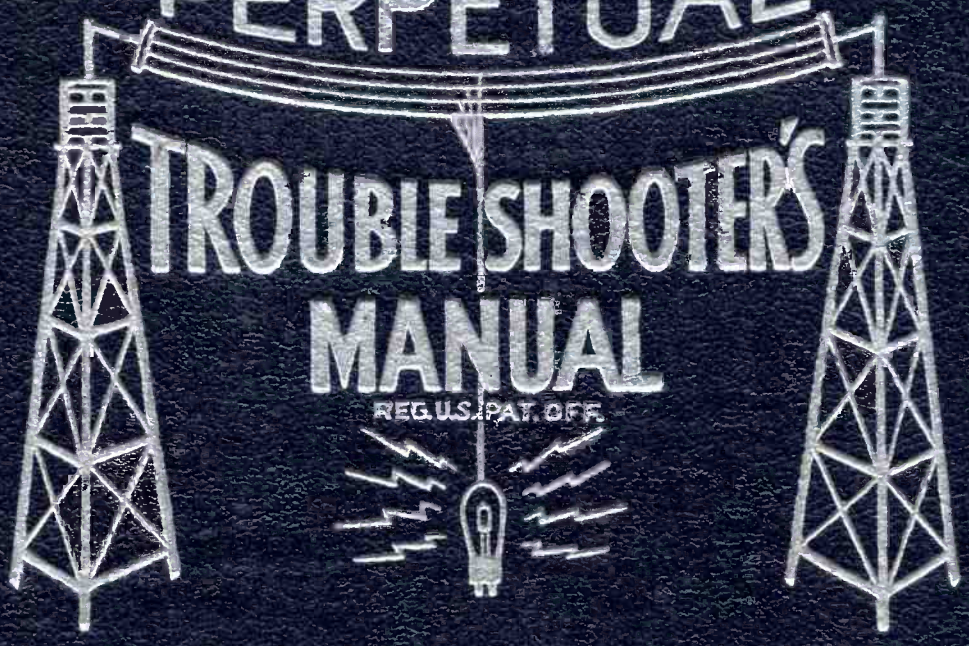
VOLUME VIII

PERPETUAL TROUBLE SHOOTER'S MANUAL

REG. U.S. PAT. OFF.

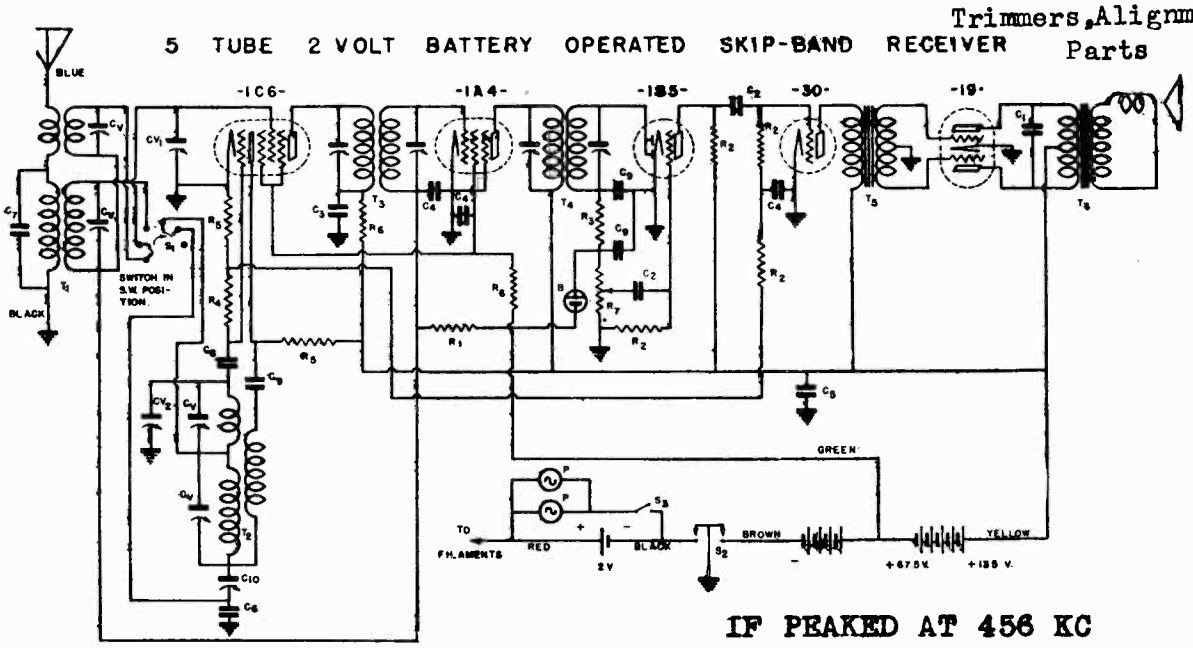


JOHN F. RIDER

THE WALGREEN CO.

MODEL B25-RS
Schematic, Socket
Trimmers, Alignment
Parts

5 TUBE 2 VOLT BATTERY OPERATED SKIP-BAND RECEIVER



IF PEAKED AT 456 KC

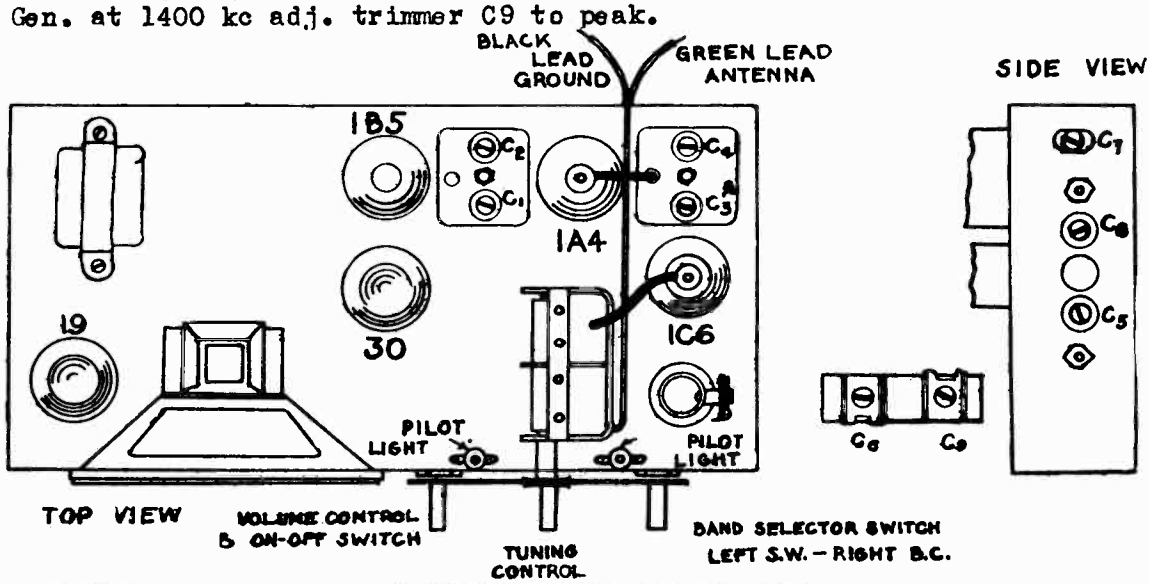
CONVENTIONAL ALIGNMENT - see Index

BROADCAST ALIGNMENT

Gen. at 456 kc mesh condenser and adj. trimmers C1,C2,C3 & C4 to peak.
Gen. and dial at 1400 kc, adj. trimmer C8 and then C6 to peak.
Gen. and dial at 600 kc, adj. trimmer C7, rocking cond., to peak.

SHORT WAVE ALIGNMENT

Gen. and dial at 14 MC adj. trimmer C5 to peak.
Check image at 14.9 Mc.
Gen. at 1400 kc adj. trimmer C9 to peak.



LEGEND	OUR PART NO.	DESCRIPTION
C_1	218	.002 MFD. 600 V. TUBULAR CONDENSER
C_2	211	.01 MFD. 400 V. TUBULAR CONDENSER
C_3	212	.05 MFD. 200 V. TUBULAR CONDENSER
C_4	203	1 MFD. 200 V. TUBULAR CONDENSER
C_5	204	.25 MFD. 200 V. TUBULAR CONDENSER
C_6	410	.0018 MFD. MICA CONDENSER
C_7	412	50 MMFD. MICA CONDENSER
C_8	400	100 MMFD. MICA CONDENSER
C_9	401	250 MMFD. MICA CONDENSER
C_{10}	507	5 PLATE PADDING CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	612	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
R_1	119	1 MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_2	117	$\frac{1}{2}$ MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_3	113	50,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_4	111	25,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_5	109	10,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_6	134	2,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_7	2009C	500,000 VOLUME CONTROL
P	2901	MAZDA #40 PILOT LIGHTS

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1225	SKIP-BAND ANTENNA COIL
T_2	1412	SKIP-BAND OSCILLATOR COIL
T_3	1503	INPUT I.F TRANSFORMER
T_4	1507	DIODE I.F TRANSFORMER
T_5	1019	INTERSTAGE TRANSFORMER
T_6	IN 815	P.M. DYNAMIC SPEAKER TRANSFORMER
S_1	4920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
S_3	—	PILOT LIGHT ECONOMIZER SWITCH
B	3000	BIAS BUTTON

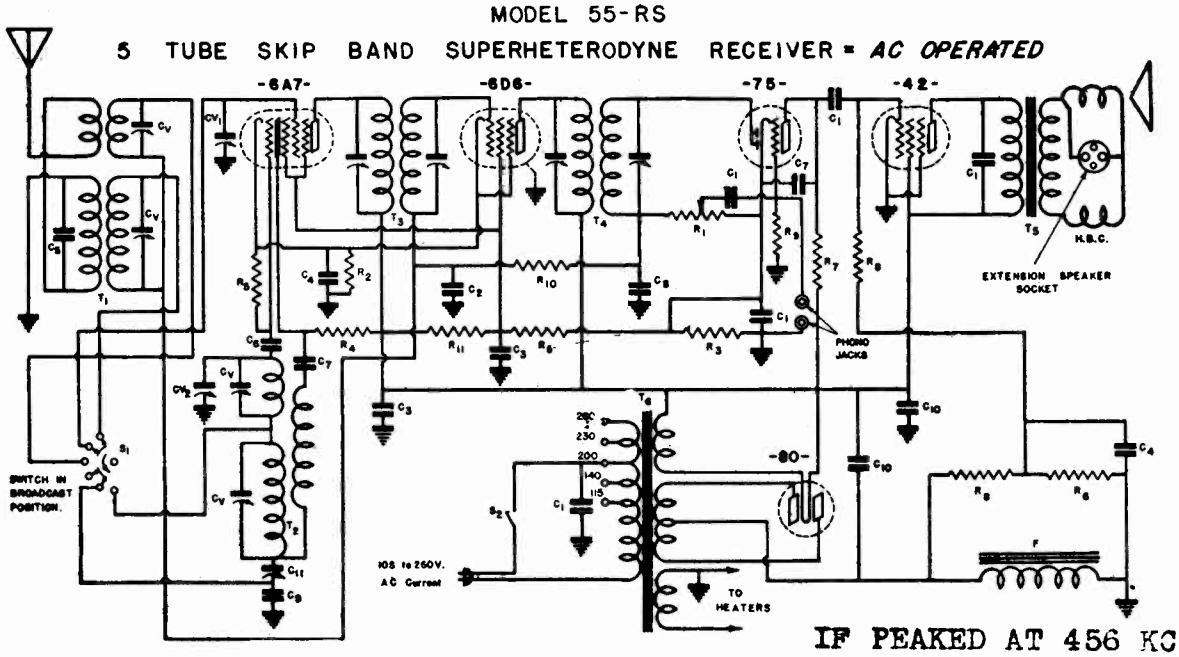
MODEL 55RS
Schematic, Socket

THE WALGREEN CO.

Trimmers, Alignment
Parts

MODEL 55-RS

5 TUBE SKIP BAND SUPERHETERODYNE RECEIVER = *AC OPERATED*



IF PEAKED AT 456 KC

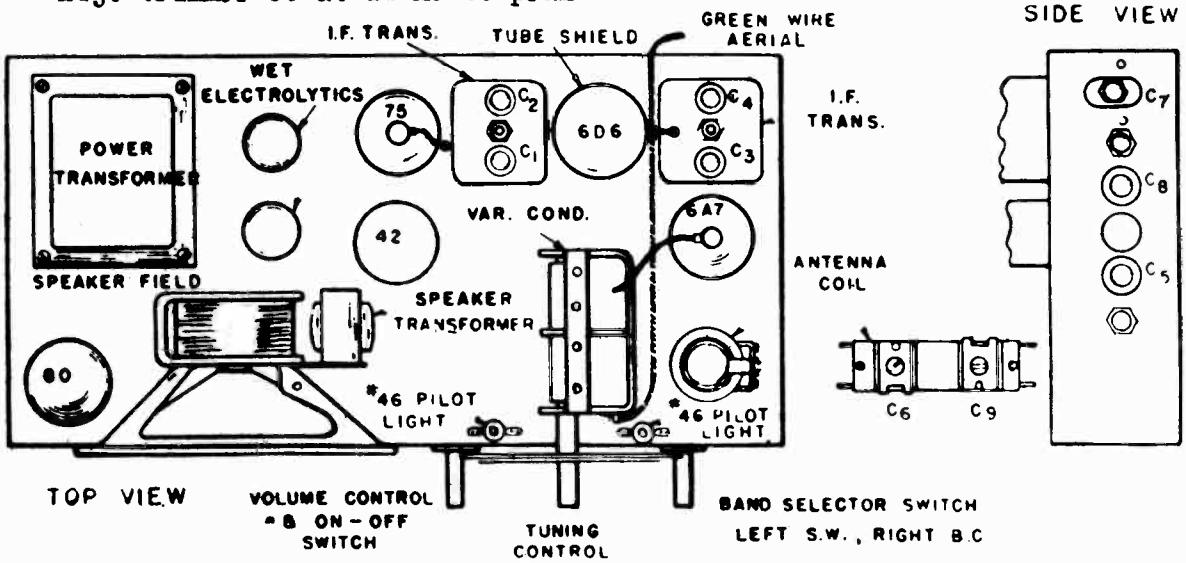
CONVENTIONAL ALIGNMENT - See special section

BROADCAST ALIGNMENT

Gen. at 456 kc mesh condenser & adj. trimmers C1,C2,C3 & C4 to peak.
Gen. & dial at 1400 kc, adj. trimmer C8 and then C6 to peak.
Gen. & dial at 600 kc, adj. trimmer C7, rock cond. and peak.

SHORT WAVE ALIGNMENT

Gen. & dial 14 MC adj. trimmer C5 to peak. Check image at 14.9 Mc.
Adj. trimmer C9 at 14 MC to peak



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD.-400 V. TUBULAR CONDENSER
C_2	203	.1 MFD.-200 V. TUBULAR CONDENSER
C_3	210	.1 MFD.-400 V. TUBULAR CONDENSER
C_4	204	.25 MFD. 200 V. TUBULAR CONDENSER
C_5	412	.00006 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	402	.0005 MFD. MICA CONDENSER
C_9	410	.0018 MFD. MICA CONDENSER
C_{10}	317	8MFD. 450 W.V. WET ELECTROLYTIC COND.
C_{11}	807	5 PLATE PADDING CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	415-A	2 GANG VARIABLE CONDENSER
C_V	500	6-30 MMFD. TRIMMER CONDENSER
T_1	1225	B.C. & SKIP BAND ANTENNA COIL
T_2	1412	B.C. & SKIP BAND OSCILLATOR COIL
T_3	1503	INPUT I.F. TRANSFORMER
T_4	1507	DIODE I.F. TRANSFORMER
T_5	1W 811	SPEAKER TRANSFORMER
T_6	1017	POWER TRANSFORMER
F	1W 811	SPEAKER FIELD (1600 OHMS)
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL.

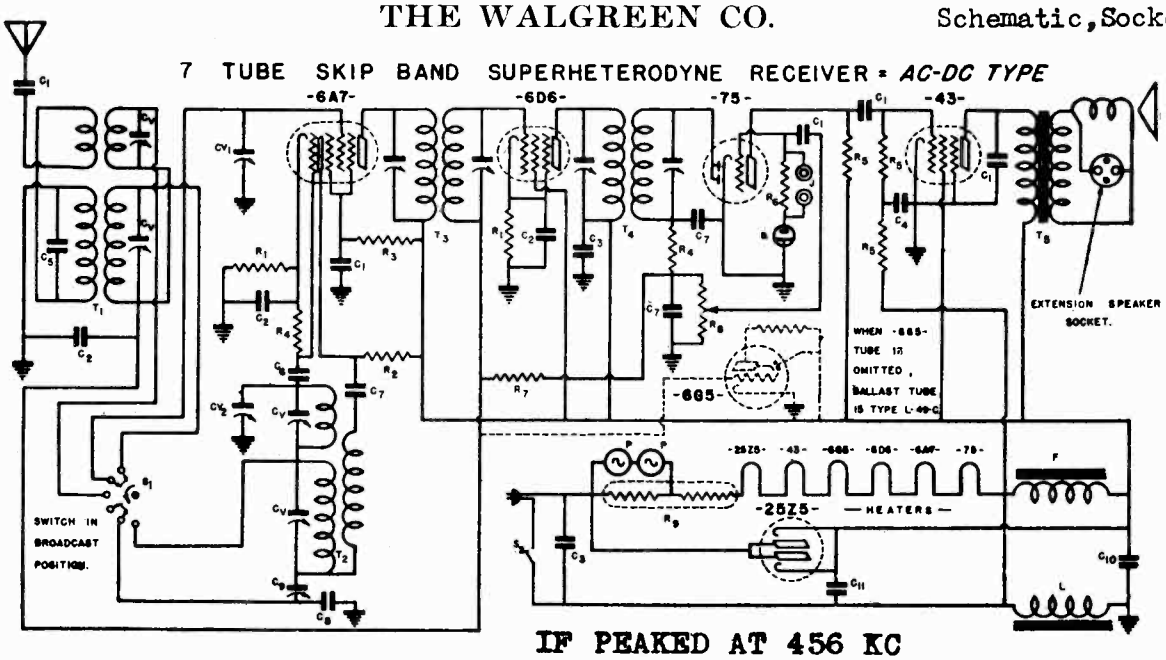
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2009	500,000 OHM VOLUME CONTROL
R_2	103	250 OHM ½ WATT CARBON RESISTOR
R_3	139	400 OHM ½ WATT CARBON RESISTOR
R_4	109	10,000 OHM ½ WATT CARBON RESISTOR
R_5	113	50,000 OHM ½ WATT CARBON RESISTOR
R_6	115	100,000 OHM ½ WATT CARBON RESISTOR
R_7	116	250,000 OHM ½ WATT CARBON RESISTOR
R_8	140	400,000 OHM ½ WATT CARBON RESISTOR
R_9	117	500,000 OHM ½ WATT CARBON RESISTOR
R_{10}	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_{11}	146	25,000 OHM 1 WATT CARBON RESIST.

Trimmers, Alignment Parts

THE WALGREEN CO.

