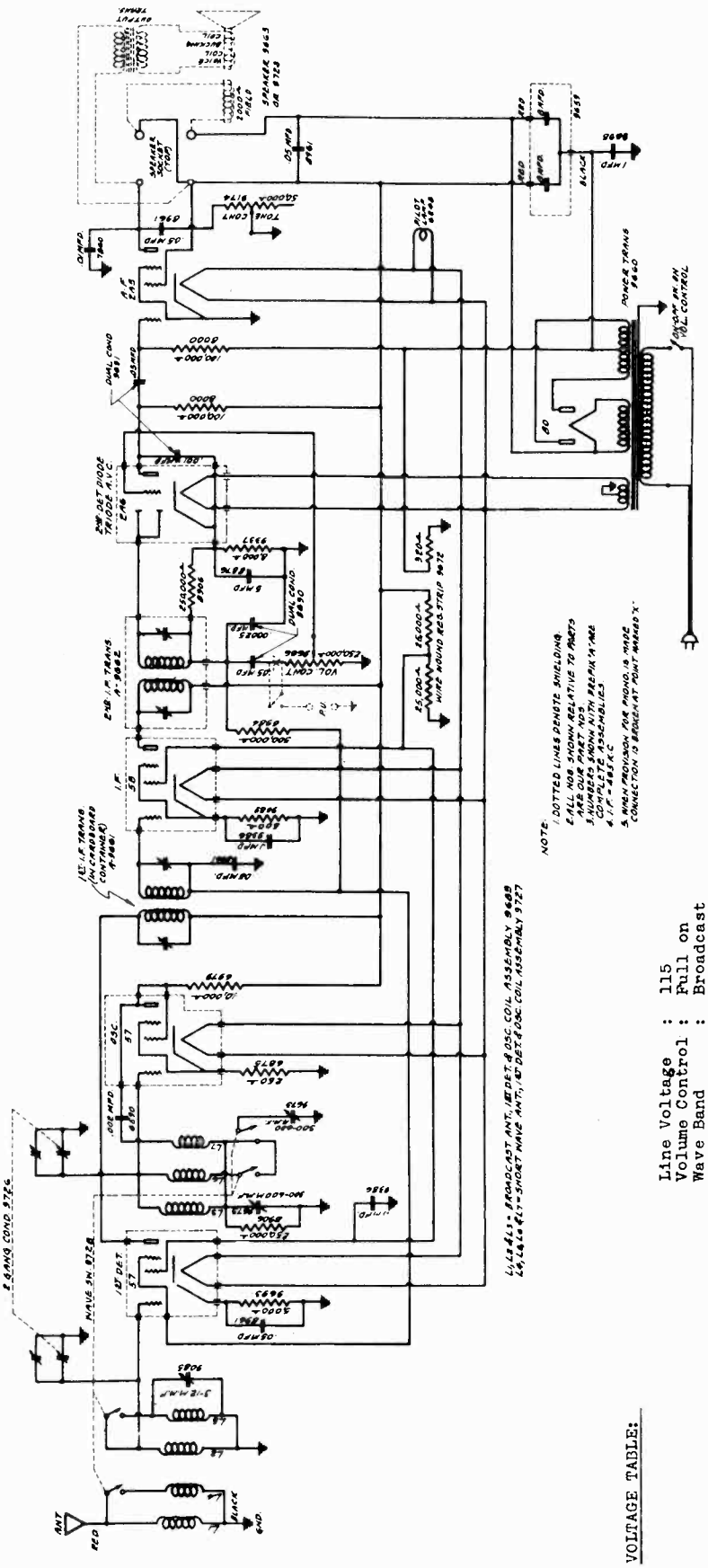
* A.C. each plate
Total "A" current - 6.2 amperes.

INTERMEDIATE FREQUENCY: Unless an intermediate transformer has become defective due to an open or burned out winding it should never be necessary to readjust the intermediate stage. Should this occur it is essential that an oscillator be used with some type of output measuring device to correctly tune the I.F. Transformers. Connect the high side of the oscillator output to the control grid cap (grid No. 4) of the 6A7 oscillator modulator tube leaving the grid cap disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. If the output of the oscillator is too great the value of this resistor may be reduced. The ground side of the tes oscillator should be connected to the chassis. Set the oscillator to 265 K.C. (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency transformer trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary trimmer. The first I.F. transformer is double-tuned, the trimmers of which are accessible through the top of the I. F. can, one section of which is adjusted by turning the brass hex nut and the other section by screwing in and out the set screw that is accessible through the hole provided in the brass hex nut. The second intermediate transformer has but one trimmer which is likewise accessible from the top of the intermediate transformer shield can. After both intermediate transformers are correctly adjusted the alignment of the intermediate stage is complete and the trimmers should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and 50,000 ohm resistor removed.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if the antenna, R.F. or oscillator coil have been replaced it will be necessary to realign the variable condensers. If the receiver is not mounted in the set housing it will be necessary to place a metal shield along side of the variable condenser and flush against the side of the set chassis nearest the variable condenser trimmers. It is necessary to do this otherwise when the receiver is placed in the set housing the metal housing will detune the receiver. Three holes should be made in the shield to correspond with the hole provided in the set housing which permits alignment of the receiver when the set is in the housing. Be sure the shield is properly grounded to the receiver chassis. NOTE: When the receiver and "B" unit is removed from the set housing be sure to set the receiver on top of the "B" unit, otherwise considerable R.F. and audio hash will be encountered. Regardless of whether the receiver is mounted in the set housing or not the alignment procedure is the same. Adjust the variable condenser to minimum capacity. Connect the high output side of the set oscillator to set antenna lead and the low side to antenna shield lead or chassis. Then adjust the test oscillator to 1500 K. C. Next, BRING THIS SIGNAL IN BY ADJUSTING THE VARIABLE CONDENSER OSCILLATOR SECTION TRIMMER. Looking at the front of the receiver, the variable condenser trimmers are mounted on the left side of the set on the variable condenser and reading from the bottom up the trimmers are, oscillator, R.F. and antenna. After the oscillator section has been properly peaked, adjust the antenna and R.F. trimmers in the order mentioned. After the variable condenser trimmers have been correctly adjusted at 1500 K.C. tune the receiver to 600 K.C. and adjust the oscillator to this frequency. Then adjust the oscillator padding condenser which is located on the lefthand side to the rear of the chassis, to obtain maximum reading on the output meter. If the set is mounted in the receiver housing the padding condenser is accessible through the small hole in the side of the set housing. It may be necessary to turn the variablecondenser slightly to the right and left to find the point where greatest output is obtained. If the alignment procedure is correctly followed the receiver will now track correctly over the entire tuning range. It is always advisable to align the receiver with the tubes to be used in the set whenever possible.

MODEL 622,623
Schematic,Voltage
Notes

SENTINEL RADIO CORP.



VOLTAGE TABLE:

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I. F.	2.4	230	90	4
2A6 2nd Detector	2.45	160*		3
2A5 A. F.	2.4	218	230	7**
80 Rectifier	4.8	340 ea.plate		

IF PEAK 465 KC.

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

BAND SELECTOR SWITCH: This receiver has a tuning range from 555 meters to 70 meters (540 Kilocycles to 4500 Kilocycles). Selection of either band is made with the band selector switch which is located on the right front of the cabinet below the tuning control knob. When the band selector switch is placed in the left hand position the set is operating on the 1500-4500 kilocycle band (200-70 meters). To operate the set on the 1500-540 kilocycle band (200-255 meters) place the band selector switch in the right hand position.

SENTINEL RADIO CORP.

MODEL 622,623
Alignment

SERVICE NOTES
for the
70-555 METER
SIX TUBE SUPERHETERODYNE RECEIVER.

Only when the antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the type 57 modulator tube (1st detector) leaving the grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

NOTE: Some of the IF intermediate transformers used do not have the brass hex nut and the trimmer screw inside of the brass hex nut, but have two parallel trimmers which are likewise accessible through two holes provided in the top of the I. F. shield can.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 1400 kilocycles on the dial, adjust the band selector switch for operation on the broadcast band (1500-540 kilocycles) and set the oscillator to 1400 kilocycles. Then adjust the oscillator variable condenser section trimmer condenser TO BRING THIS SIGNAL IN (maximum output). The oscillator and antenna variable condenser trimmers are mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

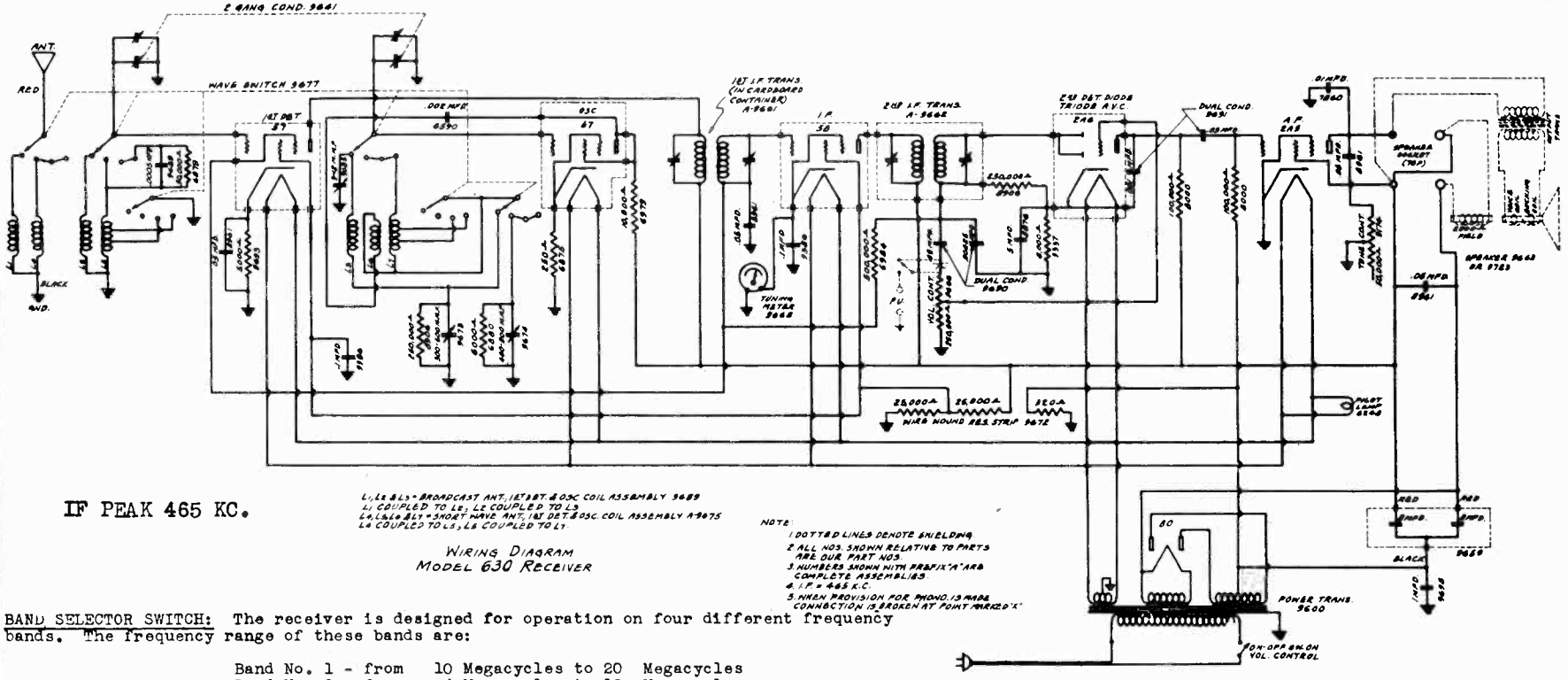
3. Leave the band selector switch for operation on the same band, set the oscillator at 600 kilocycles and tune the receiver to approximately 600 kilocycles on the dial. Then adjust the 600 kilocycle padding condenser which is the one located towards the front on the right hand side of the chassis and accessible through the small hole in the chassis for maximum output. It is necessary to rock the condenser slightly to the right and left to obtain the correct position. After aligning the 600 kilocycle padding condenser be sure to recheck the 1400 kilocycle adjustment as the 600 kilocycle alignment may have changed the alignment at 1400 kilocycles.

4. Adjust the short wave switch for operation on 1500 kilocycle to 4500 kilocycle band. Set the oscillator at 4 megacycles and the receiver to 4 megacycles on the dial. Turn the receiver on end and BRING THE 4 MEGACYCLE SIGNAL IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 4 MEGACYCLE TRIMMER located underneath the chassis and adjacent to the band selector switch.

Next, tune the receiver to 1600 kilocycles on the dial and set the oscillator frequency to 1600 kilocycles after which adjust the 1600 kilocycle padding condenser which is located on the rear right hand side and accessible through the hole in the chassis for maximum output. It is imperative that after making this adjustment at 1600 kilocycles that the alignment at 4 megacycles be rechecked, as the 1600 kilocycle adjustment may throw the receiver out at 4 megacycles.

TUBES: The receiver uses the following tubes:

One (1) Type 57 Detector
One (1) Type 57 Oscillator
One (1) Type 58 I. F.
One (1) Type 2A6 Second Detector Diode, Triode AVC
One (1) Type 2A6 Output
One (1) Type 80 Rectifier



IF PEAK 465 KC.

L1, L2 & L3 = BROADCAST ANT., 1ST DET. & OSC. COIL ASSEMBLY 9689
L1 COUPLED TO L2, L2 COUPLED TO L3
L4, L5 & L6 = SHORT WAVE ANT., 1ST DET. & OSC. COIL ASSEMBLY A-9675
L4 COUPLED TO L5, L5 COUPLED TO L6

Wiring Diagram
Model 630 Receiver

NOTE:
1. DOTTED LINES DENOTE SHIELDING
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 465 K.C.
5. WHEN PROVISION FOR PHONO IS MADE CONNECTION IS BROKEN AT POINT MARKED "X"

BAND SELECTOR SWITCH: The receiver is designed for operation on four different frequency bands. The frequency range of these bands are:

Band No. 1 - from 10 Megacycles to 20 Megacycles
Band No. 2 - from 4 Megacycles to 10 Megacycles
Band No. 3 - from 1.5 Megacycles to 4 Megacycles
Band No. 4 - from 1500 Kilocycles to 540 Kilocycles.

Selection of the desired frequency band is made with the band selector switch knob (large rear knob of double knob) which is located on the lower right front of the cabinet below the tuning control knob. When the band selector switch is placed in the maximum left hand position the receiver is operating on Band No. 1, 10 megacycles to 20 megacycles. Rotating the band selector knob in the clockwise direction the three other positions are in the order named Band No. 2, 4 megacycles to 10 megacycles, Band No. 3, 1.5 to 4 megacycles and Band No. 4, 1500 kilocycles to 540 kilocycles. All four frequency bands are calibrated on a single dial. The calibrated section of the dial for the band that the receiver is adjusted to operon is indicated by the dial indicator which is automatically adjusted by the band selector switch knob.

SHORT-WAVE TRIMMER: A short wave trimmer control is incorporated in the receiver and is used for a fine tuning adjustment when tuning for short-wave reception from 1.5 megacycles to 20 megacycles. The band selector switch knob consists of two sections. The small front section knob is used for adjusting the short-wave trimmer and the large rear section is the band selector switch knob. When tuning for short-wave reception always rotate the tuning control slowly until a station is heard with maximum volume. Don't hurriedly skim over the dial or pass up any weak signals. After adjusting the tuning control so as to bring the station in at its loudest point adjust the short wave trimmer control by turning the trimmer knob first in the clockwise and then in the counter-clockwise direction to the position of greatest volume. Occasionally after tuning in this manner still better results may be obtained by readjusting the tuning control and then further fine adjustment should be made with the short-wave trimmer for maximum volume.

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MODEL 634,635
Voltage,Alignment

VOLTAGE TABLE:

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I.F.	2.4	230	90	4
2A6 Second Detector	2.45	160*		3
2A5 A.F.	2.4	218	230	7**
80 Rectifier	4.8	340 each plate		

* Comparative voltage only. The voltmeter when readings are taken at this point is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the #57 Modulator tube (1st detector), leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the 1st intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second I.F. transformer should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 4 megacycles on the dial and adjust the band selector switch for operation on this band.

   Set the short wave trimmer about one-half the distance between maximum clockwise and counter-clockwise rotation.

   Next set the test oscillator to exactly four megacycles and tune the signal in by adjustingthe oscillator variable condenser trimmer mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band and tune the receiver to 1.6 megacycles on the dial.

   Set the oscillator to exactly 1.6 megacycles.

   Adjust the padding condenser accessible through the hole in the right hand side of the chassis and the closest to the rear of the chassis to obtain maximum output reading. After making this adjustment recheck the alignment at 4 megacycles. It is advisable to recheck the 1.6 and 4 megacycle adjustment several times.

MODEL 634,635
Alignment
Parts List

SENTINEL RADIO CORP.

4. Adjust the band selector switch for operation on the broadcast band.

   Tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency.

   Turn the receiver on end and adjust the trimmer screw on the small trimmer located adjacent to the short-wave switch underneath the chassis for maximum signal after which adjust the antenna variable condenser trimmer mounted on top of the variable condenser for maximum signal strength.

5. Leave the band selector switch for operation on the broadcast band and tune the receiver to approximately 600 kilocycles and adjust the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser which is located on the righthand side next to the 1.6 megacycle padding condenser for maximum output reading. As this adjustment is quite critical it is necessary to rock the condenser slightly to obtain maximum sensitivity.

   NOTE: Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles and the 600 kilocycle adjustment after aligning at 1400 kilocycles. All short-wave bands are properly aligned after correctly aligning at 4 megacycles.

PARTS & PRICE LIST
for the
SIX TUBE SUPERHETERODYNE RECEIVER
20-550 Meters.

PART NUMBER		LIST PRICE
9689	Broadcast, Antenna, First Detector & Oscillator Coil	$1.40
9675	Short-Wave and First Detector Coil	4.07
9686	Short-Wave Oscillator Coil	1.32
9287	Short-Wave Trimmer Disc. Assembly	.39
9682	Short-Wave Trimmer Worm Tuning Rod	.88
9661	1st IF Transformer	2.20
9662	2nd IF transformer	2.15
9641	Two Gang Condenser	3.03
9699	Dial	.61
9673	Padding Condenser	.50
9674	Padding Condenser	.50
9666	Volume Control	1.27
9668	Tuning Meter	2.75
9174	Tone Control	.94
9660	Power Transformer	4.02
9659	2-8 Mfd. Electrolytic Condenser	2.80
8876	5 Mfd. Electrolytic Condenser	.72
9663	Dynamic Speaker	9.79
9672	Wire Wound Resistor Strip	1.00
9651	Wave Band Indicator Assembly	1.10
9677	Wave Switch	3.58
9671	Pilot Light Socket	.09
6248	Pilot light	.17
9386	.1 Mfd. 200 Volt Condenser	.19
8961	.05 Mfd. 400 Volt Condenser	.19
6590	.02 Mfd. 400 Volt Condenser	.19
7860	.01 Mfd. 400 Volt Condenser	.17
9690	.0025 Mfd. & 05 Mfd. 400 Volt Dual Condenser	.44
9691	.05 Mfd. & .001 Mfd. 400 Volt Dual Condenser	.39
9698	1 Mfd. 100 Volt Condenser	.56
9459	.0005 Moulded Condenser	.21
6976	10,000 Ohm 1 Watt Resistor	.22
6880	6,000 Ohm 1/3 Watt Resistor	.19
9693	5,000 Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
6875	250 Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19
9337	8,000 Ohm 1/3 Watt Resistor	.19
9889	Tuning Control Knob	.22
9889	Tone Control Knob	.22
9887	Short Wave Switch Control Knob	.22
9886	Volume Control Knob	.22
9888	Short Wave Trimmer Knob	.22
9063	Tube Shield Base	.05
8980	Tube Shield	.11
9082	Tube Shield Cap	.04
6576	Phono Jacks	.14
6123	S.P.D.T. Phono Switch	.55

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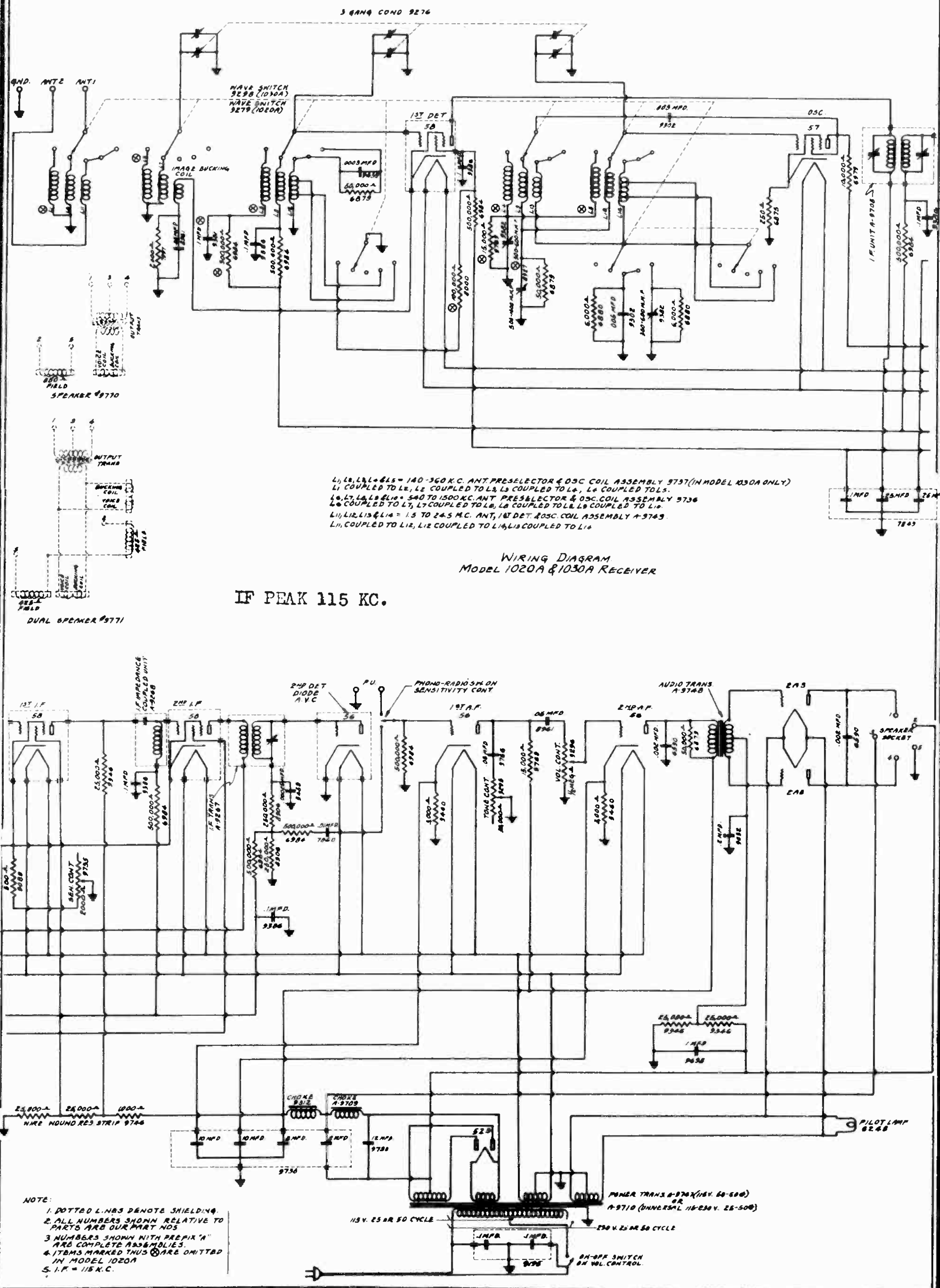
MODEL 1020A, 1030A
Schematic



MODEL 1020A,1030A
Alignment

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BANDS: On those receivers which are designed for operation on the European band from 140 to 370 kilocycles, there are five different frequency bands. Receivers which are designed for operation only up to 550 kilocycles have four bands.

Band #1 - from 24 Megacycles to 9.8 Megacycles
Band #2 - from 9.8 Megacycles to 3.8 Megacycles
Band #3 - from 3.8 Megacycles to 1.5 Megacycles
Band #4 - from 1500 Kilocycles to 550 Kilocycles
Band #5 - from 370 Kilocycles to 140 Kilocycles

Model 1020A does not have Band #5, 370 to 140 K.C. The desired frequency band is selected by adjusting the selector switch knob. The first position of the band selector (turned all the way to the left) is for operation on the 24 to 9.8 megacycle band. Rotating the knob clockwise to the second position is Band #2, 9.8 to 3.8 megacycles. The third position is Band #3, 3.8 to 1.5 megacycles. The fourth position is Band #4, 1500 kilocycles to 550 kilocycles. Band #5 is the fifth position, 370 kilocycles to 140 kilocycles. The dial scale is calibrated and divided into four or five sections, depending upon the range of the receiver, one for each band. The 550 to 1500 kilocycle and 140 to 370 kilocycle is calibrated in kilocycles, the other three sections in megacycles.

INTERMEDIATE FREQUENCY ALIGNMENT: Referring to the circuit diagram, it will be noted that there are three intermediate frequency transformers. The first I. F. transformer is mounted in back of the short-wave coil assembly and has two trimmers. The second I.F. transformer is located between the #58 first I.F. tube and the #56 second I.F. tube. This is the impedance coupled I.F. transformer and has no alignment trimmers. The third I.F. transformer is located between the #58 second I.F. tube and the #56 2nd detector tube, and has one trimmer. All three of the I. F. trimmers are accessible from the top of the I. F. transformer shield can. Only when an intermediate transformer has become defective due to an open or burned out winding, should it be necessary to readjust the intermediate stages. Should this occur it is absolutely necessary that an oscillator be used with some type of output measuring device so as to correctly tune the transformer.

THE INTERMEDIATE FREQUENCY IS 115 K. C.

To align the intermediate transformer, connect the high side of the test oscillator output to the control grid of the #58 first detector tube, leaving the grid cap of this tube disconnected. The ground side of the test oscillator should be connected to the ground post of the chassis. Set the oscillator at 115 K.C., (this must be accurate) and adjust the oscillator so that a convenient reading is obtained on the output meter. If, during the alignment the output meter goes off scale, reduce the output of the oscillator or turn the volume control further in the minimum volume position. Align the first intermediate transformer by turning the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws of the first I. F. transformer should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the third I. F. transformer, excepting that this transformer has but one trimmer. After both the intermediate transformers are adjusted, the alignment of the intermediate stage is complete and the trimmers should not be further disturbed.

VARIABLE CONDENSER ALIGNMENT: If the antenna preselector or oscillator coil requires replacement it will be necessary to re-align the variable condensers and padding condensers. As a general rule this is the only time that this realignment should be necessary. An oscillator and output meter is, of course, necessary. If the test oscillator frequency range does not include a signal of 9.5 megacycles, it will be necessary to use a harmonic of the oscillator for alignment of the high frequency band as a signal of 9.5 megacycles is required. It must be remembered that the signal voltage of the oscillator decreases with increase of harmonics, that is, the harmonic will not give as large a reading on the output meter as the fundamental frequency. As some oscillators may not have sufficient harmonic output to permit aligning on 9.5 megacycles it would be advisable to check the output of the oscillator at this frequency by using a set that is known to be perfectly aligned and in good condition, noting whether or not the harmonic can be picked up by the receiver. The 140 K. C. signal may be obtained on the intermediate frequency band available on most oscillators. Reference will be made to bands #1, 2, 3, 4 and 5, the frequencies of which are given in the paragraph entitled "Bands". To align the variable condensers proceed as follows: Connect the high side of the test oscillator to the antenna post and the low side of the oscillator to the ground post. Tune the receiver to 1400 K. C. on the dial and set the test oscillator to this frequency. Then adjust the oscillator variable condenser trimmer condenser for maximum output reading, after which the antenna preselector and first detector variable condenser trimmers should be adjusted in the order named. The variable condenser sections are, reading from front of the receiver to the rear, the antenna preselector, first detector and oscillator.

After the alignment is correctly made at 1400 K. C. tune the receiver to 600 K.C. and set the test oscillator to this frequency and adjust the 600 K.C. padding condenser for maximum output. This padding condenser is located, looking at the front of the receiver, on the lefthand side of the chassis pan closest to the rear of the chassis. The one toward the front of the chassis immediately adjacent to the 600 K. C. padding condenser, is the 9.8 megacycle padding condenser. It may be necessary to rock the variable condenser by rotating the tuning control knob slightly to the right and left which adds and subtracts capacity) to correctly align the padding condenser at this frequency. Next adjust the band selector switch for operation on Band #1 and tune the receiver to a point midway between 10 megacycles and the end of the dial (approximately 9.5 megacycles). The oscillator should be adjusted for a signal of 9.5 megacycles. The 9.5 megacycles padding condenser located along side of the 600 K.C. padding condenser, should NOW BE ADJUSTED TO BRING THIS SIGNAL IN AT THIS DIAL SETTING. Failure to have the correct signal frequency or an improper setting of the dial will result in the calibration of the dial being inaccurate. After the 9.5 megacycle padding condenser has been correctly adjusted, the band selector switch should be changed for operation on Band #2 and the 9.5 megacycle signal should come in at approximately 9.5 megacycles on this band's dial calibrated section. If the signal is received too far from the correct dial position, it will be necessary to recheck the 9.5 megacycle padding condenser adjustment. Note the cause may be due to improper oscillator signal frequency. If the signal is tuned in correctly, the short wave alignment is complete and no further adjustments are necessary.

On Model 1030A it will be necessary to align the 140 K.C. to 370 K.C. band. To do so tuned the receiver to 140 K.C. on the dial and adjust the oscillator frequency to exactly 140 K. C. then place

SENTINEL RADIO CORP.

the band selector switch for operation on Band #5 and adjust the 140 K. C. padding condenser for maximum output reading. THE SIGNAL MUST BE TUNED IN WI TH THE 140 K. C. PADDING CONDENSER WITH THE DIAL SET AT 140 K. C. This padding condenser is located on the front of the chassis pan below the tuning dial and is accessible through the small hole in the chassis pan. It is absolutely essential when making the adjustment on the 140 K. C. to 370 K. C. band, that the dial be tuned to 140 K. C. and that the test oscillator frequency be exactly adjusted to this frequency and the SIGNAL TUNED IN BY ADJUSTING THE 140 K. C. PADDING CONDENSER TO BRING IN THIS 140 K. C. Failure to do this will result in inaccurate dial calibration.

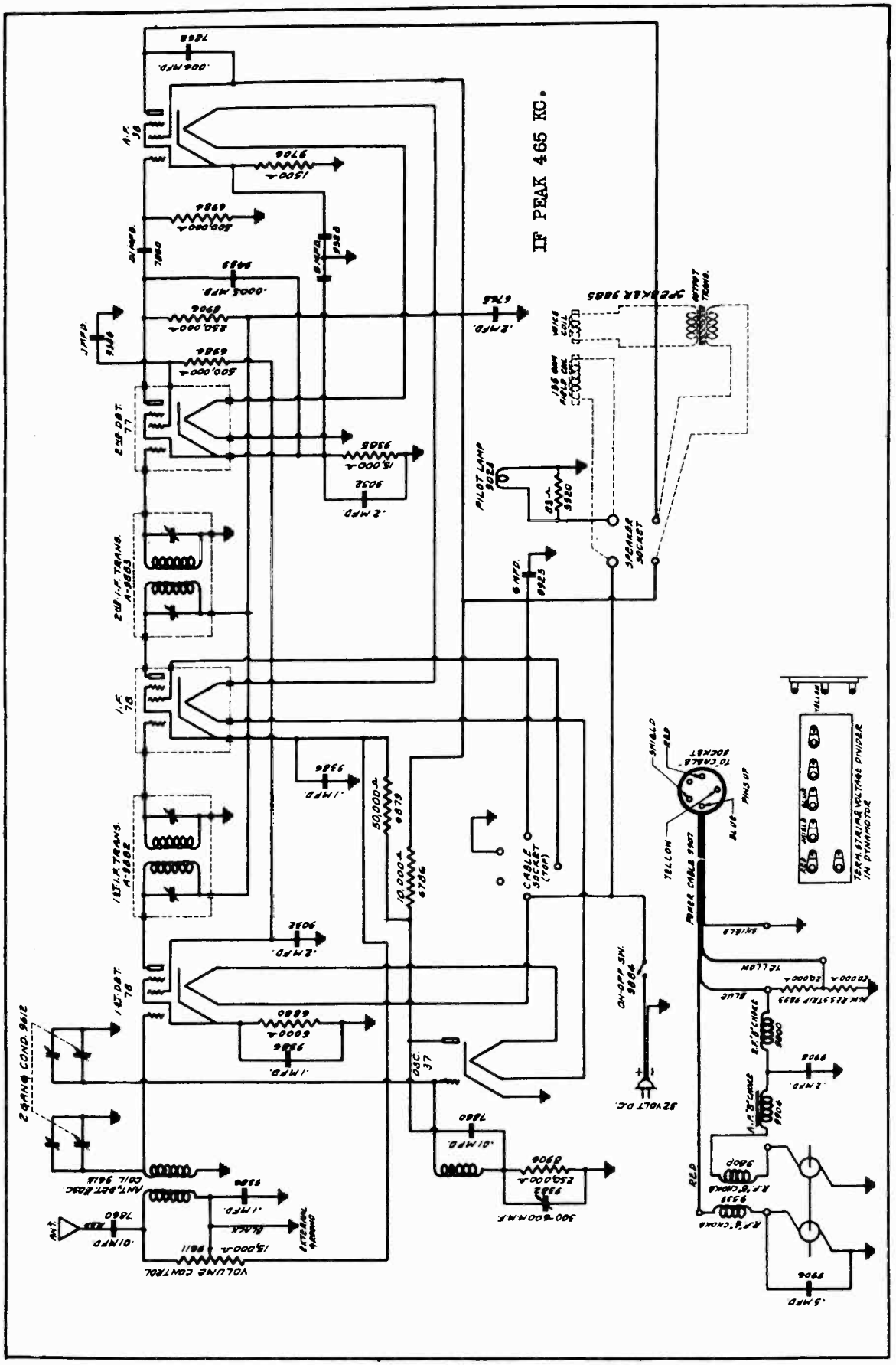
Line Voltage - 115 Volts A.C.
Volume Control - Full On
S. & N.S. Control - Minimum Suppression
Wave Band - Broadcast

TUBE	FIL.	PLATE	SCREEN	SUPPR.	CATHODE	GRID BIAS
#58 (1st Det.)	2.4	230	203	1.2	1.2	
#57 (Osc.)	2.4	130	130	2.8	2.8	
#58 (1st I.F.)	2.4	143	90	3.7	3.7	
#58 (2nd I.F.)	2.4	230	90	3.7	3.7	
#56 (2nd Det. AVC)	2.4					
#56 (1st Audio)	2.4	190			10	
#56 (2nd Audio)	2.4	240			12.5	
#2A3(Output)	2.4	270				44
#2A3(Output)	2.4	270				44
#80(Rectifier)	5.0	300				

9738	Electrolytic Condenser (2-8 Mfg. & 2-10 Mfd.)	3.85
9739	14 Mfd. Wet Electrolytic Condenser	1.98
9195	Condenser (2-.1 Mfd. 400 Volt)	.66
7843	Bypass Condenser (2-.25 & 1-.1 Mfd.)	1.27
9386	.1 Mfd. 200 Volt Condenser	.19
7860	.01 Mfd. 400 Volt Condenser	.17
9032	.2 Mfd. 200 Volt Condenser	.25
6590	.002 Mfd. 400 Volt Condenser	.17
8961	.05 Mfd. 400 Volt Condenser	.19
9766	.03 Mfd. 400 Volt Condenser	.19
9698	1. Mfd 100 Volt Condenser	.61
9302	.005 Moulded Condenser	.55
9459	.0005 Moulded Condenser	.21
9458	.00025 Moulded Condenser	.21
9346	25,000 Ohm 1/2 Watt Resistor	.22
9769	15,000 Ohm 1/2 Watt Resistor	.22
8906	250,000 Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
9098	500 Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19
6875	250 Ohm 1/3 Watt Resistor	.19
7997	2,000 Ohm 1/3 Watt Resistor	.19
6786	10,000 Ohm 1/3 Watt Resistor	.19
9460	3,000 Ohm 1/3 Watt Resistor	.19
6880	6,000 Ohm 1/3 Watt Resistor	.19

SENTINEL RADIO CORP.

MODEL 5000,5100
Schematic



MODEL 5000,5100
Voltage,Alignment
Parts List

SENTINEL RADIO CORP.

9925	6 Mfd. Elect. Condenser	8000	100,000 Ohm 1/3 Watt Resistor
9328	Duo 5 Electrolytic Condenser	6880	6,000 Ohm 1/3 Watt Resistor
9882	First I.F. Transformer	9385	15,000 Ohm 1/3 Watt Resistor
9883	Second I.F. Transformer	9901	32 Volt Dynamotor Complete
9617	Antenna, Detector & Oscillator Coil	9902	Dynamotor Filter Assembly Complete
6765	.2 Mfd. 400 Volt Condenser	9804	A.F. "B" Choke
9032	.2 Mfd. 200 Volt Condenser	9539	R.F. "A" Choke
9386	.1 Mfd. 200 Volt Condenser	9800	R.F. "B" Choke
7860	.01 Mfd. 400 Volt Condenser	9908	.2 Mfd. 200 Volt Condenser
7862	.004 Mfd. 400 Volt Condenser	9906	.5 Mfd. 200 Volt Condenser
9459	.0005 Mfd. Moulded Condenser	9893	Wire Wound Resistance Strip 40,000 Ohm
8106	250,000 Ohm 1/3 Watt Resistor	9907	Three Conductor Power Cable with Plug
6984	500,000 Ohm 1/3 Watt Resistor	9611	Volume Control
6786	10,000 Ohm 1/3 Watt Resistor	9382	Padding Condenser
9706	15,000 Ohm 1/3 Watt Resistor	8980	Tube Shield
		9082	Tube Shield Cap

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.
3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.
4. The second I.F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser:

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the ground lead.
2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.
3. Adjust the variable condenser trimmer screws for maximum output reading.
4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

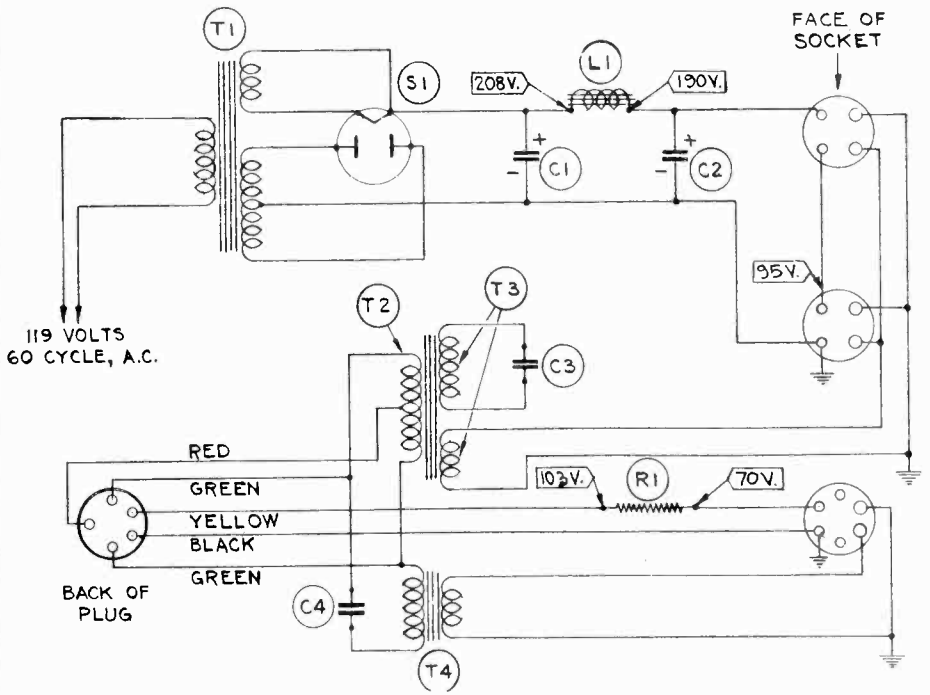
When making this adjustment be sure to rock the variable condenser slightly to the right and left using the position where the greatest output reading is obtained.

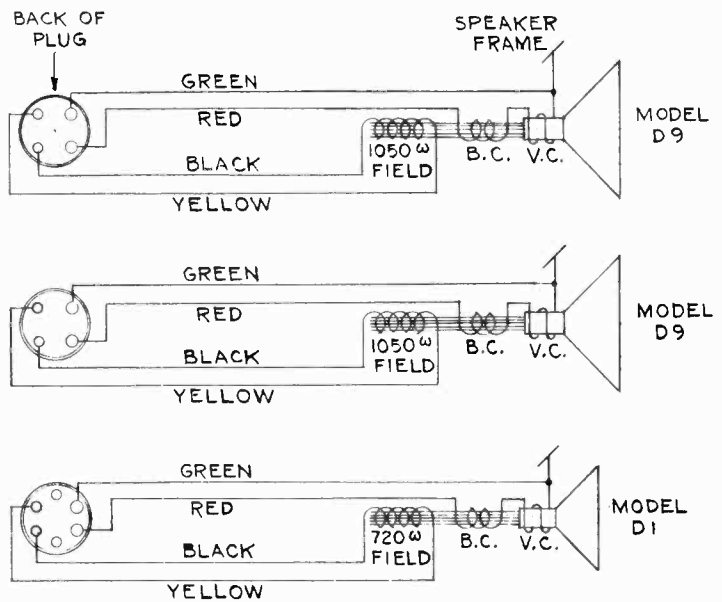
VOLTAGE TABLE:

Line Voltage : 32 Volts
Volume Control : Full on

TUBE	FIL.	PLATE	SCREEN	CATHODE
78 1st Detector	6.5	215	100	10
37 Oscillator	6.5	140		25
78 I.F.	6.5	215	100	26
77 2nd Detector	6.5	90*	32.5*	4
38 Output	6.5	208	215	20

* Comparative Voltage only.
Read voltage from socket to chassis.





TRIPLE SPEAKER & POWER SUPPLY DIAGRAM

USED WITH MODELS "V", "X", & "Q DELUXE"

LEGEND

C1-C2 - 4 MFD. ELECTROLYTIC CONDENSER	13177
C3 - .01 MFD. MICA CONDENSER	7047
C4 - .007 MFD. TYPE M MICA CONDENSER	3305
L1 - 3395 CHOKE	
R1 - 330 OHM RED DEVIL RESISTOR	4757
S1 - 280 TUBE	
T1 - 10257 TRANSFORMER	
T2 - 10247 PRIMARY COIL	
T3 - 10248 SECONDARY COIL	
T4 - 10228 TRANSFORMER	

DRAWN BY M.K.
APPVD.
SILVER-MARSHALL, INC.
7-19-32

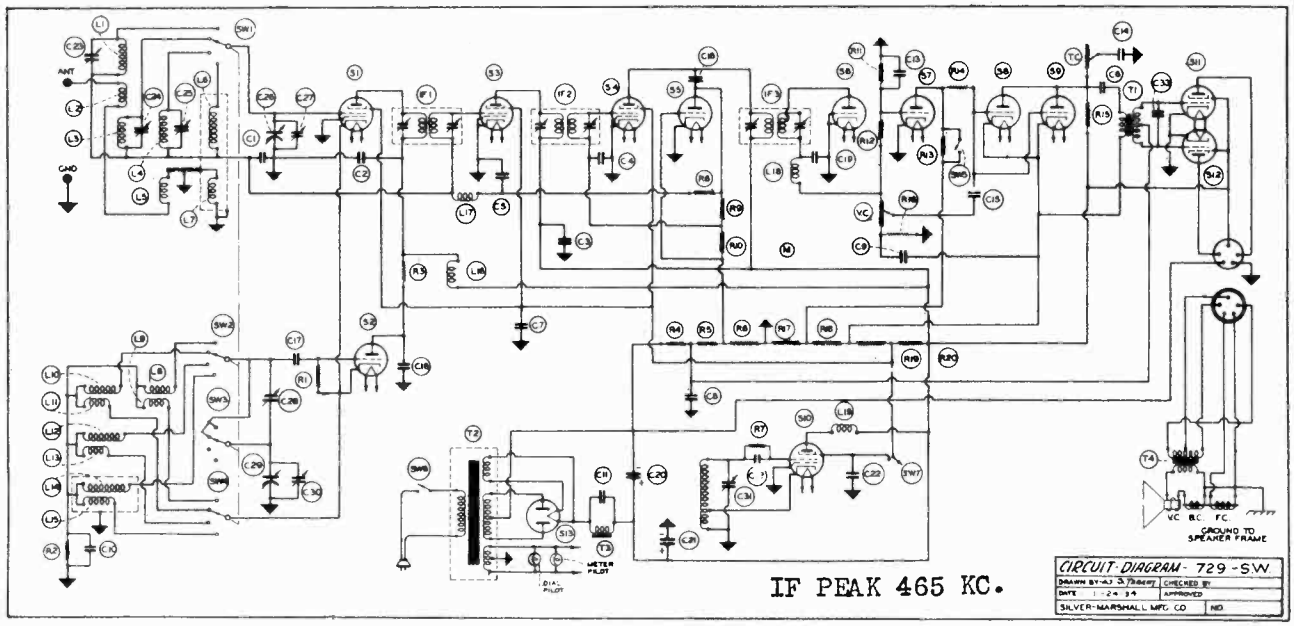
DWG. NO. 310-3

SILVER-MARSHALL MFG. CO.

MODEL Triple Speaker "V", "X", "Q" Schematic

MODEL 729 SW
Schematic
Parts List

SILVER - MARSHALL MFG. CO.



Model 729-SW Superheterodyne

RESISTANCES
R1- 100,000 - 1/2 watt
R2- 150 - 1/2 "
R3- 3,000 - 2 "
R4- 230,000 - 1 "
R5- 60,000 - 1 "
R6- 11,000 - 1 "
R7- 100,000 - 1/2 "
R8- 500,000 - 1/2 "
R9- 1,000,000 - 1/2 "
R10- 1,000,000 - 1/2 "
R11- 1,000,000 - 1/2 "
R12- 2,000,000 - 1/2 "
R13- 300,000 - 1/2 "
R14- 1,000,000 - 1/2 "
R15- 8,000 - 1 "
R16- 100,000 - 1 "
R17- 2,600)-
R18- 340)- Wire Wound
R19- 1,840)
R20- 5,750)
V. C. with A. C. Switch,
500,000 ohms with log taper.
T. C. Tone Control 5,000 tapered.

TUBES
S1- 58 1st Detector
S2- 56 Oscillator
S3- 58 1st Int. Amp.
S4- 58 2nd Int. Amp.
S5- 56 A. V. C.
S6- 56 2nd Detector
S7- 56 Quiet A. V. C.
S8- 56 1st Audio Driver
S11, S12- 2A5 Push-Pull Output
S13- 523 Rectifier

TRANSFORMERS
T1- CB-1038 Audio Transformer
T2- CB-1008 Power Transformer
T3- CB-1007 Power Choke Coil
T4-(CB-1013 Output Trans. with 10" speaker
(CB-1037 Output Trans. with Auditorium speaker

COILS
L1, L2, L3- R.F. and antenna coil - purple and green SW ranges
L4, L5- R.F. and antenna coil - red SW range
L6, L7- R.F. and antenna coil - black BC range
L8, L9, L10, L11- Oscillator and cathode coils - purple and green SW ranges
L12, L13- Oscillator and cathode coils - red SW range
L14, L15- Oscillator and cathode coils - black BC range
L16, L17, L18, L19- 15 m.h. R. F. chokes

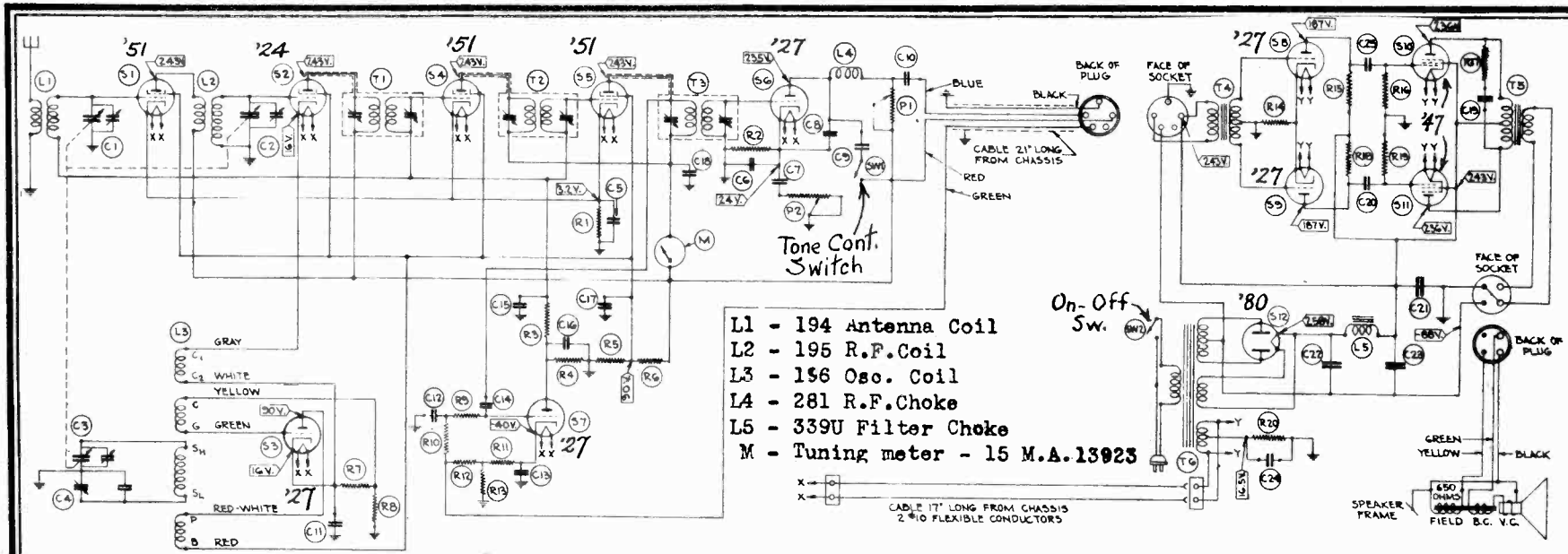
SWITCHES
SW1, SW2, SW3, SW4- Frequency Range Switch
SW5- Switch for Quiet AVC Circuit
SW6- Power Switch on Volume Control
SW7 - Switch for "Beat Note" Oscillator

CONDENSERS
C1- .01 mfd 200V Paper
C2- .25 " 400V "
C3- .5 " 400V "
C4- .01 " 200V "
C5- .01 " 200V "
C6- .1 " 400V "
C7- .5 " 400V "
C8- .5 mfd 400V Paper
C9- .5 " 400V "
C10- .1 " 200V "
C11- .15 " 400V "
C12- .0001 " Mica
C13- .025 " 200V "
C14- .25 " 400V "
C15- .01 " 200V "
C16- .00025 Mica
C17- .00005 "
C18- .002 "
C19- .0001 "
C20- 8 mfd 450V Dry Electrolytic
C21- 12 " 450V " "
C22- .002 Mica
C23- 20-65 mmf Adjustable Mica
C24- 6-30 " " "
C25- 25-65 " " "
C26, C27, C29, C3- Adjustable Air Condenser 410 mmf
C28- Adjustable Mica Condenser 350-500 mmf
C31- " " " 70-125 "
C33- .002 Mica Condenser

SPEAKER - 8,000 ohm P.C., D-19 Type, or A DeLuxe

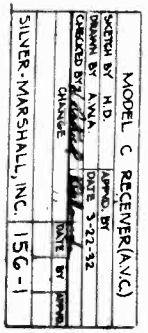
SILVER - MARSHALL MFG. CO.

MODEL C w/ AVC
Schematic
Parts List



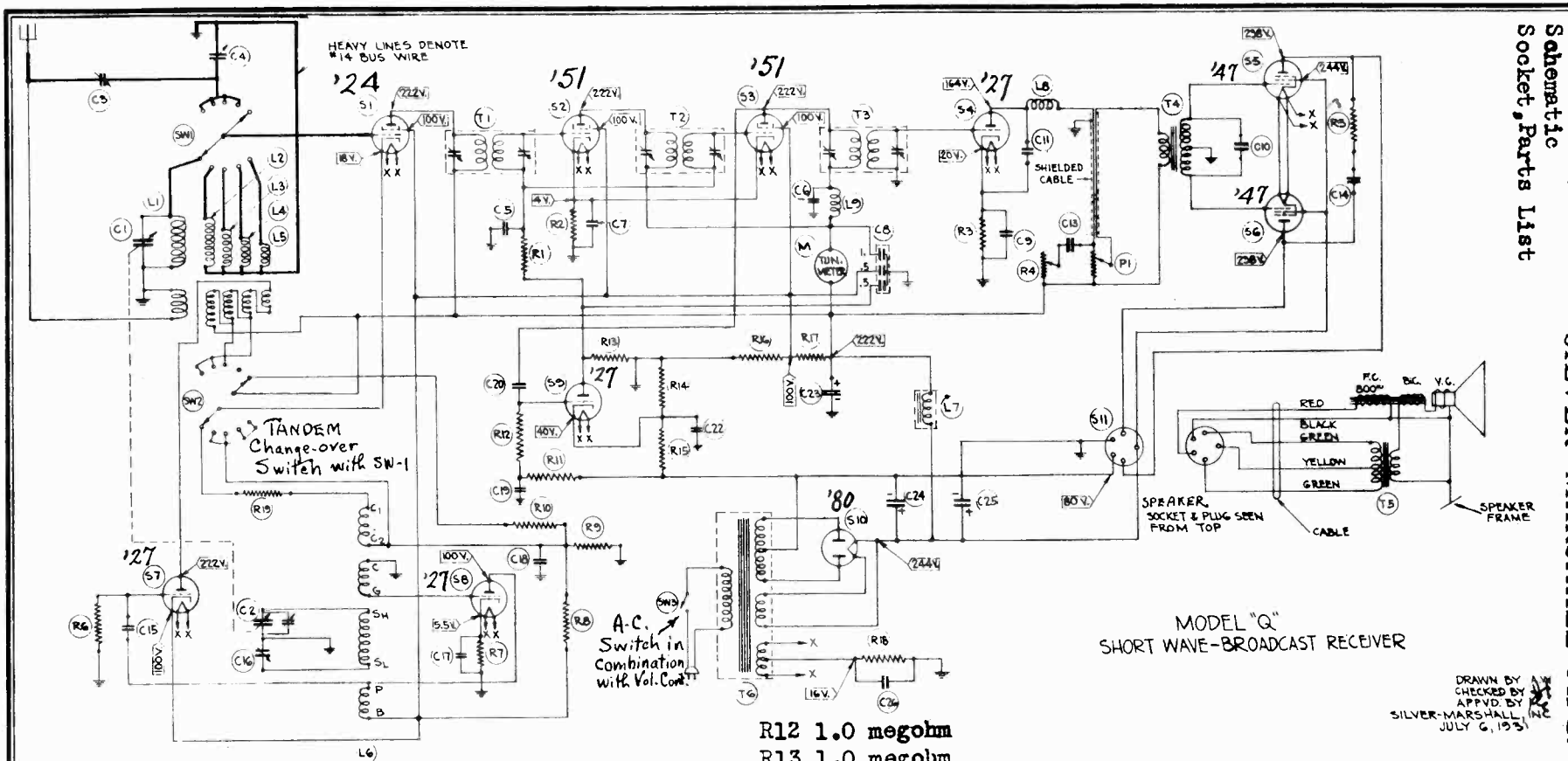
L1 - 194 Antenna Coil
L2 - 195 R.F.Coil
L3 - 156 Osc. Coil
L4 - 281 R.F.Choke
L5 - 339U Filter Choke
M - Tuning meter - 15 M.A.13923

C1-C2-C3	365 Mmfd. Variable Cond. ± 5 mmfd.	13189	P1	20,000 ohm Pot. (Volume control)	14427
C4	Trimmer Cond. Assem.	16035	P2	½ Megohn Pot. (Tone control)	4507
C5	.5 mfd. Cond. - Waxtite - 200 V.	13329			
C6	.02 mfd. Cond. - Sprague - 500 V.	13195	R1	150 ohm Resistor - wire wound	4720
C7	1 mfd. Cond - 300 V.	3254	R2	60,000 ohm Resistor - 1 watt carbon	4695
C8	.0005 mfd. Cond (Mica)	7052	R3	100,000 ohm Resistor - 1 watt carbon	14691
C9	.02 mfd. Cond. - Sprague - 500 V.	13195	R4	500,000 ohm Resistor - 1 watt carbon	4772
C10	.06 mfd. Cond. - Sprague - 400 V.	7050	R5	8250) 14750 Ohm R.D.Ohmite - 3 watt	14781
C11	.1 mfd . Cond. - Sprague - 200 V.	3220	R6	6500)	
C12	.1 mfd. Cond. - Sprague - 200 V.	3220	R7	100) 1800 ohm Resistor - wire wound	14723
C13	.5 mfd. Cond. - Waxtite - 200 V.	13329	R8	1700)	
C14	.0005 mfd. Cond. (Mica)	7052	R9	1 Megohm Resistor - 1 watt carbon	4759
C15	.1 mfd. Cond. - Sprague - 200 V.	3220	R10	1 Megohm Resistor - 1 watt carbon	4759
C16	.5 mfd. Cond. - 200 V.)		R11	60,000 ohm Resistor - 1 watt carbon	4695
C17	.5 mfd. Cond. - 200 V.)	13140	R12	12,000 ohm Resistor - 1 watt carbon	4746
C18	1.0 mfd. Cond. - 300 V.)		R13	9,000 ohm Resistor - 1 watt carbon	14748
C19	.006 mfd. Cond. -	3144	R14	1550 ohm Resistor - 1 watt carbon	14767
C20	.15 mfd. Cond. - Sprague	13145	R15	10,000 ohm Resistor - 1 watt carbon	14696
C21	8 mfd. Cond. - 450 V. (Dry Electrolytic)	13181	R16	300,000 ohm Resistor - 1 watt carbon	4685
C22	4 mfd. Cond. - 450 V. (Dry Electrolytic)	13177	R17	25,000 ohm Resistor - 1 watt carbon	4697
C23	8 mfd. Cond. - 450 V. (Dry Electrolytic)	13181	R18	10,000 ohm Resistor - 1 watt carbon	14696
C24	.1 mfd. Cond. - Sprague - 200 V.	3220	R19	300,000 Ohm Resistor - 1 watt carbon	4685
C25	.15 mfd. Cond. - Sprague	13145	R20	220 ohm R.D.Ohmite	14766



MODEL "Q" Type 1 Schematic Socket, Parts List

SILVER - MARSHALL MFG. CO.

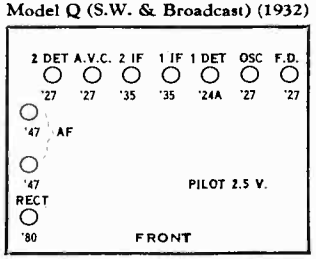


DRAWN BY
CHECKED BY
APPVD. BY
SILVER-MARSHALL INC.
JULY 6, 1932

DWG. No. 154-A

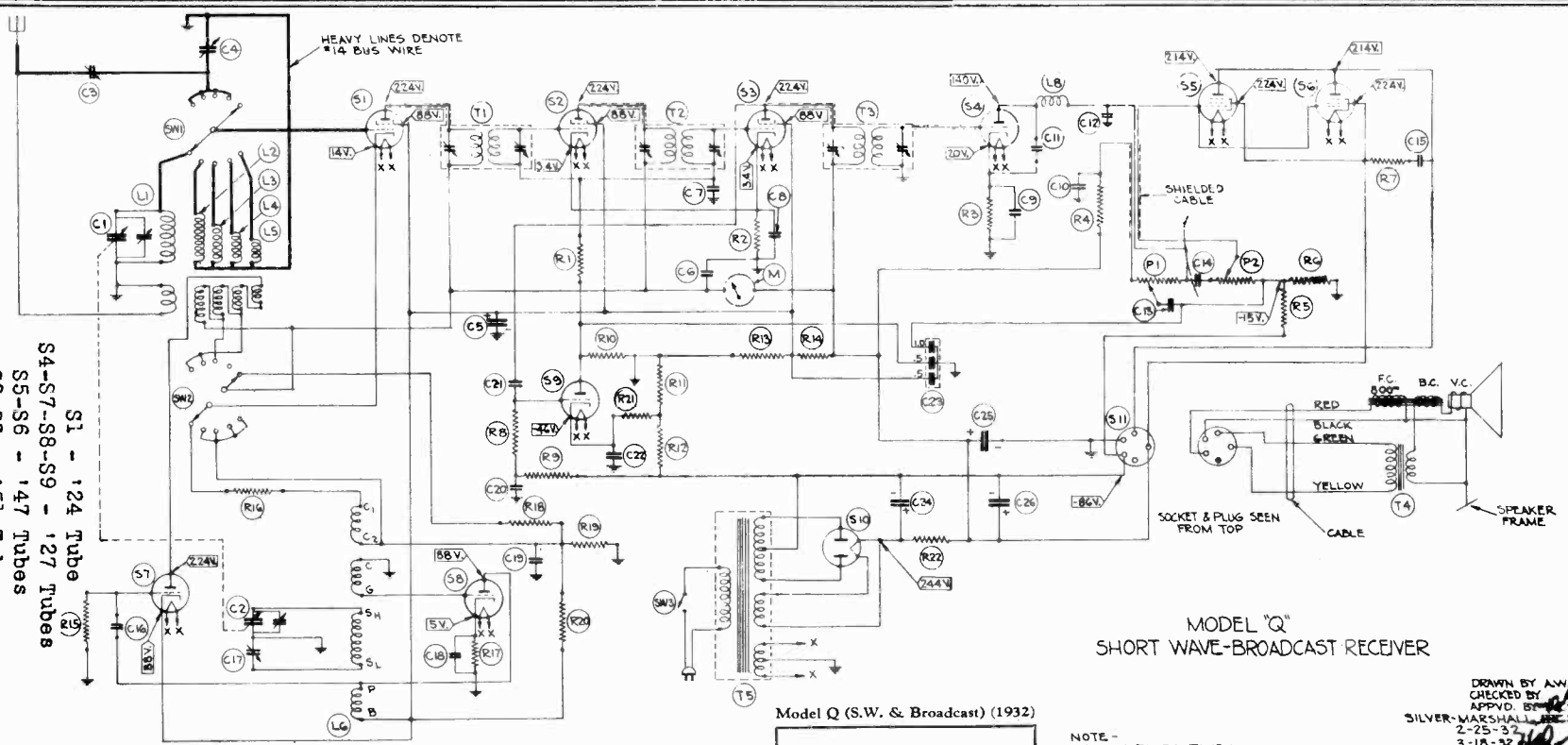
C1,C2	365 mfd	C15	.00015 mfd	P1	100000 ohms	R12	1.0 megohm
C3	25 mmfd	C16	Osc. Tr.	R1	100000 ohms	R13	1.0 megohm
C4	200 mfd	C17	0.1 mfd	R2	400 ohms	R14	10000 ohms
C5	0.1 mfd	C18	0.1 mfd	R3	100000 ohms	R15	9000 ohms
C6	0.1 mfd	C19	0.1 mfd	R4	500000 ohms	R16	10000 ohms
C7	0.1 mfd	C20	.0005 mfd	R5	25000 ohms	R17	6500 ohms
C8	see diagram	C21		R6	300000 ohms	R18	220 ohms
C9	1.0 mfd	C22	1.0 mfd	R7	400 ohms	R19	400 ohms
C10	.001 mfd	C23	4.0 mfd	R8	60000 ohms		
C11	.001 mfd	C24	8.0 mfd	R9	3500 ohms	L1	550-1500 kc
C12		C25	4.0 mfd	R10	300000 ohms	L2	1.56-3.46 megcyc
C13	.025 mfd	C26	0.1 mfd	R11	1.0 megohm	L3	3.51-5.36 megcyc
C14	.006 mfd					L4	5.54-10.29 megcyc
						L5	9.6-18.15 megcyc

Model Q (S.W. & Broadcast) (1932)



SILVER - MARSHALL MFG. CO.

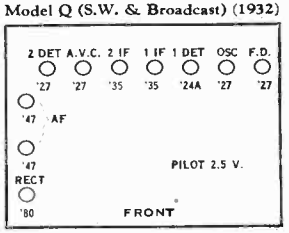
MODEL "Q" Type 3
Schematic, Socket
Parts List



S1 - '24 Tube
S4-S7-S8-S9 - '27 Tubes
S5-S6 - '47 Tubes
S2-S3 - '51 Tubes
S10 - '80 Tube
S11 - Speaker Socket

DRAWN BY A.W.
CHECKED BY
APPVD. BY
SILVER-MARSHALL, INC.
2-25-32
3-18-32
4-12-32
DWG. No. 155-4

Model Q (S.W. & Broadcast) (1932)



NOTE - ALL VOLTAGES TAKEN FROM GROUND.

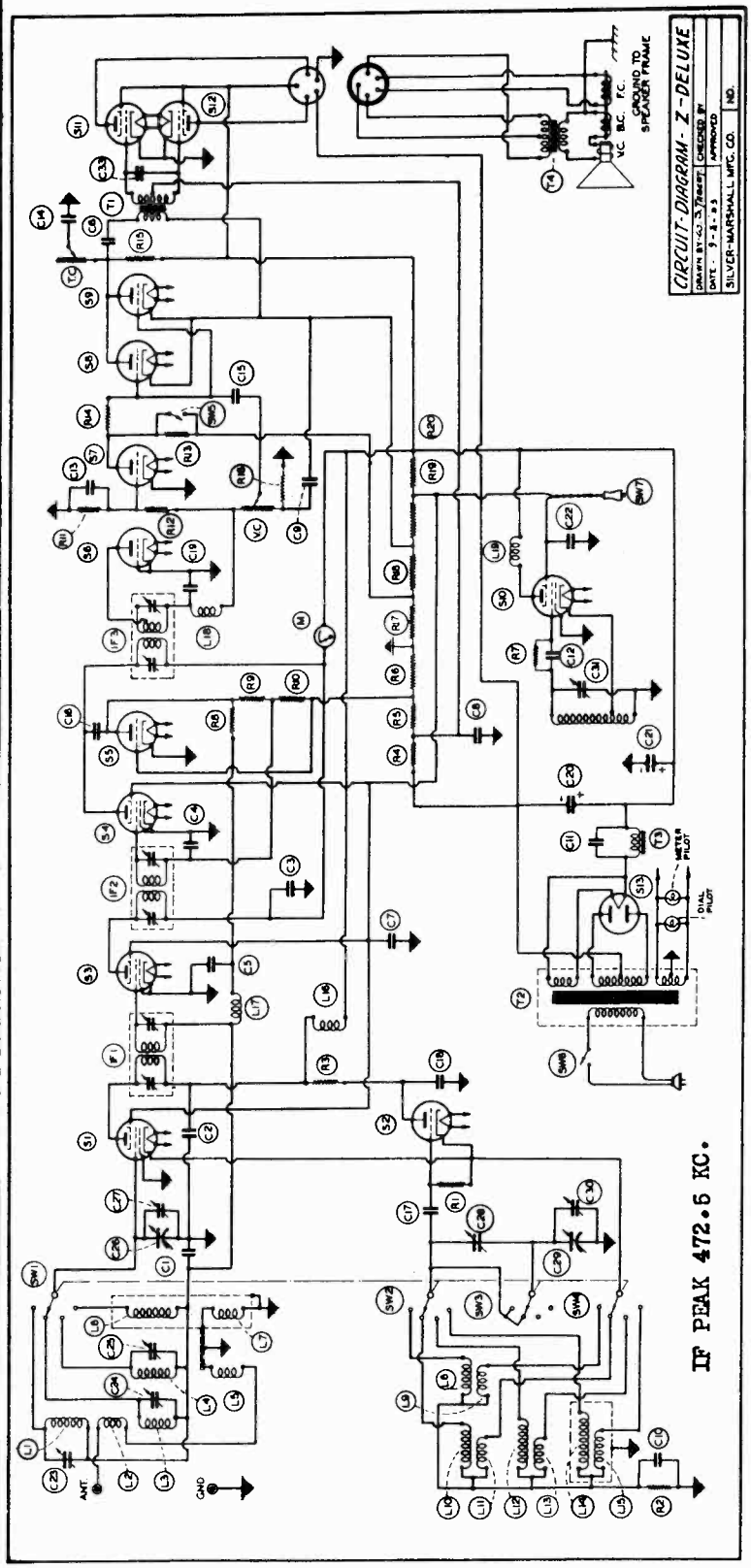
C1-C2	365 mmfd	C19	0.1 mfd	R9	1. meg
C3	25 mmfd	C20	0.15 mfd	R10	1. meg
C4	200 mmfd	C21	.0005 mfd	R11	12000 ohms
C5	4. mfd	C22	0.5 mfd	R12	9000 ohms
C6	0.1 mfd	C23	See diagram	R13	8250 ohms
C7	0.1 mfd	C24	12 mfd	R14	6500 ohms
C8	0.1 mfd	C25	8 mfd	R15	300000 ohms
C9	0.1 mfd	C26	4 mfd	R16	400 ohms
C10	0.5 mfd			R17	400 ohms
C11	.001 mfd	R1	100000 ohms	R18	300000 ohms
C12	.001 mfd	R2	250 ohms	R19	3500 ohms
C13	.025 mfd	R3	60000 ohms	R20	60000 ohms
C14	.025 mfd	R4	25000 ohms	R21	60000 ohms
C15	.03 mfd	R5	500000 ohms	R22	220 ohms
C16	.00015 mfd	R6	100000 ohms	P1	100000 ohms
C17	Osc Tr.	R7	5000 ohms	P2	250000 ohms
C18	0.1 mfd	R8	1. meg		

L1 - 197 Broadcast Antenna Coil (550-1500 kc.)
L2 - 202 Short Wave antenna Coil (1.56-3.46 megacycles)
L3 - 201 Short Wave Antenna Coil (3.51-5.36 megacycles)
L4 - 200 Short Wave Antenna Coil (5.54-10.29 megacycles)
L5 - 199 Short Wave Antenna Coil (9.6-18.15 megacycles)
L6 - 198 Oscillator Coil
L8 - 283 R.F.Choke

M - Tuning Meter - 15 m.a. 13923

MODEL "Z" DeLuxe
Schematic
Parts List

SILVER - MARSHALL MFG. CO.



Parts List
Z-DE LUXE Superheterodyne

RESISTANCES
R1- 100,000 - 1/2 watt
R2- 150 - 1/2 "
R3- 3,000 - 2 "
R4- 230,000 - 1 "
R5- 60,000 - 1 "
R6- 11,000 - 1 "
R7- 100,000 - 1/2 "
R8- 500,000 - 1/2 "
R9- 1,000,000 - 1/2 "
R10- 1,000,000 - 1/2 "
R11- 1,000,000 - 1/2 "
R12- 2,000,000 - 1/2 "
R13- 300,000 - 1/2 "
R14- 1,000,000 - 1/2 "
R15- 8,000 - 1 "
R16- 100,000 - 1 "
R17- 2,600) - Wire Wound
R18- 340) - Wire Wound
R19- 1,840) - Wire Wound
R20- 5,760) - Wire Wound
V. C. with A. C. Switch,
600,000 ohms with log taper.
T. C. Tone Control 5,000 tapered.

TUBES
S1- 58 1st Detector
S2- 56 Oscillator
S3- 58 1st Int. Amp.
S4- 58 2nd Int. Amp.
S5- 56 A. V. C.
S6- 56 2nd Detector
S7- 56 Quiet A. V. C.
S8- 56 1st Audio Driver
S11, S12- 2A5 Push-Pull Output
S13- 523 Rectifier

COILS
L1, L2, L3- R.F. and antenna coil - purple and green SW ranges
L4, L5- R.F. and antenna coil - red SW range
L6, L7- R.F. and antenna coil - black BC range
L8, L9, L10, L11- Oscillator and cathode coils - purple and green SW ranges
L12, L13- Oscillator and cathode coils - red SW range
L14, L15- Oscillator and cathode coils - black BC range
L16, L17, L18, L19- 15 m.h. R. F. chokes

TRANSFORMERS
T1- CB-1038 Audio Transformer
T2- CB-1008 Power Transformer
T3- CB-1007 Power Choke Coil
T4-(CB-1013 Output Trans. with 10" speaker
(CB-1037 Output Trans. with Auditorium speaker

SWITCHES
SW1, SW2, SW3, SW4- Frequency Range Switch
SW5- Switch for Quiet AVC Circuit
SW6- Power Switch on Volume Control
SW7 - Pendant Switch for "Beat Note" Oscillator

CONDENSERS
C1- .01 mfd 200V Paper
C2- .25 " 400V "
C3- .5 " 400V "
C4- .01 " 200V "
C5- .01 " 200V "
C6- .1 " 400V "
C7- .5 " 400V "
C8- .5 mfd 400V Paper
C9- .5 " 400V "
C10- .1 " 200V "
C11- .15 " 400V "
C12- .0001 " Mica
C13- .025 " 200V "
C14- .25 " 400V "
C15- .01 " 200V "
C16- .00025 Mica
C17- .00005 "
C18- .002 "
C19- .0001 "
C20- 8 mfd 450V Dry Electrolytic
C21- 12 " 450V "
C22- .002 Mica
C23- 20-65 mmf Adjustable Mica
C24- 6-30 " " "
C25- 25-65 " " "
C26, C27, C29, C3- Adjustable Air Condenser 410 mmf
C28- Adjustable Mica Condenser 350-500 mmf
C31- " " 70-125 "
C33- .002 Mica Condenser

SPEAKER - 80,000 ohm F.C., D-9 Type, or A Deluxe

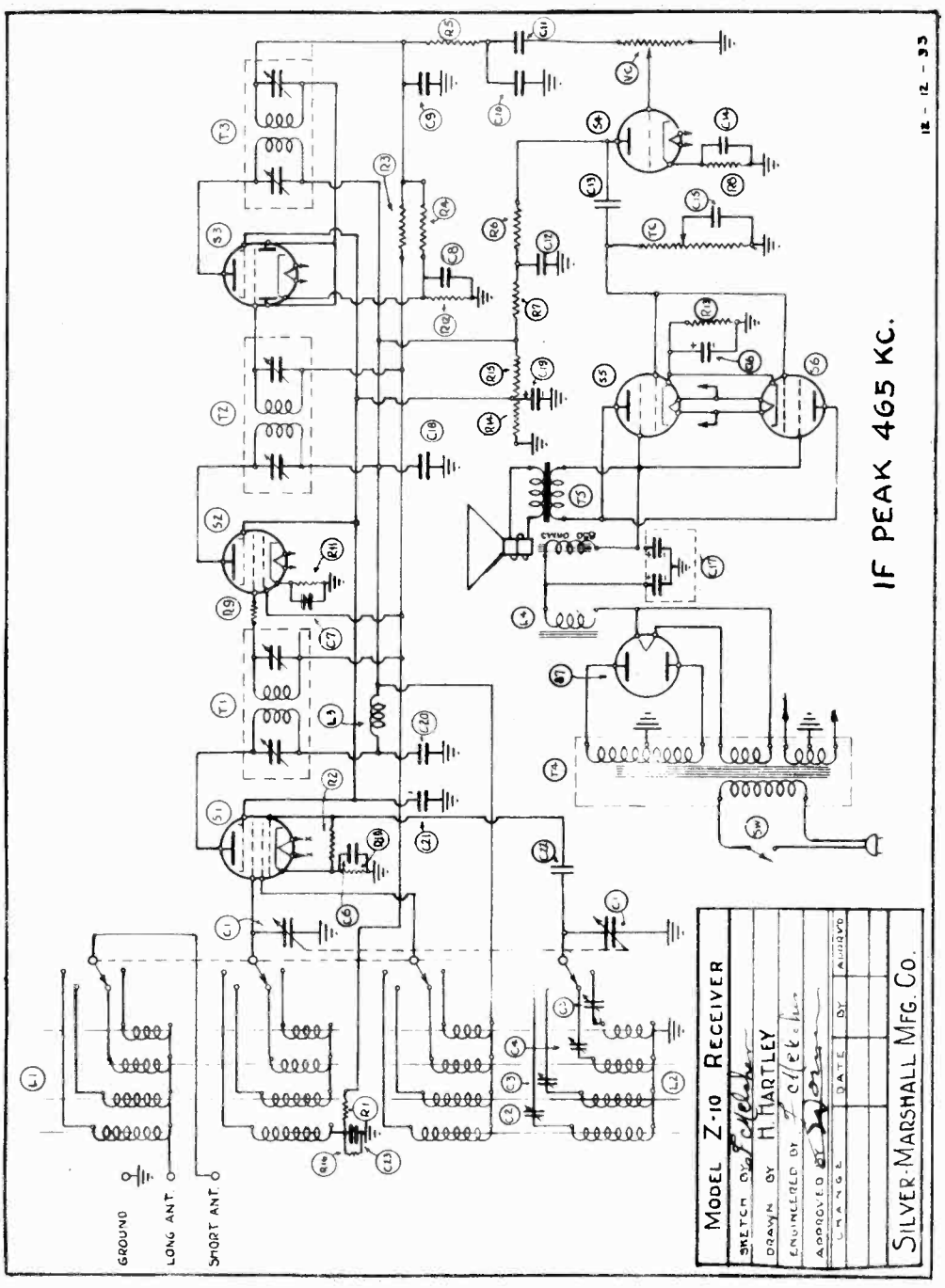
9-2-33

SILVER - MARSHALL MFG. CO.

MODEL Z-10
Schematic, Parts List
List

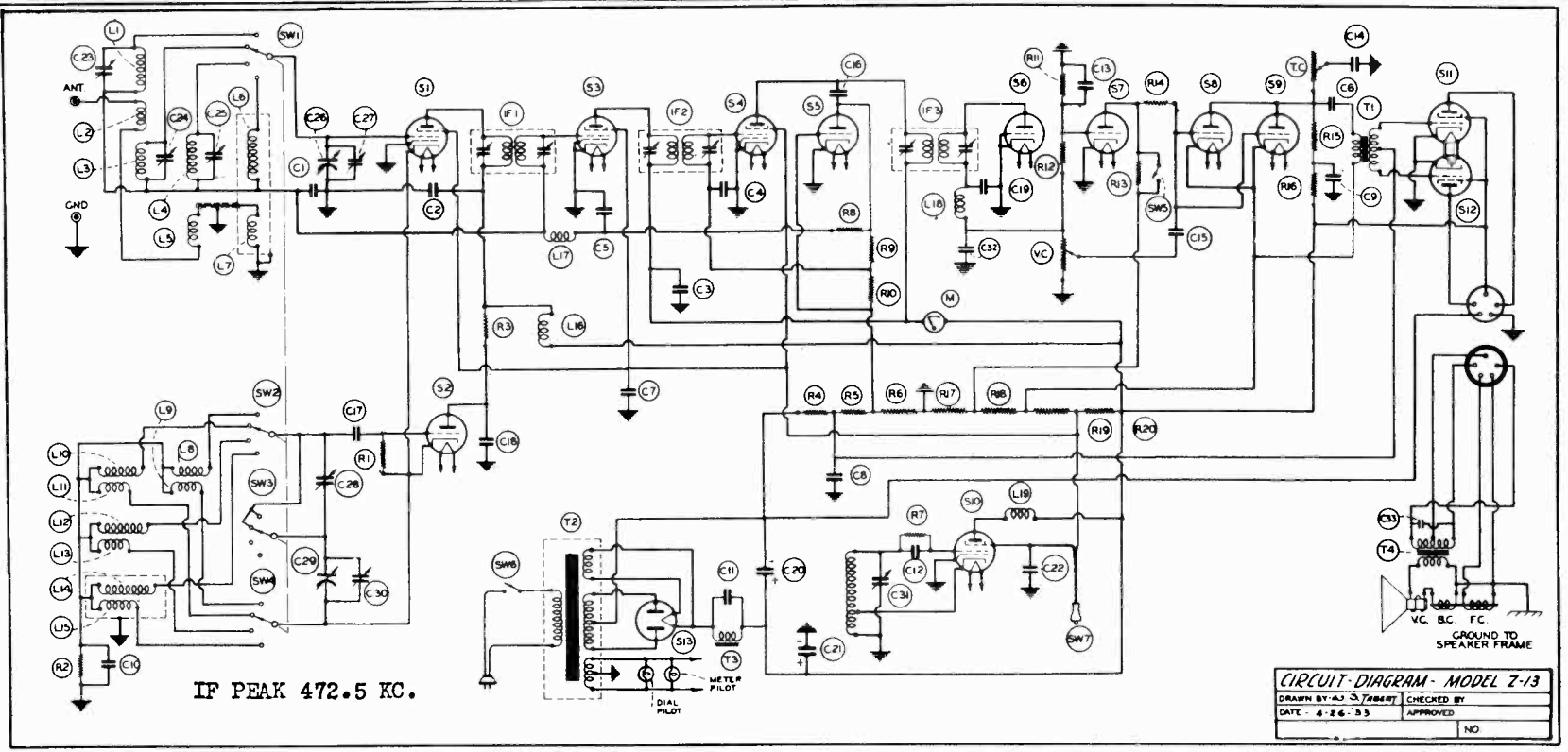
LEGEND MODEL Z-10

L1	R.F. coil assembly
L2	Oscillator coil assembly
L3	10 m.h. R. F. choke
L4	510 choke 15 henry
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	3rd I.F. transformer
T4	510 power transformer
T5	Output transformer
C1	410 mmf variable gang condenser
C2	Broadcast oscillator pad 550 mmf
C3	1st S.W. band osc. pad 2000 mmf
C4	2nd S.W. band osc. pad 2000 mmf
C5	3rd S.W. band osc. pad 2000 mmf
C6	.1 mf 25 volt paper cond.
C7	.1 mf 25 volt paper cond.
C8	.1 mf 25 volt paper cond.
C9	.00025 mf mica
C10	.001 mf mica
C11	.01 mf paper
C12	.1 mf 400 volt paper
C13	.01 mf 400 volt paper
C14	.5 mf 25 volt paper
C15	4 mf 25 volt dry electrolytic
C16	.025 mf 25 volt paper
C17	2-8 mf canned electrolytic
C18	1 mf 400 volt paper
C19	8 mf 150 volt dry electrolytic
C20	.1 mf 400 volt paper
C21	.5 mf 200 volt paper
C22	.00025 mf mica
C25	.1 mf 100 volt paper
R1	300,000 ohm 1/3 watt
R2	60,000 ohm 1/3 watt
R3	1 meg 1/3 watt
R4	500,000 ohm 1/3 watt
R5	300,000 ohm 1/3 watt
R6	12,000 ohm 1/2 watt
R7	60,000 ohm 1 watt
R8	2,750 ohm 1 watt
R9	60,000 ohm 1/3 watt
R10	500 ohm 1 watt
R11	300 ohm 1 watt
R12	500 ohm 1 watt
R13	250 ohm 2 watt
R14	Resistor 6,150 ohm 15 watt
R15	Resistor 7,500 ohm 15 watt
R16	300,000 ohm 1/3 watt
S1	2A7 tube
S2	58 tube
S3	2B7 tube
S4	56 tube
S5	2A5 tube
S6	2A5 tube
S7	5Z3 tube
TC	Tone control with switch 300,000 ohm tapered
VC	Volume control 500,000 ohm tapered



MODEL Z-13
Schematic
Parts List

SILVER - MARSHALL MFG. CO



Parts List
Model Z-13 Superheterodyne

RESISTANCES
R1- 100,000 - 1/2 watt
R2- 150 - 1/2 "
R3- 3,000 - 2 "
R4- 230,000 - 1 "
R5- 60,000 - 1 "
R6- 11,000 - 1 "
R7- 100,000 - 1/2 "
R8- 500,000 - 1/2 "
R9- 500,000 - 1/2 "
R10- 250,000 - 1/2 "
R11- 1,000,000 - 1/2 "
R12- 2,000,000 - 1/2 "
R13- 300,000 - 1/2 "
R14- 1,000,000 - 1/2 "
R15- 6,000 - 1 "
R16- 8,000 - 1 "
R17- 2,600)
R18- 340)
R19- 1,840) - Wire Wound
R20- 5,750)
V. C. with A. C. Switch,
500,000 ohms with log taper.
T. C. Tone Control 5,000 tapered.

TUBES
S1- 58 1st Detector
S2- 56 Oscillator
S3- 58 1st Int. Amp.
S4- 58 2nd Int. Amp.
S5- 56 A. V. C.
S6- 56 2nd. Detector
S7- 56 Quiet A. V. C.
S8, S9- 56 1st Audio Driver
S11, S12- 59 Push-Pull Output
S13- 523 Rectifier

COILS
L1, L2, L3- R.F. and antenna coil - purple and green SW ranges
L4, L5- R.F. and antenna coil - red SW range
L6, L7- R.F. and antenna coil - black BC range
L8, L9, L10, L11- Oscillator and cathode coils - purple and green SW ranges
L12, L13- Oscillator and cathode coils - red SW range
L14, L15- Oscillator and cathode coils - black BC range
L16, L17, L18, L19- 15 m.h. R.F. chokes

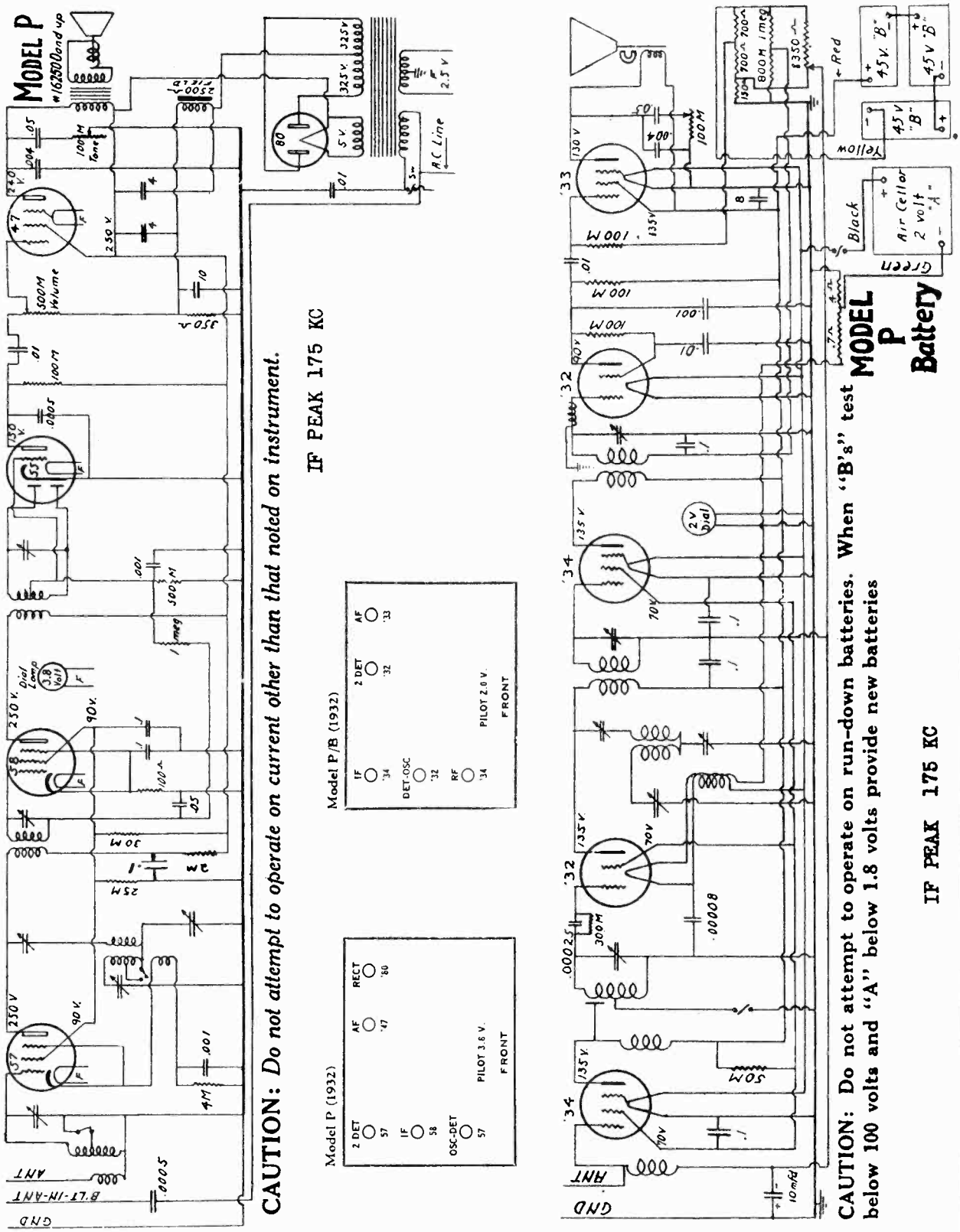
TRANSFORMERS
T1- CB-1038 Audio Transformer
T2- CB-1008 Power Transformer
T3- CB-1007 Power Choke Coil
T4-(CB-1013 Output Trans. with 10" Speaker
(CB-1037 Output Trans. with Auditorium Speaker

SWITCHES
SW1, SW2, SW3, SW4- Frequency Range Switch
SW5- Switch for Quiet AVC Circuit
SW6- Power Switch on Volume Control
SW7- Pendant Switch for "Beat Note" Oscillator

CONDENSERS
C1- .01 mfd 200V Paper
C2- .25 " 400V "
C3- .5 " 400V "
C4- .01 " 200V "
C5- .01 " 200V "
C6- .1 " 400V "
C7- .5 " 400V "
C8- .5 mfd 400V Paper
C9- .5 " 400V "
C10- .01 " Mica
C11- .15 " 400V "
C12- .0001 " Mica
C13- .025 " 200V "
C14- .1 " 400V "
C15- .01 " 200V "
C16- .00025 Mica
C17- .00005 "
C18- .002 "
C19- .0001 "
C20- 8 mfd 450V Dry Electrolytic
C21- 12 " 450V " "
C22- .002 Mica
C23- 20-65 mmf Adjustable Mica
C24- 6-30 " " "
C25- 25-65 " " "
C26, C27, C3- Adjustable Air Condenser 410 mmf
C28- Adjustable Mica Condenser 350-500 mmf
C31- " " " 70-125 "
C32- .00025 Mica Condenser
C33- .002 " "

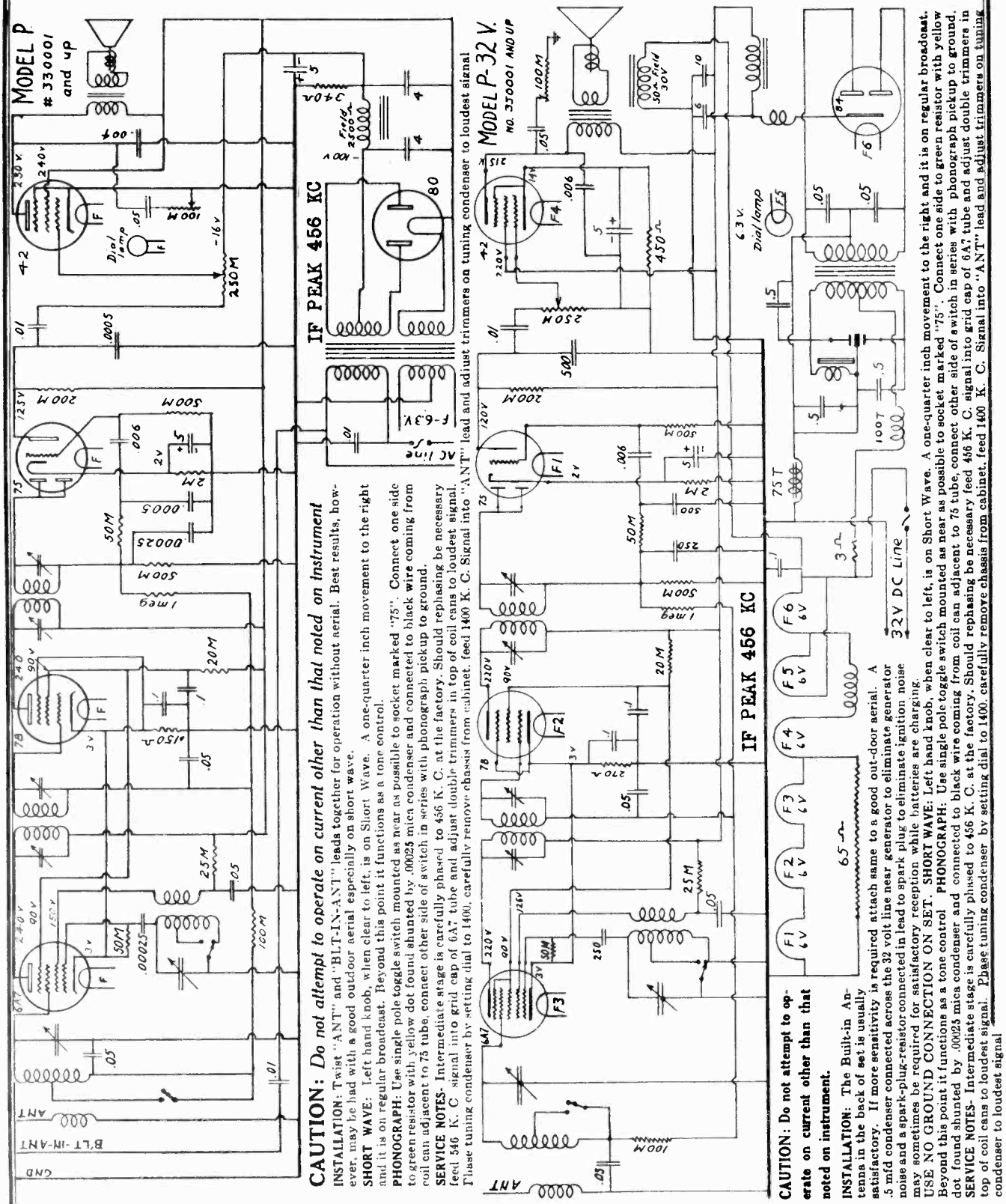
SIMPLEX RADIO CO.

MODEL P Battery
Schematic, Socket
MODEL B AC
Above serial
162500
Schematic



MODEL P AC
Above 330001
MODEL P 32 V
Above 350001

SIMPLEX RADIO CO.



CAUTION: *Do not attempt to operate on current other than that noted on instrument*

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial especially on short wave.

SHORT WAVE: Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

CAUTION: Do not attempt to operate on current other than that noted on instrument.

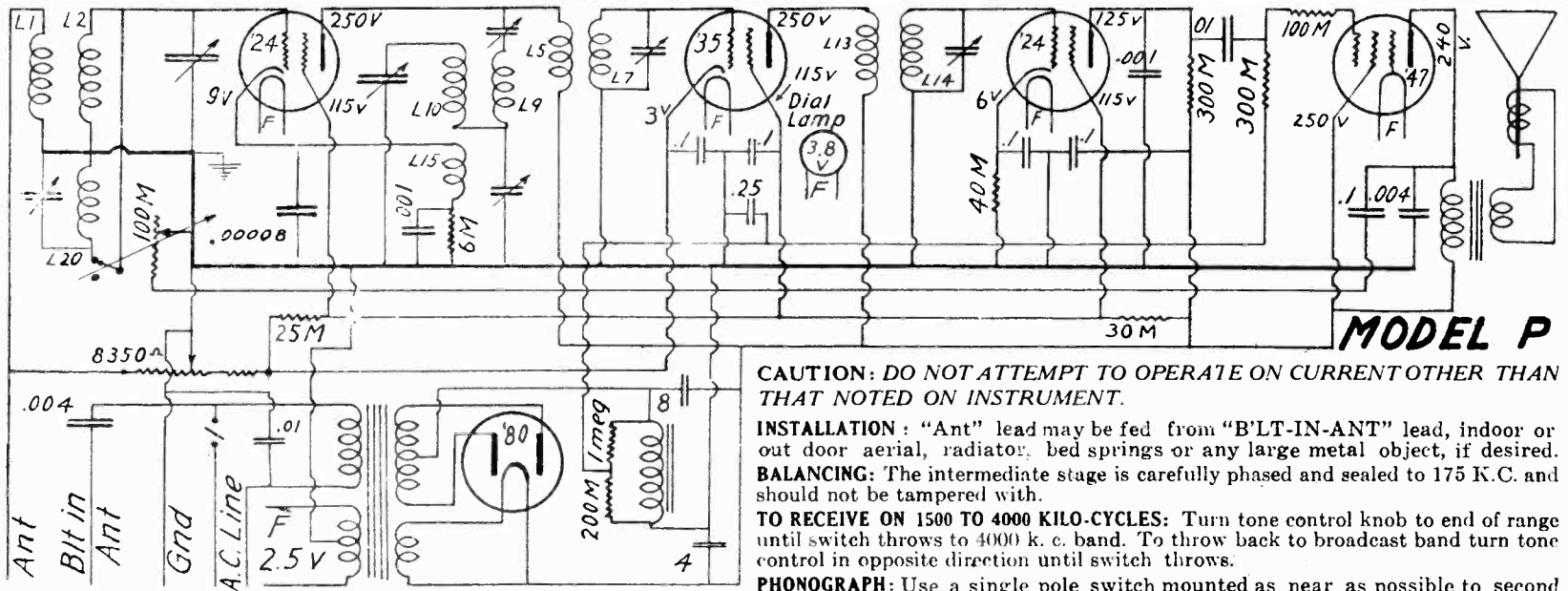
INSTALLATION: The Built-in Antenna in the back of set is usually satisfactory. If more sensitivity is required attach same to a good out-door aerial. A .5 mfd condenser connected across the 32 volt line near generator to eliminate generator noise and a spark-plug-resistor connected in lead to spark plug to eliminate ignition noise may sometimes be required for satisfactory reception while batteries are charging.

USE NO GROUND CONNECTION ON SET. **SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control **PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

SIMPLEX RADIO CO.

MODEL P 1931 Schematic
MODEL Q 1931 Schematic



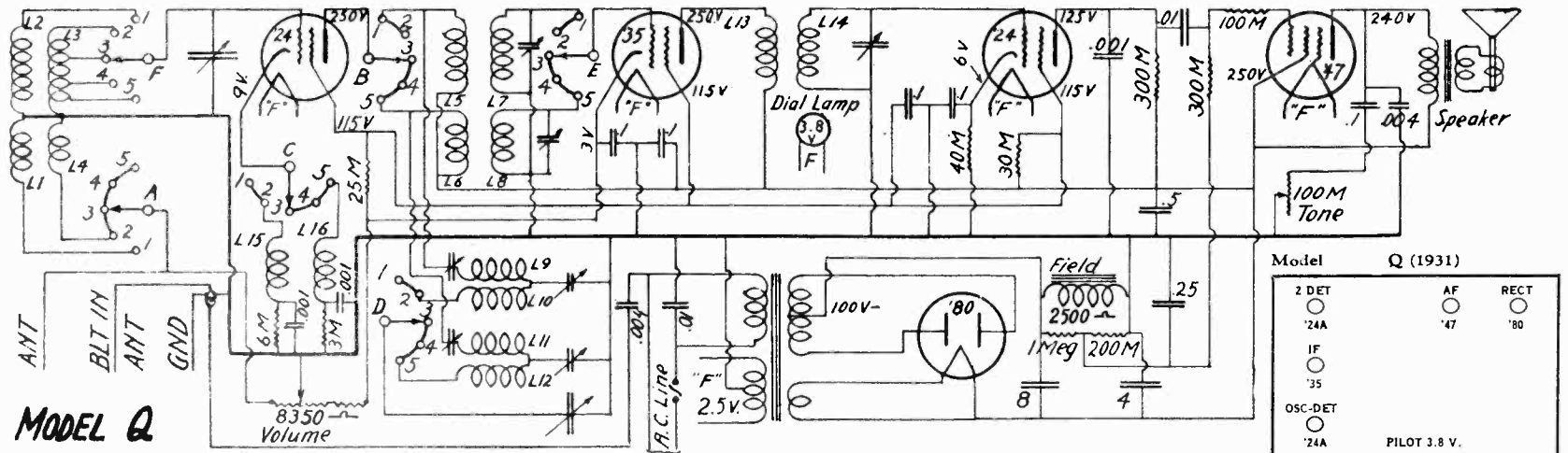
CAUTION: *DO NOT ATTEMPT TO OPERATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT.*

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K.C. and should not be tampered with.

TO RECEIVE ON 1500 TO 4000 KILO-CYCLES: Turn tone control knob to end of range until switch throws to 4000 k. c. band. To throw back to broadcast band turn tone control in opposite direction until switch throws.

PHONOGRAPH: Use a single pole switch mounted as near as possible to second detector socket, connect in series with lead from ground end of grid coil of second detector tube. Solder phonograph pickup leads to switch terminals



CAUTION: *Do not attempt to operate on current other than that noted on instrument.*

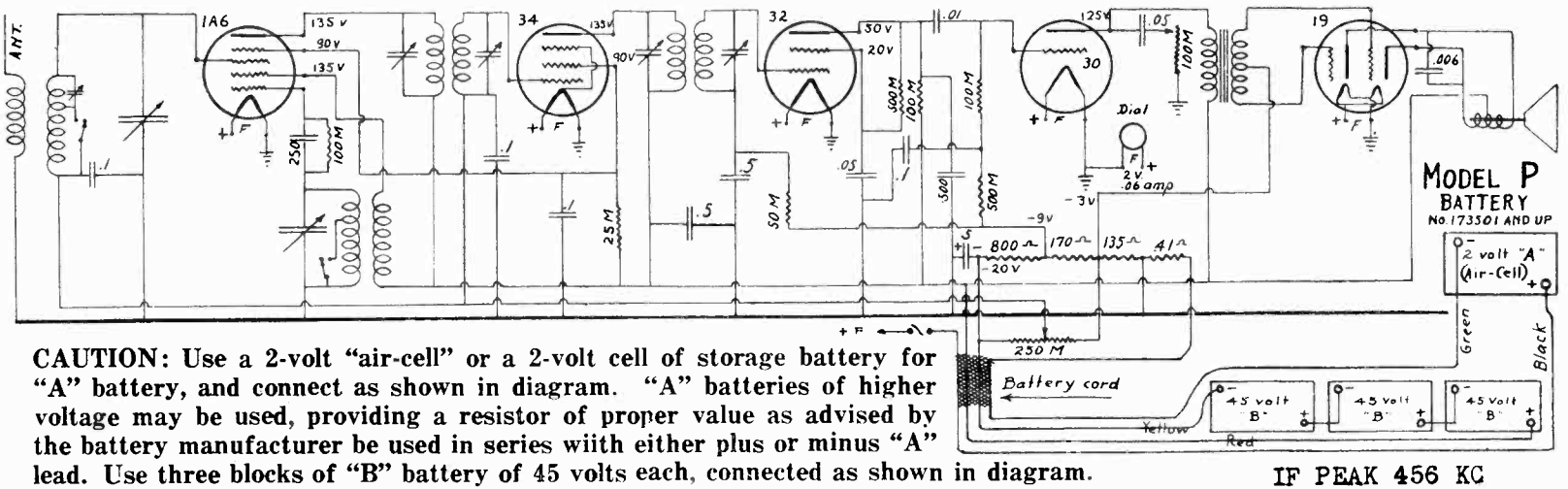
INSTALLATION: "ANT" may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs, or any large metal object, if desired

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

PHONOGRAPH: Use a single pole switch mounted as near as possible to the second detector socket, connect in series with lead from ground end of the grid coil of second detector tube. Solder phonograph pick-up leads to switch terminals.

MODEL P Battery
Above 173501
MODEL R AC
Above 320001

SIMPLEX RADIO CO.



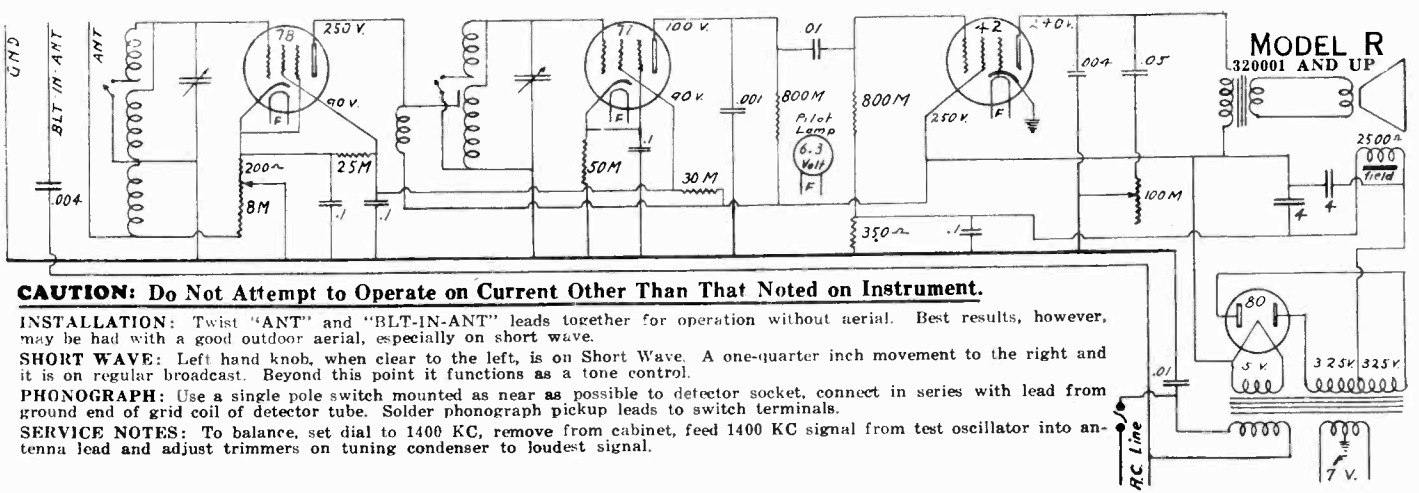
CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

IF PEAK 456 KC

INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.

SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.



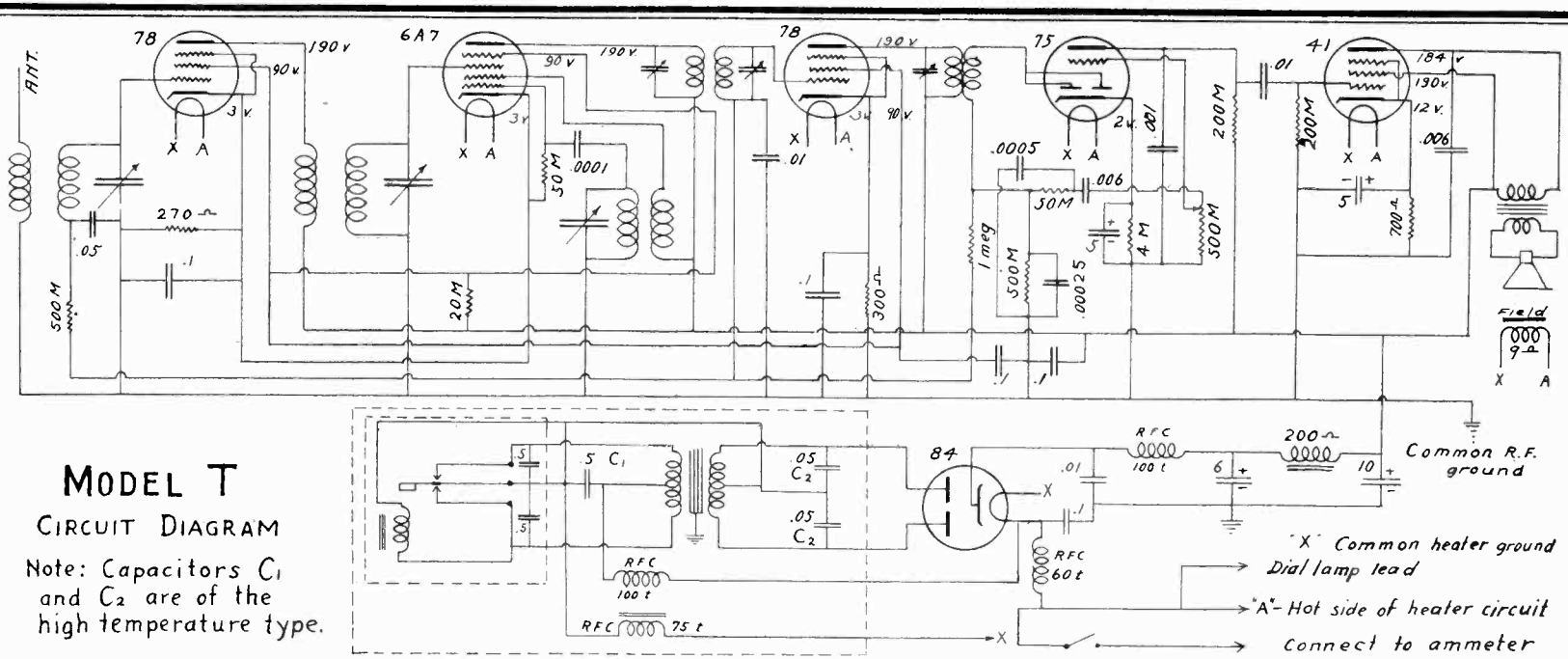
CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial, especially on short wave.

SHORT WAVE: Left hand knob, when clear to the left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SERVICE NOTES: To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.



MODEL T

CIRCUIT DIAGRAM

Note: Capacitors C_1 and C_2 are of the high temperature type.

BALANCING I-F. COILS. These are trimmed through the tops of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Remove chassis from cabinet and feed signal from test oscillator into grid cap of the 6A7.

BALANCING R-F. COILS. Tuning control must be attached to tuning condenser shaft with pointer set to 530 when condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting, carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car, slightly readjust the first trimmer through hole in top of cabinet.

Determine most satisfactory mounting position on bulkhead which should be at the left hand side or directly in front of steering column. Spot the mounting bolt location and drill ½" diameter hole. Insert bolt through hole and assemble washer and nut on engine side. Hang receiver over bolt head and tighten nut.

Attach flexible shafts to control unit by first inserting shaft as far in as possible and then tighten set screws of shaft housing, being careful it is not so tight as to cause shaft to bind in housing.

Mount control unit on steering column in approximately correct position, set pointer to 530 on dial, turn upper control of receiver to extreme clockwise position, carefully place right hand shaft in position on upper receiver control and left hand shaft on lower control and tighten set screws securely.

Adjust control unit position so that shafts leave set with least amount of bend possible and fasten securely in this position. Trial of controls will show best location for smooth operation.

Attach heavy rubber covered lead to ammeter terminal.

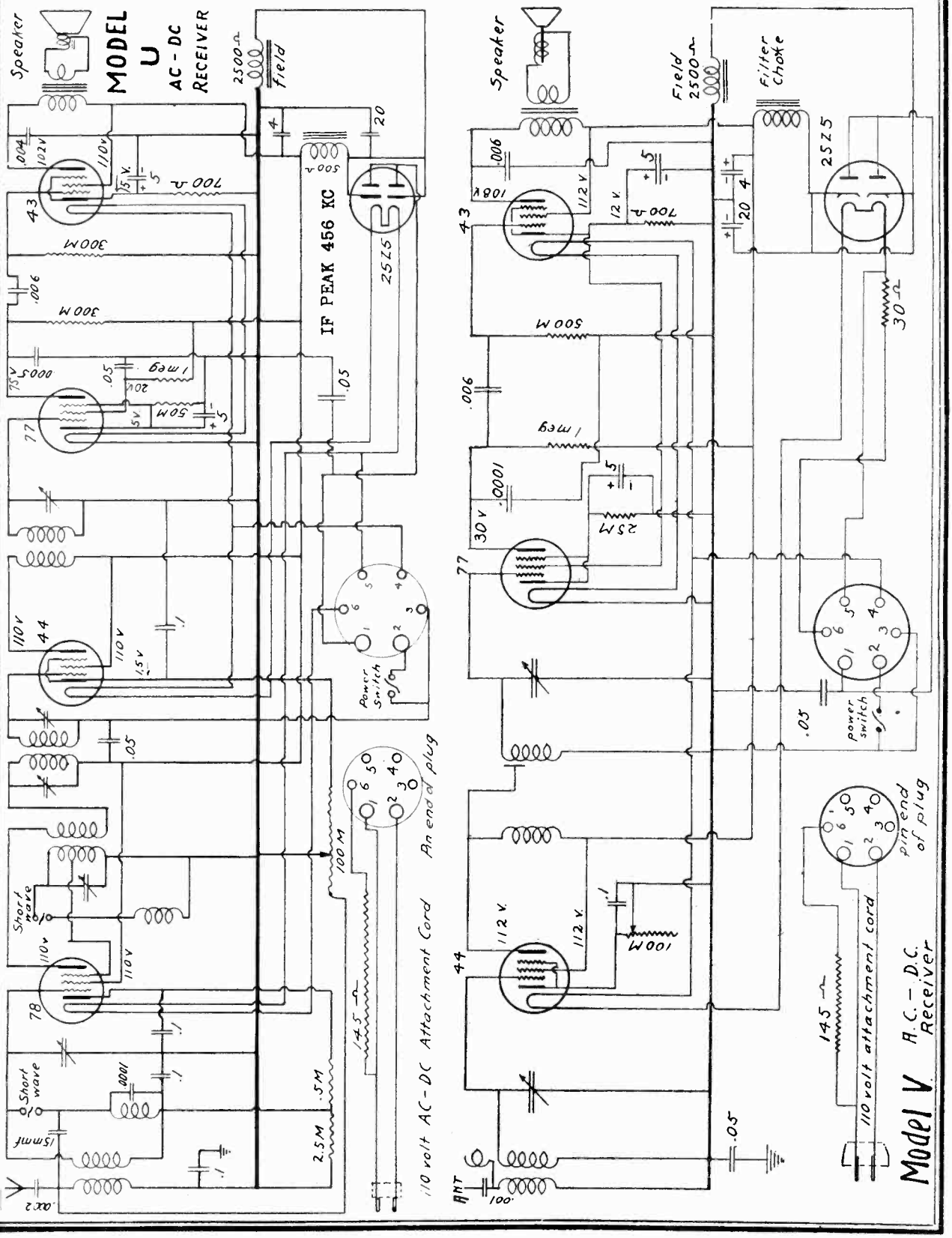
Connect pilot light wire from control head to short black wire on set, making connection close to set, and tape up joint. Ground shield by loosening screw under nearest corner of set and connecting wire therefrom to end of shield and tighten up screw.

Disconnect ignition leads from spark plugs, attach one suppressor to top of each plug and reattach the ignition lead to free end of suppressor. Disconnect center wire from distributor head, and substitute distributor suppressor, then plug center wire into free end of suppressor.

Attach generator bypass condenser to generator frame by means of screw holding cut-out. Connect wire from condenser to generator side of cut-out switch.

MODEL U
MODEL V

SIMPLEX RADIO CO.



SPARKS WITHINGTON CO.

MODEL 9X,13,14,14A,15X, 17,18,27,27A,28, 30A,34,414,42,54, 620X,750X,870X. 111X Alignment

Tune in a weak distant station or oscillator signal between 1300 and 1400 kilocycles, (Model 41-A or 42 use station to which receiver will be tuned) turn the volume control on full, and rotate the inter-station noise suppressor control knob (none on Models 13, 30-A, 41-A or 42) clockwise as far as it will go. Next, with a hex-socket insulated wrench, turn the hex-nut on the condenser or the screw in the condenser with an insulated handle screw driver to the position where the volume from the station "tuned in" or the oscillator signal is the loudest. Once made, this adjustment need not be changed unless the antenna system is altered, the receiver is moved from one location to another, or the other condensers are re-adjusted.

NOTE—When antenna equalizing condenser is adjusted on oscillator signal, adjustment will not hold true when receiver is connected to aerial, this condenser must be aligned to antenna system.

ALIGNING THE OSCILLATOR, PRE-SELECTOR EQUALIZING AND I. F. ADJUSTABLE CONDENSERS

Symptoms denoting that the condensers require alignment

1. Oscillator Equalizing Condenser
   (a) Dial calibration incorrect.
2. Pre-selector equalizing condensers
   (a) Weak reception.
   (b) Multiple peaks within a 40 kilocycle band from a loud local station.
   (c) Hiss.
3. I. F. Adjustable Condensers
   (a) When the condenser is replaced.
   (b) When the I. F. transformer is replaced.
   (c) When they have been purposely misaligned.

ALIGNING THE OSCILLATOR EQUALIZING CONDENSER (none on Model 41-A or 42)

The adjustment of this condenser determines the accuracy of the dial calibration. If alignment of this condenser is required to correct the dial calibration, it must be adjusted before either the antenna or pre-selector equalizing condensers are adjusted.

To cause the pointer to move towards 1500 kilocycles, or the high end of the scale, turn the condenser nut down. Conversely, to cause the pointer to move toward 530 kilocycles or toward the low end of the scale, turn the condenser nut up.

The procedure of adjusting this condenser is as follows:

1. Turn the volume control on full.
2. Rotate inter-station noise suppressor control knob clockwise as far as it will go.
3. Turn the tone and static control all the way to the **left** or to the position where low tone is obtained.
4. Adjust the condenser so that a station broadcasting on any frequency in the region of 1300 to 1400 kilocycles "comes in" at its assigned frequency.
5. If the calibration of the dial is correct on the high frequency end and off on the low frequency end, proceed as follows:

If the calibration is incorrect between 600 and 1200 kilocycles, tune in a station at about 900 kilocycles. If the calibration is incorrect between 600 and 530 kilocycles, tune in a station at about 600 kilocycles. Then bend slightly inward, if the pointer is lower than the required point, or outward, if it is higher than the required point, one or both of the end stator plates (not rotor plate) of the oscillator variable condenser. Make the bend on the portion of the plate indicated in Fig. 2, depending upon the frequency at which this operation is being performed.

CAUTION: THE BEND NEED ONLY BE SLIGHT!

To those unfamiliar with the adjustment of an oscillator condenser, it will be noted that when the adjusting wrench is placed over the condenser, that the volume of the station tuned in decreases—and that by giving the condenser about a quarter turn in either direction, the volume can be brought back to normal. When the wrench is removed, the volume of the station "dies away," or the station is not heard at all. This is a normal condition, and by turning the dial knob one way or the other, depending upon whether the condenser nut was moved up or down, the station is again "tuned in" at its normal amount of volume.

FIG 2. ILLUSTRATING PORTION OF OSCILLATOR VARIABLE CONDENSER PLATE TO BEND WHEN CORRECTING DIAL CALIBRATION

ALIGNING THE FIRST DETECTOR EQUALIZING CONDENSER

Two resonance peaks are obtained when this condenser is adjusted. One peak occurs when the condenser is turned down (capacity increased), and the other peak occurs when the condenser is turned up (capacity decreased). The correct peak to use is the one which occurs when the condenser is turned down. If this condenser is adjusted on the wrong peak, the effect will be "Dead Spots" around 1300 and 1450 kilocycles, and poor sensitivity at 900 and 600 kilocycles.

STEP BY STEP ALIGNMENT PROCEDURE, FOR ANTENNA, PRE-SELECTOR and OSCILLATOR EQUALIZING CONDENSERS

1. Tune in a weak distant station between 1300 and 1400 kilocycles or tune the modulated oscillator to this frequency.
2. Turn the volume control on full and the tone and static control all the way to the left or to the position where low tone is obtained.
3. Rotate the inter-station noise suppressor control knob clockwise as far as it will go.
4. Connect the output meter as illustrated in Fig. 1.
5. If necessary, adjust the oscillator equalizing condenser before proceeding further.
6. Adjust the antenna equalizing condenser.
7. Adjust the pre-selector equalizing condensers.
8. Repeat the entire adjustment for assurance that the first adjustment was executed properly.

ALIGNING THE INTERMEDIATE FREQUENCY ADJUSTABLE CONDENSERS

CAUTION: These condensers must not be adjusted except under the conditions, and with the equipment recommended, as follows:

A. Conditions when Adjustment is Required

1. When replacement of the condenser itself is made.
2. When replacement of the intermediate frequency transformer is made.
3. When they have been purposely misaligned.

B. Equipment Required

1. A 12-inch screw driver solidly constructed from insulating material.
2. A modulated oscillator from which a signal of exactly 172.5 kilocycles can be obtained.
3. A suitable output meter.

If the oscillator is crystal controlled, the exact frequency is assured. If not, the oscillator should be calibrated, in accordance with the manufacturer's instructions, each time it is used for this purpose.

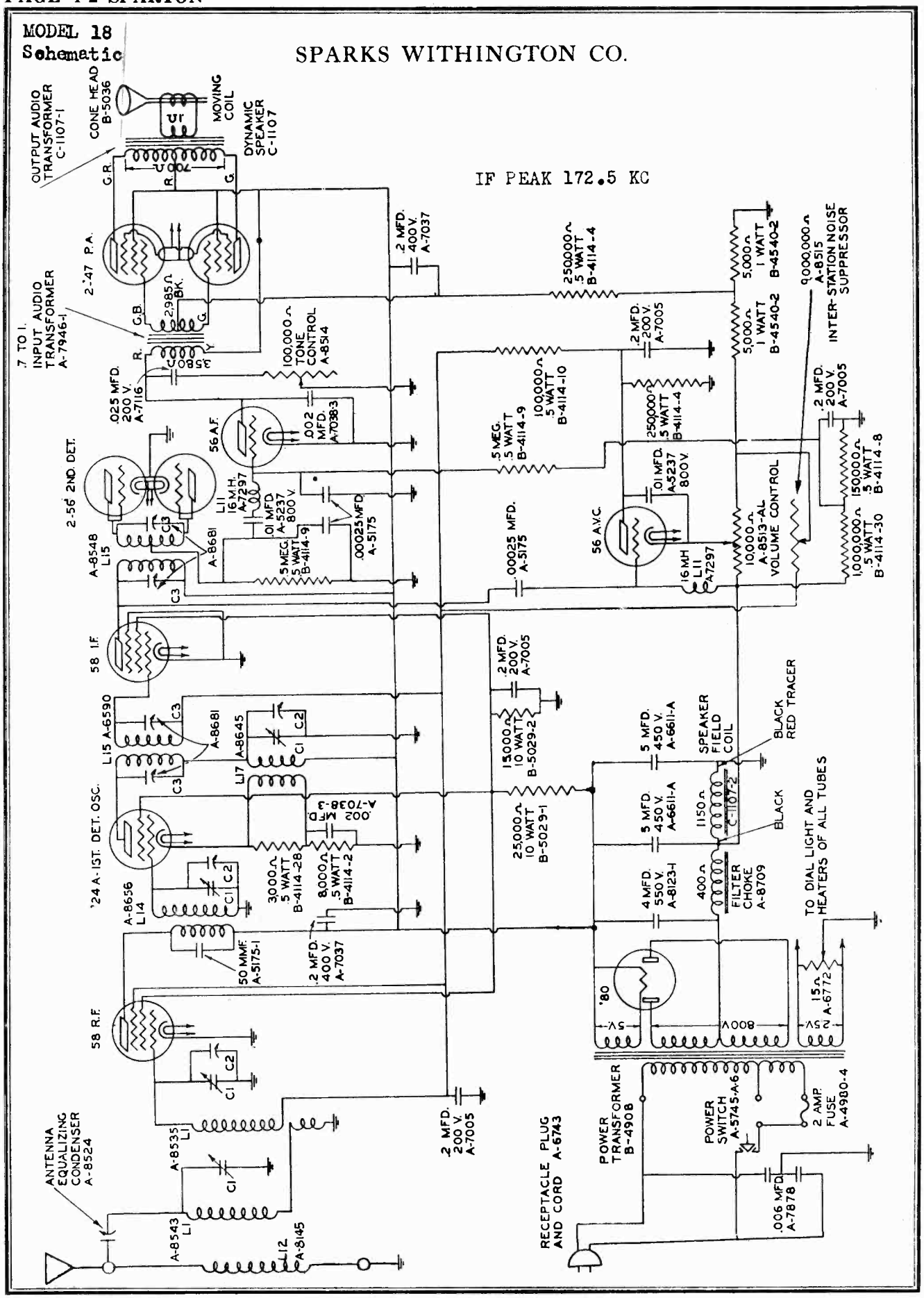
Recalibration is necessary in an oscillator not crystal controlled, as a change in frequency will occur due to a very slight change in tube characteristics and applied voltages.

C. How the Condensers are Adjusted

1. Connect the aerial terminal of the oscillator to the control grid terminal (terminal on top of tube) of the first detector-oscillator tube, and the ground terminal to the ground binding post of the receiver.
2. Turn the tone and static control to the left, or to the position where low tone is obtained.
3. Turn the volume control on full.
4. Rotate the inter-station noise suppressor control knob clockwise as far as it will go.
5. Turn the attenuator or volume control on the oscillator to the position where the oscillator is heard faintly. If the oscillator is not heard at all, even with the control full on, the condensers of the stage requiring adjustment should be manipulated until it is heard at the loudest. The control should then be reduced so that only a faint sound from the oscillator is audible.
7. All intermediate frequency adjustable condensers should be adjusted if the adjustment of one is necessary. When adjustment of the stage that requires such has been made, the other stages should be adjusted in rotation, from front to rear of chassis, or vice versa. Each pair of condensers should be adjusted before proceeding to the next.

MODEL 18
Schematic

SPARKS WITHINGTON CO.



SPARKS WITHINGTON CO.

MODEL 18
Voltage, Chassis
Trimmers

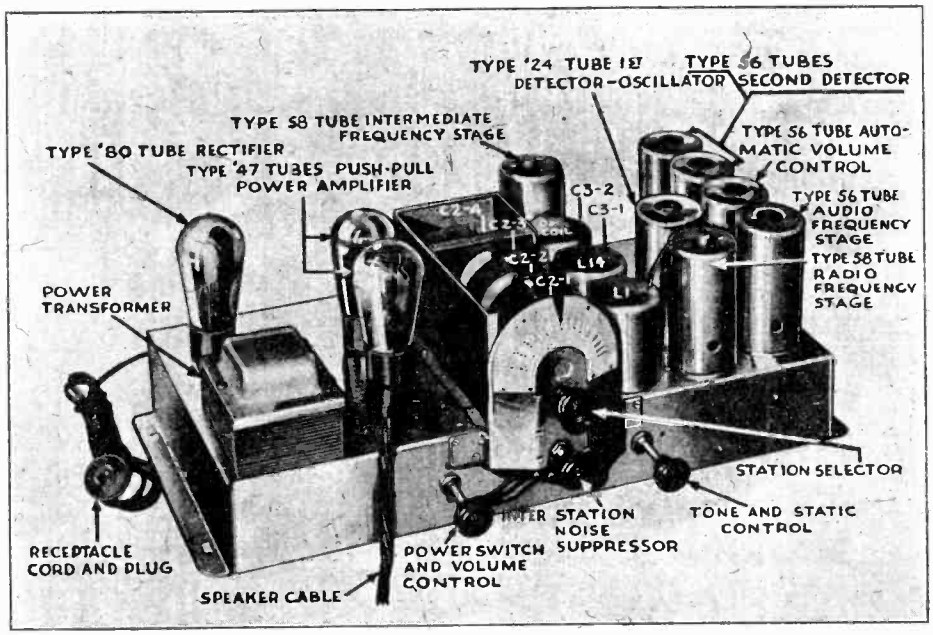
VOLTAGE ANALYSIS

Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
58	R. F. Stage	2.2—2.5	260—305	1.9—2.5	70—88	4.5—8.0
'24	1st Det.-Osc.	2.2—2.5	260—305	5—9	70—88	0.8—1.4
58	I. F. Stage	2.2—2.5	260—305	1.9—2.5	70—88	4.5—8.0
56	2nd Det.	2.2—2.5	*	*	——	*
56	2nd Det.	2.2—2.5	*	*	——	*
56	A. F. Stage	2.2—2.5	245—285	10—14	——	4.5—8.0
56	AVC	2.2—2.5	35—50	40—50	——	Zero
'47	Power Stage	2.2—2.5	250—295	19—25	260—305	18—25
'47	Power Stage	2.2—2.5	250—295	19—25	260—305	18—25
'80	Rectifier	4.2—5.0	360—440	——	——	33-45 per Plate

* Present only when signal is applied.

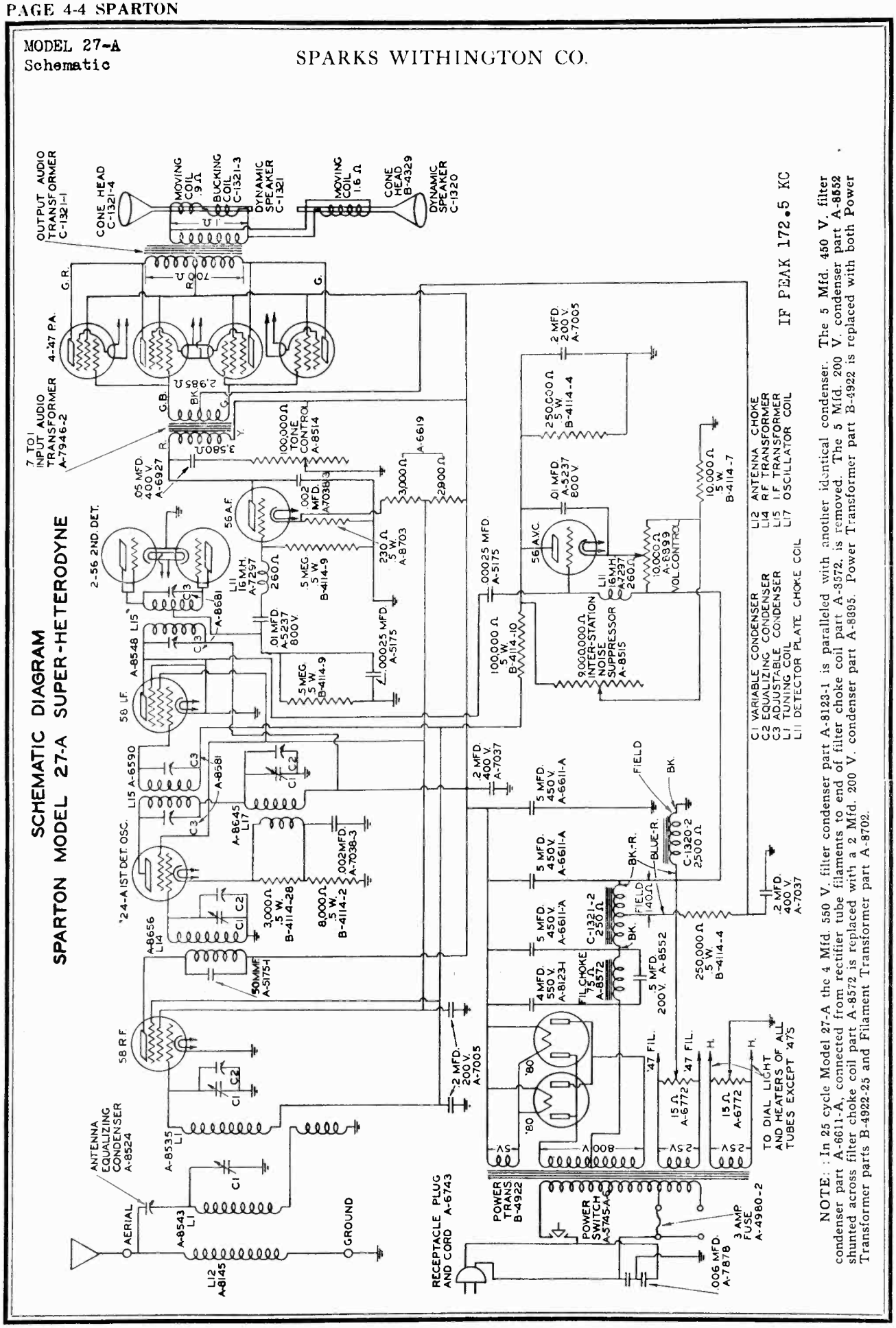
MODEL 18 CHASSIS



C2-1 Antenna Equalizing Condenser
C2-2 R. F. Stage Equalizing Condenser
C2-3 1st Detector Equalizing Condenser
C2-4 Oscillator Equalizing Condenser
C3-1 I. F. Input Stage Adjustable Condenser
C3-2 I. F. Output Stage Adjustable Condenser
L1 1st Tuning Coil
L14 R. F. Transformer

MODEL 27-A
Schematic

SPARKS WITHINGTON CO.



NOTE: : In 25 cycle Model 27-A the 4 Mfd. 550 V. filter condenser part A-8123-1 is paralleled with another identical condenser. The 5 Mfd. 450 V. filter condenser part A-6611-A, connected from rectifier tube filaments to end of filter choke coil part A-3572, is removed. The 5 Mfd. 200 V. condenser part A-8552 shunted across filter choke coil part A-8572 is replaced with a 2 Mfd. 200 V. condenser part A-8895. Power Transformer part B-4922 is replaced with both Power Transformer parts B-4922-25 and Filament Transformer part A-8702.

SPARKS WITHINGTON CO.

MODEL 27-A
Chassis
Voltage

Sparton Model 27-A Super-Heterodyne Schematic Diagram and Voltage Analysis

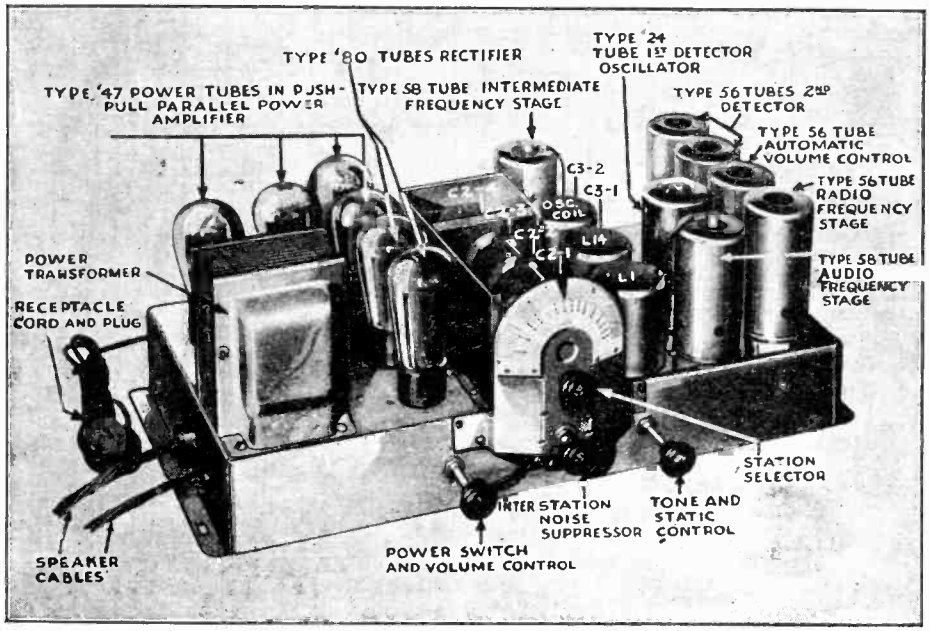
VOLTAGE ANALYSIS

Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
58	R. F. Stage	2.2—2.5	165—200	2.3—2.7	90—112	4.5—8.0
'24	1st Det.-Osc.	2.2—2.5	165—200	5.0—9.0	90—112	0.8—1.4
58	I. F. Stage	2.2—2.5	165—200	2.3—2.7	90—112	4.5—8.0
56	2nd Det.	2.2—2.5	*	*	——	*
56	2nd Det.	2.2—2.5	*	*	——	*
56	A. F. Stage	2.2—2.5	145—180	7—11	——	4—7
56	AVC	2.2—2.5	30— 50	50—80	——	0
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'80	Rectifier	4.2—5.0	320—375	——	——	33–45 per Plate
'80	Rectifier	4.2—5.0	320—375	——	——	33–45 per Plate

* Present only when signal is applied.

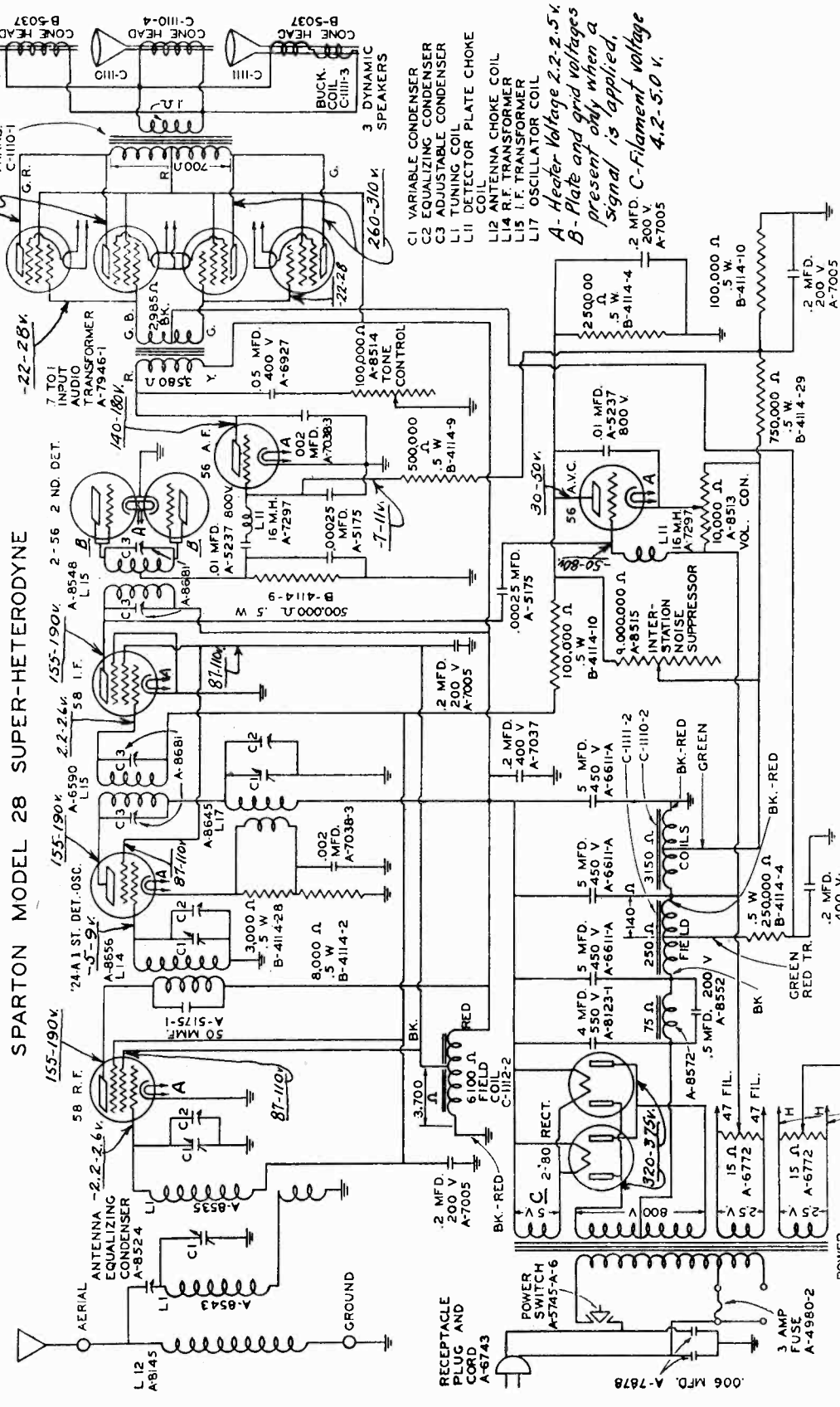
MODEL 27-A CHASSIS



C2-1 Antenna Equalizing Condenser
C2-2 R. F. Stage Equalizing Condenser
C2-3 1st Detector Equalizing Condenser
C2-4 Oscillator Equalizing Condenser
C3-1 I. F. Input Stage Adjustable Condenser
C3-2 I. F. Output Stage Adjustable Condenser
L1 1st Tuning Coil
L14 R. F. Transformer

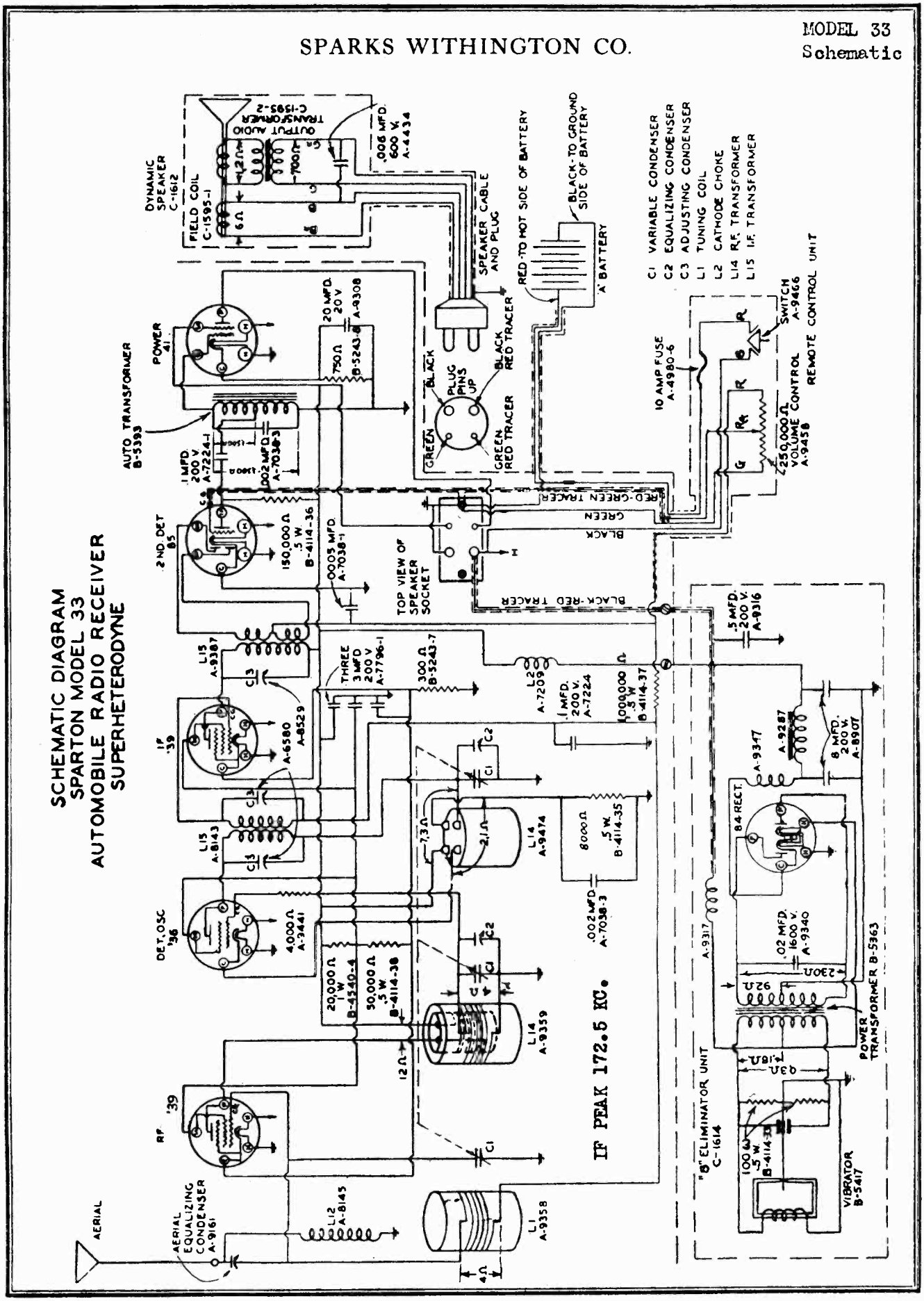
MODEL 28
Schematic

SPARKS WITHINGTON CO.



SPARKS WITHINGTON CO.

MODEL 33
Schematic



MODEL 33
Voltage, Notes
Socket
MODEL 43
Voltage

SPARKS WITHINGTON CO.

The receiver is equipped with pin jack post. A low capacity shielded lead-in wire is furnished. The shield must be grounded as close to the antenna post as possible. A clamp is attached to the receiver for this purpose. Keep lead-in wire as short as possible. When under hood mounting is found necessary, the antenna post may pick up motor noise, in which case it will be necessary to shield it. The lead-in wire should be brought down the body post nearest the end of the receiver that has the antenna post so as to keep the lead-in wire as short as possible. The shielded portion of the lead-in should extend from the receiver to a point approximately eight inches from the aerial proper and the shielding must be grounded at this point to the metal framework of the car by soldering a piece of wire to the shield and fastening the wire under a convenient screw head.

There are various types af antennae, but the recommended type is the roof antenna. Many automobile manufacturers install antennas in the roof of the cars at the factory. The lead-in wire is usually coiled up under one side of the instrument panel.

Every antenna should be checked for ground in the following manner: Using a continuity tester consisting of a low range high resistance voltmeter (1.5 or 3.0 volt scale) in series with a dry cell, touch one lead from the continuity tester to the antenna and touch the other lead from the continuity tester to the body or other grounded portion of the car. If any reading is obtained, even though very small, the antenna is grounded and cannot be used for an aerial until the ground is removed.

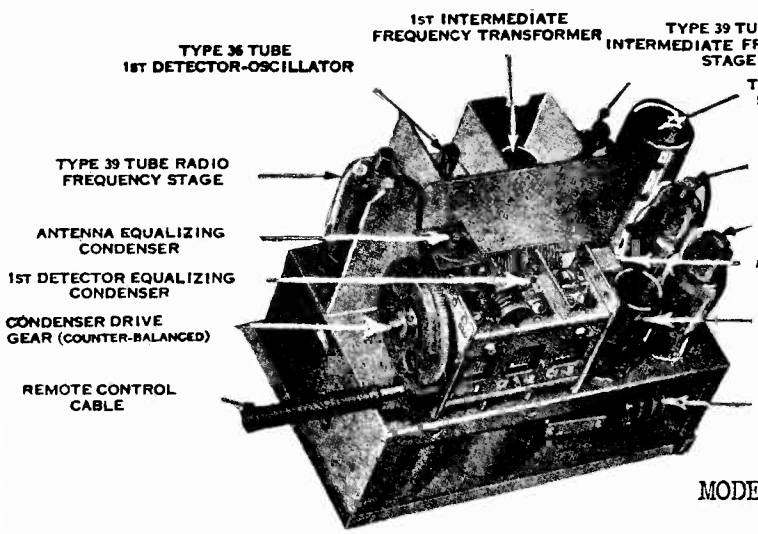
If a continuity tester is not available, connect 200 volts of "B" battery in series with a 200 volt, 1000 ohm per volt, sensitive meter. Touch one lead from the meter to the antenna and touch the other lead from the batteries to a grounded portion of the car. If the sensitive meter reads more than two volts, even when the roof of the car is damp, it indicates that antenna is grounded. *The ground must then be removed.*

Under car antennas are not recommended, but where it is impossible to install a roof antenna, we suggest an antenna formed by placing not less than four square feet of copper screen between two pieces of water-proof material, such as leatherette, and sewing it in. The water-proof insulating material is then fastened to the frame of the car. It may be necessary to make the antenna in two pieces in order to obtain four square feet of screen. Care must be taken to make sure that the screen is not or cannot become grounded to the frame of the car. Test for ground in the same manner as instructed for roof antenna.

ADJUSTING THE ANTENNA CIRCUIT

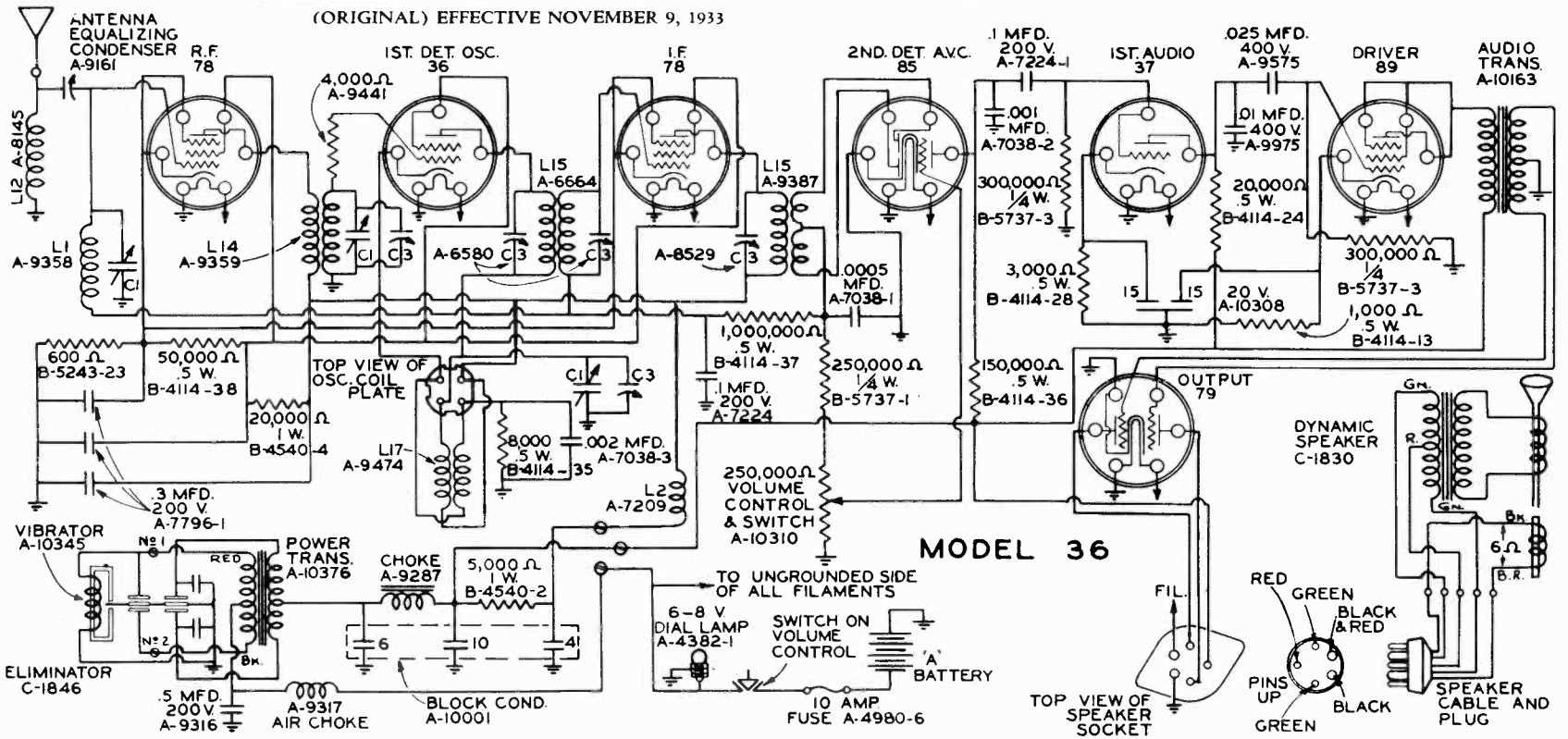
The antenna circuit must be adjusted to be in perfect resonance with the particular antenna to which the receiver is connected. Tune in the station the receiver will be operated on. A distant location, or a point of low signal strength, will permit the best adjustment, for a weak signal produces the sharpest resonance point. The adjusting screw is under the hole-cover nearest the dial drive adjustment hole. With a small insulated handle screw driver, turn the screw to the right or left slowly to the position of maximum volume. Once made, the adjustment need never be changed unless the antenna system is altered, or the receiver is operated on a different kilocycle frequency.

MODEL 43	Filament or Heater	Plate	Control Grid	Screen Grid	Plate Current M.A.
39 1st R.F.	6	135	- 3	85	4.5
39 2nd R.F.	6	135	- 3	85	4.5
39 3rd R.F.	6	135	- 3	85	4.5
36 Det.	6	132	-10	63	1
37 AVC	6	--	-18	--	0
38 Power	6	180	-18	180	9



MODEL 33 CHASSIS

MODEL 33	Filament or Heater	Plate	Control Grid	Screen Grid	Plate Current M.A.
'39 R.F.	6.3	195	- 3.5	100	4.2
'36 1st Det-Osc.	6.3	195	-12.	100	1.5
'39 I.F.	6.3	195	- 3.5	100	4.2
85 2nd Det.-AVC	6.3	30	--	--	1.5
41 Power	6.3	195	-16.	195	16.
84 Rect.	6.3	220	---	---	20 per plate



NOTE: WHEN POSITIVE (+) 'A' BATTERY IS GROUNDED, CONNECTIONS TO ELIMINATOR TERMINALS ONE (1) AND TWO (2) ARE AS SHOWN. (MODEL 36 SHIPPED FROM FACTORY WITH THESE CONNECTIONS.)
WHEN NEGATIVE (−) 'A' BATTERY IS GROUNDED, REMOVE ELIMINATOR COVER AND REVERSE CONNECTIONS TO TERMINALS ONE (1) AND TWO (2).

C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL
L2 CATHODE CHOKE

L12 ANTENNA CHOKE COIL
L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER 172.5 K.C.
L17 OSCILLATOR COIL

All heater voltages: 6.3.

CHANGES IN MODEL 36 SCHEMATIC DIAGRAM

Effective November 16, 1933

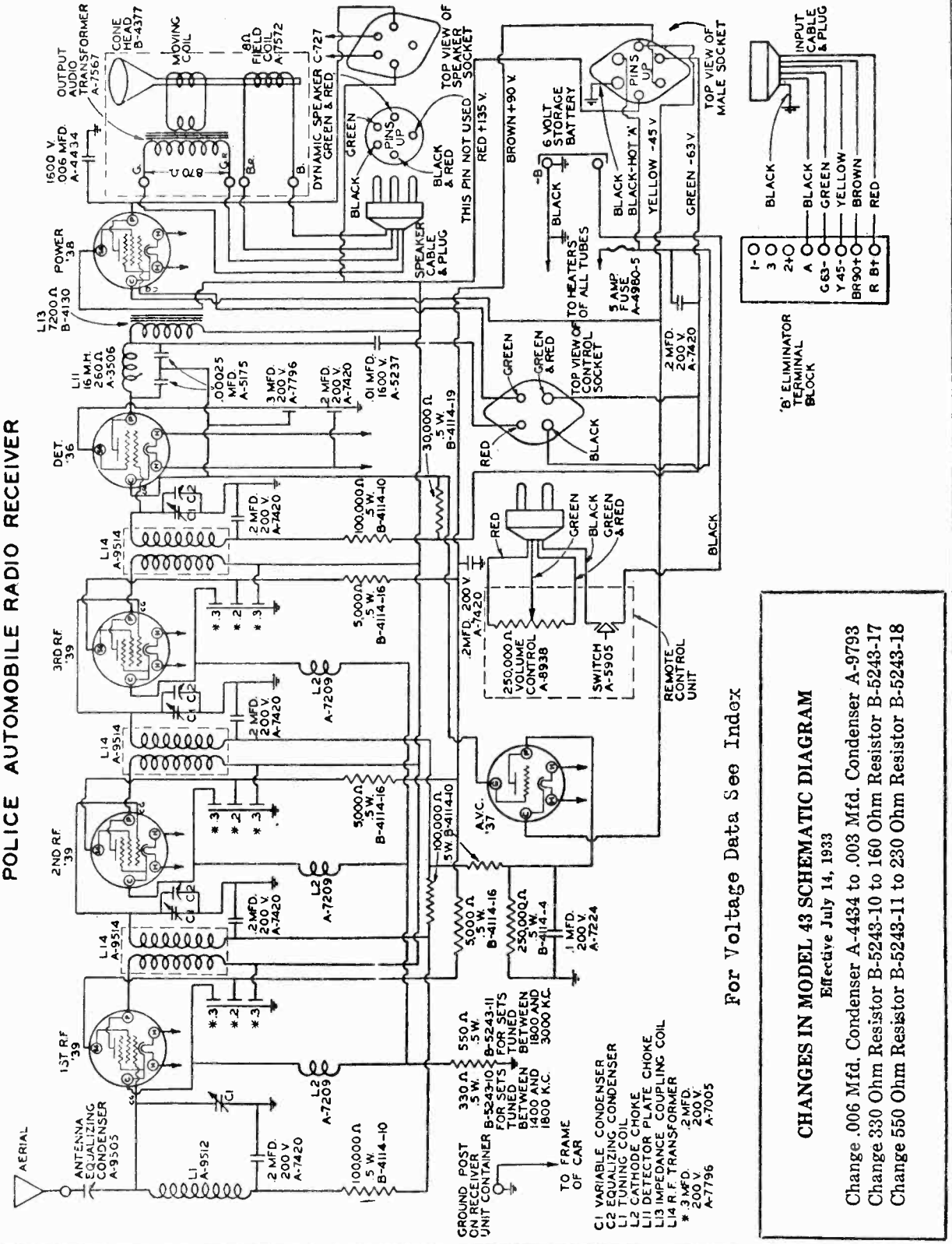
Condenser part #A-4434 .006 mfd added across primary of output transformer between green and green lead.
Condenser part #A-5175-1, .00005 mfd added from ground to eliminator terminal connection which continues through Cathode Choke L-2

Volume Control—Full with Antenna Disconnected

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
78	R-F Stage	200	4.2	100	—3.	—	70,000	50,000	1,250,000	600
36	1st Det.-Osc.	200	1.5	100	—12.	80,000	70,000	50,000	4,000	8,000
78	I-F Stage	200	4.2	100	—3.	1,500,000	70,000	50,000	1,250,000	600
85	2nd Det.-AVC	50	1.5	—	0	325,000	225,000	—	250,000	0
37	1st Audio	170	3.5	—	—10.	575,000	95,000	—	300,000	3,000
89	Driver Stage	240	20.0	240	—20.	495,000	75,000	75,000	300,000	1,000
79	Power Stage	240	*4.0	—	0	75,000	75,000	—	300	0

MODEL 43
Schematic, Changes

SPARKS WITHINGTON CO.



For Voltage Data See Index

CHANGES IN MODEL 43 SCHEMATIC DIAGRAM

Effective July 14, 1933

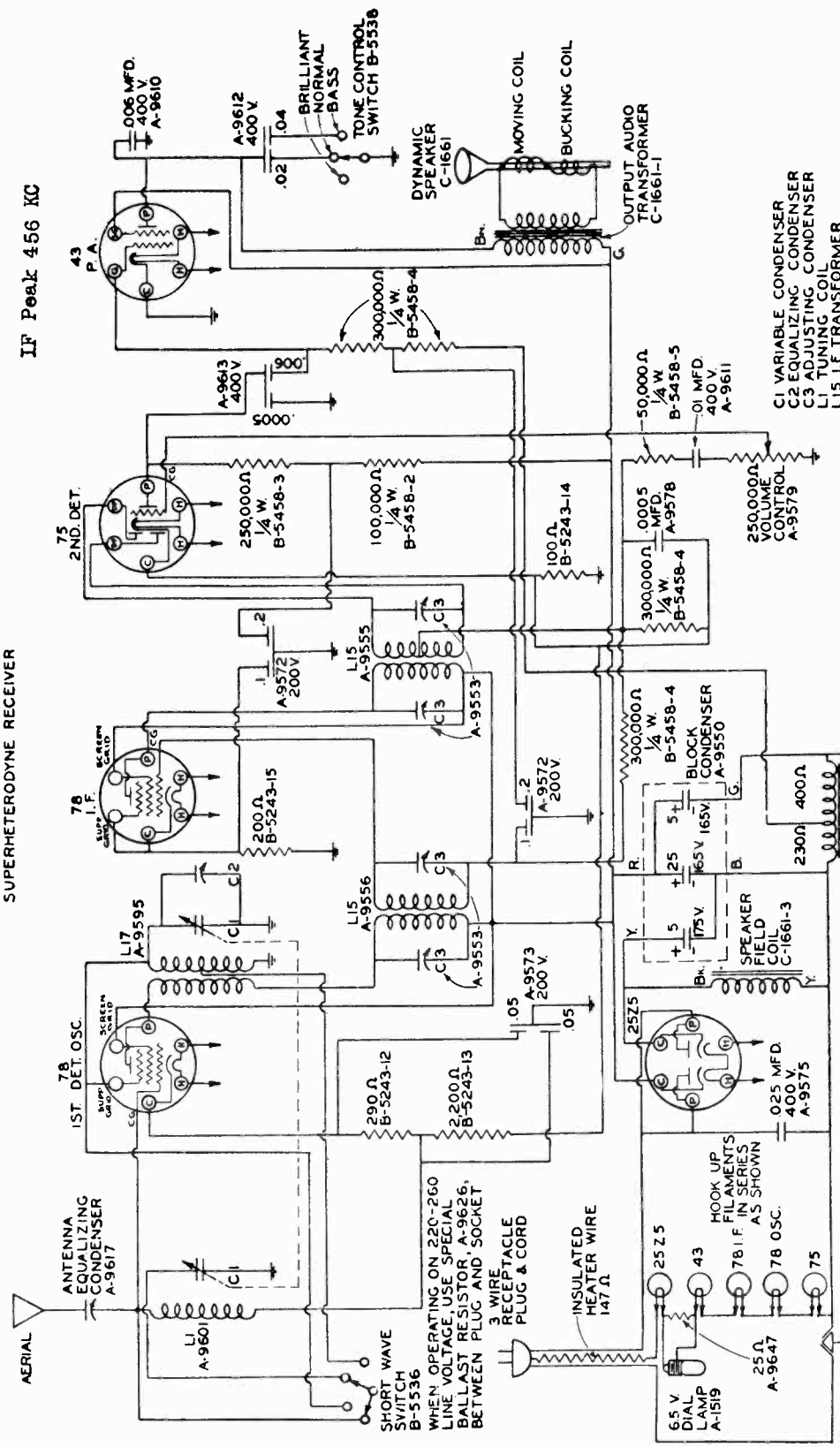
Change .006 Mfd. Condenser A-4434 to .003 Mfd. Condenser A-9793
Change 330 Ohm Resistor B-5243-10 to 160 Ohm Resistor B-5243-17
Change 550 Ohm Resistor B-5243-11 to 230 Ohm Resistor B-5243-18

SPARKS WITHINGTON CO.

MODEL 61,62
Schematic, Voltage

SPARTON MODELS 61-62

COMBINATION BROADCAST BAND - SHORT WAVE BAND AC-DC
SUPERHETERODYNE RECEIVER



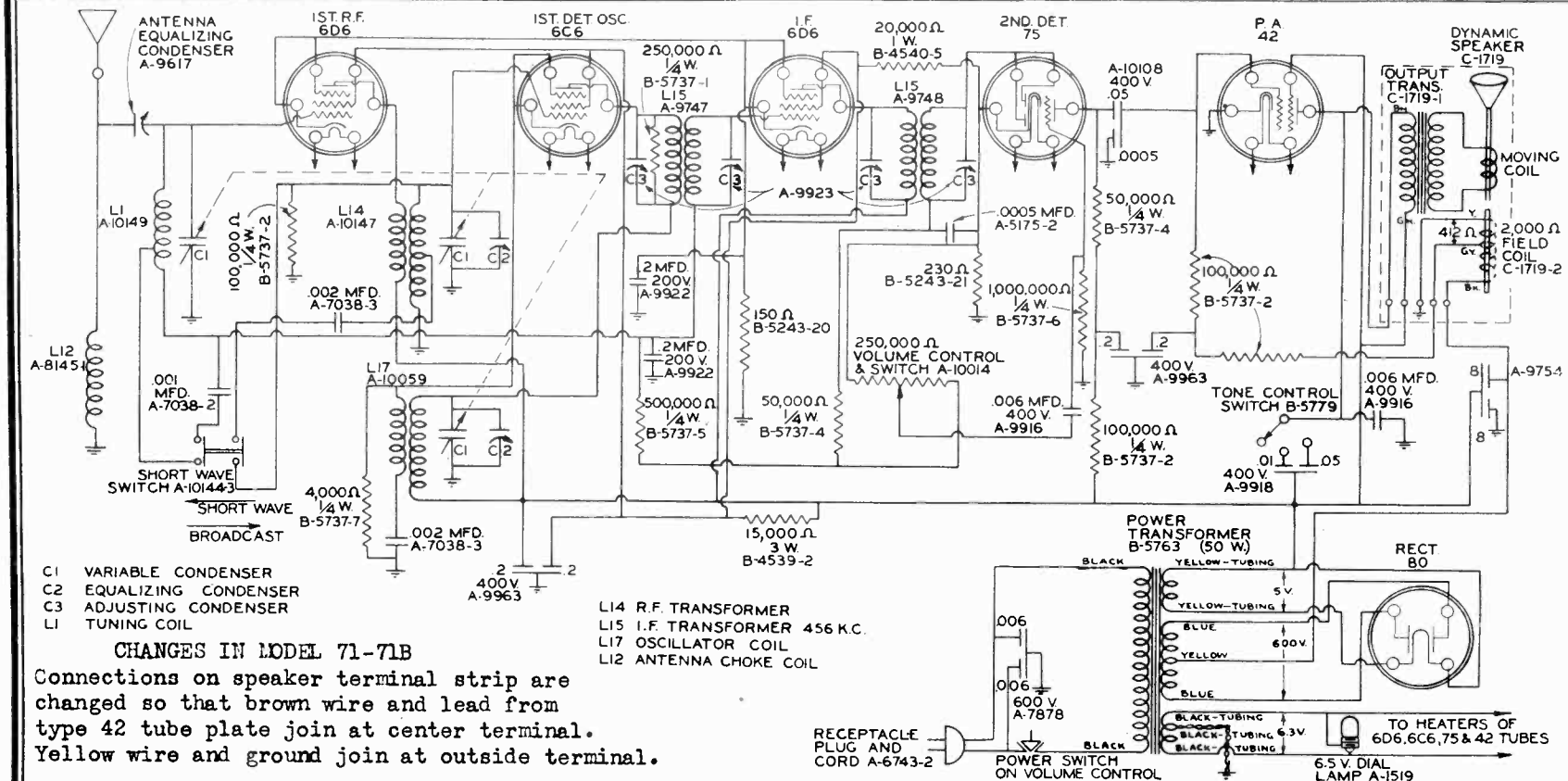
Voltage across speaker field is 100-120

VOLTAGE DATA — Volume Control at FULL

Line Voltage 120 Tube	Location	Heater	Plate	Control Grid	Screen Grid	Plate Current
2525	Rectifier	22-28	-------	----------	----------	----------
43	Power	22-28	92-98	14-18	98-108	18-25
75	Det-AVC	5.9-7	35-45	.4-.65	------	.19-.22
78	IF Amp	5.9-7	98-108	1.8-2.5	98-108	7-10
78	Det-Osc	5.9-7	98-108	14-18	98-108	4-6

MODEL 71, 71-B
Schematic, Voltage
Resistance data

SPARKS WITHINGTON CO.



C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL

L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER 456 K.C.
L17 OSCILLATOR COIL
L12 ANTENNA CHOKE COIL

CHANGES IN MODEL 71-71B

Connections on speaker terminal strip are changed so that brown wire and lead from type 42 tube plate join at center terminal. Yellow wire and ground join at outside terminal.

Line Voltage 115

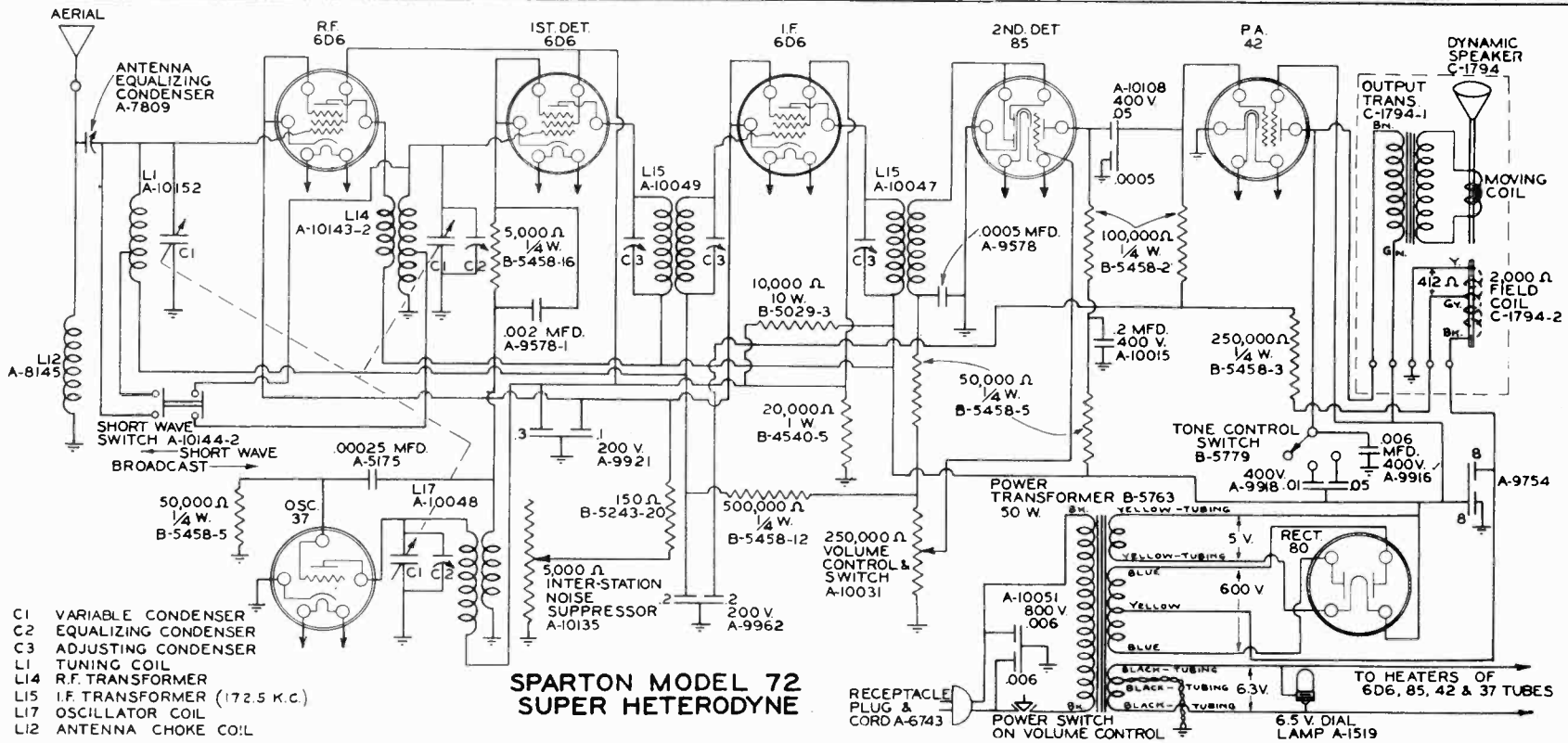
Position of Volume Control—Full with Antenna Disconnect

Position of Band Selector Switch—Broadcast

Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
6D6	R-F Stage	250	8.	100	—3.	—	35,000	20,000	750,000	150
6C6	1st Det.—Osc.	250*	*	100*	*	35,000	35,000	20,000	0	4,000
6D6	I-F Stage	250	8.	100	—3.	785,000	35,000	20,000	750,000	150
75	Diode Det.	0	0	—	—	785,000‡	750,000	—	—	230
	Triode A-F	135	0.5	—	—1.5	1,000,000	185,000	—	1,000,000	
42	Power Stage	240	20.	250	—12.**	385,000	35,000	35,000	200,000	0
80	Rectifier	450†	28.5***	—	—	600[1]	2,300	—	—	30,000[2]

(ORIGINAL) EFFECTIVE SEPTEMBER 13, 1933

Allow 15% + or — on all measurements.
All heater voltages: 6.3, except 80 Rectifier filament: 5.0
* Cannot be measured with test kit and adapter without causing oscillator to cease functioning; thus the omitted readings are of no value.
** Using 300,000 ohm volt meter.
*** Per plate.
† As read on 800 volt scale of A-C meter in Jewell 444
‡ Diode plates to I-F plate.
[1] Plate to plate on 80 Rectifier.
[2] Filament on 80 Rectifier to ground.