MODEL 57RS
Schematic, Socket

7 TUBE SKIP BAND SUPERHETERODYNE RECEIVER - *AC-DC TYPE*



IF PEAKED AT 456 KC

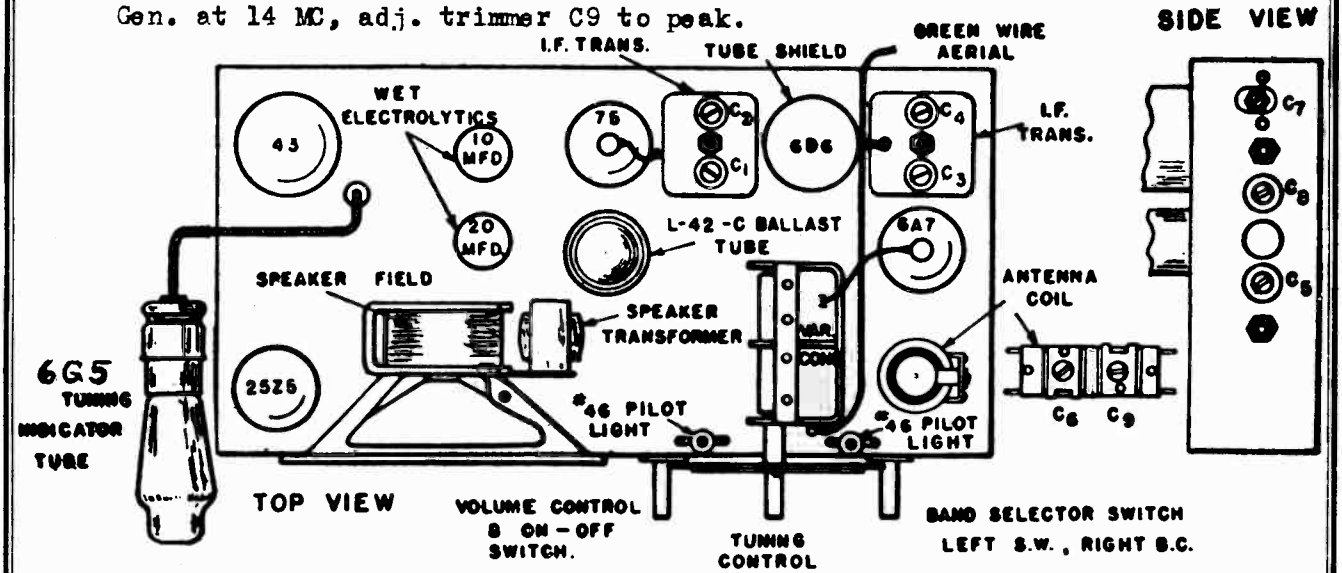
CONVENTIONAL ALIGNMENT - see Index

BROADCAST ALIGNMENT

Gen. at 456 kc, mesh var. cond. and adj. trimmers C1,C2,C3 & C4 to peak.
Gen. and dial at 1400 kc, adj. trimmer C8 and then C6 to peak.
Gen. and dial at 600 kc, adj. C7 to peak.

SHORT WAVE ALIGNMENT

Gen. and dial at 14 MC, adj. trimmers to peak.
Check image at 14.9 MC.
Gen. at 14 MC, adj. trimmer C9 to peak.



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	203	.1 MFD. 200V. TUBULAR CONDENSER
C_3	210	.1 MFD. 400 V. TUBULAR CONDENSER
C_4	204	.25 MFD. 200 V. TUBULAR CONDENSER
C_5	412	.00005 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	410	.0018 MFD. MICA CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
C_{10}	314	10 MFD. 150 W.V. WET ELECTROLYTIC COND.
C_{11}	311	20 MFD. 150 W.V. WET ELECTROLYTIC COND.

LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	1612-A	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
R_1	103	250 OHM ½ WATT CARBON RESISTOR
R_2	108	5000 OHM 1 TT CARBON RESISTOR
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	113	50,000 OHM ½ WATT CARBON RESISTOR
R_5	118	250,000 OHM ½ WATT CARBON RESISTOR
R_6	117	500,000 OHM ½ WATT CARBON RESISTOR
R_7	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_8	2009	500,000 OHM VOLUME CONTROL
R_9	2906	L-42-C BALLAST TUBE (with 665 tube)
R_9	2908	L-49-C BALLAST TUBE (without 6G5 tube)

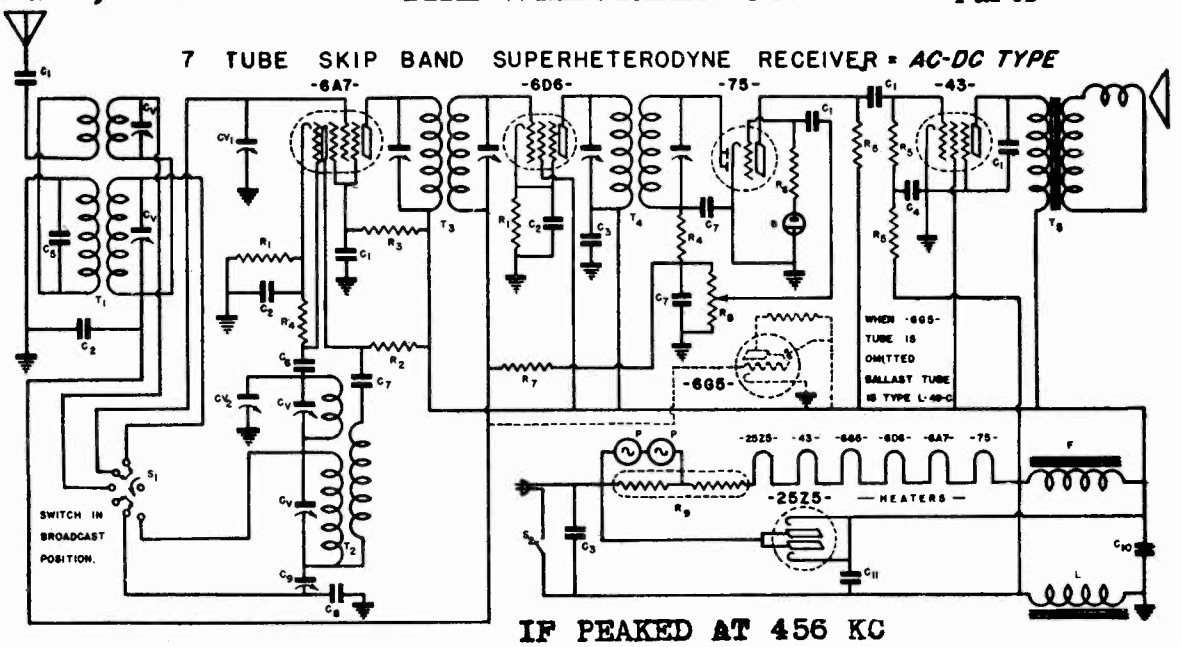
LEGEND	OUR PART NO.	DESCRIPTION
T_1	1225	ANTENNA COIL
T_2	1412	OSCILLATOR COIL
T_3	1607	OUTPUT I.F. TRANSFORMER
T_4	1503	INPUT I.F. TRANSFORMER
T_5	1800	SPEAKER TRANSFORMER
L	1100	FILTER CHOKE
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA NO. 46 PILOT LIGHT
B	3000	BIAS CELL
F	1800	SPEAKER FIELD
J	2230	PHONO JACK

MODEL 370
Schematic, Socket

THE WALGREEN CO.

Trimmers, Alignment
Parts

7 TUBE SKIP BAND SUPERHETERODYNE RECEIVER - *AC-DC TYPE*



IF PEAKED AT 456 KC

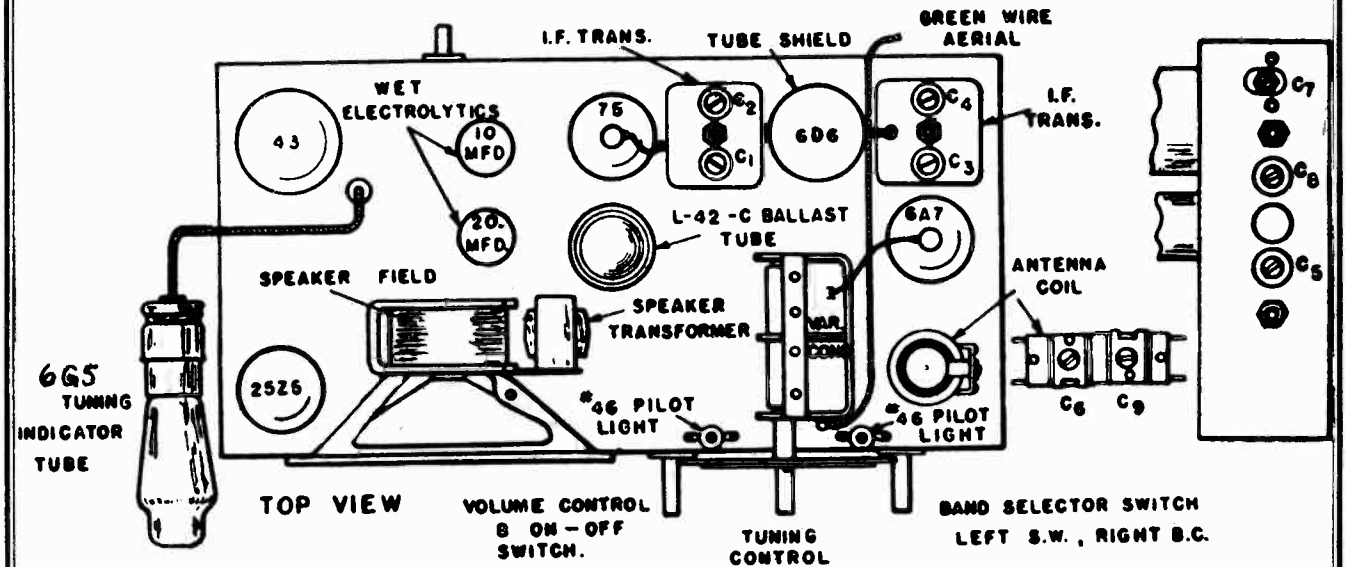
CONVENTIONAL ALIGNMENT - see special section

BROADCAST ALIGNMENT

(1) Adj. trimmers C1,C2,C3 & C4 for max. o.p. at 456 KC. (2) Gen. & dial at 1400 kC adj. trimmers C8 and then C6 to peak. (3) Gen. & dial at 600 kc adj. trimmer C7 to peak.

SHORT WAVE ALIGNMENT

(1) Gen. & dial at 14 MC, adj. trimmer C5 to peak.
(2) Check image at 14.9 MC.(3) Pad Osc. at 14 MC peak by trimmer C9.



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	203	.1 MFD. 200 V. TUBULAR CONDENSER
C_3	210	.1 MFD. 400 V. TUBULAR CONDENSER
C_4	204	.25 MFD. 200 V. TUBULAR CONDENSER
C_5	412	.00005 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	410	.0018 MFD. MICA CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
C_{10}	314	10 MFD. 150 W.V. WET ELECTROLYTIC COND.
C_{11}	311	20 MFD. 450 W.V. WET ELECTROLYTIC COND.

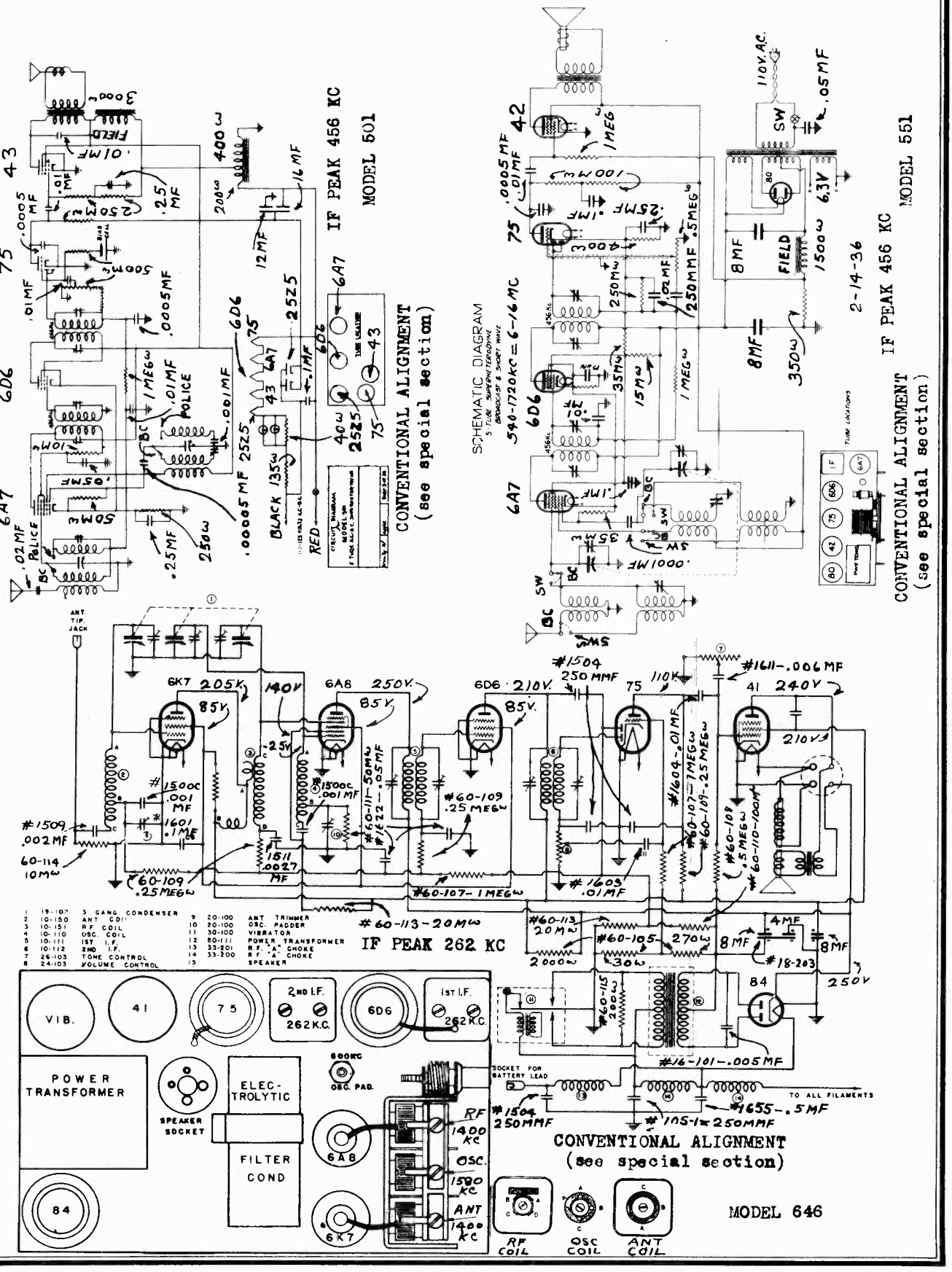
LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-3}	612-A	2 GANG VARIABLE CONDENSER
C_V	500	8-30 MMFD. TRIMMER CONDENSER
R_1	103	250 OHM ½ WATT CARBON RESISTOR
R_2	108	5000 OHM ½ WATT CARBON RESISTOR
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	113	50,000 OHM ½ WATT CARBON RESISTOR
R_5	116	250,000 OHM ½ WATT CARBON RESISTOR
R_6	117	500,000 OHM ½ WATT CARBON RESISTOR
R_7	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_8	2009	500,000 OHM VOLUME CONTROL
R_9	2906	L-42-C BALLAST TUBE (with 6G5 tube)
R_9	2905	L-49-C BALLAST TUBE (without 6G5 tube)

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1225	ANTENNA COIL
T_2	1412	OSCILLATOR COIL
T_3	1507	OUTPUT I.F. TRANSFORMER
T_4	1503	INPUT I.F. TRANSFORMER
T_5	1 IN 800	SPEAKER TRANSFORMER
L	1100	FILTER CHOKE
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA NO. 46 PILOT LIGHT
B	3000	[illegible] CELL
F	1 IN 800	SPEAKER FIELD

Schematics, Socket Trimmers, Alignment

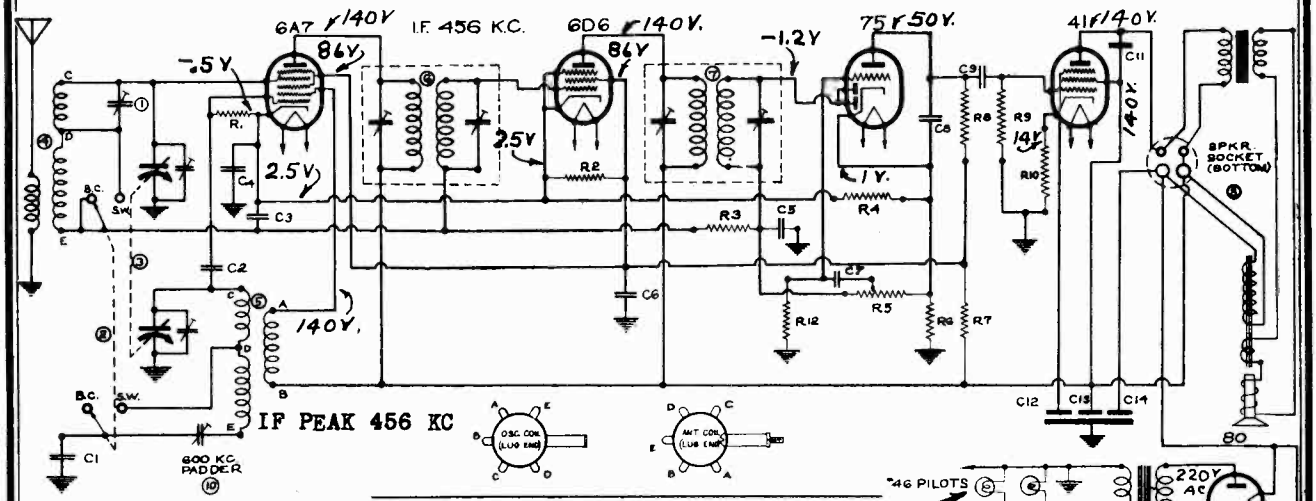
WARWICK MFG. CO.

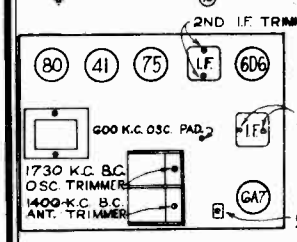
MODEL 501
MODEL 551
MODEL 646 Auto



MODEL 518
MODEL 536
Schematic, Voltage
Socket, Trimmers
Alignment, Parts

WARWICK MFG. CO.



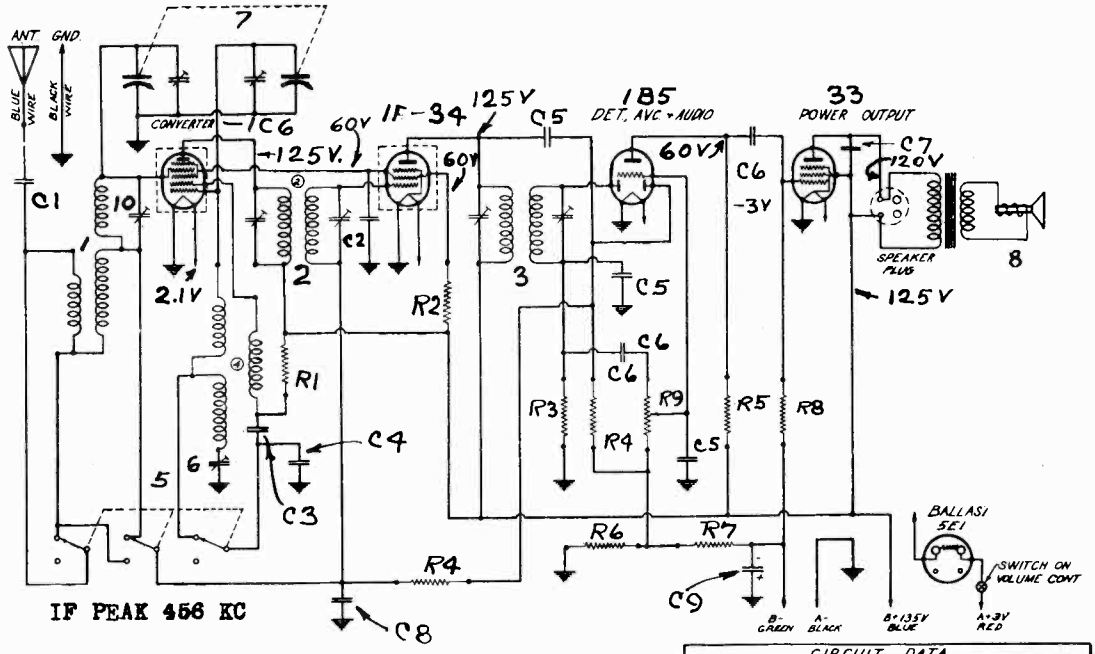


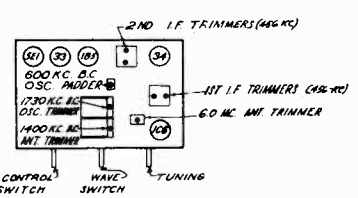
TUBE LOCATION

CIRCUIT DATA

PART NO.		DESCRIPTION		PART NO		DESCRIPTION	
C1	15-100	.00157 MFD.		R1	6028	40,000 OHMS	1/3 W
C2	1501	.0001 "		R2	6117	25,000 OHMS	1/2 W
C3	1622	.05 "	200v.	R3	6018	500,000 "	1/3 W
C4	1614	.25 "	"	R4	6011	100 "	"
C5	1504	.00025 "		R5	24-102	500,000 "	VOL. CONT.
C6	1607	.05 "	400v.	R6	6009	50 "	1/3 W
C7	1603	.01 "		R7	6105	10,000 "	1/2 W
C8	1504	.00025 "		R8	6056	200,000 "	1/3 W
C9	1603	.01 "		R9	6018	500,000 "	"
C10	1651	.004 "	600 V	R10	6052	600 "	"
C11	1651	.004 "	600 v.	R12	6017	1.0 MEG "	"
C12		4 MFD. 25v. YELLOW		3	10-147	OSC. COIL	
C13	18-102	4 " 250v. GREEN		6	1123	FIRST I.F. COIL	
C14		8 " 250v. RED		7	1124	SECOND I.F. "	
1	2054	S.W. ANT. TRIMMER		8		SPEAKER	
2	6922	WAVE BAND S.W.		9	80-104	POWER TRANSFORMER	
3	19-107	GANG CONDENSER		10	20-100	PADDER	
4	10-129	ANT. COIL					

MODEL 518
CONVENTIONAL ALIGNMENT
(see special section)





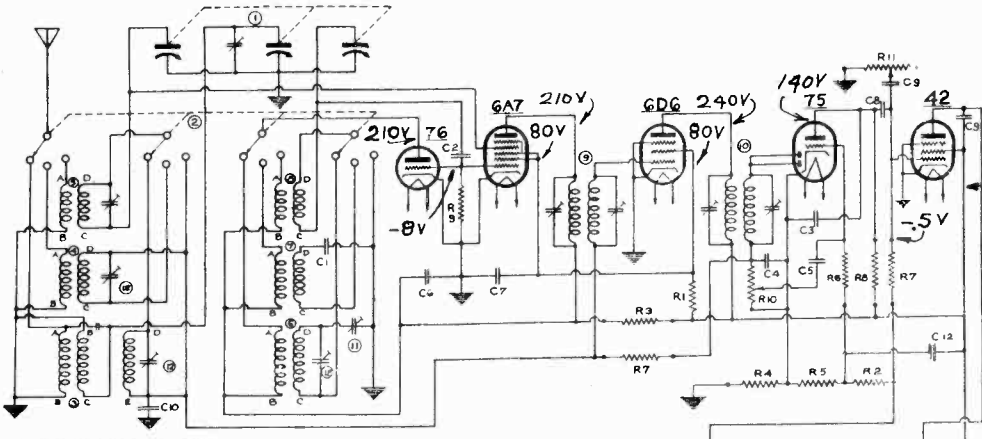
MODEL 536
CONVENTIONAL ALIGNMENT
(see special section)

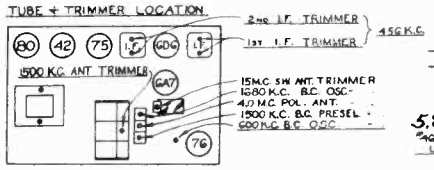
CIRCUIT DATA

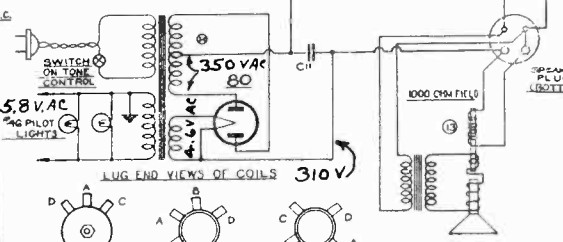
PART No.		DESCRIPTION		PART No.		DESCRIPTION
C1	1628	.01 MFD	200v	1	10-183	B.C. + S.W. ANT. COIL
C2	1601	.1	400v.	2	1156	1st I.F. TRANSFORMER
C3	1500	.001	MICA	3	1157	2nd I.F. "
C4	1509 D	.002	1.5% MICA	4	10-184	B.C. + SW OSC. COIL
C5	1504	.00025 MFD	"	5	20-101	WAVE BAND SWITCH
C6	1604	.01 MFD	600v.	6	20-100	OSC. PADDING COND.
C7	1611	.006	600v	7	19-107	GANG VAR. COND
C8	1600	.1	200v.	8	79-113	SPEAKER
C9	16-100	10	25v ELEC.	10	2054	S.W. ANT TRIMMER
R1	6028	15000 OHMS 1/3 W				
R2	6027	25000				
R3	6018	500,000				
R4	6017	1.0 MEG				
R5	6024	250,000				
R6	6011	100				
R7	6058	800				
R8	6018	500,000				
R9	24-102	500,000	VOL CONT			

WARWICK MFG. CO.

MODEL 601
MODEL 613
Schematics, Voltage
Socket, Trimmers
Alignment, Parts







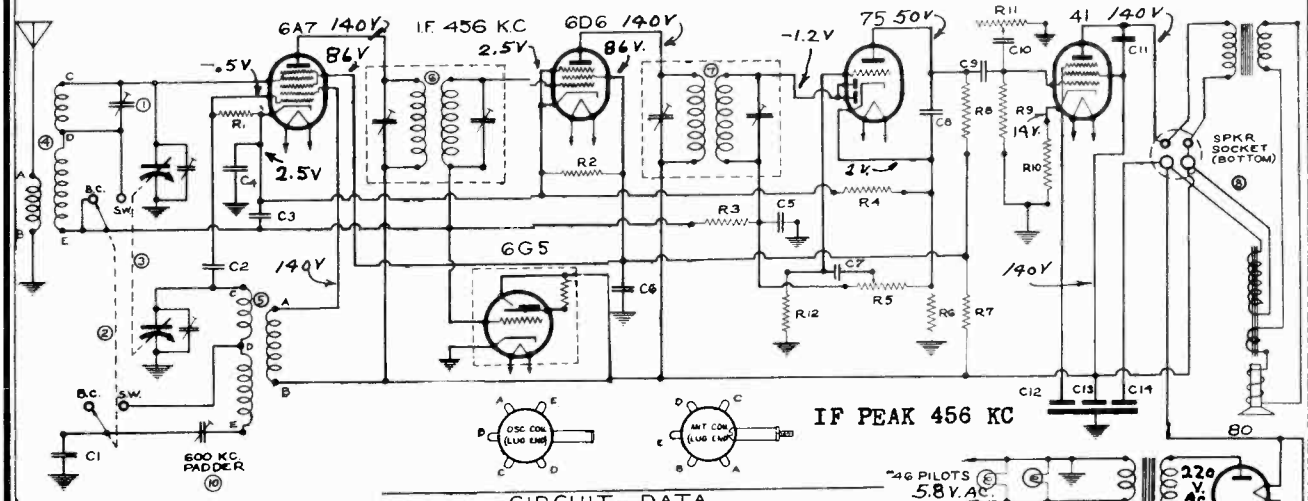
IF PEAK 456 KC

MODEL 601

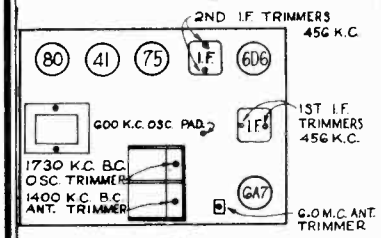
CONVENTIONAL ALIGNMENT
(see special section)

CIRCUIT DATA

	PART No.	DESCRIPTION		PART No.	DESCRIPTION
C1	1500C	.0009 MFD. MICA	R7	6018	800,000 OHMS 1/3W
C2	1503	.00005 " "	R8	6024	250,000 "
C3	1502	.0005 " "	R9	6023	50,000 "
C4	1504	.00025 " "	R10	24-101	500,000 VOL. CONTR.
C5	1605	.02 " 400 v	R11	26-101	500,000 TONE CONTR.
C6	1602	.1 " 600 v	1	19-106	GANG
C7	1601	.1 " 400 v	2	69-103	SWITCH
C8	1648	.03 " 600 v	3	10-137	B.C. ANT. + PRESELECTOR
C9	1651	.004 " "	4	10-135	POL. " COIL
C10	1622	.05 " 200	5	10-132	S.W. " "
C11	18-202	10.0 ELECTROLYTIC	6	10-134	B.C. OSC. "
C12	18-201	12.0 "	7	10-136	POL. " "
			8	10-133	S.W. " "
R1	6211	15,000 OHMS 1W.	9	1123	1ST I.F.
R2	80-100	200 " 1W. 5%	10	1124	2ND I.F.
R3	6115	1000 " 1/2 W. "	11	20-100	B.C. OSC. PADDER
R4	60-103	30 " " 5%	12	20-101	TRIMMER GANG
R5	60-104	20 " "	13		SPEAKER
R6	6020	2.0 MEG. " 1/3 W	14	80-105	POWER TRANSF.



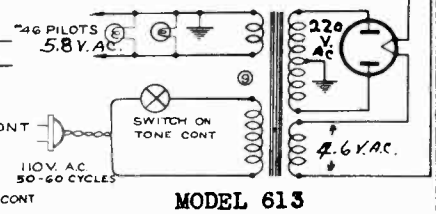
IF PEAK 456 KC



TUBE LOCATION

CIRCUIT DATA

	PART No.	DESCRIPTION		PART No.	DESCRIPTION
C1	15-100	.00157 MFD.	R1	6028	40,000 OHMS 1/3 W
C2	1501	.0001 "	R2	6117	25,000 " 1/2 W
C3	1622	.25 " 200v.	R3	6018	500,000 " 1/3 W
C4	1614	.25 " "	R4	6011	100 " "
C5	1504	.00025 "	R5	24-101	500,000 " VOL. CONT
C6	1607	.05 " 400v.	R6	6009	50 " 1/3 W
C7	1603	.01 " "	R7	6105	10,000 " 1/2 W
C8	1504	.00025 "	R8	6056	200,000 " 1/3 W
C9	1603	.01 " "	R9	6018	500,000 " "
C10	1651	.004 " 600v.	R10	6052	800 " "
C11	1651	.004 " 600v.	R11	26-101	500,000 " TONE CONT
C12	18-102	4 MFD 25v YELLOW	R12	6017	1.0 MEG. "
C13		4 " 250v. GREEN	5	10-147	OSC. COIL
C14		8 " 250v. RED	6	1123	1ST I.F.
1	2054	S.W. ANT TRIMMER	7	1124	2ND I.F.
2	6922	WAVE BAND SW.	8	79-204	6 INCH SPEAKER
3	19-107	GANG COND.	9	80-104	POWER TRANSFORMER
4	10-125	ANT COIL	10	20-100	PADDER
			8	79-206	8 INCH SPEAKER



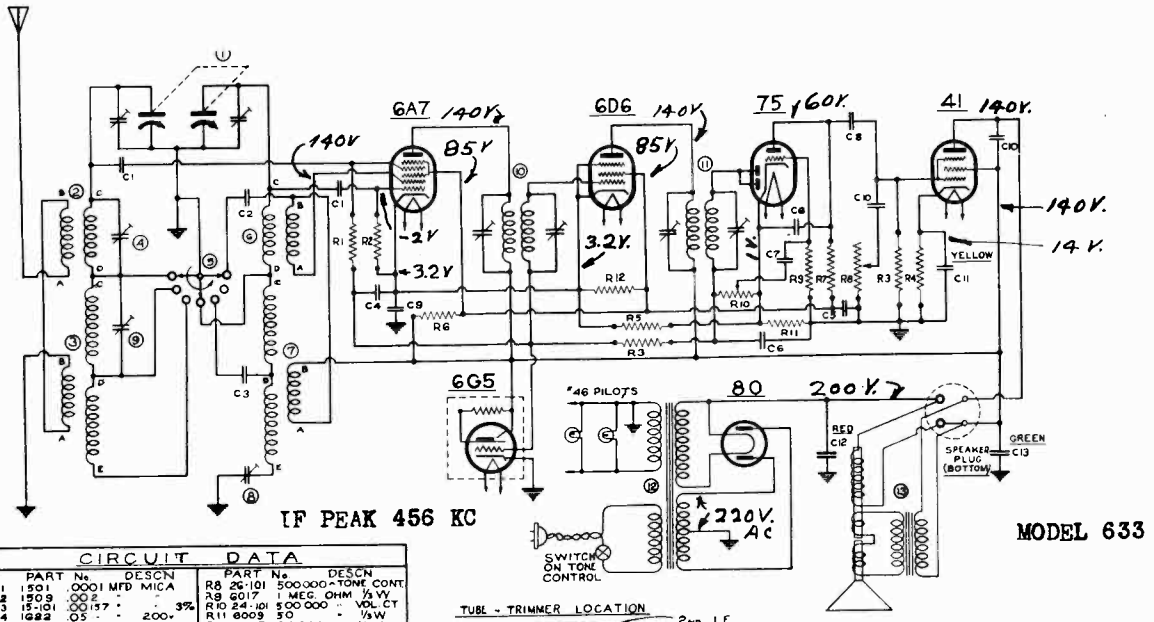
MODEL 613

CONVENTIONAL ALIGNMENT
(see special section)

MODEL 633
MODEL 651
Schematics, Voltage

WARWICK MFG. CO.

Socket, Trimmers
Alignment, Parts



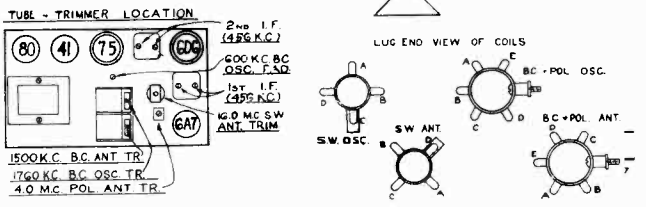
IF PEAK 456 KC

MODEL 633

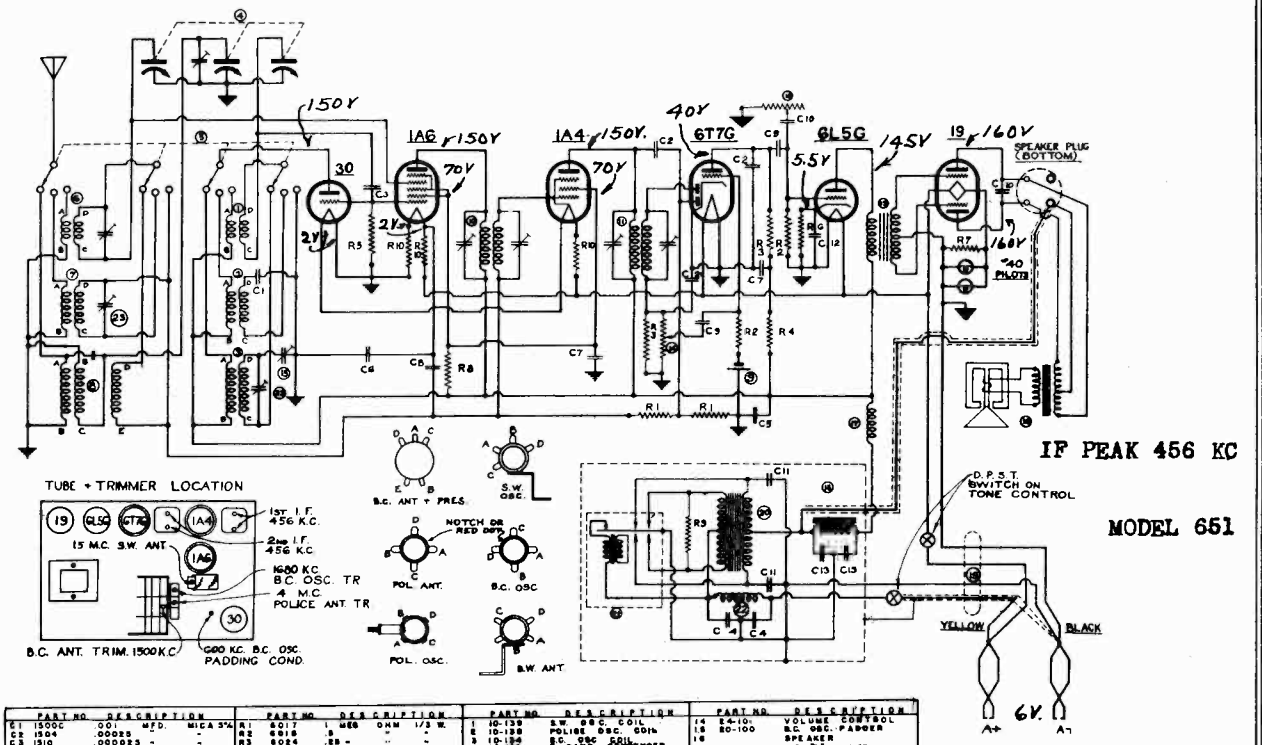
CIRCUIT DATA

	PART No.	DESCN
C1	1501	.0001 MFD MICA
C2	1509	.002 " "
C3	15-101	.00157 " " 3%
C4	1682	.05 " " 200V
C5	1607	.05 " " 400V
C6	1504	.00025 " MICA
C7	1603	.01 " " 400V
C8	1603	.01 " " 400V
C9	1614	.25 " " 200V
C10	1651	.004 " " 600V
C11	18-102	4 MFD 25V ELECTRO
C12		8 " 50V "
C13		4 " 250V "
R1	6020	2 MEG OHM 1/3 W
R2	6028	40,000 " "
R3	6018	500,000 " "
R4	6052	800 " "
R5	6011	100 " "
R6	6105	10,000 " 1/2 W
R7	6056	200,000 " 1/3 W

	PART No.	DESCN
R8	26-101	500,000 TONE CONT.
R9	6017	1 MEG OHM 1/3 W
R10	24-101	500,000 " VOL. CT
R11	6009	50 " 1/3 W
R12	6117	25,000 " 1/2 W
1	19-107	GANG COND.
2	10-128	S.W. ANT COIL
3	10-129	POL + BC ANT "
4	2052	SW ANT TRIMMER
5	69-102	WAVE SWITCH
6	10-127	SW OSC. COIL
7	10-128	POL + BC OSC COIL
8	20-100	600 KC BC OSC PAD
9	2054	POL ANT TRIMMER
10	1123	1st I.F.
11	1124	2nd I.F.
12	80-104	POWER TRANSFMR
13		SPEAKER



CONVENTIONAL ALIGNMENT
(see special section)



IF PEAK 456 KC

MODEL 651

PART NO.	DESCRIPTION
C1	1500C .001 MFD. MICA 5%
C2	1504 .00025 " "
C3	1510 .000025 " "
C4	1853 .1 " 600V
C5	1818 .25 " 400V
C6	1614 .25 " 200V
C7	1601 .1 " 400V
C8	1600 .1 " 200V
C9	1603 .01 " 400V
C10	1611 .006 " 600V
C11	1604 .01 " 600V
C12	16-100 10 M.F.D. 25V. ELECTROLYTIC
C13	1845 8 " 150V "

PART NO.	DESCRIPTION
R1	6017 1 MEG OHM 1/3 W.
R2	6016 .5 " "
R3	6024 .25 " "
R4	6058 100,000 " "
R5	6025 50,000 " "
R6	6006 1500 " "
R7	6007 500 " "
R8	6117 25,000 " 1/2 W.
R9	6101 100 " "
RFC	80-102 33 1/3 " WIRE WOUND

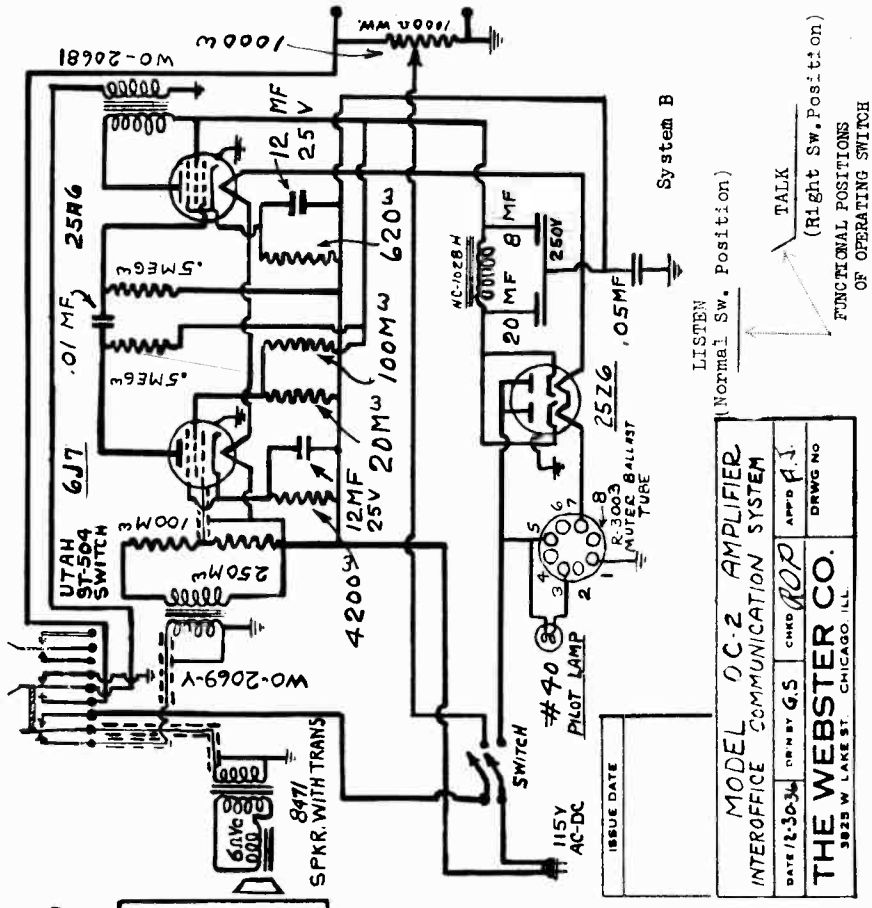
PART NO.	DESCRIPTION
1	10-139 S.W. OSC. COIL
E	10-138 POLICE OSC. COIL
2	10-136 B.C. OSC. COIL
3	19-106 GANG CONDENSER
5	69-103 WAVE SWITCH
6	10-132 S.W. ANT. COIL
7	10-135 POLICE ANT. COIL
8	10-137 B.C. ANT. & PRESEL. COIL
9	4000 BIAS CELL
10	1153 1ST I.F. TRANSFORMER
11	1154 2ND I.F. TRANSFORMER
12	80-105 TONE CONTROL
13	0000 PUSH-PULL AUDIO TRANS.