SPARTON MODEL 72 SUPER HETERODYNE

Line Voltage 115

Position of Volume Control—Full with Antenna Disconnected

Position of Inter-Station Noise Suppressor—Full

Position of Band Selector Switch—Broadcast

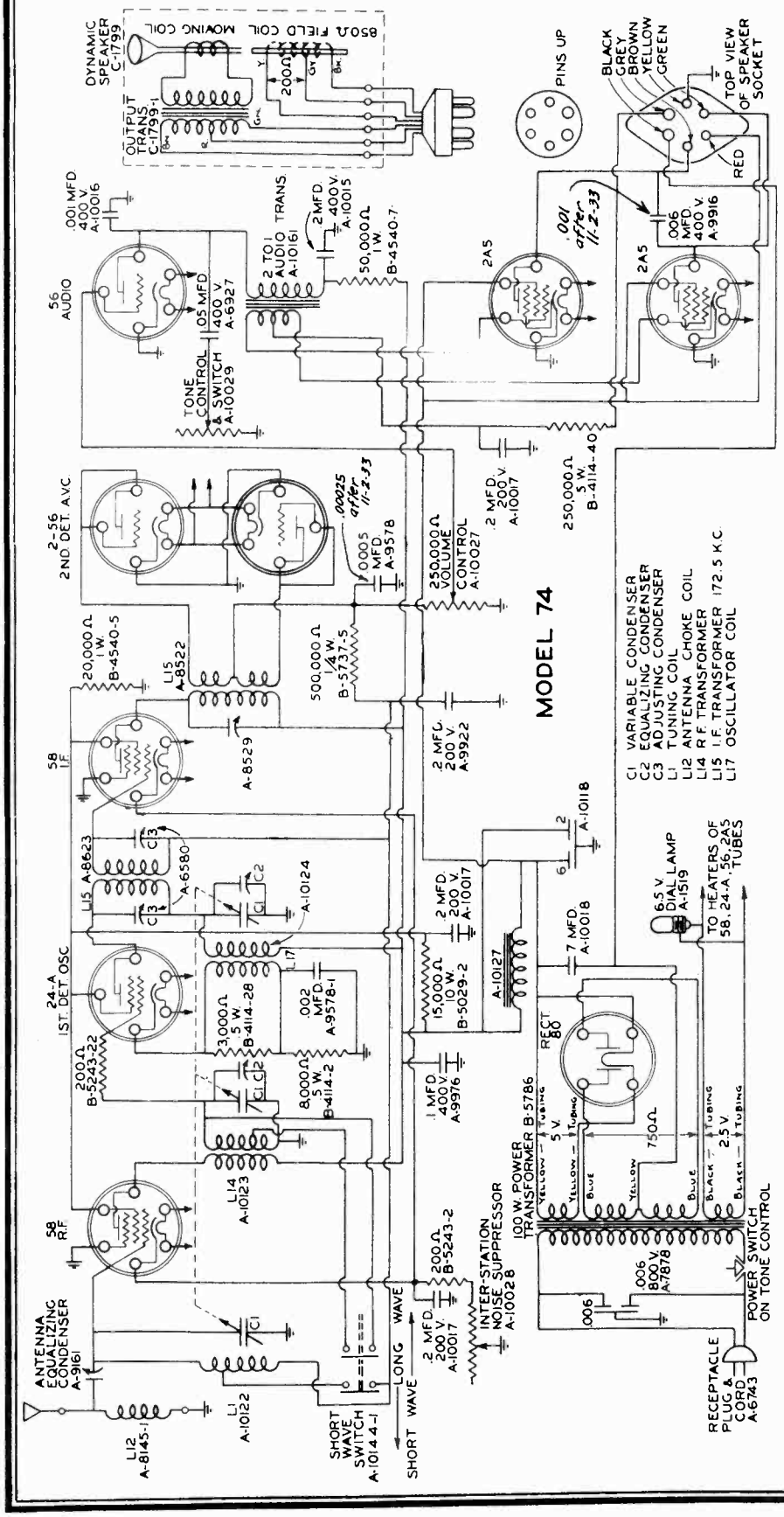
Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preced. Plate (Ohms)	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
6D6	R-F Stage	250	8.	100	—3.	—	30,000	20,000	750,000	150
6D6	1st Det.	250	*	100	*	30.000	30,000	20,000	0	5,400
37	Osc.	100*	*	—	*	80.000	20,000	0	50.000	0
6D6	I-F Stage	250	8.	100	—3.	780,000	30,000	20,000	750.000	150
85	Diode Det.	0	0	—	—	330,000‡	300,000	—'	—	0
	Triode A-F	22	1.6	—	0	280,000	180,000	—	250,000	
42	Power Stage	240	20.	250	—11.**	530,000	30,000	30,000	350,000	0
80	Rectifier	450†	26.***	—	—	600[1]	2,300	—	—	30,000[2]

Allow 15% + or — on all measurements.
All heater voltages: 6.3, except 80 Rectifier: 5.0 volts
* Cannot be measured with test kit and adapter without causing oscillator to cease functioning; thus omitted readings are of no value.
** Using 300,000 ohm volt meter.
*** Per plate.
† As read on 800 volt scale of A-C meter in Jewell 444
‡ Diode plates to I-F plate.
[1] Plate to plate on 80 Rectifier.
[2] Filament on 80 Rectifier to ground.

MODEL 74
Schematic, Voltage
Resistance data

SPARKS WITHINGTON CO.

(ORIGINAL) EFFECTIVE OCTOBER 13, 1933



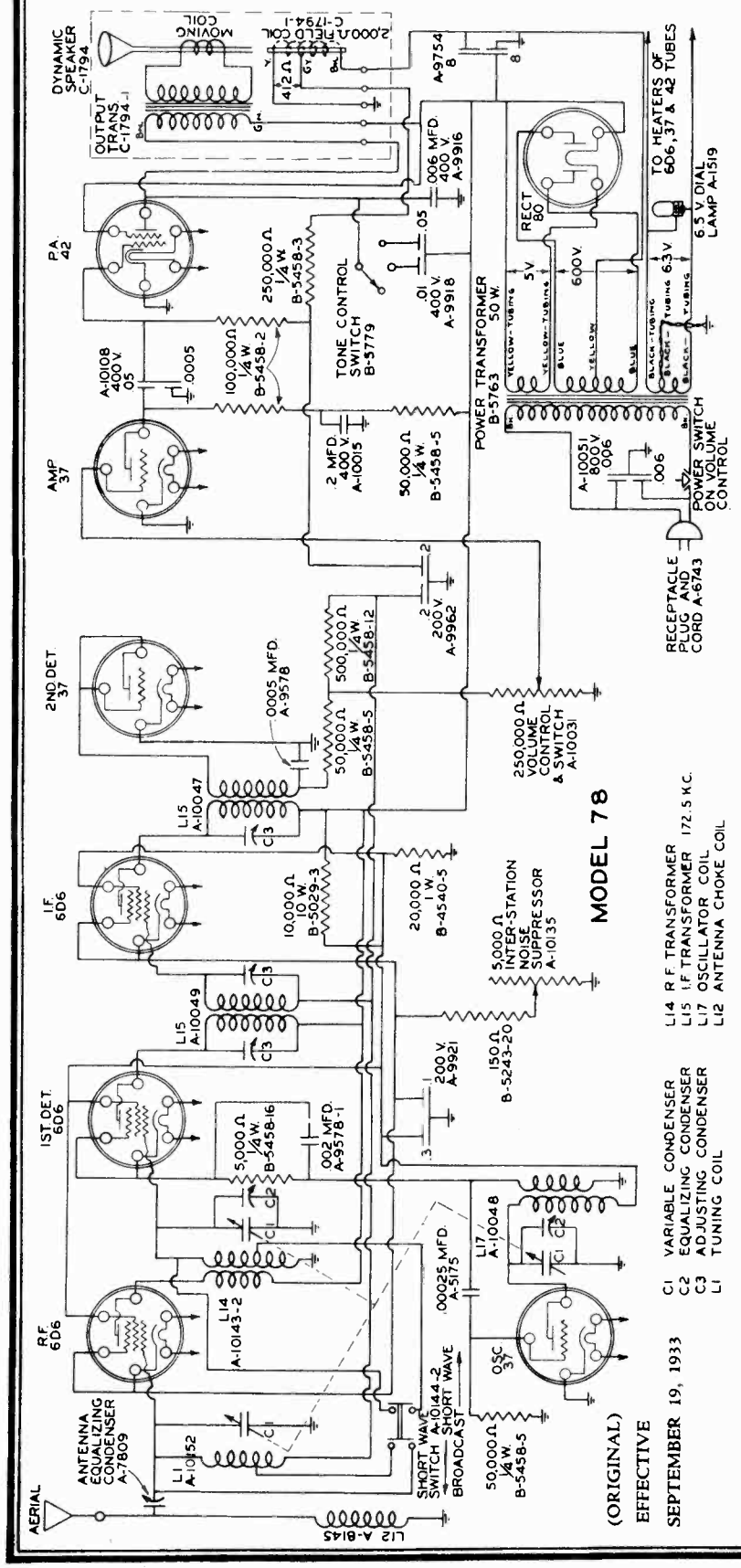
Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
58	R-F Stage	250	8.	110	—3.	—	35,000	20,000	750,000	200
24-A	1st Det.-Osc.	250	*	110	*	35,200	35,000	20,000	200	11,000
58	I-F Stage	250	8.	110	—3.	785,000	35,000	20,000	750,000	200
56	2nd Det.-A.V.C.	0	0	—	0	285,000	250,000	—	250,000	0
56	2nd Det.-A.V.C.	0	0	—	0	285,000	250,000	—	250,000	0
56	1st Audio	50	4.	—	0	0	85,000	—	250,000	0
2A5	Power Stage	260	28.	270	—11.**	335,000	35,000	35,000	250,000	0
2A5	Power Stage	260	28.	270	—11.**	335,000	35,000	35,000	250,000	0
80	Rectifier	490†	44.	—	—	2,200[1]	950	—	—	3,000[2]

Line Voltage 115
Inter-station Noise Suppressor-FULL
Volume Control- FULL with Antenna off
Band Selector Switch--Broadcast

Allow 15% + or — on all measurements.
All heater voltages: 2.5, except 80 Rectifier: 5.0 volts.
* Cannot be measured with test kit and adapter are of no value.
** Using a 300,000 ohm voltmeter.
† As read on 800 volt scale of A-C meter in Jewell 444
[1] Plate to plate on 80 Rectifier.
[2] Plate of 80 Rectifier to ground.

SPARKS WITHINGTON CO.

MODEL 78
Schematic, Voltage Resistance data



Line Voltage 115

Position of Volume Control—Full with Antenna Disconnected

Position of Inter-Station Noise Suppressor—Full

Position of Band Selector Switch—Broadcast

Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preced. Plate (Ohms)	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
6D6	R-F Stage	250	8.	100	—3.	—	30,000	20,000	750,000	150
6D6	1st Det.	250	*	100	*	30,000	30,000	20,000	0	5,400
37	Osc. Stage	100**	*	—	*	80,000	20,000	0	50,000	0
6D6	I-F Stage	250	8.	100	—3.	780,000	30,000	20,000	750,000	150
37	2nd Det.-A.V.C.	0	*	—	*	330,000	300,000	—	300,000	0
37	1st Audio	22	1.6	—	0	280,000	180,000	—	250,000	0
42	Power Stage	240	20.	250	—11.5‡‡	530,000	30,000	30,000	350 000	0
80	Rectifier	450†	26.‡	—	—	600[1]	2,300	—	—	30,000[2]

All heater voltages: 6.3 except 80 Rectifier: 5.0 volts.
Allow 15% + or — on all measurements.

* Cannot be measured with test kit and adapter without causing oscillator to cease functioning; thus the omitted readings are of no value.

** Using a 300,000 ohm volt meter.

‡ Per plate.

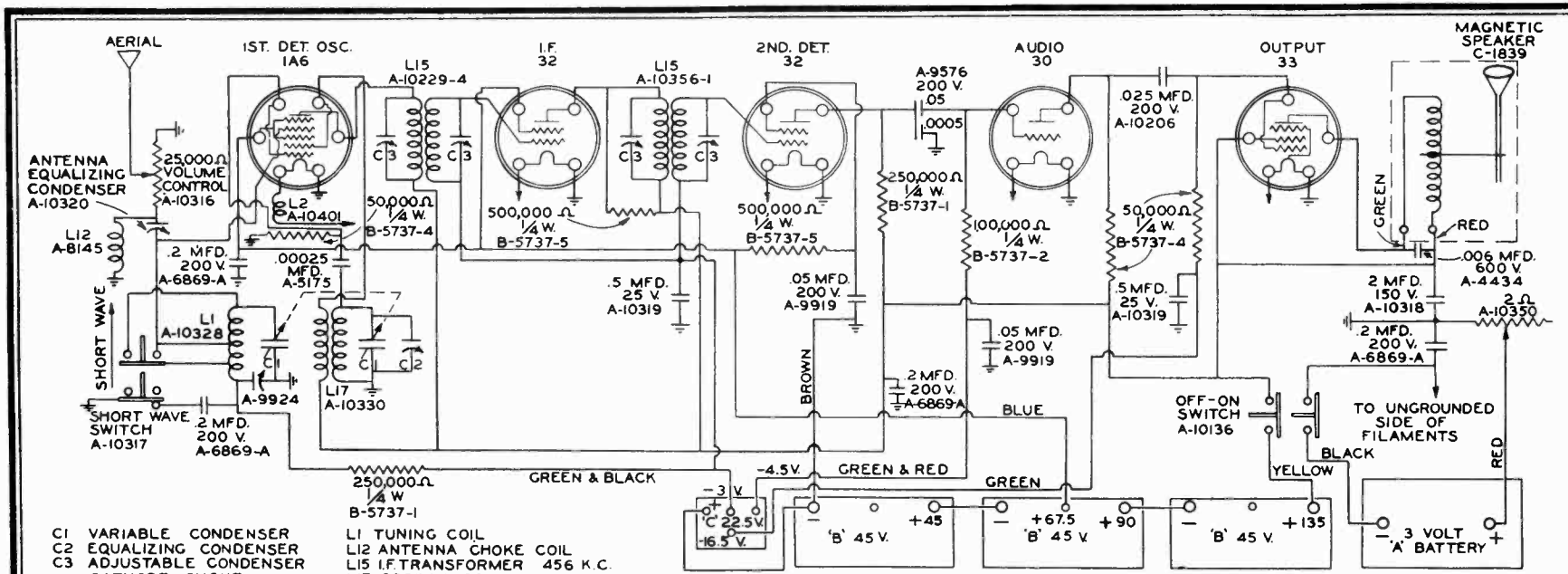
† As read on 800 volt scale of A-C meter in Jewell 444 Analyzer.

[1] Plate to plate on 80 Rectifier.

[2] Filament on 80 Rectifier to ground.

MODEL 81
Schematic, Voltage
Resistance data

SPARKS WITHINGTON CO.



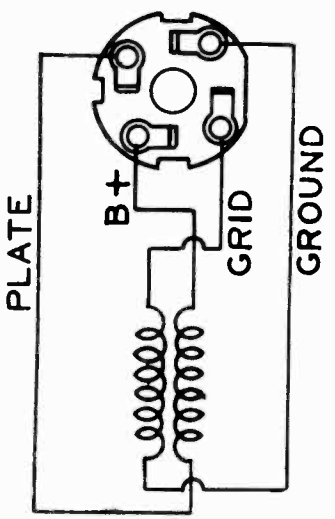
C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTABLE CONDENSER
L2 CATHODE CHOKE

L1 TUNING COIL
L12 ANTENNA CHOKE COIL
L15 I.F. TRANSFORMER 456 K.C.
L17 OSCILLATOR COIL

SPARTON MODEL 81 COUNTRY HOME RECEIVER SUPERHETERODYNE

(ORIGINAL) EFFECTIVE OCTOBER 25, 1933

HOOK UP OF TERMINALS ON OSCILLATOR COIL A-10330

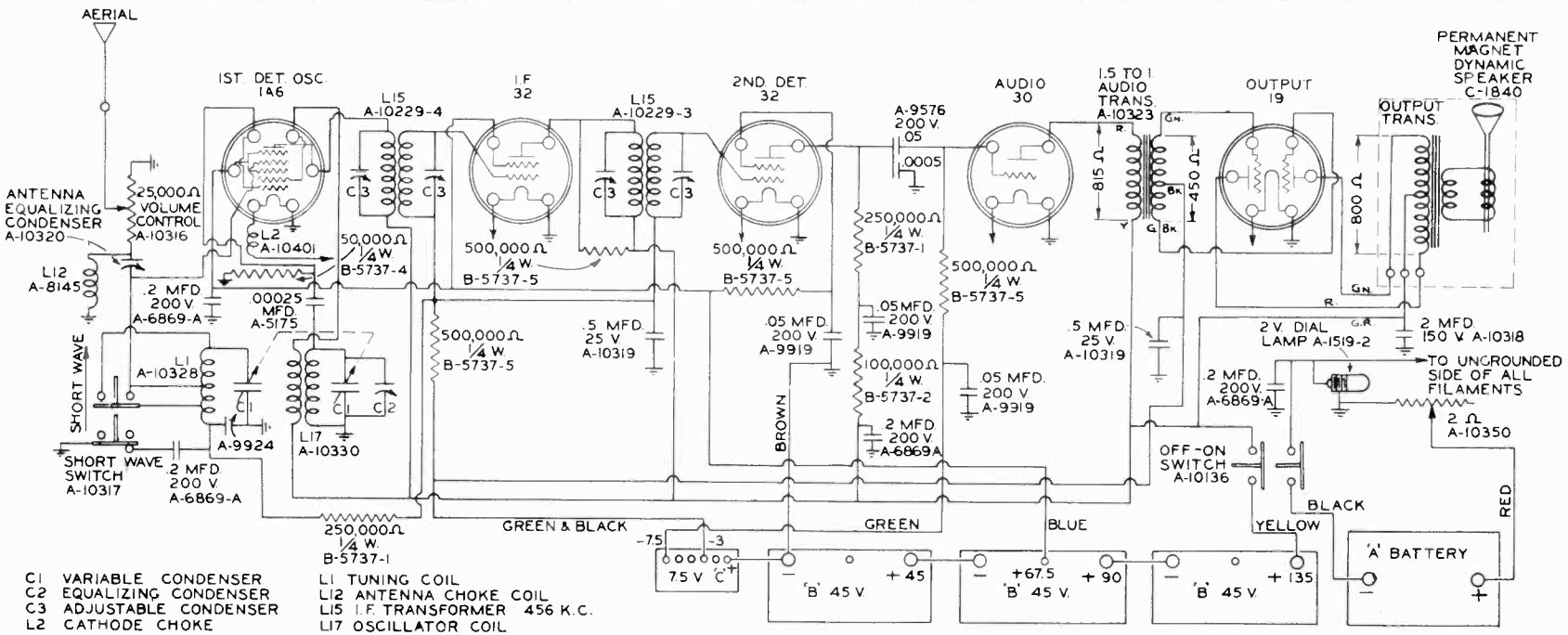


Condition of "A" Battery—Good
Condition of "B" Batteries—Good
Condition of "C" Battery—Good

Position of Volume Control—Full with Antenna Disconnected
Position of Band Selector Switch—Broadcast

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
1A6	1st Det.-Osc.	135	1.3	67.5	—3.	—	12.5	0	250,000	0
32	I-F Stage	135	1.7	67.5	—3.	25	10.0	0	12.5	0
32	2nd Det.	135	.6	50.	—3.	20	250,000	500,000	10.0	0
30	1st Audio	135	3.0	—	—4.5	300,000	100,000	—	50,000	0
33	Power Stage	135	14.5	135	—16.5	150,000	630	0	50,000	0

NOTES: Allow 15% + or — on all resistance measurements (all battery leads connected together).
All filament voltages: 2.4 volts.
"A" battery drain 0.5 ampere.
"B" battery drain 30. milliamperes.



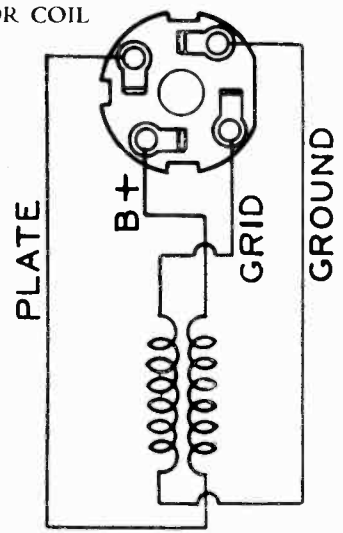
C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTABLE CONDENSER
L2 CATHODE CHOKE

L1 TUNING COIL
L12 ANTENNA CHOKE COIL
L15 I.F. TRANSFORMER 456 K.C.
L17 OSCILLATOR COIL

SPARTON MODEL 82 COUNTRY HOME RECEIVER SUPERHETERODYNE

(ORIGINAL) EFFECTIVE OCTOBER 20, 1933

HOOK UP OF TERMINALS ON OSCILLATOR COIL A-10330



MODEL 82

Condition of "A" Battery—Good

Condition of "B" Batteries—Good

Condition of "C" Battery—Good

Position of Volume Control—Full with Antenna Disconnected

Position of Band Selector Switch—Broadcast

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
1A6	1st Det.-Osc.	135	1.3	67.5	—3.	—	12.5	0	750,000	0
32	I-F Stage	135	1.7	67.5	—3.	500,000	12.5	0	500,000	0
32	2nd Det.	135	.6	50.	—3.	500,000	350,000	500,000	500,000	0
30	1st Audio	135	3.0	—	—7.5	85,000	80	—	500,000	0
19	Power Stage	135	4.0	—	—3.	300	75	—	220	0

NOTES: Allow 15% + or — on all resistance measurements (all battery leads connected together).
All filament voltages: 2.0 volts.

SPARKS WITHINGTON CO.

MODEL 82
Schematic, Voltage
Resistance Data

SPARTON PAGE 4-17

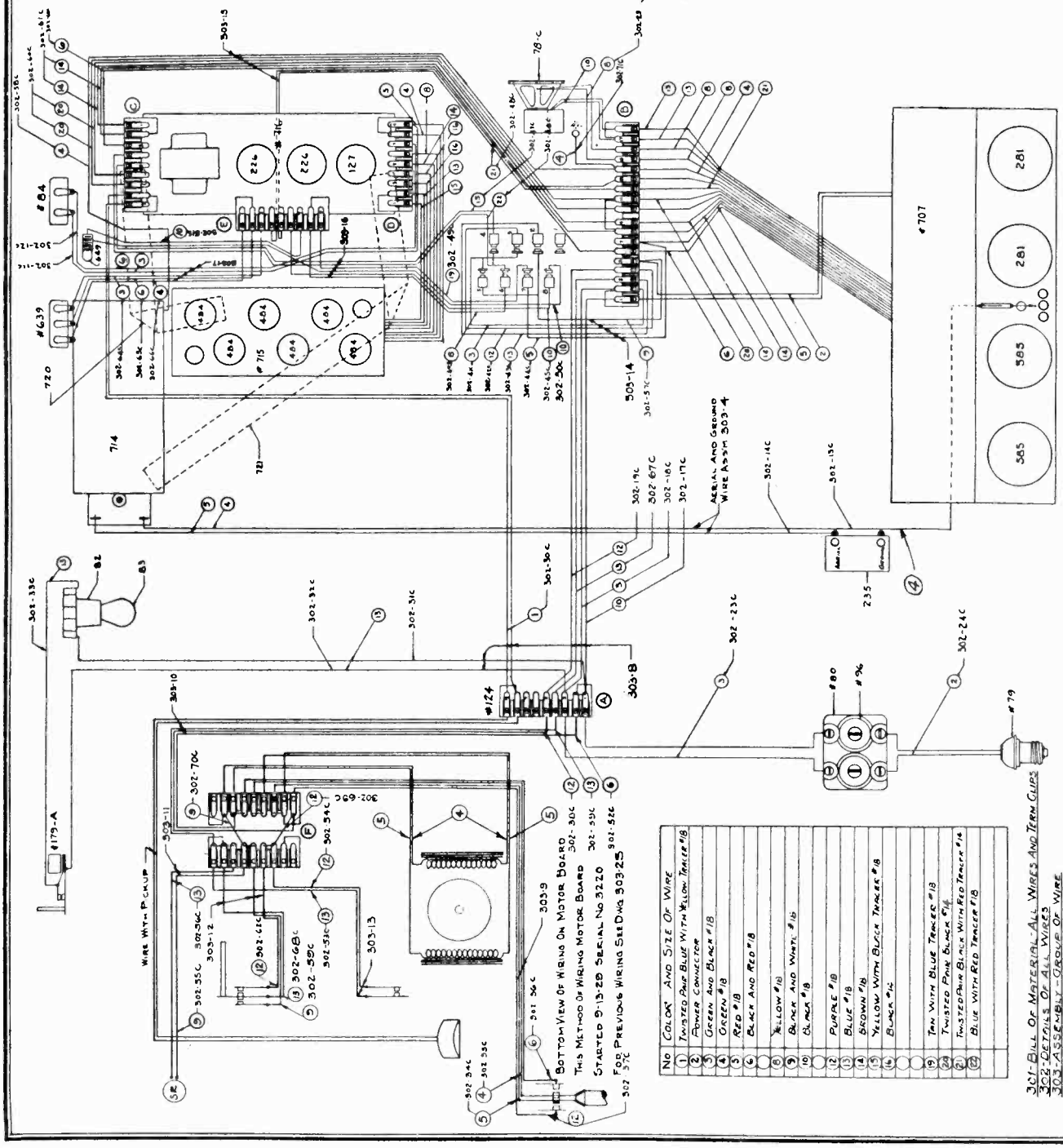
MODEL 101
Voltage
Assembly wiring

SPARKS WITHINGTON CO.

SPARTON—Model 101-103-109
Line Voltage 120—Volume Control Full

TUBE NO. IN ORDER	TYPE OF TUBE	POSITION OF TUBE (1ST RF DET. ETC	READINGS PLUG IN SOCKET OF SET								
			TUBE OUT		TUBE IN TESTER						
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	C VOLTS (CONTROL GRID)	CATHODE - HEATER VOLTS	NORMAL PLATE M A	PLATE M A GRID TEST	PLATE CHANGE M A	SCREEN GRID VOLTS
1	C-484	1st RF	3.2	125	3	120	9		4.3	7.3	3.0	
2	C-484	2nd RF	3.2	126	3	122	8		6.5	11.4	4.9	
3	C-484	3rd RF	3.2	125	3	122	8		8	9.5	1.5	
4	C-484	4th RF	3.2	125	3	122	8		6.5	11.2	4.7	
5	C-484	5th RF	3.2	128	3	120	8		6.3	11.0	4.7	
6	C-484	Det.	3.2	240	3	185	32		3.8	6.	2.2	
7	585	Audio	7.9	345	7.7	340	65		55	60	5	
8	585	Audio	7.9	345	7.7	340	65		55	60	5	
9	281	Rect.	8	-	7.7	-	-		68	-	-	
10	281	Rect.	8	-	7.7	-	-		68	-	-	

*Model 101—2 Additional 226 Tubes, Also 1 484

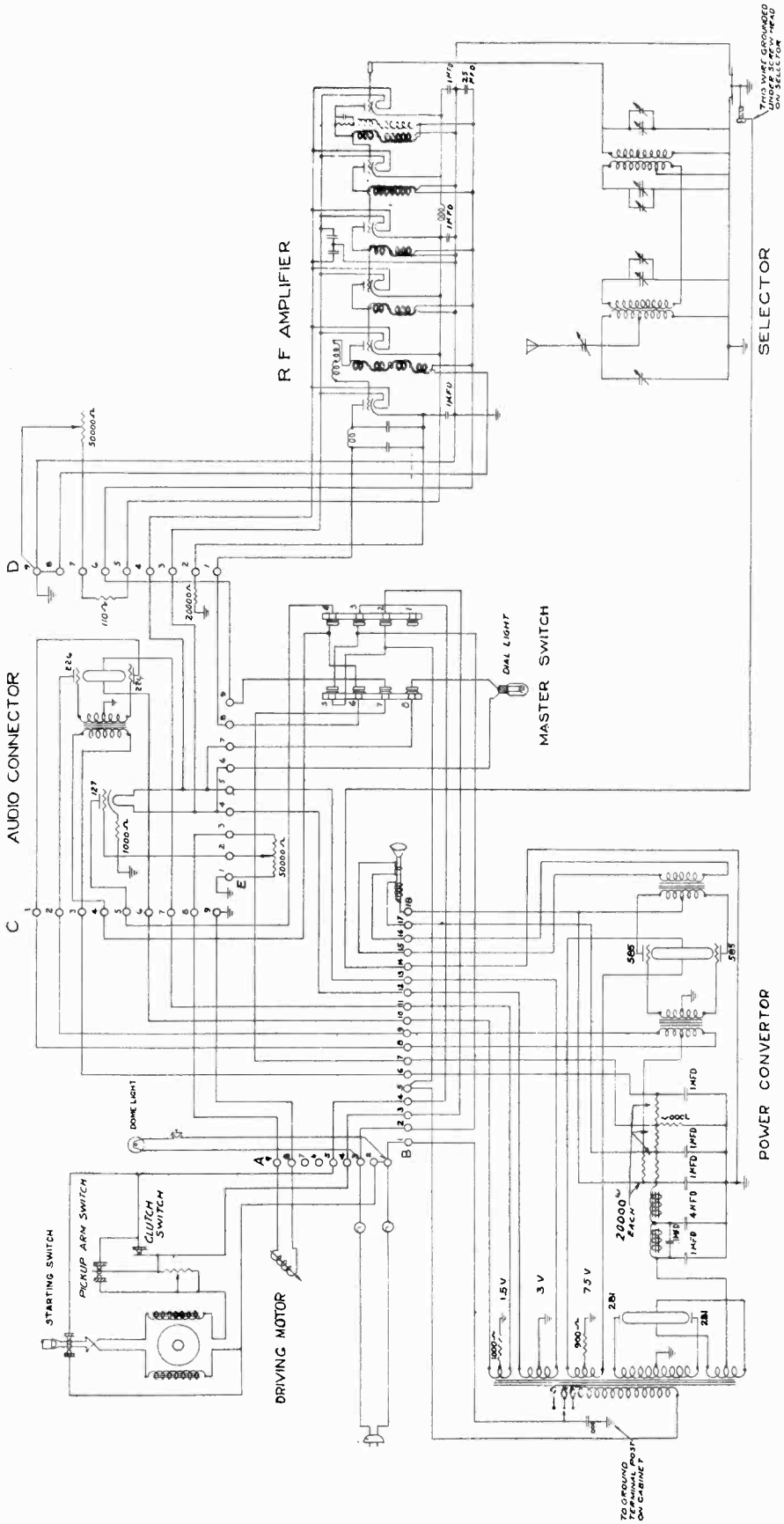


No	COLOR AND SIZE OF WIRE
1	TWISTED PAIR BLUE WITH YELLOW TRACER #18
2	POWER CONNECTOR
3	GREEN AND BLACK #18
4	GREEN #18
5	RED #18
6	BLACK AND RED #18
7	YELLOW #18
8	BLACK AND WHITE #18
9	BLACK #18
10	
11	PURPLE #18
12	BLUE #18
13	BROWN #18
14	YELLOW WITH BLACK TRACER #18
15	BLACK #14
16	
17	TAN WITH BLUE TRACER #18
18	TWISTED PINK BLACK #14
19	TWISTED PAIR BLACK WITH RED TRACER #14
20	BLUE WITH RED TRACER #18

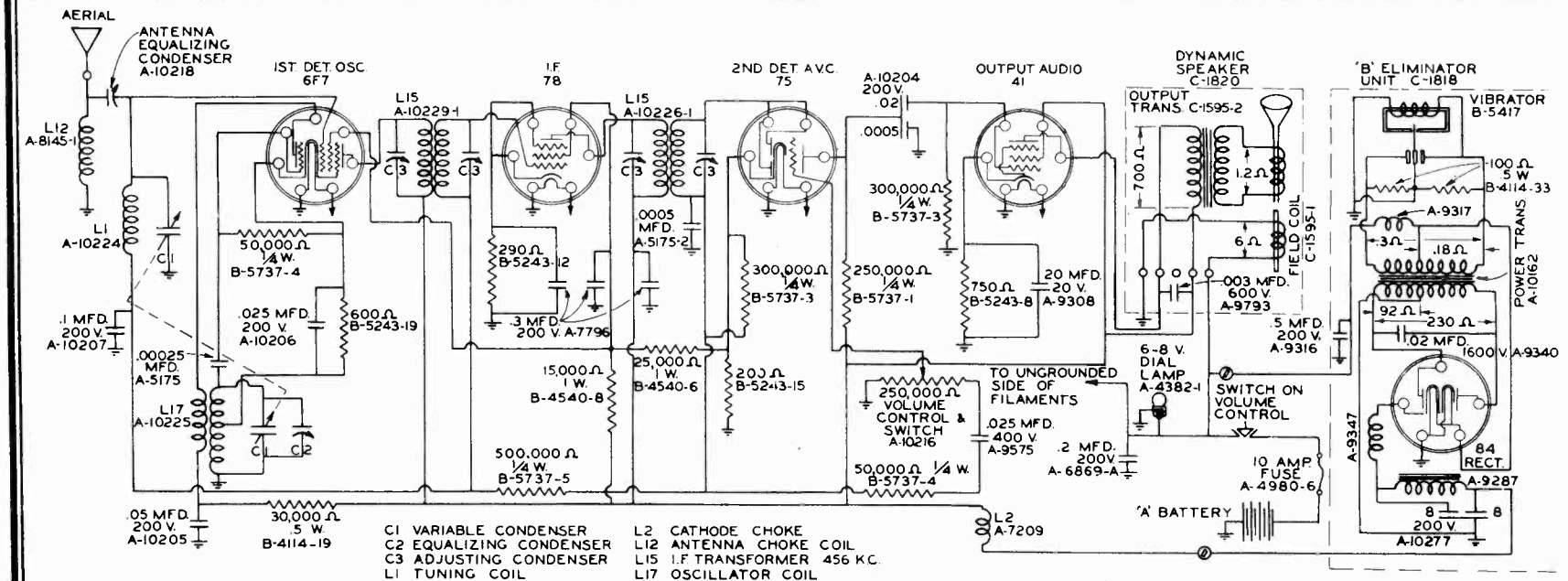
301-BILL OF MATERIAL-ALL WIRES AND TERM CLIPS
302-DETAILS OF ALL WIRES
303-ASSEMBLY-GROUP OF WIRE

SPARKS WITHINGTON CO.

MODEL 101
Ensemble
Schematic



Schematic Drawing of Sparks Ensemble Model 101



SPARTON MODEL 333
AUTOMOBILE RADIO RECEIVER
SUPERHETERODYNE

(ORIGINAL) EFFECTIVE OCTOBER 24, 1933

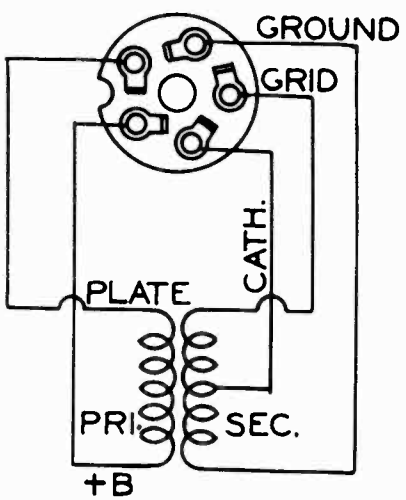
Condition of "A" Battery—Good

Position of Volume Control—Full with Antenna Disconnected

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
6F7	Triode Osc.	100	3.5	—	—3.0	—	70,000	—	50,000	600
	Pent. Mixer	200	6.	100	—2.5	850,000	40,000	25,000	800,000	
78	I-F Stage	200	6.	100	—2.5	840,000	40,000	25,000	800,000	290
75	Diode Det.-AVC	0	0	—	—	—	300,000	—	—	200
	A-F Triode	200	1.	—	—1.2	550,000	290,000	—	250,000	
41	Power Stage	185	18.	200	—16.0	590,000	40,000	40,000	300,000	750
84	Rectifier	250	25.	—	—	—	92	—	—	40,000

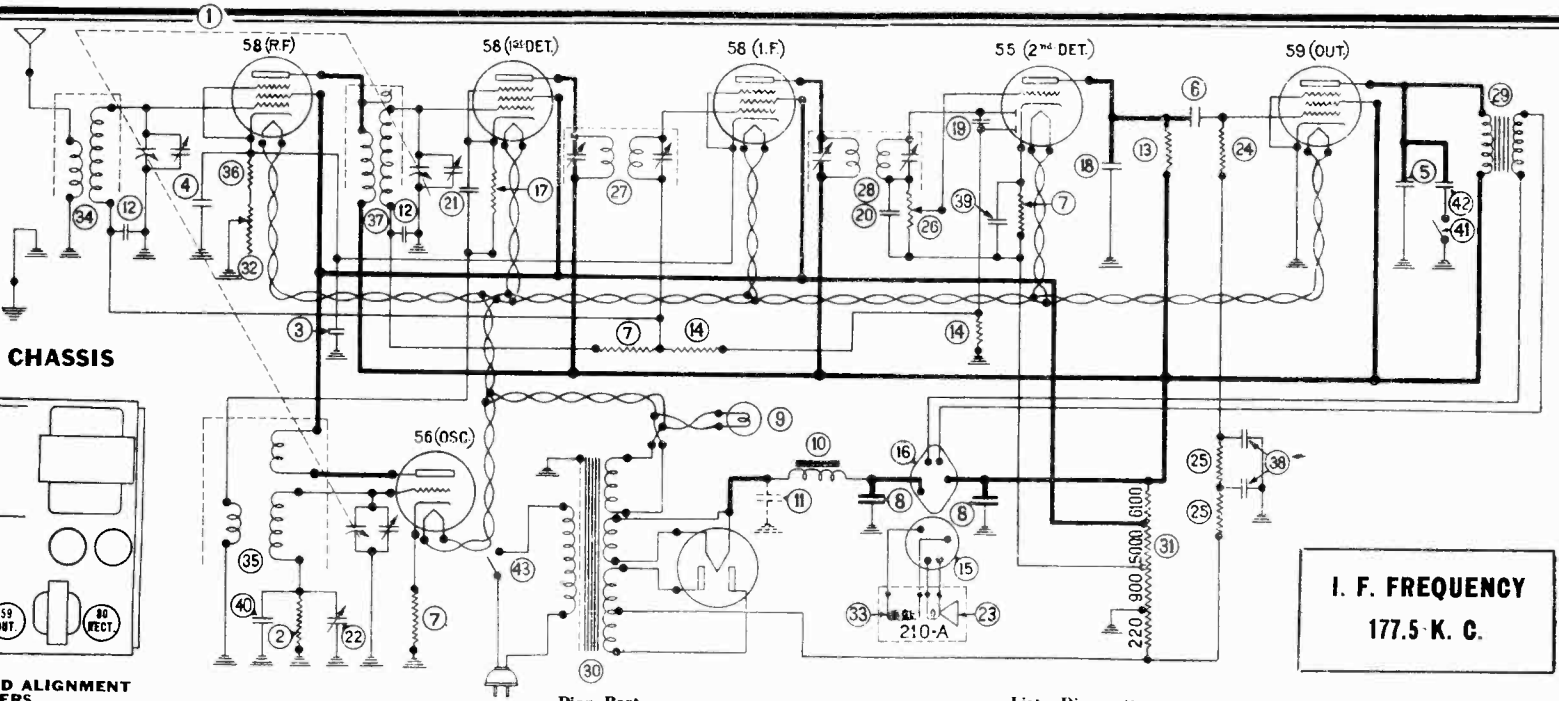
NOTES: Allow 15% + or — on all measurements.
All heater voltages: 6.3.
"A" battery drain: 5.7 amperes.

HOOK UP OF TERMINALS ON OSCILLATOR COIL A-10225

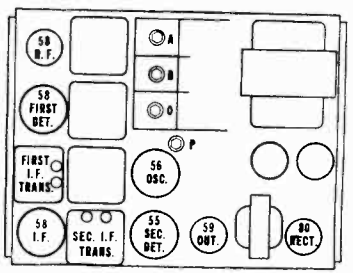


STEWART - WARNER CORP.

MODEL R-106
Schematic, Voltage
Parts List, Socket



FRONT OF CHASSIS



TUBE LAYOUT AND ALIGNMENT TRIMMERS

I. F. FREQUENCY
177.5 K. C.

VOLTAGE TABLE

LINE VOLTAGE 115 — VOLUME AND SENSITIVITY CONTROLS FULL ON

Tube Circuit	Type of Tube	Filament Voltage	Plate Voltage	Screen Grid Voltage	Bias Voltage
58	R. F.	2.29	245	97	3.1
56	Osc.	2.28	97	...	9.3
58	1st Det.	2.28	245	97	...
58	I. F.	2.26	245	97	3.1
55	2nd Det.	2.24	66	...	7.9
59	Output	2.24	229	245	17.4
80	Rect.	4.78	...	...	...

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltages.

*This reading taken between negative end of voltage divider and chassis.

Diag. No.	Part No.	Description	List Price
1	67248	3 gang tuning condenser	$5.50
2	67259	45,000 ohm, ¼ w. carbon res.	.25
3	67294	.1 mf., 200 v. tubular cond.	.30
4	67297	.25 mf., 200 v. tubular cond.	.40
5	67298	.01 mf., 600 v. tubular cond.	.30
6	67299	.02 mf., 400 v. tubular cond.	.30
7	67303	2,000 ohm, ¼ w. carbon res.	.25
8	67328	8 mf., 440 v. electrolytic cond.	1.75
9	67551	2.5 volt pilot lamp	.25
10	67584	Filter choke coil	2.00
11	67588	8 mf., 500 v. electrolytic cond. (For 25 cycle sets only)	1.80
12	67762	.05 mf., 200 v. tubular cond.	.25
13	67938	100,000 ohm, 1 w. carbon res.	.25
14	67939	1 megohm, ½ w. carbon res.	.25
15	67971	Speaker cable only	.40
	67972	Speaker cable and plug	.60
	81092	Speaker plug only	.20
16	81042	Speaker socket	.20
17	81151	4,000 ohm, ½ w. carbon res.	.25
18	81155	.0005 mf. pigtail mica cond.	.25
19	81156	.001 mf. pigtail mica cond.	.30
20	81157	.00025 mf. pigtail mica cond.	.30
21	81190	.1 mf., 200 v. tubular cond. & bracket	.35
22	81231	Oscill. pad trimming cond.	.50
23	81274	Diaphragm (R210A and RL211A)	2.75
	81279	Diaphragm & shell (RH211A)	2.75
24	81381	150,000 ohm, ½ w. carbon res.	.25
25	81382	60,000 ohm, ½ w. carbon res.	.25
26	81484	500,000 ohm volume control	.95
27	81510	1st I. F. trans. assembly	2.00
	81200	Double I. F. trim. cond. only	.60
	81234	I. F. transformer coils only	1.00
28	81511	2nd I. F. trans. assembly	2.00
	81200	Double I. F. trim. cond. only	.60
	81234	I. F. transformer coils only	1.00
29	81513	Single speaker output trans.	2.75
	81596	Twin speaker output trans.	2.75
30	81325	115 v., 60 cy. power trans.	8.00
	81571	115 v., 25 cy. power trans.	10.00
	81574	110-250 v., 50-60 cy. power trans.	10.00
31	81530	Voltage divider vitreous res.	1.25
32	81534	8,000 ohm sensitivity control & switch	1.50
33	81532	R210A speaker field coil (1000 ohms)	3.50
	81265	211A speaker field coil (460 ohms)	3.50
34	81538	R. F. tuning coil	1.00
35	81539	Oscillator tuning coil	1.00
36	81548	200 ohm, ¼ w. resistor	.25
37	81550	First detector tuning coil	1.00
38	81580	.25 mf., 100 v. shlded. cond. in one can	1.50
39		.25 mf., 100 v. shlded. cond. in one can	
		1 mf., 100 v. shlded. cond. in one can	
40	81593	.0075 mf. oscill. pad. cond.	.25
41	81616	Tone control switch only	.40
42	81618	.04 mf., 600 v. tubular cond.	.30
43		Power switch (mtd. on 81534)	

PARTS NOT SHOWN IN DIAGRAM

Part No.	Description	List Price
81568	R. F. tube shield shell	.20
81569	R. F. tube shield cover	.05
67964	1st det. & I. F. tube shield	.30
81213	R. F. coil shield (with hole)	.50
67326	R. F. coil shield (plain)	.50
81212	I. F. coil shield	.50
67712	Gang cond. rubber pad	.05
67711	Gang cond. rubber washer	.05
67236	Dial drive rubber bushing	.05
81592	Celluloid dial and frame	.35
67269	No. 14 x 1" chassis screw	.05
67667	1⅛ diam. ¼ hole washer	.01
81091	No. 8—32 x 1½ speaker mtg. screw	.01
66735	No. 8—32 thin hex. nut	.01
67953	Escutcheon plate	.50
81326	Escutcheon wood screws per (	.50
81413	Large knob	.25
81412	Small knob	.25
66961	Felt washer for knobs	.01

MODEL R-106
Alignment

STEWART - WARNER CORP.

SERVICE DATA FOR MODEL 106 CHASSIS

CIRCUIT DESCRIPTION

The Model 106 Stewart-Warner Radio Chassis is a seven tube superheterodyne receiver embodying three important features: (1) Interstation Noise Suppression; (2) "Q" or "Squelch" Circuit; (3) Delayed Automatic Volume Control Action. These desirable features are obtained thru the use of a 55 detector tube which functions as three tubes in one—two diode rectifiers and a triode amplifier. One diode is used for detection, the detected signal obtained in this way being then passed on to the grid of the triode part of the same tube where it is amplified at audio frequencies and fed into the pentode output tube. A constant negative bias is provided on this diode by means of a cathode resistor which prevents detection of signal or noise unless the incoming signal is above a certain minimum value, thus providing the "squelcher" or "Q" circuit. This circuit, in combination with a manually operated sensitivity control (No. 32 on the diagram) makes it possible to eliminate objectionable noise when tuning between stations, resulting in interstation noise suppression.

Delayed A. V. C. is obtained thru the second diode section of the 55 tube, which is coupled to the first by a .001 mfd. condenser. However, this diode plate is about 15 volts negative with respect to the cathode, so that no rectification and consequently no A. V. C. action can take place in this circuit unless the incoming signal builds up to this value, which represents the minimum signal capable of giving full audio output. Consequently no fading will be noticed throughout the range where the A. V. C. has hold. Furthermore, any station not capable of producing full output in the speaker, is not further reduced in volume by the action of the A.V.C. circuit, as is the case in normal A.V.C., so that with delayed A.V.C. weak stations come in with much better volume and the effects of severe fading are greatly minimized.

ALIGNING THE 106 CHASSIS

Alignment can be carried out intelligently only if the service man knows the general layout of the set, and how each circuit is affected during the process of alignment. The simplified top view of the chassis appearing on the other side of this sheet gives the layout of the receiver and locations of the various aligning adjustments. The following brief discussion of what actually happens during alignment should be carefully read, using the sketch as a basis before commencing the actual work.

LOCATION AND FUNCTION OF ALIGNING ADJUSTMENTS

The incoming signal is tuned first by the radio-frequency stage and then fed into the first detector circuit, where it is tuned again to improve selectivity. These circuits are brought into exact alignment by the two trimmer condensers "A" and "B," pointed out in the attached sketch. The tuned oscillator circuit is so designed that it tunes to a frequency exactly 177.5 K.C. higher than the incoming signal. This circuit is kept in exact step by means of two adjustments, the oscillator condenser trimmer "O," and the padding condenser "P," which can be reached thru a small hole in the chassis base just in back of the "O" condenser.

THE "O" TRIMMER IS MAINLY EFFECTIVE AT THE HIGH FREQUENCY END OF THE DIAL, AND THE PADDING CONDENSER "P" AT THE LOW FREQUENCY END. The alignment routine which will be outlined takes this into consideration.

The two intermediate frequency (I.F.) transformers are of the tuned input,—tuned output type and each winding is tuned by a separate trimmer condenser, making a total of four additional adjustments. The first I.F. transformer is in the shield at the right side of the set, while the second I.F. transformer is at the rear of the chassis. The I.F. trimmer adjusting screws can easily be reached thru two small holes at the top of each shield.

PRELIMINARY STEPS IN ALIGNING

In aligning the Model 106 it is essential to use a high grade oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. circuit to function, making correct alignment impossible. The output meter must be sufficiently sensitive to give a satisfactory reading with this low signal.

Before starting the alignment procedure see that the volume control and inter-station noise suppressor are full on, and the output meter connected either between the pentode plate and ground **thru a .25 mfd condenser** or across the voice coil, depending upon its sensitivity.

ALIGNING PROCEDURE

With this preliminary discussion clearly in mind, the actual alignment can be started. The following step-by-step routine should be followed for satisfactory results:

1. Set up the oscillator, and tune it to exactly 177.5 K.C. (This frequency can be accurately determined by tuning in a station at either 710 or 1420 K.C. and beating the 4th or 8th harmonic of the oscillator 177.5 K.C. signal against it. To be sure that you have the harmonic of the 177.5 K.C. signal, instead of some other frequency, tune in the other 177.5 harmonics on the broadcast dial. These should come in 177.5 K.C. on either side of the original setting. **Do not use the oscillator calibration curve to determine this intermediate frequency.**)

2. Connect the oscillator output across the grid clip of the first detector tube and ground.

3. Adjust the oscillator output to give about one-half full scale deflection of the output meter.

Adjusting the I. F. Circuits

1. Adjust all four I.F. trimmer condensers, in each case tuning carefully to make sure that maximum deflection is obtained on the output meter.

IT IS VERY IMPORTANT THAT ABSOLUTELY NO INWARD PRESSURE BE APPLIED TO THE ALIGNMENT TOOL, OR THE CONDENSER MAY SPRING BACK TO A DIFFERENT SETTING AS SOON AS THE TOOL IS REMOVED.

2. Go back and repeat all four adjustments since the adjustment of each I.F. trimmer affects the others to a certain extent, thus necessitating readjustment.

Adjusting R. F. and Oscillator Circuits

1. Twist the aerial and ground wires of the set together for their entire length to reduce noise pick-up. Connect the aerial wire to the output of the oscillator and **ground both set and oscillator.** Adjust the oscillator frequency to 1400 K.C. and carefully tune the receiver to give maximum output. Adjust the oscillator output to produce about one-half full scale deflection of the output meter.

2. Carefully tune the radio frequency stage "A" trimmer till the output meter reading reaches a maximum.

3. Retune the set and adjust the "B" first detector trimmer for maximum output. The oscillator, or "O" trimmer should not be touched unless the set is badly out of calibration at the high frequency end of the dial.

4. Set the oscillator at 600 K.C. and tune the set carefully to this frequency.

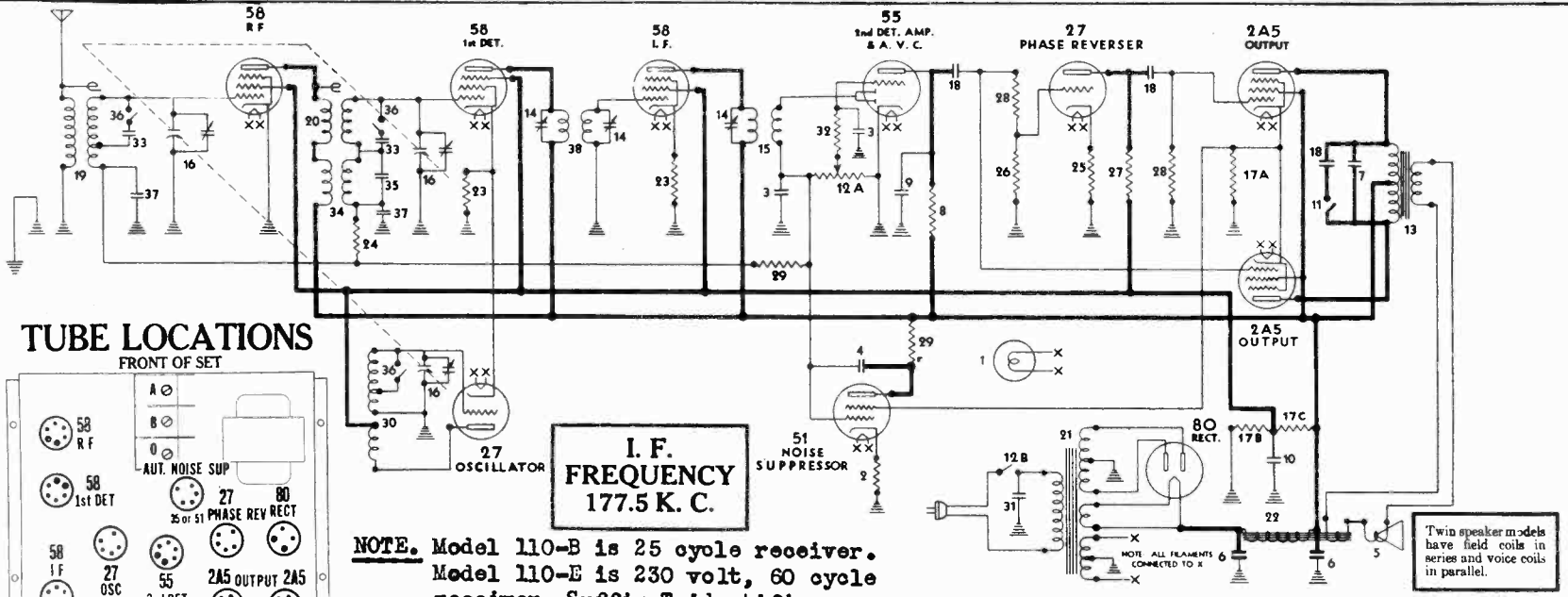
5. Adjust the oscillator padding condenser "P" for maximum output, **RETUNING THE SET AFTER EACH CHANGE IN ADJUSTMENT. This is important.**

6. Turn back the oscillator to 1400 K.C., tune the set to the same frequency, and very carefully readjust the "A" and "B" trimmer condensers to produce maximum output.

The receiver should now be perfectly aligned.

STEWART - WARNER CORP.

MODEL R-110 Series
Schematic, Voltage
Parts List, Socket



TUBE LOCATIONS

FRONT OF SET

NOTE. Model 110-B is 25 cycle receiver. Model 110-E is 230 volt, 60 cycle receiver. Suffix T identifies twin speaker model and F, phono.

R-110 PARTS LIST

VOLTAGE TABLE

LINE VOLTAGE 115 — VOLUME CONTROL FULL ON

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
58	R. F.	2.26	280	101	—0.1	0
58	1st. Det.	2.27	281	101	—0.1	5.7
58	I. F.	2.29	280	101	0	3.9
27	Osc.	2.32	101		0	5.7
55	2nd Det.	2.34	26.0		—0.1	0
51 or 35	Noise Suppressor	2.37	17.0	17	—0.1	1.1
27	Phase Reverser	2.36	35.0		0	2.8
2A5	Output	2.34	271	281	0	17.0
2A5	Output	2.33	272	281	0	17.0
80	Rectifier	4.95	353 Volts D. C. from Fil. to Ground			

—0.1 Volt from Diodes of 55 to Ground.

Speaker Field Voltage 72 Volts (Half of this across each field in twin speaker models.

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

Diag. No.	Part No.	Description	List Price
1	67551	Pilot Light, 2½ volt, .5 amp.	$0.15
2	81151	4000 ohm ¼ watt resistor	.20
3	81157	.00025 mfd. condenser	.30
4	81158	.0001 mfd. condenser	.25
5	81274	Single speaker diaphragm assembly (Note: See 83045 for twin speaker)	2.75
6	81347	8 mfd. 475 volt Electrolytic condenser	1.75
7	81415	.002 mfd. 1000 volt condenser. (Used in twin speaker models only) (Note: See 83011 for single speaker sets)	.35
8	81810	110,000 ohm 1 watt resistor	.20
9	81812	.00051 mfd. condenser	.25
10	81901	8 mfd. 180 volt dry electrolytic cond.	1.20
11	81903	Tone control switch	.45
12A, 12B	81904	500,000 ohm volume control; Line switch — In one unit	1.25
13	81907	Single speaker output transformer (Note: See 83096 for twin speaker)	2.25
14	81940	I. F. trimmer condenser	.50
15	81947	2nd I. F. transformer coil	1.25
16	81988	Variable condenser	3.65
17A, 17B, 17C	83001	200 ohm 1.5 watt resistor; 10,000 ohm 1 watt resistor; 7500 ohm 5 watt resistor — In one unit	.75
18	83007	.02 mfd. 600 volt condenser. (For single speaker models) (Note: For twin speaker models see 83352)	.35
..	83011	.004 mfd. 600 volt condenser. (Used in single speaker models only.)	.30
19	83024	Antenna coil	1.00
20	83025	Detector coil	1.00
21	83028	115 volt 60 cycle power transformer (Note: See 83103 for 230 volt 50-60 cycle transformer.) (See 83416 for 115 volt 25 cycle transformer.)	6.00
..	83045	Twin speaker diaphragm and shell assem.	1.75
22	83071	Single speaker field coil (Note: See 83092 for twin speaker field coil)	2.25
23	83077	500 ohm 1 watt resistor	.25
24	83078	2000 ohm ¼ watt resistor	.20
25	83079	4000 ohm 1 watt resistor	.25
26	83080	51,000 ohm ¼ watt resistor	.20
27	83081	76,000 ohm ½ watt resistor	.25
28	83082	260,000 ohm ¼ watt resistor	.20
29	83083	1.1 meg. ½ watt resistor	.25
..	83092	Twin speaker field coil	2.25
30	83094	Oscillator tuning coil	1.00
..	83096	Twin speaker output transformer	2.25
..	83103	230 volt special tapped power transformer	7.00
31	83216	.02 mfd. 1000 volt condenser	.35
32	83286	21,000 ohm ¼ watt resistor	.20
33	83329	.0015 mfd. fixed condenser	.25
34	83339	Short wave detector coil	.75
35	83341	16 mmfd. special capacity	.15
36	83344	Short wave range switch	1.00
..	83352	.015 mfd. 600 volt condenser. (For twin speaker models only)	.35
37	83353	.05 mfd. 100 volt condenser	.30
38	83392	1st I.F. transformer coil	1.00
..	83416	115 volt 25 cycle power transformer	8.50

MISCELLANEOUS PARTS NOT ON DIAGRAM

Part No.	Description	List Price
67236	Rubber drive roller	$0.02
81413	Tuning knob	.25
81834	6-prong tube socket	.10
81837	4-prong tube socket	.15
81910	Tube shield	.15
81924	Pilot light socket and bracket	.15
81951	5-prong tube socket	.10
81974	Power cord and plug	.60
83049	Button for covering aligning condenser openings	.05
83064	Escutcheon plate	.30
83105	Dial and gear assembly	.50
83134	Speaker cable	.40
83248	Volume control knob	.20

SERVICE DATA FOR MODEL 110 CHASSIS

CIRCUIT DESCRIPTION

The Model 110 Stewart-Warner Radio Chassis is a ten tube Superheterodyne receiver embodying the following important features: (1) Push-pull Resistance Coupled Power Output Tubes; (2) Short Wave Band for the reception of 2500 and 1715 K. C. police calls; (3) Automatic Noise Suppression; and (4) Automatic Volume Control (A.V.C.).

The incoming signal is tuned and amplified by the R. F. amplifier tube to improve selectivity and sensitivity, and to reduce image frequency interference. It then goes to the tuned first detector stage where it beats with the output of the oscillator tube to produce a 177.5 K. C. intermediate frequency signal. This particular frequency is chosen to further improve the image frequency ratio.

The I. F. signal is amplified in a carefully-designed, high gain I. F. stage and is then rectified by the diodes of the 55 which are connected in parallel. This rectified signal appears across the 500,000 ohm potentiometer as an R.F. and A.F. D.C. voltage. Any desired portion of the audio voltage is selected by the moving arm of the potientiometer and impressed on the grid of the triode section which operates as an audio frequency amplifier. The potentiometer thus acts as a manual volume control.

The necessary A.V.C. operating potential is developed by virtue of the rectified radio frequency drop across the potentiometer resistance. This is smoothed out by a resistance-capacity filter and applied as a bias to the grids of the R.F. and first detector tubes. Thus as the incoming signal increases or decreases in strength the bias is raised or lowered proportionately and so the audio output is maintained at a constant value.

The automatic noise suppression is accomplished by the 51 tube which is connected to act as a variable capacity across the audio output of the detector. This lowers the high frequency audio response of the set as the signal strength decreases, and thus reduces the noise background which tends to increase as the incoming signal becomes weaker.

The 27 phase reversing tube makes it possible to use the output tubes in a resistance-coupled push-pull circuit which eliminates the distortion which would be produced by an input transformer, increases the low frequency response, and greatly improves the tone quality.

The phase reversal tube as used in the resistance-coupled push-pull circuit, functions as follows: By means of a voltage divider arrangement (resistances Nos. 26 and 28) a part of the audio output of the 55 is impressed on the grid of the 27, which then amplifies the signal, reverses the phase and applies it to the grid of one of the 2-A-5 output tubes. The other 2-A-5 receives its signal direct from the 55. Thus the two output tubes receive signals in opposite phase relation giving a true push-pull effect without the use of a transformer. By this method about 7 watts of undistorted power output are available with excellent tone quality.

Short wave reception is accomplished by shunting parts of the R.F. and detector coils by condensers, and by shorting out part of the oscillator coil.

ALIGNING THE 110 CHASSIS

Alignment can be carried out intelligently only if the service man knows the general layout of the set, and how each circuit is affected during the process of alignment. The simplified top view of the chassis appearing on the other side of this sheet gives the layout of the receiver. The following brief discussion of what actually happens during alignment should be carefully read, using the sketch as a basis before commencing the actual work.

LOCATION AND FUNCTION OF ALIGNING ADJUSTMENTS

R.F. alignment and calibration are accomplished by means of the three trimmer condensers located on the top of the variable condenser gang.

The first intermediate frequency (I.F.) transformer is a tuned-input, tuned-output type and each winding is tuned by a separate trimmer condenser. Looking at the chassis from the rear, these trimmer adjustment screws may be reached through holes in the left side of the chassis. In the second intermediate transformer, only the primary is tuned by a trimmer. This may be reached through a hole in the rear of the chassis. Each hole is covered by a flat metal button which may be pried out with a knife or small screwdriver.

PRELIMINARY STEPS IN ALIGNING

In aligning the Model 110 it is essential to use a high grade oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. circuit to function, making correct alignment impossible. The output meter must be sufficiently sensitive to give a satisfactory reading with this low signal.

Before starting the alignment procedure see that the volume control is full on, and the output meter connected either between the plates of the two 2-A-5 output tubes thru a .25 mfd. condenser or across the speaker voice coil, depending upon its sensitivity.

ALIGNING PROCEDURE

With this preliminary discussion clearly in mind, the actual alignment can be started. The following step-by-step routine should be followed for satisfactory results:

1. Set up the oscillator, and tune it to exactly 177.5 K.C. (This frequency can be accurately determined by tuning in a station at either 710 or 1420 K.C. and beating the 4th or 8th harmonic of the oscillator 177.5 K.C. signal against it. To be sure that you have the harmonic of the 177.5 K.C. signal, instead of some other frequency, tune in the other 177.5 harmonics on the broadcast dial. These should come in 177.5 K.C. on either side of the original setting. **Do not use the oscillator calibration curve to determine this intermediate frequency.)**
2. Connect the oscillator output across the grid cap of the first detector tube and ground.
3. Adjust the oscillator output to give about one-half full scale deflection of the output meter.

ADJUSTING THE I. F. CIRCUITS

1. Adjust all three I.F. trimmer condensers, in each case tuning carefully to make sure that maximum deflection is obtained on the output meter.

A Stewart-Warner phasing tool (No. T-79890, net price 75c) should be used for these adjustments. However a quarter inch (No. 4) Spintite socket wrench may be employed. It must be insulated by wrapping a piece of tape around it so that it will not short to the chassis because the plate trimmer adjusting nuts of the I.F. transformers are connected to B plus.

It is very important that absolutely no inward or sideward pressure be applied to the alignment tool, or the condenser may spring back to a different setting as soon as the tool is removed.

2. Go back and repeat all three adjustments since the adjustment of each I.F. trimmer affects the others to a certain extent, thus necessitating readjustment. Replace buttons covering trimmer holes to prevent tampering.

ADJUSTING THE R. F. AND OSCILLATOR CIRCUITS

1. Connect the aerial wire to the output of the oscillator and ground both set and oscillator. Adjust the oscillator frequency to 1400 K.C. and carefully tune the receiver to give maximum output. Adjust the oscillator output to produce about one-half full scale deflection of the output meter.
2. Carefully tune the radio frequency stage "A" trimmer till the output meter reading reaches a maximum.
3. **Retune the set** and adjust the "B" first detector trimmer for maximum output. The oscillator, or "O" trimmer should not be touched unless the set is badly out of calibration at the high frequency end of the dial.

Calibration can be checked by arranging a wire pointer above the condenser shaft center and then tuning in several stations of known frequency.

If the set is out of calibration, it can be re-calibrated as follows: Set the tuning dial at the frequency reading of some station between 1200 and 1500 kilocycles only, whose exact frequency is known and which can be picked up without any difficulty. Adjust the oscillator trimmer "O" until this station is brought in with maximum volume. Re-adjust the "A" and "B" trimmers again, since these are always affected by any change in the oscillator tuned circuit, taking care to retune the set between adjustments.

No adjustment is provided for aligning the set for the short wave band.

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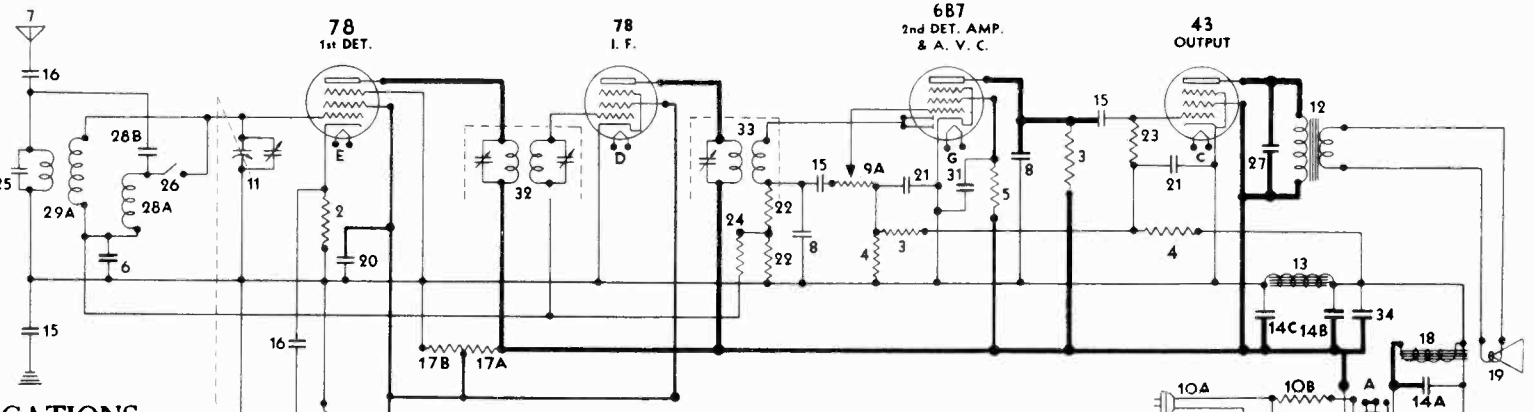
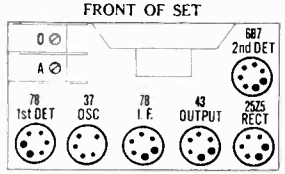
MODEL R-111, R-115 Schematic, Voltage Socket, Parts List



TUBE LOCATIONS

FRONT OF SET



NOTE: TUBE FILAMENTS ARE CONNECTED IN SERIES IN ALPHABETICAL ORDER.

I. F. FREQUENCY 456 K. C.

LINE VOLTAGE 115 A. C. VOLTAGE TABLE VOLUME CONTROL FULL ON

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
78	1st Det.	5.4	98	59	—0.4	5.8
37	Osc.	5.3	58		0	5.6
78	I. F.	5.7	98	59	—0.4	0
43	Output	20.	91	98	—2.9	0
25Z5	Rect.	22.	—21 —21			89 70 (Spkr.)
6B7	2nd Det.	5.4	21	37	—0.5	0

—0.4 Volt from Diode of 6B7 to Ground. Speaker field voltage 70.
For a 115 Volts D.C. line the above voltages will be about 10 to 15% lower with the exception of the speaker field voltage which will be about 85 and the filament voltages which will be the same. The A.C. filament voltages will depend upon the meter range and resistance.

IMPORTANT

All D. C. voltages mensured with respect to condenser frame, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltages.

R-111 AND R-115 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	67257	500 ohm ¼ watt resistor	$0.25
2	81151	4000 ohm ½ watt resistor	.20
3	81161	250,000 ohm ½ watt resistor	.20
4	81381	150,000 ohm ½ watt resistor	.25
5	81509	500,000 ohm ¼ watt resistor	.35
6	81630	.1 mfd. 100 volt paper condenser	.30
7	81671	Antenna wire per 100 ft.	.70
8	81812	.00051 mfd. mica fixed condenser	.25
9A, 9B	81908	500,000 ohm volume control; Line switch — In one unit	1.25
10A	81942	(Used in Model 111) Power cord and plug including filament series resistor	.85
10B	83295	(Used in Model 115) Power cord and plug including filament series resistor	.85
11	81948	Two gang variable tuning condenser	2.50
12	81956	Output transformer on 217-A speaker	2.00
13	81958	Filter choke assembly	1.75
14A, 14B, 14C	81959	4 mfd., 13 mfd., 7 mfd. — 3 section 150 volt dry electrolytic condenser	2.80
15	83007	.02 mfd. 600 volt paper fixed condenser	.35
16	83011	.004 mfd. 600 volt paper fixed condenser	.30
17A, 17B	83029	For Model 111 — 2500 ohm 1 watt res., 12500 ohm ½ watt res. — In one unit	.50
17A, 17B, 17C	83305	For Model 115 only — 2500 ohm 1 watt res., 12500 ohm ½ watt res., 20 ohm ballast res. — In one unit	.70
18	83042	Field coil and housing for 217-A speaker	2.75
19	83045	Diaphragm, voice coil, shell and spider assembly	1.75
20	83058	.25 mfd. 100 volt paper fixed condenser	.35
21	83063	.5 mfd. 100 volt paper fixed condenser	.45
22	83072	510,000 ohm ¼ watt resistor	.20
23	83082	260,000 ohm ½ watt resistor	.20
24	83083	1.1 meg. ½ watt resistor	.25
25	83109	.0001 mfd. mica fixed condenser	.20
26	83179	Short wave switch	.30
27	83219	.01 mfd. 600 volt paper fixed condenser	.30
28A, 28B	83254	Short wave coil; Short wave coupling condenser — In one unit	.60
29A, 29B	83255	Antenna coil; Oscillator coil — In one unit	1.25
30	83278	Pilot bulb (6.3 volt). Used on Model 115 only	.15
	83295	(For Model 115 only). Power cord and plug including filament series resistor. See part No. 81942 for Model 111	.85
	83305	For Model 115 only — 2500 ohm 1 watt res., 12500 ohm ½ watt res., 20 ohm ballast res. (See Part No. 83029 for Model 111)	.70
31	83353	.05 mfd. 100 volt paper fixed condenser	.30
32	83385	1st I.F. transformer with trimmers	2.00
33	83386	2d I.F. transformer with trimmers	2.00
34	83394	12 mfd. 100 volt dry electrolytic condenser	1.30

MISCELLANEOUS PARTS NOT LISTED ON DIAGRAM

Part No.	Description	List Price
81824	Antenna reel	$0.25
81834	6-prong tube socket	.10
81841	Antenna reel clip	.02
81891	Knob (used on Models 1116-7-8)	.40
81909	Tube shield	.05
81949	7-prong tube socket	.10
81951	5-prong tube socket	.10
83245	Tuning escutcheon — Used on	.10
83246	Volume control escutcheon — Models 1112-3-4	.10
83280	Knob. (Used on Model 1111)	.20
83292	Knob. (Used on Model 1119)	.25
83296	Volume control escutcheon — Used on	.10
83297	Tuning escutcheon — Model 115	.15
83299	Pilot light socket and bracket assembly. (Used on Model 115)	.15
83304	Knob. (Used on Model 115)	.25

STEWART - WARNER CORP.

SERVICE DATA FOR MODELS 111 AND 115 CHASSIS

CIRCUIT DESCRIPTION

The Models 111 and 115 Stewart-Warner Radio Chassis are identical except that the 115 has a pilot light inserted in the filament circuit. These models use a six-tube superheterodyne circuit employing automatic volume control (A.V.C.) through the action of the type 6-B-7 detector tube. They are designed for operation on 110-120 volt D.C. or 60 cycle A.C. power supplies. In addition to the regular broadcast band, these sets are designed to receive signals on the 175 and 120 meter police bands. In operation, the incoming signal is first passed to the tuned first detector circuit and then beats with the oscillator output to produce a 456 K. C. intermediate frequency signal.

The I.F. signal is amplified in an exceptionally high gain stage and then fed to the diodes of the 6-B-7 tube where it is rectified. The rectified current produces a modulated D.C. voltage drop across the two resistors No. 22. This audio modulation is impressed across the 500,000 ohm potentiometer. Any desired portion of the A.F. voltage is picked up by the moving arm of the potentiometer and applied to the grid of the 6-B-7 tube. The pentode section of the tube then acts as an A.F. amplifier. Good tone quality is made possible by the resistance-coupling and by the high power output of the 43 tube.

The necessary A.V.C. potential is taken from the mid-tap of the two resistors, No. 22, smoothed out by a resistance-capacity filter, and applied as a bias to the grids of the first detector and I. F. amplifier tubes. Thus as the incoming signal increases or decreases in strength, the bias is raised or lowered proportionally and the audio output of the set is maintained at a constant value.

ALIGNING THE 111 AND 115 CHASSIS

Alignment can be carried out intelligently only if the service man knows the general layout of the set, and how each circuit is affected during the process of alignment. The simplified top view of the chassis appearing on the other side of this sheet gives the layout of the receiver. The following brief discussion of what actually happens during alignment should be carefully read, using the sketch as a basis before commencing the actual work.

LOCATION AND FUNCTION OF ALIGNING ADJUSTMENTS

The first detector and oscillator circuits are aligned by the two trimmers, "A" and "O"; and are kept in exact step by the special shape of the rotor plates of the oscillator tuning condenser. This shaping of the plates makes it unnecessary to use a padding condenser for low frequency alignment.

For the reception of police calls and other short wave signals, a switch, No. 26, shunts an additional coil (No. 28A) across the first detector tuned circuit, thus making it tune to higher frequencies. The constants are such that it tunes to exactly 456 K. C. ABOVE the oscillator frequency and thus a 456 K.C. I.F. signal is produced on the short waves with no change in the oscillator circuit.

The first intermediate frequency (I.F.) transformer is a tuned-input, tuned-output type and each winding is tuned by a separate trimmer condenser. In the second I.F. transformer only the primary is tuned by a trimmer.

The I.F. transformers are located under the chassis in the front and the trimmers may be reached through holes in the front of the chassis.

PRELIMINARY STEPS IN ALIGNING

In aligning the Models 111 and 115 it is essential to use a high grade oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. circuit to function, making correct alignment impossible. The output meter must be sufficiently sensitive to give a satisfactory reading with this low signal.

Before starting the alignment procedure see that the volume control is full on, and the output meter connected either between the 43 plate and the **frame of the tuning condenser** thru a .25 mfd condenser or across the voice coil, depending upon its sensitivity. **Do not hook the output meter to the chassis.**

ALIGNING PROCEDURE

With this preliminary discussion clearly in mind, the actual alignment can be started. The following step-by-step routine should be followed for satisfactory results:

1. A modulated oscillator having a fundamental frequency of 152, 228, or 456 K.C. is needed to align the 456 K.C. intermediate frequency trimmers. Do not use the oscillator calibration curve to determine the frequency but determine by checking against broadcast stations. With the oscillator set at 152 K.C., the third harmonic is used for aligning and the fifth harmonic is 760 K.C. Thus if a 760 K.C. station is tuned in, the oscillator can be accurately adjusted by beating its fifth harmonic with the station.

To be sure that you have the harmonic of the 152 K.C. signal, tune in the other harmonics on the broadcast dial. These should come in 152 K.C. on either side of the original setting. With a 228 or 456 K.C. oscillator a similar procedure can be followed using a 910 K.C. station. (The exact frequency to be used is 912 K.C. but 910 will be close enough).

2. Connect the oscillator output from the grid cap of the first detector tube to the **frame of the variable condenser.**

3. Adjust the oscillator output to give about one-half full scale deflection of the output meter.

ADJUSTING THE I. F. CIRCUITS

1. Adjust all three I.F. trimmer condensers, in each case tuning carefully to make sure that maximum deflection is obtained on the output meter. A screwdriver can be used for this operation on some sets but in others the first I.F. transformer has a double trimmer consisting of a slotted screw for one trimmer and a hex. nut around it for the other. If a suitable aligning tool is not available, we can furnish one, Part No. T-79800, priced at 50c net.

IT IS VERY IMPORTANT THAT ABSOLUTELY NO INWARD OR SIDEWARD PRESSURE BE APPLIED TO THE ALIGNMENT TOOL, OR THE CONDENSER MAY SPRING BACK TO A DIFFERENT SETTING AS SOON AS THE TOOL IS REMOVED.

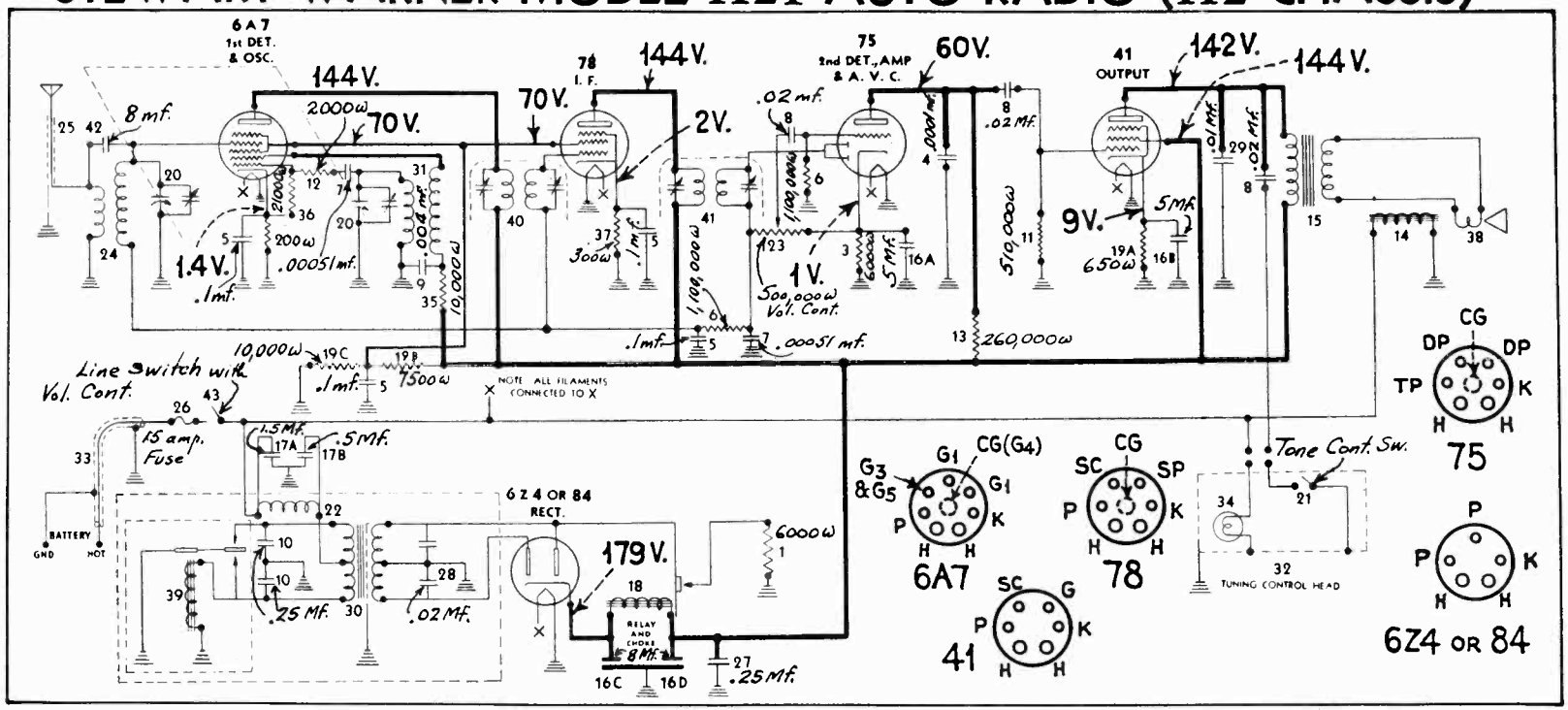
2. Go back and repeat all three adjustments since the adjustment of each I.F. trimmer affects the others to a certain extent, thus necessitating readjustment.

ADJUSTING THE R. F. AND OSCILLATOR CIRCUITS

Connect the aerial wire to the output of the oscillator and connect both set and oscillator to ground through a condenser of .1 mfd. or more. **Do not omit this series condenser** because the set is directly connected to the 110 volt line. Adjust the oscillator frequency to 1400 K.C. and carefully tune the receiver to give maximum output. Adjust the oscillator output to produce about one-half full scale deflection of the output meter.

2. Adjust the "A" first detector trimmer for maximum output. The oscillator, or "O" trimmer should not be touched unless the set is out of calibration at the high frequency end of the dial.

STEWART-WARNER MODEL 1121 AUTO RADIO (112 CHASSIS)



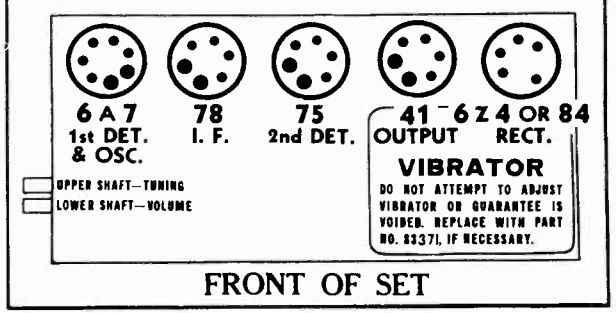
VOLTAGE TABLE

Battery Voltage 6.0 — Volume Control Full On

Tube Type	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Cathode (Bias) Voltage
6A7	1st Det. and Osc.	5.5	144	70	1.4
78	I. F.	5.5	144	70	2.0
75	2nd Det.	5.5	60	—	1.0
41	Output	5.5	142	144	9.0
84	Rect.	5.5	—	—	179

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltages.

TUBE LOCATIONS



I. F. FREQUENCY 456 K. C.

STEWART-WARNER CORP.

MODEL 112 (1121)
Schematic, Voltage
Socket

MODEL 112,(1121)
Alignment
Notes

STEWART - WARNER CORP.

STEWART-WARNER SERVICE MANUAL
MODEL 1121 AUTO RADIO

CIRCUIT DESCRIPTION

The Model 1121 Stewart-Warner Auto Radio makes use of a five-tube superheterodyne circuit (chassis model R-112). The action of the set is as follows:

An incoming signal is fed to the 6 A 7 combination detector and oscillator, where it is amplified and its frequency is converted to 456 K. C. This 456 K. C. intermediate frequency signal is amplified by the 78 tube I. F. stage and fed to the diode section of the 75 tube where it is rectified. This rectified signal appears across the 500,000 ohm potentiometer (No. 23 in the diagram) as an audio voltage, any desired portion of which is picked up by the sliding arm of the potentiometer and fed to the triode section of the 75 tube, which functions purely as an A. F. amplifier. Thus the potentiometer is made to act as a volume control.

The necesary A.V.C. voltage is obtained by virtue of the rectified radio frequency drop across the potentiometer resistance. This potential is smoothed out by an appropriate resistance-capacity filter and applied as a bias to the grids of the first detector and I.F. tubes. Thus as the incoming signal increases or decreases in strength, the bias is raised or lowered proportionately and the audio output of the set maintained at a constant level.

The audio circuit is an extremely simple yet efficient one and needs no special explanation.

A unique and important feature of the Model R-112 Radio chassis is the protective relay (No. 12 in the diagram). When the set is first turned on, the relay is arranged to connect a load of 6000 ohms across one half of the high voltage winding of the transformer, thus holding down the voltage peaks to a safe value until the heater type tubes warm up and start drawing plate current. This plate current flows thru the relay, causing it to open the 6000 ohm load. Incidentally the field winding of the relay is used as a choke to filter the rectified B voltage.

ALIGNING THE R-112 CHASSIS

In aligning the Model R-112 Radio chassis it is essential to use a high grade oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. circuit to function, making correct alignment impossible. The output meter must be sufficiently sensitive to give a satisfactory reading with this low signal.

Before starting the alignment procedure see that the volume control is full on and the output meter connected either between the pentode plate and ground thru a .25 mfd condenser or across the voice coil, depending upon its sensitivity.

Now proceed with alignment as follows:

1. Set up the oscillator and tune it to 456 K. C. This frequency can be determined by tuning in a station at 910 K. C. and beating the second harmonic of the oscillator 456 K. C. signal against it. Altho this will give an I. F. of 455 instead of 456, the difference is negligible.

Do not use the oscillator calibration curve to determine this intermediate frequency.

If the oscillator cannot tune to 456 K. C., it may be set to 228 or 152 K. C. and either the second or third harmonic of this signal used.

2. Connect the oscillator output between the grid cap of the first detector tube and chassis.

3. Align the I. F. trimmer condensers located on the front of the chassis just below the speaker so as to produce the maximum output. In some chassis, instead of four separate trimmers, each I. F. transformer has a double trimmer adjustment, a slotted screw for one trimmer and a hex nut around it for the other. If a suitable aligning tool is not available, an aligning tool T-79800, priced at 50c net can be purchased from Stewart-Warner.

Calibrating and Aligning the R. F. Circuits

1. Turn the variable condensers of the chassis all the way out of mesh.
2. Connect the tuning dial drive and set the red arrow of the tuning control to the first mark below 15 on the dial (this represents 1550 K. C.).
3. Tune the set to 14 on the dial (this corresponds to 1400 K. C.).
4. Connect the test oscillator to the antenna lead of the set and adjust it accurately to 1400 K. C.
5. Carefully adjust the trimmer on the rear of the variable condenser until the 1400 K. C. signal is brought in with maximum output. This calibrates the set.
6. Adjust the front trimmer of the variable condenser for maximum output, taking care to retune the set several times during the adjusting process. The set is now in correct alignment and calibration.

Note: When installing the set in the car, it will be necessary to re-calibrate the tuning head, since any bending of the flexible control shafts changes the dial reading.