PART NO.	DESCRIPTION
14	E4-101 VOLUME CONTROL
15	80-100 B.C. OSC. PADDER
16	SPEAKER
17	3303 R.F. "B" CHOKE
18	3307 FILTER
19	83-103 BATTERY CABLE
20	0061 POWER TRANSFORMER
21	3407 VIBRATOR
22	3313 R.F. "A" CHOKE
23	88-102 TRIMMER STRIP

CONVENTIONAL ALIGNMENT
(see special section)

WEBSTER CO.

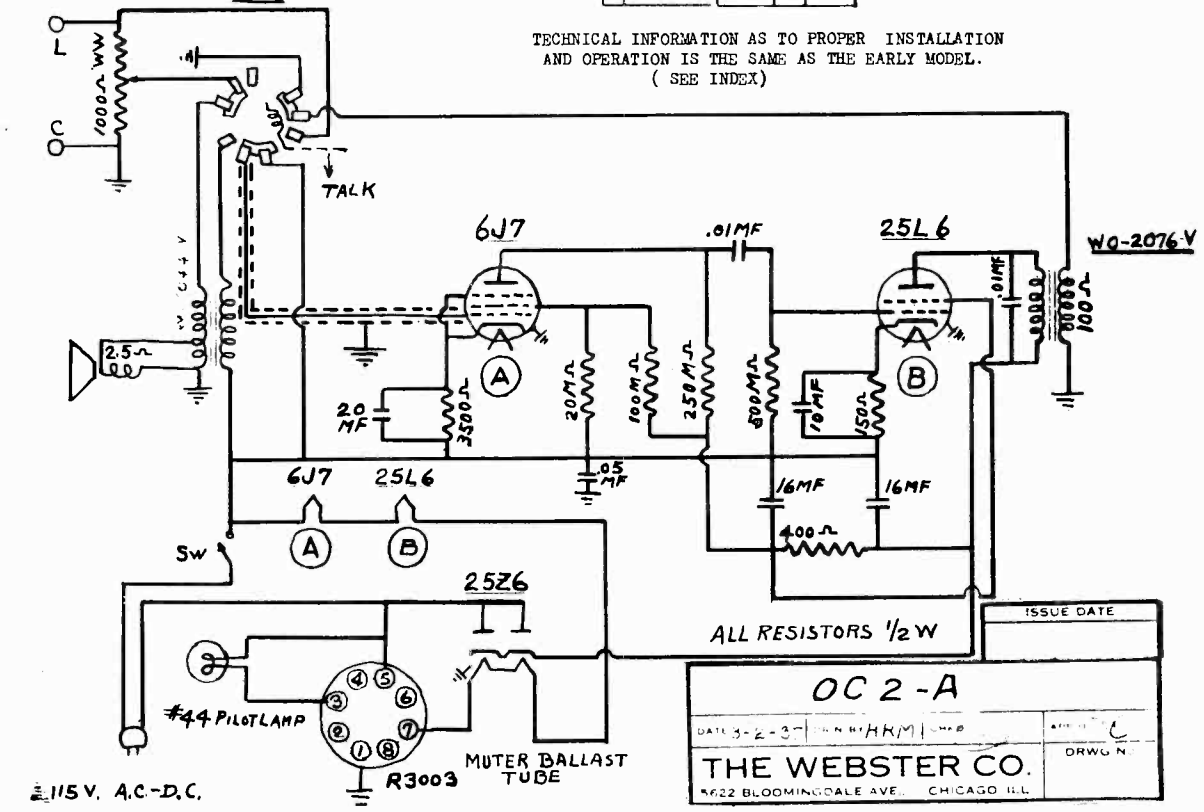
MODEL B, Commun. Sys.
MODEL OC-2 Amplifier
MODEL OC-2A Amplifier
Schematics, Notes



This system is built for operation on 115 Volt D.C., and 115 Volt A.C., 25,40,50 and 60 cycles. IF THE SYSTEM FAILS TO OPERATE WHEN CONNECTED TO D.C. LINE REVERSE THE POWER CORD PLUG.

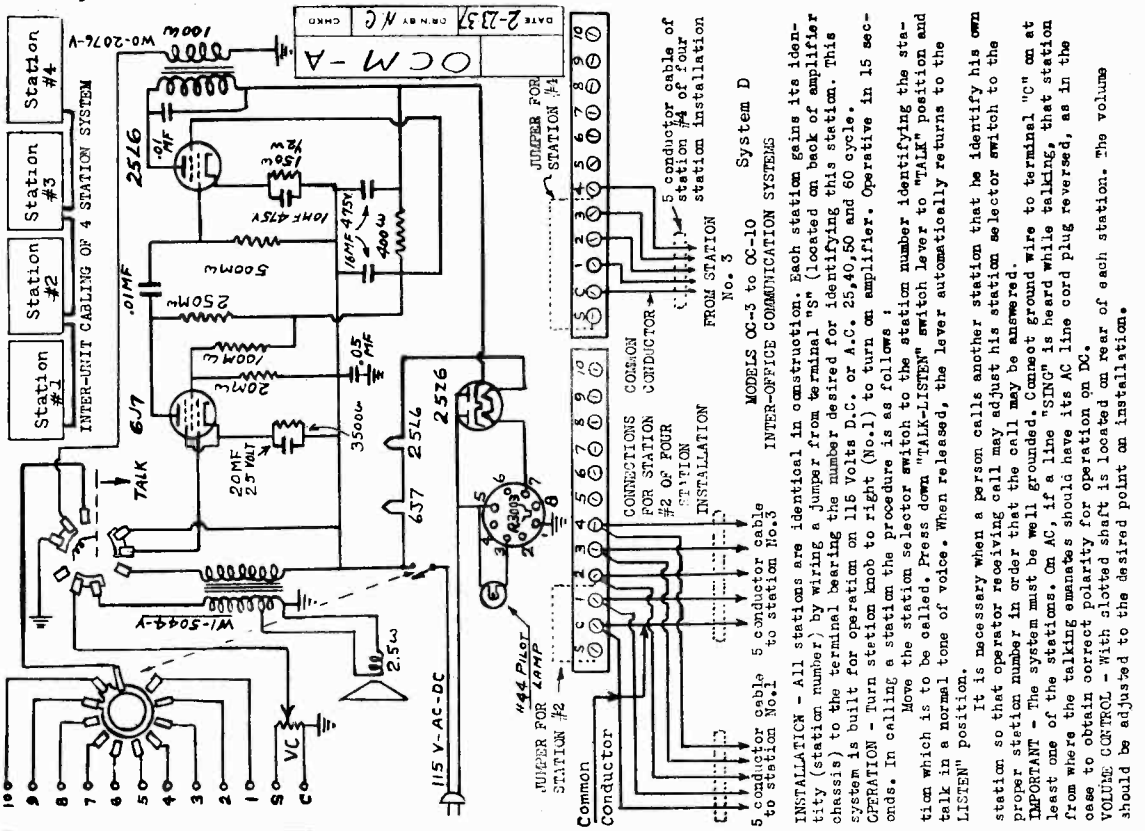
INSTALLATION Each cabinet contains its own amplifier, and its power cord should be inserted into the nearest light receptacle. The two wires of a two conductor unshielded cord should be connected to lugs at the rear of chassis. The right hand terminal is grounded. The other terminal (ungrounded) is indicated by a red dot. Webster two conductor cable is recommended but whatever cable is used should be color coded so that the same wire is connected to ground on both of the amplifiers. A volume control is mounted on the rear side of the chassis controlling the volume of the station. This control is set for the desired volume. OPERATION- After "ON-OFF" switch is turned on, in 15 seconds station is operative. The "OFF-ON" switch controls the operation of each unit. The only other control is the operation switch, wich, in its normal position, is for listening. Operator turns switch to right hand position to talk, must be held in position while talking, when released it returns to listening position.

TECHNICAL INFORMATION AS TO PROPER INSTALLATION AND OPERATION IS THE SAME AS THE EARLY MODEL.
(SEE INDEX)



MODEL C, Commun. Sys.
MODELS OXC & OXM
MODEL D, Commun. Sys.
MODELS OC-3 to OC-10
Schematics, Notes

WEBSTER CO.



INSTALLATION - All stations are identical in construction. Each station gains its identity (station number) by wiring a jumper from terminal "S" (located on back of amplifier chassis) to the terminal bearing the number desired for identifying this station. This system is built for operation on 115 Volts D.C. or A.C. 25,40,50 and 60 cycle.

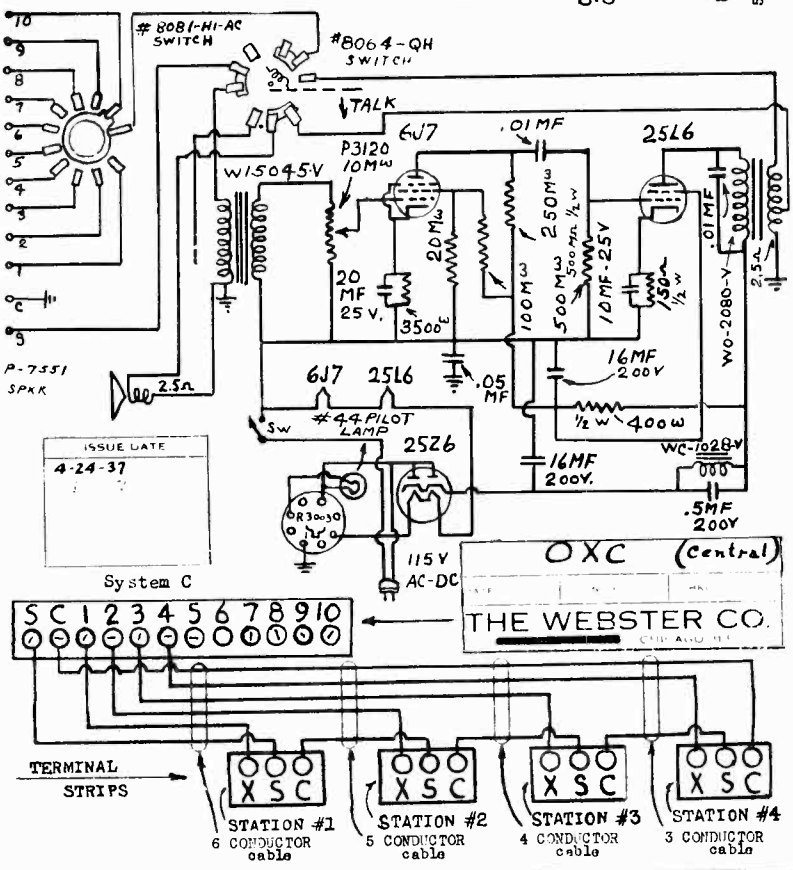
OPERATION - Turn station knob to right (No.1) to turn on amplifier. Operative in 15 seconds. In calling a station the procedure is as follows :

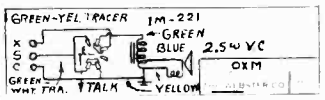
Move the station selector switch to the station number identifying the station which is to be called. Press down "TALK-LISTEN" switch lever to "TALK" position and talk in a normal tone of voice. When released, the lever automatically returns to the LISTEN" position.

It is necessary when a person calls another station that he identify his own station so that operator receiving call may adjust his station selector switch to the proper station number in order that the call may be answered.

IMPORTANT - The system must be well grounded. Correct ground wire to terminal "C" on at least one of the stations. On AC, if a line "SING" is heard while talking, that station from where the talking emanates should have its AC line cord plug reversed, as in the case to obtain correct polarity for operation on DC.

VOLUME CONTROL - With slotted shaft is located on rear of each station. The volume should be adjusted to the desired point on installation.





INSTALLATION-

Terminal "S" of OXC is connected to "S" of OXM, station #1. Terminal "C" station #1 to "S" of station # 2. Other stations may be connected in a similar manner. From the last outlying station, the terminal "C" is connected back to the terminal "C" of OXC central. Terminal "X" on each station is wired to number on OXC terminal strip corresponding to station number on OUTLYING STATION.

OPERATION -

There can be no inter-communication between OXM units. Central may call any station with selector switch, and "TALK-LISTEN" switch in the "TALK" position. Release switch to listen. Outlying stations may call central in the same manner but must be identified to operator for proper selector switching in order that the outlying station may listen.

IMPORTANT -

For AC operation, if buzz is heard, the line cord plug should be reversed (FOR OXC). Buzzes may also be caused by defective tubes. For DC operation, line cord must be plugged in with proper polarity.

VOLUME CONTROL -The volume control, at rear of chassis (reached thru a ventilating hole thru back of cabinet) should be adjusted with a screw driver to desired volume.

Sensitivity

WELLS-GARDNER & CO.

MODEL OEL
Schematic

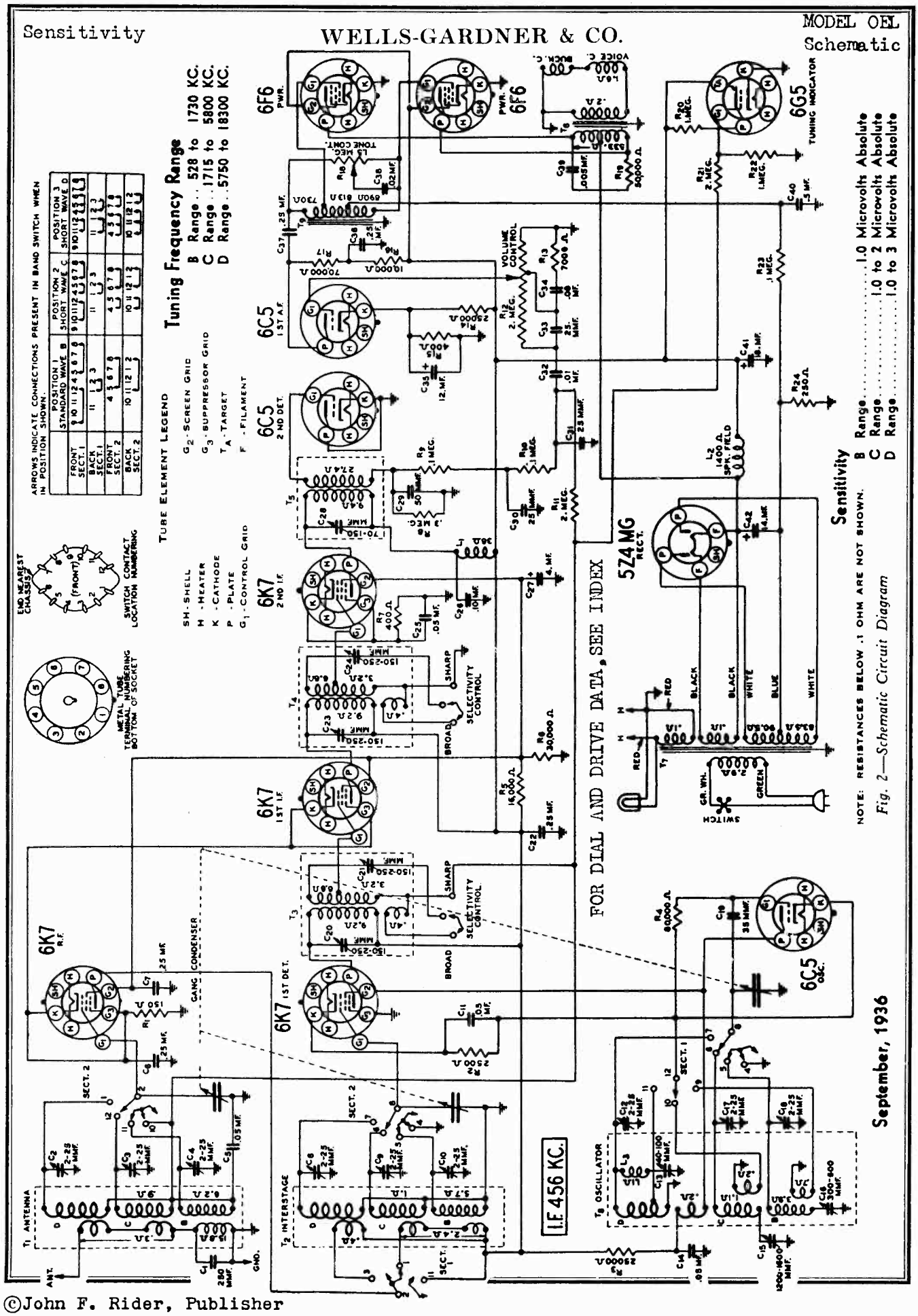


Fig. 2—Schematic Circuit Diagram

MODEL OEL
Socket, Trimmers
Voltage, Coils

WELLS-GARDNER & CO.