This is done after the installation is made in the car as follows:

1. Mount the tuning head with its shafts on the steering column or dash.
2. Turn the volume control shaft (the lower one on the set) all the way to the left until the switch clicks.
3. Lock the volume control knob by turning the key of the tuning head to the left and turning the left hand knob to the left until it locks in place.
4. Turn the variable condenser shaft (the upper one on the chassis) all the way out (to the right).
5. Set the arrow on the tuning head to the first mark below 15 on the dial (1550 K. C.).
6. Attach the flexible shafts to their respective controls, making sure that the small coupling is shoved as far onto the shaft as possible. Make sure the set screws are well tightened.
7. Mount the tuning dial bracket and tighten the set screws holding the shaft casings in place. The casings should be pulled out as far as possible, allowing just enough to project into the bushing on the mounting bracket, to be held by the set screw.

ELIMINATING VIBRATOR HASH

Occasionally an early production model 112 auto radio chassis may be found in which the vibrator creates electrical interference known as "vibrator hash". This type of interference is similar in character to that caused by the ignition system but can be readily distinguished from the latter since it is present when the engine is not running. Vibrator hash may be eliminated as follows:

1. Remove the chassis from the metal cabinet.
2. With a heavy soldering iron, solder the top of the transformer-vibrator housing to the sides, making sure that you run a complete ring of solder clear around all four sides. If the top cover is already soldered. the set is probably of later production.
3. Check to see that the bottom cover is soldered to the side at least at one point.

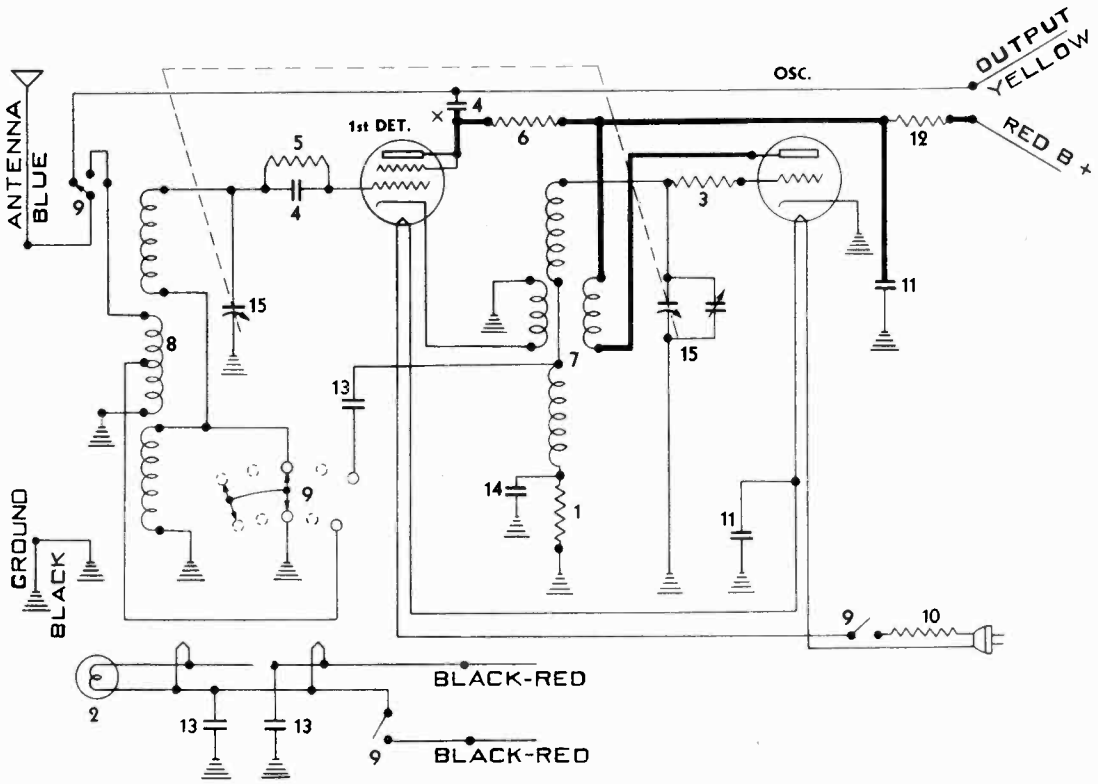
Special Instructions

Earlier production Model 1121 Auto Radio Receivers are somewhat more subject to motor interference than later sets. This condition can be rectified by:

(1) Shielding the pilot light and tone control lead running from the tuning control head to the set. Ordinary metal braiding may be used, altho our part 83382 shield, listing at 20c, will be found more satisfactory.

STEWART - WARNER CORP.

MODEL R-113, R-114
Schematic, Voltage



FILAMENT WIRING OF R-114

The Model R-113 Converter uses a 36 tube as first detector and a 37 oscillator. Model R-114 uses a 57 first detector and a 56 oscillator.

NOTE: The upper circuit diagram is that of the R-113. In the R-114, the filament circuit only is different, and is wired as shown in the lower diagram. In addition, a 6000 ohm carbon resistor, No. 67580 is inserted in series with the detector plate coupling condenser No. 4, at the point marked "X".

See Instruction Booklet for further information.

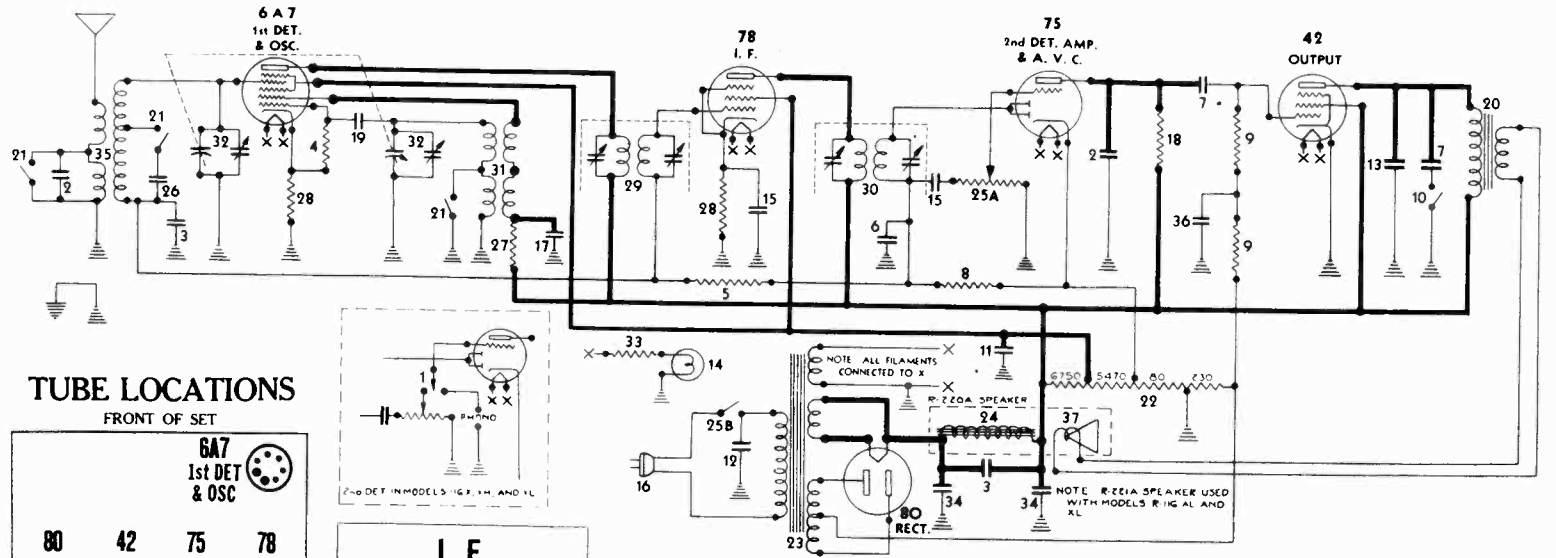
VOLTAGE TABLE

Plate Supply Voltage	1st Detector Plate Voltage	Oscillator Plate Voltage
170	14	59
210	16	70
250	19	83
270	20	89

The voltages are measured between the tube socket terminals and chassis, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for the detector voltage. The filament voltage readings of the 113 will also be dependent upon the type of meter used, but will be from 5.0 to 6.0 volts. The filament voltage of the Model 114 will be about 2.2 when used with a Model 110 Stewart-Warner broadcast set.

R-113-114 PARTS LISTS

Dia. No.	Part No.	Description	Price
1	67259	45,000 ohm, ¼ watt Carbon Resistor	$0.25
2	67551	2½ volt Pilot Bulb (Used in Model 114 only	.15
	67580	6000 ohm, ¼ watt Carbon Resistor (Used in Model 114 only)	.25
3	67981	400 ohm, ¼ watt Carbon Resistor	.25
4	S1158	.0001 Mica Fixed Condenser	.25
5	S1644	2.1 megohm, ¼ watt Carbon Resistor	.20
6	S1810	110,000 ohm, 1 watt Carbon Resistor	.20
7	S1985	Oscillator Coil	1.00
8	S1991	Antenna Coil	1.00
9	S1994	Three Section Range and Filament Switch	1.50
10	S3003	Power Cord and Plug including 315 ohm Filament Series Resistor (Used in Model 113 only)	.65
11	S3007	.02 mfd. 600 volt Fixed Condenser	.35
12	S3014	26,000 ohm, 2 watt Carbon Resistor	.35
13	S3015	.01 mfd. 200 volt Mica Fixed Condenser	.65
14	S3016	.00055 mfd Mica Fixed Condenser	.15
15	S3017	Two gang Variable Condenser	2.50
		MISCELLANEOUS PARTS NOT ON DIAGRAM	
	97282	Escutcheon	.25
	67532	Dial Drive Rubber Roller	.02
	S1413	Tuning Knob	.25
	S1834	6 prong Tube Socket (Model 114 only)	.10
	S1951	5 prong Tube Socket	.10
	S3019	Pilot Light Socket and Bracket	.20
	S3101	Range Switch Knob	.25



TUBE LOCATIONS

FRONT OF SET

I. F. FREQUENCY 456 K. C.

VOLTAGE TABLE

Line Voltage 115 A. C. — Volume Control Full On

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
6A7*	1 Det & Osc.	6.15	240	90	0	2.7
78	I. F.	6.15	240	90	0	2.4
75	2nd Det.	6.15	110		0	1.3
42	Output	6.15	227	240	-1.5†	0
80	Rect.	5.0	320 Volts D. C. From Filament to Ground			

* Oscillator plate voltage, 130; Oscillator grid voltage, —7.5.

† Actual bias voltage on type 42 tube is 17.0 volts measured across 230 ohm section of voltage divider.

Speaker field voltage, 85.

All D. C. voltages are to be measured with respect to ground, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

Readings taken with set analyzers will be different because such instruments generally measure voltages with respect to cathode instead of ground.

R-116 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	73689	Phonograph Switch (Used in R-116X, XL, and XH)	$1.00
2	81158	.0001 Mfd. Mica Fixed Condenser	.25
3	81630	.1 Mfd. 100 volt Fixed Condenser	.30
4	81681	29,000 ohm, ¼ watt Carbon Resistor	.20
5	81682	1.1 megohm, ¼ watt Carbon Resistor	.20
6	81812	.00051 mfd. Mica Fixed Condenser	.25
7	83007	.02 Mfd. 600 volt Fixed Condenser	.35
8	83072	510,000 ohm, ¼ watt Carbon Resistor	.20
9	83082	260,000 ohm, ¼ watt Carbon Resistor	.20
10	83179	Tone Control Switch	.30
11	83214	.25 mfd. 250 volt Fixed Condenser	.30
12	83216	.02 mfd. 1000 volt Fixed Condenser	.35
13	83219	.01 mfd. 600 volt Fixed Condenser (Used in models R-116-AL and XL only. See No. 83352 for R-116-A, AH, X and XH)	.30
14	83278	6.3 volt Pilot Light Bulb	.15
	83352	.015 mfd. 600 volt Fixed Condenser (Used in Models 116A, AH, X, and XH only)	.35
15	83353	.05 mfd. 100 volt Fixed Condenser	.30
16	83406	Power Cord and Plug	.50
17	83440	.1 mfd. 400 volt Fixed Condenser	.35
	83455	Diaphragm and Shell Assembly (for R221A Speaker used in Models R-116AL and XL)	2.75
18	83538	260.000 ohm, 1 watt Carbon Resistor	.25
19	83539	.00026 mfd. Mica Fixed Condenser	.25
20	83541	Output Transformer for R-220A Speaker (Used in Models R-116 A, AH, X and XH. See No. 83625 for R-116, AL and XL)	2.00
21	83542	Range Switch	1.00
22	83543	6750-5470-80-230 ohm Voltage Divider	1.00
23	83544	Power Transformer, 115 volts, 60 cycles. (Used in R-116A, AH, and AL only. See No. 83620 for 115-250 volt, 25-60 cycle)	4.25
24	83548	Field Coil and Housing for R-220A Speaker. (Used in R-116A, AH, X, and XH. See No. 83635 for R-221A Speaker Field Coil	2.50
25-A, 25-B	83551	500,000 ohm Volume Control; Line Switch (in one unit..	1.25
26	83554	.0011 mfd. Mica Fixed Condenser	.25
27	83555	21,000 ohm, 1 watt Carbon Resistor	.25
28	83556	310 ohm, ¼ watt Carbon Resistor	.20
29	83557	1st I. F. Transformer Complete	1.75
30	83558	2nd I. F. Transformer Complete	1.75
31	83559	Oscillator Coil	1.25
32	83565	Variable Condenser	2.50
33	83566	10 ohm Wire Wound Resistor	.25
34	83613	8 mfd. 440 volt Dry Electrolytic Condenser	1.65
	83620	Power Transformer, 115-250 volts 60 cycles. (Used in Models R-116X, XH, XL)	6.00
	83625	Output Transformer for R-221A Speaker. (Used in Models R-116AL and XL only)	2.00
35	83631	Antenna Coil	1.50
36	83632	.5 mfd. 100 volt Fixed Condenser	.40
	83635	Field and Hum Bucking Coils (for R-221A Speaker used in R-116 AL and XL)	2.50
37	83662	Diaphragm and Shell Assembly for R-220A Speaker. (Used in R-119A, AH, X and XH only. See No. 83455 for R-221A Speaker)	2.50

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

83447	Range Switch Knob	.10
83470	Speaker Cable (Used in R-116 AL and XL)	.50
83560	Tube Shield	.15
83574	Pilot Light Socket and Bracket	.15
83577	Escutcheon (Used in R-1161 and R-1162)	.35
83579	Knob for R-1161-2-3-4	.25
83580	Dial & Bushing (Used in R-116A,AL,X,& XL	.45
83581	Volume Control Dial and Bracket (Used in R-116A, AL, X, and XL	.12
83590	Volume Control Dial and Bracket (Used in R-116AH and XH)	.12
83593	Escutcheon (Used in R-1163-A)	.35
83603	Dial and Bushing (Used in R-116AL & XL)	.45
83637	Escutcheon (Used in R-1165)	.35
83638	Knob for Model R-1165	.30
R-220A	Dynamic Speaker (6 inch used in Models R-116A, AH, X, and XH)	6.25
R-221A	Dynamic Speaker (8 inch used in Models R-116L and XL)	7.00

SERVICE DATA FOR MODEL R-116 CHASSIS

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-116 chassis uses a five-tube superheterodyne circuit. The incoming signal goes to the tuned first detector circuit and then beats with the oscillator output to produce a 456 K. C. intermediate frequency signal. This particular frequency is chosen to prevent image frequency interference.

The 456 K. C. signal is amplified by a high-gain I. F. stage and is then rectified by the diodes of the 75 tube which are connected in parallel. The audio component of the rectified signal is impressed across the 500,000 ohm potentiometer through condenser No. 15. The volume is controlled by selecting any desired portion of the A. F. voltage with the moving arm of the potentiometer which is connected to the grid of the 75 tube. The triode section of this tube acts as a high-mu audio amplifier, resistance-coupled to the type 42 output tube. This method of coupling produces excellent tone quality.

The necessary A. V. C. operating voltage is secured by smoothing out the modulated drop across resistor No. 8 by a resistance-capacity filter consisting of resistor No. 5 and condensers No. 3 and 6, and applying the voltage to the grids of the 6A7 and 78 tubes. Thus the bias of these tubes increases and drops in proportion to the strength of the received signal and tends to maintain the audio output at a practically constant value.

For the reception of short wave signals, portions of the antenna coil primary and the oscillator grid coil are shorted and a condenser is connected across part of the antenna coil secondary. This reduces the inductance of the coils and thus permits tuning to higher frequencies.

The R-116 A, H, and L are designed for operation on 115 volt 60 cycle power circuits while the R-116 X, XH, and XL are adaptable for use with voltages of 115, 125, 230, 240, or 250 at any frequency from 25 to 60 cycles. To permit this flexibility of operation, the power transformer has two separate tapped primaries. The connections for the various line voltages are shown on the tag attached to the transformer. All X models are also wired for operation with a high impedance phonograph pick-up. The R-116 AL and XL chassis are used in console cabinets with 8 inch speakers. The others are used in table models with 6 inch speakers.

ALIGNING THE R-116 CHASSIS

Before attempting to align a set, the service man should remove the chassis from the cabinet and become familiar with the general layout and with the function and location of the various alignment trimmers. The following discussion briefly explains how each circuit is affected during the various steps of alignment.

The first detector and oscillator circuits are aligned by the two trimmers located on the two-gang variable condenser and are kept in exact step by the special shape of the rotor plates of the oscillator section. This shaping of the plates makes it unnecessary to use a padding condenser for low frequency alignment.

The I. F. transformers, located on the top of the chassis in front of the 75 and 78 tubes, are the tuned-input, tuned-output type, with each winding tuned by a separate trimmer condenser. The four I. F. adjustments are reached through holes in the tops of the I. F. transformer shields.

PRELIMINARY STEPS

A high-grade modulated oscillator and a sensitive output meter are necessary for correct alignment of the Model R-116 receiver. It must be possible to reduce the oscillator output to a very low value or the signal will cause the A. V. C. circuit to function making it difficult to secure exact alignment. The output meter must be sufficiently sensitive to give a satisfactory reading with the low signal.

All aligning adjustments should be made with the **volume control full on but with no broadcast signal being received.** The output meter should be connected between the plate of the 42 and the chassis through a .25 mfd. condenser or across the speaker voice coil, depending upon the type used.

ALIGNING PROCEDURE

The step-by-step routine given below should be carefully followed after reading the preceding instructions.

1. The modulated oscillator should be tuned to a frequency of 152, 228, or 456 K. C. to align the 456 K. C. I. F. amplifier. **Do not use the oscillator calibration curve to determine this frequency but check the oscillator** harmonics against broadcast stations which are required to be on their assigned frequency. First check the accuracy of the broadcast dial by noting whether stations come in at the correct setting. With the oscillator set at 152 K. C., the third harmonic is used for aligning while the fifth harmonic can be tuned in on the broadcast dial. It should come in at exactly 760 K. C.

To be sure that you have the harmonic of the 152 K. C. signal, tune in the other harmonics on the broadcast dial. These should come in 152 K. C. on either side of the original setting. With a 228 or 456 K. C. oscillator signal a similar procedure can be followed using 910 K. C. (The exact frequency to be used is 912 K. C. but 910 will be satisfactory.)

2. Connect the oscillator output from the grid cap of the 6A7 to chassis. Turn the tuning condenser of the set to some point where it has no effect upon the signal strength.

3. Adjust the oscillator output to give about one-half full scale deflection of the output meter.

ADJUSTING THE I. F. CIRCUIT

1. Adjust all four I. F. trimmer condensers, in each case tuning carefully to make sure that maximum deflection is obtained on the output meter. It is desirable to use an all-bakelite screw driver for this purpose although one with a small metal point may be used.

No inward or sideward pressure should be applied to the alignment tool, or the condenser may spring back to a different setting as soon as the tool is removed.

2. Go back and repeat all four adjustments since the changing of each I. F. trimmer affects the others to a certain extent, thus necessitating readjustment.

ADJUSTING R. F. AND OSCILLATOR CIRCUITS

1. Connect a .0001 mfd. condenser from the blue aerial wire to the output of the oscillator, and ground both set and oscillator. Adjust the oscillator frequency to 1400 K. C. and carefully tune the receiver to give maximum output. Set the oscillator output to produce about half-scale deflection on the output meter.

2. Carefully adjust the 1st detector trimmer which is the front one on the gang, to give a maximum output meter reading. Retune the set and again adjust the trimmer. The rear section which tunes the oscillator, should not be touched unless the set is out of calibration at the high frequency end of the dial.

If the set is out of calibration it can be re-calibrated as follows: Disconnect the test oscillator, connect an aerial and set the tuning dial at the frequency reading of some broadcast station between 1000 and 1500 K. C., whose exact frequency is known and which can be picked up without any difficulty. Adjust the oscillator trimmer (rear) until this station is brought in with maximum volume. Re-connect the modulated oscillator and output meter and again adjust the front trimmer for maximum output meter reading. This is necessary because the first detector circuit is always affected by any change in the oscillator tuned circuit.

HUM AND NOISE ELIMINATION

Hum in early R-116 table model chassis may be reduced by reversing the two speaker field coil leads. This may be done underneath the chassis where these leads connect to the two electrolytic condensers. The green field coil lead should go to the front electrolytic condenser, and the white lead to the rear electrolytic. Later production chassis already have the connections made in this way. All console model chassis are already wired for least hum with the white lead connected to the front electrolytic and the green to the rear electrolytic.

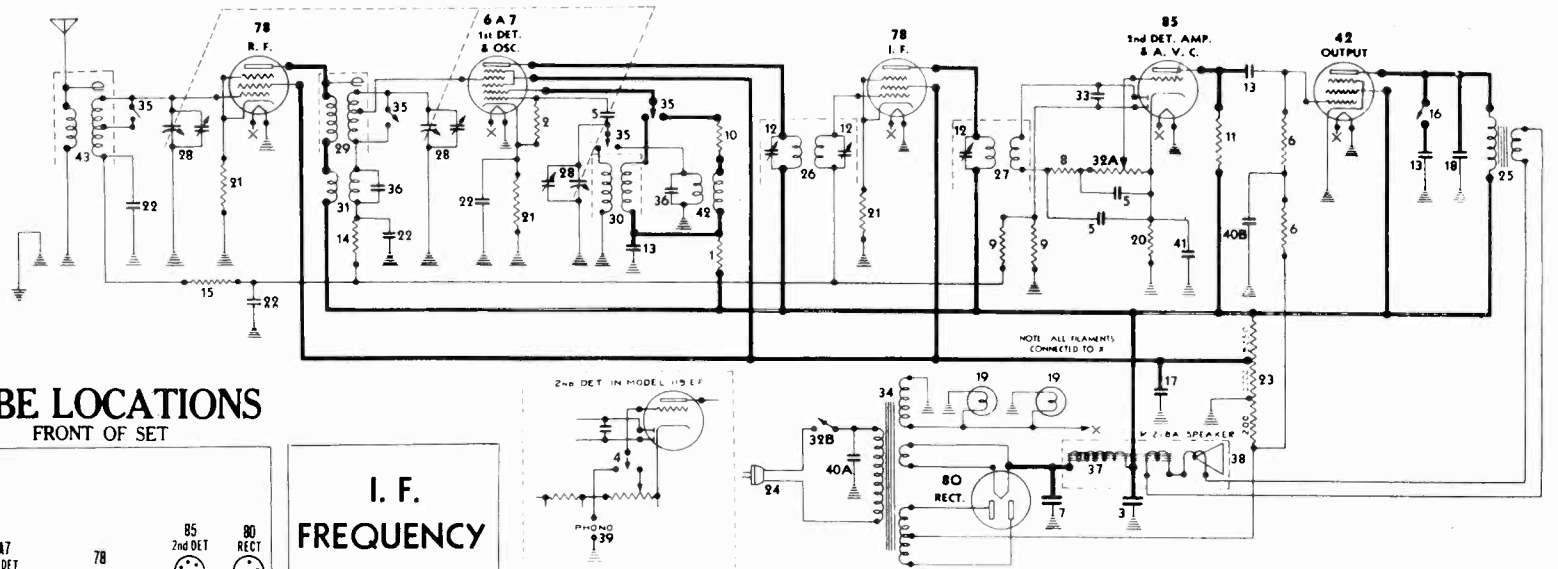
Excessive hum may also be due to the fact that the A. C. line lead is too close to the .05 mfd. 100 volt condenser No. 15 which is hooked in series with the volume control. The remedy is to separate the two as far as possible.

Another cause of hum is poor contact at the grounding lug of the voltage divider. This may be caused by the grounding screw being loose or may be at the point where the resistance wire is soldered to the terminal strap on the resistor. To eliminate hum from this cause, first tighten the grounding screw and solder to the chassis. If the hum continues, the 230 ohm negative end of the voltage divider should be replaced by a **230 ohm wire wound** resistor. The two wires connected to the negative end of the voltage divider should be unsoldered and hooked to one end of the new resistor. The other end should be soldered to ground, preferably to the lug located just below the short wave switch.

Intermittent or noisy operation especially noticeable when the dial is turned or when the variable condenser is jarred, is frequently caused by metal particles shorting the variable condenser. This trouble can be eliminated by cleaning with a blast of air or by running a pipe cleaner between the plates.

MODEL R-119
Schematic, Voltage
Socket, Parts List

STEWART - WARNER CORP.



TUBE LOCATIONS

FRONT OF SET

I. F. FREQUENCY 177.5 K. C.

VOLTAGE TABLE

Line Voltage 115 A.C. — Volume Control Full On

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
78	R. F.	6.1	260	104		3.2
6A7*	1 Det. & Osc.	6.1	260	104		3.0
78	I. F.	6.1	260	104		3.0
85	2nd Det	6.1	50	—		17.5
42	Output	6.1	247	260	-1.8†	0
80	Rectifier	5.1	320 Volts D. C. From Filament to Ground			

*** Oscillator plate voltage 175; Oscillator grid voltage -5.**

† Actual bias on 42 tube is 17.3 volts measured across 200 ohm section of voltage divider.

Speaker Field Voltage, 60.

All D. C. voltages are to be measured with respect to ground, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variatio is most marked for the second detector plate voltage. Readings taken with set analyzers will be different because such instruments generally measure voltages with respect to cathode.

R-119 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	67100	20,000 ohm, 1 watt Carbon Resistor	$0.25
2	67301	75,000 ohm, ½ watt Carbon Resistor	.25
3	67328	8 Mfd. 440 volt, Wet Electrolytic Condenser	1.75
4	73689	Phonograph Switch (Note: Used in Models R-119 EF only)	1.00
5	81157	.00025 Mfd. Mica Fixed Condenser	.30
6	81161	250,000 ohm, ½ watt Carbon Resistor	.20
7	81347	8 Mfd. 485 volt Wet Electrolytic Condenser	1.75
8	81681	29,000 ohm, ½ watt Carbon Resistor	.20
9	81682	1.1 Megohm, ½ watt Carbon Resistor	.20
10	81727	1000 ohm, ½ watt Carbon Resistor	.20
11	81810	100,000 ohm, 1 watt Carbon Resistor	.20
12	81940	I. F. Trimmer Condenser	.50
13	83007	.02 Mfd. 600 volt Fixed Condenser	.35
14	83078	2000 ohm, ½ watt Carbon Resistor	.20
15	83081	76,000 ohm, ½ watt Carbon Resistor	.25
16	83179	Tone Control Switch	.30
17	83214	.25 Mfd. 250 volt Fixed Condenser	.30
18	83219	.01 Mfd. 600 volt Fixed Condenser	.30
19	83278	6.3 volt Pilot Light Bulb	.15
20	83285	10,000 ohm, ½ watt Carbon Resistor	.25
21	83293	300 ohm, ½ watt Carbon Resistor	.25
22	83353	.05 Mfd. 100 volt Fixed Condenser	.30
23	83398	9250-10,000-200 ohm Voltage Divider	1.00
24	83406	Power Cord and Plug	.50
25	83408	Output Transformer	2.75
26	83410	1st Intermediate Transformer Coil	1.25
27	83412	2nd Intermediate Transformer Coil	1.25
28	83413	3 gang Variable Condenser	3.75
29	83418	Broadcast 1st Detector Coil	1.25
30	83419	Broadcast Oscillator Coil	.75
31	83420	Short-Wave 1st Detector Coil	.75
32-A	83424	500,000 ohm Volume Control, In one unit	1.30
32-B	83424	Line Switch, In one unit	1.30
33	83436	.002 Mfd. 1000 volt, Fixed Condenser	.25
34	83442	Power Transformer, 115 volt, 60 cycle (Note: See No. 83469 for 25-60 cycle 115-250 volt Transformer used in Model R-119EF)	5.75
35	83444	Range Switch (4 sections)	1.00
36	83448	25 Mmfd. Fixed Condenser	.10
37	83454	Speaker Field and Humbucking Coil Assembly	2.50
38	83455	Diaphragm, Voice Coil, Spider and Shell Assembly	2.75
39	83463	Terminal Strip (Used in Model R-119EF only)	.15
	83469	Power Transformer, 115-250 volts, 25-60 cycles (Note: Used on Model R-119-EF only)	9.00
40-A	83476	.02 Mfd. 1000 volt Fixed Condenser, In one unit	.75
40-B	83476	.5 Mfd. 100 volt Fixed Condenser, unit	
41	83537	10 Mfd. 25 volt Electrolytic Condenser	.75
42	83599	Short Wave Oscillator Coil	.75
43	83602	Antenna Coil	1.00

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

67236	Rubber Drive Roller	.02
81834	6 prong Tube Socket	.10
81837	4 prong Tube Socket	.15
81941	Tube Shield	.20
81949	7 prong Tube Socket	.10
83049	Button for covering trimmer holes	.05
83405	Pilot Light Bracket and Socket	.20
83438	Pilot Light Socket and Volume Control Dial	.30
83460	Dial and Gear	.55
83461	Escutcheon for Models R-1191-2-3	.30
83497	Knob for Model R-1191-2	.20
83505	Knob for Model R-1193	.20
R-218A	Dynamic Speaker (8 inch)	6.75

SERVICE DATA FOR MODEL R-119 CHASSIS

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-119 Chassis is a six-tube superheterodyne. It will cover the broadcast and short wave ranges from 530 to 3750 K. C. The tuning dial is calibrated from 530 to 1740 K. C. and a short wave range is provided through a switch on the back of the chassis, for reception up to 3750 K. C. (80 meters).

The R-119A Chassis is designed for operation on 115 volt, 60 cycle power circuits while the R-119EF is adaptable for use with voltages of 115, 125, 230, 240, or 250 at any frequency from 25 to 60 cycles. To accomplish this, the power transformer has two separate tapped primaries. The method of connecting these primaries is shown on a tag attached to the chassis. The R-119-EF chassis is wired for operation with a high impedance phonograph pick-up.

In the R-119A and EF chassis, the incoming signal is amplified by a stage of tuned radio frequency to improve selectivity and sensitivity, and to prevent image frequency interference. It then goes to the 6-A-7, first detector and oscillator, where its frequency is converted to 177.5 K. C.

The 177.5 K. C. intermediate frequency signal is amplified by the high gain I. F. stage, and is then rectified by the diodes of the 85 tube. Detection is accomplished by the diode connected directly to the I. F. transformer. A modulated D. C. voltage drop is produced across the 500,000 ohm potentiometer by the rectified current. The volume is controlled by selecting any desired portion of the A. F. voltage with the moving arm of the potentiometer which is connected to the grid of the 85 tubes. The triode section of this tube acts as an audio amplifier and is resistance-coupled to the 42 output tube.

Delayed A. V. C. is obtained by using the voltage drop produced by the rectified current of the second diode of the 85 tube, for bias on the 78 and 6A7 tubes. This diode, which is coupled to the I. F. transformer by a .002 mfd. condenser, is 17.5 volts negative with respect to the cathode since it is biased by the cathode bias resistor. Consequently, no rectification and no A. V. C. action can take place in this circuit until the incoming signal is strong enough to exceed this value. This represents the minimum signal capable of giving full audio output. Through the use of the delayed A. V. C. any signal which cannot be amplified to this minimum value is not reduced in volume by the action of the A. V. C. circuit.

Short wave reception is accomplished by shorting a portion of the antenna coil, shorting the secondary of the broadcast r. f. coil so that only the short-wave r. f. coil is active, and by switching in a short wave oscillator coil. These operations are performed by a single two-position switch located on the back of the chassis.

ALIGNING THE R-119 CHASSIS

Before attempting to align a set, the service man should become familiar with the general layout of the chassis and with the function and location of the various trimmer condensers. The following discussion briefly explains the action of each alignment step.

R. F. alignment and calibration are accomplished by the three trimmer condensers located on the top of the variable condenser gang. The oscillator is kept in exact step with the other R. F. circuits by the special shape of the stator plates in the oscillator tuning section.

Both windings of the first I. F. transformer are tuned but only the plate coil (primary) of the second I. F. transformer is tuned. The three I. F. tuning trimmers are mounted on the rear of the chassis and may be reached through holes which are covered with flat metal buttons. The buttons may be pried out with a knife or screw-driver.

EQUIPMENT AND PRELIMINARY STEPS

A good modulated oscillator and an output meter are essential for proper alignment. The attenuator on the oscillator must be capable of reducing the signal to a low value because the A. V. C. will function if the signal is too strong and thus make correct alignment impossible. The output meter must be sensitive enough to give a satisfactory reading with this low signal.

The output meter should be connected from the plate of the 42 tube to ground through a .25 mfd. condenser or across the speaker voice coil, depending upon the type used.

All alignment adjustments should be made with the volume control full on but with no broadcast signal being received.

ALIGNING THE I. F. CIRCUITS

An insulated, ¼ inch socket wrench is needed for I. F. alignment since two of the trimmers are connected to B plus. A Stewart-Warner phasing tool (No. T-79890, net price 75c) should be used although a Spintite wrench insulated with tape so that it will not short to the chassis, can be employed.

The step-by-step routine given below should be carefully followed after reading the preceding instructions:

1. The modulated oscillator must be tuned exactly to **177.5 K. C.** This frequency can be acurately determined by checking the oscillator harmonics against broadcast stations. First check the accuracy of the broadcast dial, and then tune in either the fourth or eighth harmonic of the 177.5 K. C. signal. If they come in at exactly 710 or 1420 K. C. the oscillator frequency is correct. To be sure that you have the harmonic of a 177.5 K. C. signal instead of some other frequency, tune in the other 177.5 K. C. harmonics on the broadcast dial. These should come in 177.5 K. C. on either side of the original setting. **Do not use the oscillator calibration curve to determine this intermediate frequency.**

2. Connect the oscillator output across the 6-A-7 grid cap and ground.

3. Set the oscillator output to give about half scale deflection on the output meter.

4. Adjust all three I. F. trimmer condensers, in each case tuning carefully to get maximum deflection of the output meter. Reduce oscillator output if output meter goes off scale.

It is very important that no inward or sideward pressure be applied to the alignment tool or the condenser may spring back to a different setting as soon as the tool is removed.

5. Repeat all three adjustments since the adjustment of each I. F. trimmer may affect the others to a certain extent. Replace buttons covering trimmer holes to prevent tampering.

ADJUSTING R. F. AND OSCILLATOR CIRCUITS

1. Connect a .0001 mfd. condenser from the blue aerial wire to the output of the oscillator, and ground both set and oscillator. Adjust the oscillator frequency to 1400 K. C. and carefully tune the receiver to give maximum output. Set the oscillator output to produce about half scale deflection of the output meter.

2. Carefully tune the radio frequency, "A" trimmer, which is the back one on the condenser gang, until the output meter reading reaches a maximum.

3. Retune the set and adjust the first detector "B" trimmer, which is the middle one, for maximum output. The oscillator, or "O" trimmer should not be touched unless the set is badly out of calibration at the high frequency end of the dial.

CALIBRATION

Calibration can be checked by arranging a wire pointer above the condenser shaft center and then tuning in several stations of known frequency. With the condenser plates fully meshed, the lowest dial division (530 K. C.) should line up with the pointer.

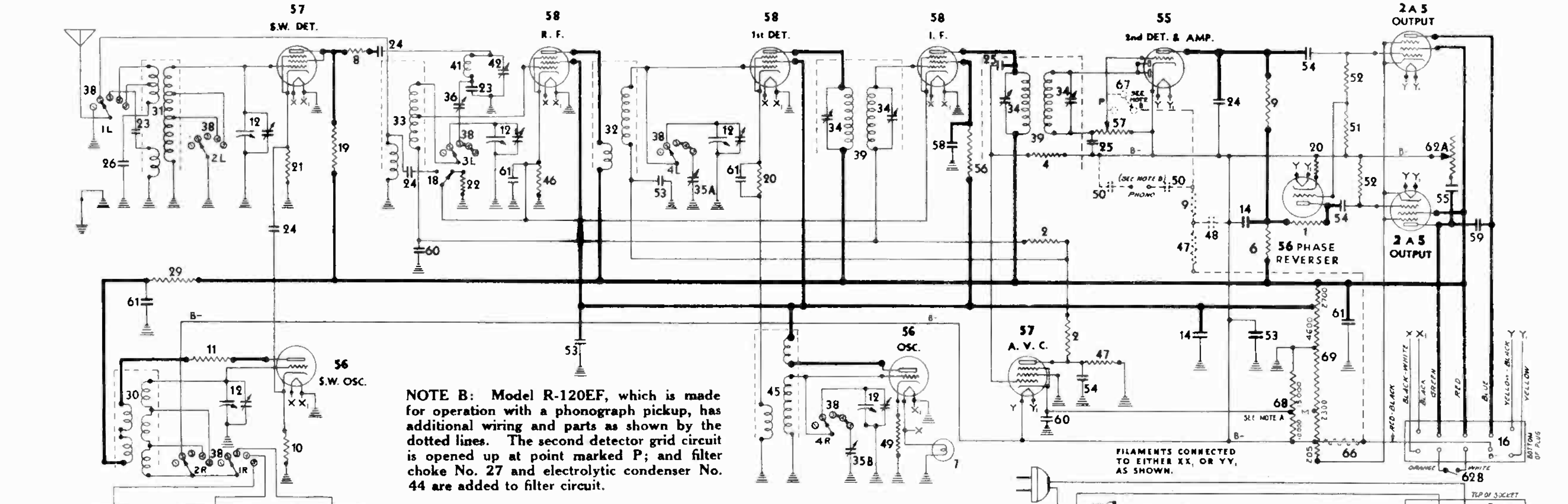
If the set is out of calibration, it can be re-calibrated as follows: Disconnect the test oscillator, connect an aerial to the blue wire, and set the tuning dial at the frequency reading of some station between 1200 and 1500 kilocycles, whose exact frequency is known and which can be picked up without any difficulty. Adjust the oscillator trimmer "O" until this station is brought in with maximum volume. Then use the modulated oscillator and output meter to re-adjust the "A" and "B" trimmers, since these are always affected by any change to the oscillator tuned circuit, taking care to retune the set between adjustments.

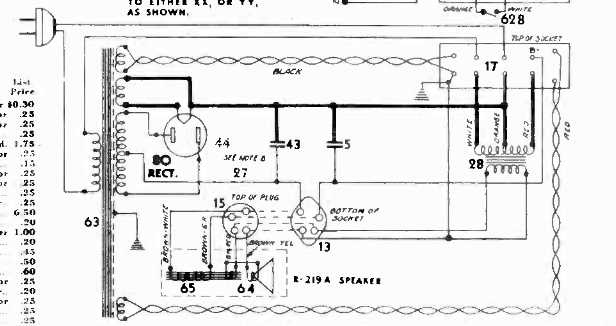
No adjustment is provided for aligning the set for the short wave band.

MODEL R-120(1201,1209)
Schematic,Voltage
Socket

STEWART-WARNER CORP.

STEWART-WARNER MODEL R-120 CHASSIS



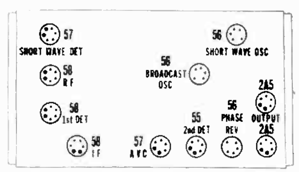


NOTE B: Model R-120EF, which is made for operation with a phonograph pickup, has additional wiring and parts as shown by the dotted lines. The second detector grid circuit is opened up at point marked P; and filter choke No. 27 and electrolytic condenser No. 44 are added to filter circuit.

NOTE A: Resistor No. 68, mounted on the A. V. C. tube cathode terminal, is used in all chassis using voltage divider (Diag. No. 69) Part No. 83430. It is not used in chassis which have voltage divider No. 83628. In such sets, the A. V. C. tube cathode is connected directly to point M. The two voltage dividers differ only in the position of tap M. Use No. 83628 for all replacements.

I. F. FREQUENCY 177.5 K. C.

TUBE LOCATIONS
FRONT OF SET



Use an 80 Tube in Power Unit

CAUTION

Voltage readings must be taken with the set switched to one of the short wave ranges, and the local-distance switch pulled out.

All D. C. voltages are measured between the tube socket terminals and chassis, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for all detector and oscillator D. C. voltages. Allowance must be made for line voltage variations.

Readings taken with set testers plugged into tube sockets may deviate considerably from the values given in this table, due to their internal circuit arrangements.

VOLTAGE TABLE

Line Voltage 115 A. C. — Distance Switch Pulled Out

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Cathode Voltage	Control Grid Voltage
57	Short Wave Detector	2.33	8*	8*		0
56	Short Wave Oscillator	2.33	75		5.0	0
58	R. F.	2.33	166	90	2.1	0
58	First Detector	2.33	166	90	8.5	0
56	Broadcast Oscillator	2.33	90		9.4	0
58	I. F.	2.33	166	77	2.1	0
57	A. V. C.	2.32	0	0	—56	—30
55	Second Detector	2.32	—68*		—95	—95
56	Phase Reverser	2.32	—1*		—89	—83
2A5	Output	2.28	156	166	—79	—66
80	Rectifier	4.9	164 Volts D C from Filament to Chassis			

* Approximate Reading. Drop across Speaker Field, 68 volts. B- to chassis, -95 volts; B plus to B-, 260 volts

R-120 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	61559	75,000 ohm 1 watt Carbon Resistor	$0.30
2	67256	75,000 ohm ⅓ watt Carbon Resistor	.25
3	67259	45,000 ohm ¼ watt Carbon Resistor	.25
4	67302	2 meg. ⅓ watt Carbon Resistor	.25
5	67328	8 mfd. 440 volt Electrolytic Cond.	1.75
6	67428	25,000 ohm 1 watt Carbon Resistor	.25
7	67551	2.5 volt Pilot Light Bulb	.15
8	67580	6,000 ohm ¼ watt Carbon Resistor	.25
9	67938	100,000 ohm 1 watt Carbon Resistor	.25
10	67986	2000 ohm 1 watt Carbon Resistor	.25
11	67987	100 ohm ⅓ watt Carbon Resistor	.25
12	81000	Five Section Variable Condenser	6.50
13	81042	Speaker Socket	.20
14	81082	1 mfd. 400 volt Shielded Condenser	1.00
15	81092	Speaker Plug	.20
16	81094	Terminal Plug Assembly	.45
17	81095	Terminal Receptacle Assembly	.50
18	81126	Local-Distance Switch	.60
19	81150	750,000 ohm ⅓ watt Carbon Resistor	.25
20	81151	4000 ohm ⅓ watt Carbon Resistor	.20
21	81152	10,000 ohm ⅓ watt Carbon Resistor	.25
22	81153	150 ohm 1 watt Carbon Resistor	.25
23	81155	.0005 mfd. Mica Fixed Condenser	.25
24	81156	.001 mfd. Mica Fixed Condenser	.30
25	81157	.00025 mfd. Mica Fixed Condenser	.30
26	81158	.0001 mfd. Mica Fixed Condenser	.25
27	81159	Filter Choke (Used in R-120EF only)	2.70
28	81160	Output Transformer	2.75
29	81162	40,000 ohm 1 watt Carbon Resistor	.25
30	81178	Short Wave Oscillator Coil	1.50
31	81179	Short Wave Detector Coil	1.70
32	81188	Broadcast First Detector Coil	1.00
33	81189	Broadcast Antenna Coil	1.00
34	81200	I.F. Trimmer Cond. (Double) (One unit used in each I. F. Transformer)	.60
35A, 35B	81201	Trimmer Condenser (Double)	.60
36	81202	Single Trimmer Condenser	.40
37	81231	Short Wave Padding Trimmer Cond.	.50
38	81232	Range Switch	4.00
39	81234	I. F. Transformer Coil	1.00
40	81282	.003 mfd. Mica Fixed Condenser	.50
41	81305	Trap Circuit Coil	.35
42	81306	Trap Circuit Trimmer	.50
43	81347	8 mfd. 485 volt Wet Electrolytic Condenser (Used in model R-120A only. Model R-120EF uses No. 67328)	1.75
44	81367	10 mfd. 485 volt Wet Electrolytic Cond. (Used in R-120EF only)	2.00
45	81406	Broadcast Oscillator Coil	1.00
46	81427	1200 ohm ¼ watt Carbon Resistor	.25
47	81509	500,000 ohm ½ watt Carb. Resistor	.35
48	81630	.1 mfd. 100 volt Fixed Condenser (Used in Model R-120EF only)	.30
49	81829	1500 ohm ⅓ watt Carbon Resistor	.20
50	83058	.25 mfd. 100 volt Fixed Condenser (Used in Model R-120EF only)	.35
51	83080	51,000 ohm ¼ watt Carbon Resistor	.20
52	83082	200,000 ohm ¼ w. Carbon Resistor	.20
53	83214	.25 mfd. 250 volt Fixed Condenser	.30
54	83216	.02 mfd. 1000 volt Fixed Condenser	.35
55	83217	.04 mfd. 600 volt Fixed Condenser	.35
56	83285	10,000 ohm ⅓ watt Carbon Resistor	.25
57	83425	500,000 ohm Volume Control (Used in model R-120A only. See No. 83612 for Model R-120EF)	.95
58	83429	.5 mfd. 300 volt Fixed Condenser	.55
59	83436	.002 mfd. 1000 volt Fixed Condenser	.25
60	83437	.05 mfd. 200 volt Fixed Condenser	.30
61	83440	.1 mfd. 400 volt Fixed Condenser	.30
62A, 62B	83466	25,000 ohm Tone Control / Line Switch (In one unit)	1.25
63	83489	Power Transformer, 115 volts, 60 cycles (Used in Model R-120A. See No. 83608 for Model R-120EF)	8.00
64	83525	Diaphragm and Shell Assembly	3.25
65	83528	Field & Hum Bucking Coils. Field Resistance, 160 ohms (Cold)	2.50
	83608	Power Transformer, 115-250 volts, 25-60 cyc. (Used in R-120EF only)	11.00
66	83610	35 ohm, 1 watt Resistor (Used in model R-120EF only)	.25
67	83612	500,000 ohm Volume Control and Phonograph Switch (Used in model R-120EF only)	1.25
68	83627	15,000 - 10,000 ohm Wire Wound Resistor (See Note A)	.60
69	83628	Voltage Divider Resistor (See Note A)	1.75

Miscellaneous Parts Not Shown on Diagram

Part No.	Description	List Price
61841	Felt Knob Washer	.01
67263	No. 6 x ¼ Self Tapping Bottom Screw	.03
67326	R. F. Coil Shield, plain	.50
67964	I. F. (Short) Tube Shield	.30
81007	Tube Shield Cover	.06
81012	Tube Shield Shell	.15
81068	Dial Cord (17½" long), Per foot	.05
81069	Dial Cord Tension Spring	.10
81098	Speaker Cable only	.45
81099	Terminal Plug Cover	.20
81100	Speaker Cable and Plug	.60
81104	Chassis Bottom Plate	.70
81109	Small Rubber Drive Bushing	.03
81111	Large Rubber Drive Bushing	.04
81209	S. W. Coil Shield (plain)	.25
81210	S. W. Coil Shield (hole)	.65
81212	I. F. Coil Shield	.50
81213	R. F. Coil Shield (hole)	.50
81214	Knob Set Screw	.02
81216	Dial Drive Shaft with Fibre Spool	.60
81220	Light Bracket and Dial Pointer	.90
81237	Dial Guide Spring	.14
81328	Fibre Dial Frame Guide Pad	.01
81340	Chassis Bottom Gasket	.12
81420	Rubber Mounting Cushion	.05
81421	No. 11x1¾" Self Tapping Screw	.03
81426	Mounting Cushion Cup	.03
81433	Range Switch Lever Set Screw	.02
83468	Celluloid Dial and Frame	1.00
83514	Escutcheon Plate	.75
83570	Tone or Volume Control Knob	.35
83571	Tuning Knob with Set Screw	.35
83572	Range Switch Lever with Set Screw	.35
83573	Escutcheon Wood Screw, Per 100	.50
R-219A	Loud Speaker (10 inch)	9.25

SERVICE DATA for STEWART-WARNER R-120 CHASSIS (RECEIVER MODELS 1201 to 1209)

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-120 radio chassis is a 12 tube all-wave receiver, using a double superheterodyne circuit. Thru the use of a multi-section range switch, any one of four tuning ranges extending from 15 to 565 meters may be used.

By means of this range switch, radio signals are made to follow one of two general circuit paths, depending on their wave length. If the signal is in the broadcast band, it is fed directly to the tuned input circuit of the R.F. tube, and from there on amplified in the usual way. During broadcast reception the short wave section is rendered inoperative by applying a very high negative bias on the short wave oscillator tube.

When the set is switched over to any one of the three short wave ranges, the received short wave signal passes thru the short wave detector, where it is converted to 1540 K. C. by the action of the short wave oscillator and it is then amplified at this frequency in the broadcast section of the receiver.

By the use of a separate A. V. C. tube, input to the second detector is kept practically constant regardless of variation in signal strength. Volume is controlled by a potentiometer in the diode circuit of the 55 second detector tube. This volume control feeds any desired portion of the audio signal to the triode section of the tube which acts as an audio amplifier.

This amplified audio signal is then fed into a resistance coupled push-pull stage. The resistance coupled push-pull stage with its necessary phase reversal tube, not only eliminates the distortion which would be produced by an input transformer but also increases the low frequency response, and greatly improves the tone quality.

The type 56 phase reversal tube as used in the resistance-coupled push-pull circuit, functions as follows: By means of a voltage divider arrangement (resistances No. 51 and 52) one-sixth of the audio output voltage of the 55 is impressed on the grid of the 56 which reverses the phase, amplifies the signal to its original value, and applies it to the grid of one of the 2A5 output tubes. The other 2A5 receives its signal direct from the 55. Thus the two output tubes receive signals of equal strength but in opposite phase relation, giving a true push-pull effect without the use of a transformer.

LOCAL-DISTANCE SWITCH

The local-distance or "quiet" switch, which is operated by an in-and-out motion of the tone control knob, makes the following circuit changes. In the "in" or local position, the primary of the R. F. coil is shunted by a fixed condenser, thus by-passing part of the signal to ground and reducing the signal input into this circuit. In this position the R. F. and I. F tubes are operated at a high negative bias to reduce their amplification. In the "out" or distance position, the by-pass condenser is cut out of the circuit and a fixed resistor is connected in parallel with the bias resistor of the R. F. and I. F. tubes, thus reducing the bias on these tubes to its normal value, permitting them to operate at maximum sensitivity.

EXPLANATION OF RANGE SWITCH:

The range switch consists of eight independent switch sections, each section being provided with five contacts. Only seven sections of the eight, and only four contacts of the five per section are used.

In the circuit diagram these different switch sections are labelled 1R, 1L, 2R, etc., and for the sake of simplicity are shown in different locations in the diagram, altho they are all parts of the master range switch assembly located in the center of the chassis. With the chassis **bottom-side up and controls pointing toward you,** 1R is the front right hand section, 1L is the front left hand section, 2R is the second right-hand section counting from the front of the chassis, and so on. (Note that the switch numbers are identical with those of the 105 circuit diagram but that the letters L and R are reversed.)

As the range switch is rotated in a clockwise direction the following circuit changes are effected.

POSITION 1: Switch 1L grounds the aerial, preventing any reception.

POSITION 2: Broadcast Band. In this position switch 2R biases the short wave oscillator to stop it from oscillating so that the short wave section cannot cause interference when receiving stations on the broadcast band. Switch 1L connects the aerial to the primary of the R. F. coil. Switch 3L connects the third section of the variable condenser gang across the secondary of the R. F. coil. Switch 4L connects the fifth section of the variable condenser gang across the secondary of the first detector coil. Switch 4R connects the fourth section of the variable condenser gang across the secondary of the broadcast oscillator coil. Switch 1R is open.

POSITION 3: 185 to 78 Meter Short Wave Band. In this position switch 1L connects the aerial to one of the two primaries of the short wave detector. Switch 3L connects the output of the short wave detector to the secondary of the R. F. coil, and also connects an adjustable trimmer condenser across the secondary of this coil to tune it to 1540 K. C. Switch 4L connects an adjustable trimmer across the secondary of the first detector coil to tune it to 1540 K. C. Switch 4R connects a variable trimmer across the secondary of the broadcast oscillator to tune it to 1717.5 K. C. thus giving an I. F. of 177.5 K. C. Switch 1R connects an adjustable padding circuit in series with the secondary of the short wave oscillator coil, thus permitting proper tracking of this circuit in this short wave band.

POSITION 4: 80 to 33 Meter Short Wave Band. In this position switch 1L connects the aerial to the second of the two primaries of the short wave detector coil. Switch 2L shorts out a portion of the secondary of the short wave detector coil, thus enabling it to tune to the 80 to 33 meter band. Connections to switches 3L, 4R, and 4L remain the same as in position 3, tuning the R. F. section to 1540 K. C. Switch 1R connects a different adjustable padding circuit in series with the secondary of the short wave oscillator coil, thus permitting proper tracking of this circuit in this short wave band. Switch 2R shorts out part of the secondary of the short wave oscillator coil so that it will tune to wavelengths between 80 and 33 meters.

POSITION 5: 33 to 14.5 Meter Short Wave Band. In this position switch 1L connects the aerial thru a tap to the second primary of the short wave detector coil. Switch 2L shorts out a larger section of the secondary of the short wave detector coil so that this circuit can be tuned from 33 to 14.5 meters.

Connections made by switches 3L, 4L and 4R remain as in positions 3 and 4 since three points on each switch are connected together. Switch 1R connects a non-adjustable padding circuit in series with the secondary of the short wave oscillator coil. Switch 2R shorts out another portion of the secondary of the short wave oscillator coil, thus permitting this tuned circuit to cover the 33 to 14.5 meter band.

ALIGNING THE R120 CHASSIS

EQUIPMENT AND PRELIMINARY STEPS

Before proceeding to align the R-120 the following important suggestions should be noted:

(A) This chassis absolutely cannot be aligned properly "on the air" or by ear. Only one of the best service oscillators should be used. Two frequency bands are needed, one including the 177.5 K. C. intermediate frequency and the other covering the broadcast band. A wide range of modulated signal output must be available; very weak for broadcast alignment so that the A. V. C. circuit will not be actuated, and very strong for short wave alignment since harmonics as high as the ninth are used if the oscillator has no short wave range. The output lead should be shielded.

(B) **Do not rely on calibration curves for test oscillator frequency determination. Check all frequencies used against broadcasting stations,** which are required to operate on their assigned frequencies.

(C) An output meter must be used, preferably of the copper oxide rectifier type with a 0 to 50 volt scale. It should be connected across the plates of the two 2A5 output tubes. During alignment, re-adjust the oscillator output whenever necessary to keep the output meter at about half-scale reading.

(D) A Stewart-Warner No. T-75470 aligning tool or an insulated screwdriver should be used for all adjustments.

(E) Choose, if possible, a location free from "man-made-static," as high frequency noise disturbance might make short wave alignment difficult. A good ground is helpful, a poor one worse than none at all.

(F) To reduce noise pick-up, the antenna and ground wires of the chassis should be twisted together.

(G) Noise effect can be reduced by turning the tone control to the right.

(H) The A. V. C. tube can be removed for short wave alignment to increase sensitivity. It must not be removed for any of the other adjustments or calibration will be incorrect.

MODEL R-120,(1201,1209)
Alignment

STEWART - WARNER CORP.

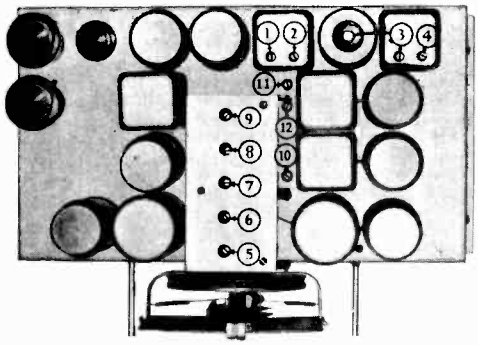
(1) During all aligning adjustments, the volume control should be turned full-on but no station should be tuned in. **The local-distance switch should be pulled out for all adjustments. The chassis bottom must be fastened in place and all tube shields must be in their proper positions during alignment.**

ALIGNING PROCEDURE:

The following aligning procedure for the R-120 can also be applied to the R-105 chassis if attention is paid to the difference in the position of the No. 11, 12, and 15 trimmers. This procedure is a development and improvement of the former (105) alignment procedure differing in the choice of the Short-Wave Intermediate Frequency and the sequence of the short-wave trimmer adjustments. For the R-105, follow the following procedure but use the diagrams given in the 105 Service Data Sheet.

There are six different groups of circuits to be aligned in the R-105 and R-120 chassis. These must be aligned in the order given below.

(1) **The Broadcast Band Intermediate Frequency Amplifier (177.5 K. C.)** This requires adjustment of trimmers No. 1, 2, 3, and 4, which tune the I. F. transformers. (See diagram on this page.)



(2) **The Broadcast Band Radio Frequency Circuits (530 to 1540 K. C.)** This group has three adjustments, trimmers No. 7, 8 and 9 calibrating and aligning the R. F., broadcast oscillator, and first detector circuits, respectively.

(3) **The Short Wave Intermediate Frequency Amplifier (1540 K. C.)** There are three adjustments, trimmers No. 10, 11 and 12 tuning the same circuits in order, as No. (2) but as a fixed 1540 K. C. short wave intermediate frequency amplifier; and a fourth adjustment, trimmer No. 15, tuning the short wave detector plate circuit to 1540 K. C.

(4) **The 33 to 14.5 Meter Short Wave Band.** This requires two adjustments, trimmers No. 5 and 6, calibrating and aligning the short wave oscillator and detector circuits for all three short wave bands.

(5) **The 80 to 33 Meter Short Wave Band.** This has one adjustment, trimmer No. 13, padding the short wave oscillator on this band.

(6) **The 185 to 78 Meter Short Wave Band.** Trimmer No. 14 is used to pad the short wave oscillator on this band.

(1) ALIGNING THE BROADCAST I. F. AMPLIFIER

The modulated oscillator must be tuned **exactly to 177.5 K. C.** This frequency can be accurately determined by checking the oscillator harmonics against broadcast stations. First check the accuracy of the broadcast dial, and then connect the oscillator to the aerial and ground wires of the chassis and tune in either the fourth or eighth harmonic of the 177.5 K. C. signal. If they come in at exactly 710 or 1420 K. C. the oscillator frequency is correct. To be sure that you have the harmonic of a 177.5 K. C. signal instead of some other frequency, tune in the other 177.5 K. C. harmonics on the broadcast dial. These should come in 177.5 K. C. on either side of the original setting. **Do not use the oscillator calibration curve to determine this intermediate frequency.**

Turn the receiver dial to some point where the oscillator signal cannot be heard to prevent the receiver oscillator from beating with the test oscillator. Then connect the test oscillator output from the grid cap of the 58 first detector tube to chassis. Carefully adjust trimmers No. 4, 3, 2 and 1, in order, for maximum output meter deflection. Repeat the four adjustments since the adjustment of each trimmer has some effect on the others.

(2) CALIBRATING AND ALIGNING THE BROADCAST R. F. CIRCUITS

Before proceeding further, it is necessary to check the calibration of the set on the broadcast band, since this band must be subsequently used as a reference point in aligning the three short wave bands. **This calibration check is very important.** It can easily be done by connecting the aerial and tuning in broadcast stations of known frequency between 550 and 700 K. C. for the low frequency check and between 1200 and 1400 K. C. for the high frequency end. If the calibration between 550 and 700 K. C. is incorrect, bend the brackets guiding the side of the dial frame until the stations come in at the correct setting.

For the high frequency correction, turn the dial to the frequency of a station between 1300 and 1400 K. C. whose frequency is definitely known. Using no aerial or a very short one carefully adjust trimmer No. 8 (broadcast oscillator) until the station is tuned in with maximum volume and then also adjust trimmers 7 and 9.

Unless the condenser plates are misaligned the rest of the dial should then be properly calibrated. About 10 K. C. variation is generally allowable. If the pointer is too far away from the dial, bend it in to avoid parallax or false reading.

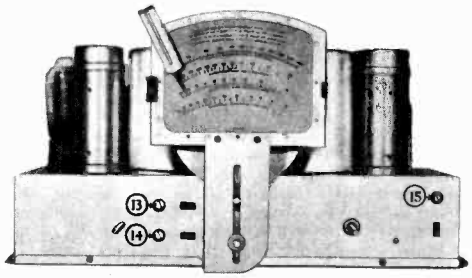
Connect the test oscillator to the aerial and ground leads of the receiver and set the oscillator to approximately 1400 K. C. Carefully tune the receiver to this signal. Adjust trimmers No. 7 and 9 for maximum output meter response. Retune the receiver and check adjustments. Do not touch trimmer No. 8 since this will alter the calibration.

(3) ALIGNING THE SHORT WAVE I. F. AMPLIFIER

The second harmonic of a 770 K. C. oscillator signal is used for aligning the 1540 K. C. short wave I. F. amplifier. Tune the receiver exactly to 770 K. C., allowing for any error in dial reading and connect the oscillator output to the receiver aerial and ground wires. Tune the test oscillator to give maximum output meter response.

Connect the test oscillator output from the 57 short wave detector grid cap to chassis.

Shift the range switch to the third short wave band (33 to 14.5 meters) and adjust trimmer No. 11 until the signal is tuned in with maximum output meter response. **Two peaks may be noted in some sets. The peak at the minimum trimmer capacity, that is, the one where the trimmer is turned nearly all-the-way-out is the correct one.** Then adjust trimmers No. 10, 12, and 15 for maximum output meter reading. When adjusting No. 15, two relatively broad peaks may be found, but the nearly-all-the-way-out position is again the proper one.



(4) ALIGNING THE THIRD SHORT WAVE BAND

Set the range switch to the broadcast position, tune the receiver to exactly 1390 K. C. allowing for calibration error. Connect the test oscillator to the aerial and ground wires of the receiver and adjust the frequency of the oscillator until the signal is at a peak. Shift the range switch to the third short wave band (33 to 14.5 meters) and turn the receiver dial pointer to exactly 24.0 meters (12500 K. C.) Adjust trimmer No. 5 until the oscillator signal (ninth harmonic of 1390 K. C.) is picked up with maximum output meter reading. Adjust trimmer No. 6 to an approximate peak. Connect a 400 ohm resistor or a .0001 mfd condenser in series with the oscillator output and the blue aerial wire as a short wave dummy antenna, and then carefully adjust trimmer No. 6 for maximum output. The resistor or condenser will reduce the signal strength so increased oscillator output will be needed.

(5) ALIGNING THE SECOND SHORT WAVE BAND

Shift to the second short wave band (33-80 meters) and set the dial pointer to 54 meters (5555 K. C.) With the oscillator still at 1390 K. C. adjust trimmer No. 13 until the signal (4th harmonic of 1390 K. C.) gives maximum output meter indication.

(6) ALIGNING THE FIRST SHORT WAVE BAND

Using the broadcast dial for reference, adjust the test oscillator to 910 K. C. Switch the receiver to the first short wave band (185 to 78 meters), turn the dial pointer to 165 meters and adjust trimmer No. 14 for maximum output meter reading.

STROMBERG - CARLSON TEL. MFG. CO.

MODEL Compact
Police Receiver
Wiring, Socket

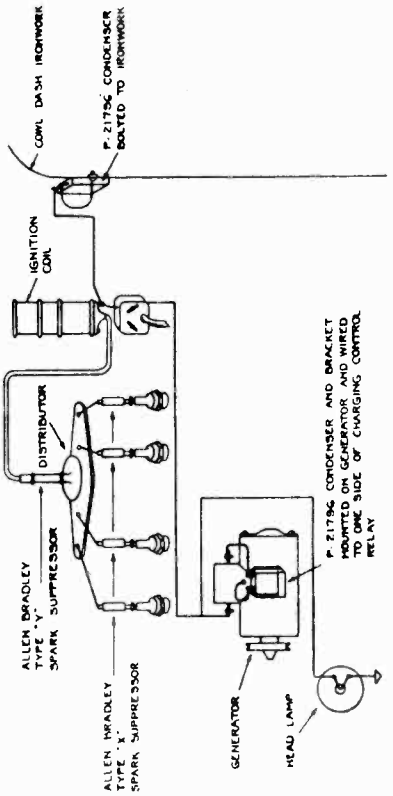


FIG 3 WIRING AND EQUIPMENT FOR SPARK AND GENERATOR NOISE SUPPRESSION ALSO SEE FIG 4

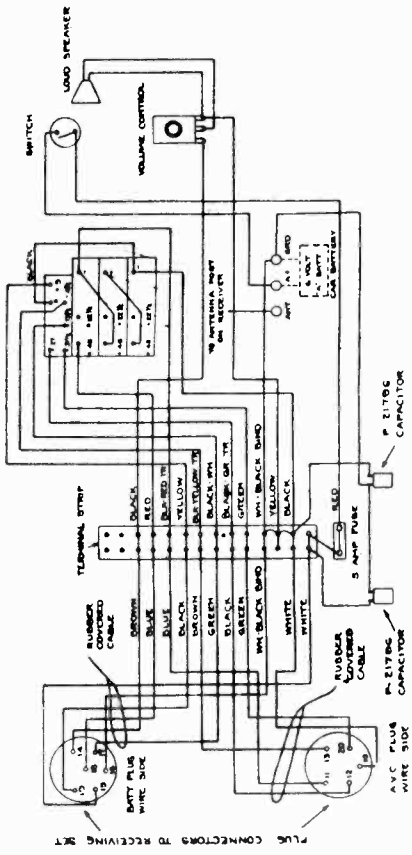


FIG 4 WIRING CONNECTIONS AT TERMINAL STRIP DRY CELL BATTERIES ETC

TUBE AND ALIGNING LOCATIONS FOR STROMBERG-CARLSON AUTOMOBILE POLICE RECEIVER

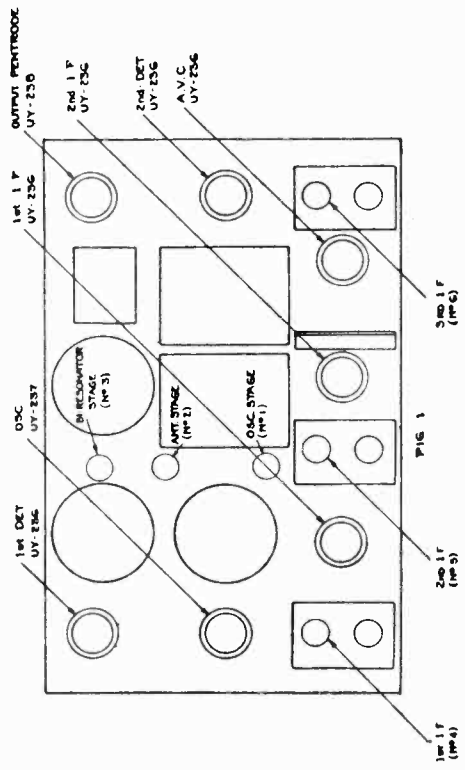


FIG 1

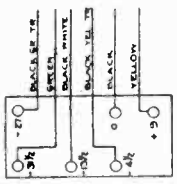


FIG B

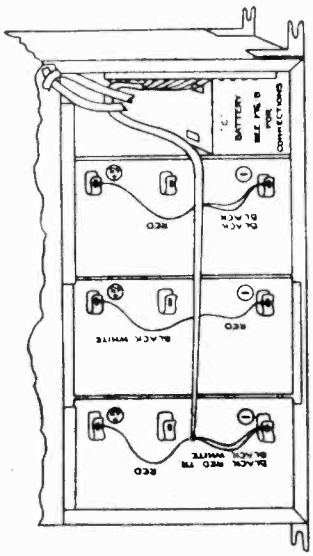
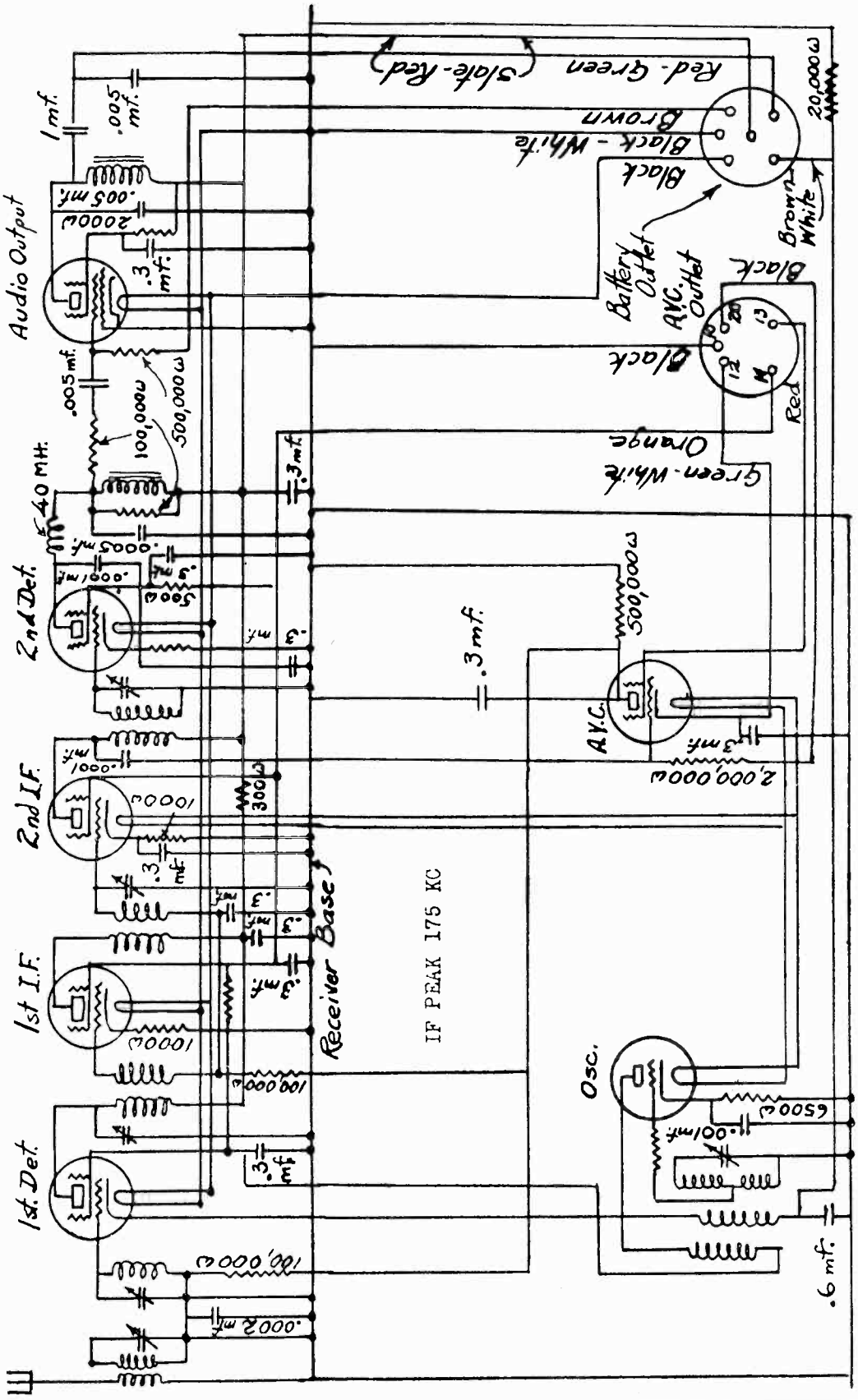


FIG A

FIG 2 DRY CELL CONNECTIONS

MODEL Compact
Police Receiver
Schematic

STROMBERG - CARLSON TEL. MFG. CO.



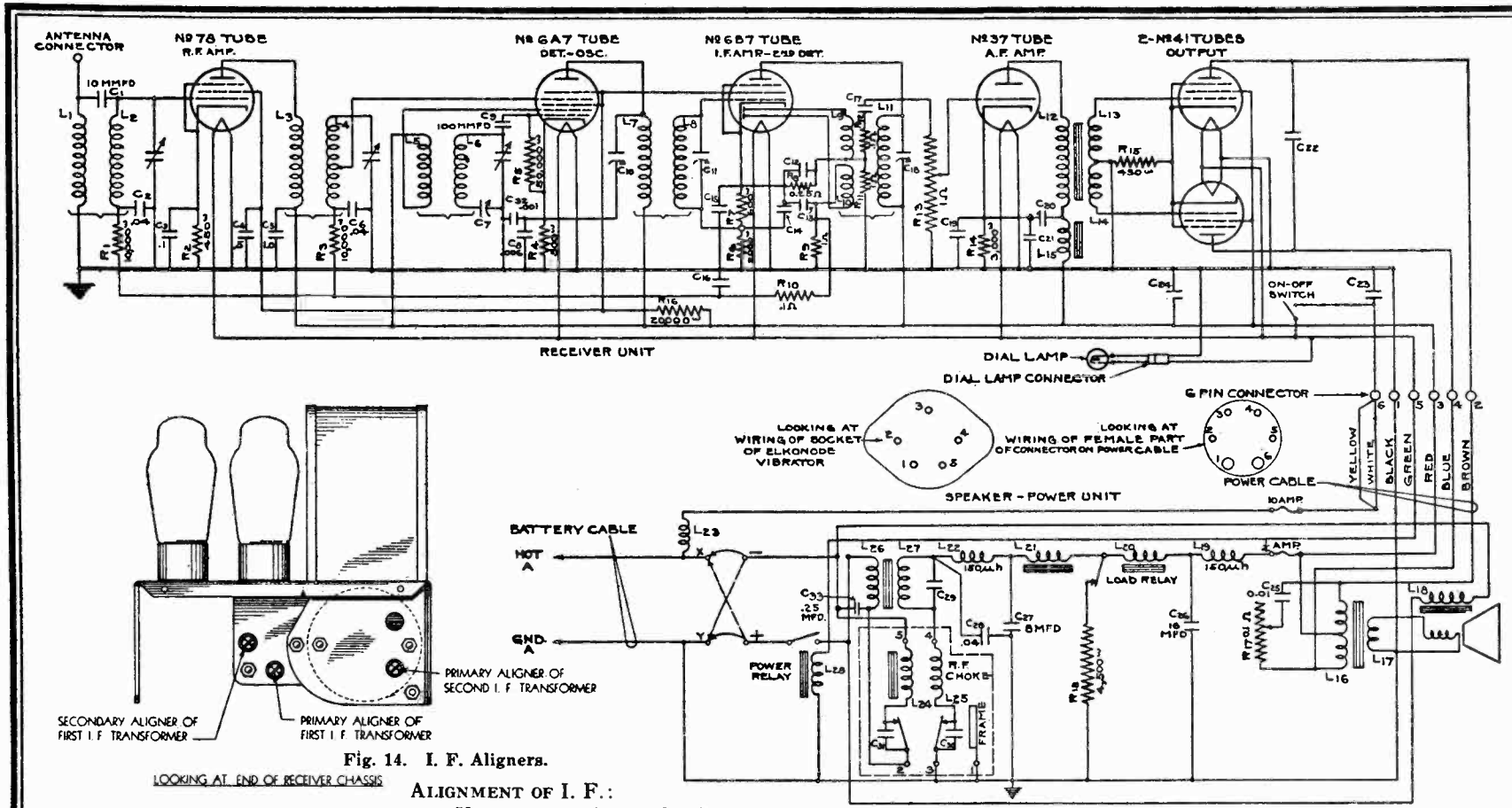


Fig. 14. I. F. Aligners.

ALIGNMENT OF I. F.:

IF PEAK 260 KC

Use a test oscillator having an output with a frequency of 260 kilocycles. Connect the leads from this oscillator between the grid (top cap) of the No. 6A7 tube and chassis base. A .5 mfd. capacitor should be connected in series with the lead going to the grid to insulate the 260 k. c. oscillator source from the voltages of the No. 6A7 tube.

Connect the output meter across terminal "M" of the fuse block (See Fig. 11) and the speaker-power supply frame. This puts the meter across the moving coil of the speaker (4 ohms impedance). The signal applied should be very weak, just sufficient to show a deflection on the output meter.

Now adjust the aligners of the primary and the secondary of the first I. F. transformer (See Fig. 14) for the peak swing on the output meter. It will be necessary to check over these adjustments as they are somewhat interdependent. Now, adjust the aligner of the primary of the second I. F. transformer in the same manner. For this aligning operation an insulated screwdriver should be used, a Formica rod with a small piece of metal inserted in the end will serve.

Continuity Test—Receiver Unit

This test is made with all tubes removed from sockets and the power cord removed from the receiver unit. The On-Off switch should be turned "Off" The readings given are in ohms as measused on a Weston Volt-ohmmeter No. 663. See Fig. 13.

Measurements Made Between Points		*Ohms*	*If resistance differs greatly from value shown, Check the following*
3	1	Open	Capacitors C4, C5, C24 or grounds in wiring or apparatus.
6	1	Open	Defective Switch or Capacitor C23.
7	5	0	Wiring of heater circuits.
8	3	70	Primary of R. F. Transformer L3.
9	3	20,000	R16 or wiring.
10–11	1	450	Cathode Resistor of No. 78 Tube R2.
12	1	0	Ground Connection.
13	5	0	Wiring of heater circuits.
14	3	20	Primary of 1st I. F. Transformer L7.
15	3	20,000	R16 or wiring.
16	3	1	Plate winding of oscillator coil L5.
17	18	50,000	Grid Leak R5 or Grid Capacitor C9.
18	1	500	Cathode Resistor R4.
19	1	0	Ground Connection.
20	5	0	Wiring of heater circuits.
21	3	45	Primary of second I. F. Transformer L11.
22	3	20,000	R16 or wiring.
23	25	200,000	Secondary of Second I. F. Transformer L9 or R8, or R11.
24	1	1,000,000	Secondary of Second I. F. Transformer L10 or R9.
25	1	2,600	Resistors R6 and R7.
26	1	0	Ground Connection.
27	1	0	Ground Connection.
28	3	5,500	Primary of Audio Transformer L12 or Choke L15.
29	1	0–10 (Switch "off")	Volume Control Potentiometer.
30	1	3,000	Cathode Resistor R14.
31	5	0	Wiring of heater circuits.
32	1	0	Ground Connection.
33	2	0	Wiring of output tubes.
33	39	Open	Capacitors C22.
34	3	0	Wiring of output tubes.
35	1	2700–3700	Secondary of Audio Transformer L13 or L14.
36	1	450	Cathode Resistor R15 or wiring.
37	5	0	Wiring of heater circuits.
38	1	0	Ground Connection.
39	4	0	Wiring of output tubes.
40	3	0	Wiring of output tubes.
41	1	2700–8700	Secondary of audio transformer L13 or L14.
42	1	450	Cathode Resistor R15 or wiring.
43	5	0	Wiring of heater circuits.
44	1	2000	Secondary of first I. F. Transformer L8 and Resistor R6.
45	1	1,100,000	Secondary of R. F. Transformer L4; Resistors R3, R9, R10 or Capacitors C6, C13, C16.
46	1	1,100,000	Secondary of Antenna Transformer L2; Resistors R1, R9, R10 or Capacitors C2, C13, C16.
47	1	25	Primary of Ant. Transformer.
47	46	Open	Capacitor C1.

Note—Due to manufacturing tolerances on carbon resistors, the values in the above table may vary plus or minus 10 per cent.

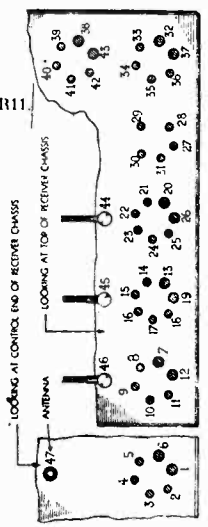


Fig. 13. Location of Points for Continuity Test.

Voltage Table.

These voltage readings are obtained by measuring between the various tube socket contacts and chassis base, with the tubes in place. Fig. 12 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater pin as 1 and proceeding clockwise around the pin circle to the other heater pin. This is done looking at the bottom of the socket.

Voltages are read on the meter scale (1000 ohms per volt) normally used for the magnitude of the particular voltage except as otherwise specified. The voltages given are those obtained when the battery voltage is 6.3 volts.

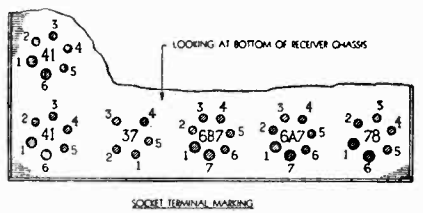


Fig. 12. Location of Socket Terminals for Measuring Voltages.

			Terminals of Sockets						
Tube	*Circuit*	*Grid Clip*	1	2	3	4	5	6	7
No. 78	R. F. Amp.	0	—6.1	+187	+81	+2.9	2.9	0	—
No. 6A7	Det. Osc.	0	—6.1	+187	+81	+187	—2 250 Scale	—3.6	0
No. 6B7	I. F. Det.	8.1	—6.1	+187	+81	+3 100 Scale	0	+12	0
No. 37	A. F. Amp.	—	0	+166	0	+11	—6.1	—	—
No. 41	Output	—	0	+184	+187	0	+14.5	—6.1	—

Note—These readings are made with the positive pole of the storage battery grounded. If the negative is grounded, the heater voltages will naturally be reversed. These voltages will vary slightly from the average given due to tolerances in resistors, variations in tubes, battery voltage differences, etc.

			Terminals of Sockets						
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7
78	R. F. Amp.	Control Grid	"Hot" Heater	Plate	Screen	Sup-pressor	Cathode	Grounded Heater	—
6A7	Det. Osc.	Detector Control Grid	"Hot" Heater	Plate of Detector	Screen	Plate of Osc.	Control Grid of Osc.	Cathode	Grounded Heater
6B7	I. F. Det.	Control Grid	"Hot" Heater	Plate	Screen	Audio Diode	A. V. C. Diode	Cathode	Grounded Heater
37	A. F. Amp.	—	Grounded Heater	Plate	Control Grid	Cathode	"Hot" Heater	—	—
41's	Outputs	—	Grounded Heater	Plate	Screen	Control Grid	Cathode	"Hot" Heater	—

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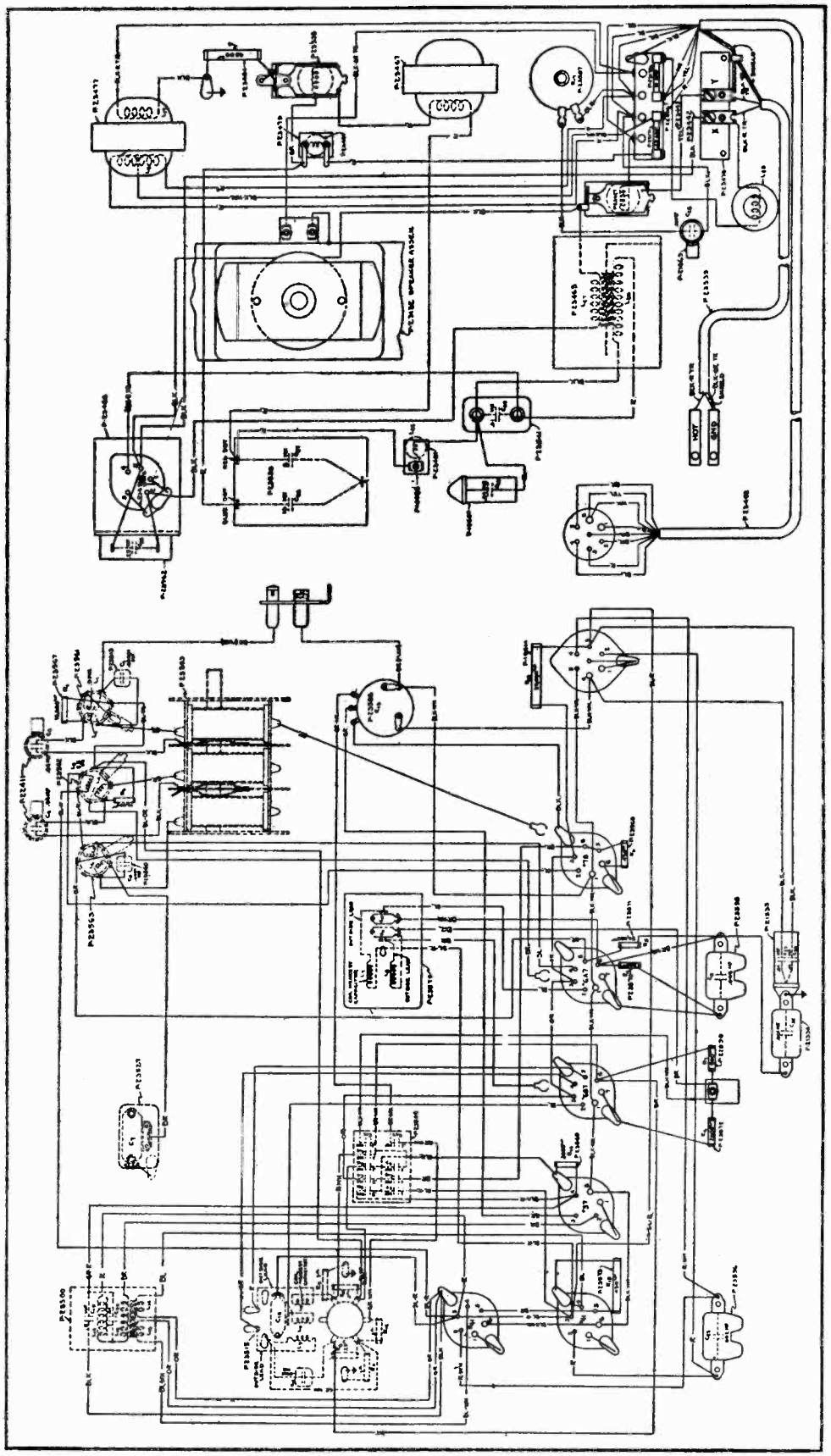
MODEL 33
Chassis Wiring
Socket Layout



ALIGNMENT OF R. F. AND OSCILLATOR:

Now put the output of the oscillator on the antenna input terminal through a 200 mmfd. capacitor, the "low" side of the oscillator being connected to the chassis base.