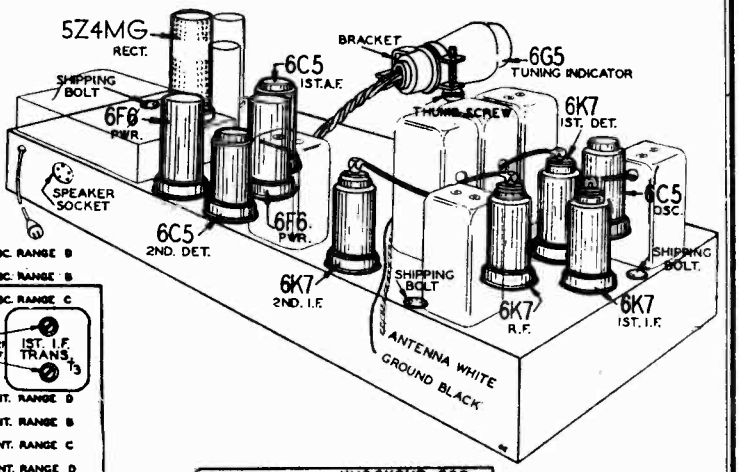


Fig. 6—Location of Tubes

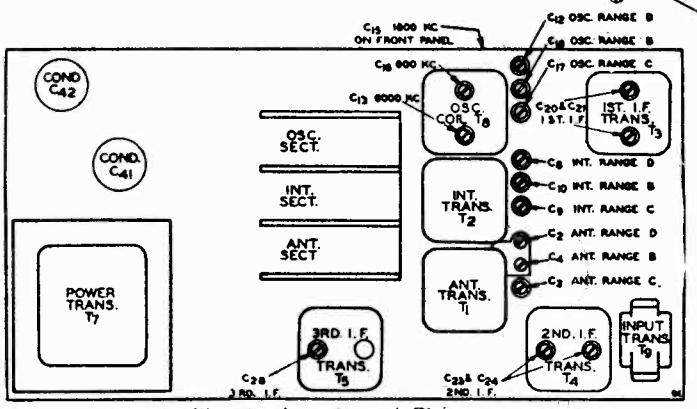


Fig. 3—Location of Trimmers

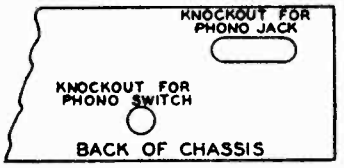
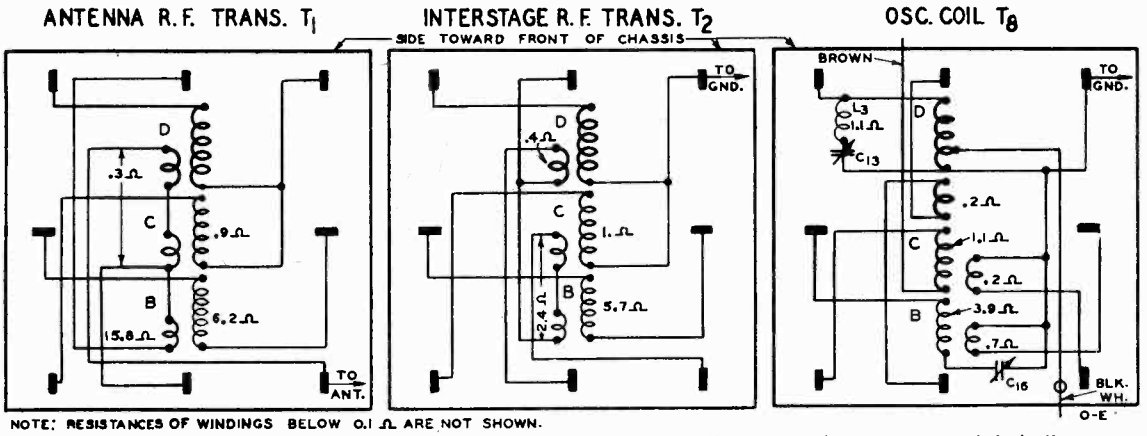


Fig. 8—Location of Phono Knockouts



NOTE: RESISTANCES OF WINDINGS BELOW 0.1 Ω ARE NOT SHOWN.

Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.1(1)	250	100	2.5	...	6.1(1)	2.5
6K7	1st Det.	0	6.1(1)	250	120	0	...	6.1(1)	9
6C5	Osc.	0	6.1(1)	120	...	...	...	6.1(1)	0
6K7	1st I.F.	0	6.1(1)	250	100	2.5	...	6.1(1)	2.5
6K7	2nd I.F.	0	6.1(1)	250	100	3	...	6.1(1)	3
6C5	2nd Det.	0	6.1(1)	0	...	...	...	6.1(1)	0
6C5	1st A.F.	0	6.1(1)	110	...	...	...	6.1(1)	4.5
6F6	Power Amp.	0	6.1(1)	330	250	25(2)	...	6.1(1)	0
5Z4MG	Rect.	0	4.8(3)	...	640(4)	...	640(4)	...	4.8(3)

6G5	Tuning Indicator	Plate to Ground 20(5)	Target to Ground 250	Cathode to Ground 0	Across Heater 6.1 A.C.

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) As read across resistor R24.
(3) A.C. voltage as read across heater terminals 2 and 8.
(4) A.C. voltage as read across terminals 4 and 6.
(5) As read with 500,000 ohm meter.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Re-tighten the screw.

In sets using the moving beam of light, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Re-tighten the screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the white wire connected to the insulated lug of the terminal strip on which one end of condenser C32 is also connected. The terminal strip is located at the back of the volume control. This wire is then connected to the phono switch as shown in Fig. 7. A wire is then connected from the lug on the above mentioned terminal strip to the phono switch, as shown in Fig. 7. Both of the above wires are connected to the switch terminals nearest the chassis base and should be twisted together as far

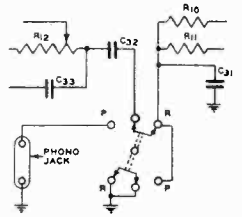


Fig. 7—Phonograph Connections

as possible and run as close to the back of the chassis base as possible.

The lead to condenser C32, after turning away from the back of the chassis base, should be run close to the 6C5 tube sockets.

Complete the other connections as illustrated in Fig. 7, using the lugs in the chassis base, located near the phono switch and jack, for grounding purposes.

The control grid lead of the 6F6 power tube nearest the back of the chassis should be removed and a longer lead substituted. This lead is run from the tone control to the back of the chassis, along the lower edge and is then brought to the grid terminal by being routed between the speaker socket and the tubular condenser next to it.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 5 On the schematic circuit diagram, Fig. 2, is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

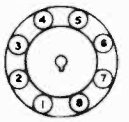


Fig. 5—Metal Tube Terminal numbering (bottom of socket)

MODEL OEL
Notes,Parts

WELLS-GARDNER & CO.

Referring to the 1st and 2nd I.F. transformers T3 and T4 in Fig. 2, it will be noted that there are coupling windings shown below the primaries in the illustration.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

Across the volume control resistor R12 is a filter composed of condensers C33 and C34 and resistor R13. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the movable arm approaches the tap, the higher frequencies are by-passed through condenser C34. Very high frequencies are transmitted through condenser C33 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Transformer coupling is used between the first audio stage and the output stage which employs two type 6F6 output pentode tubes in a stage of push-pull amplification. A type 5Z4MG (metal glass tube) full wave rectifier is used in the power unit.

The 6G5 tuning indicator tube is wired as shown in the schematic. This tube contains a triode and cathode ray section in one envelope.

The cathode ray is produced by the attraction of electrons from the upper end of the cathode to the coated target or anode, which is operated at a high positive potential. When this electron stream strikes the target the coating glows. The electron stream is controlled by an additional element, or control electrode, in the tube.

As a signal is tuned in, the control grid of the triode section of the 6G5 cathode ray tube becomes increasingly negative, the negative bias voltage being taken from the AVC line. The AVC voltage is reduced to a suitable value by the potentiometer arrangement of the 1 and 2 megohm resistors. The increased bias voltage reduces the triode plate current. This reduces the voltage drop across the 1 megohm plate resistor and raises the triode plate voltage. The triode plate is connected to the control electrode of the cathode ray section of the tube.

The shape and size of the area on the target struck by the cathode ray is governed by the voltage of the control electrode. When the signal is tuned to resonance, practically no plate current flows and the voltage of the control electrode is the same as that of the target. There is no opposition to the flow of electrons to the target. Tuning off resonance decreases the control electrode voltage and causes the darkened sector of the target to widen, because of the opposition to the flow of electrons in the direction of the control electrode.

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

Prices subject to change without notice

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A622	T1	Antenna Transformer and Can Assembly	$1.90
P-9A623	T2	R. F. Interstage Transformer and Can Assembly	1.85
P-9A625	T3	1st I. F. Transformer and Can Assembly	1.85
P-9A626	T4	2nd I. F. Transformer and Can Assembly	1.85
P-9A627	T5	3rd I. F. Transformer and Can Assembly	1.50
P-51X41	T6	Output Transformer (Part of Speaker Assembly)	2.45
P-53X113	T7	115 Volt, 60 Cycle, Power Transformer	4.40
P-53X126	T7	115 Volt, 25 Cycle, Power Transformer	7.20
P-53X127	T7	115-230 Volt, 40-60 Cycle Power Transformer	6.20
P-9A624	T8	Oscillator Coil and Can Assembly	2.05
P-50X34	T9	Input Transformer	1.25
P-9A496	L1	2nd I. F. Plate Isolating Reactor	.75

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X80	C5	.05 mf.	180	$0.15
P-46X117	C6	.25 mf.	180	.25
P-46X104	C7	.25 mf.	240	.25
P-46X80	C11	.05 mf.	180	.15
P-46X119	C14	.05 mf.	360	.20
P-46X121	C22	.25 mf.	360	.30
P-46X80	C25	.05 mf.	180	.15
P-46X105	C26	.10 mf.	360	.20
P-46X120	C32	.01 mf.	360	.15
P-46X176	C34	.08 mf.	180	.15
P-49X10	C36	.25 mf.	360	.60
	C37	.25 mf.	360	
P-46X120	C38	.01 mf.	360	.15
P-46X174	C39	.005 mf.	1000	.20
P-46X191	C40	.5 mf.	180	.30

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage		List Price
P-45X213	C27	4 mf.	150	Dry	.95
	C35	12 mf.	25		
P-44X11	C41	18 mf.	290	Wet	1.10
P-44X10	C42	14 mf.	400	Wet	1.25

MOLDED

P-47X69	C1	250 mmf.	.15
P-47X53	C19	35 mmf.	.10
P-47X56	C29	50 mmf.	.10
P-47X72	C30	25 mmf.	.10
P-47X72	C31	25 mmf.	.10
P-47X72	C33	25 mmf.	.10

TRIMMER

P-17A45 Trimmer Strip	C2	2-25 mmf. Range "D" Antenna Trimmer	.95
	C3	2-25 mmf. Range "C" Antenna Trimmer	
	C4	2-25 mmf. Range "B" Antenna Trimmer	
	C8	2-25 mmf. Range "D" Interstage Trimmer	
	C9	2-25 mmf. Range "C" Interstage Trimmer	
	C10	2-25 mmf. Range "B" Interstage Trimmer	
	C12	2-25 mmf. Range "D" Oscillator Trimmer	
	C17	2-25 mmf. Range "C" Oscillator Trimmer	
	C18	2-25 mmf. Range "B" Oscillator Trimmer	

See Part Number 17A36 for replacement of any one section.

P-17A35	C13	40-100 mmf. Range "D" Oscillator Padding Condenser	.45
	C16	300-600 mmf. Range "B" Oscillator Padding Condenser	
P-17A47	C15	1200-1600 mmf. Range "C" Oscillator Padding Condenser	.45
P-17A30	C20	150-250 mmf.	.45
	C21	150-250 mmf.	1st I. F. Trimmers
P-17A30	C23	150-250 mmf.	.45
	C24	150-250 mmf.	2nd I. F. Trimmers
P-17A40	C28	70-150 mmf. 3rd I. F. Trimmer	.30

MISCELLANEOUS

P-17A36	2-25 mmf. (to be used for replacement of any one section of Trimmer Strip P-17A45)	.10
P-14A52	3 Gang Condenser, Less Dial and Drive Assembly	3.60

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
P-A94151	R1	150 Ohms	0.2	$0.15
P-A95252	R2	2,500 Ohms	0.2	.10
P-C94253	R3	25,000 Ohms	1.0	.15
P-A94803	R4	80,000 Ohms	0.2	.15
P-D93163	R5	16,000 Ohms	2.0	.45
P-C94303	R6	30,000 Ohms	1.0	.15
P-A94401	R7	400 Ohms	0.2	.15
P-A94304	R8	300,000 Ohms	0.2	.15
P-A95104	R9	100,000 Ohms	0.2	.10
P-A95104	R10	100,000 Ohms	0.2	.10
P-A94205	R11	2.0 Megohms	0.2	.15
P-A94702	R13	7,000 Ohms	0.2	.15
P-E94253	R14	25,000 Ohms	3.0	.30
P-A94401	R15	400 Ohms	0.2	.15
P-A95103	R16	10,000 Ohms	0.2	.10
P-B95703	R17	70,000 Ohms	0.5	.10
P-C95503	R19	50,000 Ohms	1.0	.10
P-A95105	R20	1.0 Megohms	0.2	.10
P-A94205	R21	2.0 Megohms	0.2	.15
P-A94105	R22	1.0 Megohms	0.2	.15
P-A95104	R23	100,000 Ohms	0.2	.10

WIRE WOUND

P-43X56	R24	250 Ohms	3.0	.30

VARIABLE

P-36X219	R12	2.0 Megohms	Volume Control and On-Off Switch	1.10
P-40X213	R18	1.5 Megohms	Tone Control and Selectivity Switch	1.30

WELLS-GARDNER & CO.

MODEL OF
Schematic
Sensitivity

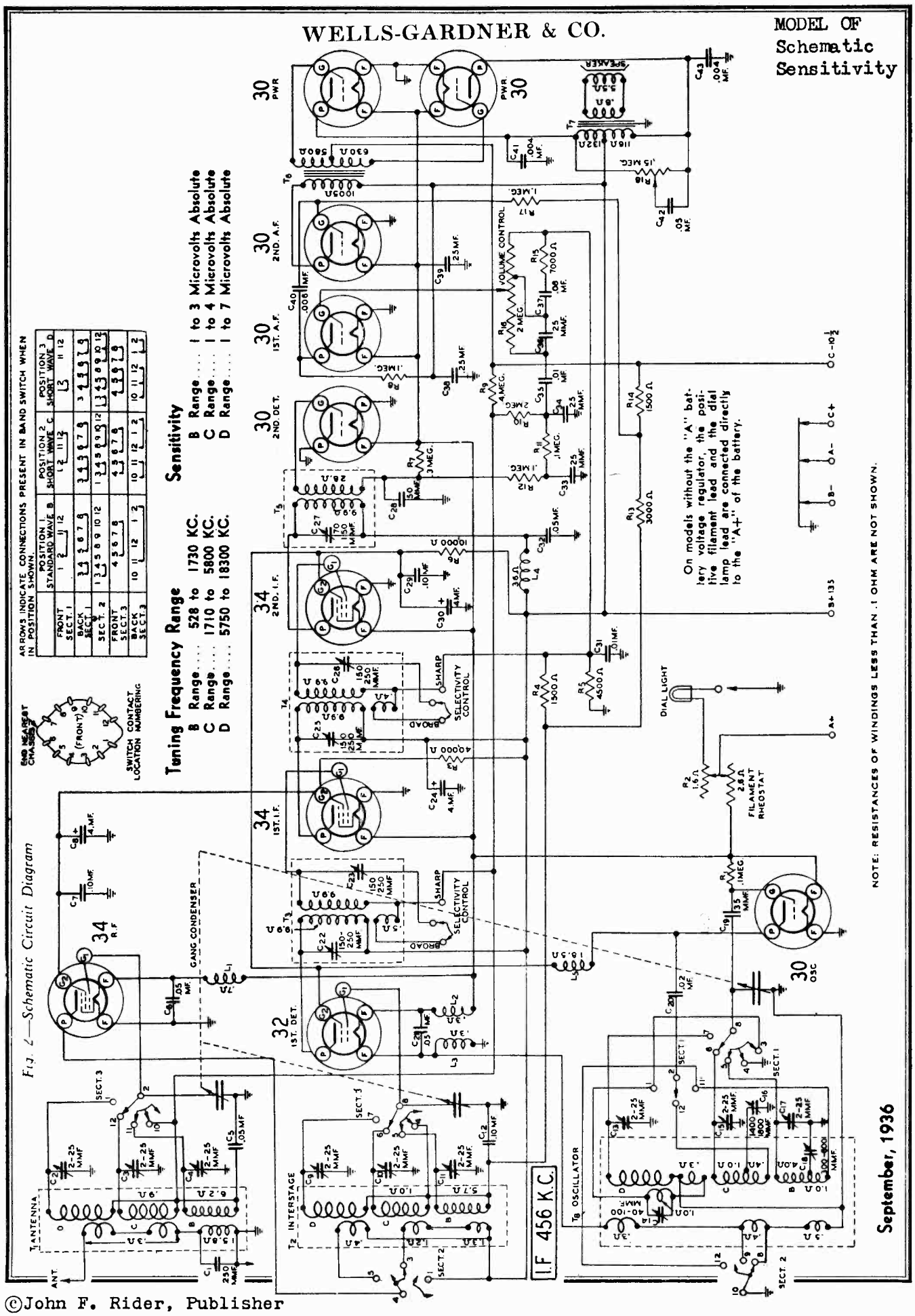


Fig. 2—Schematic Circuit Diagram

September, 1936

MODEL OF
Socket, Trimmers
Voltage, Coils, Notes

WELLS-GARDNER & CO.

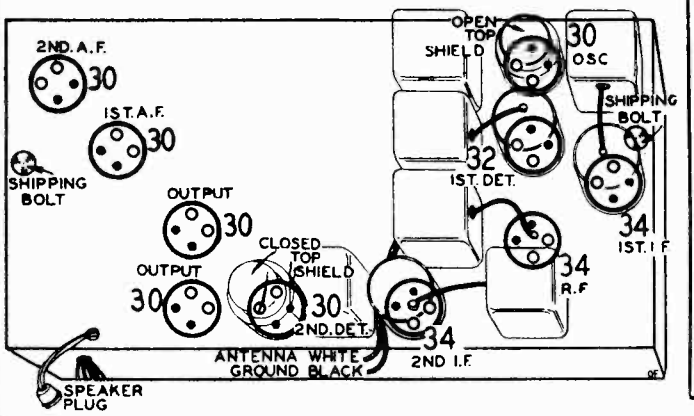


Fig. 7—Location of Tubes

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Control Grid to Ground
34	R. F.	2.0	135	65	
32	1st Det.	2.0	135	90	6
30	Osc.	2.0	90		
34	1st I. F.	2.0	135	65	
34	2nd I. F.	2.0	135	90	4.5
30	2nd Det.	2.0			
30	1st A. F.	2.0	75		4.5(1)
30	2nd A. F.	2.0	132		9 (2)
30	Power	2.0	135		10.5

(1) Volume control at minimum setting.
(2) As read from connection between R13 and R14, and ground.