Now tune the test oscillator to 1400 k. c. and set the dial of the remote control unit at 140. Make sure that the signal applied is only strong enough to give a deflection on the output meter. Now, adjust the oscillator shunt aligner (Fig. 15) for maximum meter deflection. Then, adjust the R. F and Antenna Aligners (Fig. 15) in the same manner.

Now, set the test oscillator frequency to 600 k. c. and adjust the oscillator series aligner for maximum meter deflection. If this adjustment was very far out, it is advisable to re-set to 1400 k. c. and check the oscillator shunt aligner.

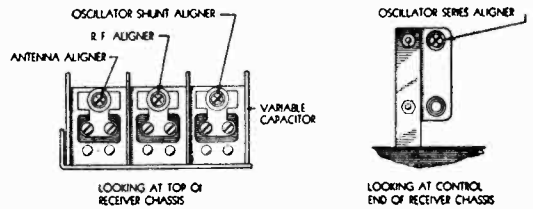


Fig. 15.
R. F. and Oscillator Aligners.

SECTION II—IDENTIFICATION OF CIRCUIT CONSTANTS

RESISTORS

R1	Bias Feed of R. F. Amplifier—10,000 Ohms, Type D; Brown, Black, Orange.
R2	Cathode Resistor of R. F. Amplifier—450 Ohms, Type D; Yellow, Green, Brown.
R3	Bias Feed of First Detector—10,000 Ohms, Type T; Brown, Black, Orange.
R4	Cathode Resistor of No. 6A7—500 Ohms, Type D; Green, Black, Brown.
R5	Grid Leak of Oscillator—50,000 Ohms, Type D; Green, Black, Orange.
R6	Delay Bias Resistor of Cathode of No. 6B7—2,000 Ohms, Type D; Red, Black, Red.
R7	Grid Bias Resistor of Cathode of No. 6B7—600 Ohms, Type D; Blue, Black, Brown.
R8	Audio Diode Load—.25 Megohm, Type D; Red, Green, Yellow.
R9	A. V. C. Diode Load—1.0 Megohm, Type D; Brown, Black, Green.
R10	Feeder of A. V. C. voltage—.1 Megohm, Type D; Brown, Black, Yellow.
R11	"Q" Resistor for Audio Diode—1.0 Megohm, Type D; Brown, Black, Green.
R12	Filter Resistor in Volume Control Circuit—.1 Megohm, Type D; Brown, Black, Yellow.
R13	Volume Control Potentiometer—1.0 Megohm.
R14	Bias Resistor of Audio Amplifier—3,000 Ohms, Type D; Orange, Black, Red.
R15	Bias Resistor of Output Tubes—450 Ohms, Type B; Yellow, Green, Brown.
R16	Screen Series Resistor—20,000 Ohms, Type B; Red, Black, Orange.
R17	Temporary Load Resistor—4,500 Ohms, Vitreous Enamel.

INDUCTANCES

L1	Primary of Antenna Transformer—.9 Mh. 25 Ohms.	(P-23561)
L2	Secondary of Antenna Transformer.	
L3	Primary of R. F. Transformer—5.5 Mh. 73 Ohms.	(P-23562)
L4	Secondary of R. F. Transformer.	
L5	Plate Winding of Oscillator Coupler.	(P-23563)
L6	Grid Winding of Oscillator Coupler.	
L7	Primary of First I. F. Transformer—5.5 Mh.; 20 Ohms.	(P-23579)
L8	Secondary of First I. F. Transformer—5.5 Mh.; 20 Ohms.	
L9	Secondary of Second I. F. Transformer—5.5 Mh.; 45 Ohms.	(P-23515)
L10	Secondary of Second I. F. Transformer—5.5 Mh.; 45 Ohms.	
L11	Primary of Second I. F. Transformer—5.5 Mh.; 45 Ohms.	

INDUCTANCES (Contd.)

L12	Primary of Audio Input Transformer—2,400 Ohms.	(P-23500)
L13	Secondary of Audio Input Transformer. 7,000 Ohms	
L14	Secondary of Audio Input Transformer. 7,000 Ohms	
L15	Plate Circuit Choke—2,800 Ohms.	
L16	Primary of Audio Output Transformer—530 Ohms.	(P-23417)
L17	Secondary of Audio Output Transformer.	
L18	Field of Electro-Dynamic Speaker—6 Ohms.	
L19	R. F. Choke—150 Microhenries (P-23481)	
L20	Load Relay Winding—48 Ohms. (In P-23537 Relay)	
L21	Filter Choke—210 Ohms (P-23467)	
L22	R. F. Choke—150 Microhenries. (P-23481)	
L23	R. F. Choke "A" Supply Circuit to Chassis. (P-23651)	
L24	Driving Coil of Elkonode. (In P-23466 Elkonode Assembly)	
L25	R. F. Choke. (In P-23466 Elkonode Assembly)	
L26	Primary of Power Transformer.	(P-23465)
L27	Secondary of Power Transformer—90 Ohms.	
L28	Winding of Power Relay—Ohms. (P-23537)	

CAPACITORS

C1	Antenna Series Capacitor—10 Mmfd. (P-23518)	
C2	A. V. C. By-Pass in R. F. Amplifier—.04 Mfd. (P-22411)	
C3	Cathode Resistor By-pass in R. F. Amplifier—.1 Mfd. (In P-23508)	
C4	Screen By-pass .5 Mfd. (In P-23508)	
C5	Plate Circuit By-pass—1.0 Mfd. (In P-23508)	
C6	A. V. C. By-pass in First Detector Circuit—.04 Mfd. (P-22411)	
C7	Oscillator Series Aligner. (P-23527)	
C8	Cathode By-pass No. 6A7 Tube—.006 Mfd. (P-23595)	
C9	Grid Capacitor of Oscillator—100 Mmfd. (P-19560)	
C10	Tuning Capacitor for Primary of First I. F. Transformer.	
C11	Tuning Capacitor for Secondary of First I. F. Transformer.	
C12	By-pass for Audio Diode Load—100 Mmfd. (P-19560)	
C13	By-pass for A. V. C. Diode Load—.1 Mfd. (In P-23508)	
C14	By-pass for Grid Bias Resistor of No. 6B7—.1 Mfd. (In P-23508)	
C15	By-pass for Grid and Delay Bias Resistors of No. 6B7—.1 Mfd. (In P-23508)	
C16	By-pass for A. V. C. Filter Circuit—.1 Mfd. (In P-23508)	
C17	Stopping Capacitor Audio Diode Circuit—.1 Mfd. (In P-23508)	
C18	Tuning Capacitor Primary of Second I. F. Transformer.	
C19	By-pass for Cathode Resistor No. 37 Tube—.5 Mfd. (In P-23500)	
C20	Plate Circuit Capacitor No. 37 Tube—.15 Mfd. (In P-23500)	
C21	By-pass for Cathode Resistor No. 37 Tube—.5 Mfd. (In P-23508)	
C22	By-pass for Plate Circuits Output Tubes—.002 Mfd. (P-23596)	
C23	By-pass for "Hot" A Circuit—.01 Mfd.	(P-21535)
C24	By-pass for "B—" Circuit—.01 Mfd.	
C25	Tone Control Capacitor .01 Mfd. (P-21669)	
C26	Filter Capacitor—16 Mfd.	(P-23538)
C27	Filter Capacitor—8 Mfd.	
C28	Filter Capacitor—.04 Mfd. (P-19597)	
C29	Secondary Capacitor (P-23541)	
C30	Vibrator Capacitor.	(In P-23466 Vibrator Assembly)
C31	Vibrator Capacitor.	
C32	Cathode By-pass No. 6A7—.001 Mfd. (P-19334)	
C33	Primary Capacitor, Vibrator Circuit—.25 Mfd. (P-23765)	

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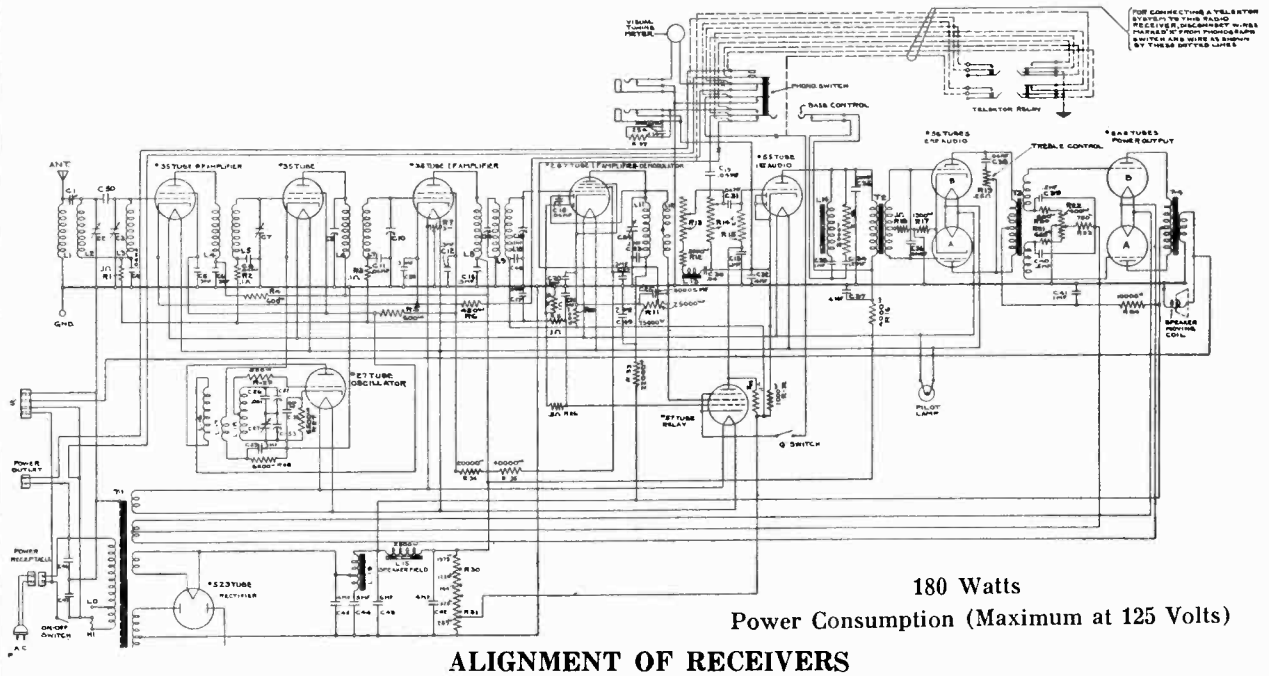
MODEL 52, 54
Schematic,
Alignment, Data



180 Watts
Power Consumption (Maximum at 125 Volts)

ALIGNMENT OF RECEIVERS

If a test oscillator and output meter are used, the signal strength applied to the receiver should be low enough so that the automatic volume control is not operated in order to avoid apparent broad adjustment. If broadcast signals are used, moderately strong signals which swing the meter pointer about half the distance back toward the "Off" position should be used.

With whichever method is used, the receiver should be tuned to a 1400 kc. signal first, and the Antenna, R. F. and Oscillator Shunt Aligners adjusted for best setting. Next the receiver should be set at 600 kc. on the dial, and the Oscillator Series Aligner ONLY adjusted for best position for maximum background noise. After this is done re-check the Oscillator Shunt Aligner at 1400 kc., using same dial setting as previously. The receiver should be left turned "On" for about fifteen minutes before aligning.

The Intermediate Amplifier circuits are aligned on oscillographs to obtain the proper shape of resonance curves having "steep" sides to get proper selectivity and fidelity. "Peak" methods of alignment (with oscillator and meter) do not give the desired curve, as it may be broad and unsymmetrical although a high peak is indicated. The adjustment of these circuits is very stable as shown by field experience and Proving Division tests. Therefore, as these adjustments cannot be duplicated exactly without the oscillograph equipment, it is recommended that the I. F. circuits never be adjusted by a service man.

Warning regarding changing position of cable wires in base of chassis—Re-arrangement may cause mis-alignment, tweets, hum, etc.

CONTINUITY TEST—No. 52 RECEIVER

Socket	Heater	Plate	Screen	Suppressor	Cathode	Control Grid
R. F.	0	4080	24,040	.....	450	1,600,000
Mixer	0	4080	24,040	.....	6500	1,600,000
Osc.	0	23,440	.....	.....	6500	600
1st I. F.	0	3480	23,440	.....	450	1,600,000
2nd I. F.	0	18,480	33,440	1264	1264	664
Relay	0	100,520	101,164	See Note A	See Note A	1,500,000
Demod.	0	8,840	664	664	661	2,100,520
1st Audio No. 1	0	14,940	.....	.....	1200	5,500
1st Audio No. 2	0	14,315	.....	.....	1200	4,200
2nd Audio No. 1	750	3,670	.....	.....	.....	830
2nd Audio No. 2	750	3,590	.....	.....	.....	750
Rectifier	3510	30	.....	.....	.....	28

NOTE A: No reading when either Q switch is open or when phono-switch is operated. Zero ohms when Q switch is closed and phono-switch is not in operated position.

MODEL 52,54
Voltage,
Circuit notes

STROMBERG - CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

Voltage	Meter	Scale	Where Measured	Approx. Value in Volts
Heater Voltage Nos. 35, 27 2B7, 55, 56 and 57 Tubes	A. C.	0–4	Across Heater Terminals of Sockets	2.5
Filament Voltages Nos. 2A3 Tubes	A. C.	0–4	Across Filament Terminals of Sockets	2.5
Filament Voltage No. 5Z3 Tube	A. C.	0–8	Across Filament Terminals of Sockets	5.
Plate Voltage Radio Amplifier Tube	D. C.	0–250	Between Plate Terminal of R. F. Amplifier Socket (+) and Chassis Base (−)	184
Plate Voltage Mixer Tube	D. C.	0–250	Between Plate Terminal of Mixer Socket (+) and Chassis Base (−)	186
Plate Voltage Oscillator Tube	D. C.	0–250	Between Plate Terminal of Oscillator Socket (+) and Chassis Base (−)	83
Plate Voltage First I. F. Tube	D. C.	0–250	Between Plate Terminal of First I. F. Socket (+) and Chassis Base (−)	186
Plate Voltage I. F. Demodulator Tube	D. C.	0–750	Between Plate Terminal of I. F.—Demodulator Socket (+) and Chassis Base (−)	290
Plate Voltage First Audio Tube	D. C.	0–250	Between Plate Terminal of First Audio Socket (+) and Chassis Base (−)	182
Plate Voltage Second Audio Tubes	D. C.	0–250	Between Plate Terminals of Second Audio Sockets (+) and Chassis Base (−)	240
Plate Voltages Power Output Tubes	D. C.	0–750	Between Plate Terminals of Power Output Sockets (+) and Chassis Base (−)	358
Screen Voltages, R. F. and Mixer Tubes	D. C.	0–250	Between Screen Terminals of R. F., Mixer and First I. F. Sockets (+) and Chassis Base (−)	81
Screen Voltage First I. F. Tube	D. C.	0–250	Between Screen Terminal of First I. F. Socket (+) and Chassis Base (−)	83
Screen Voltage Second I. F. Tube	D. C.	0–250	Between Screen Terminal of Second I. F. Socket (+) and Chassis Base (−)	131
"C" Voltage R. F. Amplifier Tube	D. C.	0–10	Between Cathode Terminal of R. F. Amplifier Socket (+) and Chassis Base (−)	3.2
"C" Voltage Mixer Tube	D. C.	0–10	Between Cathode Terminal of Mixer Socket (+) and Chassis Base (−)	8.2
"C" Voltage First I. F. Tube	D. C.	0–10	Between Cathode Terminal of First I. F. Socket (+) and Chassis Base (−)	3.6
"C" Voltage I. F.,— Demodulator Tube	D. C.	0–10	Between Cathode Terminal of I. F., Demodulator Socket (+) and Chassis Base (−)	3.6
"C" Voltage First Audio Tube	D. C.	0–250	Between Cathode Terminal of First Audio Socket (+) and Chassis Base (−)	35
Grid Voltage Oscillator Tube	D. C.	0–250	Between Cathode Terminal of Oscillator Tube Socket (+) and Chassis Base (−)	26
Grid Voltage Second Audio Tubes	D. C.	0–250	Between Cathode Terminal of Second Audio Sockets (+) and Chassis (Base (−)	11
Grid Voltage Power Output Tubes	D. C.	0–250	Between Grid Terminals of Power Output Tubes (−) and Terminal No. 1 on Voltage Divider (+)	57
"B" Voltage R. F. Amplifier Tube	D. C.	0–250	Between Tube Side of 600 ohm Resistor R4 (+) and Chassis Base (−)	186
"B" Voltage Mixer, First I. F. and First Audio Tubes	D. C.	0–250	Between Hi Side of Voltage Divider (+) and Chassis Base (−)	184
"B" Voltage Oscillator Tube	D. C.	0–250	Between Tube Side of 20,000 ohm Resistor (+) and Chassis Base (−)	83
"B" Voltage Second Audio Tubes	D. C.	0–250	Between Low Side of 10,000 ohm Resistor R24 (+) and Chassis Base (−)	248
"B" Voltage Power Output Tubes	D. C.	0–750	Between Hi Side of 10,000 ohm Resistor R24 (+) and Chassis Base (−)	365
"C" Voltage Power Output Tubes	D. C.	0–250	Across 750 ohm Biasing Resistor R23 on Voltage Divider	57
Speaker Field Voltage	D. C.	0–250	Across Small Pins on Speaker Connector Socket	182
Plate Voltage A. C. per Anode No. 5Z3 Rectifier Tube	A. C.	See Remarks	Between Plate Terminals of No. 5Z3 Rectifier Socket and Chassis Base	380†

A Bi-resonator is used to couple the antenna to the R. F. amplifier to prevent cross modulation. The R. F. amplifier is coupled to the mixer by a regular tuned R. F. transformer. This gives three tuning circuits (four-gang tuning capacitor) for R. F. selectivity ahead of the mixer, thus the image response ratio is extremely high. The oscillator is coupled to the cathode circuit of the mixer tube in the regular manner. The I. F. output of the mixer tube is fed into the first I. F. amplifier through a transformer. From the first I. F. amplifier the signal is coupled to the pentode portion of the second I. F. amplifier-demodulator tube. This tube is the No. 2B7, and the diodes are fed from the output of the pentode amplifier through a single tuned R. F. transformer. One of the diodes is used for the audio signal rectification and the other for AVC voltage.

The resistor unit of the volume control potentiometer forms part of the load of the "audio" diode of the No. 2B7 tube, and the audio voltage is applied to the triode portion of the No. 55 first audio tube. (The diodes in this No. 55 tube are not used). The potentiometer is double, the rear unit being used in the low level tone compensation circuit, which increases the response to bass frequencies and high frequencies in proper proportion as the volume level is reduced. The output of the No. 55 triode is fed through a transformer to the push-pull first audio stage. "The Bass Control" circuit apparatus is connected across the primary of this transformer. The "Bass Control" switch is provided to remove the bass compensation by opening this circuit when it is desired to secure extremely high levels of sound output for dancing, etc. The AVC voltage secured from the other diode of the No. 2B7 tube is fed back to the first three tubes through a suitable filter.

The "Q" circuit for providing quiet operation for tuning between stations, consists of the No. 57 relay tube connected to the "AVC" diode of the No. 2B7 tube. When there is no carrier coming in, the action of this circuit is to put high negative potentials on the "audio" diode and the grid of the No. 55 triode, thus preventing reception of inter-carrier noise. When a carrier of suitable strength comes in, these negative potentials are removed and the signal is received. A switch on the side of the chassis (right side looking at rear) is provided, so that this "Q" circuit can be rendered inoperative if it is desired to use the maximum sensitivity of the receiver.

MODEL 52,54
Chassis wiring

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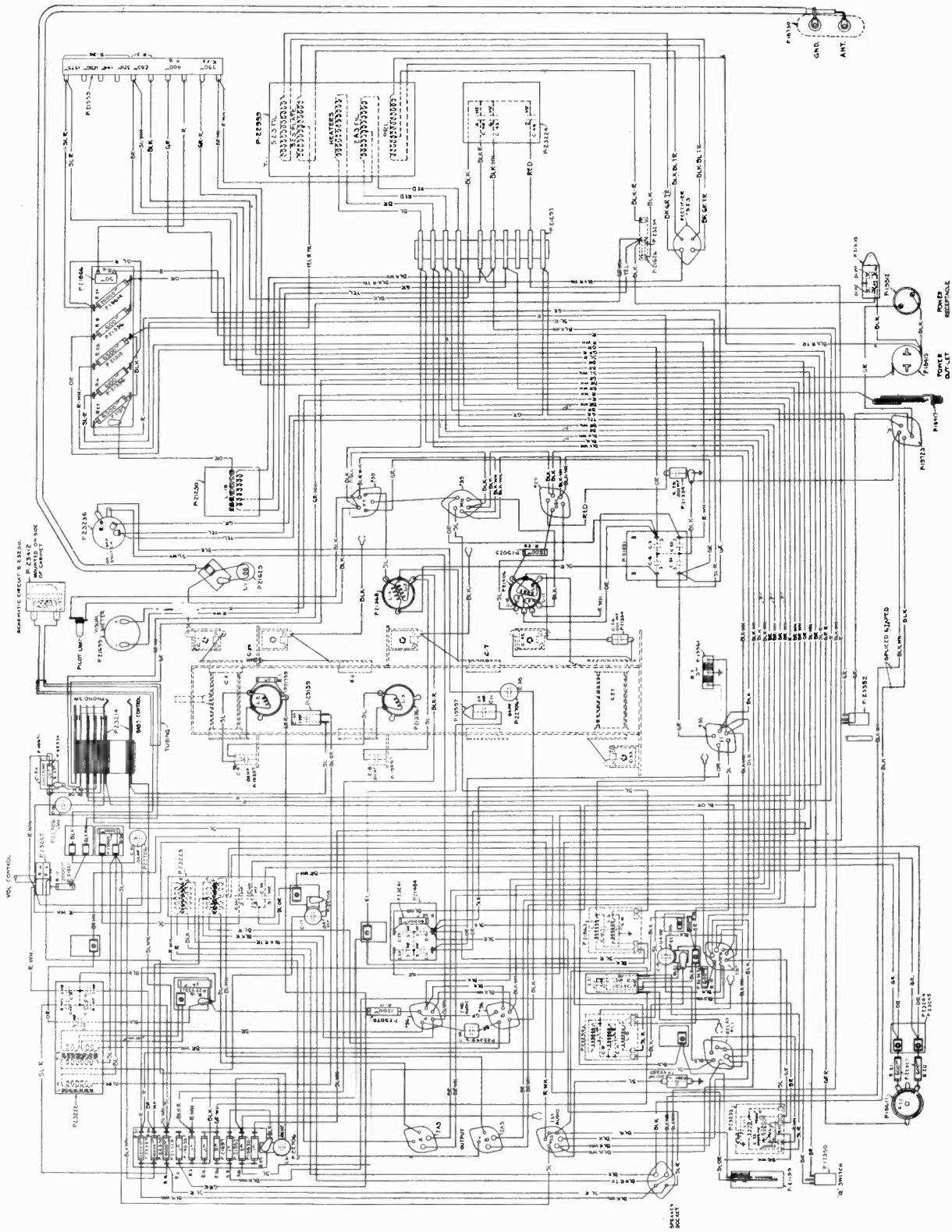

Fig. 3. Wiring Diagram.

MODEL 55,56
Schematic
Voltage

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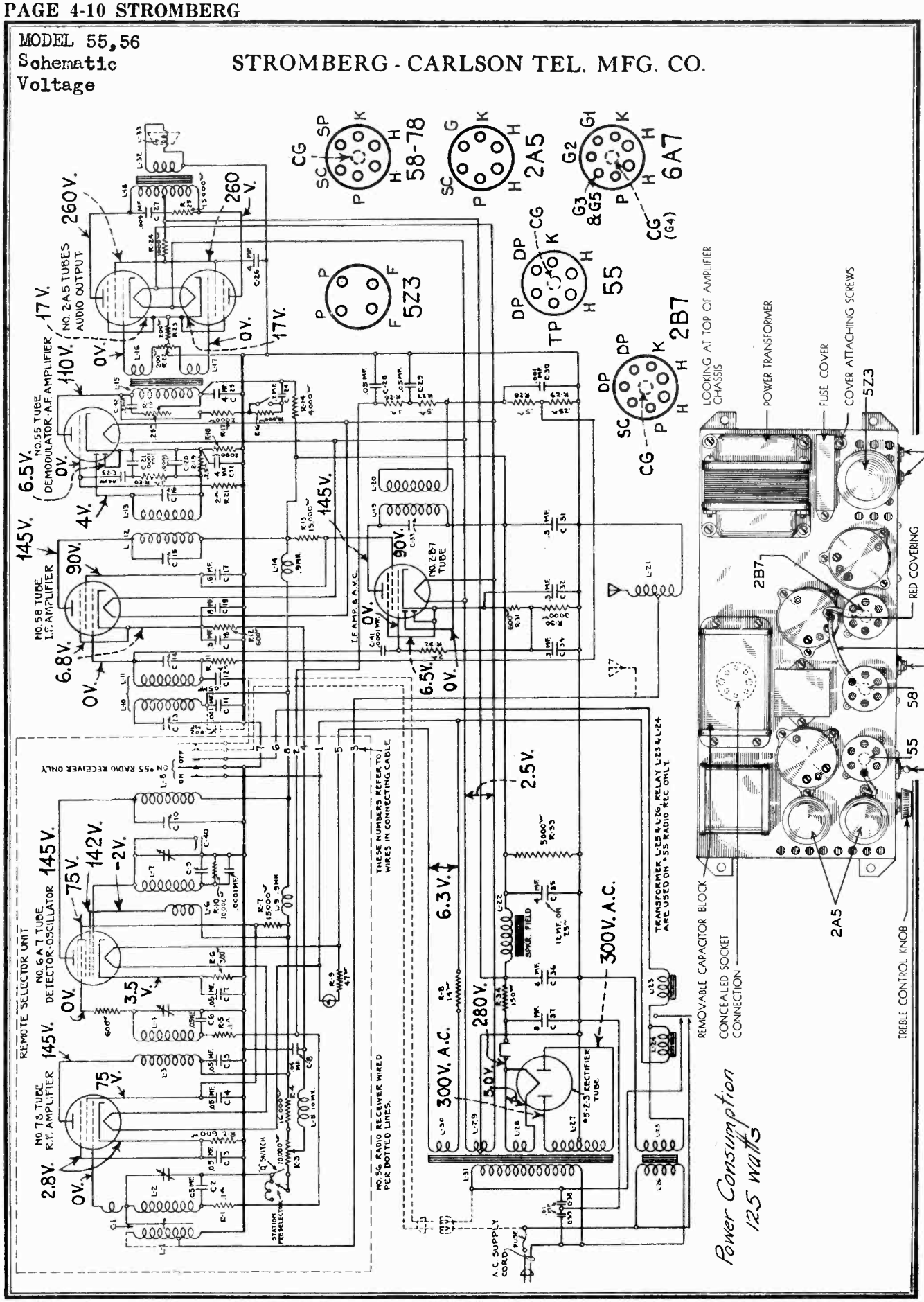

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MODEL 55,56
Socket,Voltage

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes, speaker, and cable plug in place. The set is therefore in operation when the measurements are made. Fig. 1 and Fig. 2 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120

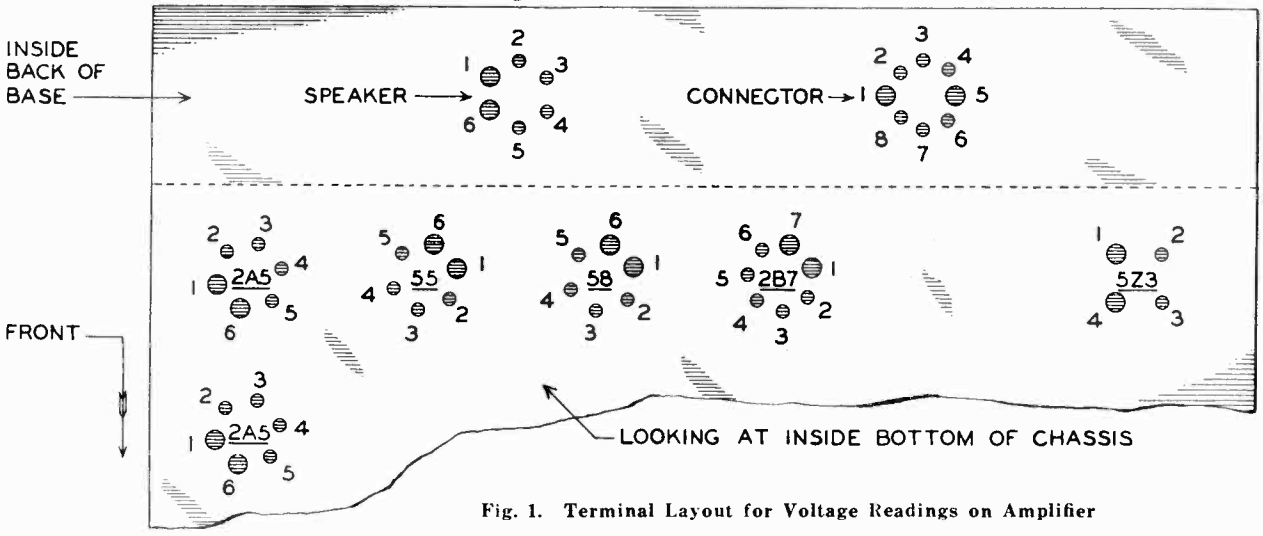


Fig. 1. Terminal Layout for Voltage Readings on Amplifier

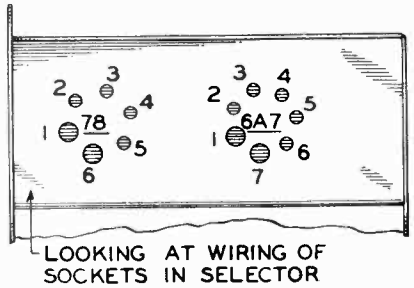


Fig. 2. Termina! Layout for Voltage Readings on Selector Unit

Tube	*Circuit*	*Grid Clip*	1	2	3	4	5	6	7	**Heater Voltages between Terminal Nos.*
78		0	*	+145	+ 75	+ 2.8	+ 2.8	*		1–6—*6.3* volts
6A7		0	*	+145	+ 75	+142	— 2	+ 3.5	*	1–7—*6.3* volts
58		0	*	+145	+ 90	+ 6.8	+ 6.8	*		1–6—*2.5* volts
2B7		0	*	+145	+ 90	0	+ 6.4	+ 6.4	*	1–7—*2.5* volts
55		0	*	+110	+ 4	+ 6.5	+ 6.5	*		1–6—*2.5* volts
2A5's		—	*	+260	+260	0	+ 17	*		1–6—*2.5* volts
5Z3 80		—	* +280	*300*	*300*	* +280				1–4— *5* volts
Speaker Socket		—	0	+260	+270	+270	+130	0		

A. C. voltages are indicated by italics. Additional voltages may be measured directly across the proper terminals.

CONTINUITY TESTS

This test is made with all tubes, the loud speaker plug, and the cable plug removed from the sockets. The power supply cord must be disconnected from the convenience outlet. The readings given are in ohms as measured on a Weston Volt-Ohmmeter No. 663.

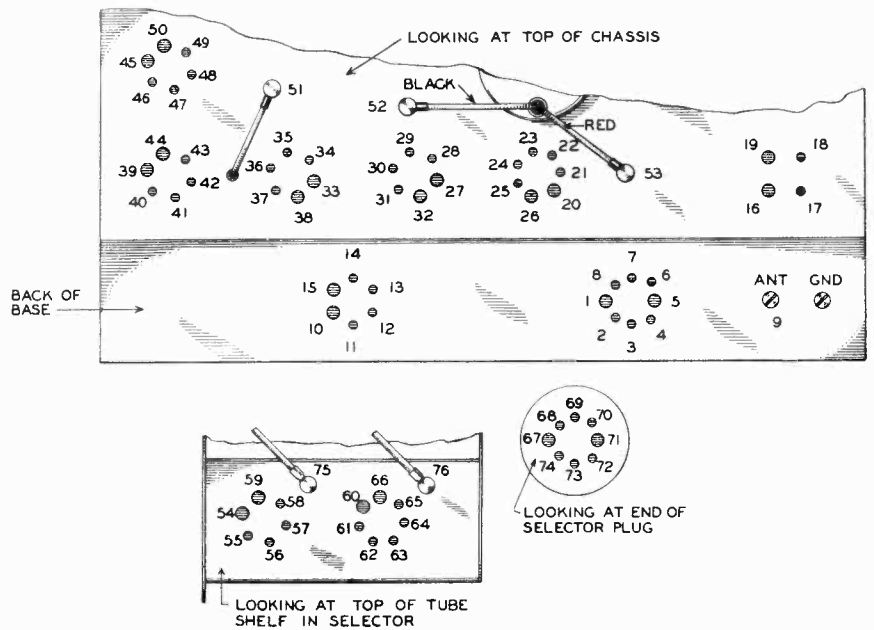


Fig. 3. Layout of Point for Continuity Test

Measurements Between Points		*Resistors*	*If resistance differs greatly from value shown, check the following*
1	5	14.5 ohms	L30, R35.
2	23	7.5 ohms	R26, R27, L20.
2	Ground	7.5 ohms	R26, R27, R28, R29.
3	9	600,000 ohms	L21.
3	Ground	1.5 megohms	L21.
4	31	600 ohms	R12.
5	6	35 ohms	L23, L24 (Relay Windings).
6	Ground	19 ohms	L24, L25.
7	Ground	0	Wiring.
8	22	16,000 ohms	L14, R13.
10	15	1 ohm	L32.
16	19	.1 ohm	L28.
17	18	90 ohms	L27.
21	Ground	5,000 ohms	L19, R33.
22	29	0	Wiring.
25	Ground	3,600 ohms	R30, R31.
26	34	5,000 ohms	L12, R14, L15.
35	Ground	300,000 ohms	L13, R19, R18.
40	46	475 ohms	L18.
40 or 46	41 or 47	1,100 ohms	L18, R24.
43 or 49	Ground	200 ohms	R22, R23.
42 or 48	Ground	5,500 ohms	L16 or L18, R22.
51	Ground	2 megohms	R21.
52	Ground	400,000 ohms	L11, R11, R29.
53	Ground	2 megohms	R30, R32.
54	71	0	Cable.
55	74	23 ohms	L3, L9, Cable.
56	74	17,500 ohms	R7, L9, Cable
58	Ground	600 ohms	R2.
61	74	60 ohms	L8, Cable.
62	74	17,500 ohms	R7, L9, Cable.
63	74	17,500 ohms	L6, R7, L9.
64	Ground	15,000 ohms	L7, R10.
65	Ground	300 ohms	R6.
66	67	0	Cable.
75	68	120,000 ohms	L2, R1, Cable.
76	68	120,000 ohms	L4, R5, Cable.

CONTINUITY TESTS—Continued

LOCATION AT POINTS USED IN CONTINUITY TEST

Point	*Location*	*Point*	*Location*
1	"Free" Filament lead.	39	Heater of No. 2A5 Socket.
2	A. V. C. lead.	40	Plate of No. 2A5 Socket.
3	Antenna transmission line.	41	Screen of No. 2A5 Socket.
4	Manual Volume Control lead.	42	Grid of No. 2A5 Socket.
5	Filament and Relay lead.	43	Cathode of No. 2A5 Socket.
6	Relay lead.	44	Heater of No. 2A5 Socket.
7	Shield terminal.	45	Heater of No. 2A5 Socket.
8	I. F. transmission line.	46	Plate of No. 2A5 Socket.
9	Antenna post.	47	Screen of No. 2A5 Socket.
10	Moving coil terminal for speaker.	48	Grid of No. 2A5 Socket.
11	Field coil terminal for speaker.	49	Cathode of No. 2A5 Socket.
12	Rectifier circuit rectifier side.	50	Heater of No. 2A5 Socket.
13	Rectifier circuit Filter side.	51	Grid clip for No. 55 Tube.
14	Field coil terminal for loud speaker.	52	Grid clip for No. 58 Tube.
15	Moving coil terminal for loud speaker.	53	Grid clip for No. 2B7 Tube.
16	Filament Rectifier Tube Socket.	54	Heater of No. 78 Socket.
17	Plate of Rectifier Tube Socket.	55	Plate of No. 78 Socket.
18	Plate of Rectifier Tube Socket.	56	Screen for No. 78 Socket.
19	Filament of Rectifier Tube Socket.	57	Suppressor of No. 78 Socket.
20	Heater of No. 2B7 Socket.	58	Cathode of No. 78 Socket.
21	Plate Terminal of No. 2B7 Socket.	59	Heater of No. 78 Socket.
22	Screen Terminal of No. 2B7 Socket.	60	Heater of No. 6A7 Socket.
23	Diode Terminal of No. 2B7 Socket.	61	Plate of No. 6A7 Socket.
24	Diode of No. 2B7 Socket.	62	Nos. 3 and 5 Grids of No. 6A7 Socket.
25	Cathode of No. 2B7 Socket.	63	No. 2 Grid of No. 6A7 Socket.
26	Heater of No. 2B7 Socket.	64	No. 1 Grid of No. 6A7 Socket.
27	Heater of No. 58 Socket.	65	Cathode of No. 6A7 Socket.
28	Plate of No. 58 Socket.	66	Heater of No. 6A7 Socket.
29	Screen of No. 58 Socket.	67	Same as 1 on Socket.
30	Suppressor of No. 58 Socket.	68	Same as 2 on Socket.
31	Cathode of No. 58 Socket.	69	Same as 3 on Socket.
32	Heater of No. 58 Socket.	70	Same as 4 on Socket.
33	Heater of No. 55 Socket.	71	Same as 5 on Socket.
34	Plate of No. 55 Socket.	72	Same as 6 on Socket.
35	Diode of No. 55 Socket.	73	Same as 7 on Socket.
36	Diode of No. 55 Socket.	74	Same as 8 on Socket.
37	Cathode of No. 55 Socket.	75	Grid clip of No. 78 Tube.
38	Heater of No. 55 Socket.	76	Grid clip of No. 6A7 Tube.

MODEL 55,56
Chassis wiring

STROMBERG - CARLSON TEL. MFG. CO.

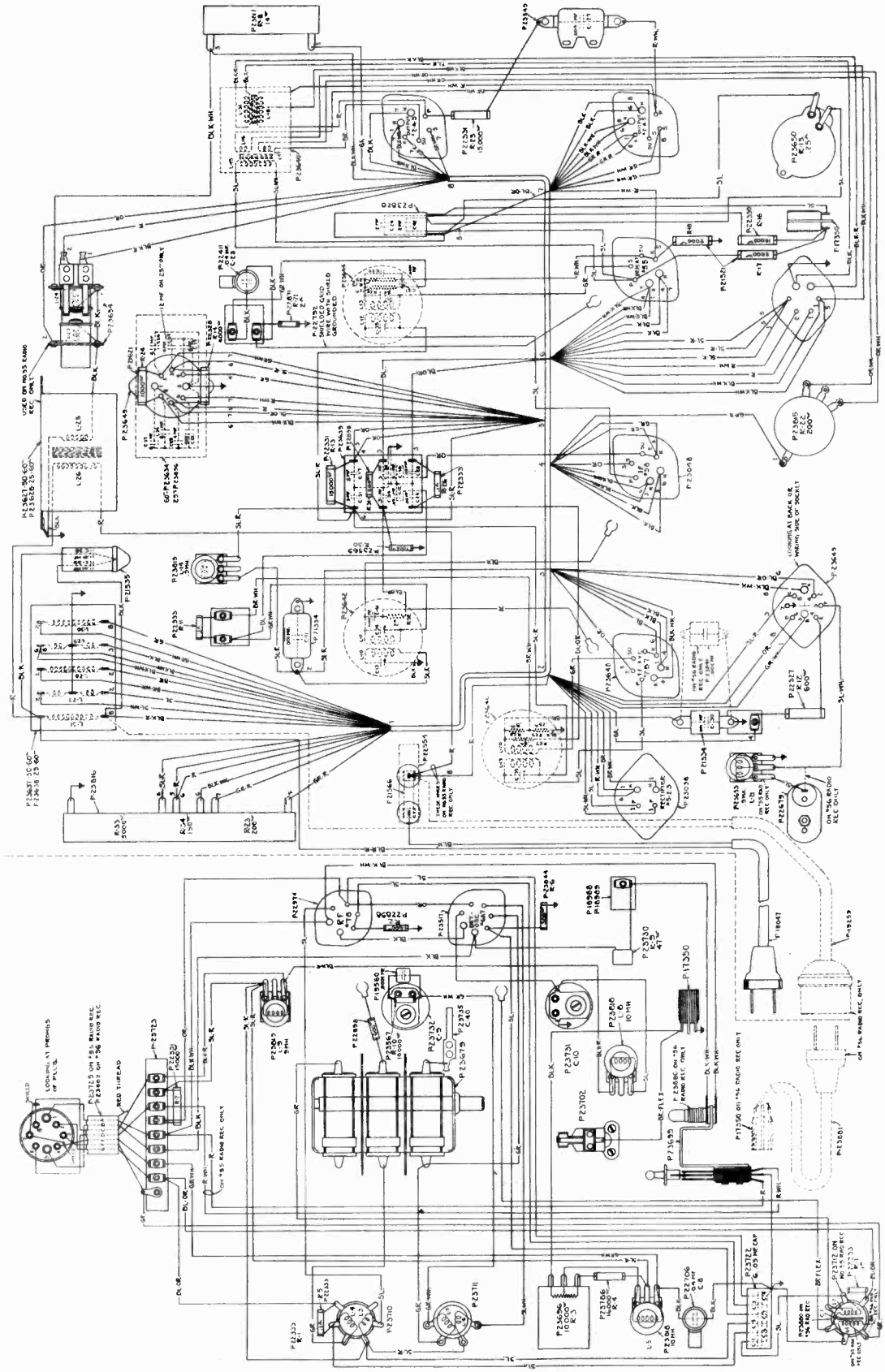


Fig. 5. Wiring Diagram.

MODEL 55,56
Selector notes

STROMBERG - CARLSON TEL. MFG. CO.

SECTION 5—PRE-SELECTOR INSTRUCTIONS

First—List the eight favorite stations which you wish to set up on the Pre-Selector Mechanism. Local and other stations that give best daytime and evening service should be selected. Arrange these eight stations in the order of their channel numbering. Channel numberings are obtained by omitting the right hand "0" from the kilocycle numbers, which you find in newspaper radio programs. For example, 700 kilocycles is channel "70".

Second—Release the lid stay on the Remote Selector Case by lowering the lid to the position where the stud "M", Fig. 3, on the upper end of the stay can be pushed out of the enlarged slot "N" of the slide plate. A slight side movement is sufficient to release this stay arm. This allows the control box lid to be completely opened as shown in the last view of Fig. 3.

Third—Remove the cover over the Selector Dial by unscrewing the four knurled headed thumbscrews "A", Fig. 2, (one located in each corner of the cover) and lifting this cover completely off. It is not necessary to remove control knobs; also the four knurled screws remain in the cover holes, to avoid misplacing these small parts.

Fourth—Take the first station nearest the "55" channel end of the dial, from the pre-selected list of "favorite" stations and tune this station by aid of the markings on the Station Selector dial. For example, WGR, which occupies channel "55" (550 kilocycles).

Fifth—With a small screwdriver, loosen Pre-Selector Contact Lug Screw "C", Fig. 7, of the first lug in the left hand end of the Contact Lug Slot, about one-half turn. This will allow the pointed end of stud of the first lug to be moved directly under and into the notch in the Contact Arm "E". Allow the Te-lek-tor-et Receiver to remain turned on for a period of at least 15 minutes before making a final setting of the contact points. This will insure correct temperature adjustment of the thermostatic control.

Sixth—Sharpen the tuning of pre-selected stations by turning down the volume (left hand knob turned counter-clockwise) and moving the right hand knob slightly until the setting is obtained where the audio quality is "full tone". Any movement in either direction from this correct setting will give a higher pitched tone or a distorted reproduction.

Seventh—Set Contact Lug Screws "C", Fig. 7, tight, taking care not to disturb the accurate setting previously obtained. Check sharpness of tuning, after setting screw "C" as described in the previous paragraph. When making this check, have the "Q" Switch Lever "G", Fig. 7, in the right hand position so as to be sure that the electrical circuit is completed through contact arm "E" and pointed stud on contact lug.

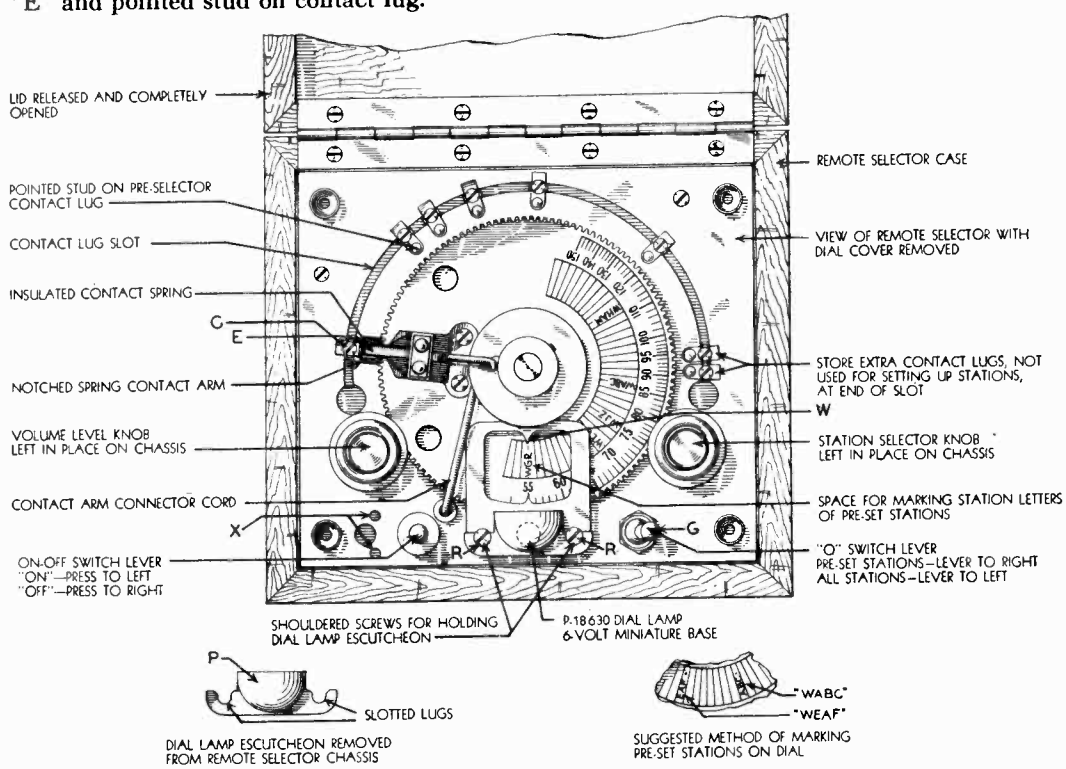


Fig. 7. Remote Selector Unit of No. 55 Te-lek-tor-et with Dial Cover removed for setting Pre-Selector Mechanism.

Eighth—Proceed to set up remaining stations on your list in the order of the channel numbering, moving the contact lugs around the adjusting slot as the operation of setting proceeds. Store any Contact Lugs not used in setting-up favorite stations in the two ends of the adjusting slot, so as not to come into contact with the notched contact arm when operating the station selector over the used portion of the dial.

Ninth—Now, mark the station letters of the pre-selected stations only, in the white space provided on the Selector Dial, placing a dot on the dial directly in line with the upper pointer "W", Fig. 7, when the station is accurately tuned. Use a soft lead pencil and arrange letters as shown in lower view of Fig. 7. Leave off the first letter of four letter stations, for better legibility. Use a damp cloth for removing pencil markings on the dial.

Tenth—Return Selector Dial Cover, turning the four corner screws until tight.

Eleventh—Lower the lid of Remote Selector Case to a location where the end "M" of the lift stay will enter the enlarged slot "N", Fig. 3, in the lid slide plate, after which the lid can be completely lowered or raised to the limit of the stay arm.

Replacing Tubes in Remote Selector Unit

There are two radio tubes in the Te-lek-tor-et Remote Selector Case which require replacing when "worn out" in service. These tubes are easily accessible by removing the complete Remote Selector chassis as follows:

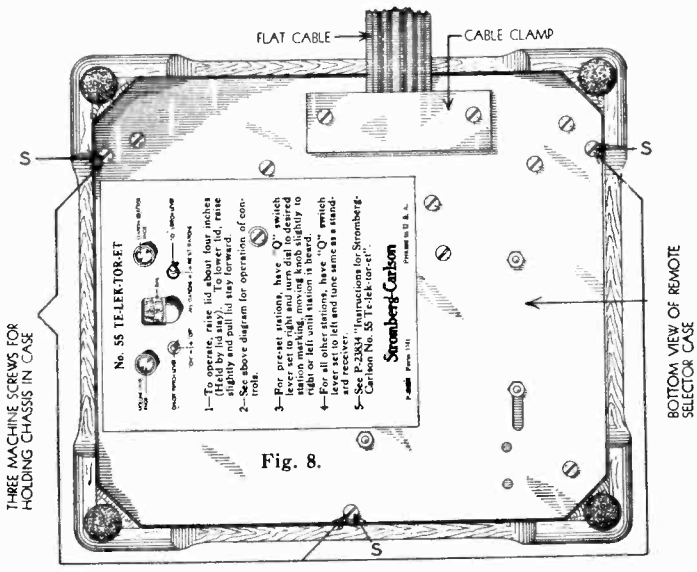


Fig. 8.

Bottom view of Remote Selector Unit of No. 55 Te-lek-tor-et showing location of Chassis Holding Screws.

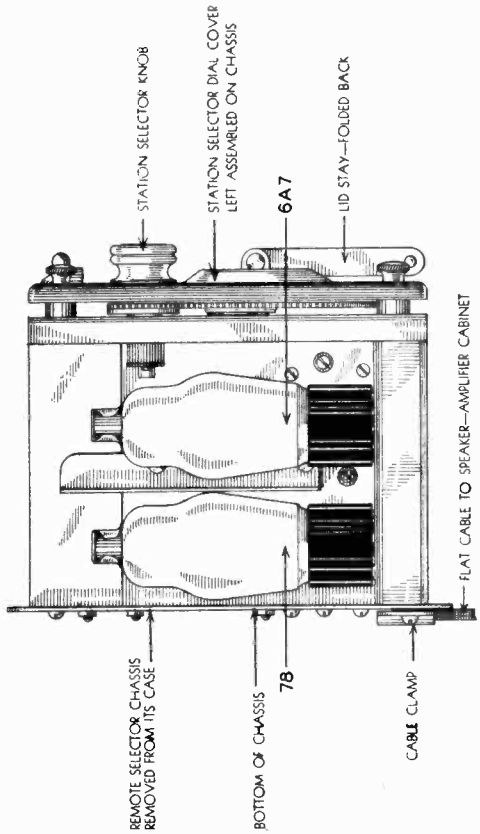


Fig. 9. Chassis of Remote Selector removed from its case for Tube Replacement.

First—Release the Remote Selector Case lid stay as shown in Fig. 3. Swing this stay back and close the lid.

Second—Turn Remote Selector Case over so as to rest on a newspaper or magazine and avoid marring the finish. Now, remove three copper colored machine screws "S", Fig. 8. This completely releases the chassis unit.

Third—Turn the Selector Case over so as to allow the chassis to come out with its own weight. Place the hand over the bottom of case when turning the Selector Unit over so as to avoid accidentally dropping the chassis and marring a table top. If the chassis sticks in the case, open the lid and press down on the top of chassis.

Fourth—Now, the two radio tubes, shown in Fig. 9, as well as all working parts of this chassis are completely accessible.

MODEL 64

Schematic, Notes STROMBERG - CARLSON TEL. MFG. CO.

Stromberg-Carlson No. 64 Radio Receiver

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Type and Number of Tubes	1 No. 37, 3 No. 42, 1 No. 78, 1 No. 6A7, 1 No. 6B7, 1 No. 5Z3
Voltage Rating	105-125 Volts
Frequency Rating	50-60 Cycles
Power Consumption (Maximum at 125 volts)	160 Watts

CIRCUIT DESCRIPTION

The No. 78 tube is used as the R. F. Amplifier. The No. 6A7 tube is used for the oscillator-mixer. The No. 6B7 tube is used for the I. F. Amplifier, A. V. C., and demodulator. The No. 37 tube and one of the No. 42 tubes is used for the first and second (driver) audio stages respectively. The other two No. 42 tubes are used in the high power push-pull output stage.

This receiver is provided with two tuning ranges, 540 k. c. to 1,500 k. c. and 1,400 k. c. to 3,600 k. c. "Touch Tuning" is provided and includes means for "Free Wheeling" operation. See P-24185 "Installation and Operation Instructions" for directions for operating the controls of this receiver.

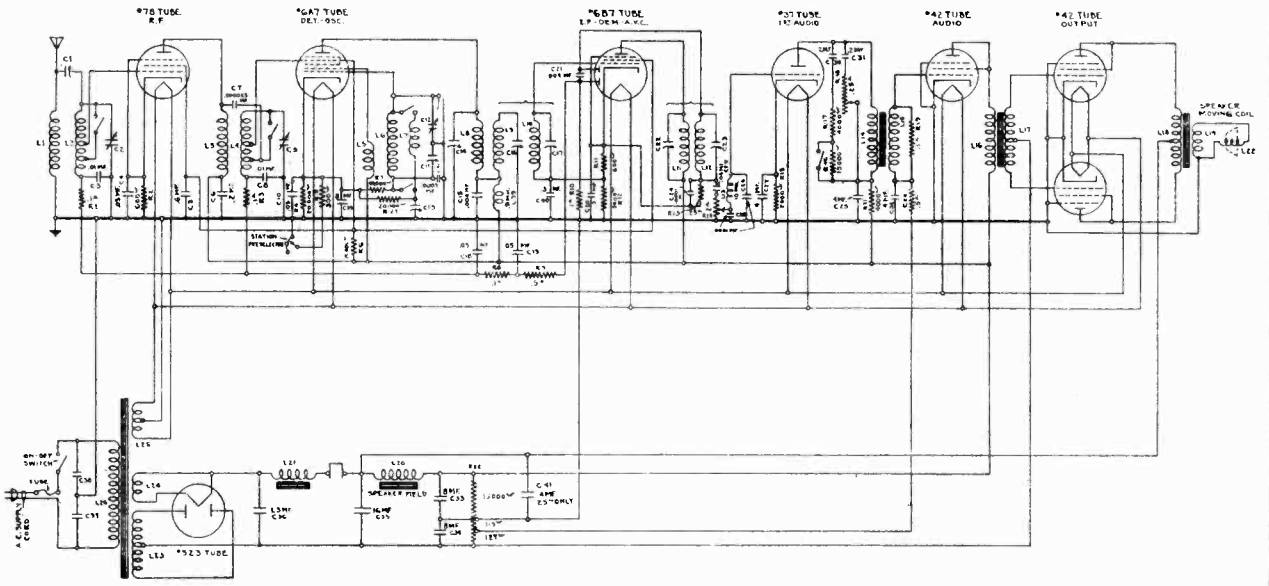
An antenna aligner, which may be adjusted with a screwdriver, if necessary, is located on the rear of the top of the chassis. Align only at high frequency end of dial with very weak station.

If the receiver does not respond over the dial when the "Q" switch is in the "All-Stations" position or if the pre-selector arms cause the grounding (outer) contact on the spring assembly to make when the brush rides up on the end of the arm (determined by listening with the "Q" switch in the "Pre-selected Stations" position), adjust the grounding spring on the contact assembly to the right, looking at the back of the receiver, so that it makes contact when the "Q" switch is in the "All-Stations" position only, and at no other time. See Fig. 2, P-24185 Instruction Book. When adjusting this outside contact spring, make bends only in the section near the contact end so as not to effect the initial tension of the spring against its mounting frame.

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes, speaker, and cable plug in place. The set is therefore in operation when the measurements are made. Fig. 1 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. The Volume Control should be set all "On" (clockwise) before measuring voltages. See page 2.



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MODEL 64
Voltage
Parts List

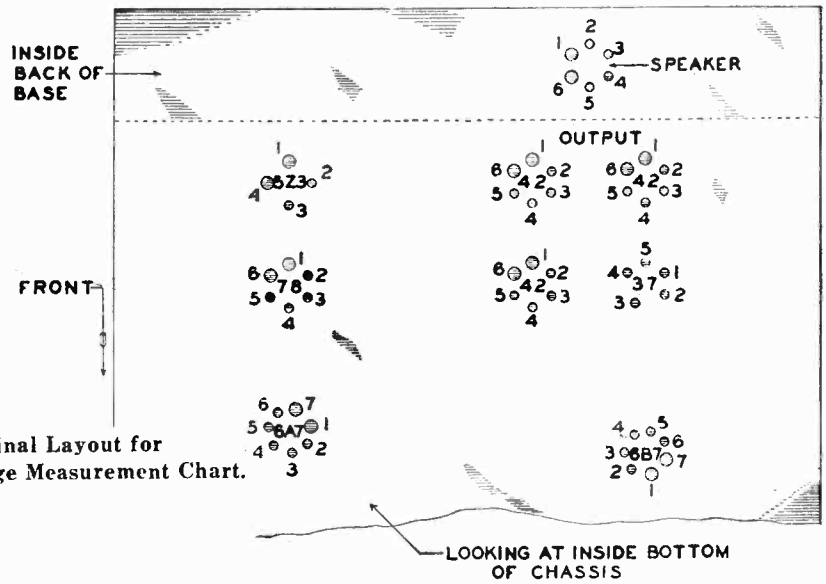


Fig. 2. Terminal Layout for Voltage Measurement Chart.

Terminals of Sockets

Tubes	*Circuit*	*Cap.*	1	2	3	4	5	6	7	*A. C. Meter for Heater Voltages Between Terminal Nos.*
78	R. F.			+210	+ 90	+2.5	+2.5			1–6—6.3 volts
6A7	Det. Osc.			+210	+ 90	+210	− 35	+2.5		1–7—6.3 volts
6B7	I. F. Dem. A. V. C.	+12		+210	+ 90		2.5	15		1–7—6.3 volts
37	1st Audio			+190		+ 10				1–5—6.3 volts
42	2nd Audio			+190		−3.5				1–6—6.3 volts
42	Output			+350		− 35				1–6—6.3 volts
5Z3	Rectifier	A. C. voltmeter between plate terminal and chassis base		480						1–4—5 volts
Speaker Socket				+210	+350	+350	+350			

A. C. voltages are indicated by italics. Additional voltages may be measured directly across the proper terminals.

REPLACEMENT PARTS

Piece Number		List Price Each
P-23965	Transformer Assembly Audio	$4.55
P-24025	Transformer Assembly Audio	2.40
P-23967	Transformer Assembly Output	2.20
P-23969	Capacitor Assembly, 60 cycles	7.20
P-24058	Capacitor Assembly, 25 cycles	7.20
P-23964	Capacitor Assembly	4.95
P-24030	Capacitor Assembly	2.30
P-21535	Capacitor Assembly	.80
P-24067	Capacitor Assembly	.30
P-22411	Capacitor Assembly	.80
P-24060	Condenser	.35
P-24061	Condenser	.35
P-24062	Condenser	.45
P-24072	Condenser	.60
P-22557	Capacitor	.70
P-24064	Potentiometer Volume Control	1.20
P-24065	Potentiometer Treble Control	1.20
P-23150	Fuse	.12
P-18047	Power Cord	.80
P-23819	Coil Assembly, 9 M H	.60
P-19630	Grid Clip	.12
P-23818	Coil Assembly, 10 M H	.70
P-22390	Knob—Large	.27
P-22391	Knob—Small	.22
P-24084	Knob—"Q" Circuit	.12

Piece Number		List Price Each
P-24013	Power Transformer, 60 cycle	8.55
P-24014	Power Transformer, 25 cycle	8.55
P-21521	Resistor, 2,000 Ohms	.37
P-21562	Resistor, 1 Megohm, Type "C"	.37
P-21593	Resistor, 20,000 Ohms, Type "C"	.37
P-22328	Resistor, 4,000 Ohms, Type "C"	.37
P-22331	Resistor, 15,000 Ohms, Type "C"	.37
P-22333	Resistor, 100,000 Ohms, Type "D"	.37
P-22335	Resistor, 500,000 Ohms, Type "D"	.37
P-22898	Resistor, 600 Ohms, Type "D"	.37
P-23569	Resistor, 3,000 Ohms, Type "D"	.37
P-23844	Resistor, 300 Ohms, Type "D"	.37
P-23567	Resistor, 10,000 Ohms, Type "D"	.37
P-23966	Resistor, Wire Wound	1.85
P-23038	Tube Socket, 4 Prong	.17
P-23039	Tube Socket, 5 Prong	.17
P-23218	Tube Socket, 6 Prong	.17
P-23648	Tube Socket, 7 Prong	.17
P-23649	Tube Socket, 8 Prong	.17
P-24046	Coil Assembly Antenna	2.50
P-24048	Coil Assembly, R. F.	2.50
P-24049	Coil Assembly Oscillator	.90
P-24042	Transformer Assembly, 1st I. F.	2.60
P-24043	Transformer Assembly, 2nd I. F.	4.05

MODEL 64
Chassis wiring

STROMBERG - CARLSON TEL. MFG. CO.

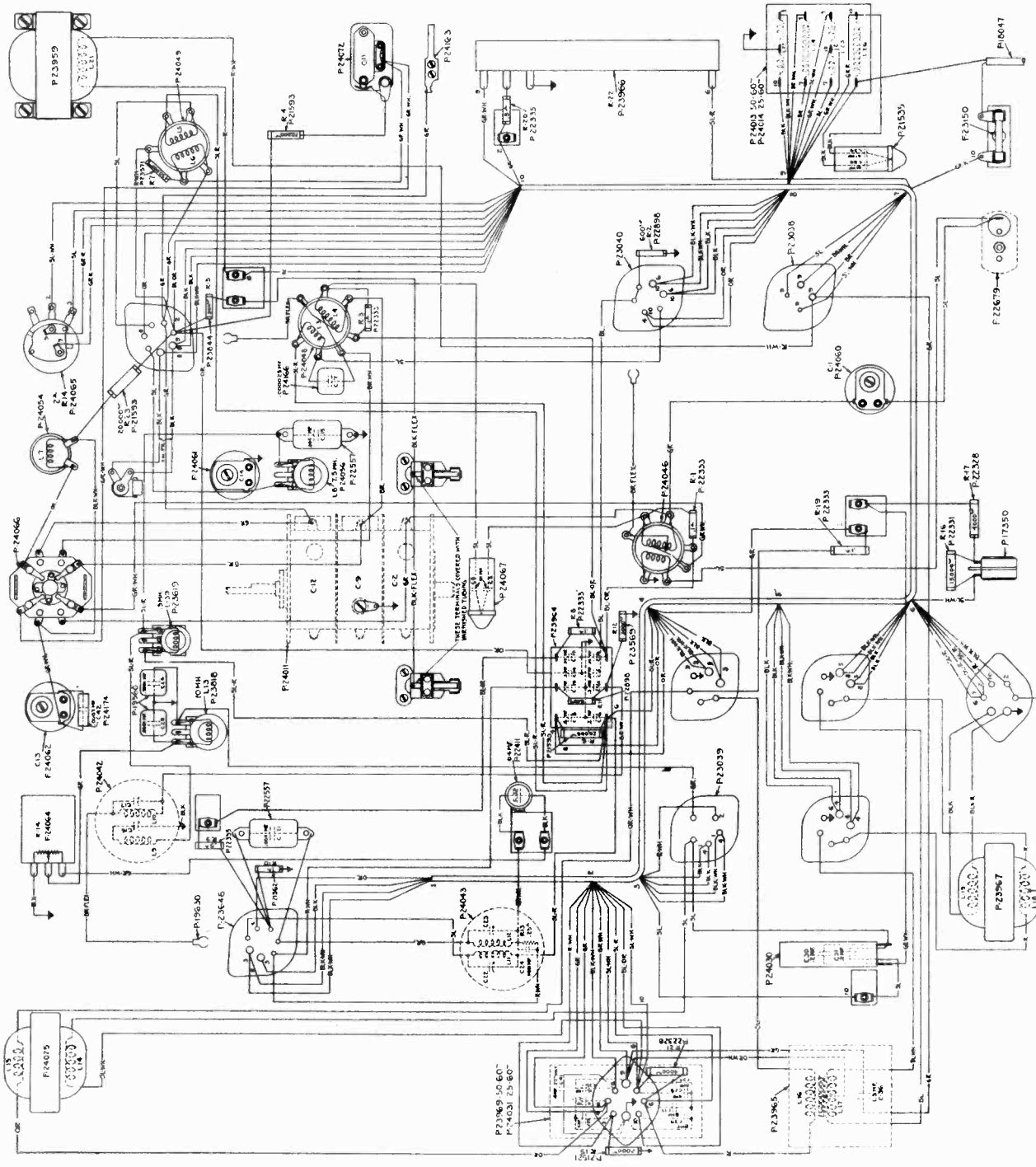


Fig. 3. Wiring Diagram of Chassis.

MODEL 64

STROMBERG - CARLSON TEL. MFG. CO. Chassis assembly

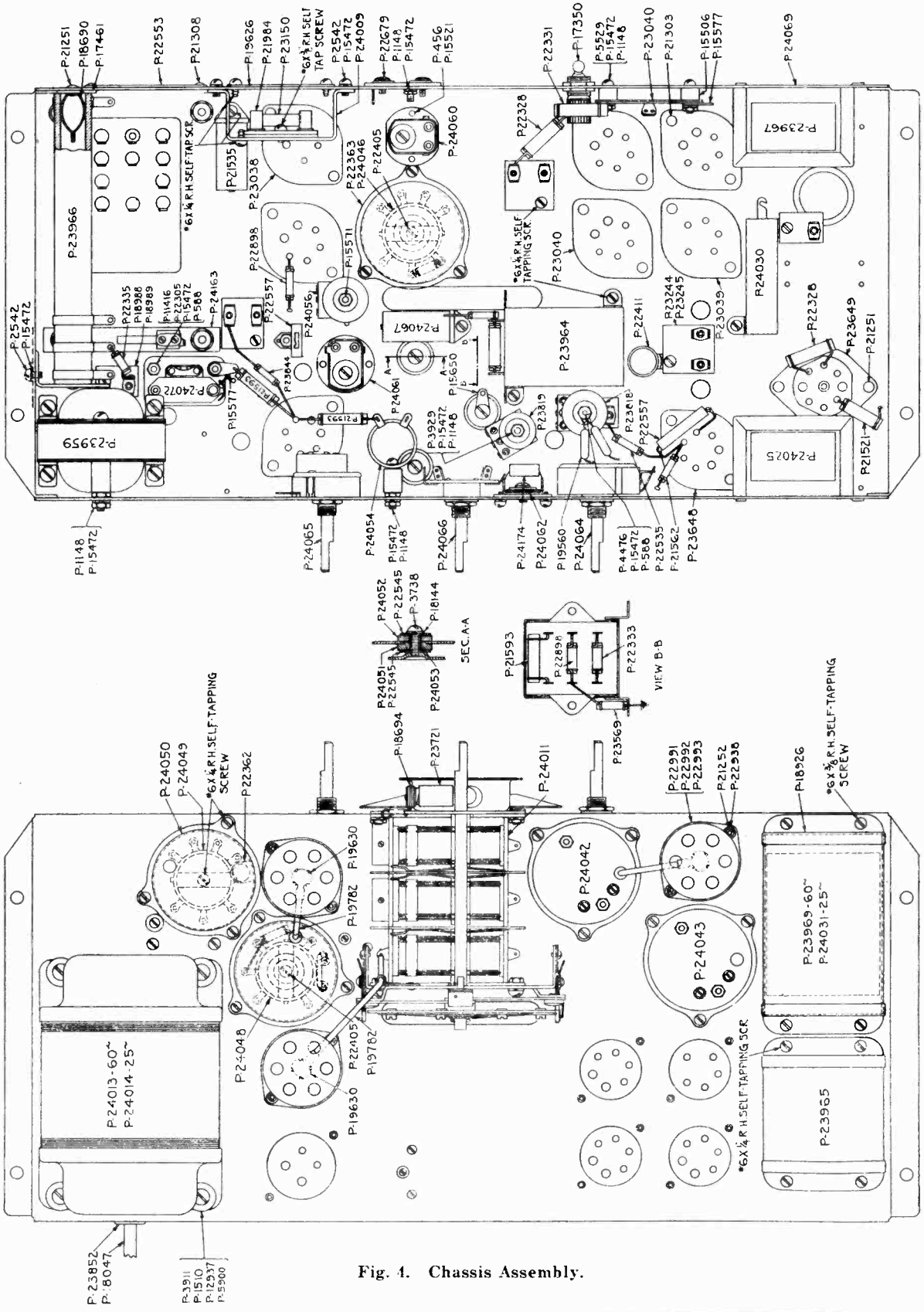


Fig. 4. Chassis Assembly.

MODEL 64
Selector notes

STROMBERG - CARLSON TEL. MFG. CO.

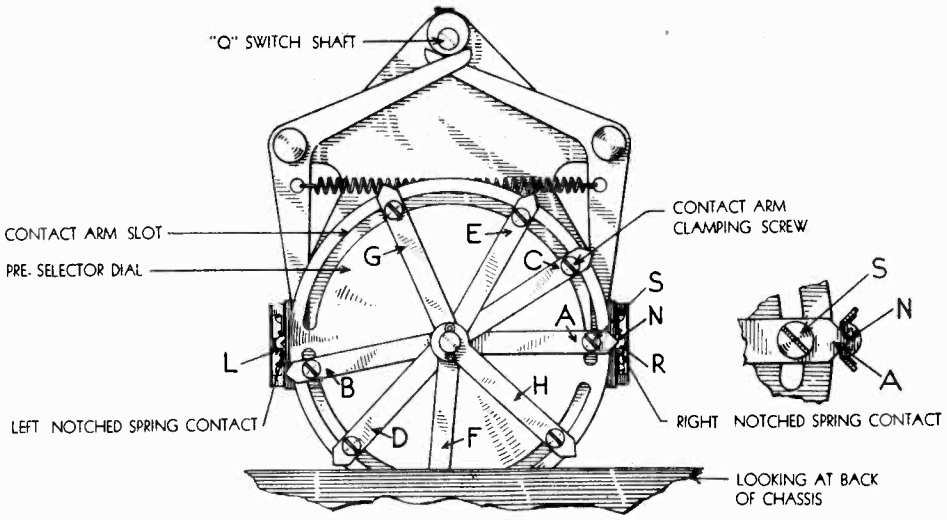


Fig. 2. Pre-selector Mechanism

SETTING UP "FAVORITE STATIONS" ON PRE-SELECTOR MECHANISM:

First—List the eight favorite stations which you wish to set up on the Pre-Selector Mechanism. Local and other stations that give best daytime and evening service should be selected. Arrange these eight stations in the order of their channel numbering. Channel numberings are obtained by omitting the right hand "0" from the kilocycle numbers, which you find in newspaper radio programs. For example, 700 kilocycles is channel "70"

Second—Take the first station nearest the "55" channel end of the dial, from the pre-selected list of "favorite" stations and tune this station by aid of the markings on the Station Selector Dial. For example, WGR, which occupies channel "55" (550 kilocycles).

Third—With a small screwdriver, loosen Pre-Selector Contact Arm Screw "S", Fig. 2, of the first arm in the right hand end of the upper Contact Arm Slot, about one-half turn. This will allow the pointed end of the first arm "A" to be moved directly under and into the notch "N" in the Contact Arm "R" Have the "Q" Switch Knob pointer in right hand position when "setting-up" stations,

Fourth—Sharpen the tuning of pre-selected stations by turning down the volume (left hand knob on front of cabinet turned counter-clockwise) and moving the large middle station selecting knob slightly until the setting is obtained where the audio quality is "full tone". Any movement in either direction from this correct setting will give a higher pitched tone or a distorted reproduction.

Fifth—Now, set Contact Lug Screws "S", Fig. 2, tight, taking care not to disturb the accurate setting previously obtained. Check sharpness of tuning, after setting screw "S" as described in the previous paragraph. When making this check, have the pointer of the "Q" Switch Knob, Fig. 1, in the right hand position so as to be sure that the electrical circuit is completed through contact arm "R" and "S" and pointed stud on contact arm. Allow the Receiver to remain turned on for a period of at least 15 minutes before making a final setting of the contact points. This will insure correct temperature adjustment of the thermostatic control.

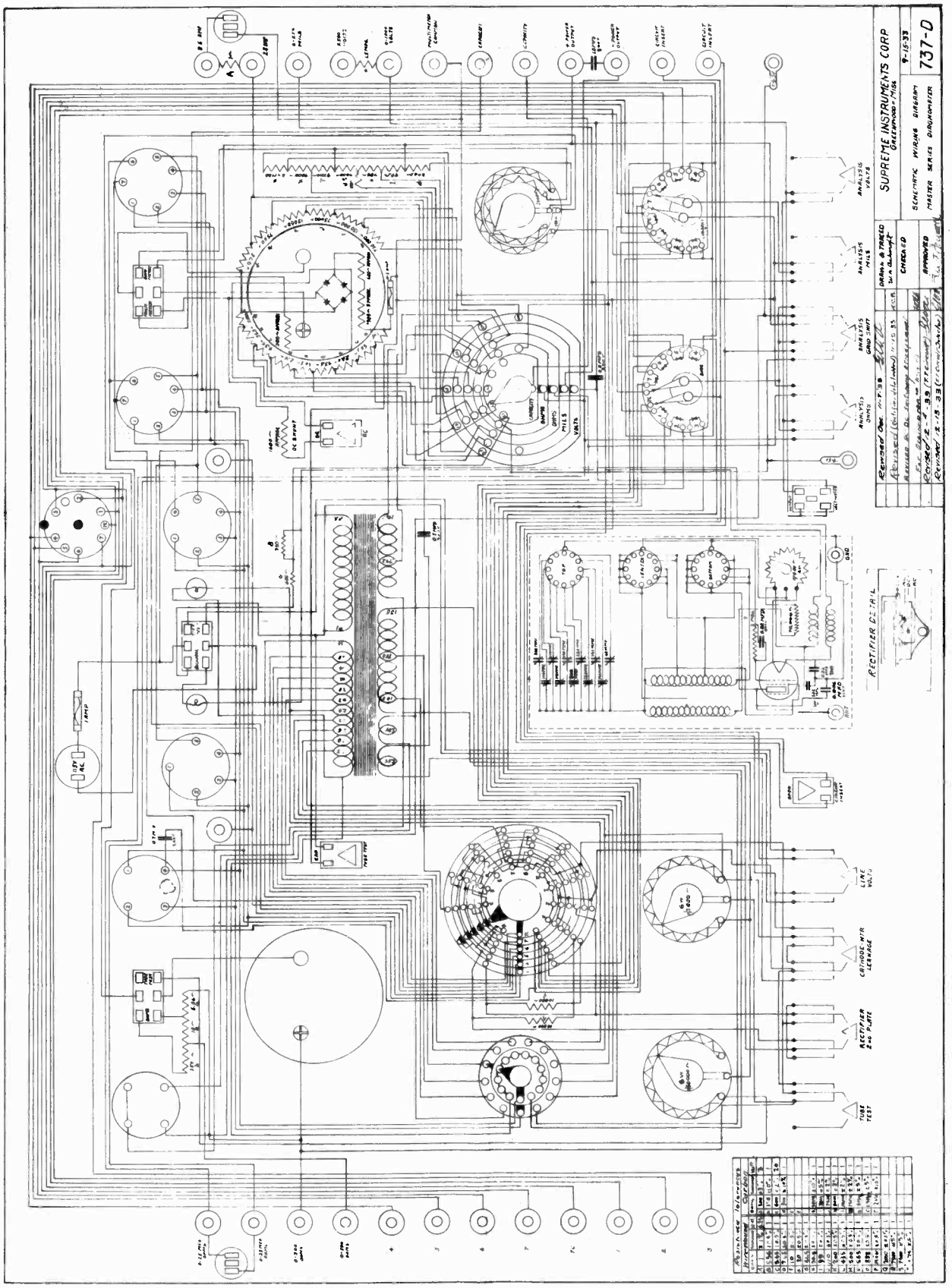
Sixth—Proceed to set up remaining stations on your list in the order of the channel numbering, using first contact arm "B" in the left hand end of lower slot (Fig. 2) and left hand notched Spring Contact "L" for the second station in pre-selected list of "Favorite Stations". For the third station use contact arm "C" and right hand notched Spring Contact "R". For the fourth station use Arm "D" and left hand Contact "L". For the fifth station use Arm "E" and right hand Contact "R". For the sixth station use Arm "F" and left hand Contact "L". For the seventh station use Arm "G" and right hand Contact "R". For the eighth station use Arm "H" and left hand Contact "L". This use of contact arms from alternate slots allows close spacing of adjacent "Favorite Stations". If alternate arrangements are not used it may be found impossible to make use of all the contact arms. Store any Contact Lugs not used in setting up favorite stations in the two ends of the adjusting slots, so as not to come into contact with the notched contact arms when operating the station selector over the used portion of the dial.

Seventh—Now, mark the station letters of the pre-selected stations only, in the white space provided on the Selector Dial between the dial numberings, when the station is accurately tuned. Use a soft lead pencil. Leave off the first letter of four letter stations, for better legibility. Use a damp cloth for removing pencil markings on the dial.

Eighth—By setting the pointer of the "Q" Switch Knob to the left hand position (for "all stations") both of the contact springs "L" and "M" are raised so as to be clear of the pointed ends of the rotating contact arms, giving free action of the tuning dial (popularly termed "Free Wheeling").

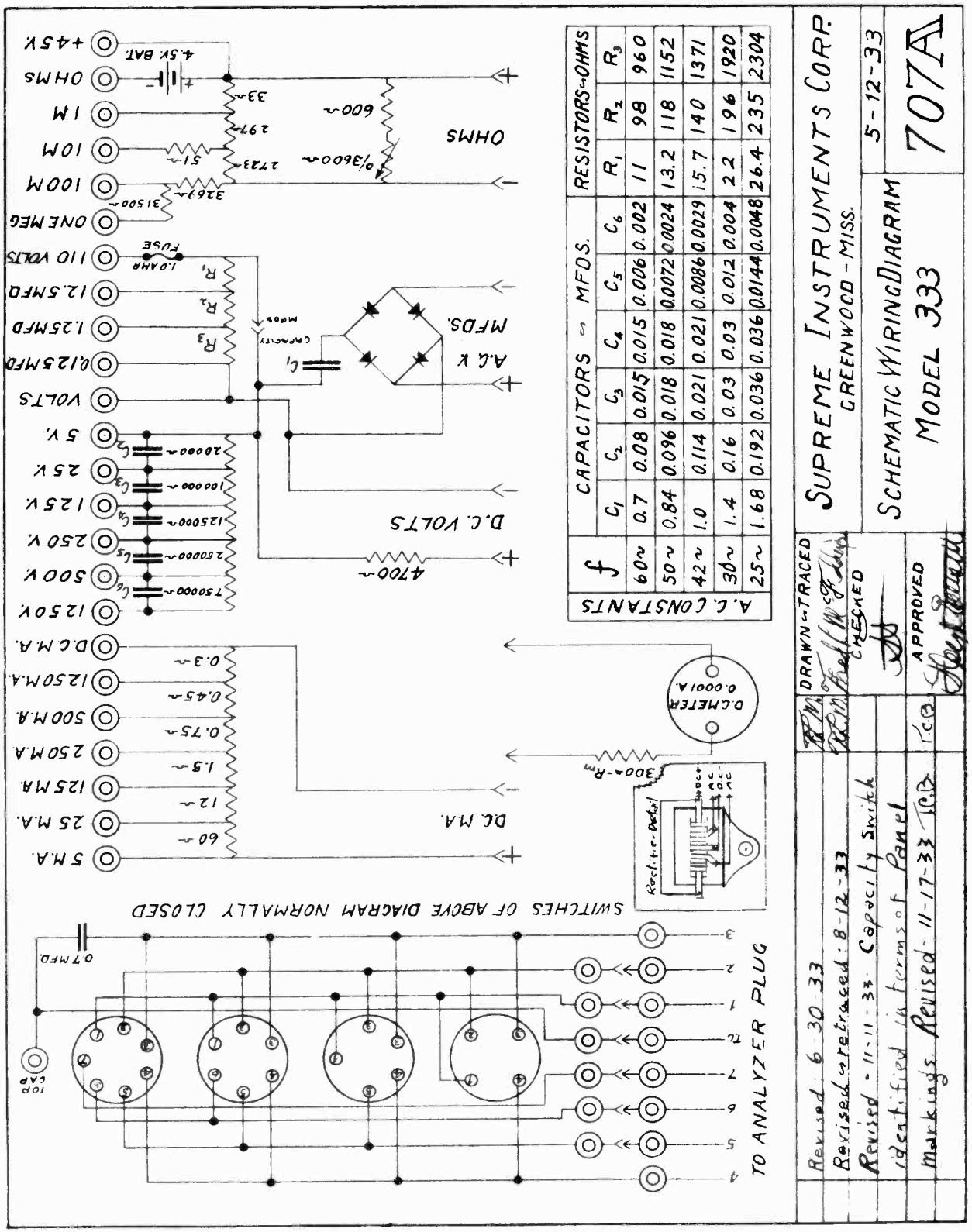
SUPREME INSTRUMENTS CORP.

MODEL "Master"
Diagnometer
Schematic



MODEL "333"
Free Reference Point
Tester

SUPREME INSTRUMENTS CORP.



A.C. CONSTANTS	CAPACITORS = MFDS.						RESISTORS=OHMS		
f	C_1	C_2	C_3	C_4	C_5	C_6	R_1	R_2	R_3
60~	0.7	0.08	0.015	0.015	0.006	0.002	11	98	960
50~	0.84	0.096	0.018	0.018	0.0072	0.0024	13.2	118	1152
42~	1.0	0.114	0.021	0.021	0.0086	0.0029	15.7	140	1371
30~	1.4	0.16	0.03	0.03	0.012	0.004	22	196	1920
25~	1.68	0.192	0.036	0.036	0.0144	0.0048	26.4	235	2304

SUPREME INSTRUMENTS CORP.
GREENWOOD - MISS.

SCHEMATIC WIRING DIAGRAM
MODEL 333

5-12-33

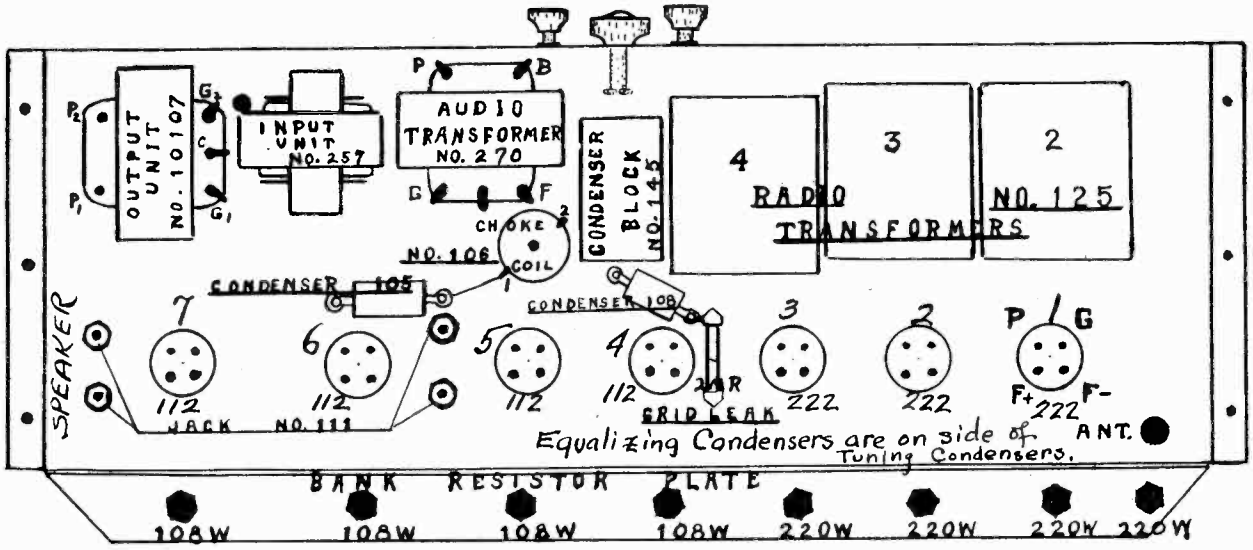
707A

DRAWN - TRACED
CHECKED
APPROVED

Revised: 6-30-33
Revised - retraced: 8-12-33
Revised - 11-11-33 Capacity Switch
identified to terms of Panel
Markings. Revised - 11-17-33 RCB

L. TATRO PRODUCTS CORP.

MODEL A,B
Socket,Voltage
Resistance data



(Continuity Tests, Radio)

Place one Prod on	The other one	Voltmeter Reading should be approx.	Part tested
F2 of Coil 125	G of Coil 125	Full	Secondary of 125
F1 of Coil 125	P of Coil 125	Full	Primary of 125
G of Coil 125	P of Coil 125	None	For Short of 125
GND	G of Coil 125P	Full	Secondary of 125P
ANT	P of Coil 125P	Full	Special Coil of 125P

Unsolder and separate the two wires from below at ANT for next test.

GND	F1 of Coil 125P	None	For Short of 125
GND	G of Loading Coil 125	Full	Loading Coil

Unsolder the four wires from bottom of each condenser or gang number 3604B.