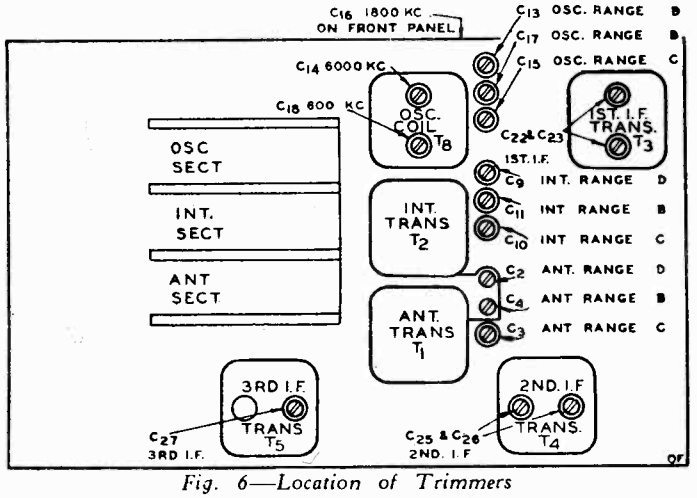


Fig. 6—Location of Trimmers

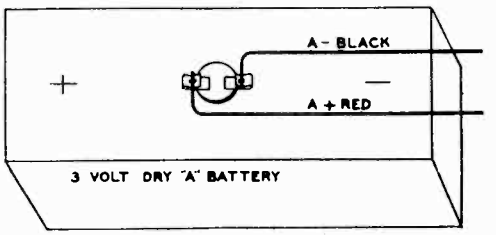


Fig. 4—3 V. Dry "A" Battery Connections

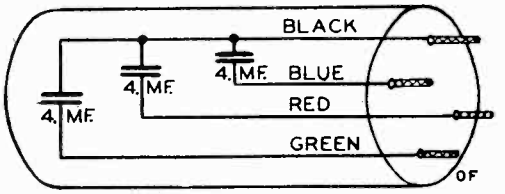


Fig. 9—Electrolytic Condenser Internal Connections

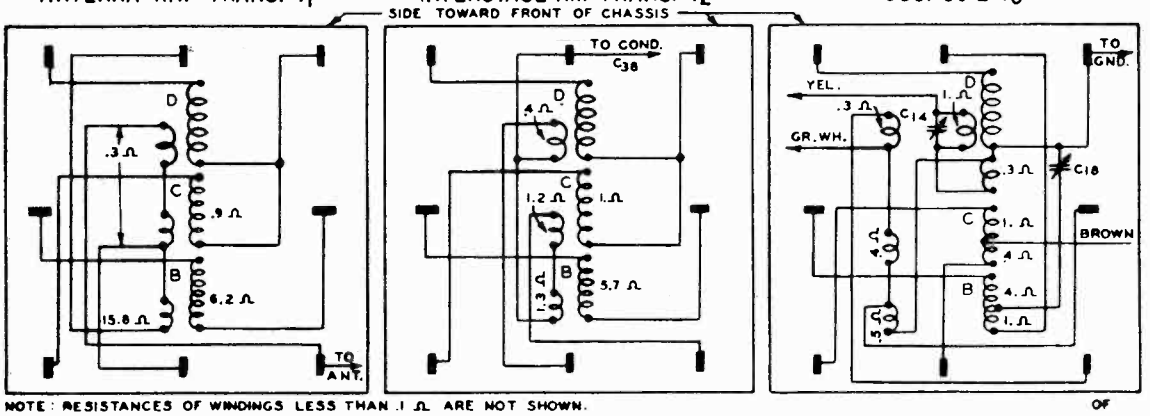


Fig. 8—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 6.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C11) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range C Alignment

CAUTION: When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 6000 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C15) until maximum output is obtained. See Fig. 6 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C13) until maximum output is obtained. See Fig. 6 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

MISCELLANEOUS

Referring to the 1st and 2nd I. F. transformers T3 and T4 in Fig. 2, it will be noted that there are coupling windings shown below the primaries in the illustration.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

Across the volume control resistor R16 is a filter composed of condensers C36 and C37 and resistor R15. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the movable arm approaches the tap, the higher frequencies are by-passed through condenser C37. Very high frequencies are transmitted through condenser C36 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Models with the filament rheostat are connected as shown in Fig. 2. This rheostat permits the use of a 3 volt "A" battery. As shown in Fig. 2, there are two separate variable resistors one of which controls the filament voltage and the other the dial lamp voltage. In models which do not have the filament rheostat the "+A" connection is made directly to the "+A" line and the dial lamps.

Replacement Parts

SOCKETS

Part No.	Description	List Price
P-3A244	4 Prong Tube Socket (All Types)	$0.10

SPEAKERS

P-12A353	8" P.M. Dynamic Speaker complete with Output Trans.	6.00
P-13R268	Speaker Cable and Socket Assembly	.45

KNOBS

Specify Name of Knob and Name and Model of Radio	Tone Control—Small Push-on Type	.15
	Volume Control—Small Push-on Type	.15
	Tuning Control—Large Push-on Type	.15
	Band Switch—Large Setscrew Type	.20

GENERAL

P-2X38	Felt Washers (Used behind Knobs)	ea.	.10
P-8X23	Rubber Chassis Mounting Cushions	ea	.10
P-4A38	Terminal Strip (Single Lug Insulated—mounting foot to left of lug)		.10
P-4A42	Terminal Strip (Two Lugs Insulated—mounting hole in center)		.10
P-4A54	Terminal Strip (Five Lugs Insulated—Two Lugs Grounded)		.10
P-2A56	3 Section, 3 Position, Band Change Switch		1.75
P-32X14	Grid Clip Only		.10
P-13X219	"A" "B" and "C" Battery Cable		1.15
P-13X214	Antenna and Ground Lead Assembly		.30
P-32X63	Tube Shield (Large)		.20
P-32X32	Tube Shield (Small—Open Top)		.15
P-32X50	Tube Shield (Small—Closed Top)		.10
P-32X18	Tube Shield Base (Large)		.10
P-32X30	Tube Shield Base (Small)		.10
P-25X221	Chassis Mounting Feet	ea.	.10
P-8X43	Rubber Mounting Cushions for Gang Condenser (front)	ea.	.10
P-8X44	Rubber Mounting Cushion for Gang Condenser (rear)		.10
P-8X45	Rubber Mounting Cushion for Gang Condenser (rear under chassis base)		.10

TRANSFORMERS AND COILS

P-9A628	T1	Antenna Transformer and Can Assembly	$1.95
P-9A629	T2	R. F. Interstage Transformer and Can Assembly	1.95
P-9A631	T3	1st I.F. Transformer and Can Assembly	1.70
P-9A632	T4	2nd I.F. Transformer and Can Assembly	1.70
P-9A633	T5	3rd I.F. Transformer and Can Assembly	1.95
P-50X11	T6	Input Transformer	2.10
P-51X44	T7	Output Transformer (Part of Speaker Assembly)	1.30
P-9A630	T8	Oscillator Coil and Can Assembly	3.25
P-9A599	L1, L5	Filament Reactor "B" Reactor } One Assembly	.60
P-9A610	L2, L3	Double Filament Reactor	.30
P-9A598	L4	2nd I.F. Plate Isolating Reactor	.70

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X80	C5	.05 mf.	180	$0.15
P-46X80	C6	.05 mf.	180	.15
P-46X98	C7	.1 mf.	180	.20
P-46X195	C12	.1 mf.	180	.15
P-46X187	C20	.02 mf.	180	.15
P-46X80	C21	.05 mf.	180	.15
P-46X98	C29	.1 mf.	180	.20
P-46X124	C31	.01 mf.	180	.15
P-46X80	C32	.05 mf.	180	.15
P-46X120	C35	.01 mf.	360	.15
P-46X176	C37	.08 mf.	180	.15
P-46X117	C38	.25 mf.	180	.25
P-46X117	C39	.25 mf.	180	.25
P-46X101	C40	.006 mf.	600	.15
P-46X114	C41	.004 mf.	600	.15
P-46X119	C42	.05 mf.	360	.20
P-46X114	C43	.004 mf.	600	.15

ELECTROLYTIC

P-45X214	C8	4 mf.	150 Dry		.75
	C24	4 mf.			
	C30	4 mf.			

MOLDED

Part No.	Code	Capacitance	Voltage	List Price
P-47X69	C1	250 mmf.		.15
P-47X53	C19	75 mmf.		.10
P-47X56	C28	50 mmf.		.10
P-47X72	C33	25 mmf.		.10
P-47X72	C34	25 mmf.		.10
P-47X72	C36	25 mmf.		.10

TRIMMER

P-17A45 Trimmer Strip	C2	2-25 mmf.	Range "D"	Antenna Trimmer
	C3	2-25 mmf.	Range "C"	Antenna Trimmer
	C4	2-25 mmf.	Range "B"	Antenna Trimmer
	C9	2-25 mmf.	Range "D"	Interstage Trimmer
	C10	2-25 mmf.	Range "C"	Interstage Trimmer
	C11	2-25 mmf.	Range "B"	Interstage Trimmer
	C13	2-25 mmf.	Range "D"	Oscillator Trimmer
	C15	2-25 mmf.	Range "C"	Oscillator Trimmer
	C17	2-25 mmf.	Range "B"	Oscillator Trimmer

.95

See Part Number P-17A36 for replacement of any one section

P-17A35	C14	40-100 mmf.	6000 KC Oscillator Padding Condenser	.45
	C18	200-600 mmf.	600 KC Oscillator Padding Condenser	
P-17A47	C16	1400-1800 mmf.	1800 KC Oscillator Padding Condenser	.45
P-17A30	C22	150-250 mmf.	1st I.F. Trimmer Condenser	.45
	C23	150-250 mmf.	1st I.F. Trimmer Condenser	
P-17A30	C25	150-250 mmf.	2nd I.F. Trimmer Condenser	.45
	C26	150-250 mmf.	2nd I.F. Trimmer Condenser	
P-17A40	C27	70-150 mmf.	3rd I.F. Trimmer Condenser	.30
P-17A36	(To be used for replacement of any one section of Trimmer Strip P-17A45)			.10

MISCELLANEOUS

P-16A52	3 Gang Condenser Only (less Drive Mechanism and Dial Assembly)		3.60

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
P-A9410	R1	.1 Megohm	.2	$0.15
P-A9440	R3	40,000 Ohm	.2	.15
P-A9452	R4	1,500 Ohm	.2	.15
P-A9445	R5	4,500 Ohm	.2	.15
P-B9410	R6	10,000 Ohm	.5	.15
P-A9430	R7	.3 Megohm	.2	.15
P-A9510	R8	.1 Megohm	.2	.10
P-A9460	R9	.6 Megohm	.2	.15
P-A9420	R10	.2 Megohm	.2	.15
P-A9510	R11	.1 Megohm	.2	.10
P-A9510	R12	.1 Megohm	.2	.10
P-A9430	R13	.3,000 Ohm	.2	.15
P-A9452	R14	1,500 Ohm	.2	.15
P-A9470	R15	7,000 Ohm	.2	.15
P-A9510	R17	.1 Megohm	.2	.10

VARIABLE

Part No.	Code	Resistance	List Price
P-36X220	R16	.2 Megohm Tapped Volume Control and Switch	1.05
P-40X211	R18	.15 Megohm Tone Control and Selectivity Switch	1.10

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
Specify Name and Model of Radio	Dial Assembly Complete with Dial Glass; Dial Plate, Small Pointers; Reflectors; Small Pointer Cords; Springs, Pulleys and Collars; and Band Indicator Less Large Station Pointer and Micrometer Pointer	3.85
See above	Dial Glass Only	1.45
P-25A175	Dial Assembly Mounting Plate, Includes Small Pointer Shafts and Pulleys, and Band Indicator Assembly	1.45
P-75X297	Dial Assembly Support Brackets (Attached to Gang Condenser)	ea. .10
P-15X59	Large Station Pointer	.25
P-15X60	Micrometer Pointer	.10
P-15X57	Small Volume or Tone Control Pointer	ea. .10
P-9X16	Dial Cardboard	.10
P-13X41	Fibre Strip (At Bottom of Dial Glass)	.10
P-41X12	Dial Lamp Reflectors (At each side of Dial Plate)	ea. .10
P-7A27	Dial Lamp Sockets	ea. .10
P-7A40	Dial Lamps	ea. .10
P-29X20	10" Black Cord for Small Pointers Brass Collars with Set Screws for Securing Small Pointer Cords to Shafts	dozen .45 ea. .10
P-28X44	Tension Springs for Small Pointer Cords	ea. .10
P-26X279	Small Pointer Shafts and Pulleys	ea. .10
P-17X15	Glass, Dial Crystal	.35
P-29X58	Crystal Retaining Ring	.15
P-2A60	Dial Lamp Push Button Switch Assembly	.50

DRIVE ASSEMBLY

P-5A34	Planetary Assembly Complete with Hex Nut and Lock-washer (This is the unit mounted at the front of the chassis base and is integral with the tuning shaft)	1.25
P-10X14	Black Tuning Drive Cord Only	.20
P-28X49	Tension Spring for Tuning Drive Cord	.10
P-25X269	Drive Assembly Bracket Only (Mounted on Gang Condenser)	.25
P-25X283	Rear Mounting Foot for Gang Condenser	.10
P-24X239	Drive Drum Assembly Complete with Gears, Micrometer and Main Pointer Shaft	1.25
P-28X84	Spreader Spring for Rotary Gear (Part of Above Assembly)	.10
P-28X83	Spreader Spring for Stationary Gear (Part of Above Assembly)	.10

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

Prices subject to change without notice

"A" Battery (Models with Voltage Regulator)

Models equipped with the voltage regulator on the back panel of the chassis may use any type of "A" battery delivering from 2 to 3 volts.

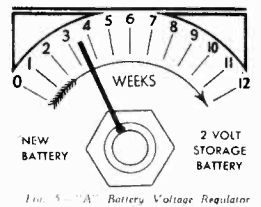


Fig. 5—"A" Battery Voltage Regulator

Batteries

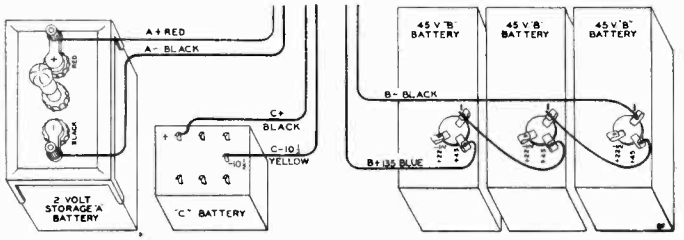


Fig. 3—"A", "B" and "C" Battery Connections

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (medium wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator, and adjust the I.F. wave trap trimmer (C1) for minimum output. The location of this trimmer is shown in Fig. 3.

Range D Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15000 KC. The signal will then be heard at 15000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15000 less 912 KC, or 14088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range D trimmer (C8) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C3) to maximum.

When adjusting the antenna Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the medium wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator Range B trimmer (C9) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C12) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range A Alignment

380 KC Adjustment

Set the signal generator for 380 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range A position (long wave band).

Adjust the oscillator Range A trimmer (C10) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

350 KC Adjustment

Set the signal generator for 350 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range A trimmer (C5) to maximum.

Do not change the setting of the oscillator Range A trimmer.

165 KC Adjustment

Set the signal generator for 165 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 165 KC trimmer (C11) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

General Service Data

The models with the tuning indicator tube are wired as shown in the schematic. The action of this tube is described in the Series 7FL Service Manual as well as in current literature and will not be repeated here.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
1A245	Tube Socket, 8 Prong	$0.15
3A242	Tube Socket, 7 Prong	.15
3A243	Tube Socket, 5 Prong	.15
3A58	Speaker Socket, 5 Prong	.10
19X255	6G6 Tube Socket and Cable Assembly	.65

SPEAKERS

12A257	6" Dynamic Speaker Compl. with Output Transformer (T6)	5.80
12A260	8" Dynamic Speaker Compl. with Output Transformer (T6)	6.35
12A258	10" Dynamic Speaker Compl. with Output Transformer (T6)	6.85

KNOBS

Specify Name of Knob and Name and Model of Radio	Tuning Control — Set Screw Type	.20
	Volume Control — Push-On Type	.15
	Band Switch — Push-On Type	.15

GENERAL

2X38	Felt Washer (Used behind knobs)	doz.	.10
8X23	Rubber Chassis Mounting Cushion	ea.	.10
2A72	Band Change Switch		.90
2A61	Tone Control Switch		.20
32X44	Grid Clip Only	doz.	.10
4A50	Terminal Strip (2 lugs insulated with mounting hole in center)		.10
32X69	Tube Shield (Tuning Eye)		.15
32X70	Tube Shield Base (Tuning Eye)		.10
13X80	Line Cord and Plug		.50
13X214	Antenna and Ground Lead Assembly		.30
25X122	Chassis Mounting Feet	ea.	.10
23A61	Gang Condenser Mounting Cushion Assembly. Includes 3—Rubber Cushions, 3—Hex Shoulder Nuts, 3—No. 6 Flat Washers		.15

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
15A105	Dial Assembly Complete less Dial Lamp, Lamp Socket and Main Pointer	$3.00
25X324	Dial Bracket Only	.25
58X165	Dial Glass	1.15
24X735	Volume Control Pointer, Shaft and Pulley	.20
24X240	Band Change Pointer Shaft and Pulley	.20
29X20	Brass Collar for Volume Indicator	.10
29X60	Brass Collar for Band Indicator	.25
15X280	Small Pointers	.10
28X44	Takeup Springs for Small Pointers	.10
15X79	Main Pointer	.20
	Wave Band or Volume Indicator Cord (8")	doz. .10
41X12	Lamp Reflector	.10
7A37	Lamp Socket	.20
7A32	Dial Lamp	.10
9X30	Cardboard Dial Background	.10
25X331	Dial Clamping Bracket	1.15
4X141	Dial Crystal and Escutcheon Assembly	

DRIVE ASSEMBLY

5A36	Drive Bracket and Bushing Assembly Complete		.35
26X234	Dr. Shaft		.20
24X249	Dr. Drum and Main Pointer Shaft		.45
	20" Tuning Drive Cord	doz.	.45
28X27	Tension Spring for Drive Cord		.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A706	T1	Antenna Transformer and Can Assembly	$2.25
9A707	T2	Oscillator Coil and Can Assembly	1.65
9A708	T3	1st I.F. Transformer and Can Assembly	1.35
9A709	T4	2nd I.F. Transformer and Can Assembly	1.35
53X134	T5	115-230 Volt, 40-60 Cycle Power Transformer	4.70
51X21	T6	Output Transformer (Part of Speaker Assembly)	2.45
9A714	L1	Wave Trap (456 KC)	.55

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C6	.05 mf.	180	$0.15
46X98	C15	.10 mf.	180	.20
46X117	C16	.25 mf.	180	.25
46X105	C22	.10 mf.	360	.20
46X120	C25	.01 mf.	360	.15
46X120	C27	.01 mf.	360	.15
46X117	C28	.25 mf.	180	.25
46X172	C29	.02 mf.	180	.15
46X172	C20	.02 mf.	480	.15
46X205	C31	.002 mf.	600	.15
46X100	C32	.02 mf.	360	.15
46X202				

MOLDED

47X69	C2	250 mmf.		.15
47X72	C7	25 mmf.		.10
47X76	C13	4800 mmf.		.35
47X53	C14	35 mmf.		.10
47X57	C21	100 mmf.		.10
47X66	C26	250 mmf.		.15
47X53	C33	35 mmf.		.10

ELECTROLYTIC

44X32	C23	16 mf.	250 Wkg.	.75
44X31	C24	12 mf.	340 Wkg.	.80

TRIMMERS

17A64	C1	30-90 mmf.	Wave Trap Trimmer	.25
17A59	C3	2-25 mmf.	Range "D" Antenna Trimmer	.60
	C4	2-25 mmf.	Range "B" Antenna Trimmer	
	C5	2-25 mmf.	Range "A" Antenna Trimmer	
	C8	2-25 mmf.	Range "D" Oscillator Trimmer	
	C9	2-25 mmf.	Range "B" Oscillator Trimmer	
	C10	2-25 mmf.	Range "A" Oscillator Trimmer	
17A44	C11	100-200 mmf.		.50
	C12	300-600 mmf.		
17A33	C17	70-150 mmf.	1st I.F. Trimmers	.40
	C18	70-150 mmf.		
17A34	C19	70-150 mmf.	2nd I.F. Trimmers	.40
	C20	150-250 mmf.		

Prices Subject to Change Without Notice

MISCELLANEOUS

14A61	2 Gang Condenser less Dial and Drive Assembly	2.50

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94104	R1	100,000 Ohm	0.2	$0.15
A95153	R2	15,000 Ohm	0.2	.10
A95205	R3	2 Megohm	0.2	.10
A94151	R4	150 Ohm	0.2	.15
B94503	R5	50,000 Ohm	0.5	.15
C94103	R6	10,000 Ohm	1.0	.15
A95603	R7	50,000 Ohm	0.2	.10
A95104	R9	100,000 Ohm	0.2	.10
A95205	R10	2 Megohm	0.2	.10
A94504	R11	500,000 Ohm	0.2	.15
A94104	R14	100,000 Ohm	0.2	.15
A94504	R15	500,000 Ohm	0.2	.15
A95105	R16	1 Megohm	0.2	.10
A95805	R17	8 Megohm	0.2	.10
A95805	R18	8 Megohm	0.2	.10

WIRE WOUND

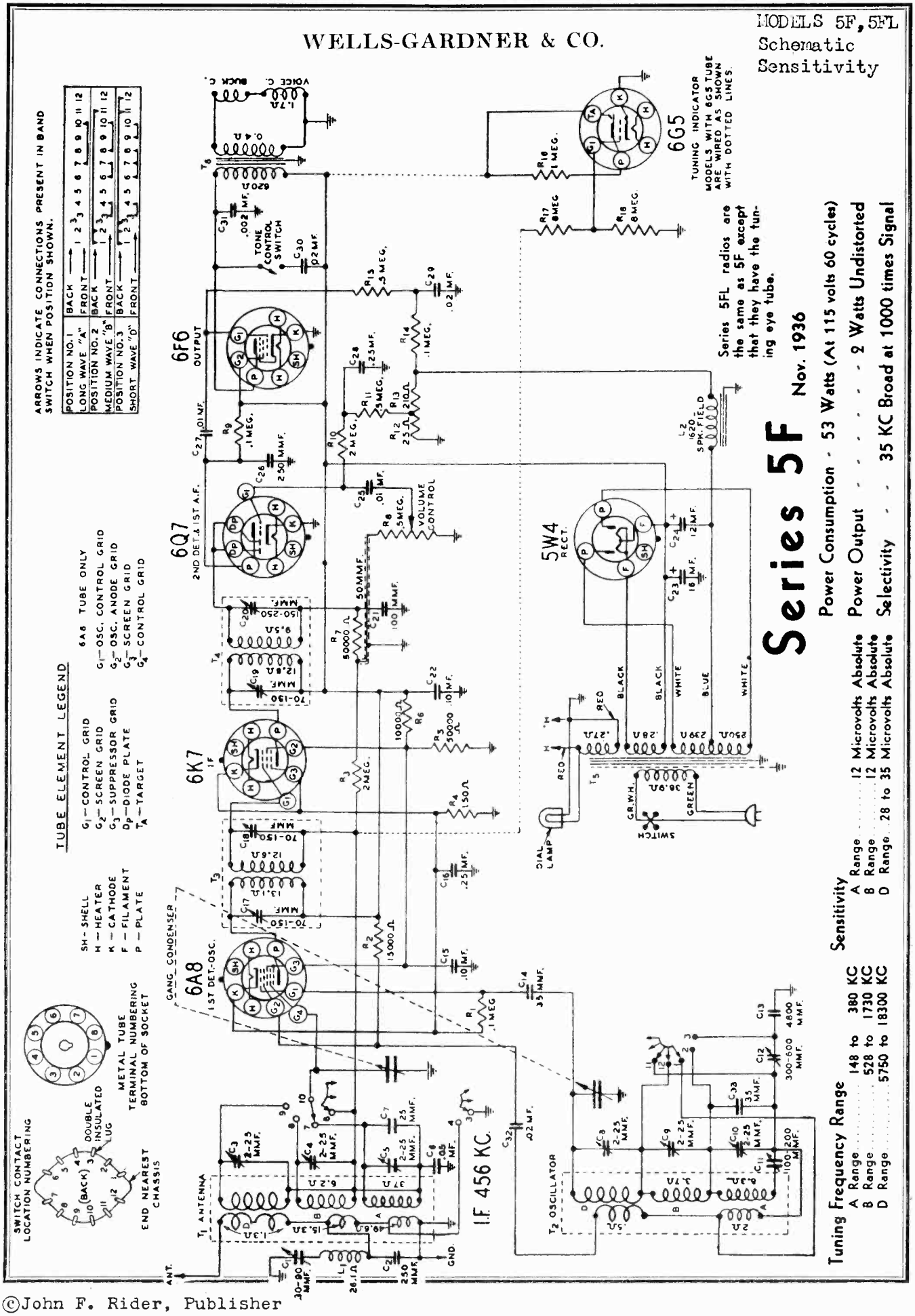
13X69	R12	25 Ohm	25	.35
	R13	210 Ohm	2.0	

VARIABLE

36X227	R8	0.5 Megohm	Volume Control and On-Off Switch	1.00

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
2A31	Phono Switch	$0.60
3A12	Phono Jack	.10
10A36	Knob for Phono Switch	.20



MODELS 5F, 5FL
Socket, Trimmers
Voltage, Coils

WELLS-GARDNER & CO.

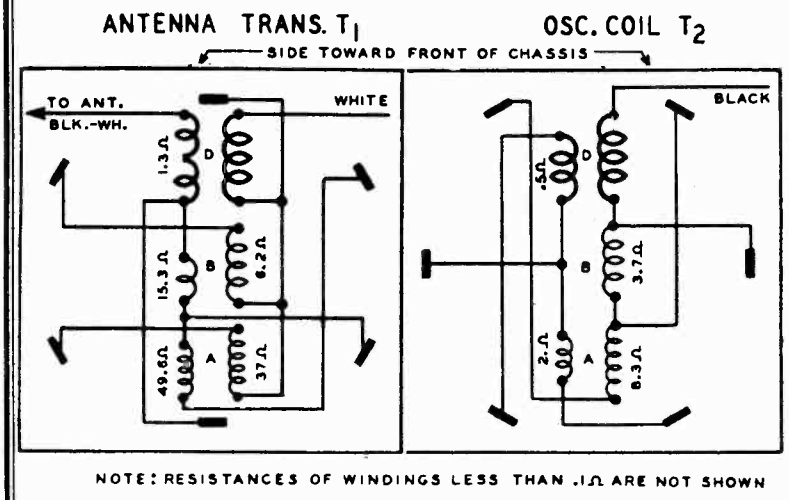


Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

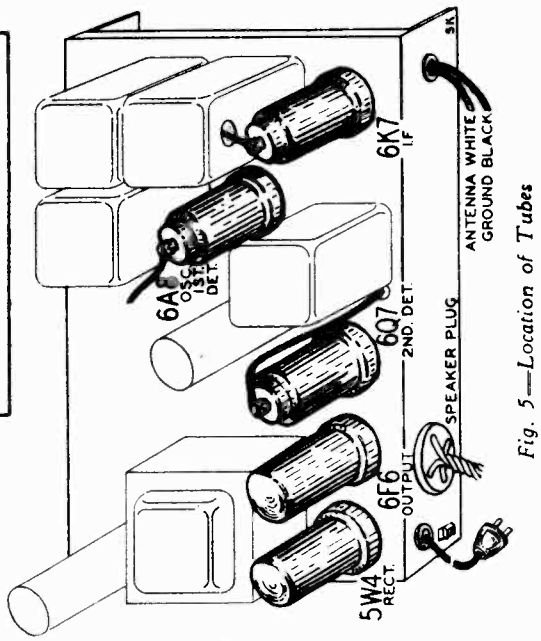


Fig. 5—Location of Tubes

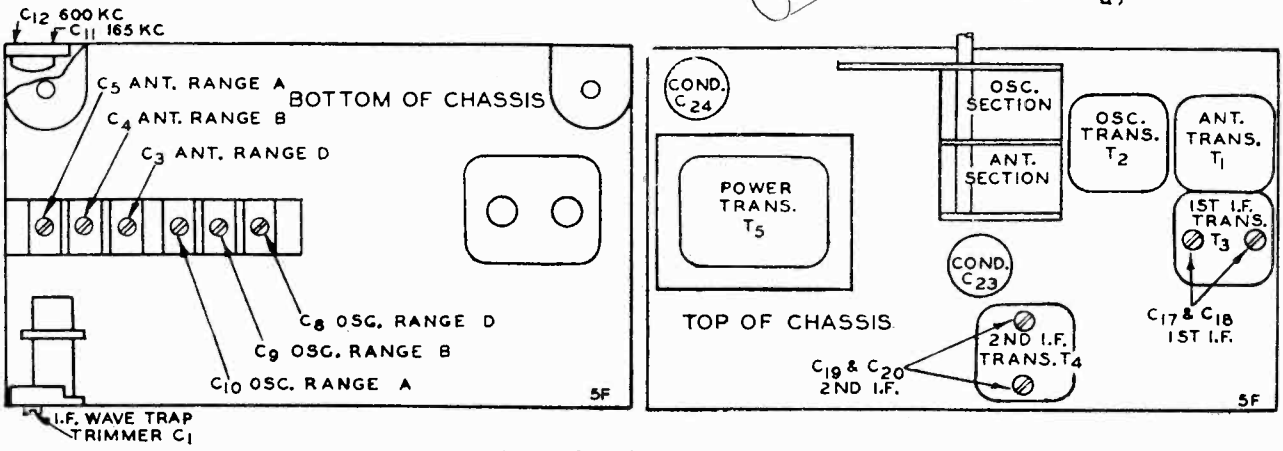


Fig. 3—Location of Trimmers

VOLTAGES AT SOCKETS

Line Voltage: 115 | Volume Control: Maximum | Antenna Shorted to Ground

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6A8	1st Det.-Osc.	0	6.3(1)	200	110		160	6.3(1)	3
6K7	I.F.	0	6.3(1)	200	110	3		6.3(1)	3
6Q7	2nd Det.	0	6.3(1)	110	0	0		6.3(1)	0(2)
6F6	Output	0	6.3(1)	185	200	12.5(3)		6.3(1)	0
5W4	Rectifier	0	5.1(4)		620(5)		620(5)		5.1(4)
6G5	Tuning Indicator	Plate to Ground 25		Target to Ground 200		Cathode to Ground 0		Across Heater 6.3 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R12.
(3) Read across resistor R12 and R13.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage read across terminals 4 and 6.

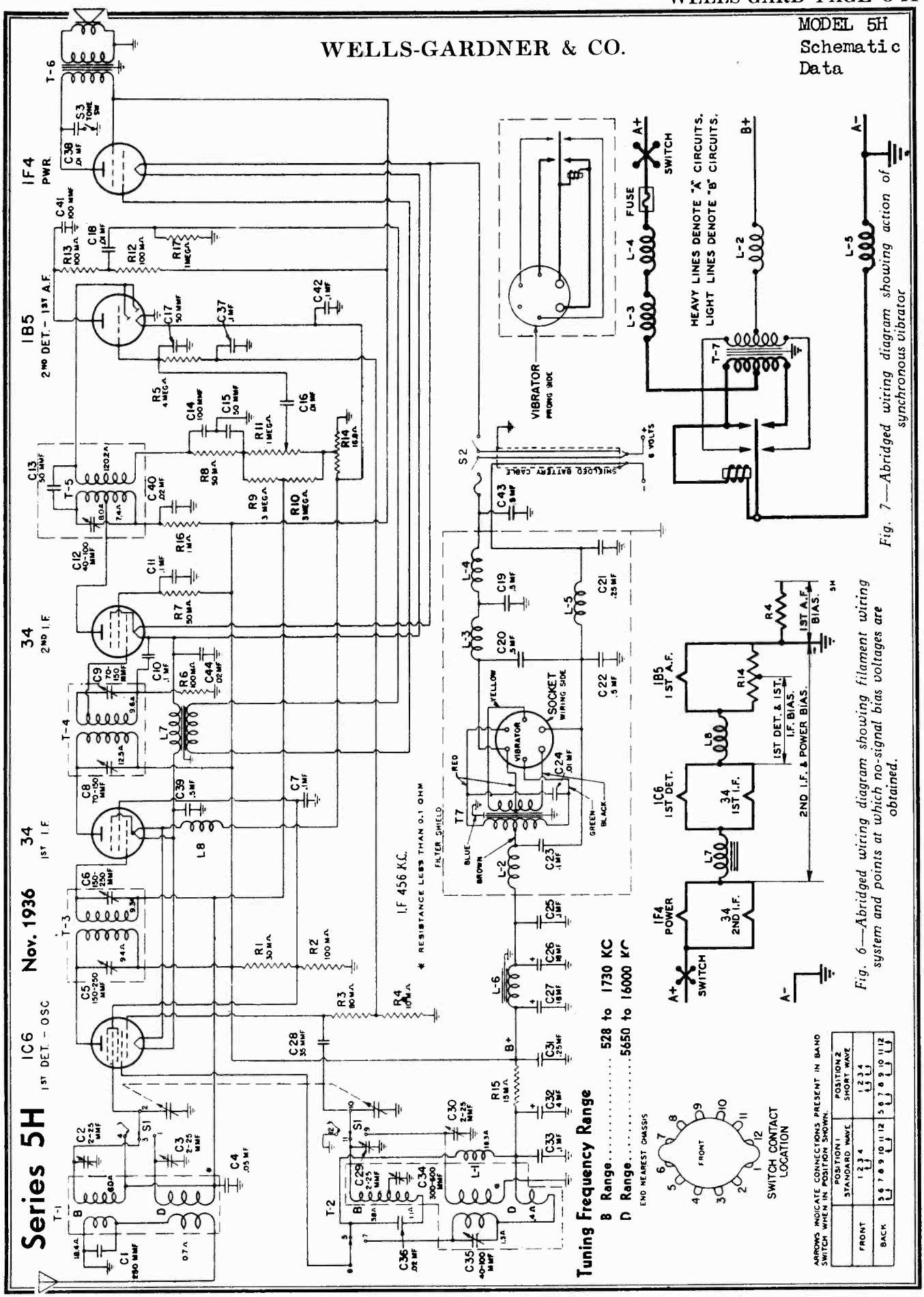


Fig. 7—Abridged wiring diagram showing action of synchronous vibrator

Fig. 6—Abridged wiring diagram showing filament wiring system and points at which no-signal bias voltages are obtained.

MODEL 5H
Socket, Trimmers
Voltage, Coils
Resistance

WELLS-GARDNER & CO.

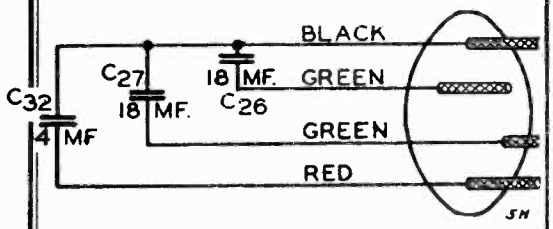


Fig. 4—Electrolytic Condenser Internal Connections

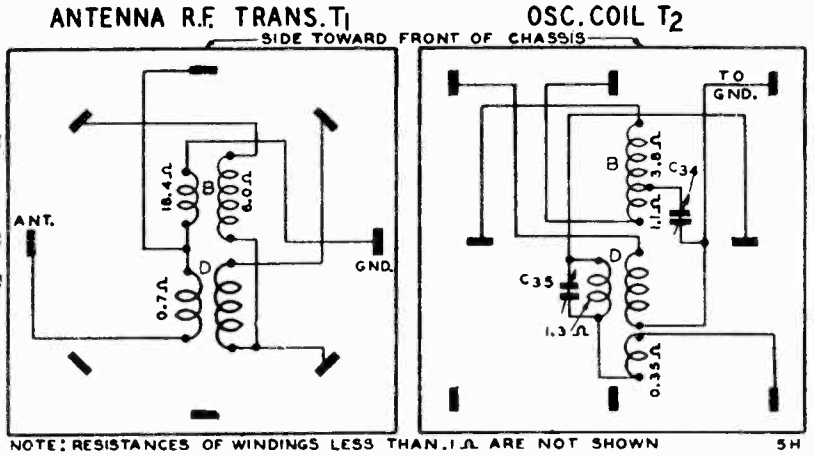


Fig. 8—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

Power Consumption 1.1 Amperes at 6.3 Volts

Power Output - - - 0.35 Watt Undistorted

D. C. Resistances of Audio and Filter Circuit Windings — Other Resistances are Shown in Fig. 2

The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
51X47	Output Transformer	T6	
	Primary Winding		713.
	Secondary Winding		0.4
12A248 & 12A249	Dynamic Speaker 6" and 8" Speaker Voice Coil		5.4
53X132	Power Transformer	T7	
	Primary Winding		
	Center Tap to Inside		0.3
	Center Tap to Outside		0.3
	Secondary Winding		
	Center Tap to Inside		166.
	Center Tap to Outside		185.
9A645	"B" Reactor	L1	18.3
9A647	"B" Reactor	L2	17.7
9A646	Vibrator Reactor	L3	0.1
9A654	"A" Line Reactor	L4	0.1
9A654	"A" Line Reactor	L5	0.1
52X45	"B" Reactor	L6	305.
52X48	Transformer	L7	
	Audio Choke (Primary)		1.3
	Hum Bucking Winding (Secondary)		22.7
9A645	"A" Reactor	L8	0.3

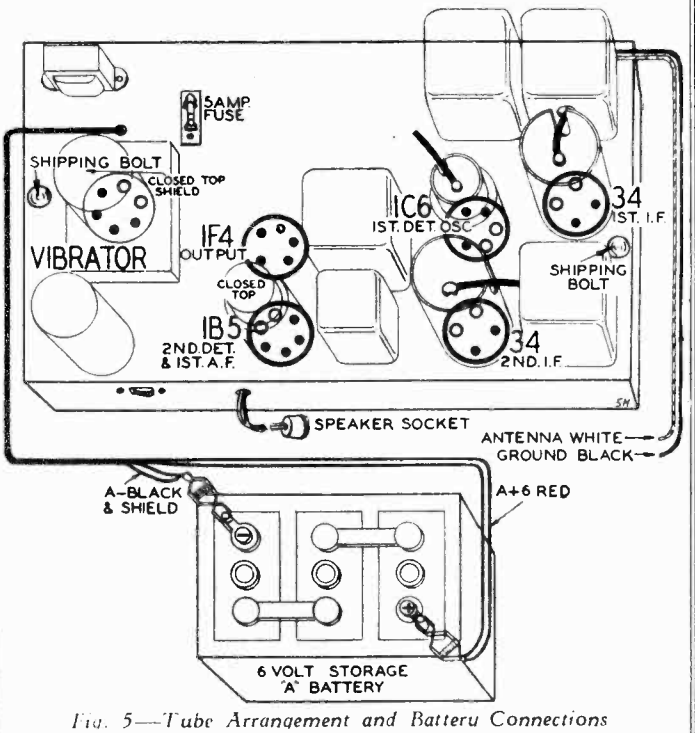


Fig. 5—Tube Arrangement and Battery Connections

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Battery—6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage
1C6	1st Det.-Osc.	2.0	140 110(1)	55	1.1(2)
34	1st I.F.	2.0	140	55	1.1(2)
34	2nd I.F.	2.0	140	75	4.0
1B5	2nd Det. 1st A.F.	2.0	75		3.0(3)
1F4	Power	2.0	135	140	4.0

(1) Anode Grid to ground.
(2) As read from negative filament leg to center tap of R14.
(3) As read across Resistor R4 (using 100,000 ohm meter). This voltage is subject to considerable variation depending on band and frequency setting.

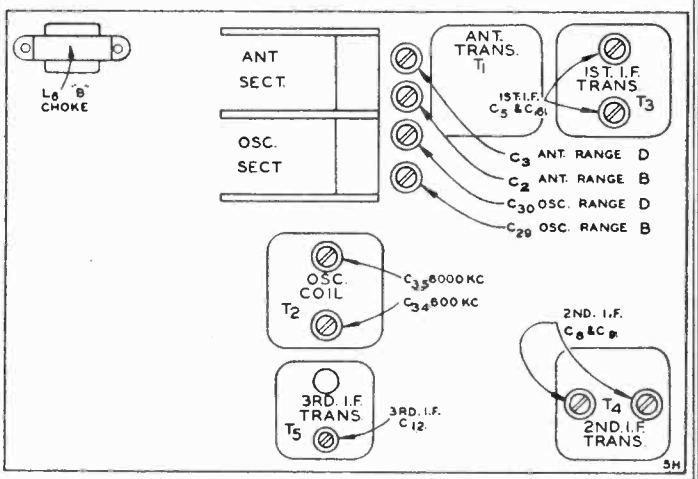


Fig. 3—Location of Trimmers

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the control grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C29) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC padder (C34) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C30) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C3) to maximum. When adjusting this trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC (C35) padder until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Servicing Power Unit

The power unit is that portion of the chassis assembly contained within the large rectangular shield can and the circuit for which is shown within the dotted lines at the lower center of the schematic diagram, Fig. 2.

Continuity Resistance Check—The power transformer, choke coil circuits and condenser shorts may be checked by utilizing the vibrator socket terminals and various points on the "A" or "B" lines, or ground without removal of the shield can. For example: when checking the continuity or resistance of the upper half of the transformer secondary, contact may be made with the test prods at the proper vibrator socket terminal, as shown on the circuit diagram, and at the terminal strip lug to which the 18 mf. electrolytic condenser, C26 is connected.

Removing Transformer and Vibrator Socket Assembly—Take off the filter unit shield can by removing the four self tapping screws at the right side (from front) of the chassis base and the five hex nuts from the bolts at the top of the chassis.

Unsolder the ground connections from the two lugs on the inside of the chassis base (right side from front).

Now unsolder the mounting lug holding the terminal strip to the transformer cover.