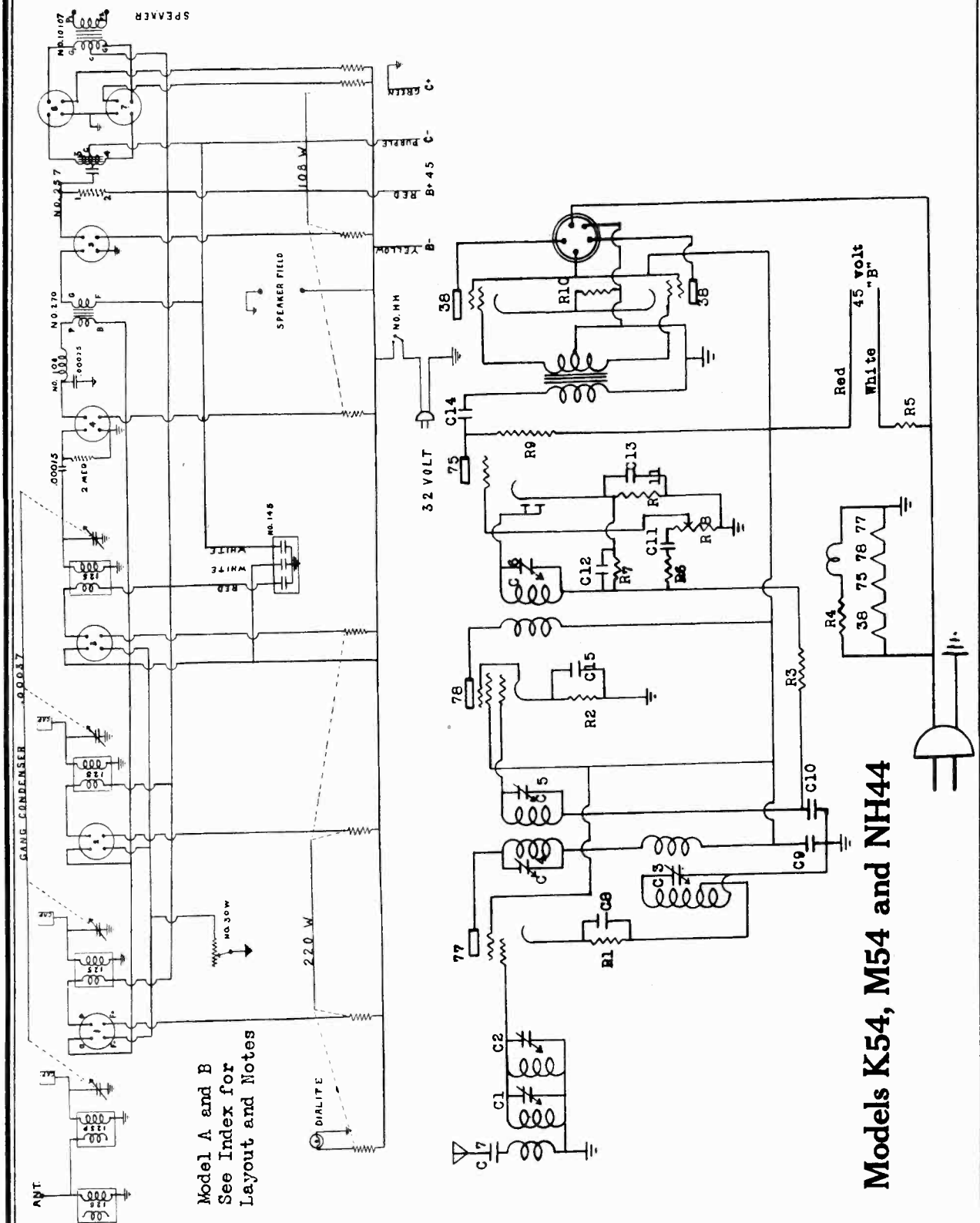
Screen Grid Cap	GND	None	Turn dial as you test each cond.

(Continuity Tests, Audio)

Place one Prod on	The other on	Ohms of resistance	Voltmeter Reading should be approx.	Part tested
P of Audio No. 270	B of Audio No. 270	2800	½ Full	Primary No. 270
G of Audio No. 270	F of Audio No. 270	7000	⅓ Full	Secondary No. 270
1 of Choke	2 of Choke	20	Full	Choke
3 of Input No. 257	4 of No. 257	10000	¼ Full	Secondary No. 257
1 of Input No. 257	2 of No. 257	27000	⅛ Full	Resistance No. 257
2 of Input No. 257	4 of No. 257		None	Condenser of No. 257
G of Output No. 10107	G2 of No. 10107	4300	⅓ Full	Primary of No. 10107
One Speaker Jack	Other Speaker Jack	6	Full	Secondary of No. 10107
F on No. 270	GND	None	None	Part of Unit No. 145
F1 on 125 No. 4	GND		None	Part of Unit No. 145
G1 Tube No. 3	GND		None	Part of Unit No. 145
One Side No. 105	Other Side No. 105		None	Condenser No. 105
One Side No. 108	Other Side No. 108		None	Condenser No. 108

MODEL A,B
Schematic
MODEL K-54,M-54,NH-44
Schematic

L. TATRO PRODUCTS CORP.

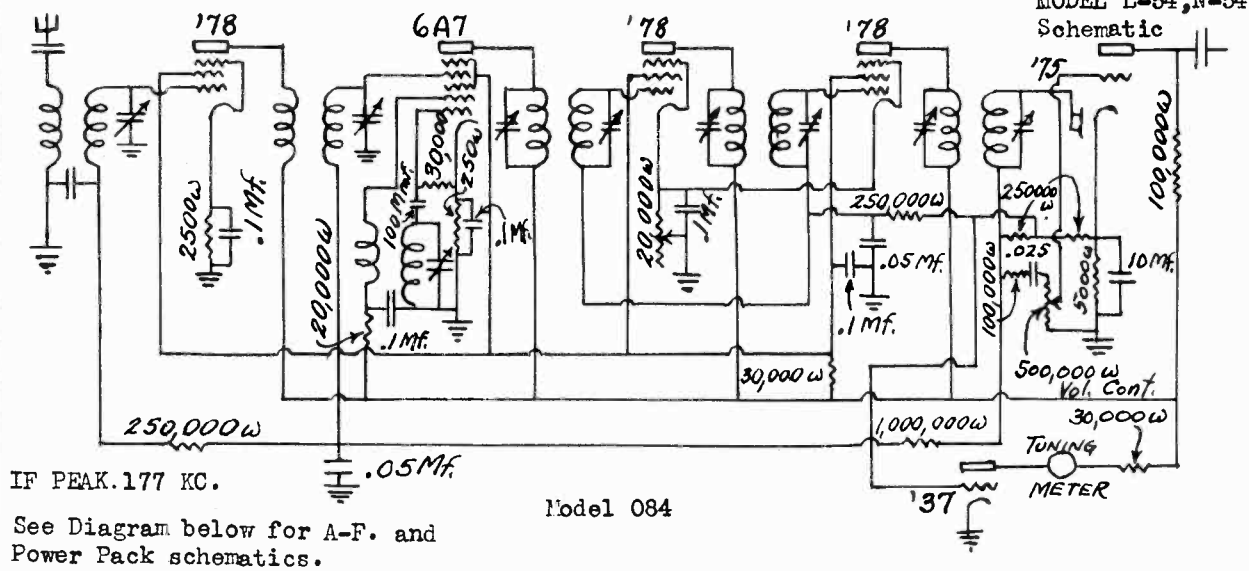


C1, C2, C3 tuning condensers; C4, C5, C6 I. F. trimmers; C7 .0025 Mfd; C8 .005 Mfd; C9, C14, C15 .1 Mfd; C10 .05 Mfd; C11 .025 Mfd; C12 .0005 Mfd; C13 .10 Mfd 6 volt electrolytic.

R1, R11 5000 ohms; R2 400 ohms; R3 1 meg; R4 200 ohms; R5 25 ohms; R6 30,000 ohms; R7 250,000 ohms; R8 ½ meg volume control; R9 100,000 ohms; R10 800 ohms; R12 (not shown on plate No. 2) ½ meg tone control connected in series to a .005 Mfd condenser between plates of output tubes.

L. TATRO PRODUCTS CORP.

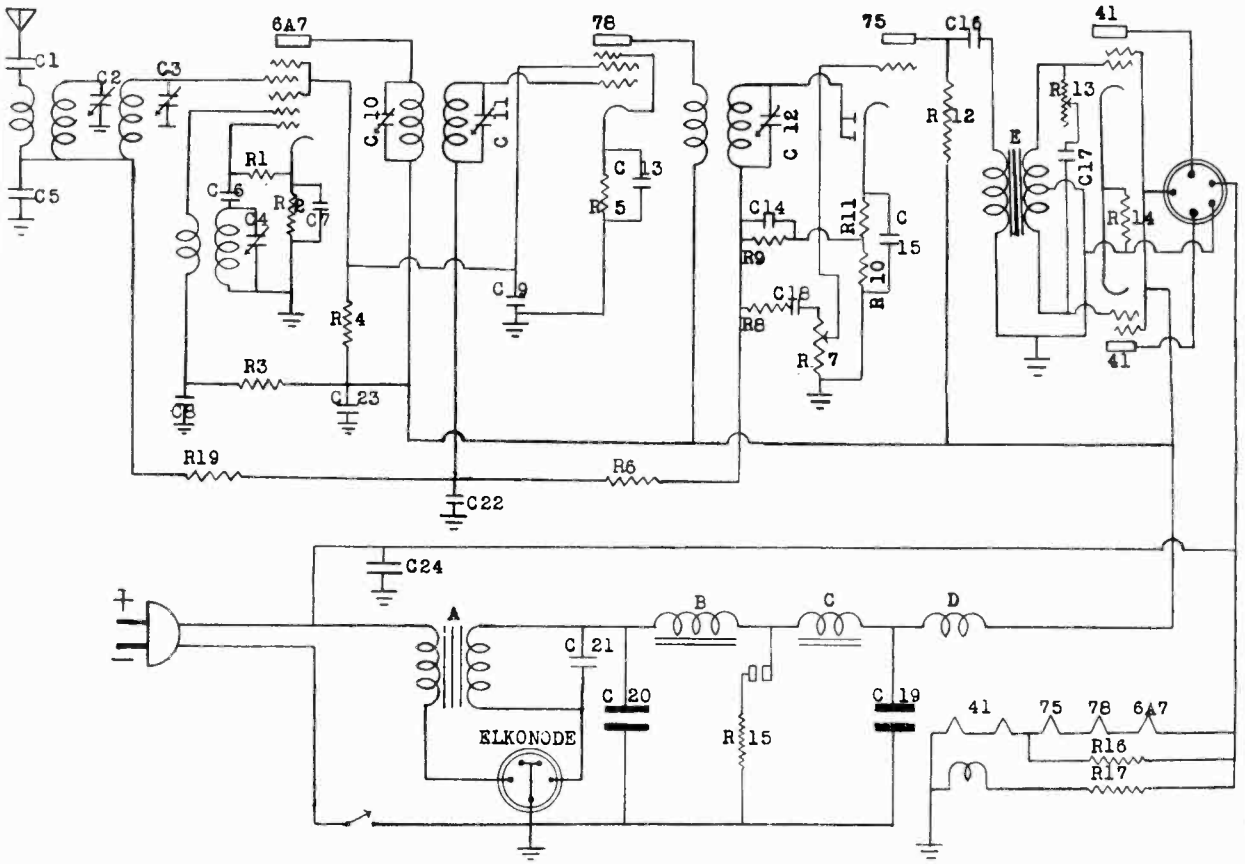
MODEL 084
Schematic
MODEL L-54, N-54
Schematic



IF PEAK. 177 KC.

Model 084

See Diagram below for A-F. and Power Pack schematics.



CIRCUIT DIAGRAM "L'TATRO" RADIO

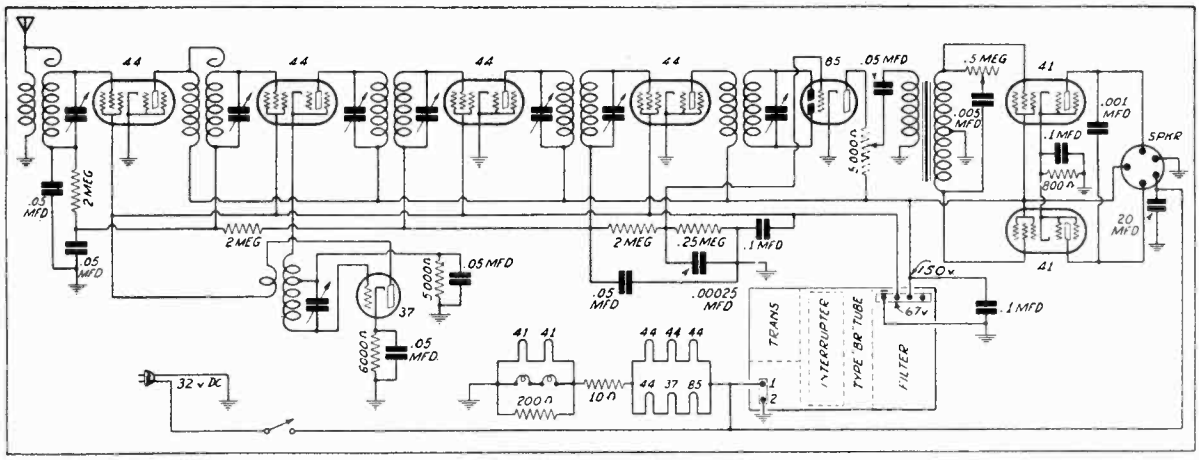
Models L54 - - N54

C2, C3, and C4 tuning condensers; C1 .0025 Mfd; C5, C7, C8, C9, C13, C16, C23 .1 Mfd; C6 100 mmfd; C10, C11, C12 I. F. trimmers; C14 .0005 Mfd; C15 10 Mfd 6 volt electrolytic; C17 .005 Mfd; C18 .025 Mfd; C19 16 Mfd 250 volt electrolytic; C20 8 Mfd 250 volt electrolytic; C21 .01 Mfd 1600 volts; C22 .05 Mfd; C24 20 Mfd 40 volt electrolytic.

R1 30,000 ohms; R2 250 ohms; R3 20,000 ohms; R4 38,000 ohms; R5 400 ohms; R6 1 meg ohm; R7 ½ meg volume control; R8 30,000 ohms; R10 3500 ohms; R11 1500 ohms; R12 100,000 ohms; R13 ½ meg tone control; R14 800 ohms; R15 7000 ohms; R16 and R17 200 ohms; R9 and R19 250,000 ohms.

MODEL F-913
Schematic, Notes

L. TATRO PRODUCTS CORP.



MODEL F 913

SERVICE NOTES

Model F913

In reference to the diagram the dial lights of the Model F913 are operated in series and are mounted as follows: one on station selector assembly and the other on the tuning meter assembly. It is very important that these dial lights are lighting when the receiver is being operated since they pass a portion of the filament current of the one bank of tubes.

The filaments of the type 41 tubes pass approximately 390 milliamperes and must not be replaced by type 41 tubes designed to pass 650 milliamperes.

The 20 mfd bipass condenser which is mounted to the speaker socket is of the electrolytic type and will be damaged if the receiver is connected to an alternating current source.

The secondary of the radio frequency and detector coils and the tuned coil of the oscillator are bank wound of "litz" wire. Should these coils become damaged through shipment of the receiver so that replacement is necessary, make sure that the single secondary turn of wire passing on the grid side of tuned section is not mutilated so as to cause a short-circuit.

In the two first intermediate amplifier coils both primary and secondary are tuned while in the third intermediate amplifier coil the secondary only is tuned. The latter being arranged with very close coupling and if damaged look for short between the primary and secondary. These coils are all wound with single strand enameled wire and are "flat-topped" at approximately 10 K. C.

The audio transformer has a ratio of approximately 2 to-1 per side. Do not substitute when replacing this unit.

The intermediate voltage of the power unit is approximately 67 volts and the high potential terminal will register approximately 150 volts at no signal when read with a voltmeter.

The visual tuning indicator as used on these receivers is placed directly in the plate lead of the radio frequency and intermediate amplifier tubes being bipassed by an .05 condenser.

If the antenna pick up coil has been damaged it will be necessary to replace the old antenna coil primary and secondary.

The antenna switch simply shunts the antenna to chassis panel and the mute tuning switch shunts the primary of the audio transformer.

In some instances an erratic noise may be noticed from the speaker of the receiver which is caused by interference from radiation of current in the 32-volt mains as a result of local conditions permitting the vibrator of the power unit to feed alternating current to these mains. When this condition exists a very noticeable hum may be heard from the receiver especially when tuned to a weak station during the daytime and can be eliminated entirely when the proper steps are taken. In the first place it is necessary that there be no leaks in the line between the 32-volt outlet socket and the battery. In order to check this it is sometimes advisable to run a separate line from the 32-volt battery to the receiver to note whether or not there will be any improvement.

If the radio is operated at some distance from the battery the line will have to be of sufficient size to carry the current with ample reserve. It is usually advisable that one side of the 32-volt line be grounded at the generator and then at several other points and if an installation is encountered where pick up of interference is excessive it is advisable to try the line grounded and also non-grounded. In any event if trouble is being experienced with interference from excessive hum it is always advisable to increase the length of the antenna since this receiver may be operated on an antenna up to 200 feet in length. Also bear in mind that if the radio is connected to the 32-volt battery in the proper manner and if the antenna is placed as far as possible from the external wiring of the 32-volt system you should not be able to notice any hum or hash even on the most distant stations.

If the receiver is operated at reversed polarity over any length of time, the contact points of the vibrator may become injured or the buffer condenser blocked. This is caused by the de-tuning affect of the primary system of the high voltage transformer being entirely out of synchronism and overloading these units. Make sure that the receiver is operated at proper polarity in accordance with instruction card inclosed with receiver.

Model F923

The Model F923 uses the same circuit as that of the F913 with the exception that it operates with two speakers. Should one of these speakers become damaged it is advisable that both be returned to distributor or factory for repairs since they are matched and if replacement is necessary the speakers will have to be operated simultaneously.

Model E83

Model E83 uses the same circuit throughout with the exception of the tube arrangement, visual tuning indicator and the one intermediate amplifier. Two type '38 output tubes are used in place of the type 41s so that 6 tubes are placed in series across the 32-volt line and one of the tubes is fed by a 100-ohm resistor. The dial light in this receiver is fed through a 200-ohm resistor placed directly across the line. The visual tuning indicator is not used in this model. Only one intermediate amplifier stage is used. The intermediate amplifier coils in this case being wound of "Litz" wire and coupled for "maximum" gain.

Models D73 and D76

Models D73 and D76 are identical to E83 with the exception that the power unit is not used in the latter models. The screen grid voltage is obtained from the positive side of the 32-volt line and the plate voltage on all of the tubes but the oscillator is obtained from the line plus a 45-volt battery, the negative terminal of which is connected to the positive of the 32-volt main.

VOLTAGE ANALYSIS

Model 240

No.	Stage	Tube	A	B	C	K	Sc.G	Ip.	Su.g
1	Autodyne. . . .	24	2.0	230	8.0	10	75	.6	....
2	Oscillator. . .	27	2.0	100	0	0	....	7.0	....
3	1st. I.F. . . .	51	2.0	250	.0	3.0	75	2.0	....
4	2nd. I.F. . . .	51	2.0	250	0	3.0	75	2.0	....
5	Audio	58	2.0	190	.4	0	25	1.0	.4
6	Dio Det	56	2.0	0	0	0	0	0	....
7	Output.	47	2.25	250	16.0	....	250	30.	....
8	Rectifier . . .	80	4.8	300	....	....	....	....	....

Vol. control "full on".
Band switch "broadcast".
Tested with Weston model 565 analyzer.
Line: 115 Volts.

CIRCUIT RESISTANCE ANALYSIS

Model 240 Socket to ground

Stage	Grid	Cathode	Heater	Plate	Screen G	Suppr G	Space G
Autodyne	4.0	10,300	0.15	20,400	8,400	.....	.....
1st.I.F.	850,000	200	0.2	20,400	8,400	.....	.....
2nd.I.F.	850,000	200	0.25	19,400	8,400	.....	.....
Dio Det.	250,000	0.17	0.33	0.11	.....	.....	.....
Oscillator . .	100,000	0.25	0.15	8,400	.....	.....	.....
Audio. .	Infinity	0.1	0.12	120,000	Infinity	0.1	.....
Pentode.	500,000	.....	0.25	20,000	.....	.....	19,400
Rectifier. .	.....	.....	19,900	1.320 1,360	.....	.....	.....

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

ADJUSTING TRIMMERS: The model 240 receiver has ten trimmer condensers. The setting is critical, due to the high intermediate frequency that is employed, namely 490 K. C. Rough handling in shipment will occasionally jar these condensers and cause the set to lose sensitivity.

Very few test oscillators of commercial design will supply a frequency of 490 K. C. We are giving, herewith, a sketch of an oscillator that might be made up with standard parts from the model 240. For this purpose you will require, one P-1595 type 80 socket at 20¢ ea. One P-1106, one meg resistor at 35¢, two P-1100 .001 condenser (in parallel) 25¢ ea. One G-1532 second I. F. coil and trimmer assembly at $2.50. In addition to this you will require a 230 type tube, three Fhanestock clips, 22½ volts of "B" battery and two volts of "A" battery. The mechanical layout is not important and can be adapted to suit your requirements. When completely assembled, the oscillator's condenser can be adjusted by connecting a wire from the B plus terminal to the grid cap of the first detector type 24 tube on the model 240, then vary the oscillator condenser until the signal comes thru the standard 240 set with peak volume. Two .001 condensers are used in parallel, to obtain a value of .002. This condenser's capacity and the value of the grid leak governs the tone of the signal. Slightly different values can be used if necessary.

To adjust the trimmers connect your 490 K. C. oscillator to the first detector type 24 grid cap and in the following order. Readjust trimmers three, four, five, six, seven and eight for maximum output, preferably using an output meter as an indicator. The above operations take care of all intermediate adjustments. These trimmers will be found numbered on the drawings of the chassis, top view, in this manual.

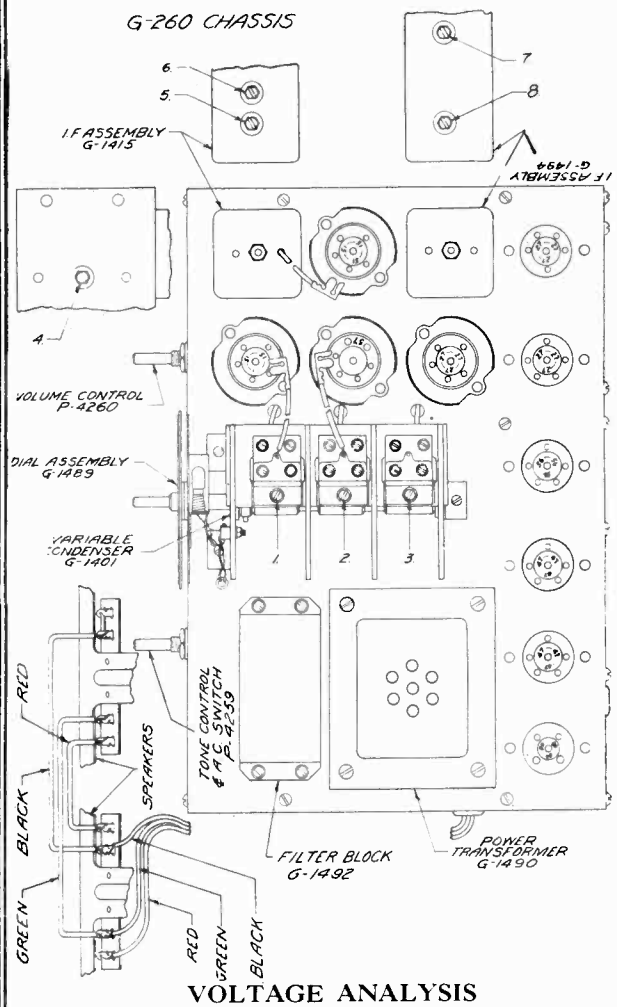
Next disconnect the 490 K. C. oscillator and tune in a broadcast signal, either from an oscillator or a known frequency, crystal controlled, broadcasting station at 1400 K. C. Adjust trimmer #1 for maximum output, then adjust trimmer #2 for proper calibration so that the dial reads exactly 1400 K. C. when the signal is tuned in at maximum volume. Next retune the receiver to 600 K. C. and adjust #10 trimmer on the rear of the chassis, slowly increasing and decreasing the capacity of #10 trimmer at the same time, and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swing closely and readjust #10 trimmer until the needle reaches the highest peak.

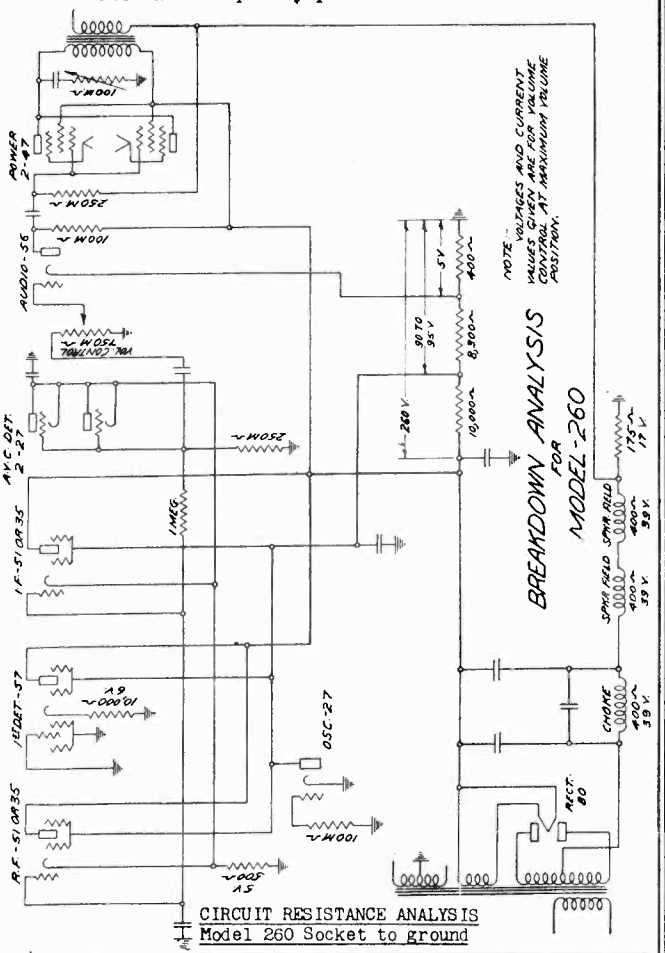
Next, throw the band switch to the center position and tune in a signal at about 1700 K. C., probably a police call station would be the handiest. Readjust #9 trimmer for maximum output. Switch back to the broadcast band and retune the receiver and test oscillator to 1400 K. C., then re-check trimmer #2 to make sure that the adjustment of #10 has not thrown the receiver out of calibration. If it has, then readjust #2 until the calibration is correct.

MODEL AC 260
Voltage
Resistance Data
Breakdown Chart
Chassis View

TRANSFORMER CORP. OF AMERICA

No. 1 is the antenna trimmer, No. 2 first detector trimmer, No. 3 oscillator gang trimmer, No. 4 oscillator padding trimmer, No. 5 second detector grid trimmer, No. 6 second detector plate trimmer, No. 7 intermediate frequency grid trimmer, No. 8 intermediate frequency plate trimmer.





VOLTAGE ANALYSIS

Taken with Weston 565 Analyzer

Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid Volts	Cath. Volts	Screen Volts	Ip Norm
R. F.	51 or 35	2.15	250	.4	4.	80	4.
1st Det.	57	2.25	137	4.5	5.	83	.5
Osc.	27	2.25	107	0	0	0	8.
I. F.	51 or 35	2.25	244	.4	4.	76	1.7
AVC Det	27	2.25	0	2.5	4.5	0	0
AVC Det	27	2.25	0	2.5	4.5	0	0
1st Audio	56	2.25	178	2.	4.	0	1.5
Pentode	47	2.25	235	16	0	0	25.
Pentode	47	2.25	235	16	0	0	25.
Rect.	80	4.9	140	0	0	0	98.

CIRCUIT RESISTANCE ANALYSIS
Model 260 Socket to ground

Stage	Grid	Cath-ode	Heater	Plate	Screen G	Suppr. G	Space G
R. F.	Infini-ty	500	.1	18,400	8,700	...	.....
1st.Det.	4.0	10,000	.1	18,800	8,700	.08	.....
Oscil-lator	100,000	.08	.1	8,700	.....	...	.....
I. F.	Infini-ty	510	.1	18,600	.....	...	.....
A.V.C. Det.	230,000	510	.1	510	.....	...	.....
A.V.C. Det.	230,000	510	.1	510	.....	...	.....
Audio	750,000	422	.1	110,000	.....	...	.....
Output	275,000	.....	.1	19,000	.....	...	18,800
Output	275,000	.....	.1	19,000	.....	...	18,800
Recti-fier	.....	.....	18,800	1,580	.....	...	.....

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

Note: Since resistance tolerances in the set are plus or minus 10 percent, and the tubes may vary over 20 percent, your readings may disagree with the above by plus or minus 30 percent.

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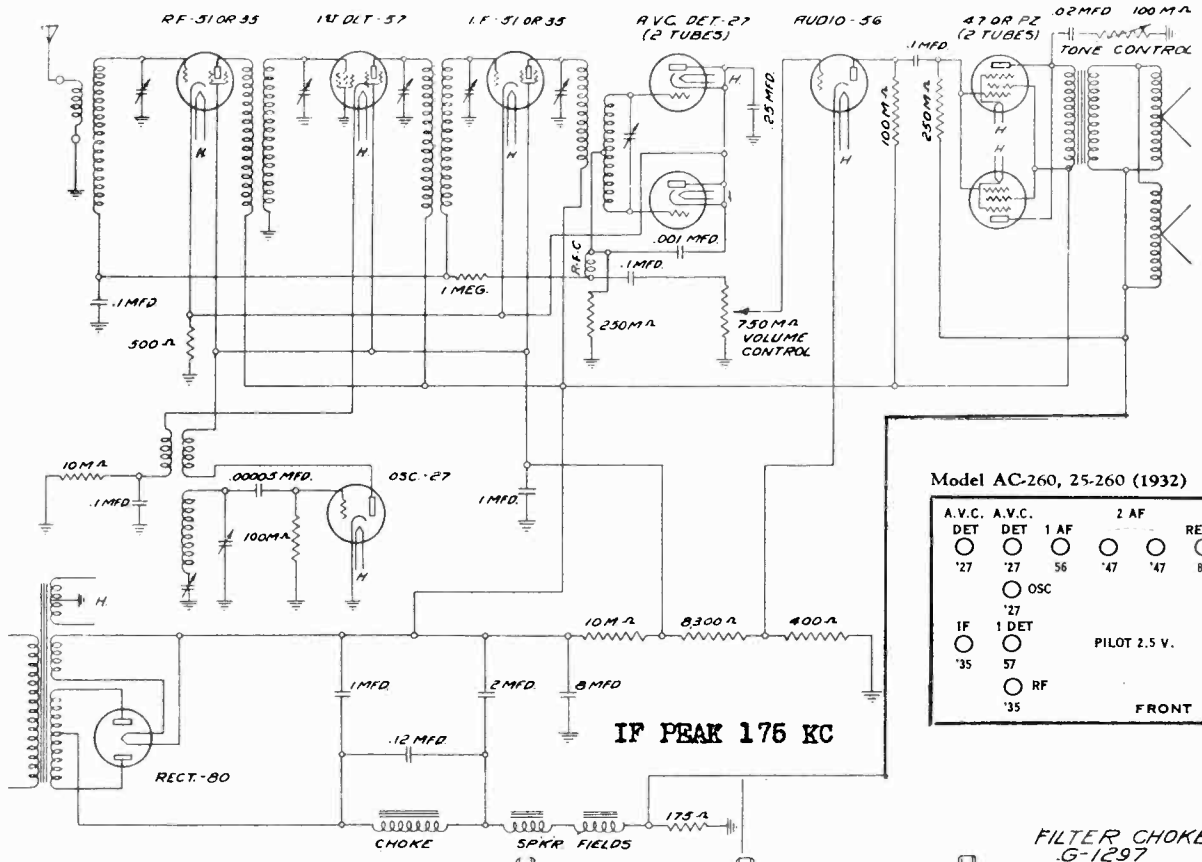
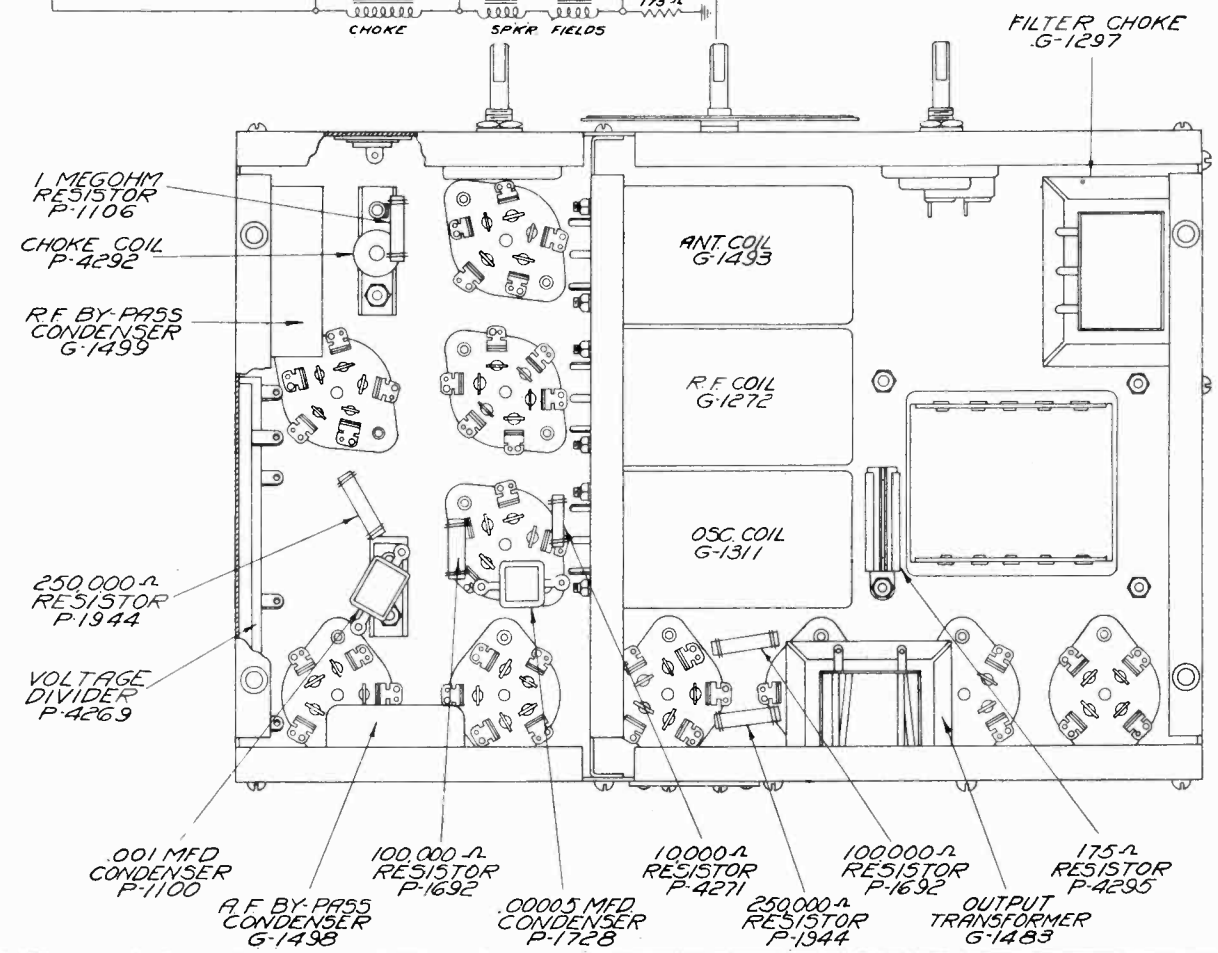
MODEL AC 260
Schematic
Chassis View



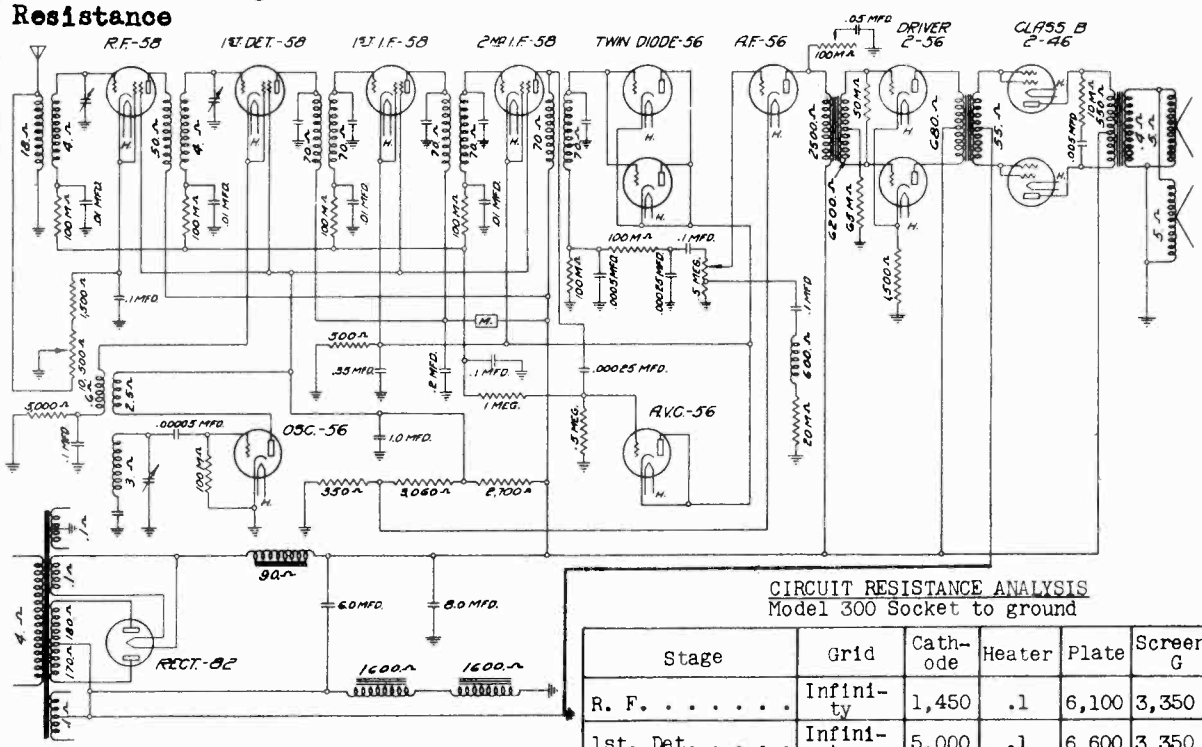
Model AC-260, 25-260 (1932)

A.V.C. DET '27	A.V.C. DET '27	1 AF 56		2 AF '47	'47	RECT 80
	OSC '27					
IF '35	1 DET 57		PILOT 2.5 V.			
	RF '35		FRONT			

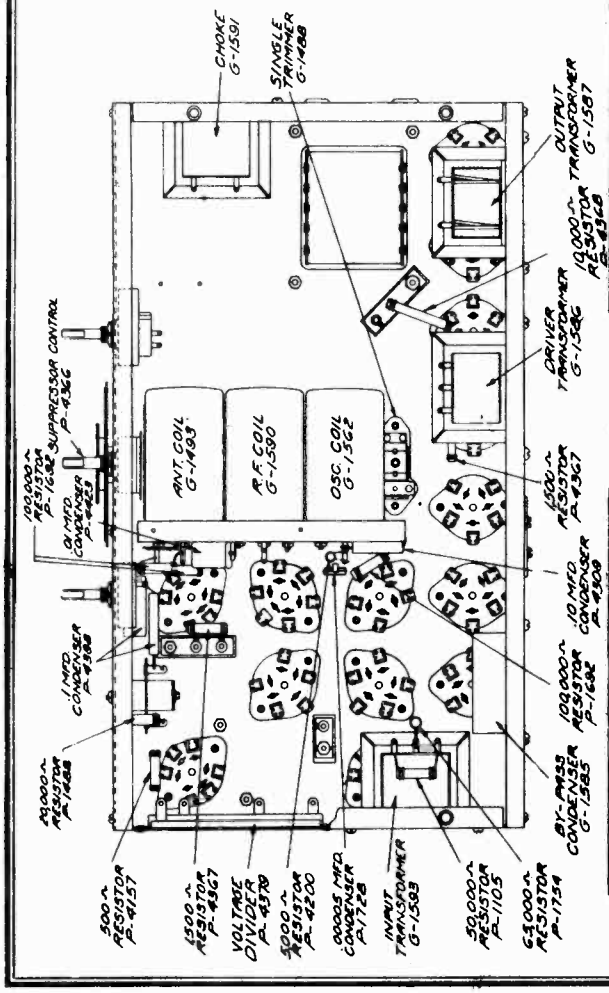


MODEL AC-300
Schematic, Voltage
Resistance

TRANSFORMER CORP. OF AMERICA



IF PEAK 175 KC



CIRCUIT RESISTANCE ANALYSIS
Model 300 Socket to ground

Stage	Grid	Cathode	Heater	Plate	Screen G	Suppr. G
R. F.	Infinity	1,450	.1	6,100	3,350	1,480
1st. Det.	Infinity	5,000	.1	6,600	3,350	5,000
1st. I. F. . . .	Infinity	500	.1	6,600	3,350	500
2nd. I. F. . . .	Infinity	500	.1	6,100	3,350	500
Oscillator. . . .	100,000	.07	.1	3,400	.....	.....
A.V.C.	500,000	500	.1	500	.....	.....
1st. diode. . . .	100,000	500	.1	500	.....	.....
2nd. diode. . . .	100,000	500	.1	500	.....	.....
A. F.	500,000	350	.1	8,600	.....	.....
Driver 1.	68,000	1,500	.1	6,400	.....	.....
Driver 2.	68,000	1,500	.1	6,400	.....	.....
1 Class "B" . . .	3,250	.....	3,250	6,300	.....	.....
2 Class "B" . . .	3,250	.....	3,250	6,300	.....	.....
Rectifier	.....	.....	6,100	3,400	.....	.....

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

VOLTAGE OF ANALYSIS
Model 300

No.	Stage	Tube	A	B	C	K	Sc.G	Ip.	Su.G.
1	R.F.	58	2.2	180	.5	7.	85	.7	7.
2	1st. Det. . . .	58	2.2	180	1.	7.	85	1.2	7.
3	Oscillator . . .	56	2.2	100	0	0	0	10.	..
4	1st. i.f. . . .	58	2.1	190	.4	4.	90	3.	4.
5	2nd. i.f. . . .	58	2.0	190	.2	4.	90	2.	4.
6	A.V.C.	56	2.0	0	0	4.	..	0	..
7	Diode	56	2.1	0	0	4.	..	0	..
8	Diode	56	2.1	0	0	4.	..	0	..
9	A.F.	56	2.2	180	0	10.	..	2.	..
10	Driver 1	56	2.3	185	0	8.	..	3.	..
11	Driver 2	56	2.3	185	0	8.	..	3.5	..
12	Class "B" 1. . .	46	2.2	400	0	0	..	5.	..
13	Class "B" 2. . .	46	2.2	400	0	0	..	5.	..
14	Rectifier . . .	82	2.3	300	..	..	..	..	..

Vol. control "full on".
Noise Suppresser "full open".
Tested with Weston model 565 analyzer.
Line: 115 volts.

TRANSFORMER CORP. OF AMERICA

MODEL AC-320
Schematic, Voltage
Resistance, Chassis

CIRCUIT RESISTANCE ANALYSIS

Model 320 Socket to Ground

Stage	Grid	Cathode	Heater	Plate	Screen G	Suppr. G	Space G
Autodyne .	1,000	8,000	.1	50,000	20,000	.1	.....
I.F . .	70	270	.1	50,000	20,000	*270.	.....
2nd.Det	110	15,000	.1	300,000	Infinity	15,000	.....
Output.	570,000	.....	.1	50,000	.....	.....	50,000
Rectifier .	.....	.....	50,000	1,900	.....	.....	.....

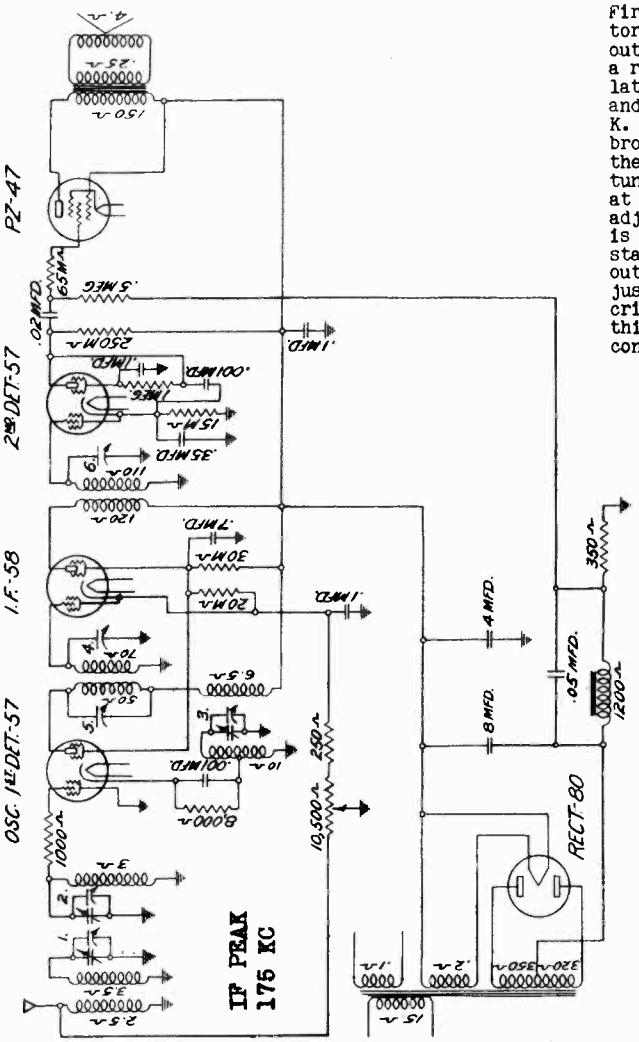
Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohmmeter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.
*NOTE: On first few thousand sets the i.f. Suppressor Grid Resistance read .1 ohm and was connected to ground.

VOLTAGE ANALYSIS

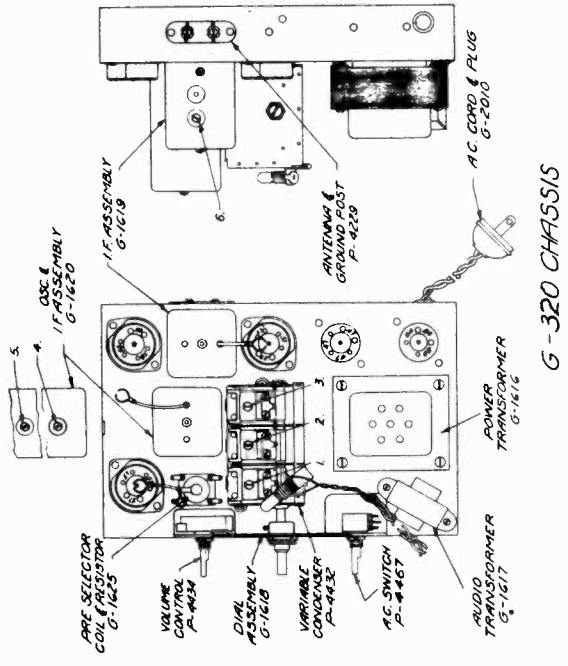
Model 320

No.	Stage	Tube	A	B	C	K	ScG	Ip	Su.G
1	Autodyne.	57	2.0	230	3.0	3.0	75	3.5	....
2	I.F	58	2.0	245	1.5	1.5	65	4.5	1.5
3	2nd. det.	57	2.0	125	1.0	2.0	45	.2	2.0
4	Output.	47	2.0	260	14	....	270	27.	....
5	Rectifier	80	4.4	280	....	....	....	....	....

Vol. control "full on".
Line: 115 volts.

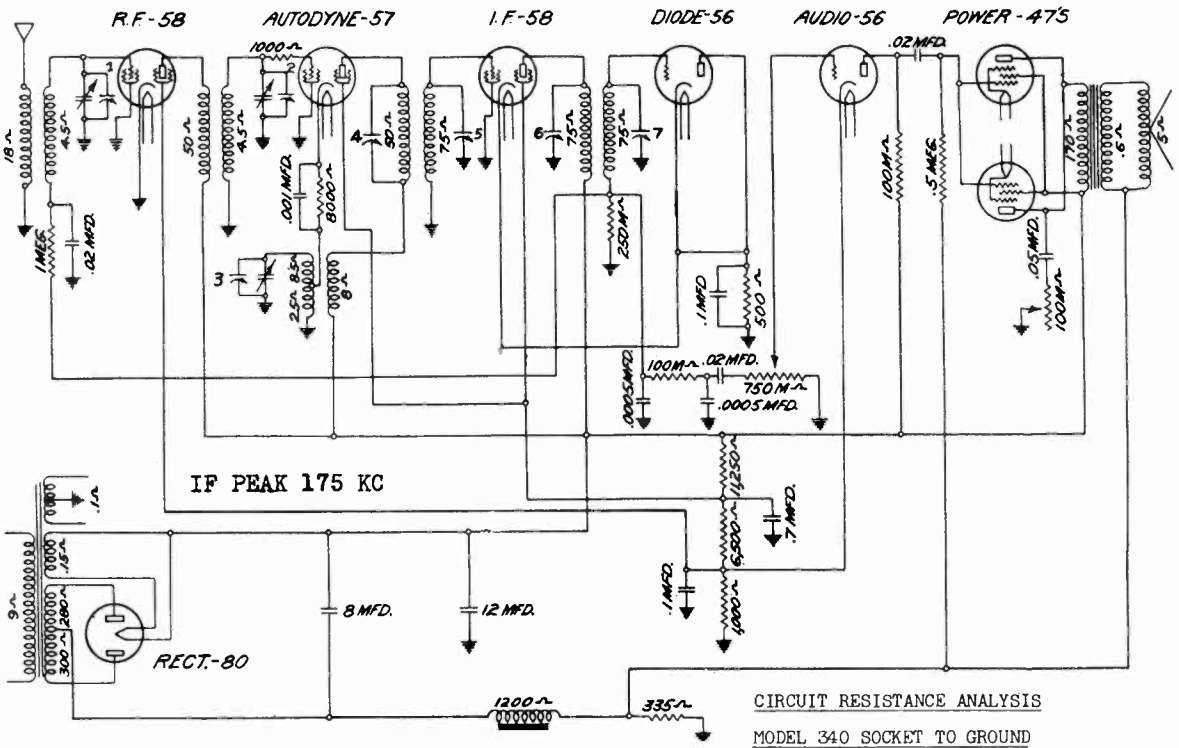


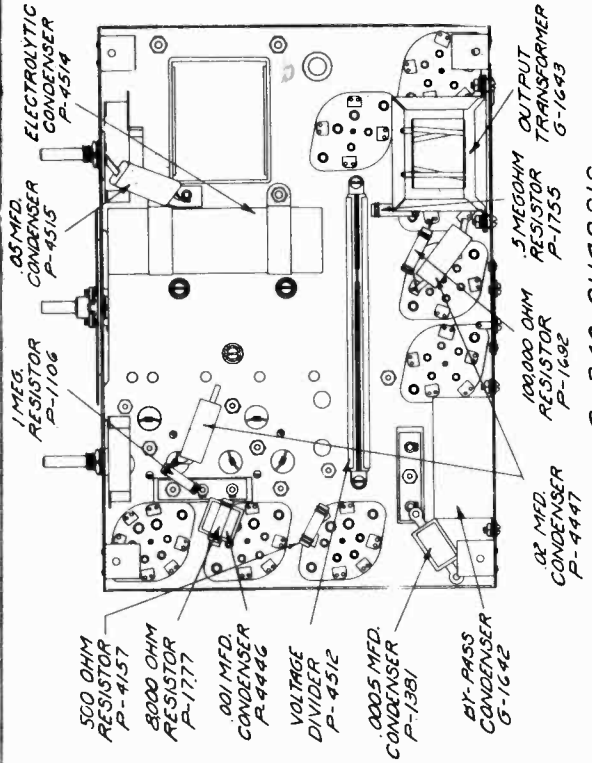
First connect the 175 K. C. Oscillator to the first detector grid and adjust trimmers Nos. 4, 5 and 6 for maximum output as indicated by the loud speaker, or preferably by a regular output meter; next hook up the broadcast oscillator to the antenna and ground binding posts of the set and adjust number 3 (oscillator gang trimmer) at 1500 K. C., for calibration. This is accomplished by using a broadcast oscillator at 1500 K. C. if the calibration of the broadcast oscillator is known to be accurate or by tuning in a broadcasting station, using "crystal control" at a known frequency between 1400 and 1500 K. C., then adjust number 3 trimmer until the receiver's dial reading is exactly the same as the frequency of the broadcasting station; next readjust trimmers number 2 and 1 for maximum output at a point between 1400 and 1500 K. C., since adjusting at these high frequencies is more accurate and critical. No oscillator padding trimmer is employed on this receiver. The special shape of the oscillator tuning condenser rotor makes such a padding trimmer unnecessary.



MODEL AC-340
Schematic, Voltage
Chassis, Resistance

TRANSFORMER CORP. OF AMERICA





CIRCUIT RESISTANCE ANALYSIS

MODEL 340 SOCKET TO GROUND

Stage	Grid	Cathode	Heater	Plate	Screen G	Suppr. G	Space G
R.F. . .	Infinity	0	.1	18,750	1,000	0	.....
Autodyne. .	1,000	8,000	.1	18,750	7,500	0	.....
I.F. . .	75	500	.1	18,750	7,500	0	.....
Diode det . .	250,000	500	.1	500	.....	.....	.....
Audio. .	*750,000	1,000	.1	18,750	.....	.....	.....
Output .	500,000	.....	.1	18,750	.....	.....	18,750
Output .	500,000	.....	.1	18,750	.....	.....	18,750
Rectifier. .	.....	.....	18,700	1,800	.....	.....	.....

* Volume control "full on".
NOTE: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohmmeter in each reading: The individual resistance in the circuit can be readily checked upon removal of chassis.

VOLTAGE ANALYSIS *ACTUAL

MODEL 340

No.	Stage	Tube	A	B	C	K	Sc.G	Ip	Su.G
1	r.f	58	2.4	260	.4	0	12	.6	0
2	Autodyne.	57	2.4	260	0	7	90	.5	0
3	i.f	58	2.4	260	0	3	90	5.	0
4	Diode det	56	2.4	3	0	3	....	0	....
5	Audio	56	2.4	180	0	12	....	5	....
6	Output.	47	2.4	250	1	..	260	20	....
7	Output.	47	2.4	250	1	..	260	20	....
8	Rectifier	80	4.8	...	..	..	....	....	....

Volume control full on.
*Tested from socket to chassis with 1000 ohm per volt meter. Line 115 volts.

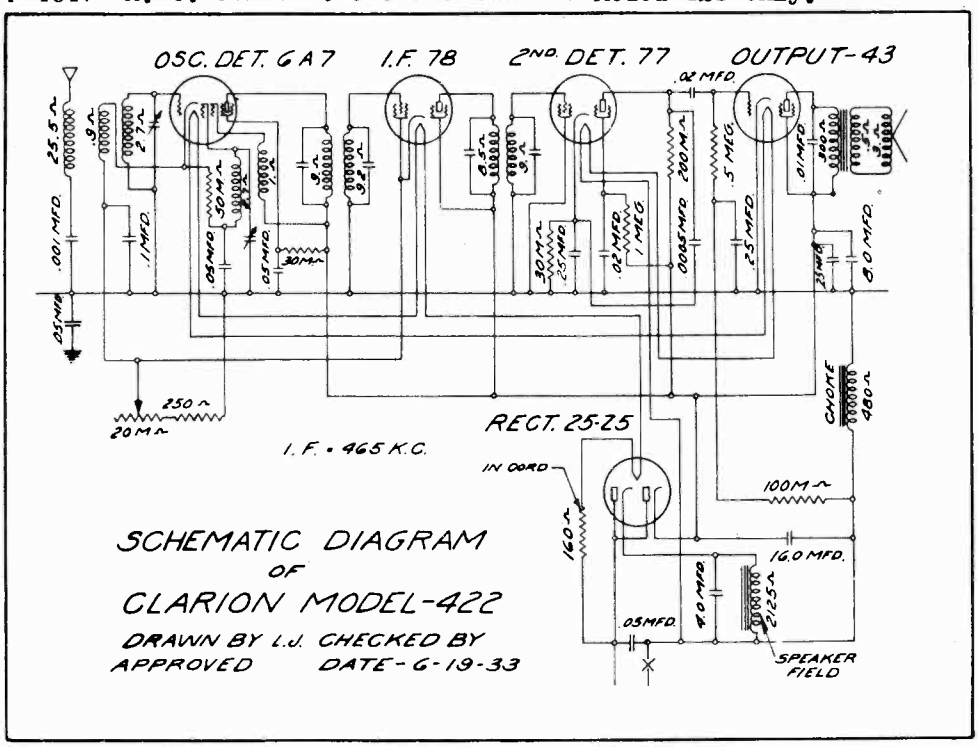
To adjust the trimmers, connect your 175 K. C. oscillator to the autodyne type 57 grid cap, and in the following order: Readjust trimmers numbers four, five, six and seven for maximum output, next disconnect the 175 K. C. oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator or tune in a broadcast signal from a known frequency crystal controlled station at 1400 K. C.; then reset trimmers two and one respectively for maximum output. This adjustment will track the first detector (autodyne) and r. f. stage.

TRANSFORMER CORP. OF AMERICA

MODEL 422,423
Schematic, Voltage
Parts List

P-1381	.0005 Mfd. Condenser	$ .50	P-4672	Field Coil	2.00
P-4361	Tube Shield	.15	P-4685	Ant. Wire Only	.30
P-4400	Grid Clips	.05	P-4701	.1 Mfd. Condenser	.30
P-4446	.001 Mfd. Condenser	.25	P-4707	#77 Sockets	.30
P-4594	30,000 Ohm Resistor	.25	P-4715	1st I. F. Transformer	2.20
P-4595	1 Megohm Resistor	.25	P-4716	2nd I. F. Transformer	2.20
P-4597	2500 Ohm Resistor	.25	P-4717	16 Mfd. Condenser	2.00
P-4629	Tuning Gang Condenser	2.65	*P-4835	6 Volt Bulb	.45
P-4632	8 Mfd. Condenser	1.60	*P-4850	Bullseye	.30
P-4640	.25 Mfd. Condenser	.20	*P-4851	Bullseye Light Socket	.15
P-4644	.05 Mfd. Condenser	.20	*P-4852	50 Ohm Resistor	.20
P-4645	.01 Mfd. Condenser	.20			
P-4647	A. C. Cordohm	.85			

* Model 423 only.



P-4648	6A7 Socket	.20
P-4649	#78 Socket	.20
P-4651	#43 Socket	.20
P-4652	Tube Shield Base	.10
P-4653	Ant. and Osc. Coil	1.25
P-4659	50,000 Ohm Resistor	.25
P-4662	100 M Resistor	.25
P-4663	1/2 Meg. Resistor	.25
P-4664	200,000 Ohm Resistor	.25
P-4667	.005 Mfd. Condenser	.20

SOCKET VOLTAGE ANALYSIS OF MODEL 422

USING A 1000 OHM PER VOLT METER

No.	STAGE	TUBE	Ef	Ep	Eg	Ek	Esg	Esug	Ip	Ep-0	Eg-0	Ip-0
1	Osc. Det.	6A7	48	80	2.5	15	35		.6	77	.2	1.8
2	I. F.	78	7	72	2.3	13	75	0	4.4			
3	2nd Det	77	6	28	.9	13	.3	.8	.1			
4	Output	43	24	78	.3	13	82		13			
5	Rectifier	25Z5	24	p 90		c 90			p 32			

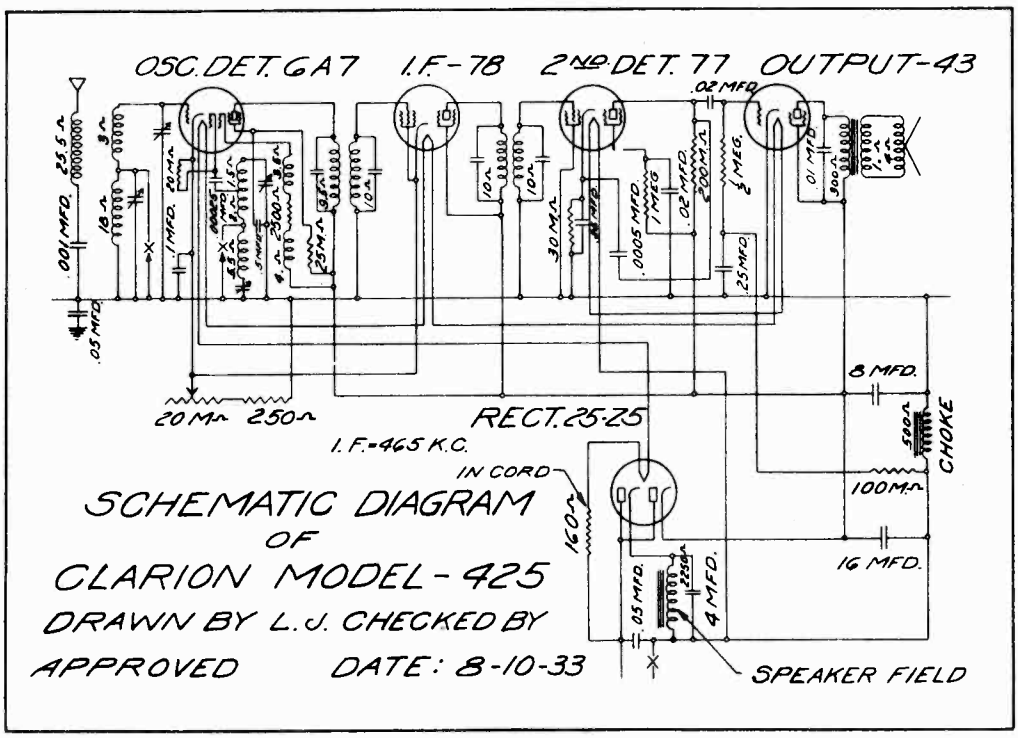
0 - Oscillator
Volume Control - Full On
Line Voltage - 105

p - Per Plate
c - Per Cathode

MODEL 425
Schematic, Voltage Parts List

TRANSFORMER CORP. OF AMERICA

P-1999	1,000 Ohm Resistor	.25	P-4654	I. F. Coil, 1st.	1.90
P-4117	30,000 Ohm Resistor.	.25	P-4662	100,000 Ohm Resistor	.25
P-4361	Tube Shield.	.15	P-4663	500,000 Ohm Resistor	.25
P-4374	.00025 Mfg. Condenser.	.25	P-4664	200,000 Ohm Resistor	.25
P-4446	.001 Mfd. Condenser.	.25	P-4685	Aerial Wire.	.30
P-4582	Socket 25Z5.	.20	P-4701	.1 Mfg. Condenser.	.25
P-4586	Knobs.	.20	P-4707	Socket 77.	.20
P-4587	Vol Escutcheon	.20	P-4716	I. F. Coil, 2nd	1.90
P-4588	Stat. Escutcheon	.20	P-4717	Elec. Condenser.	2.40
P-4595	1,000,000 Ohm Resistor	.25	P-4864	Broadcast Longwave Switch.	1.60
P-4597	250 Ohm Resistor	.25	P-4865	Trimmer Condenser.	.60
P-4640	.25 Mfd. Condenser	.20	P-4866	Preselector Coil	3.40
P-4629	Tuning Condenser	2.65	P-4868	2,500 Ohm Resistor	.25
P-4633	Elec. Condenser and Mfd.	1.60	P-4869	25,000 Ohm Resistor.	.25
P-4644	.05 Mfd. Condenser	.20	P-4870	15,000 Ohm Resistor.	.25
P-4645	.01 Mfd. Condenser	.20			
P-4646	.02 Mfd. Condenser	.25	G-1697	Output Transformer	1.25
P-4647	Cordohm.	.85	G-1704	Spkr. Comp. 5" Reg	5.30
P-4648	Sockets 6A7.	.20	G-1711	"B" Choke.	1.25
P-4649	Sockets 78	.20	G-1740	Volt Cont.	1.40
P-4651	Sockets 43	.20	G-1751	Voice Coil and Cone.	.75



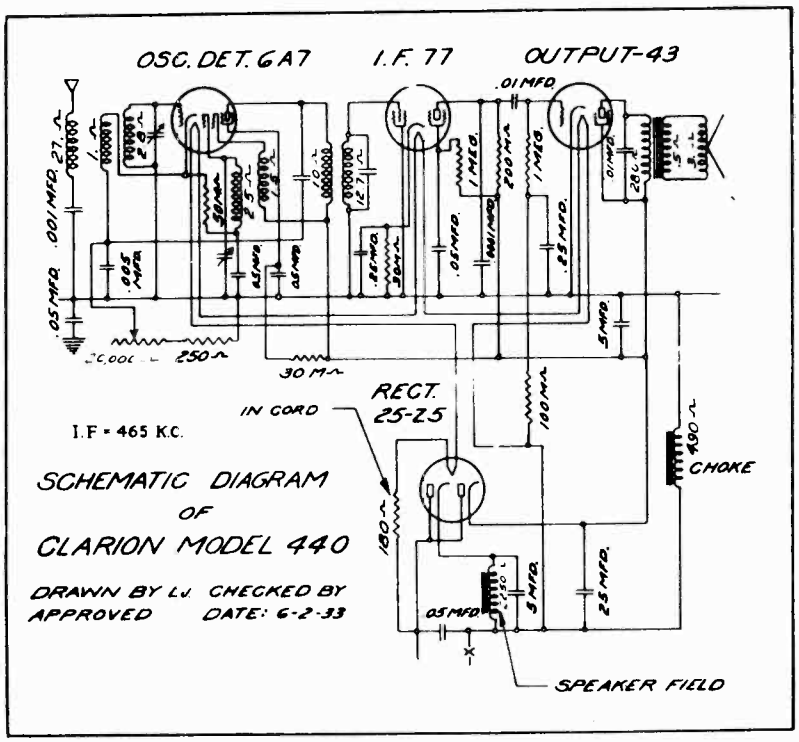
Stage	Tube	Ef	Ep	Eg	Ek	Esg	Esug	Ip	Ep-0	Eg-0	Ip-0
Osc-Det	6A7	5.5	105	2.4	20	38		1.	92	.1	3
IF Amp	78	6	105	2.1	20	105	0	6.5			
2nd Det	77	6	35	15.	18	.6	1.4	.1			
Output	43	24	100	.3	18	107		19.			
Rect	25Z5	24	p110		c110			p37			

O- Oscillator. Line voltage 110. Volume control-Full. "c"- per cathode.
"p"- Per plate

TRANSFORMER CORP. OF AMERICA

MODEL 440
Schematic, Voltage
Parts List

G-1697	Output Transformer. . . .	$1.90
G-1704	Speaker complete.	5.00
G-1727	Filter Choke.	1.60
G-1751	Voice Coil and Cone . . .	.75
P-4446	.001 Mfd. Condenser . . .	.30
P-4576	Volume Control.	1.60
P-4582	25Z5 Socket	.20
P-4586	Knobs	.20
P-4587	Volume Escutcheon	.20
P-4588	Station Escutcheon. . . .	.20
P-4590	.0001 Mfd. Cond	.25
P-4594	30,000 Ohm Resistor . . .	.25
P-4595	1,000,000 Ohm Resistor. .	.25
P-4597	250 Ohm Resistor.	.25
P-4640	.25 Mfd. Condenser. . . .	.40



P-4644	.05 Mfd. Condenser. . . .	.25
P-4645	.01 Mfd. Condenser. . . .	.25
P-4648	6A7 Socket.	.20
P-4651	43 Socket	.20
P-4653	Preselector Coil. . . .	1.65
P-4659	50,000 Ohm Resistor . . .	.25
P-4662	100,000 Ohm Resistor. . .	.25
P-4664	200,000 Ohm Resistor. . .	.25
P-4667	.005 Mfd. Condenser . . .	.25
P-4685	Aerial Wire	.40
P-4707	77 Socket	.20
P-4708	Cord Ohm.	.90
P-4709	Electrolytic Condenser. .	3.75
P-4711	I.F. Coil	2.50
P-4712	Tuning Condenser 2 Gang .	3.15

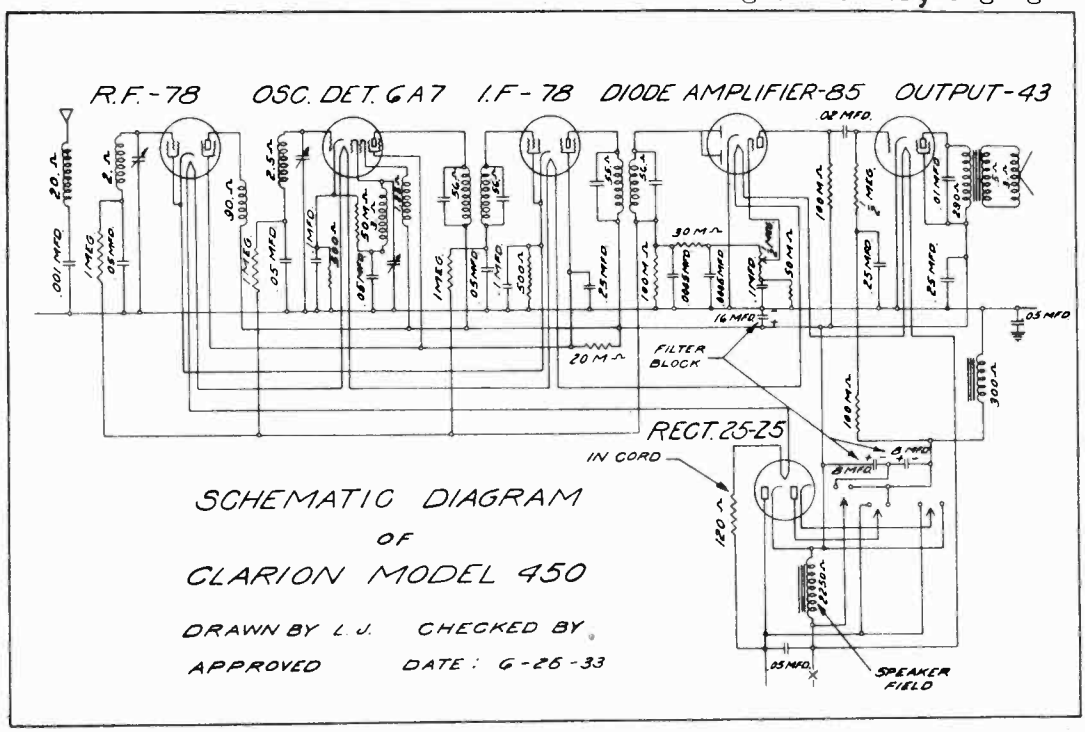
SOCKET VOLTAGE READINGS WITH 1000 Ohms/Volt METER

Stage	Tube	Ef	Ep	Ek	Esg	Esug	Ip	Ep-0	Eg-0	Ip-0	Eg
Osc-Det	6A7	6	110	20.	37.5		1.7	110	-1	2 ma	1.5
IF Amp	77	6	36	16.5	.6	1.5	.1				1.5
Output	43	25.	105	18.	112.5		26.				.1
Rect	25Z5	25.	110	110"			38.*				

* Per plate " Per cathode 0- Oscillator Line Voltage 112. Control On

MODEL 450
Schematic, Voltage TRANSFORMER CORP. OF AMERICA
Parts List

G-1697	Output transformer . . .	$1.60
G-1698	Volume control	1.60
G-1704	Speaker, complete. . . .	4.40
G-1742	"B" choke.	1.25
G-1751	Voice coil and cone. . .	.95
P-1381	.0005 mfd. condenser . .	.25
P-1488	20,000 ohm resistor. . .	.30
P-4446	.001 mfd. condenser. . .	.25
P-4586	Knobs.	.20
P-4587	Vol. escutcheon.	.20
P-4594	30,000 ohm resistor. . .	.20
P-4595	1,000,000 ohm resistor .	.20
P-4640	.25 mfd. condenser . . .	.25
P-4644	.05 mfd. condenser . . .	.20
P-4645	.01 mfd. condenser . . .	.20
P-4646	.02 mfd. condenser . . .	.20
P-4659	50,000 ohm resistor. . .	.20
P-4662	100,000 ohm resistor . .	.20
P-4663	500,000 ohm resistor . .	.20
P-4685	Aerial wire.	.40
P-4701	.1 mfd. condenser. . . .	.20
P-4725	Station escutcheon . . .	.20
P-4728	Tube shield.	.25
P-4730	I.F. coil, 1st	2.50
P-4731	I.F. coil, 2nd	2.50
P-4732	Socket 6A7	.20
P-4733	Socket 78.	.20
P-4734	Socket 85.	.20
P-4735	Socket 43.	.20
P-4736	Socket 25Z5.	.20
P-4737	Electrolytic condenser .	3.75
P-4738	AC-DC switch	1.25
P-4739	Antenna coil	1.25
P-4740	Oscillator coil.	1.45
P-4741	R.F. coil.	1.25
P-4742	Cord ohm	.95
P-4743	500 ohm resistor	.20
P-4745	Tuning condenser, 3 gang	4.40



Stage	Tube	Ef	Ep	Eg	Ek	Esg	Esug	Ip	Ep-0	Eg-0	Ip-0
RF	78	6	140	51	72	80	0	1.8			
Osc-Det	6A7	6	144	1.5	65	77		5.	144	.1	24
IF Amp	78	6	150	61	70	83	0	1.9		.1	
Diode	85	6	60	100	60			0		d65	
Output	43	25	135	2	70	148		40			
Rect	25Z5	25	p85		c85			p35			

0 - Oscillator Line voltage 109 p-Per plate. c-Per cathode. d-diode plates
Volume control on Full

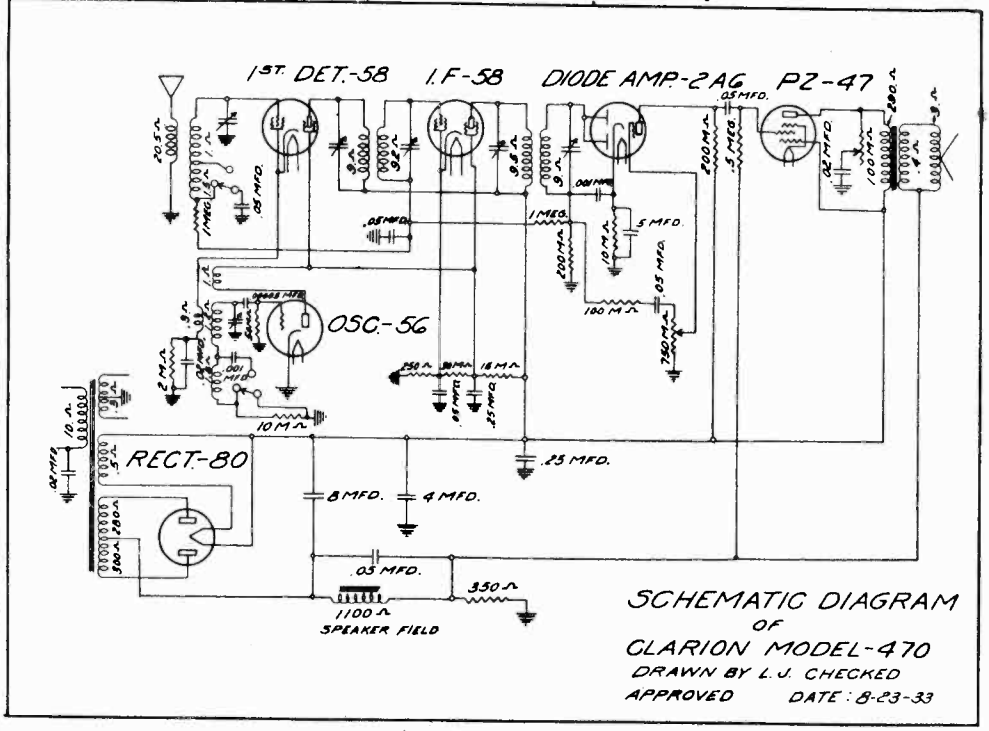
TRANSFORMER CORP. OF AMERICA

MODEL 470,472
Schematic,Voltage
Parts List

P-4504	1,000 Ohm Resistor. . .	.25
P-4594	30,000 Ohm Resistor . .	.25
P-4595	1 Megohm Resistor . . .	.25
P-4640	.25 Mfd. Condenser. . .	.20
P-4644	.05 Mfd. Condenser. . .	.20
P-4646	.02 Mfd. Condenser. . .	.20
P-4659	50,000 Ohm Resistor . .	.25
P-4661	10,000 Ohm Resistor . .	.25
P-4662	100,000 Ohm Resistor. .	.25
P-4663	500,000 Ohm Resistor. .	.25
P-4664	200,000 Ohm Resistor. .	.25
P-4685	Antenna Wire.	.30
P-4724	5 Mfd. Elec. Condensers	.75

P-4885	1st I. F. Transformer.	2.20
P-4886	Ant. Coil	.90
P-4887	Oscillator Coil	1.00
P-4890	Small Knobs	.20
P-4891	Large Knobs	.20
*P-4913	Escutcheon Plates	.60
G-1484	Voice Coil and Spider	.50
G-1706	Speaker	4.50
G-1768	Power Transformer	3.00
G-1768A	Power Transformer 25 Cycle. . .	4.50
G-1768B	Power Transformer 220 Volt. . .	3.50
G-1770	Output Audio Assembly	1.50

* Model 472 only.



SCHEMATIC DIAGRAM
OF
CLARION MODEL-470
DRAWN BY L.J. CHECKED
APPROVED DATE: 8-23-33

P-1685	2,000 Ohm Resistor.	.25
P-1688	15,000 Ohm Resistor	.25
P-1723	.0005 Mfd. Condenser	.40
P-1860	Pilot Light Bracket	.30
P-4262	56 Socket	.15
P-4264	58 Socket	.15
P-4400	Grid Clips.	.05
P-4435	250 Ohm Resistor.	.25
P-4443	8 Mfd. - 4 Mfd. Elec. Condenser	2.50
P-4445	350 Ohm Resistor.	.25
P-4485	Tube Shield	.15
P-4486	Tube Shield Cap	.10
P-4487	Tube Shield Bases	.10

SOCKET VOLTAGE ANALYSIS OF MODEL 470

USING A 1000 OHM PER VOLT METER

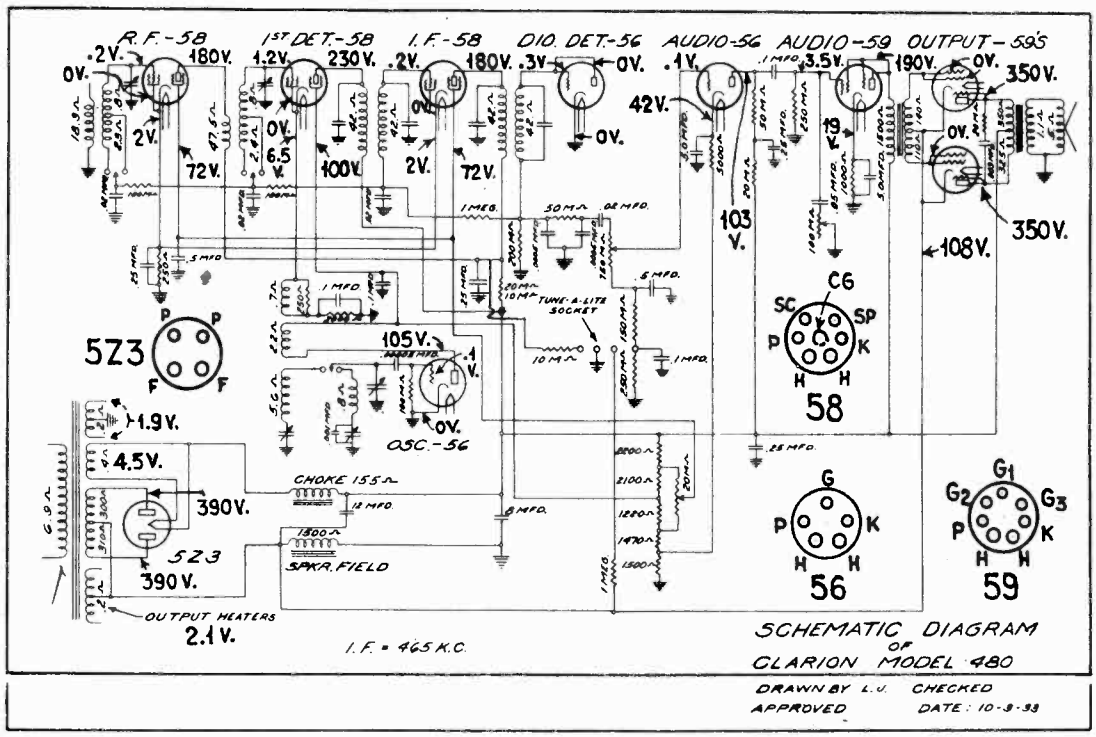
No.	STAGE	TUBE	Ef	Ep	Eg	Ek	Esg	Esug	Ip
1	1st Det. .	58	2.1	235	.4	7	80	0	2.7
2	Osc. . . .	56	2.1	95	.6	0			5
3	I. F . . .	58	2.1	243	.3	2.2	85	0	6
4	Diode Amp.	2A6	2.1	140	4	1.1	d .1		.2
5	Output . .	PZ 47	2.1	235	.5	240			24
6	Rectifier.	80	4.7	p 328					p 24

Volume Control - Full On
Line Voltage - 109

p - Per Plate
d - Diode Plate

MODEL 480
Schematic, Voltage
Parts List

TRANSFORMER CORP. OF AMERICA

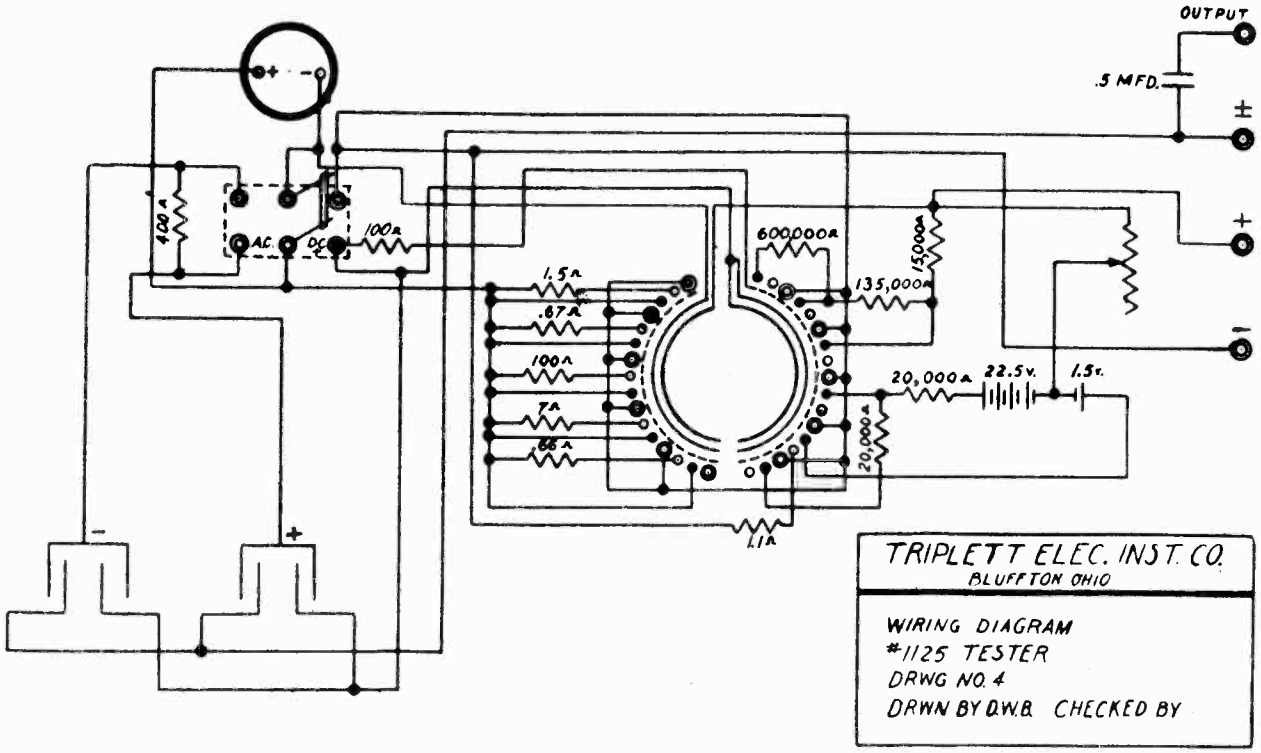


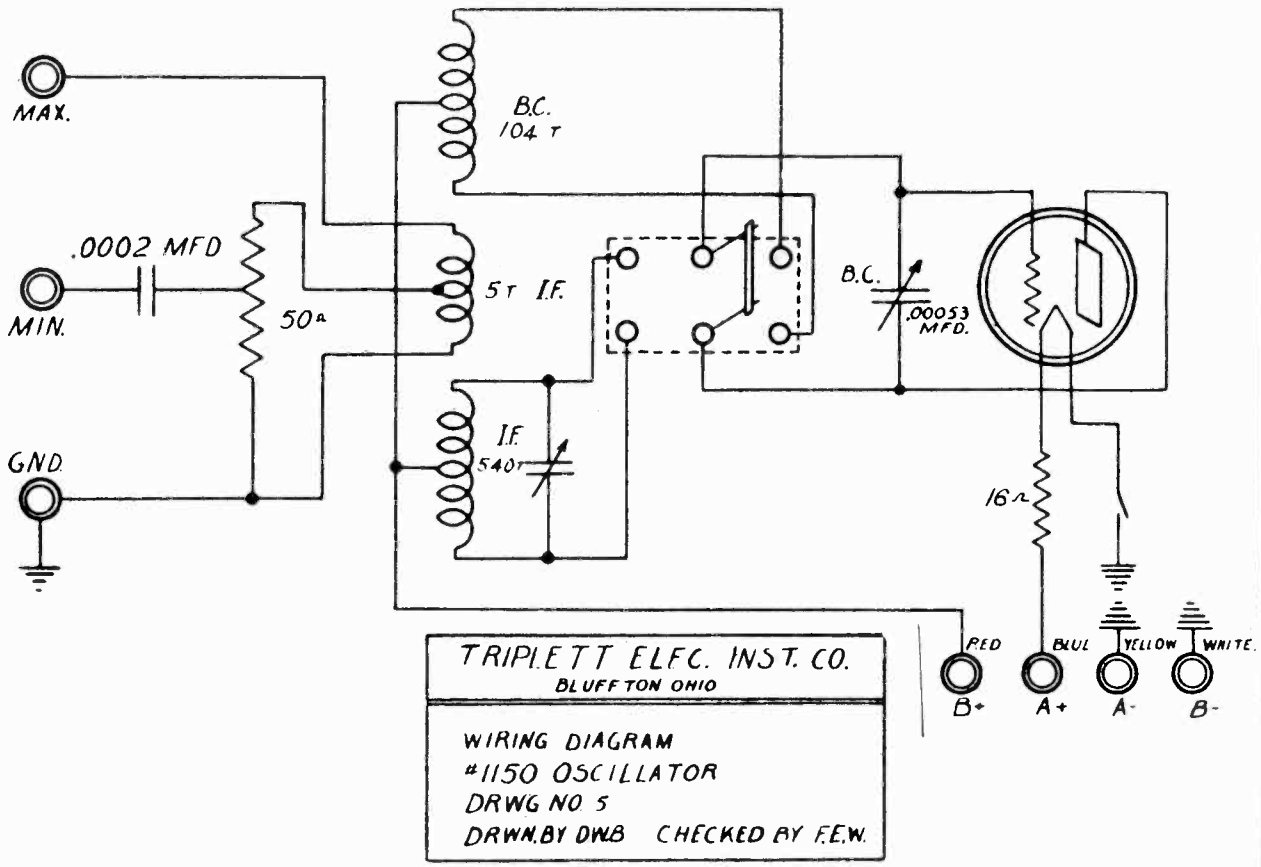
MODEL 480 PARTS PRICE LIST

PART NUMBER	DESCRIPTION	LIST PRICE
P-1038	Pilot Light	$ .45
P-1100-A	.001 Mfd. Condenser	.25
P-1106	10,000 Resistor, 1 Watt	.25
P-1381	.0005 Mfd. Condenser	.50
P-1685	2,000 Ohm Resistor	.25
P-1728	.00005 Mfd. Condenser	.40
P-1999	10,000 Ohm Resistor	.25
P-4168	Blinder	.10
P-4182	Felt Washer	.05
P-4200	5,000 Ohm Resistor	.30
P-4259	Tone Control and Switch	1.75
P-4260	Volume Control	1.25
P-4262	56 Sockets	.25
P-4264	58 Sockets	.25
P-4391	Field Coil	2.50
P-4485	Tube Shield	.15
P-4486	Tube Shield Caps	.10
P-4487	Tube Shield Case	.10
P-4514	12 Mfd. - 8 Mfd. Dual Electrolytic	2.85
P-4585	Dual 5 Mfd. Condenser	1.50
P-4595	1 Meg. Resistor	.25
P-4597	250 Ohm Resistor	.25
P-4640	.25 Mfd. Condenser	.20
P-4644	.05 Mfd. Condenser	.20
P-4646	.02 Mfd. Condenser	.25
P-4659	50,000 Ohm Resistor	.25
P-4662	100,000 Ohm Resistor	.25
P-4664	200,000 Ohm Resistor	.25
P-4701	.10 Mfd. Condenser	.30
P-4761	.5 Mfd. Condenser	.40
P-4890	Small Knobs	.25
P-4891	Large Knobs	.25
P-4894	Escutcheon Plate	.80
P-4905	59 Sockets	.15
P-4909	20,000 Ohm Resistors	.25
P-4911	.25 Mfd. Condensers	.35
P-4914	5Z3 Socket	.15
P-4915	Tune-A-Lite	3.00
P-4917	Tune-A-Lite Socket	.25
P-4919	Switch-Wave Change	1.00
P-4923	Noise Control	1.00
P-4924	Tune-A-Lite Bracket	.15
P-4925	Canopy Mtg. Studs	.10
P-4929	Tune-A-Lite Blinder	.15
P-4930	20,000 Ohm Resistor	.25
P-4931	250,000 Ohm Resistor	.25
P-4932	150,000 Ohm Resistor	.25
P-4933	1,000 Ohm Resistor	.25
P-4934	.003 Mfd. Condenser	.25
P-4937	Wing Bolts	.10
P-4952	Wing Nuts	.05
P-4957	Diaphragm	.50
G-1281	Primary Coil Assembly (R.F. Coil)	.75
G-1282	Primary Coil Assembly (Ant. Coil)	.40
G-1378	Single Insulated Trimmer	.75
G-1401	Gang Condenser	5.00
G-1403	Trimmer Assembly	.75
G-1488	Padding Condenser	.75
G-1600	Voice Coil and Spider	.65
G-1669	Filter Choke Assembly	1.75
G-1708	10" Speaker	6.00
G-1776	Power Transformer Assembly	4.50
G-1776-A	Power Transformer 25 Cycle	6.25
G-1776-B	Power Transformer 220 Volt	5.00
G-1777	Output Transformer Assembly	2.00
G-1778	Input Transformer	2.50
G-1779	R.F. Units	4.00
G-1792	1st I.F. Transformer	2.50
G-1793	I.F. Coil and Dowel Assembly (G-1792)	1.25
G-1794	2nd I.F. Transformer	2.00
G-1795	Dial Assembly	.90
G-1797	Canopy	1.00
G-1803	R.F. Coil Assembly	.80
G-1804	Oscillator Coil Assembly	.90

TRIPLETT ELECTRICAL INSTRUMENT CO.

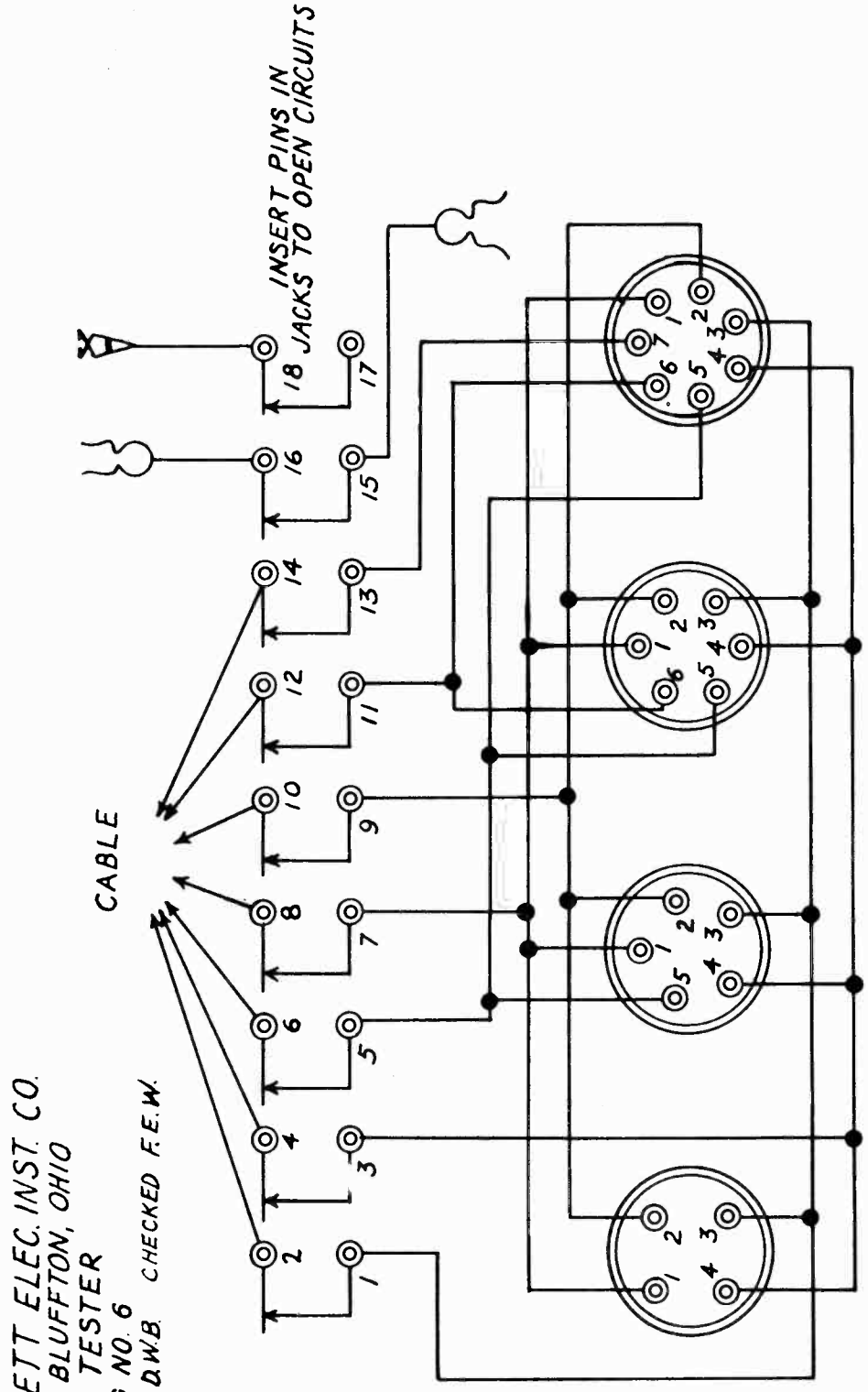
MODEL 1125
Schematic
MODEL 1150
Schematic





MODEL 1166
Schematic

TRIPLETT ELECTRICAL INSTRUMENT CO.



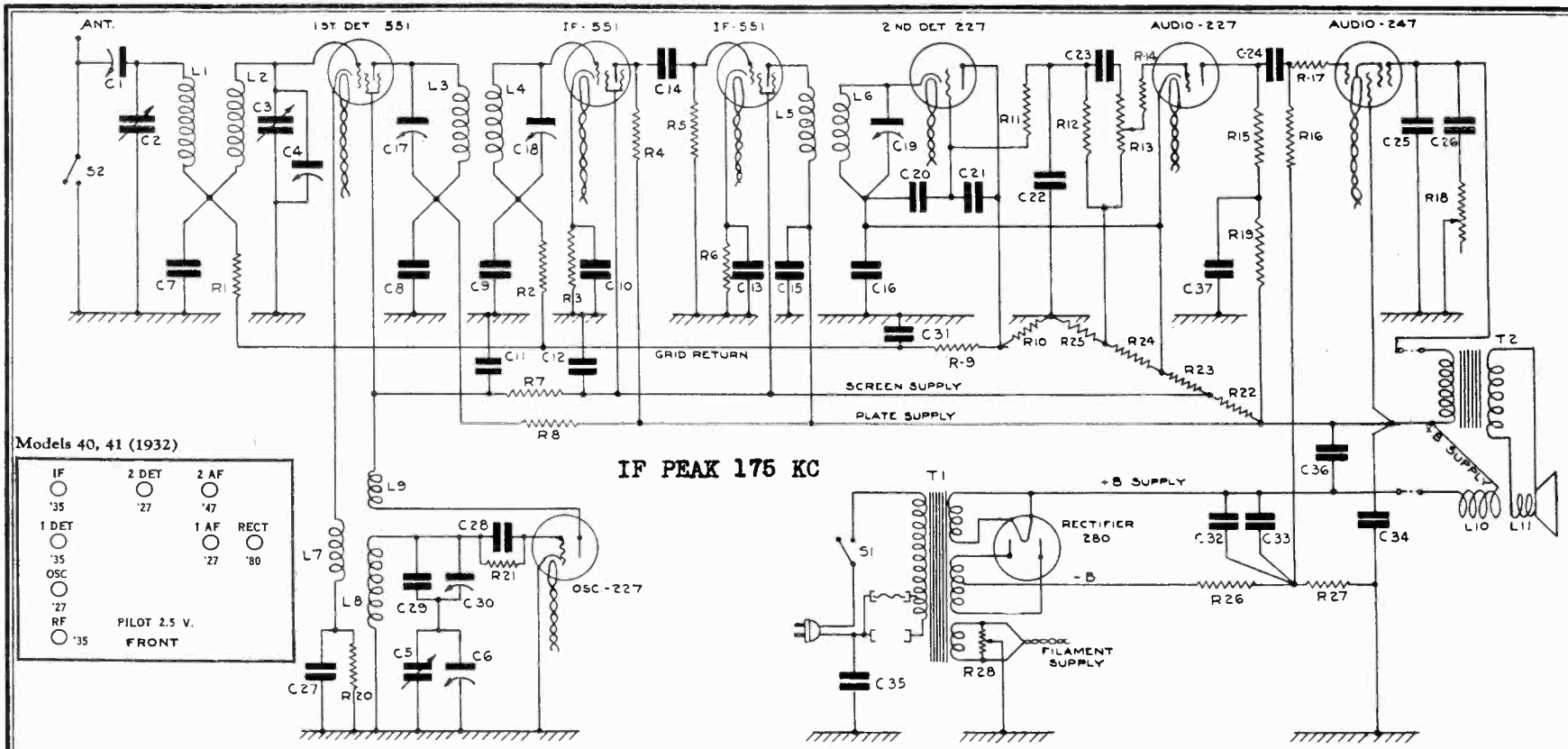
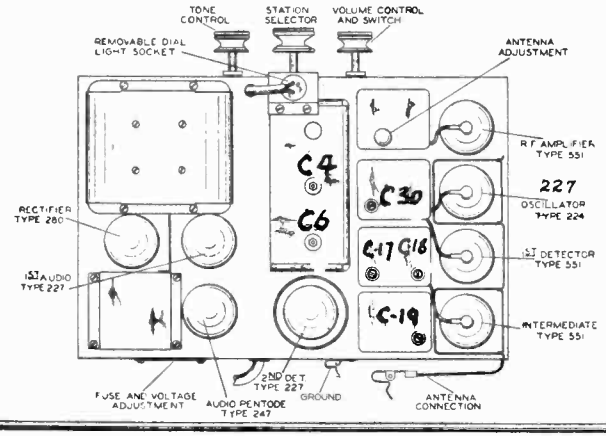


Fig. 1—Schematic Diagram — Model 40



DUO DIODE DETECTOR

The type 227 detector utilizes the elements (cathode, grid, and plate) for two very distinct functions, namely detection and automatic volume control. The grid to cathode circuit (L 6 and C 19 is the tuned IF circuit, C 20 imposes the signal on the grid, and R 11 and R 12 provide a voltage drop for the rectified audio voltage) acts as the detector and the AVC action is furnished by the plate to cathode circuit (R 10 controls the bias of the 1st detector and 1st IF tubes, and R 24 and R 25 furnish the delay action.) This type of control provides high output on weak signals and controls over a wide range of signal strengths.

MODEL 40,41 AC
Electrical Values UNITED AMERICAN BOSCH CORP.
Voltage

NOMENCLATURE - MODEL 40

R 1 - Grid Resistor - 10,000 ohms
R 2 - Grid Resistor - 10,000 ohms
R 3 - Cathode Resistor - 750 ohms
R 4 - IF Plate Resistor - 25,000 ohms
R 5 - IF Grid Resistor - .1 megohm
R 6 - Cathode Resistor - 750 ohms
R 7 - Screen Resistor - 1.000 ohms
R 8 - Plate Resistor - 1,000 ohms
R 9 - Divider Resistor - .5 megohm
R 10 - Divider Resistor - .1 megohm
R 11 - 2nd Det. Screen Resistor - 10,000 ohm
R 12 - 2nd Det. Screen Resistor - .5 megohm
R 13 - Volume Control - .5 megohm
R 14 - Audio Grid Resistor - .1 megohm
R 15 - Audio Plate Resistor - 25,000 ohms
R 16 - Audio Grid Resistor - .5 megohm
R 17 - Audio Grid Resistor - .1 megohm
R 18 - Tone Control - .5 megohm
R 19 - Audio Plate Resistor - 5,000 ohms
R 20 - 1st Det. Cathode Resistor - 5,000 ohms
R 21 - Osc. Grid Resistor - .1 megohm
R 22 - Screen Supply Resistor - 5,000 ohms
R 23 - Divider Resistor - 1,830 ohms
R 24 - Divider Resistor - 235 ohms
R 25 - Divider Resistor - 850 ohms
R 26 - Bias Resistor - 300 ohms
R 27 - Bias Resistor - 200 ohms
R 28 - Mid Tap Resistor

C 1 - Antenna Trimmer
C 2 - Tuning)
C 3 - Tuning)
C 4 - Alignment) Condenser Gang
C 5 - Tuning)
C 6 - Alignment)
C 7 - RF Coupling - .05 mfd.
C 8 - Plate By-pass - .05 mfd.
C 9 - IF Grid - .05 mfd.
C 10 - IF Cathode By-pass - .05 mfd
C 11 - Screen By-pass - .05 mfd.
C 12 - Screen By-pass - .05 mfd.
C 13 - IF Cathode By-pass - .05 mfd
C 14 - IF Coupling - 1100 mmf.
C 15 - IF Plate By-pass - .05 mfd.
C 16 - 2nd Det. Cathode - .05 mfd.
C 17 - 1st Det. Alignment
C 18 - 1st IF Alignment
C 19 - 2nd Det. Alignment
C 20 - Blocking Condenser - 100 mmf.
C 21 - By-pass Condenser - .05 mfd.
C 22 - 2nd Det. Screen By-pass - 100
C 23 - Audio Coupling - .05 mfd. μf
C 24 - Audio Coupling - .05 mfd.
C 25 - Audio Plate By-pass - .01 mfd
C 26 - Tone Control Condenser - .05 μf
C 27 - 1st Det. Cathode - .05 mfd.
C 28 - Osc. Grid Condenser - 100 mmf
C 29 - Oscillator Condenser - 1100 μf.
C 30 - Oscillator Series Alignment
C 31 - By-pass Condenser - .05 mfd.
C 32 - Filter Condenser - 8 mfd.
C 33 - Filter Condenser - 8 mfd.
C 34 - Filter Condenser - 4 mfd.
C 35 - Buffer Condenser - .05 mfd.
C 36 - Field Tuning Condenser - .05 mfd.
C 37 - 1st Audio Plate By-pass - .25 mfd

L 1 - RF Coil
L 2 - RF Coil
L 3 - Primary) 1st IF coil
L 4 - Secondary)
L 5 - Primary) 2nd IF coil
L 6 - Secondary)
L 7 - Cathode Winding)
L 8 - Grid Winding) Osc. coil
L 9 - Plate Winding)
L 10 - Speaker Field
L 11 - Voice Coil

SOCKET VOLTAGES

STAGE	TUBE	PLATE	SCREEN	CATHODE	GRID	FIL.	PLATE MA
1st Det.	551	250	75	10	2	2.2	2
Osc.	227	75	....	0	0	2.2	7
1st IF	551	140	85	4	.2	2.2	4
2nd IF	551	260	85	5	.4	2.2	5
2nd Det.	227	--5	....	35	1	2.2	.1
1st Audio	227	110	....	35	1	2.2	4
2nd Audio	247	250	250	....	16	2.2	30
Rect.	280	....	....	....	....	5.0	30

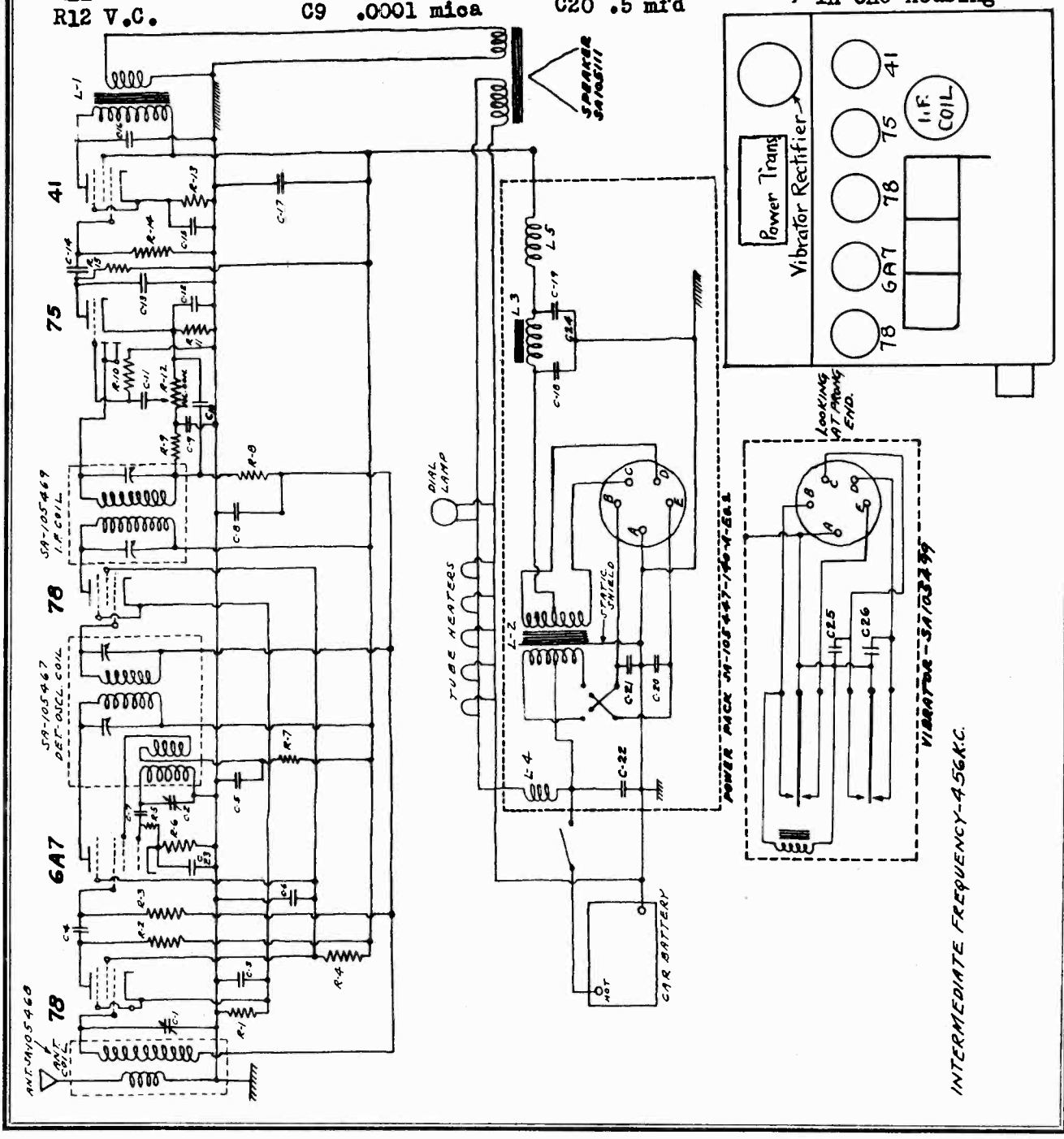
UNITED AMERICAN BOSCH CORP.

MODEL 140A
Schematic,
Values

R1	250 ohms	R13	600 ohms	C10	.0001 mica
R2	20000 ohms	R14	500000 ohms	C11	.005 mfd
R3	100000 ohms	R15	250000 ohms	*C12	.25 mfd
R4	20000 ohms	C1	Gang	C13	.003 mfd
R5	100000 ohms	C2	Gang	*C14	.005 mfd
R6	500 ohms	*C3	.5 mfd	C15	10. mfd
R7	20000 ohms	C4	.0001 mica	*C16	.005 mfd
R8	500000 ohms	*C5	.01 mfd	C17	.05 mfd
R9	50000 ohms	*C6	.05 mfd	C18	8. mfd
R10	1 megohm	C7	.0001 mica	C19	8. mfd
R11	5000 ohms	C8	.05 mfd	C20	.5 mfd
R12	V.C.	C9	.0001 mica		

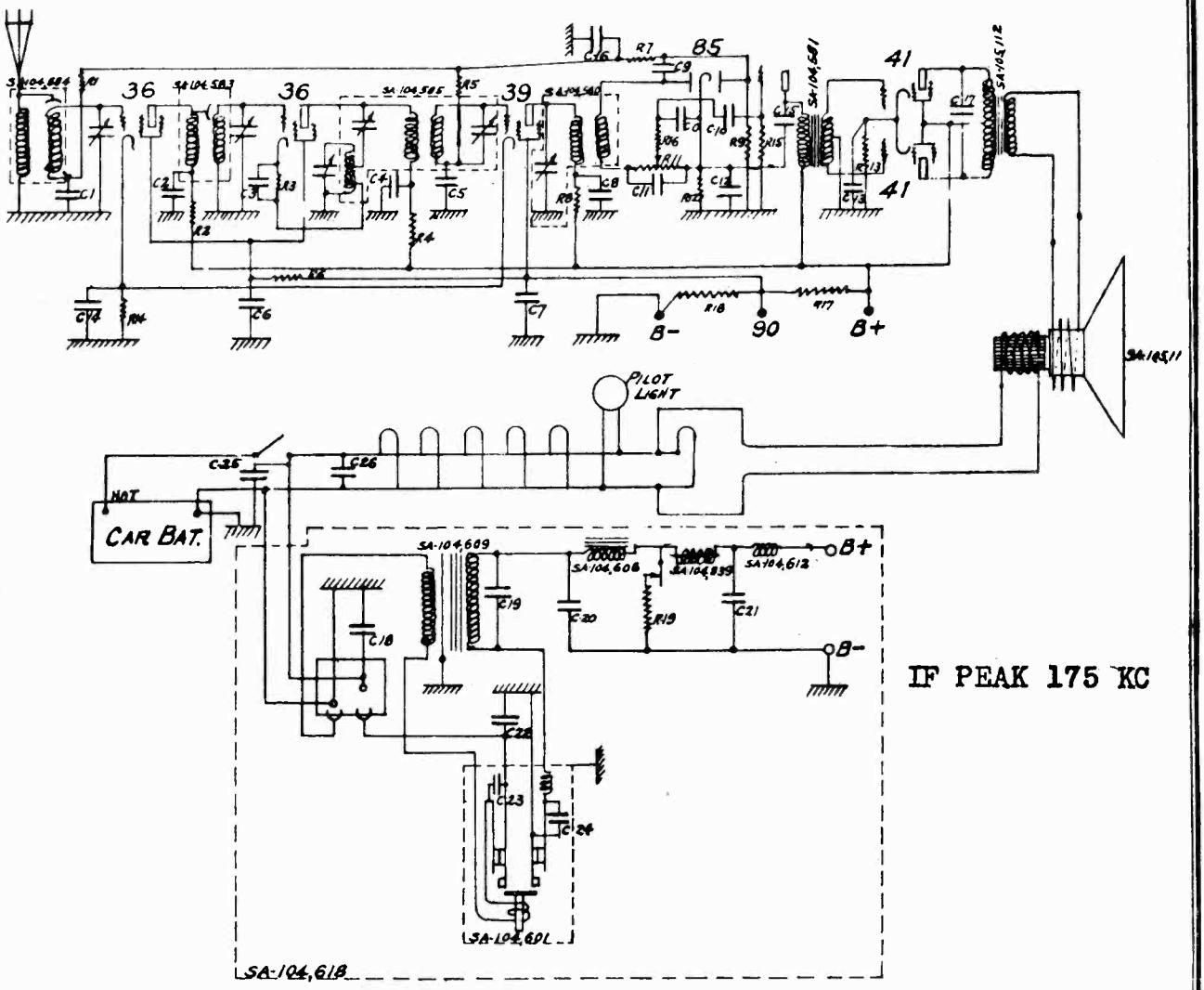
C21	.5 mfd
C22	.5 mfd
*C23	.05 mfd
C25	.01 mfd
C26	.01 mfd

* In one housing



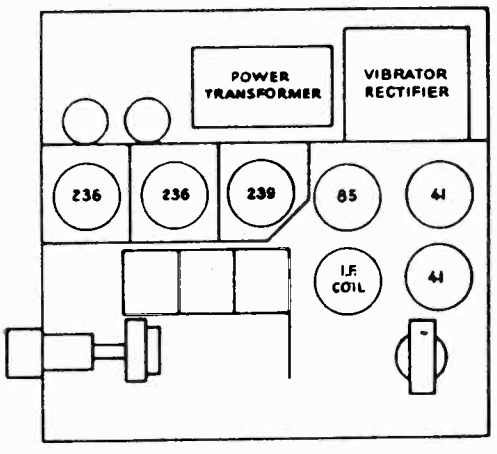
MODEL 150 Type 1
Schematic, Socket

UNITED AMERICAN BOSCH CORP.



IF PEAK 175 KC

1	C-0	.0001 MFD.	SA-101.143
3	C1	.05 - 2-PLY	SA-102.493
3	C2	.05 - 3 PLY	SA-102.492
1	C3	.002 - 4-PLY	SA-103.852
3	C4	.05 - 3-PLY	SA-102.492
3	C5	.05 - 2-PLY	SA-102.493
4	C6	.1 - 2-PLY	SA-102.495
4	C7	.05 - 2-PLY	SA-102.493
2	C8	.05 - 3-PLY	SA-102.492
2	C9	.0001 MFD	SA-101.143
2	C10	.01 - 3-PLY	SA-102.500
2	C11	.0001 MFD.	SA-101.143
1	C12	.5 - 2-PLY	SA-102.499
1	C13	.5 - 2-PLY	SA-102.499
4	C14	.25 - 2-PLY	SA-102.497
1	C15	.002 - 4-PLY	SA-103.852
4	C16	.05 - 2-PLY	SA-102.493
1	C17	.002 - 4-PLY	SA-103.852
5	C18	.002 - 4PLY	SA-103.852
5	C19	.01 MF-1600 V	SA-104.837
5	C20	8 MFD	SA-104.614
5	C21	8 MFD	SA-104.610
5	C22	.002 - 4-PLY	SA-103.852
5	C23	.5 -	SA-104.601
5	C24	.01 -	
5	C25	.5 - 2 PLY	SA-102.499
1	C26	.002 - 4PLY	SA-103.852



3	R1	100,000 ~ 1/2 WATT	SA-100.727
3	R2	1,000 ~ "	SA-100.729
1	R3	7500 ~ "	SA-104.824
3	R4	1,000 ~ "	SA-100.729
3	R5	100,000 ~ "	SA-100.727
4	R6	5,000 ~ "	SA-100.824
4	R7	0.5 MEG. "	SA-100.194
2	R8	1,000 ~ "	SA-100.729
4	R9	0.5 MEG "	SA-100.194
	R10		
6	R11	0.5 MEG VOL. CONT.	SA-104.605
4	R12	1,800 ~ 1/2 WATT	SA-102.961
1	R13	600 ~ 1 WATT	SA-105.004
4	R14	500 ~ 1/2 WATT	SA-99.583
2	R15	1 MEG "	SA-100.815
2	R16	50,000 ~ "	SA-100.512
2	R17	40,000 ~ "	SA-103.410
2	R18	75,000 ~ "	SA-101.163
5	R19	5,000 ~ 10 WATT	SA-104.704

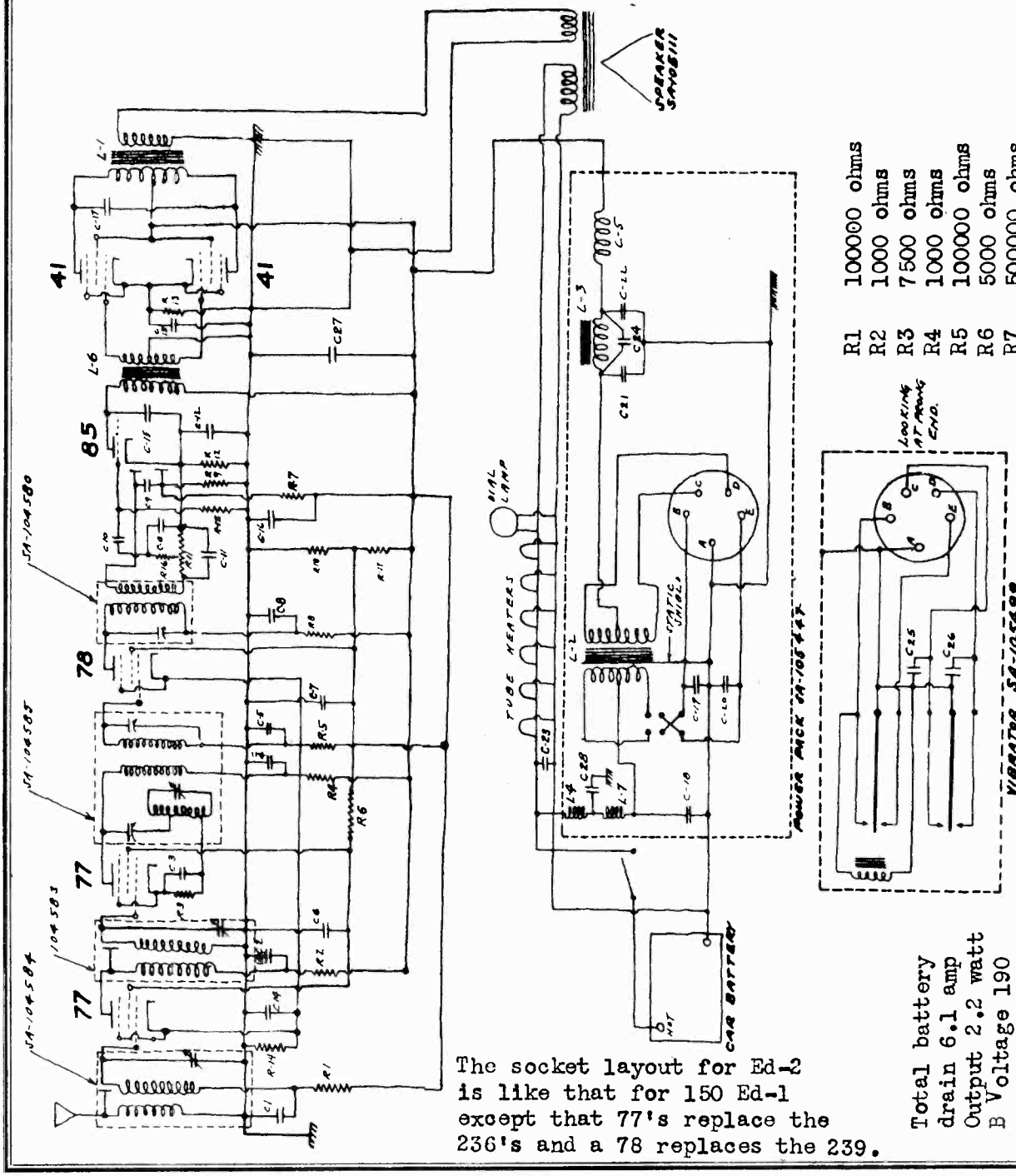
MODEL 150 Type 2
Schematic

UNITED AMERICAN BOSCH CORP.

R11	500000 ohms
R12	1800 ohms
R13	600 ohms
R14	500 ohms
R15	1. megohm
R16	50000 ohms
R17	40000 ohms
R18	75000 ohms

C0	.0001 mfd
C1	.05 mfd
C2	.05 mfd
C3	.002 mfd
C4	.05 mfd
C5	.05 mfd
C6	.1 mfd
C7	.05 mfd
C8	.05 mfd
C9	.0001 mfd
C10	.01 mfd
C11	.0001 mfd
C12	.5 mfd
C13	.5 mfd
C14	.25 mfd
C15	.002 mfd
C16	.05 mfd
C17	.002 mfd
C18	.5 Comm. in can
C19	.5 Comm. in can
C20	.5 Comm. in can
C21	8.0 mfd
C22	8.0 mfd
C23	.002 mfd
C24	.1 mfd
C25	.01 mfd
C26	.01 mfd
C27	.25 mfd
C28	.5 mfd
C29	

R1	100000 ohms
R2	1000 ohms
R3	7500 ohms
R4	1000 ohms
R5	100000 ohms
R6	5000 ohms
R7	500000 ohms
R8	1000 ohms
R9	500000 ohms



The socket layout for Ed-2 is like that for 150 Ed-1 except that 77's replace the 236's and a 78 replaces the 239.

Total battery drain 6.1 amp
Output 2.2 watt
B Voltage 190

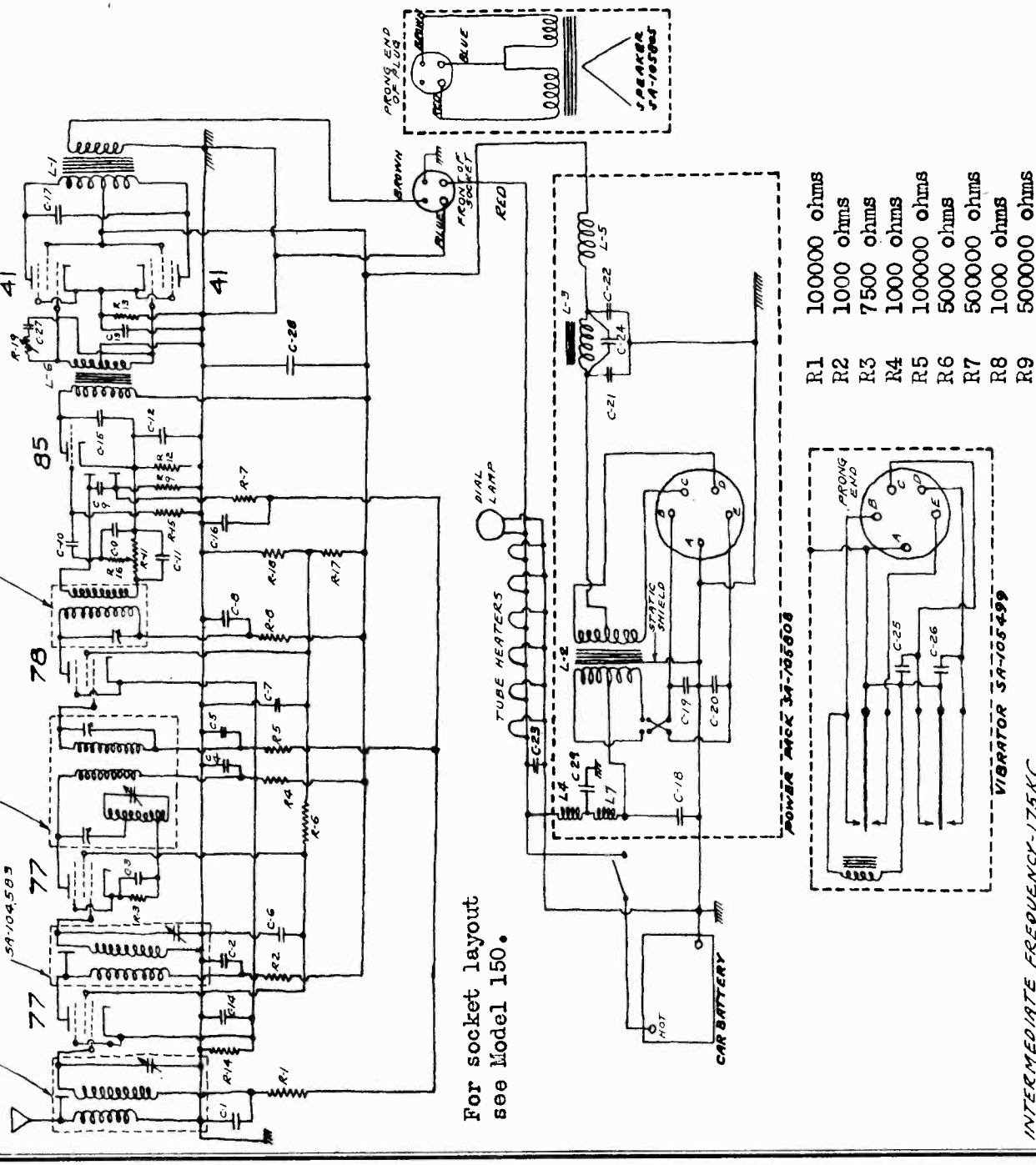
MODEL 160
Schematic

UNITED AMERICAN BOSCH CORP.

R11	500000 ohms
R12	1800 ohms
R13	600 ohms
R14	500 ohms
R15	1. megphm
R16	50000 ohms
R17	40000 ohms
R18	75000 ohms
R19	Tone Control

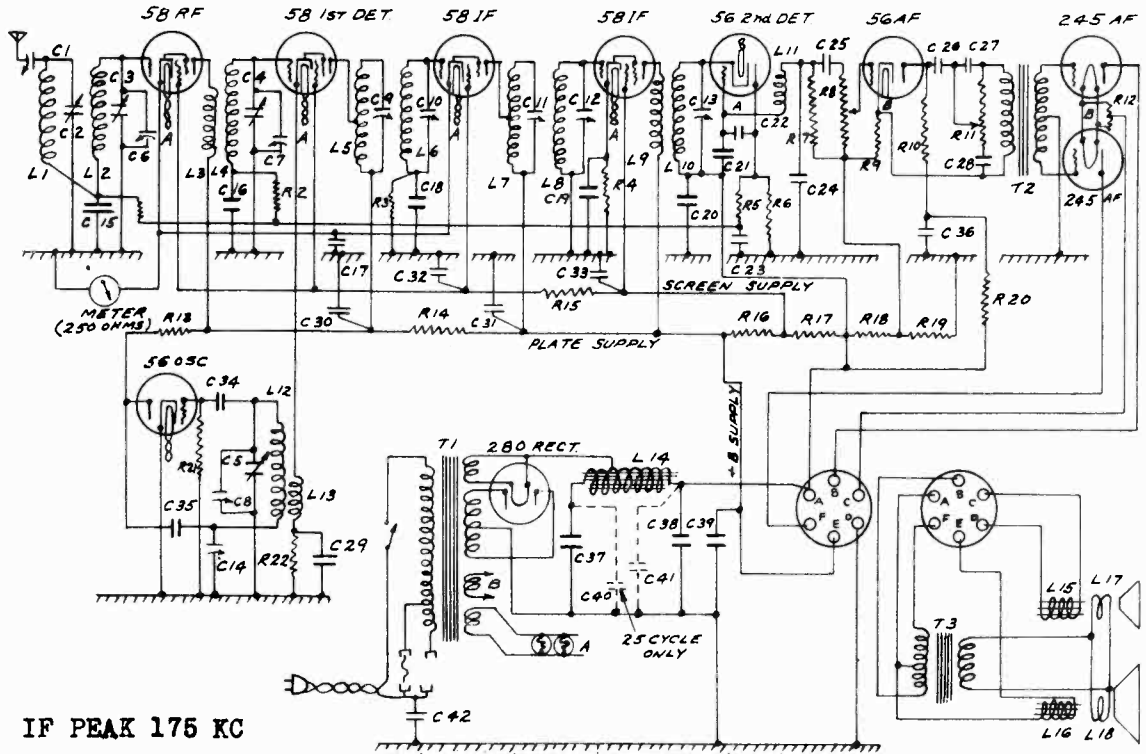
C0	.0001 mica
C1	.05 mfd
C2	.05 mfd
C3	.002 mfd
C4	.05 mfd
C5	.05 mfd
C6	.1 mfd
C7	.05 mfd
C8	.05 mfd
C9	.0001 mfd
C10	.01 mfd
C11	.0001 mica
C12	.5 mfd
C13	.5 mfd
C14	.25 mfd
C15	.002 mfd
C16	.05 mfd
C17	.002 mfd
C18	.5 mfd in can
C19	.5 mfd in can
C20	.5 mfd in can
C21	8.0 mfd
C22	8.0 mfd
C23	.002 mfd
C24	.1 mfd
C25	.01 mfd
C26	.01 mfd
C27	.005 mfd
C28	.25 mfd
C29	.5 mfd in can

R1	100000 ohms
R2	1000 ohms
R3	7500 ohms
R4	1000 ohms
R5	100000 ohms
R6	5000 ohms
R7	500000 ohms
R8	1000 ohms
R9	500000 ohms

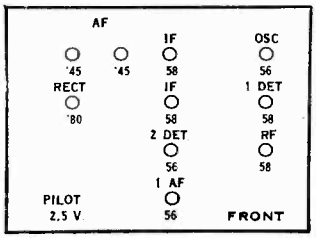


UNITED AMERICAN BOSCH CORP.

MODEL 250,251
Schematic, Voltage
Socket, Parts



Models 250, 251 (1932)



R1	100,000 ohms	C1	Trimmer	C23	.05 mfd.	L2	RF coil
R2	100,000 ohms	C2	Tuning	C24	100 mmf.	L3	RF coil
R3	100,000 ohms	C3	Tuning	C25	.05 mmf.	L4	RF coil
R4	500 ohms	C4	Tuning	C26	.5 mfd.	L5	IF coil
R5	500,000 ohms	C5	Tuning	C27	.05 mfd.	L6	IF coil
R6	100,000 ohms	C6	Alignment	C28	.05 mfd.	L7	IF coil
R7	100,000 ohms	C7	Alignment	C29	.05 mfd.	L8	IF coil
R8	500,000 ohms	C8	Alignment	C30	.05 mfd.	L9	IF coil
R9	1500 ohms	C9	IF	C31	.05 mfd.	L10	IF coil
R10	25,000 ohms	C10	IF	C32	.05 mfd.	L11	Choke
R11	100,000 ohms	C11	IF	C33	.05 mfd.	L12	Osc.
R12	Center Tap	C12	IF	C34	100 mmf.	L13	Osc.
R13	30,000 ohms	C13	2nd Det.	C35	.05 mfd.	L14	Choke
R14	1000 ohms	C14	Alignment	C36	4	L15	Field
R15	1000 ohms	C15	.05 mfd.	C37	8 mfd.	L16	Field
R16	3700	C16	.05 mfd.	C38	8 mfd.	L17	Voice
R17	2270 ohms	C17	.05 mfd.	C39	4	L18	Voice
R18	230	C18	.05 mfd.	C40	8 mfd.		
R19	1280	C19	.05 mfd.	C41	8 mfd.		
R20	10,000 ohms	C20	.05 mfd.	C42	.01 mfd.	T1	Power
R21	100,000 ohms	C21	100 mmf.			T2	Input
R22	5000 ohms	C22	.05 mfd.	L1	RF coil	T3	Output

Stage	Tube	Fil.	Plate	Screen	Cathode	Grid
RF	58	2.4	200	100	4.5	0
1st Det.	58	2.4	200	100	8.5	0
Osc.	56	2.4	85	-	0	7.8
1st IF	58	2.4	200	100	4.5	0
2nd IF	58	2.4	200	100	4.5	0
2nd Det.	56	2.4	0	-	47	0
1st AF	56	2.4	175	1	47	0
2nd AF	245	2.4	350	-	-	55
2nd AF	245	2.4	350	-	-	55
Rect.	280	4.8				

SOCKET VOLTAGES

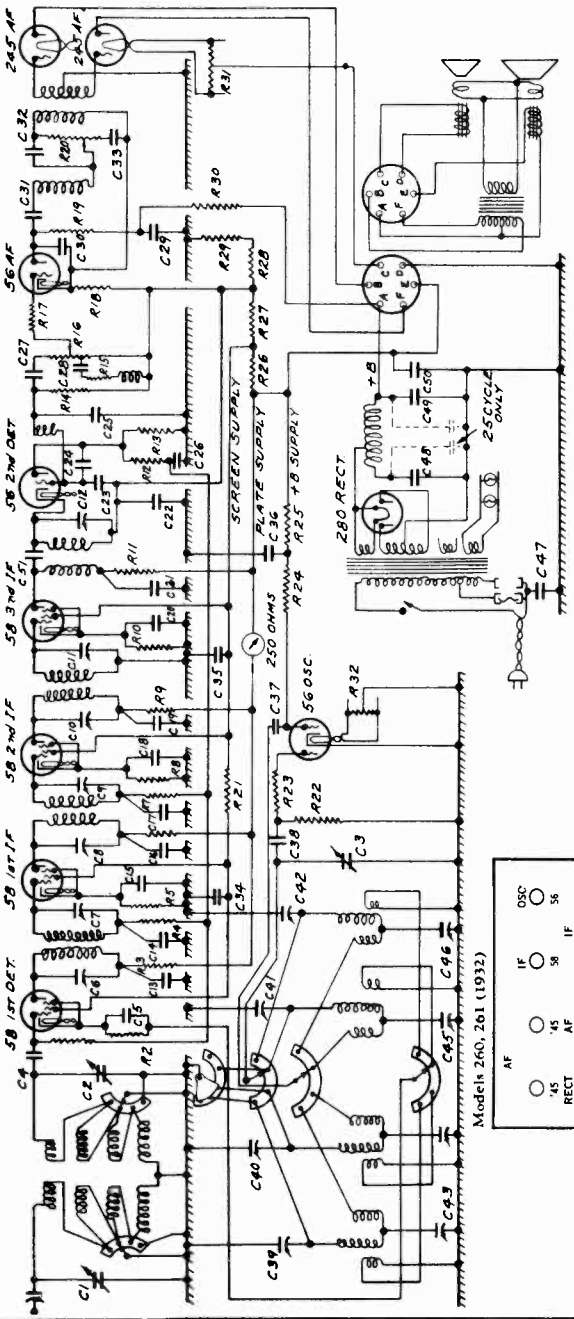
Note: These values are readings of a high resistance voltmeter to ground with the exception of the filament voltages. Cathode voltages are given for those tubes having the grid at ground.

MODEL 260,261
Schematic,Voltage
Socket,Parts

UNITED AMERICAN BOSCH CORP.

Stage	Tube	Fil.	Plate	Screen	Cathode	Grid
1st Det.	58	2.4	215	90	7.5	0
1st IF	58	2.4	215	90	5.o	0
2nd IF	58	2.4	215	105	48	0
3rd IF	58	2.4	215	105	32	0
Oso.	56	2.4	70	- -	0	0
2nd Det.	56	2.4	0	- -	45	- -
1st AF	56	2.4	180	- -	50	12
Output	245	2.4	350	- -	60	0
Output	245	2.4	350	- -	60	0
Rect.	280	4.8	-	-	-	-

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. Cathode readings are given for those tubes having the grid at ground. The values are only approximate and will vary with the line voltage and the type of meter employed.



IF PEAK 517.5 KC.

R 1 - 500,000 ohms
R 2 - 5,000 ohms
R 3 - 1,000 ohms
R 4 - 100,000 ohms
R 5 - 1,500 ohms
R 6 - 1,000 ohms
R 7 - 100,000 ohms
R 8 - 1,500 ohms
R 9 - 1,000 ohms
R10 - 350 ohms
R11 - 1,000 ohms
R12 - 500,000 ohms
R13 - 1 megohm
R14 - 100,000 ohms
R15 - 10,000 ohms
R16 - 500,000 ohms
R17 - 100,000 ohms
R18 - 1,500 ohms
R19 - 25,000 ohms
R20 - 100,000 ohms
R21 - 10,000 ohms
R22 - 50,000 ohms
R23 - 150 ohms
R24 - 10,000 ohms
R25 - 10,000 ohms
R26 - 3700)
R27 - 2270) ohms
R28 - 230)
R29 - 1280)
R30 - 10,000 ohms
R31 - Mid tap
R32 - Mid tap

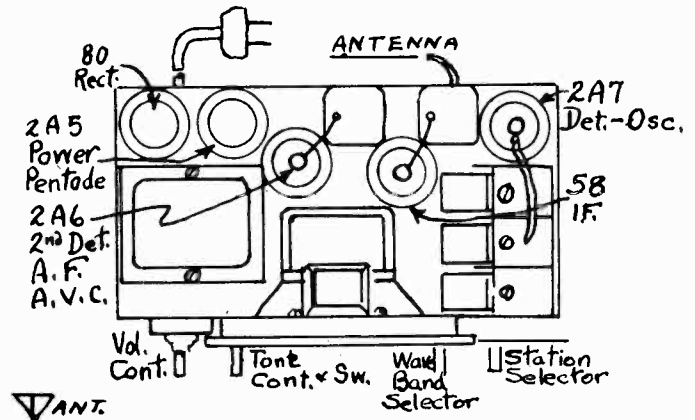
C 1 - Tuning
C 2 - Tuning
C 3 - Tuning
C 4 - 100 mmf.
C 5 - .05 mfd.
C 6 - aligment
C 7 - aligment
C 8 - aligment
C 9 - aligment
C10 - aligment
C11 - aligment
C12 - aligment
C13 - .005 mfd.
C14 - .005 mfd.
C15 - .05 mfd.
C16 - .005 mfd.
C17 - .005 mfd.
C18 - .06 mfd.
C19 - .005 mfd.
C20 - .05 mfd.
C21 - .006 mfd.
C22 - .05 mfd.
C23 - 100 mmf. Note
C24 - .05 mfd.
C25 - 100 mmf.
C26 - .25 mfd.
C27 - .05 mfd.
C28 - .025 mfd.
C29 - 4 mfd.
C30 - .001 mfd.
C31 - .5 mfd.
C32 - .05 mfd.
C33 - .05 mfd.
C34 - .05 mfd.
C35 - .05 mfd.
C36 - .25 mfd.
C37 - .05 mfd.
C38 - 100 mmf.
C39 - aligment
(R26, R27, R28, R29 - tapped unit
(C13, C14, C16, C17, C19, C21 - single unit
(C29, C48, C49, C50 - single unit

C40 - aligment
C41 - aligment
C42 - aligment
C43 - aligment
C44 - aligment
C45 - aligment
C46 - aligment
C47 - .01 mfd.
C48 - 8 mfd.
C49 - 8 mfd.
C50 - 4 mfd.
C51 - 1,000 mmf.
C52 - 8 mfd.
C53 - 4 mfd.

UNITED AMERICAN BOSCH CORP.

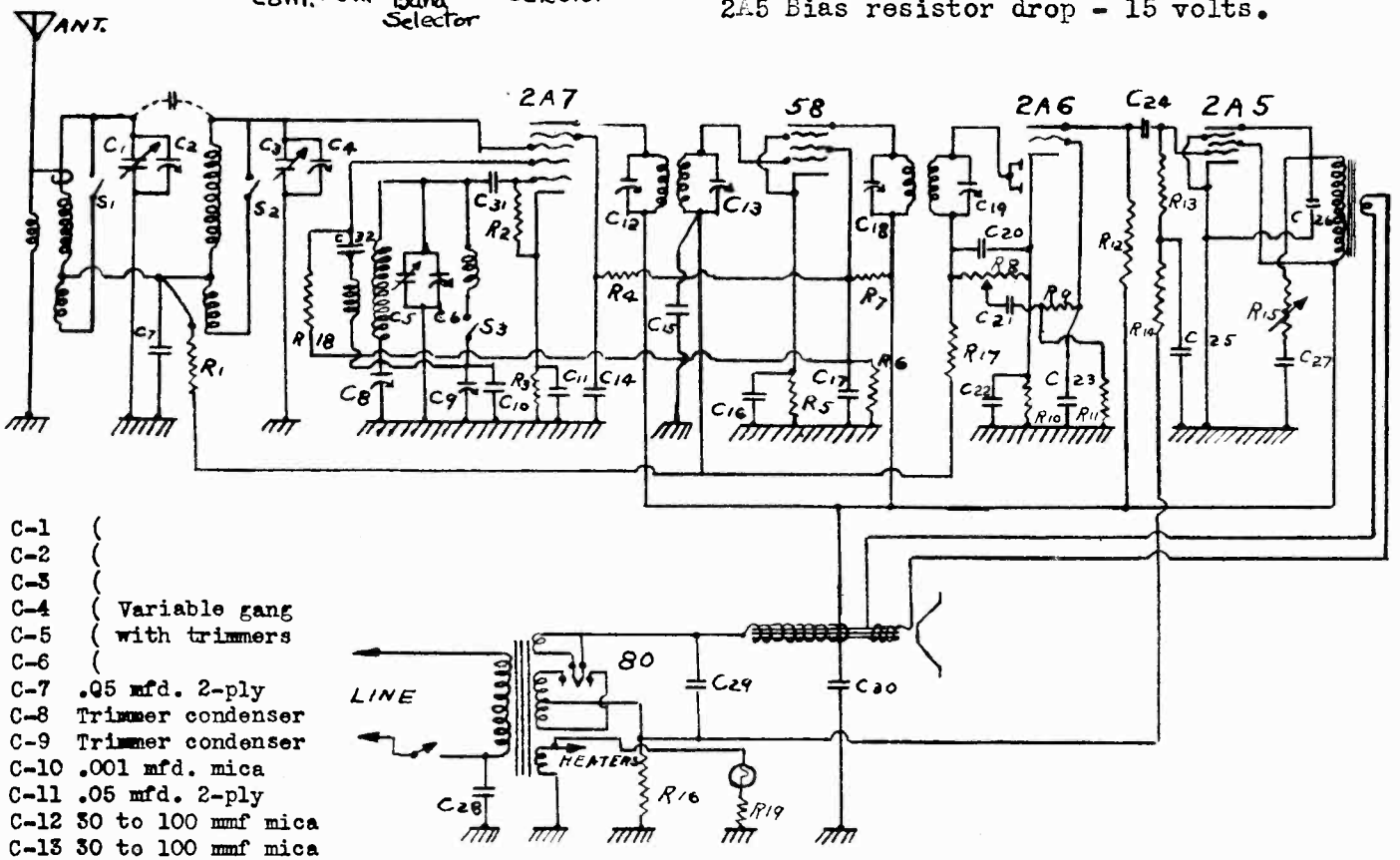
MODEL 350

Schematic, Voltage
Socket, Parts



Tube	Fil.	Plate	Screen	Cathode	Grid
2A7	2.4	75*	30	0.8	--
		60**			
58	2.4	250	75	2.0	--
2A5	2.4	95	--	1.5	--
2A6	2.5	235	250	0	7.0
80	4.7				

* Detector plate. ** Oscillator plate
Line voltage 115. Power consumption 50 w.
2A5 Bias resistor drop - 15 volts.

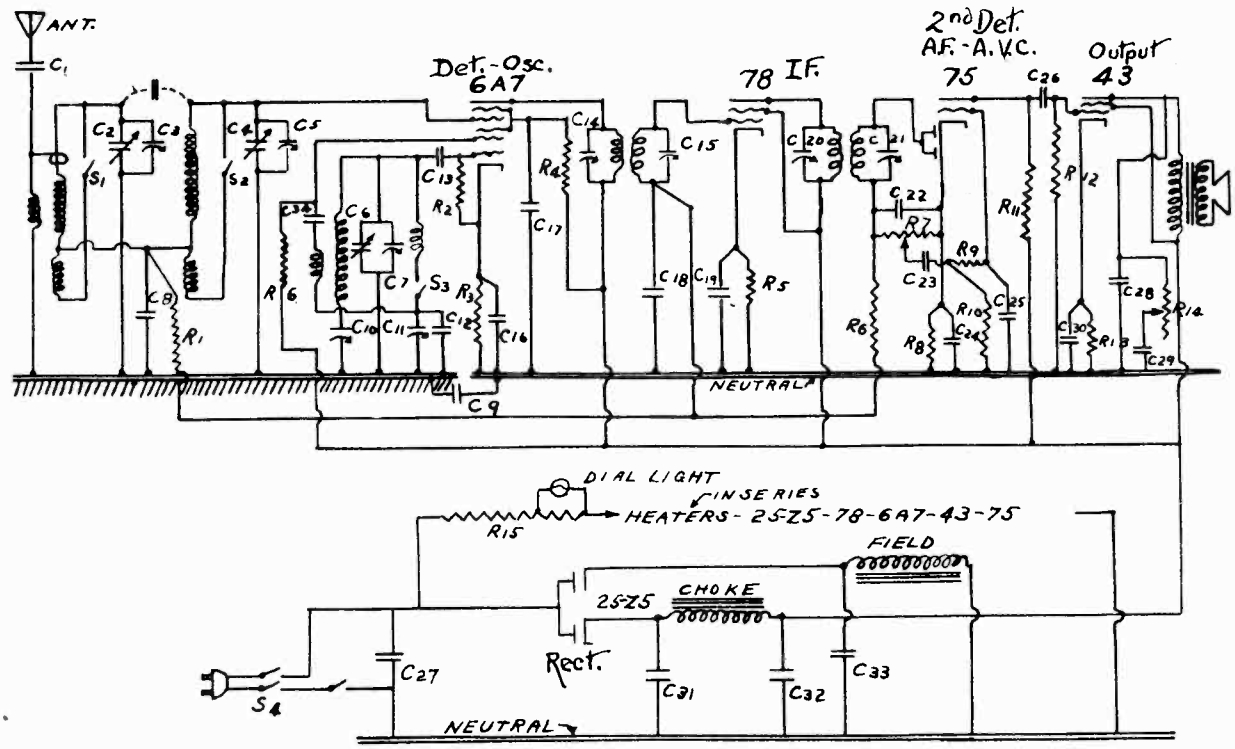


SCHEMATIC WIRING DIAGRAM OF THE MODEL 350

C-1 (
C-2 (
C-3 (
C-4 (Variable gang
C-5 (with trimmers
C-6 (
C-7 .05 mfd. 2-ply
C-8 Trimmer condenser
C-9 Trimmer condenser
C-10 .001 mfd. mica
C-11 .05 mfd. 2-ply
C-12 30 to 100 mmf mica
C-13 30 to 100 mmf mica
C-14 .05 mfd.
C-15 .05 mfd.
C-16 .05 mfd.
C-17 .05 mfd.
C-18 30 to 100 mmf mica
C-19 30 to 100 mmf mica
C-20 .0001 mfd. mica
C-21 .005 mfd. 3-ply
C-22 .25 mfd. 2-ply
C-23 .0001 mfd. mica
C-24 .005 mfd. 3-ply
C-25 .05 mfd. 2-ply
C-26 .005 mfd. 3-ply
C-27 .05 mfd. 2-ply
C-28 .01 mfd. 4-ply
C-29 8 mfd.
C-30 6 mfd.
C-31 .0001 mfd. mica
C-32 .01 mfd. 4-ply
R-1 .1 meg ½ watt
R-2 50,000 ohms ¼ watt
R-3 300 ohms ¼ watt
R-4 50,000 ohms ¼ watt
R-5 300 ohms ¼ watt
R-6 40,000 ohms ½ watt
R-8 Volume control
R-9 .1 meg. ¼ watt
R-10 5000 ohms ¼ watt
R-11 1 meg. ¼ watt
R-12 250,000 ohms ¼ watt
R-13 ½ meg. ¼ watt
R-14 .1 meg. ¼ watt
R-15 Tone control
R-16 350 ohms 1 watt
R-17 ¼ meg. ¼ watt
R-18 10,000 ohms ¼ watt
R-19 .4 ohms
S-1 Switch
S-2 Switch
S-3 Switch

MODEL 355
Schematic, Voltage
Parts List

UNITED AMERICAN BOSCH CORP.



SCHEMATIC WIRING DIAGRAM MODEL 355

AC Volts across series resistor-44
DC Volts across series resistor-52
DC Dynamic field excitation 113 volts
AC Dynamic field excitation 115 volts

AC Power Comsumption
45 watts

AC Voltage Table

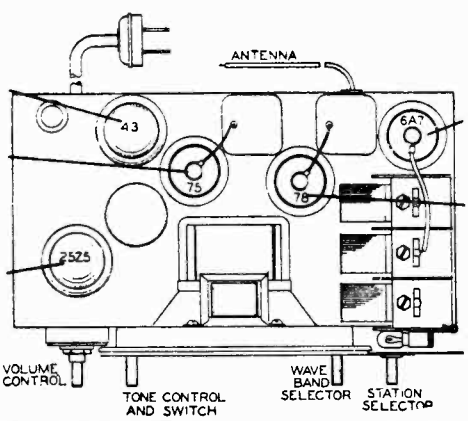
Tube	Fil	Plate	Screen	Cath.
6A7	5.1	118*	45*	1.4*
78	5.1	118	118	3.0
76	5.3	50	-	.7
43	22.3	108	118	18.
25Z5	24.	128	-	-

*Detector elements. Osc.Plate 97 V

DC Voltage Table

Tube	Fil	Plate	Screen	Cath.
6A7	5.6		40*	1.1*
78	5.5	105	105	2.4
76	5.8	47	-	0.6
43	28.	97	105	18.
25Z5	30.	113	-	-

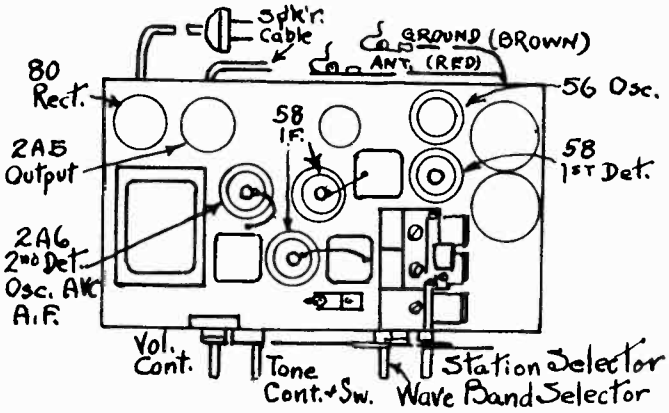
* Detector elements.



R1	100000 1/4 watt	C1	.002 4-ply	C18	.05
R2	50000 "	C2)		C19	.05
R3	500 "	C3)		C22	.0001 mica
R4	50000 "	C4)	Var. gang with	C23	.005 - 3ply
R5	500 "	C5)	trimmers	C24	.25 - 2ply
R6	1/2 meg. "	C6)		C25	.0001 mica
R7	Volume control	C7)		C26	.005 3ply
R8	5000 1/4 watt	C8	.05 - 2ply	C27	.01 - 4ply
R9	100000 "	C9	.25 - 4ply	C28	.01 - 4ply
R10	1 meg. "	C10	Trim. cond.	C29	.05 - 2ply
R11	250000 "	C11	" "	C30	4 mfd.
R12	1/2 meg. "	C12	.001 mica	C31	12 "
R13	600 1/2 watt	C13	.0001 "	C32	8 "
R14	Tone control	C16	.05	C33	4 "
R15	165	C17	.05	C34	.01 - 4ply
R16	10000 1/4 watt				

UNITED AMERICAN BOSCH CORP.

MODEL 360
Schematic, Voltage
Socket, Parts



Tube	Fil.	Plate	Screen	Cathode	Grid
58	2.65	220	40	2.8	-
58	2.65	220	95	2.0	-
58	2.65	240	95	2.7	-
56	2.65	75	-	0	25
2A6	2.65	90	-	1.4	-
2A5	2.65	235	240	0	-
80	4.8	---	-	-	-

Across 400 ohm 2A5 bias resistor 22 volts
Output of rectifier 360 volts.
Line voltage 115 . Power consumption 60 watts

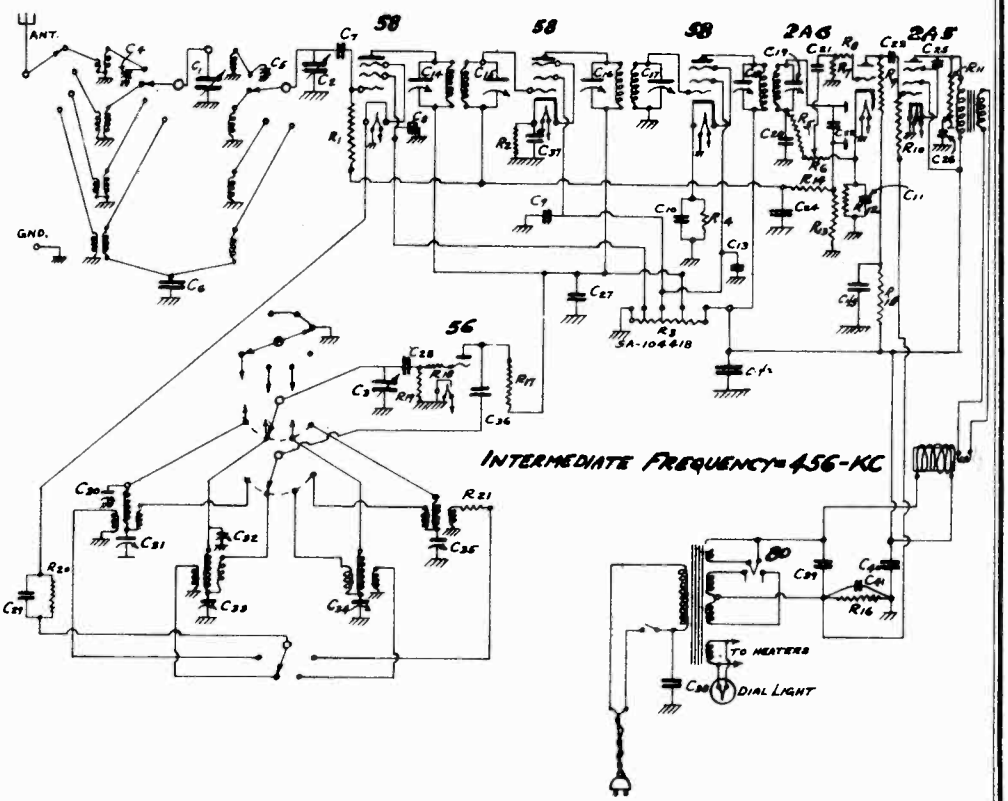
Voltage stated in table are measured between tube element and ground. Heater or filament excluded.

R-1 1/2 meg. 1/4 watt
R-2 300 ohms 1/4 watt
R-3 Multiple
R-4 300 ohms 1/4 watt
R-5 5000 ohms 1/4 watt
R-6 500,000 ohms vol.
R-7 2 meg. 1/4 watt
R-8 100,000 ohms 1/4 watt
R-9 250,000 ohms 1/4 watt
R-10 1/2 meg. 1/4 watt
R-11 Variable
R-12 6000 ohms 1/4 watt
R-13 1 meg. 1/4 watt
R-14 1/2 meg. 1/4 watt
R-15 -----
R-16 400 ohms 1 watt
R-17 2500 ohms 1/2 watt
R-18 50 ohms 1/2 watt
R-19 20,000 ohms 1/4 watt
R-20 2000 ohms 1/4 watt
R-21 200 ohms 1/4 watt

C-1 ----
C-2 Variable condenser
C-3 ----
C-4 Trim condenser
C-5 Trim condenser
C-6 .05 mfd. 2-ply
C-7 100 mmf mica
C-8 .05 mfd.
C-9 .05 mfd.

C-10 .05 mfd.
C-11 .25 mfd.
C-12 ----
C-13 .05 mfd.
C-14 30 - 100 mmf mica
C-15 " " " "
C-16 " " " "
C-17 " " " "
C-18 " " " "
C-19 " " " "

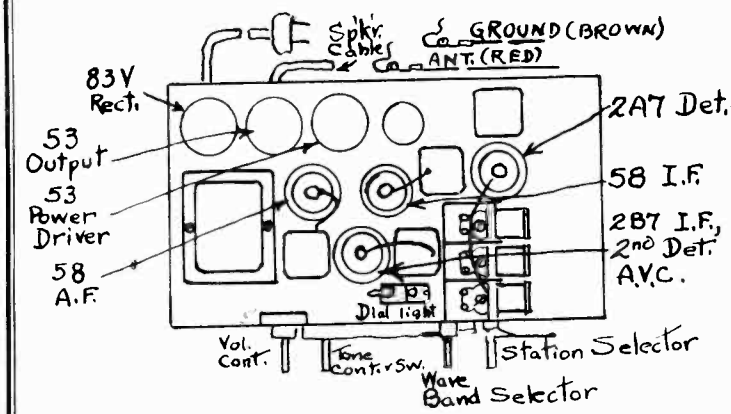
C-20 100 mmf mica
C-21 .005 mfd. 3-ply
C-22 100 mmf mica
C-23 .005 mfd. 3-ply
C-24 .05 mfd. 2-ply
C-25 .005 mfd. 3-ply
C-26 .05 2-ply
C-27 .05 mfd. 3-ply
C-28 100 mmf mica
C-29 .05 mfd. 2-ply
C-30 7 - 70 mmf
C-31 300 mmf variable
C-32 7 - 70 mmf
C-33 1200 mmf variable
C-34 1200 mmf variable
C-35 1500 mmf variable
C-36 .05 mfd. 2-ply
C-37 .05 mfd.
C-38 .01 mfd. 4-ply
C-39 8 mfd. electro
C-40 4 mfd. electro
C-41 20 mfd. electro

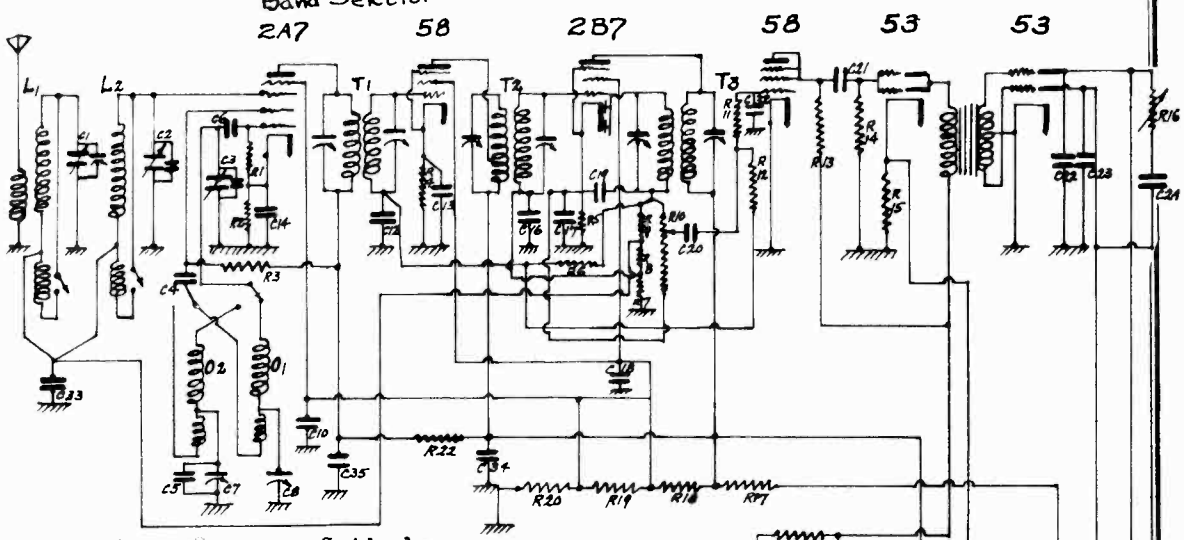


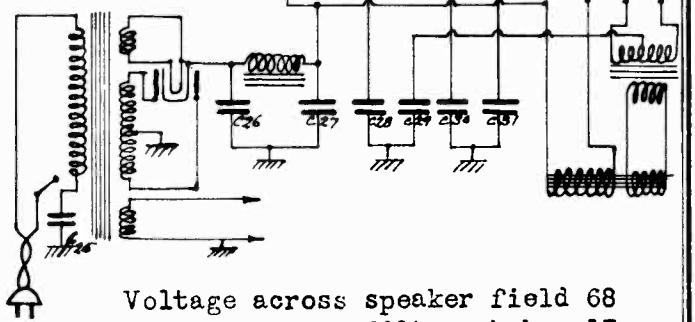
MODEL 370
Schematic, Voltage
Socket, Parts

UNITED AMERICAN BOSCH CORP.

R-1	50,000 ohms	1 watt	
R-2	500	"	
R-3	20,000	"	
R-4	500	"	
R-5	125	"	
R-6	.5 meg.	"	
R-7	50,000	"	
R-8	.25 meg.	"	
R-9	.25 meg.	variable	
R-10	.5 meg.	variable	1/4 watt
R-11	.25	"	"
R-12	.5 meg.	"	"
R-13	.1	"	"
R-14	.5	"	"
R-15	1000 ohms		
R-16	.5 meg.	variable	
R-17	1000 ohms		1 watt
R-18	12,000	"	"
R-19	8,000	"	
R-20	6,000	"	
R-21	10,000	"	
R-22	1,000	"	"
C-1)	Gang cond.		
C-2)	with trimmers		
C-3)	457 mmf.		
C-4	.02 3-ply		
C-5	.0015 mfd. mica		
C-6	100 mmf. mica		
C-7)	500 to 1200 mmf.		
C-8)	dual condenser		
C-9	- - - -		
C-10	.05 2-ply		
C-11	- - - -		
C-12	.05 2-ply		
C-13	.05 2-ply		
C-14	.05 2-ply		
C-15	- - - -		
C-16	.05 2-ply		
C-17	.05 2-ply		
C-18	.05 2-ply		
C-19	100 mmf mica		
C-20	.05 2-ply		
C-21	.005 3-ply		
C-22	.005 3-ply		
C-23	.005 3-ply		
C-24	.01 4-ply		
C-25	.01 4-ply		
C-26	8 mfd.	475 V	
C-27	8 "	"	
C-28	4 "	"	
C-29	4 "	"	
C-30	4 "	300 V	
C-31	25 "	10 V	
C-32	100 mmf. mica		
C-33	.05 2-ply		
C-34	.05 3-ply		
C-35	.05 3-ply		







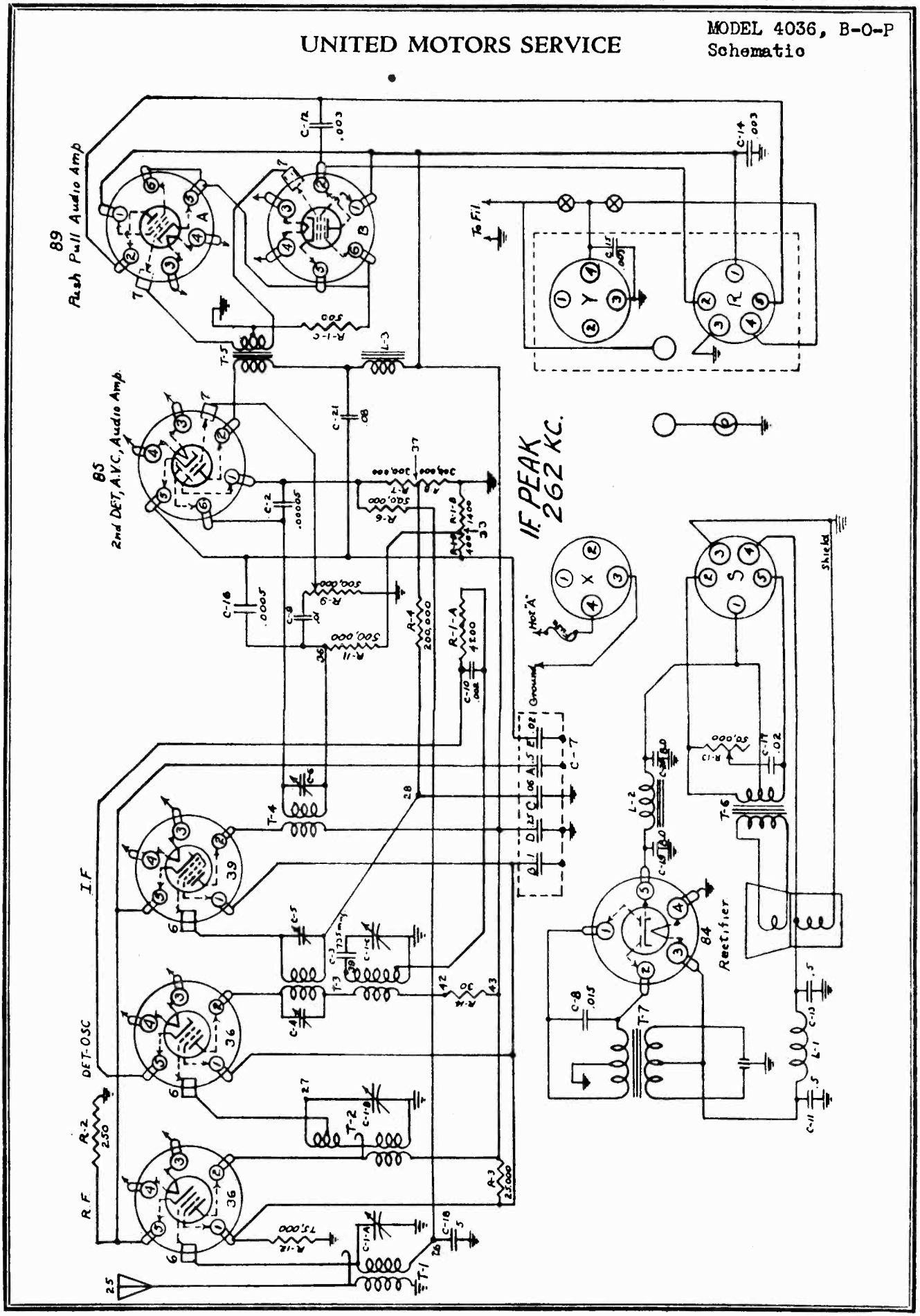
Tube	Fil.	Plate	Screen	Cathode
2A7	2.4	250*	45*	2.3*
		175**		
58	2.4	240	110	4.0
2B7	2.4	240	110	1.5
58	2.4	30		0
53	2.4	280		3.2
53	2.4	260		0
83V	4.7	360		

* Detector element. ** Oscillator element. Line voltage 115 volts.
Power consumption 66 watts.

Voltage across speaker field 68
Voltage across filter choke 17

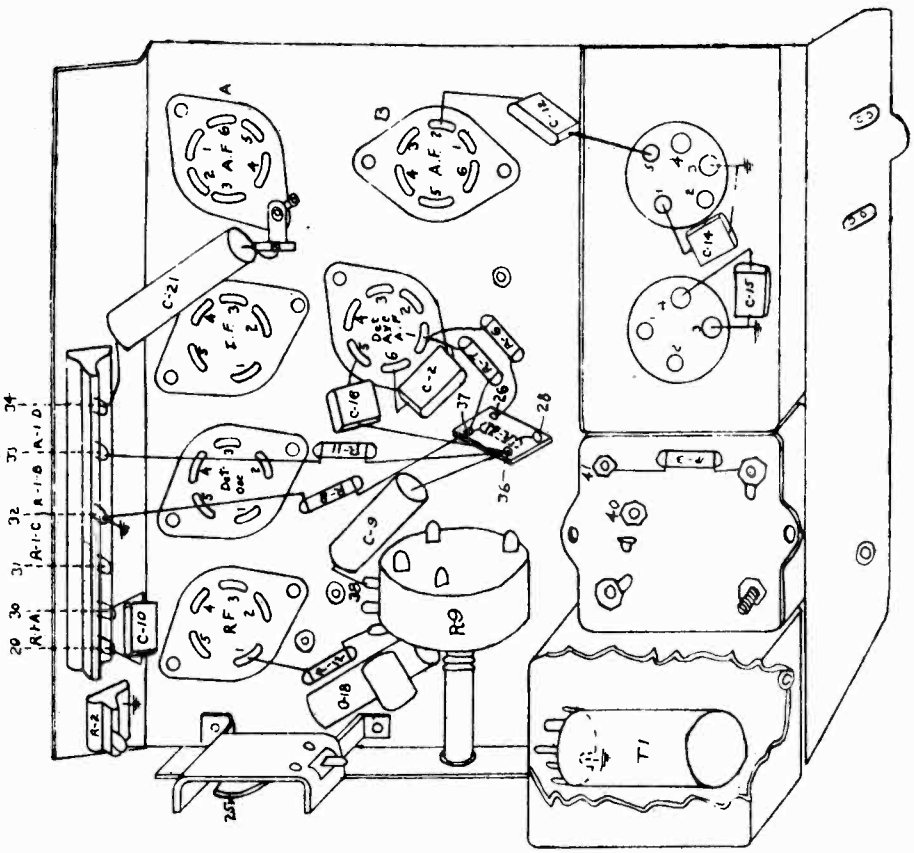
UNITED MOTORS SERVICE

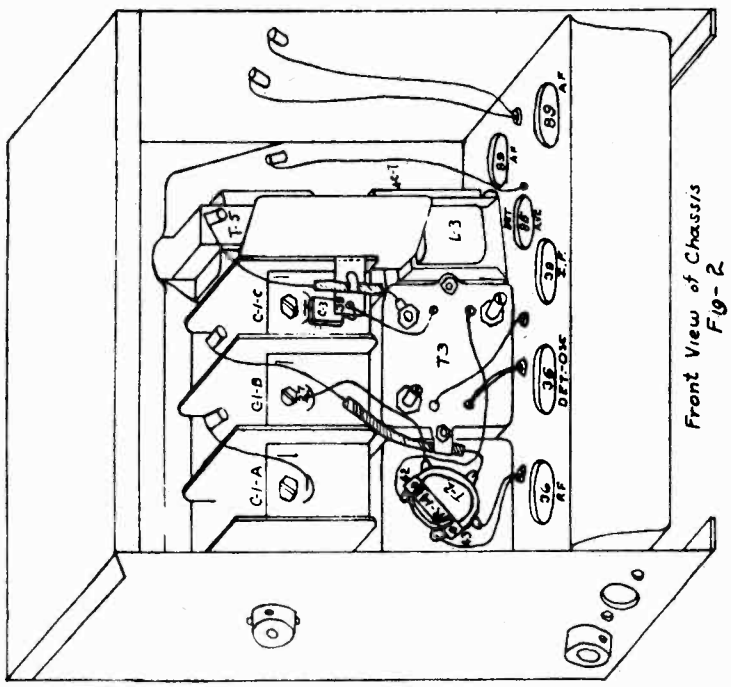
MODEL 4036, B-O-P
Schematic



MODEL 4036, B-O-P
Voltage
Socket Layout
Chassis Layout

UNITED MOTORS SERVICE





Front View of Chassis
Fig-2

Parts Location

Tube	Screen Contact #1	Plate Contact #2	Heater Contact #3	Heater Contact #4	Cathode Contact #5	Gnd. Contact #6
236 RF	85	165	0	6.0	2.1	
236 Osc.	85	165	0	6.0	6.0	
239 IF	85	165	0	6.0	2.1	
85 Det.	0-A.V.C.	125	0	6.0	7.5	.2 Det.
A-89 AF	165	160	6.0	0	30.0	30.0
B-89 AF	165	160	0	6.0	30.0	30.0
84 Rect.	3.5	3.5	0	6.0	180	

PEAKING ADJUSTABLE CONDENSERS

The complete Condenser Aligning Kit is now available under part No. 1207804. This kit contains all the small parts which are necessary for the proper aligning of the condensers on the U.M.S., 8-O-P. and Chevrolet Radio Receivers.

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I. F. transformer is changed or the adjustments are tampered with in the field.

DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and an accurate test oscillator and a screw driver (with fibre handle) are available. Using a standard metal screw driver for this purpose will not give accurate adjustment

Proceed as follows:

A. Disconnect the antenna lead-in from the chassis.

B. Ground the antenna terminal on the chassis to the frame of the chassis.

C. Set "test oscillator" to 262 kilocycles. Some oscillators are not equipped with a frequency of 262 K.C. but do have a frequency of 130 K.C. In this case, the second harmonic of 130 K.C., namely 260 K.C., may be used.

D. Connect the output leads of the test oscillator to the grid of the 1st Detector tube and to ground (frame of the chassis) Leave grid cap in place.

E. Connect an output meter across the plates of the type 89 tubes. If the output meter is not protected, place a .1 mfd. condenser in series with the meter.

F. Turn the tuning condenser rotor to minimum capacity (rotor plates out of stator places).

G. Adjust I. F. Trimmers in the following order, in each case leaving the trimmer set for maximum output as shown by the output meter* (See note

* C-4, Plate circuit of 1st Det.
C-5, Grid circuit of I. F. Amp.
C-6, Diode Input cirquit.

* See Fig 2. and 3 for location of condensers.

H. Remove connection grounding the antenna (reverse of instructions under B)

I. Insert the Calibration Block, Part No. 1206418, between the center (2nd R. F.) condenser and the rear of the chassis as follows: Lay the block on the bench with the largest flat side down and the cut-out edge toward the operator. Pick up the block between the first and second fingers of the hand so that the side having the beveled and cut-out edges faces the knuckles of the hand, and the fingers are as close to the beveled corners as is possible. Insert the hand in the case over the center tuning condenser (condenser plates fully closed) and place the Block between the condenser bracket and the chassis back, with the largest face of the Block flat against the back of the chassis. The Block will fit quite tightly and the left side must rest against the shield between the 1st and 2nd R.F. condensers in order to clear the condenser wiper spring.

J. Attach the test oscillator to antenna terminal and ground (frame) of the chassis. (Ant. on test oscillator to Ant. on chassis and ground on test oscillator to frame of chassis.)

K. Set test oscillator at 1400 K.C.

L. Open tuning condenser until it stops against the Calibration Block

M. Place Tube Shield in position around 236 Det.-Osc. tube. Adjust the trimmer condensers on the tuning condenser to maximum output, as measured by the output meter, in the following order:

C-1-C--Oscillator trimmer
C-1-B--2nd R. F. trimmer
C-1-A--1st R. F. trimmer

*NOTE: To insure sharp peaking of all trimmers, set the oscillator output below the point of start of A.V.C. action. Set the output of the oscillator so that it is less than half the maximum output available.

LOCATING TROUBLES ISOLATED BY VOLTAGE TESTS

The voltmeter tests of the chassis merely serve to isolate the defect in some particular stage of the circuit. The actual fault must be located, in that stage, by means of a point-to-point check of the resistance values of the defective stage.

NOTE: All tubes should be removed from the chassis before making these tests, unless they are known to be good tubes.

Description of incorrect voltage		Test from	To	Correct reading (in OHMS)	Part or parts probably causing incorrect voltage
A. No filament voltage at any socket	1.	Hot "A" lead	X4	Zero	Fuse or green lead
	2.	Y4	RF #4	*Zero	Switch
	3.	Y4	R #4	Zero	Switch
	4.	Y4	Gnd.	#Open	C-15
	5.	S4	"	6	Speaker field
B. No plate voltage at any socket	1.	Rect. #5	Gnd.	Open	C-19; C-20
	2.	" "	S-1	350	L-2
	3.	R-1	Gnd.	100,000	C-14;C-7-D;C-7-B; R-3; R-12
C. 89 sockets	1.	S-1	S-5	425	Output Trans.Pri.
(a) Plate volts	2.	S-1	S-2	225	" " "
	3.	R-2	R-5	Open	C-12
(b) Screen "	1.	R-1	89 #1 (A)	Zero	Defective wiring
	2.	R-2	89 #1 (B)	"	" "
(c) Cathode volts	1.	Gnd.	89 #5 (B)	500	R-1-C
(d) Suppressor grid volts	1.	Gnd.	89 #5 (B)	500	R-1-C
D. 85 Socket					
(a) Plate volts	1.	R-1	85 #2	9,500	L-3;T-5
(b) A.V.C. and Det. plate V.	1.	34	Gnd.	1,800	R-1-B; R-1-D
	2.	34	85 #6	500,000	R-11;T-4;C-9
	3.	85 #6	85 #1	1,000,000	R-7; R-8;R-1-B; R-11;C-2;C-9
(c) Cathode volts	1.	Gnd.	85 #5	1,800	R-1-B; R-1-D; C-7-E
E. 39 IF socket					
(a) Plate volts	1.	IF #2	41	52	T-4 Pri.
	2.	41	Gnd.	100,000	C-1-D; R-3; R-12
(b) Screen volts	1.	IF #1	41	25,000	R-3
	2.	IF #1	Gnd.	100,000	R-3; R-12; C-1-D; C-7-B
(c) Cathode volts		IF #5	Gnd.	250	R-2; C-7-A

* Switch on # Switch off

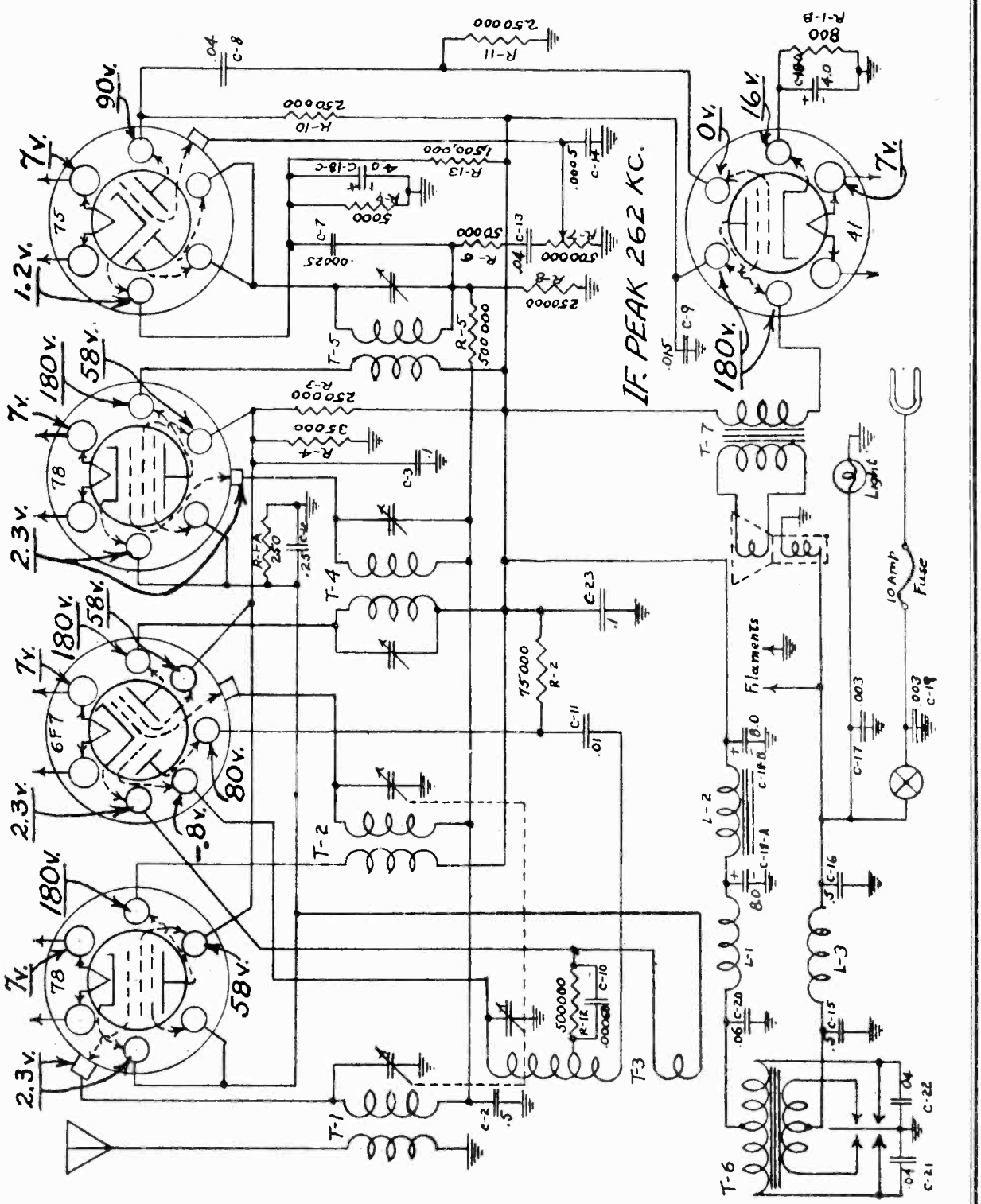
Description of incorrect voltage		Test from	To	Correct reading (in ohms)	Part or parts probably causing incorrect voltage
F. 36 Osc. socket					
(a) Plate volts	1.	Osc. #2	42	36	T-3
	2.	42	43	30	R-14
(b) Screen volts	1.	Osc. #1	41	25,000	R-3
	2.	Osc. #1	Gnd.	100,000	R-3; R-12; C-7-D C-7-B
(c) Cathode	1.	Osc. #5	Gnd.	4,200	R-1-A; C-10; T-3
G. 36 F. socket					
(a) Plate volts	1.	RF #2	43	75	T-2
(b) Screen volts	1.	RF #1	41	25,000	R-3
	2.	RF #1	Gnd.	100,000	R-3; R-12; C-7-D; C-7-B
(c) Cathode	1.	RF #5	Gnd.	250	R-2; C-7-A
H. Speaker					
(a) Weak		S-4	Gnd.	6	Speaker field
(b) Distorted	1.	S-1	S-5	200	T-6 Trans.
	2.	S-1	S-2	225	T-6 Trans.
	3.	S-2	S-5	425	T-6; C-17; R-13
I. Inoperative power unit					
(a) Vibrator operates					
1. Check 84 tube					
2. Rect. #1		Rect. #2		350	T-7 Sec; C-8
3. Rect. #1		Gnd.		175	T-7 Sec; C-8
4. Rect. #5		Gnd.		Open	C-14; C-20
5. Rect. #5		S-1		350	L-2
(b) Vibrator inoperative					
1. S-4		Gnd.		6	C-11; C-13; Vibrator
2. S-4		Rect. #3		2	L-1

NOTE--It will be necessary to disconnect one lead of all condensers, which have one terminal grounded, in order to test them accurately.

UNITED MOTORS SERVICE

MODEL 4037
Schematic, Voltage

Speaker field 6 ohms



MODEL 4037
Service Hints
Alignment

UNITED MOTORS SERVICE

SERVICE HINTS

The Battery Cable consists of a single fused lead which should be fastened to the ammeter. Advances in filtering methods minimize chassis pick-up due to connecting the battery cable to the ammeter rather than to the battery.

The paint must be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R. F noise due to the vibrator will appear if good ground connections are not made at the dash.

A very slight amount of Chassis pick-up may appear in an installation on a car having the coil mounted behind the instrument panel. Take precautions to see that a good ground is made between the control unit and the instrument panel. The location of the Ammeter and dial light lead with respect to the coil is very important. Moving these leads as far away from the coil as possible and locating them against a brace or any metal support under the cowl will reduce the interference to a minimum.

The 6F7 tube is a two unit Tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function; operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 78 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

All chassis having a Serial number below Serial #1349259 have a 500,000 ohm resistor connected between the screen (#2) of the 78 I.F. tube and the cathode (#5) of the 75 tube.

All chassis having a serial number above #1349259 have a 1,500,000 ohm resistor between the B plus terminal of the diode coil (2nd I.F.) and the cathode (#5) of the 75 tube.

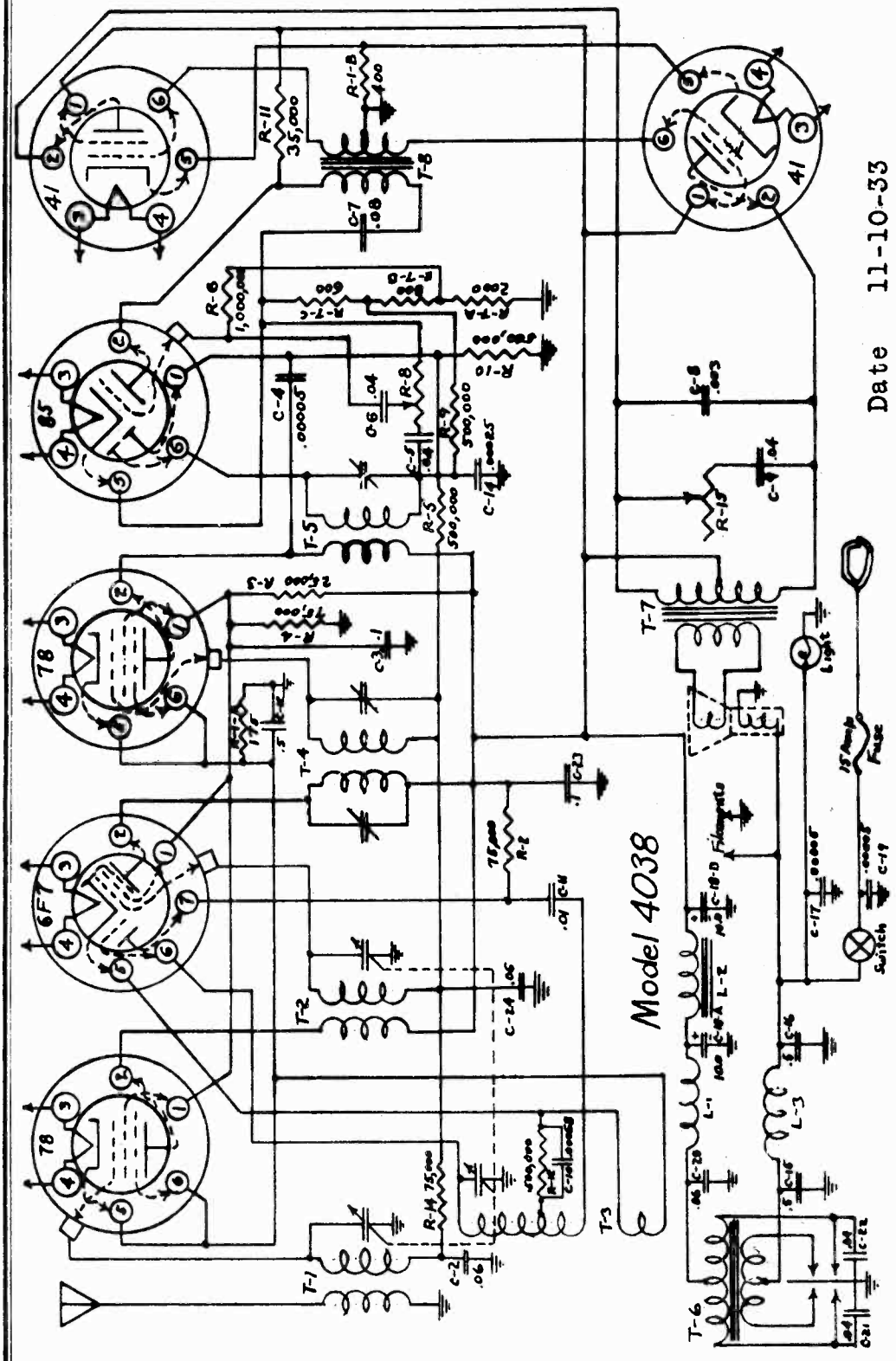
PEAKING: The peaking operation for this receiver is similar to that on the Model 4036. The I.F. stages should be peaked at 262 KC. Peak the I.F. trimmer, which is in the I.F. coil can having only one adjusting screw, first.

Peak the parallel trimmers, on the top of the tuning condenser, at 1400 KC., the oscillator section (beneath the volume control) first.

VIBRATORS. Sometimes a small amount of dirt will lodge between the contacts and result in such high contact resistance that the vibrator will not start. If such is apparently the case, remove the transformer-vibrator from the chassis. Disconnect ONLY the red B plus lead from the iron core choke. Turn the receiver "on" (there must be a connection between the vibrator case and the chassis) and start the vibrator by snapping the reed back and forth with a pencil. If the vibrator starts to function, allow it to run without stopping until the dirt has been burned out as indicated by the cessation of brilliant sparking. The vibrator should now start under its own power and should continue to function properly. If the vibrator still fails to start properly, replace the vibrator unit.

UNITED MOTORS SERVICE

MODEL 4038
Schematic, Voltage



Date 11-10-33

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Cond.	#7 Triode Plate
78	85	210	5.9	0	3.2	3.2	
6F7	85	210	0	5.9	3.2	0	90
78	85	210	5.9	0	3.2	3.2	
85	0	85	0	5.9	8.0	0	
41	210	205	5.9	0	16	0	
41	210	205	5.9	0	16	0	

MODEL 4038
Alignment, Changes

UNITED MOTORS SERVICE

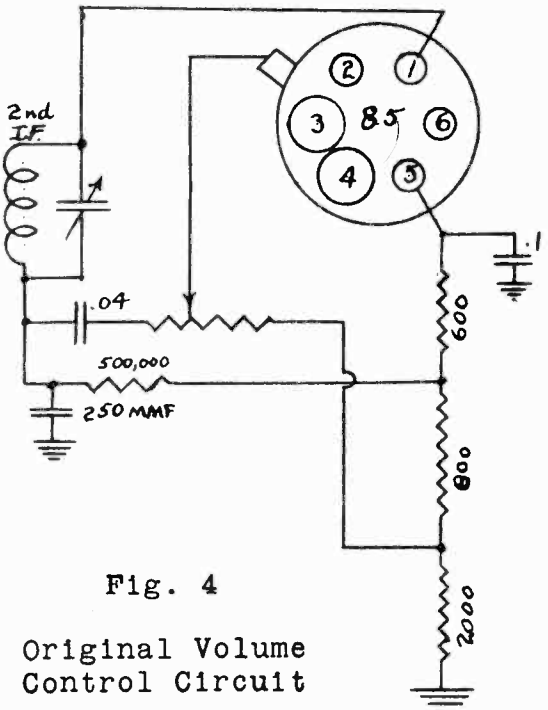


Fig. 4

Original Volume Control Circuit

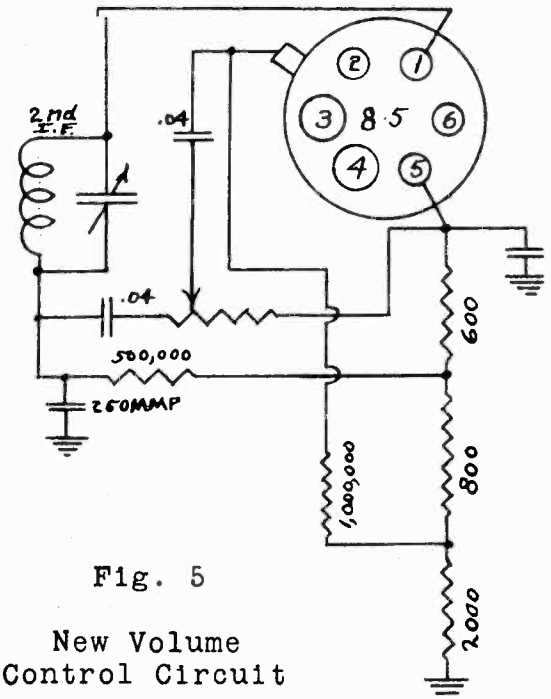


Fig. 5

New Volume Control Circuit

PEAKING: The peaking operation for this receiver is exactly the same as the peaking operation for the model 4037, as described below. The I.F. stages should be peaked at 262 K.C. Peak the I.F. trimmer, which is in the I.F. coil can having only one adjusting screw, first.

Obtain the 1400 K.C. Tuning Condenser setting by means of the red wood calibration block part #1208073, as follows:

1. Insert the block under the middle section of the tuning condenser so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket (See Figure A.)

2. Open the condenser blades until they stop solidly against the bevel edge of the block.

3. Peak the trimmers on the tuning condenser, adjusting the oscillator section (neares volume control) first.

4. Remove calibration block.

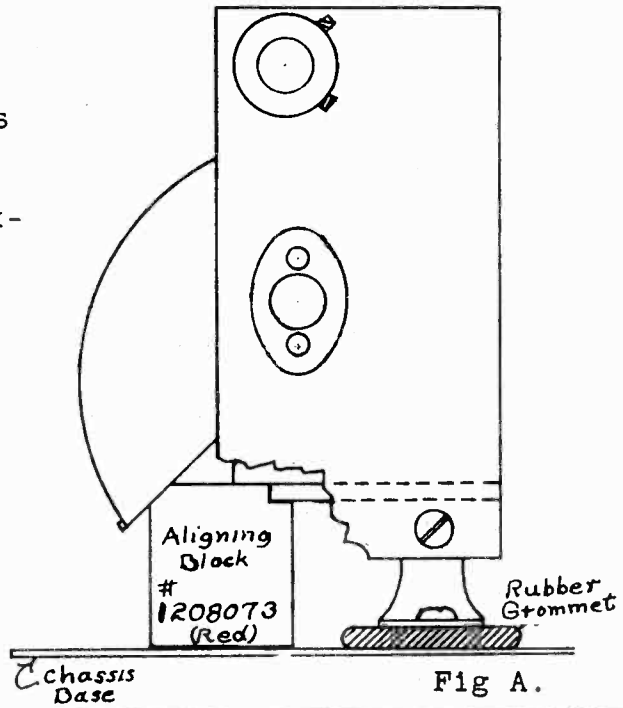
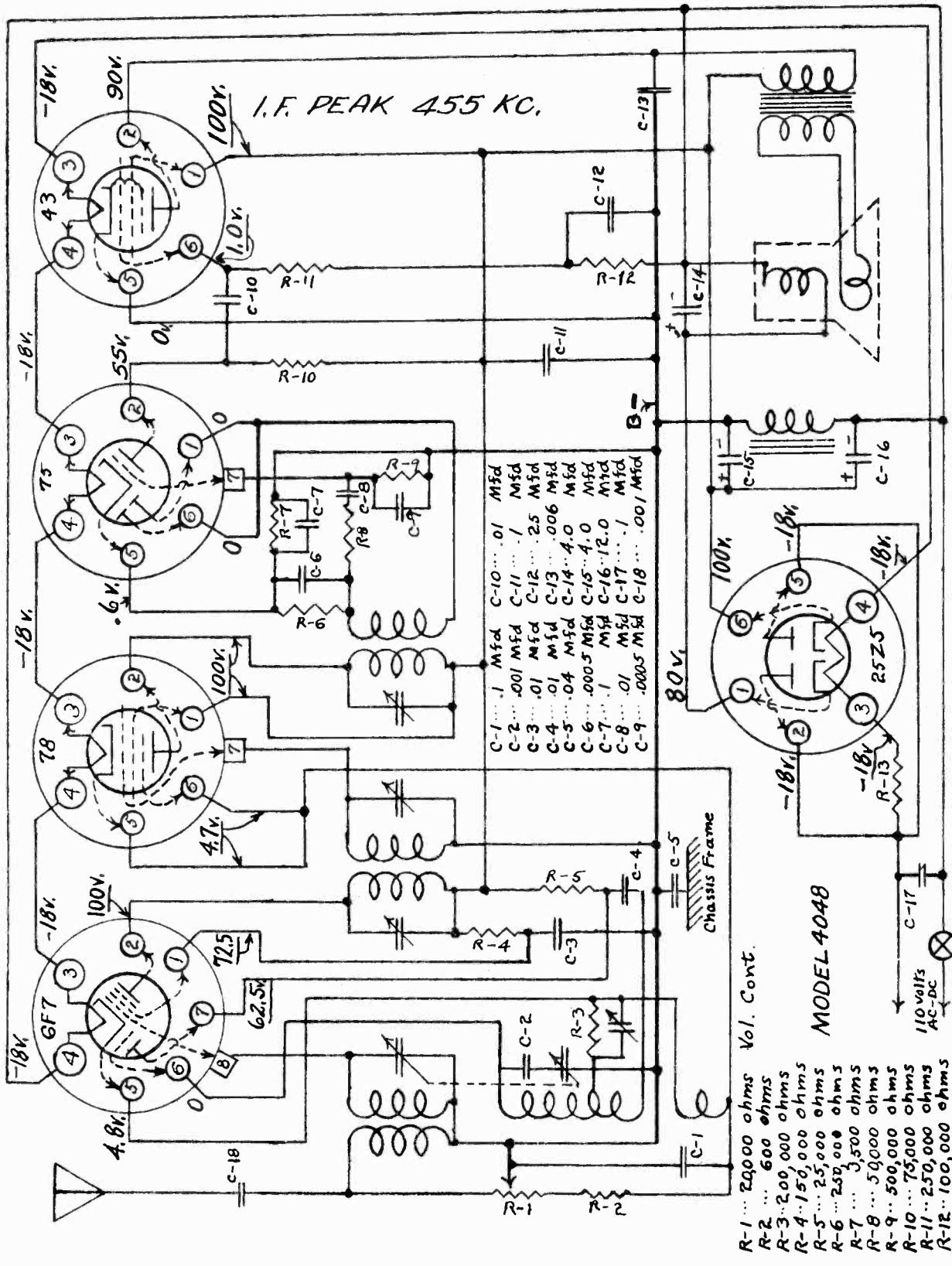


Fig A.

MODEL 4048
Schematic, Voltage

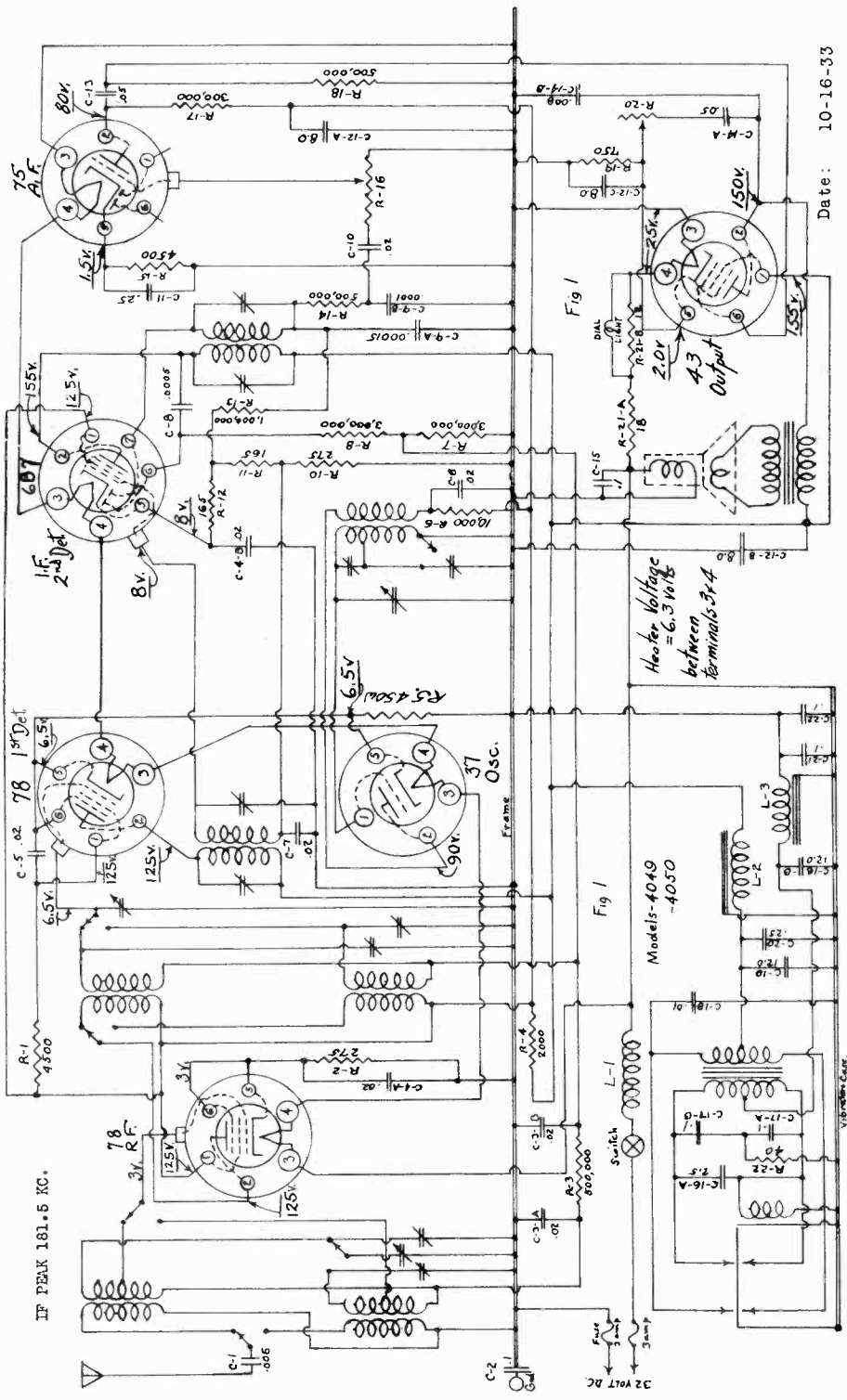
UNITED MOTORS SERVICE



Date: 6-6-33

MODEL 4049,4050
Schematic
Alignment

UNITED MOTORS SERVICE



R.F. AND OSCILLATOR STAGES

PEAKING:

The Intermediate frequency for the Model 4049 and 4050 is 181.5 K.C

I.F. STAGES

1. Connect the oscillator to the grid cap of the 1st Detector (78 tube).
2. Set the Oscillator for 181.5 K.C.
3. Peak the I.F. trimmer condensers, peaking the secondary of the second I.F. coil first and working forward to the primary of the first I.F. coil.

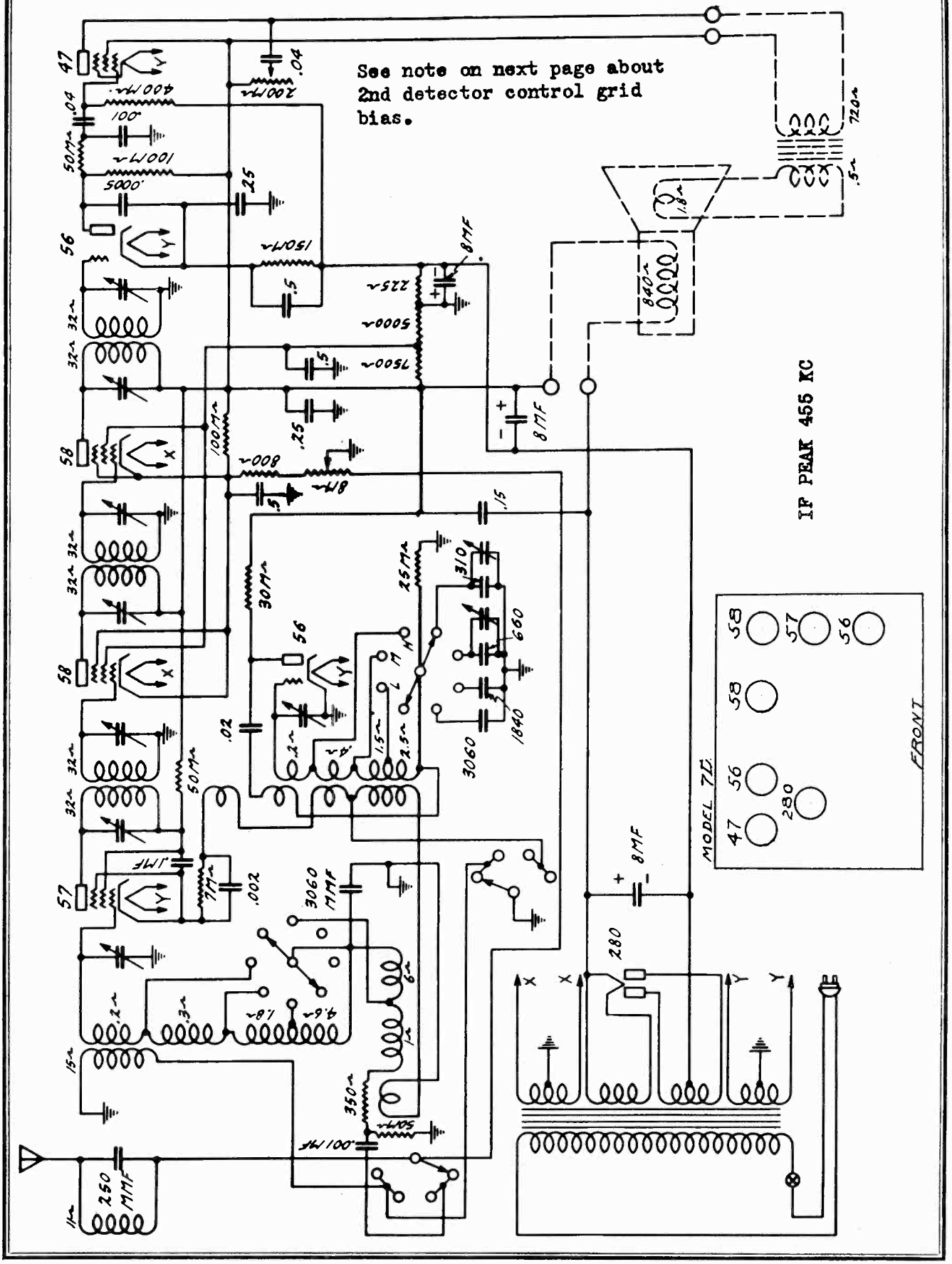
1. Connect the oscillator to the antenna and ground posts of the receiver.
2. Tune the receiver to 1400 K.C.; operate the oscillator at 1400 K.C.
3. Peak the parallel trimmers on the tuning condenser; peak the oscillator section (small plates) first.

CAUTION:

Do NOT connect the chassis of the receiver to the chassis of the vibrator as they are 32 volts apart electrically. Connecting the two chassis together will cause the fuses to blow.

U. S. RADIO & TELEVISION CORP.

MODEL 7-D
Chassis 700
Schematic
Socket



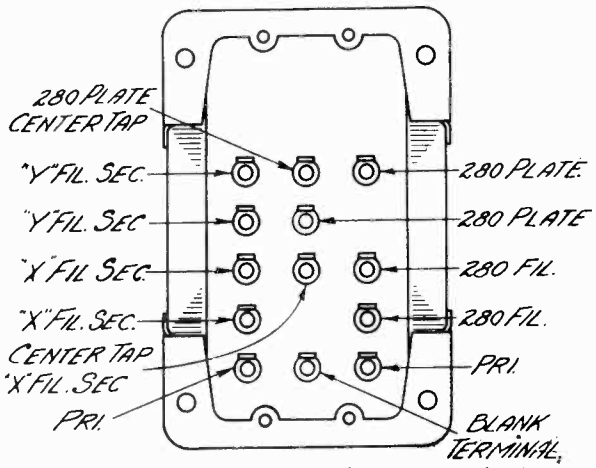
MODEL 7-D
Chassis 700
Voltage
Alignment

U. S. RADIO & TELEVISION CORP.

No. 700 CHASSIS—VOLTAGES AT SOCKETS
VOLUME CONTROL AT MAXIMUM—LINE VOLTAGE 115

Type of Tube	Position of Tube	Function	A Volts	B Volts	Control Grid C Volts	Screen Grid Volts	Screen Grid Current MA	Cathode Volts	Plate Current MA	Grid Test MA
56	1	Osc.	2.4	70	18(1)			0	6.2	6.2
57	2	1st Det.	2.4	170	8.0	170	.3	8.0	1.2	1.6
58	3	1st I.F.	2.4	260	7.0	90(2)	.6	7.0	2.5	4.0
58	4	2nd I.F.	2.4	260	7.0	90(2)	.6	7.0	2.5	4.0
56	5	2nd Det.	2.4	200(3)	17.0(2)			17.0	.2	.3
247	6	Audio	2.4	240	1.6(4)	265	6.8		33.0	38.0
280	7	Rect.	5.0						39 Per Plate	

(1) Varies with frequency. Actual voltage measured across 25,000 ohm bias resistor—39 Volts.
(2) Voltage measured with 120,000 ohm meter.
(3) Voltage measured with 600,000 ohm meter.
(4) Actual voltage measured across 225 ohm section of voltage divider resistor—17 Volts.



Power Transformer Terminals

CONDENSER ALIGNMENT

The R.F. trimmers, which are used to align the receiver at the high frequency end of the broadcast band are located on the variable tuning condenser assembly, one on each section.

There are also six I.F. trimmer condensers which are used to align the I.F. circuits accurately to 455 K.C. The adjusting screws of these trimmers are accessible from beneath the chassis and protrude from the porcelain bases of the I.F. transformers. The adjusting screws of the I.F. transformer trimmers as well as the R.F. trimmers should not be tampered with or changed unless it is apparent that they are out of adjustment. The necessity for readjustment of these circuits is usually indicated by low volume accompanied by broad tuning or a lack of selectivity but all other possible defects which might bring about these effects should be checked before attempting realignment.

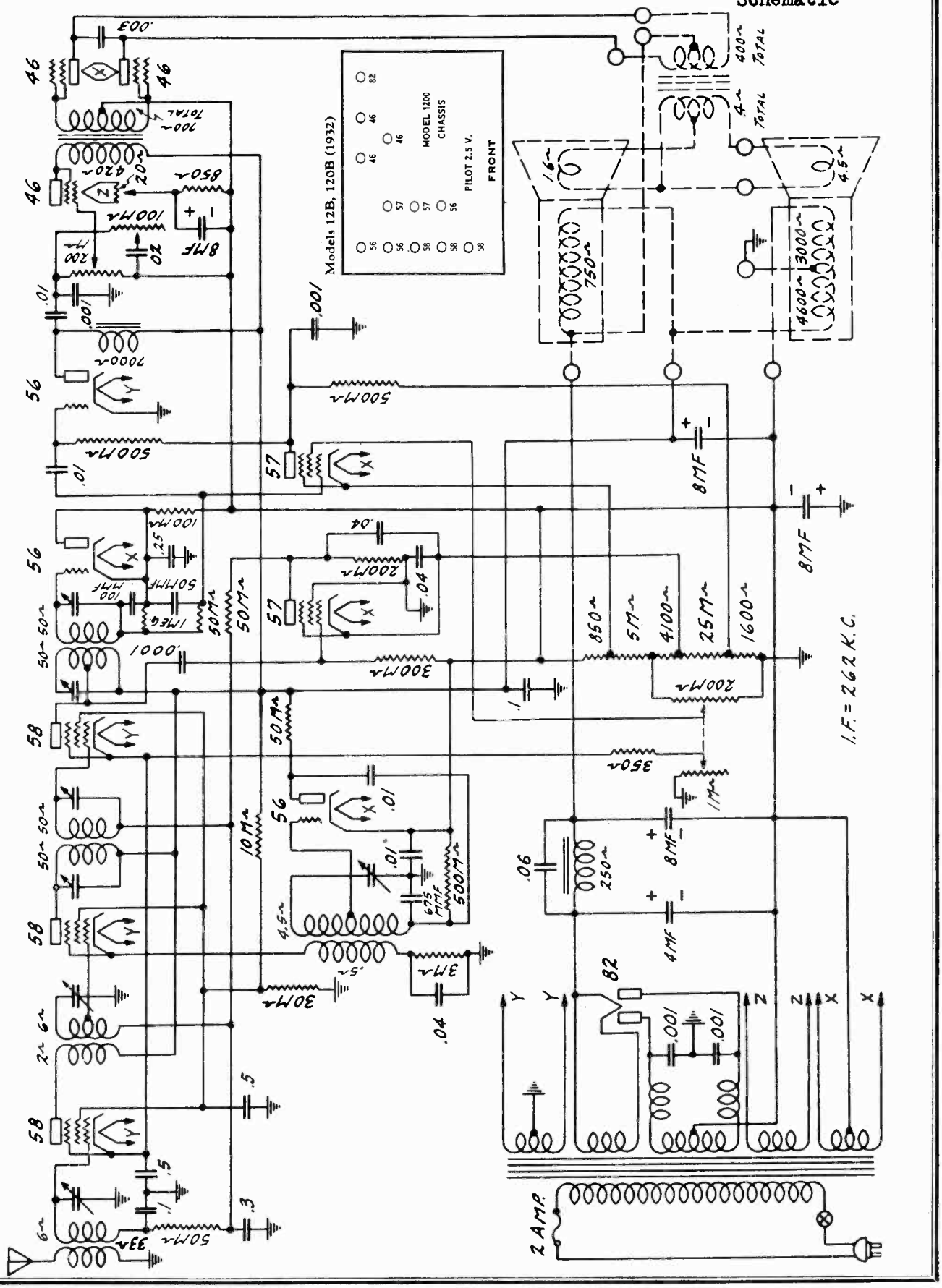
A special biasing system is used with the second detector to allow it to handle strong signals without overloading. A 150,000 ohm resistor is connected in the cathode circuit and at no signal has a voltage drop of 34 volts established across it due to the 2nd detector plate current flowing in this circuit. This voltage is in opposition to the 17 volt drop across the 225 ohm section of the voltage divider resistor and there is, consequently an initial grid bias of 17 volts applied to the grid of the 2nd detector when no signal is applied. When signal is applied to the 2nd detector, the plate current increases in proportion to the strength of the signal and the grid bias is increased accordingly. Much greater resistance to overload is obtained with this method of obtaining grid bias than would be had if a resistance of lower value were connected between cathode and ground without the bucking voltage.

Aligning Intermediate Condensers—The six I.F. trimmers must be aligned accurately before the 1st detector and oscillator circuits can be correctly aligned. Remove the 56 oscillator tube from the socket and connect the signal generator output to the grid contact of the 57 1st detector tube. Adjust the output of the signal generator to as low a value as will give a satisfactory deflection on the output meter with the receiver volume control set at maximum. Too strong a signal will cause overloading of the second detector and make it impossible to peak the I.F. transformers properly.

Then adjust the six I.F. Condenser screws until maximum output is indicated on the output meter. After all six have been adjusted the first time, go over them again and check the setting for maximum output.

U. S. RADIO & TELEVISION CORP.

MODEL 12 and 120
Class "B"
Chassis 1200
Schematic



MODEL 12 and 120
Class "B"
Chassis 1200
Changes - Voltage

U. S. RADIO & TELEVISION CORP.

SUPPLEMENTARY NOTES FOR No. 1200 CHASSIS ABOVE SERIAL No. 1189197

In No. 1200 chassis above serial No. 1189197 a new type volume control circuit and tone compensating system is used. The schematic circuit diagram of the audio section of the receiver in these chassis is shown in Fig. 7, the remainder of the circuit being the same as shown in the complete schematic diagram, Fig. 1. The volume control is a variable 600,000 ohm resistor with a tap at 100,000 ohms and is connected in the circuit as a potentiometer. One end connects to the .01 Mfd. coupling condenser and the other end to the source of grid bias voltage for the 46 driver tube. A tuned circuit consisting of a 1 henry choke, 4,000 ohm resistor and .02 Mfd. condenser is connected in series across the 100,000 ohm section of the volume control and is resonant to a frequency of approximately 900 cycles. The grid of the 46 driver tube is connected to the movable arm of the volume control and accordingly the A.F. voltage impressed upon this grid may be varied, thus controlling the volume.

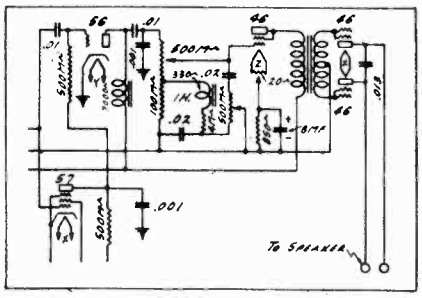


Fig. 7—Revised Audio Circuit in No. 1200 Chassis above Serial No. 1189197

The 900 cycle tuned circuit becomes effective when the volume is lowered by means of the manual volume control and then attenuates frequencies in the middle audio register. The 4,000 ohm resistor serves to make the circuit tune rather broadly and consequently, the attenuation is not confined sharply to the resonant frequency of 900 cycles but spreads over a band of frequencies in the middle register. It is desirable to attenuate these frequencies to a greater extent than the higher and lower audio frequencies due to the peculiarities of the human ear which is much more sensitive to the middle register frequencies than it is to low frequencies around 60 cycles or very high frequencies around 10,000 cycles or higher. If all frequencies are attenuated equally when reducing the volume as has been the practice in previous receivers, the effect on the ear is the same as if the higher and lower frequencies were eliminated or considerably more reduced than frequencies in the middle register.

By means of the tone blender circuit, consisting of the 500,000 ohm resistor and .02 Mfd. condenser which connect between the grid of the 46 driver tube and the 4,000 ohm resistor in the tone compensating circuit, the frequency response of the receiver may be varied to give prominence either to low frequencies or high frequencies. When the movable arm of the tone blender resistor is at the lower end the .02 Mfd. condenser in the tone compensating circuit is shorted and this circuit has no effect. At the same time, the total resistance of the tone blender resistor is thrown in series with the .02 Mfd. tone blender condenser. This double action serves to increase the response of the receiver in the middle and upper frequency registers and makes them predominate in the reproduction. With the movable arm of the tone blender resistor in the center position, the upper and middle frequency registers are attenuated to a certain extent and the receiver response is substantially equal for all frequencies. When the movable arm reaches its position nearest to the .02 Mfd. tone blender condenser, maximum attenuation of high frequencies is obtained and the low frequencies are predominant in the receiver reproduction.

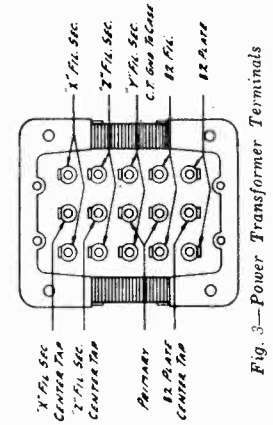


Fig. 3—Power Transformer Terminals

FLUTTERING OR MOTORBOATING

The tube shields and cover must be on, otherwise motorboating may result. Still other causes are open or defective grid circuits or open bypass condensers. Fluttering is very often due to I.F. oscillation and the causes for such a condition should be investigated in line with the information given in the section on "Oscillation."

Oscillation may be due to feed-back in the I.F. stage between the 2nd I.F. plate circuit and the 1st I.F. grid circuit. Keep the 2nd I.F. plate lead close to the subpanel and away from the preceding grid lead.

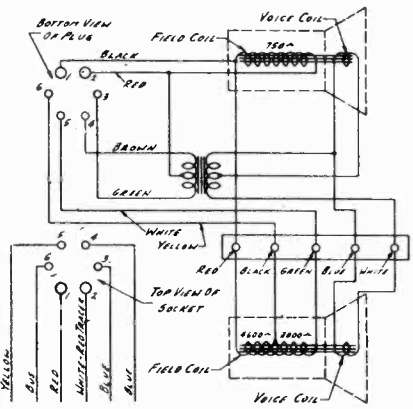


Fig. 1—Electrodynamic Speakers and Connections

No. 1200 CHASSIS—VOLTAGES AT SOCKETS—LINE VOLTAGE 115
VOLUME CONTROL AT MAXIMUM —"Q" CONTROL AT MAXIMUM

Tube No.	*Type of Tube*	*Function*	*"A" Volts*	*"B" Volts*	*Control Grid "C" Volts*	*Screen Grid Volts*	*Screen Grid MA*	*Cathode Volts*	*Plate Current MA*	*Grid Test MA*
1	58	R.F.	2.25	140	3.2(1)	80	.9	3.2	3.6	7.6
2	58	1st Det.	2.25	130	7.5	74	.5	7.5	2.0	2.3
3	58	I F.	2.25	140	3.2(1)	80	.9	3.2	3.6	7.6
4	56	2nd Det.	2.25							
5	56	1st Audio	2.25	110	5.5(2)			0	4.2	8.6
6	56	Osc.	2.25	110	10-23(3)			0	3.4	
7	57	AVC	2.25	65(4)	35(5)	85	0	35(5)	0	0
8	57	"Q"	2.25	120(6)	3.5(7)	20	0	3.5(7)	0	0
9	46	Driver	2.25	235	28(8)				26.0	28
10	46	Power	2.25	335	0				5.5(9)	13
11	46	Power	2.25	335	0				5.5(9)	13
12	82	Rect.	2.2						51 Per Plate	

(1) Measured across 350 Ohm Resistor.
(2) Measured across 1600 Ohm section of Voltage Divider Resistors.
(3) Varies as shown with frequency—measured across 500,000 Ohm Resistor.
(4) Measured with 600,000 Ohm Meter.
(5) Measured across 850—5,000—4100 Ohm sections of Voltage Divider Resistors.
(6) Measured across 5,000—4100—25,000 Ohm sections of Voltage Divider Resistors.
(7) Measured across 850 Ohm "Q" Tube Bias Resistor.
(8) Measured across 850 Ohm Driver Tube Bias Resistor.
(9) Plate Current at No Signal.

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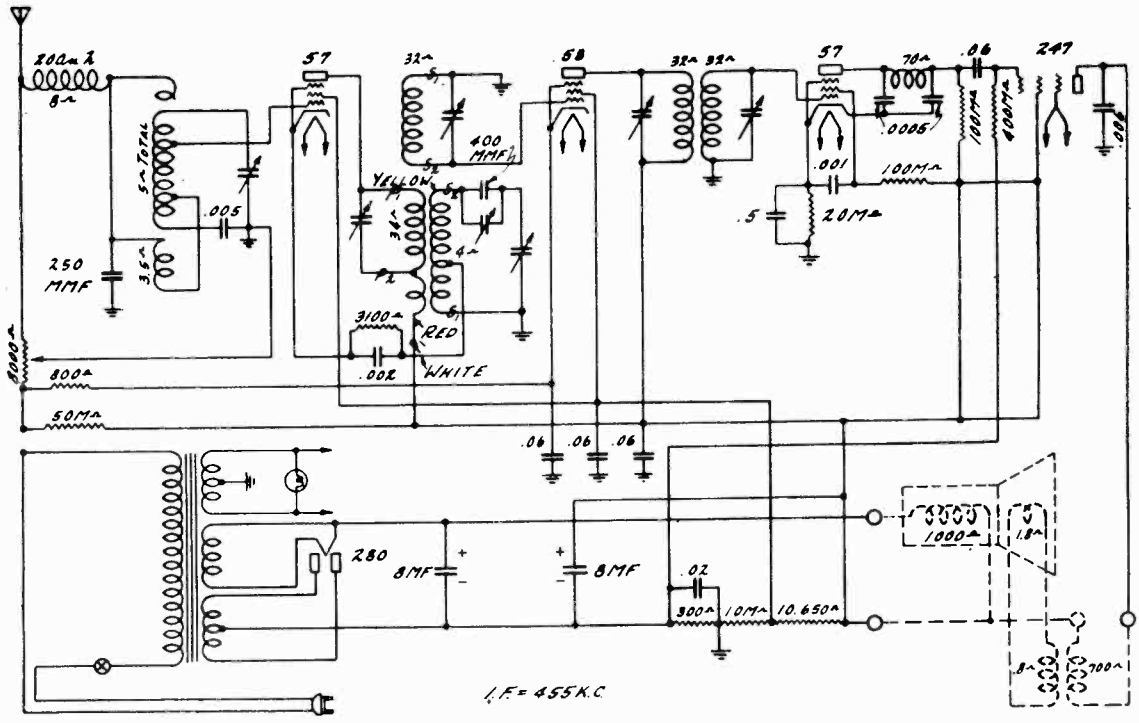
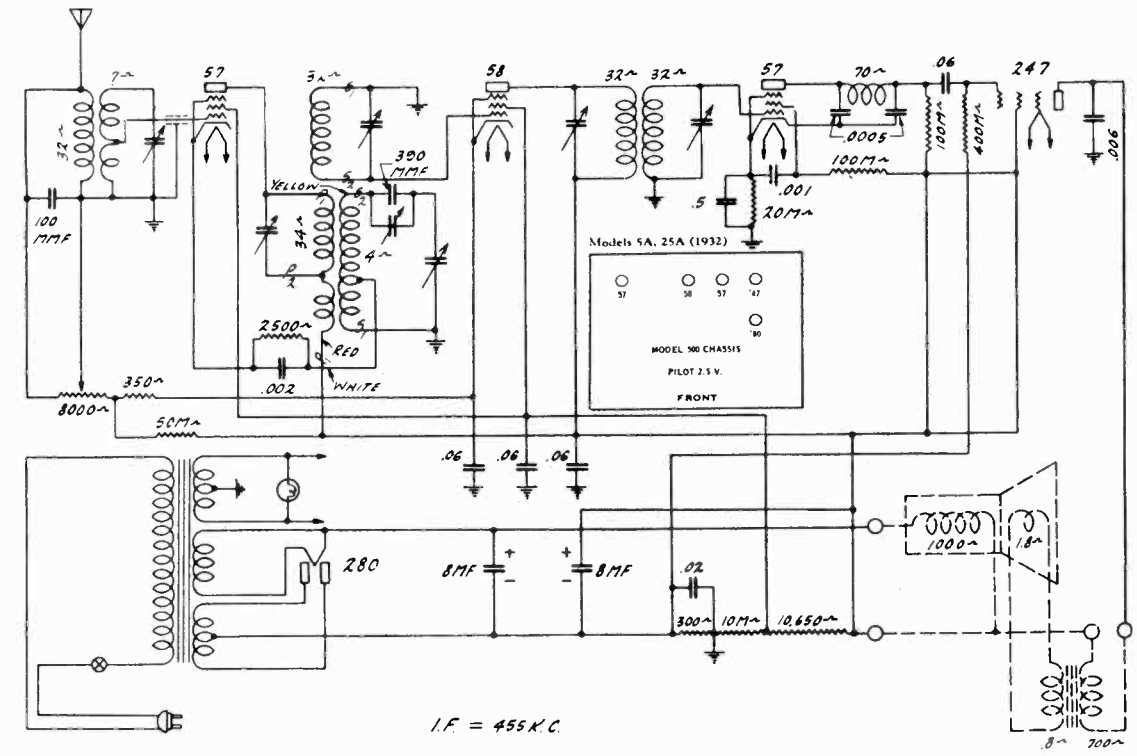
MODEL 25
Chassis 500
Schematics
Two Types



Schematic Circuit Diagram of No. 500 Chassis above Serial No. 1188825 **2nd Type**



Schematic Circuit Diagram of No. 500 Chassis **1st Type**

MODEL 25
Chassis 500
Voltage
Oscillation

U. S. RADIO & TELEVISION CORP.

OSCILLATION

Should the No. 500 chassis oscillate on being connected up, it may be due to 57 or 58 tubes whose characteristics vary considerably from the standard. In case of oscillation, therefore, try out some new 57's and 58's. Try out a new ground and investigate the line voltage to see if it is excessively high.

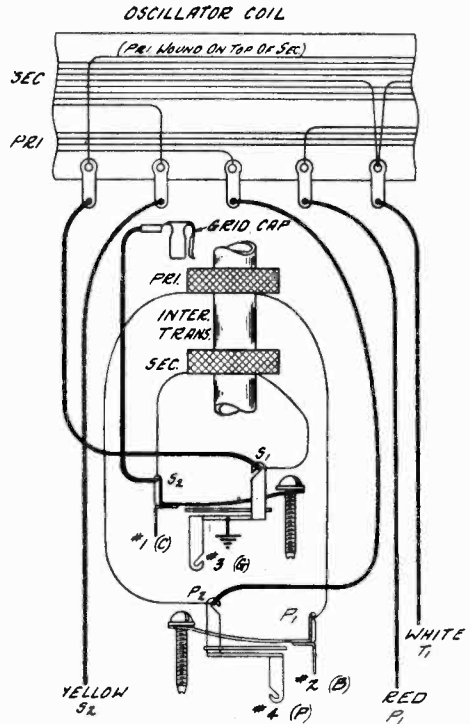
The tube shield and cover should be in place when the set is operating and the control grid leads to the 57 and 58 tubes should be in their proper positions. Otherwise, oscillation may result.

Oscillation may be caused by the plate lead to the 2nd I.F. transformer being too close to the preceding grid. The connecting point for the preceding grid is a blank lug on the base of the Oscillator-1st I.F. assembly marked "1". Keep the plate lead to the 2nd I.F. transformer as close to the I.F. shield can and as far away from the preceding grid as possible.

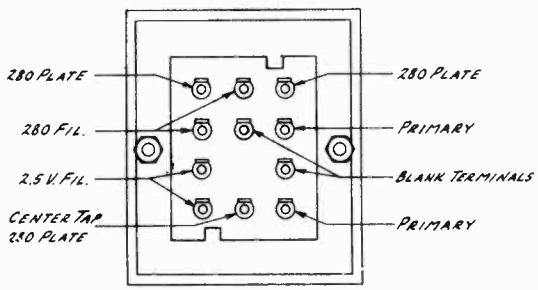
An open by-pass condenser or open leads to the by-pass condensers are a common cause of oscillation. Check the by-pass condensers for capacity and the leads to them for continuity of circuit. A quick way to check by-pass condensers for opens is to take a good condenser with test leads attached to the terminals and connect the new condenser across the condenser in the chassis.

The control grid lead to the 1st detector-oscillator tube passes through a length of copper braid which is grounded at the rear of the tuning condenser. If this braid is not grounded, "parasitic" oscillation may occur in the 1st detector circuit. The braid should extend to within ¼ inch of the grid cap. Oscillation may occur if a greater length of the grid lead is exposed at the top. Model 25 receivers of the first production did not have this shield and may oscillate at a "parasitic" frequency. The presence of oscillation of this type may be determined by removing the antenna and tuning the receiver from 550 to 1500 K.C. If "parasitic" oscillation is present a "plop" or "cluck" will be heard at certain points on the dial.

Oscillation may also be caused by the antenna lead to the primary of the antenna transformer being misplaced. This lead should be pushed close to the chassis in the small space between the coil shield and the 600 K.C. trimmer condenser.



Wiring Diagram, Osc. and I.F. Assembly



Power Transformer Terminals

NO. 500 CHASSIS—VOLTAGES AT SOCKETS
LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM
ANALYZER PLUG IN SOCKET—TUBE IN ANALYZER SOCKET

Type of Tube	*Position of Tube*	*Function*	*"A" Volts*	*"B" Volts*	*Control Grid "C" Volts*	*Screen Grid Volts*	*Screen Grid Current MA*	*Cathode Volts*	*Plate MA*	*Grid Test MA*
57	1	1st Det. & Osc.	2.15	245	4.3-5.9(1)	100	.6	4.3-5.9(1)	.95	2.0
58	2	I.F.	2.15	240	3.0	100	1.5	3.0	6.6	10.4
57	3	2nd Det.	2.15	166	9.0	115(2)	.1	9.0	.35	.45
247	4	Audio	2.15	215	17.0(3)	240	8.0		30.	48.
280	5	Rect.	4.6						30 Per Plate	

(1) Varies with frequency setting of dial approximately as shown.
(2) Voltage as measured with 120,000 ohm meter.
(3) Measured across 300 ohm section of voltage divider resistor.

U. S. RADIO & TELEVISION CORP.

MODEL 112-A SW Con.
Chassis 300
Used In Model 712
Schematic, Voltage

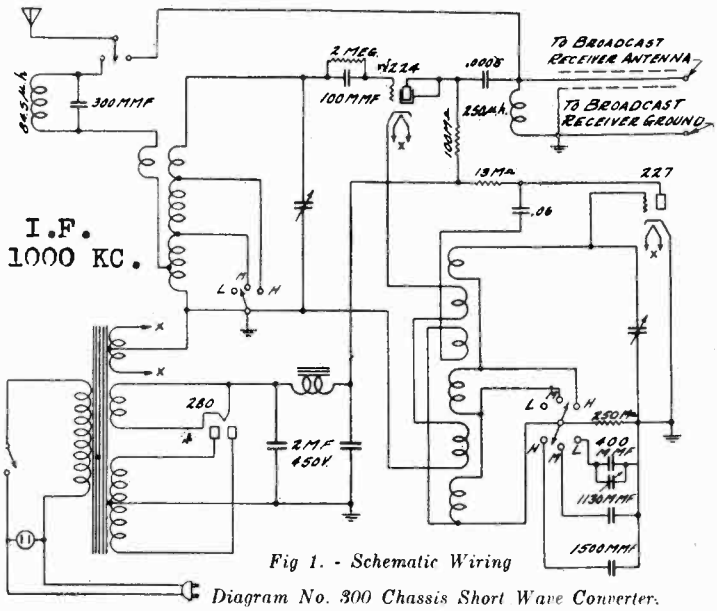


Fig 1. - Schematic Wiring Diagram No. 300 Chassis Short Wave Converter.

The No. 300 Chassis is an A. C. operated Short Wave Converter utilizing the Super-Heterodyne principle and when used in conjunction with any standard broadcast band receiver permits the reception of stations transmitting on frequencies ranging from 550 K.C. to 20,000 K.C. This chassis is used in U. S. Radio Table Models 12A and 12AX Short Wave Converters and Console Models 712A and 712AX Combination Short Wave and Broadcast Band Receivers.

The chassis is self-powered and is designed to operate satisfactorily on a power supply of from 105 to 125 volts and from 50 to 60 cycles alternating current. The No. 300X Chassis is designed for 25 cycle, 115 volt operation. The tube sequence (top view) is shown in Fig. 2.

The seven tube super-heterodyne chassis used with the converter in the combination Short Wave and Broadcast Receiver is identically the same as the chassis used in the seven tube Broadcast Super-Heterodyne receiver and in servicing the combination model the service notes for the No. 7 Super-Heterodyne chassis should be referred to for data concerning the broadcast unit of the receiver.

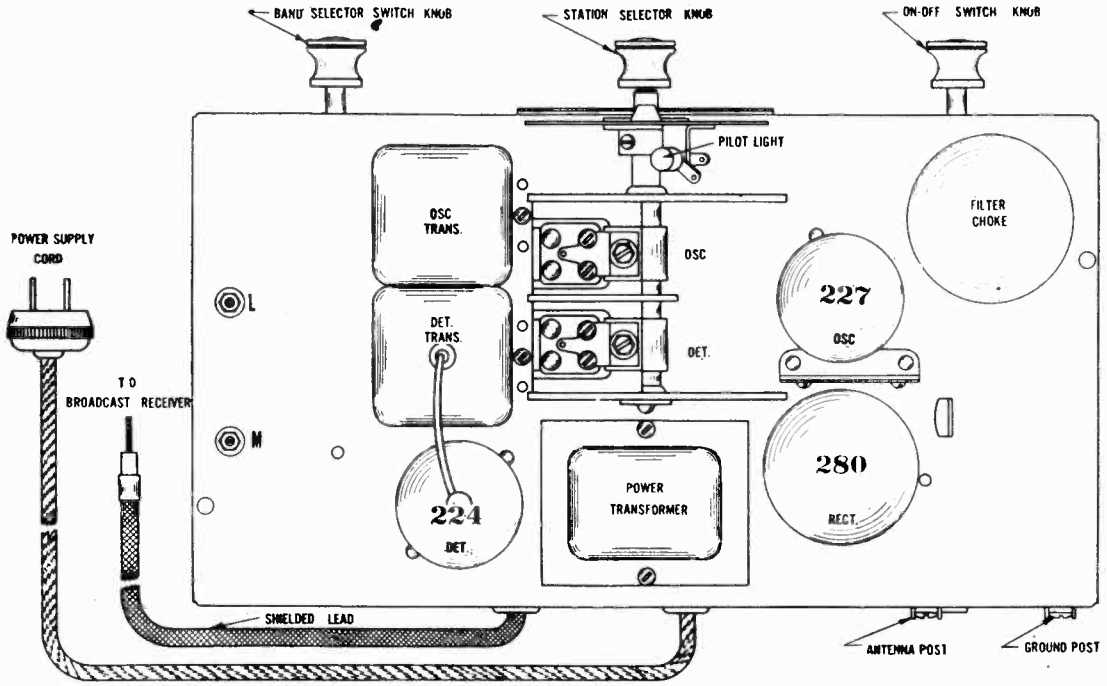


Fig. 2 - Top View of Chassis Showing Tube Location.

VOLTAGES

The voltage chart shows the voltages and current with all tubes in and the converter otherwise in operating condition.

The voltages shown in the chart were recorded with the band selector switch in the "L" position and the dial pointer of the tuning condenser rotor turned to "0" on the dial scale, with the condenser rotors in mesh with the stator plates, indicating maximum capacity. The bias voltage for the 227 oscillator tube was measured across the 250,000 ohm bias resistor as shown rather than at the socket. The voltages and currents will vary for other positions of the band selector switch and settings of the tuning condenser, or the frequency to which the receiver is tuned.

NO. 300 CHASSIS—VOLTAGES AT SOCKETS—LINE VOLTAGE 115
BAND SELECTOR SWITCH ON "L"—TUNING DIAL AT "0"

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Plate MA	Grid Test MA
224	1	1st Det.	2.45	50.	4.	1.	—
227	2	Osc.	2.45	135.	28. (*)	5.5	5.9
280	3	Rect.	5.			2.8 Per Plate	

*Measured across 250,000 ohm oscillator bias resistor.

DESCRIPTION

The broadcast receiver used in connection with the converter is tuned for the best performance to a frequency of 1000 K.C. Unless proper precaution were taken in the design of the converter troublesome interference would be introduced if it so happened a station broadcasting on 1000 K.C. was within the receiving range of the receiver. In the No. 300 Chassis this possibility is very effectively overcome by incorporating in the antenna circuit of the antenna transformer a parallel combination of inductance and capacity. The values of these parts are, as can be seen by referring to Fig. 1, 84.5 microhenries and 300 Mmf. respectively. This parallel impedance constitutes the frequency filter and offers maximum opposition to the undesirable 1000 K.C. frequency without, however, preventing the passage of currents of other frequencies and for which the tuning range of the converter is designed.

Referring to the schematic wiring diagram it will be noted the unused sections of the secondary of the antenna transformer are short circuited by the band selector switch as the frequency tuning range is increased. The effect of "dead ends" in a coil, especially at the higher frequencies, is to produce undesirable effects and to produce energy loss and considerably effect the frequency of resonance of the circuit, because the unused turns are in the magnetic field of the used portion of the coil and are closed by the inherent distributed capacity. Due to the close coupling, if the resonant frequency of this circuit is near that of the first it will greatly affect the resonant frequency of the first circuit. This undesirable effect is counteracted by short circuiting the unused portions of the coil, increasing the impedance of this circuit and causing very little current to flow, thus preventing the possibility of the circuit from responding to two frequencies.

The output from the plate of the 1st detector of the converter is fed through a .0005 coupling condenser to the antenna post of the broadcast receiver by means of a shielded cable with the shield grounded. The capacity reactance between the antenna lead and the grounded shield is of the order of a few hundred ohms and would, were not proper provisions taken in the design, seriously affect the sensitivity. This effect is satisfactorily overcome by choosing an inductance coil of suitable value and connecting it in parallel to the inherent capacity reactance of the shielded cable. This coil is the 250 microhenry choke shown in the schematic wiring diagram and it greatly increases the impedance between the antenna lead and the ground, thus preventing any loss in sensitivity.

The Band Selector Switch permits the selection of any of the three bands. The tuning knob has letters upon its face designating the three bands. The frequency band covered by the tuning condenser with the switch in the "L" position is 1.5 M.C. to 3.75 M.C; in the "M" position, 3.58 M.C. to 9.10 M.C; and from 8.40 M.C. to 20 M.C. with the switch at the "H" position. This switch is of excellent design and under normal conditions of service no inherent trouble should develop in its function.

The Antenna and A. C. Rotor Switch serves a dual purpose. It turns the power on to the converter and connects the antenna to the converter when turned clockwise. When turned counterclockwise the power supply to the converter is disconnected and the antenna connected to the broadcast receiver.

The volume and tone of the short wave signals are controlled by the volume and tone controls on the broadcast receiver.

OSCILLATOR

The oscillator is of the tuned grid type and has combined inductive and capacity coupling. The oscillator pick-up coil which is inductively coupled to the oscillator coil is connected in the cathode circuit of the 1st detector. The signal generated by the oscillator is 1000 K.C. in frequency above the frequency to which the 1st detector is tuned. The drop across the 250,000 ohm resistor in the oscillator brought about by the D.C. component of the oscillatory current establishes the bias voltage.

SERVICING

In the event the converter when connected to a broadcast receiver exhibits faulty operation or lack of sensitivity make certain the broadcast unit is performing correctly, which may be determined by giving it a thorough test throughout the broadcast band. The blades of the band selector switch should be inspected for good electrical contact. The contacts of this switch are lubricated with a very light lubricant to insure freedom from noise and under normal conditions of service no defects in this assembly should arise.

The band selector switch assembly is furnished with all bus wiring attached and equipped with the 250,000 ohm bias resistor. It is of extreme importance the soldered connections connecting the switch to the various circuits be carefully made as poorly soldered connections will seriously interfere with the performance and these switches are subjected to rigid tests at the factory after the various connections described above have been made in the complete assembly.

The tubes should be carefully tested and particular attention given to the 227 oscillator as some 227 type tubes may not oscillate over the entire frequency range. A good check is to read the voltage across the 250,000 ohm bias resistor, taking into consideration this voltage varies depending on the frequency to which the receiver is tuned.

The shielded lead should be carefully checked to make certain the antenna connection from the converter to the broadcast set is not grounded. The sensitivity will be impaired if the 250 microhenry plate choke is open or if the 100,000 ohm detector plate series resistor is shorted.

ALIGNMENT

The excellent performance of which the No. 300 Chassis is capable depends to a large degree on the correct alignment of the antenna and oscillator trimmer located on their respective sections of the two-gang tuning condenser and the oscillator padding condenser. The actual mechanics of the alignment procedure is, with the exception of the frequency range involved, identically the same as in those Super-Heterodyne chassis designed for the regular broadcast band.

The adjustable trimmers are accurately aligned at the factory with accurately calibrated signal generators and output meters and the receivers should not as a general rule require alignment unless mishandled or tampered with. If realignment is found necessary the chassis should be removed from the cabinet. The complete aligning procedure and location of the different condensers is as follows:

ALIGNING OSCILLATOR TRIMMER — The chassis must be connected to a broadcast receiver in the usual manner with the ground wire connected but the antenna lead disconnected. The signal generator placed in operation and coupled with a wire to the antenna post on the converter. The signal generator must be grounded and adjusted to 20,000 K.C.

Then turn the tuning condenser rotor until the dial pointer is at exactly 100 with the rotor plates completely out of mesh, indicating minimum capacity. If the dial does not correspond to a reading of 100 with the plates out of mesh the set screws that secure the drive to the tuning condenser shaft should be loosened and the dial shifted until the pointer is at exactly 100 on the dial scale.

The band selector switch should be turned to the "H" position and the oscillator trimmer screw turned up or down until maximum deflection on the output indicating meter is obtained. It will be noted two peaks can be obtained and the correct one is with the trimmer screw farthest out.

ALIGNING ANTENNA TRIMMER—The position of the band selector switch should be retained as in the case above with the signal generator adjusted to 20,000 K.C. and the tuning condenser rotor turned until the pointer is at 10 on the dial scale. The adjusting screw of this trimmer is then turned up or down until maximum deflection on the output meter is obtained.

ALIGNING OSCILLATOR PADDING CONDENSER—The band selector switch must be turned to the "L" position and the signal generator adjusted to 1500 K.C. The adjusting screw for this condenser is located to the right outer edge of the subpanel as indicated by "L" in Fig. 2, and it should be turned up or down until maximum output is obtained.

NOTE: In No. 300 Chassis below Serial No. 1155363 there is incorporated in the circuit of the oscillator and the "M" range of the band selector switch a variable padding condenser in addition to a fixed condenser of 1100 Mmf. The fixed condenser was subsequently changed to one having a capacity of 1130 Mmf. as shown in the schematic wiring diagram, thus making the use of a variable padding condenser unnecessary. The location of this condenser is shown at the point "M" of Fig. 2, and aligning instructions are given in the alignment paragraph in this manual.

In chassis having also this condenser the signal generator is adjusted to 3580 K.C. and the tuning condenser rotor turned until the pointer is at "0" on the dial scale with the band selector switch position at "M." The adjustment is the same as for the low range padding condenser, however, it precedes the adjustment of the low range padding condenser in the sequence of alignment.

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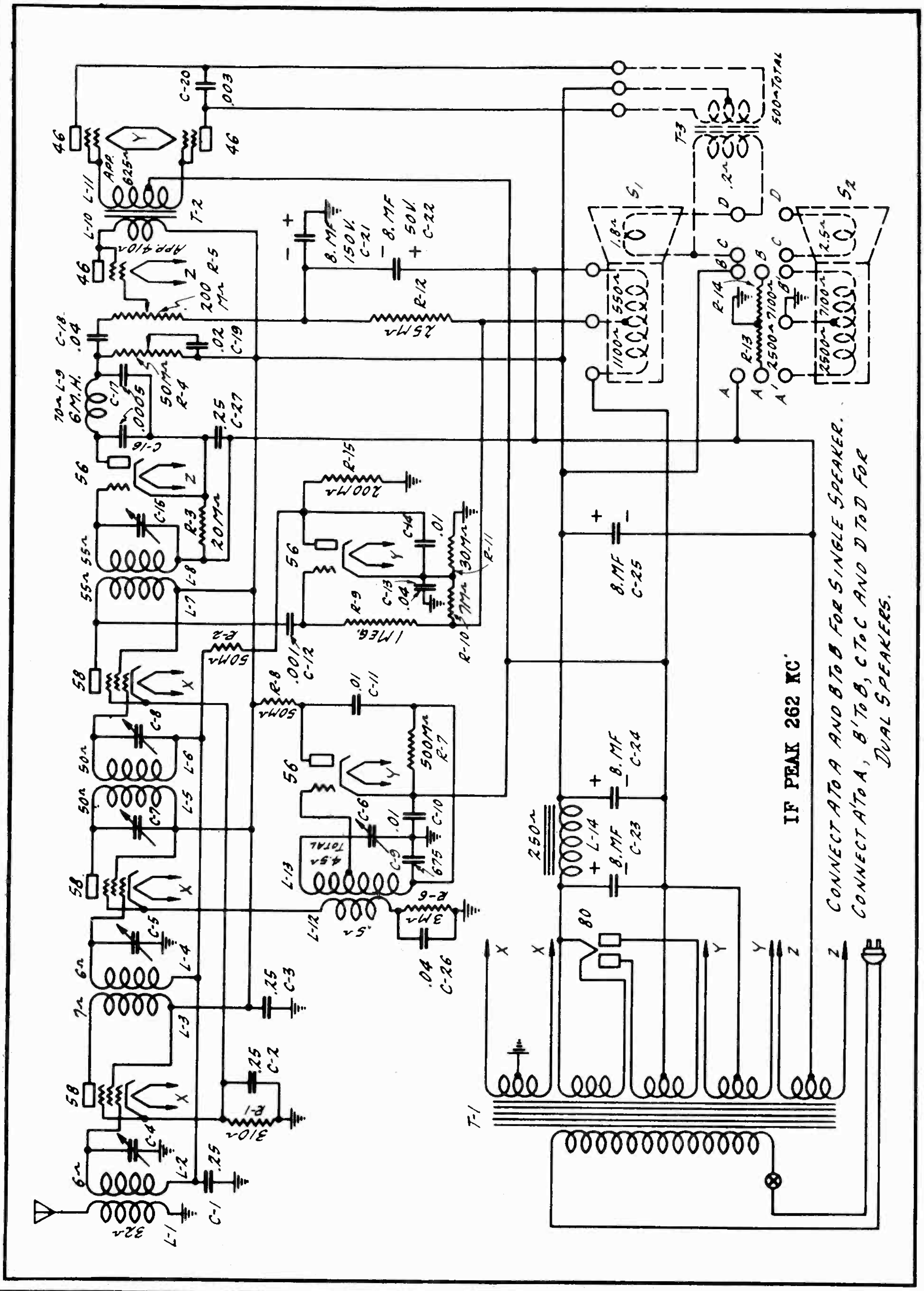
MODEL 1006,1007
Class "B"
Schematic



Schematic Circuit Diagram of No. 1006 and No. 1007 Chassis

MODEL 1006,1007
Class "B"
Voltage
Alignment

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Remove the 56 oscillator tube during I.F. alignment.

Alignment of the R.F. and oscillator circuits is made at 1400 K.C. by means of the trimmer condensers mounted on the main tuning condenser. These should be adjusted to give maximum output on a 1400 K.C. oscillator signal with the receiver dial indicator set exactly at 1400. When maximum output has been obtained the oscillator is next set for a signal of 600 K.C. and the receiver tuned to this signal. The dial reading should then be 600 but, if it is not exact, may be corrected by loosening the set screws which hold the drive disc and turning the disc until correct reading is obtained. Alignment at 1400 K.C. will then have to be repeated.

OSCILLATION

A common cause of oscillation is open bypass condensers and these should be checked by simple trial replacement. Coupling between I.F. grid and plate leads may cause the trouble and these leads should be separated and pushed close to the chassis. Too great R.F. gain in the receiver may cause instability or oscillation and is corrected by removing four or five turns from the primary of the 1st detector transfomer. This should not be done, however, until all other causes of oscillation have been investigated.

DISTORTION

Distorted reproduction may be brought about by defective tubes and in any case of distortion these should be checked first. An inoperative 46 output tube will especially cause distortion due to harmonics in the output of the good tube not being balanced out by the other tube. Leaky or open bypass condensers may also cause distortion.

The connections to the voice coil of one speaker being reversed will cause a very noticeable distortion and these should be checked at the terminal strip. Open field windings in either speaker will allow the receiver to continue operation but at reduced volume and with some distortion.

At low volume, distortion may be caused by a tone control rheostat having a resistance higher than the normal value of 50,000 ohms. Other resistors which will bring about distortion if they are high in value are the 20,000 ohm 2nd detector bias resistor and the 7,000 ohm resistor in the voltage dividing circuit which provides grid bias for the AVC tube. In case of distortion at low volume, therefore, these resistors should be checked with an ohmmeter and replaced if not within normal 10% limits.

EXCESSIVE HUM

Excessive hum may be brought about by an open filter condenser or by an open circuit in one half of the 280 plate winding of the power transformer.

Heater-cathode shorts in the 56 or 58 tubes will cause the hum to be higher than normal and new tubes should be tried in any case of excessive hum. Certain 46 tubes, when used in the driver stage, will produce a hum much greater than normal and the tube in this socket should be inter-changed with the other two 46 tubes in the receiver.

Shorted turns in the filter choke or 1,650 ohm speaker field will cause the receiver to hum as will various shorts, opens or grounds at different points in the chassis.

CHASSIS No. 1006

Chassis No. 1006 is practically the same as chassis No. 1007 except that it is designed for single speaker operation. A speaker having a 1,650 ohm field is used with this chassis and a tapped wire wound resistor is substituted for the field of the second speaker.

No. 1007 CHASSIS—VOLTAGES AT SOCKETS—LINE VOLTAGE 115 VOLUME CONTROL AT MAXIMUM

Type of Tube	*Position of Tube*	*Function*	*"A" Volts*	*"B" Volts*	*Control Grid "C" Volts*	*Screen Volts*	*Screen Current MA*	*Cathode Volts*	*Plate Current MA*	*Grid Test MA*
58	1	R.F.	2.35	125	.3(1)	125	1.3	5.0	5.6	9.6
58	2	1st Det	2.35	115	5.0(2)	115	.6	10.0	2.9	3.5
58	3	I.F.	2.35	125	.3(1)	125	1.3	5.0	5.6	9.6
56	4	2nd Det.	2.30	170	12.0			12.0	.6	.6
46	5	Driver	2.25	215	18.0(3)				18.0	21.0
56	6	Osc.	2.30	130	7-15(4)			0(4)	3.7	3.8
56	7	AVC	2.25	60(5)	2.0(6)			85.0	0	0
46	8	Class B	2.25	310	0				6.0(7)	13.0
46	9	Class B	2.25	310	0				6.0(7)	13.0
280	10	Rect.	4.2						41 Per Plate	

(1) Actual Voltage measured across 310 ohm biasing resistor—5.0 Volts.
(2) Actual Voltage measured across 3,000 ohm bias resistor—10 Volts.
(3) Read with Volume Control at minimum.
(4) Varies as shown with frequency. Actual voltage measured across 500,000 ohm bias resistor—15 to 35 Volts.
(5) Actual Voltage measured across 30,000 ohm voltage divider resistor—92 Volts.
(6) Actual Voltage measured across 7,000 ohm voltage divider resistor—22 Volts.
(7) Plate current at no signal.

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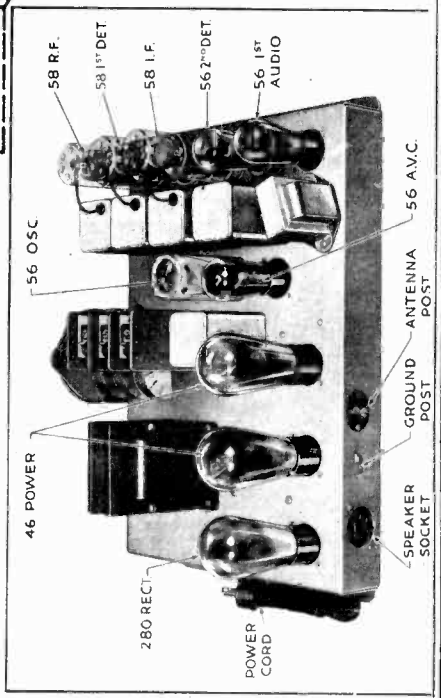
MODEL 3070
Chassis 1009
Schematic
Voltage, Layout

Tube	Function	Fil.	Plate	Screen	Con.Grid	Cathode
58	RF	2.4	280	86	3.0*	0
58	1st Det	2.4	280	86	3.0*	0
58	IF Amp	2.4	280	86	3.0*	0
56	2nd Det	2.4	0		0	0
56	1st AF	2.4	245		4.0"	0
56	Osc	2.4	120		8-14'	58
56	AVC	2.4	0		18**	54***
46	Power	2.4	275		36	
46	Power	2.4	275		36	
80	Rect	5.0				

*Voltage across R1o-B is 4.5V
"Voltage across R-10-B and R10-C is 10V
'Varies with frequency
**Voltage across R10-A and R10-B is 58.5 V.
***Voltage as measured with 300000 ohm meter.
Line voltage 115. Control at Maximum.



CONTINUITY TEST CHART

All Tubes removed—Power Cord disconnected—Volume Control at maximum—Tone Control at maximum bass—Speaker connected.

REFERENCE POINT—CHASSIS

Measurement Point	Correct Reading (Ohms)	Incorrect Reading (Ohms)	Defect
Antenna	30	Open	Open L-1
R. F. Control Grid	1,000,065.5	0 5.5 Open	Shorted C-1 or Trimmer Shorted C-4 Open R-1, R-9, R-10B or L-2
1st Detector Cathode	.5	Open	Open L-9
R. F., 1st Detector, or I. F. Screen Grid	Open	0 50,635 50,855 50,000	Shorted C-5 Shorted C-20B Shorted C-20A Shorted C-6 or C-18
R. F. Plate	Open	2 637 977	Shorted C-6 or C-18 Shorted C-20B Shorted C-20A
1st Detector Control Grid	1,000,065.5	0 5.5 Open	Shorted C-2 or Trimmer Shorted C-4 Open R-1, R-9, R-10B or L-4
1st Detector Plate	Open	50 685 1,025	Shorted C-6 or C-18 Shorted C-20B Shorted C-20A
Oscillator Control Grid	517,500	2 2.5 Open	Shorted C-3 or Trimmer Shorted C-16 Open L-10, R-8 or R-10A
Oscillator Cathode	17,500	0 Open	Shorted C-19 Open R-10A
Oscillator Plate	Open	30,000 80,000 30,635 30,975	Shorted C-6 or C-18 Shorted C-5 Shorted C-20B Shorted C-20A
I. F. Control Grid	1,000,110	50 Open	Shorted C-4 Open R-1, R-9, R-10B or L-6
I. F. Plate	Open	500,060 24 659 999	Shorted C-10 Shorted C-6 or C-18 Shorted C-20B Shorted C-20A
2nd Detector Control Grid	500,026	26	Shorted C-12
2nd Detector Plate or Cathode	0	Open	Open Connection
AVC Control Grid	500,060	Open	Open R-9 or R-10B
AVC Plate or Cathode	17,500	0 Open	Shorted C-19 Open R-10A
1st Audio Control Grid	200,135	Open	Open R-10B, R-10C or R-5
1st Audio Plate	Open	1,350 51,350 1,985 2,325	Shorted C-6 or C-18 Shorted C-5 Shorted C-20B Shorted C-20A

CONTINUITY TEST CHART

Measurement Point	Correct Reading (Ohms)	Incorrect Reading (Ohms)	Defect
Power Stage Either Control Grid	985	Open	Open L-12, R-10C, R-10B or Sec. T-1
Power Stage Either Plate	Open	185 50,185	Shorted C-6 or C-18 Shorted C-5
Rectifier Filament	Open	635 975	Shorted C-20A Shorted C-20B
Rectifier Either Plate	750	Open	Open R-10B, R-10C, L-12 or R-7

REFERENCE POINT—+B (RED LEAD IN SPEAKER PLUG)

R. F., 1st Detector, or I. F. Screen Grid	50,000	Open	Open R-2
R. F. Plate	1.5	Open	Open L-3
1st Detector Plate	50	Open 0	Open L-5 Shorted C-7
Oscillator Plate	30,000	Open	Open R-7
I. F. Plate	24	Open 0	Open L-7 Shorted C-9
1st Audio Plate	1,350	Open	Open Pri. T-1
Power Stage Either Plate	185	Open	Open Pri. T-3
Rectifier Filament	340	Open 0	Open L-11 Shorted C-21
Rectifier Plate	Open	115 455	Shorted C-20B Shorted C-20A

MISCELLANEOUS

R. F. Control Grid to I. F. Control Grid	55.5	5.5	Shorted C-8
Power Stage Grid to Grid	1300	0	Shorted C-15
Oscillator Plate to Grid	Open	2.5	Shorted C-17
2nd Det. Grid to 1st Audio Grid	Open	50,026	Shorted C-13
Rectifier Plate to Plate	230	Open	Open Rect. Plate Winding T-2
Rectifier Filament to Filament	Very Low	Open	Open Rect. Fil. Winding T-2
Filament to Filament Any Other Socket	Very Low	Open	Open Heater Winding T-2

SPEAKER (REFER TO FIG. 4)

Remove retaining ring and fibre cover from speaker plug to observe lead connections.

Black to White	300	Open	Open 300 Ohm Sec. L-12
Yellow to White	200	Open	Open 200 Ohm Sec. L-12
Brown to Red	185	Open	Open Primary T-3
Red to Green	185	Open	Open Primary T-3
Across Voice Coil (Unsolder Voice Coil Lead)	3.1	Open	Open Voice Coil
Across Sec. T-3 (Unsolder Voice Coil Lead)	.34	Open	Open Sec. T-3