Remove the four nuts from the bolts holding the transformer assembly to the chassis. Do not remove these bolts from the transformer core. Then lift the assembly to free it from the chassis so that all parts of the assembly are readily accessible.

Proceed with replacement of the power transformer or with any other necessary service or replacements and then reassemble.

Replacement of Buffer Condenser C24—This condenser is located in the top of the transformer and vibrator assembly just underneath the vibrator socket. To replace, remove the assembly as explained in the preceding article.

In addition, the two screws holding the vibrator socket to the transformer cover assembly should be taken out. The condenser is then easily replaced.

Synchronous Vibrator—The action of the synchronous vibrator used in the power unit is shown in the abridged wiring diagram Fig. 7. When the switch is closed, the armature is drawn up (from the standpoint of diagram) as a result of the current through the vibrator coil. When this occurs, the upper contacts are closed and the vibrator coil is short circuited. The spring action then causes the armature to spring back and the upper contacts are opened. The vibrator coil is again energized, but the inertia of the armature causes it to continue in motion until the two bottom contacts are closed.

The spring action then brings the armature up, opening the bottom contacts. The vibrator coil is again energized and the armature is drawn up to start the next cycle.

The "A" current (heavy lines, Fig. 7) flows first through one side of the power transformer primary and then through the other side in the opposite direction. An AC voltage is induced in the secondary as a result. That portion of the circuit shown in light lines rectifies the secondary current.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer 17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Caution

Do not turn the receiver on unless ALL the tubes are in the sockets. Removal of any of them will result in abnormal voltages on the remaining tubes.

Be sure that the battery clips are connected to the battery with the correct polarity. Reversed connections may damage the receiver.

Do not use any power source other than a 6 volt storage battery.

If the receiver does not operate after being turned on, turn the switch off immediately, examine the battery connections and the fuse and see if all tubes are properly inserted.

The primary of transformer L7 serves as an audio choke in the filament circuit. The secondary of this transformer is in the control grid circuit of the 1F4, and acts as a hum bucking winding.

Filament Wiring—Fig 6 is an abridged wiring diagram which shows the tube filament wiring system and also indicates the points at which the no-signal bias voltages are obtained.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A244	4 Prong Tube Socket	$0.10
3A248	5 Prong Tube Socket	.10
3A247	6 Prong Tube Socket	.18
19A238	6 Prong Vibrator Socket	.10

SPEAKERS

12A248	6" Dynamic Speaker Compl. with Output Transformer (T6)	5.70
12A249	8" Dynamic Speaker Compl. with Output Transformer (T6)	6.00
13X287	Speaker Cable and Socket Assembly	.40

KNOBS

Specify Name of Knob and Model of Radio		
	Tuning Control Knob	.15
	Band Switch Knob	.15
	Volume Control Knob	.15

GENERAL

8X23	Rubber Chassis Mounting Cushions ea.	.10
32X63	Tube Shield (large)	.20
32X52	Tube Shield (small—open top)	.15
32X50	Tube Shield (small—closed top)	.10
32X72	Vibrator Shield	.20
32X18	Tube Shield Base (large)	.10
32X30	Tube Shield Base (small)	.10
*32X18	Vibrator Shield Base	.10
*29X52	Vibrator Spring Clip	.10
2X38	Felt Washers (Used behind Knobs) doz.	.10
4A18	Terminal Strip (2 Lug Insulated, one extended as mounting foot)	.10
4A46	Terminal Strip (3 Lug Insulated, center lug extended as mounting foot)	.10
4A54	Terminal Strip (5 Lug Insulated, 2 lugs to ground as mounting feet)	.10
30X14	Grid Clip Only doz.	.10
13X214	Antenna and Ground Lead Assembly	.30
13X272	Shielded Battery Cable	1.00
2A65	1 Section, 2 Position Band Change Switch	.80
2A61	Tone Control Switch	.20
19A28	Vibrator Unit	3.90
25X122	Chassis Mounting Foot ea.	.10
32X71	Shield Can for Filter Assembly (Under Vibrator and Transformer Assembly)	.50
23A61	Gang Condenser Mounting Kit Includes 3—Grommets 3—Shoulder Nuts 3—No. 6 Flat Washers	.15
16X19	5 Ampere Fuse	.10
16X9	Fuse Clip Assembly	.10

TRANSFOkMERS AND COILS

Part No.	Code	Description	List Price
9A594	T1	Antenna Transformer and Can Assembly	$1.55
9A595	T2	Oscillator Coil and Can Assembly	2.45
9A596	T3	1st I.F. Transformer and Can Assembly	1.95
9A597	T4	2nd I.F. Transformer and Can Assembly	1.50
9A646	T5	3rd I.F. Transformer and Can Assembly	1.60
51X47	T6	Output Transformer—Part of Speaker Assembly	1.50
32X132	T7	Power Transformer Only	2.45
25A88		Power Transformer Assembly (Includes Parts marked *)	3.85
9A645	L1 "B" Reactor; L8 "A" Reactor	One Assembly	.60
9A647	L2 "B" Reactor		.25
9A646	L3	Vibrator Choke	.35
9A654	L4; L5	"A" Line Reactor	.35
52X45	L6	"B" Choke	.80
57X48	L7	"A" Choke	1.25

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C4	.05 mf.	180	$0.15
46X98	C7	.10 mf.	180	.20
46X98	C10	.10 mf.	180	.20
46X98	C11	.10 mf.	180	.20
46X124	C16	.01 mf.	180	.15
46X124	C18	.01 mf.	180	.15
46X135	C19	.5 mf.	180	.40
46X135	C20	.5 mf.	180	.40
46X117	C21	.25 mf.	180	.25
46X123	C22	.5 mf.	180	.30
46X98	C23	.10 mf.	180	.20
*46X202	C24	.01 mf.	1000	.15
46X98	C25	.10 mf.	180	.20
46X117	C31	.25 mf.	180	.25
46X98	C33	.10 mf.	180	.20
46X187	C36	.02 mf.	180	.15
46X98	C37	.10 mf.	180	.20

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X198	C38	.01 mf.	240	$0.15
46X125	C39	.5 mf.	180	.40
46X187	C40	.02 mf.	180	.15
46X98	C42	.10 mf.	180	.20
46X204	C43	.5 mf.	180	.30
46X187	C44	.02 mf.	180	.20

ELECTROLYTIC

45X218	C32	4 mf.	150 Dry	1.55
	C26	18 mf.		
	C27	18 mf.		

MOLDED

47X59	C1	250 mmf.	.15
47X56	C13	50 mmf.	.10
47X67	C14	100 mmf.	.10
47X56	C15	50 mmf.	.10
47X66	C17	60 mmf.	.10
47X47	C28	35 mmf.	.10
47X57	C41	100 mmf.	.10

TRIMMER

17A36 Trimmer Strip	C2	2-25 mmf.	Range "B" Antenna Trimmer	.45
	C31	2-25 mmf.	Range "D" Antenna Trimmer	
	C29	2-25 mmf.	Range "B" Oscillator Trimmer	
	C30	2-25 mmf.	Range "D" Oscillator Trimmer	

See Part Number 17A36 for replacement of any one section.

17A30	C5	150-250 mmf.	1st I.F. Trimmers	.45
	C6	150-250 mmf.		
17A33	C8	70-150 mmf.	2nd I.F. Trimmers	.40
	C9	70-150 mmf.		
17A38	C12	40-100 mmf.	3rd I.F. Trimmer	.25
17A36	C34	300-600 mmf.	600 KC Trimmer	.45
	C35	40-100 mmf.	6000 KC Trimmer	
17A36		2-25 mmf.	(To be used for replacement of any one section of Trimmer Strip 17A36)	.10

MISCELLANEOUS

14A60	2 Gang Condenser less Dial and Drive Assembly		2.55

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94103	R1	30,000 Ohm	0.2	$0.15
A94104	R2	100,000 Ohm	0.2	.15
A94803	R3	80,000 Ohm	0.2	.15
A94103	R4	10,000 Ohm	0.2	.15
A95606	R6	4 Megohm	0.2	.10
A95104	R8	100,000 Ohm	0.2	.15
A94503	R7	50,000 Ohm	0.2	.15
A95503	R8	50,000 Ohm	0.2	.10
A95305	R9	3 Megohm	0.2	.10
A95306	R10	3 Megohm	0.2	.10
A94104	R12	100,000 Ohm	0.2	.15
A94104	R13	100,000 Ohm	0.2	.15
A94153	R15	15,000 Ohm	0.2	.15
A95102	R16	1,000 Ohm	0.2	.10
A95105	R17	1 Megohm	0.2	.10

WIRE WOUND

43X63	R14	16.8 Ohm		.25

VARIABLE

36X276	R11	1 Megohm	Volume Control and On-Off Switch	1.00

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
15A103	Dial Bracket Assembly less Dial Lamp, Dial Lamp Socket and Spring Clip, Pointer and On-Off Indicator Assembly	$0.80
15X48	Pointer	.10
25A79	On-Off Indicator Disc Assembly Only	.15
7A26	Dial Lamp	.15
7A8	Dial Lamp Socket and Spring Clip	.10
7A60	Dial Lamp Push-Button Switch Assembly	.50

DRIVE ASSEMBLY

5A36	Drive Bracket Assembly, less Drive Shaft, and Drive Drum and Pointer Shaft	.35
26X233	Drive Shaft Only	.15
74X275	Drive Drum and Pointer Shaft (mounted on Gang Condenser Shaft)	.45
	20' Black Tuning Drive Cord doz.	.45
78X27	Tension Spring for Tuning Drive Cord	.10
	5' On-Off Indicator Cord doz.	.20
78X44	Tension Spring for Above Indicator Cord	.10
79X7	Brass Collar with Set Screw for Securing Indicator Cord to shaft of Volume Control	.10

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator, and adjust the I.F. wave trap trimmer (C1) for minimum output. The location of this trimmer is shown in Fig. 3.

Range D Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (2nd short wave band).

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range D trimmer (C8) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C3) to maximum.

When adjusting the antenna Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (1st short wave band).

Adjust the oscillator Range C trimmer (C9) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range C trimmer (C4) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator Range B trimmer (C10) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the antenna Range B trimmer (C5) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C11) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A245	Tube Socket, 8 Prong	$0.15
3A242	Tube Socket, 7 Prong	.15
3A243	Tube Socket, 5 Prong	.15
3A58	Speaker Socket, 5 Prong	.10
13X255	6G5 Tube Socket and Cable Assembly	.65

SPEAKERS

12A257	6" Dynamic Speaker Compl. with Output Transformer (T6)	5.80
12A260	8" Dynamic Speaker Compl. with Output Transformer (T6)	6.35
12A258	10" Dynamic Speaker Compl. with Output Transformer (T6)	6.85

KNOBS

Specify Name of Knob and Name and Model of Radio	Tuning Control — Set Screw Type	.20
	Volume Control — Push-On Type	.15
	Band Switch — Push-On Type	.15

GENERAL

2X38	Felt Washer (Used behind knobs)	doz.	.10
8X23	Rubber Chassis Mounting Cushion	ea.	.10
2A67	Band Change Switch		.85
2A61	Tone Control Switch		.20
30X44	Grid Clip Only	doz.	.10
4A50	Terminal Strip (2 lugs insulated with mounting hole in center)		.10
4A18	Terminal Strip (2 lugs insulated with mounting strap in center)		.10
32X69	Tube Shield (Tuning Eye)		.15
32X70	Tube Shield Base (Tuning Eye)		.10
13X80	Line Cord and Plug		.50
13X214	Antenna and Ground Lead Assembly		.30
25X122	Chassis Mounting Feet	ea.	.10
23A61	Gang Condenser Mounting Cushion Assembly. Includes 3—Rubber Cushions 3—Hex Shoulder Nuts 3—No. 6 Flat Washers		.15

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
15A104	Dial Assembly Complete less Dial Lamp, Lamp Socket and Main Pointer	$3.00
25X324	Dial Bracket Only	.25
58X149	Dial Glass	1.15
26X235	Volume Control Pointer Shaft and Pulley	.20
26X240	Band Change Pointer Shaft and Pulley	.20
29X20	Brass Collar for Volume Indicator	.10
29X60	Brass Collar for Band Indicator	.25
15X80	Small Pointers	.10
28X44	Takeup Springs for Small Pointers	.10
15X79	Main Pointer	.10
	Wave Band or Volume Indicator Cord (8") doz.	.20
41X12	Lamp Reflector	.10
7A37	Lamp Socket	.10
7A32	Dial Lamp	.20
9X30	Cardboard Dial Background	.10
25X331	Dial Clamping Bracket	.10
4X141	Dial Crystal and Escutcheon Assembly	1.15

DRIVE ASSEMBLY

5A36	Drive Bracket and Bushing Assembly Complete		.35
26X234	Drive Shaft		.20
24X249	Drive Drum and Main Pointer Shaft		.45
	20" Tuning Drive Cord	doz.	.45
28X27	Tension Spring for Drive Cord		.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A692	T1	Antenna Transformer and Can Assembly	$1.75
9A693	T2	Oscillator Coil and Can Assembly	1.55
9A694	T3	1st I.F. Transformer and Can Assembly	1.35
9A695	T4	2nd I.F. Transformer and Can Assembly	1.35
53X134	T5	115 Volt, 60 Cycle Power Transformer	3.35
53X136	T5	115-230 Volt, 40-60 Cycle Power Transformer	4.70
51X31	T6	Output Transformer (Part of Speaker Assembly)	2.45
9A714	L1	Wave Trap (456 KC)	.55

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C6	.05 mf.	180	$0.15
46X202	C7	.02 mf.	360	.15
46X98	C15	.10 mf.	180	.20
46X117	C16	.25 mf.	180	.25
46X105	C22	.10 mf.	360	.20
46X120	C25	.01 mf.	360	.15
46X120	C27	.01 mf.	360	.15
46X117	C28	.25 mf.	180	.25
46X172	C29	.02 mf.	180	.15
46X205	C30	.02 mf.	480	.15
46X100	C31	.002 mf.	600	.15

MOLDED

47X69	C2	250 mmf.		.15
47X75	C12	2100 mmf.		.25
47X76	C13	4800 mmf.		.35
47X53	C14	35 mmf.		.10
47X57	C21	100 mmf.		.10
47X65	C26	250 mmf.		.15

ELECTROLYTIC

44X32	C23	16 mf.	250 Wet	.75
44X31	C24	12 mf.	340 Wet	.80

TRIMMERS

17A64	C1	30-90 mmf.	Wave Trap Trimmer	.25
17A59	C3	2-25 mmf.	Range "D" Antenna Trimmer	.60
	C4	2-25 mmf.	Range "C" Antenna Trimmer	
	C5	2-25 mmf.	Range "B" Antenna Trimmer	
	C8	2-25 mmf.	Range "D" Oscillator Trimmer	
	C9	2-25 mmf.	Range "C" Oscillator Trimmer	
	C10	2-25 mmf.	Range "B" Oscillator Trimmer	
17A60	C11	450-850 mmf.	600 KC Trimmer	.45
17A33	C17	70-150 mmf.	1st I.F. Trimmers	.40
	C18	70-150 mmf.		
17A34	C19	70-150 mmf.	2nd I.F. Trimmers	.40
	C20	150-250 mmf.		

MISCELLANEOUS

14A61	2 Gang Condenser less Dial and Drive Assembly	2.50

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94104	R1	100,000 Ohm	0.2	$0.15
A95153	R2	15,000 Ohm	0.2	.10
A95205	R3	2 Megohm	0.2	.10
A94151	R4	150 Ohm	0.2	.15
894503	R5	50,000 Ohm	0.5	.15
C94103	R6	10,000 Ohm	1.0	.15
A95503	R7	5,000 Ohm	0.2	.10
A95104	R9	100,000 Ohm	0.2	.10
A95205	R10	2 Megohm	0.2	.10
A94504	R11	500,000 Ohm	0.2	.15
A94104	R14	100,000 Ohm	0.2	.15
A94504	R15	500,000 Ohm	0.2	.15
A95105	R16	1 Megohm	0.2	.10
A95805	R17	8 Megohm	0.2	.10
A95805	R18	8 Megohm	0.2	.10

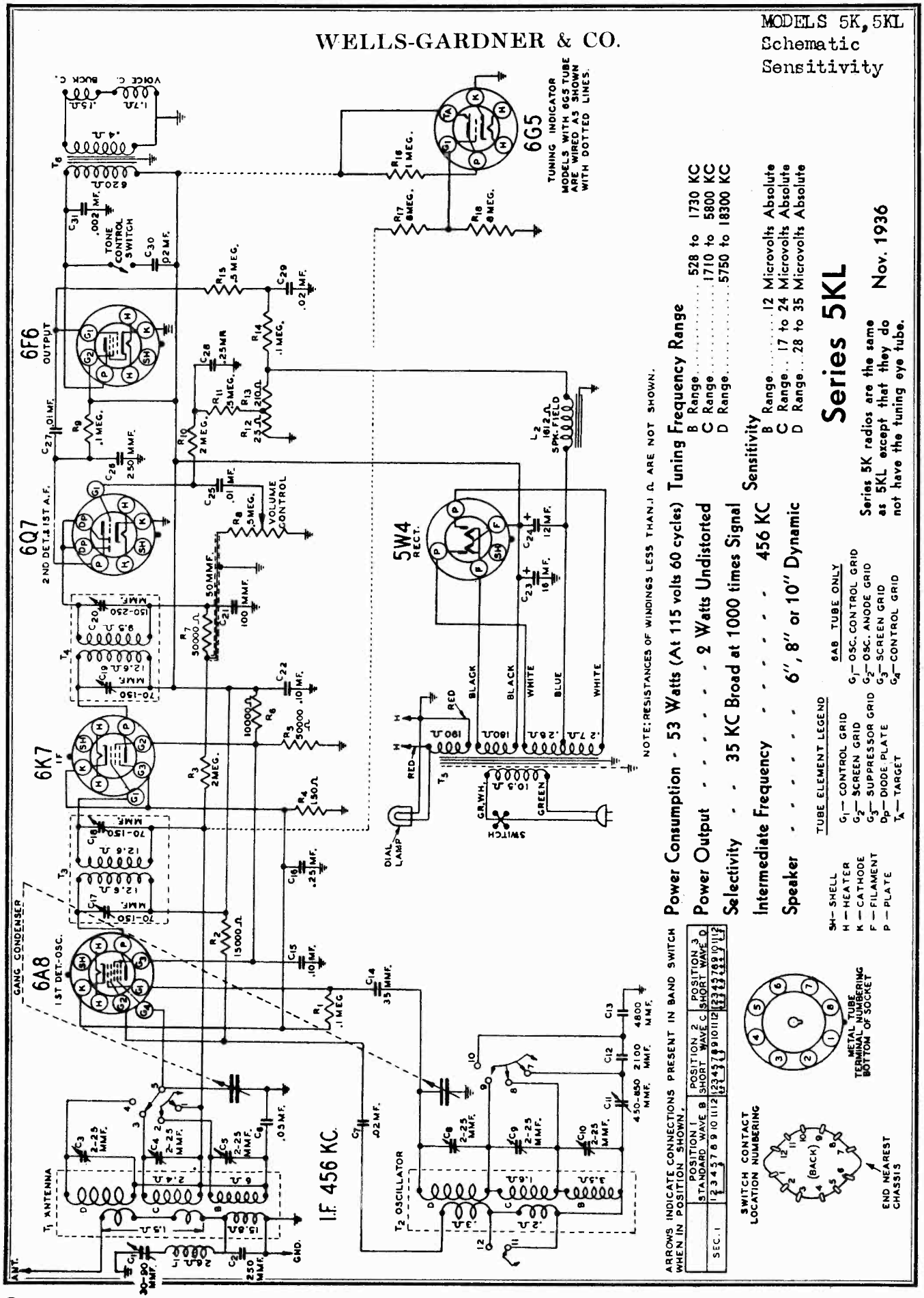
WIRE WOUND

43X69	R12	25 Ohm	.25	.35
	R13	210 Ohm	2.0	

VARIABLE

36X227	R8	0.5 Megohm	Volume Control and On-Off Switch	1.00

Prices Subject to Change Without Notice



MODELS 5K, 5KL
Socket, Trimmers
Voltage, Coils

WELLS-GARDNER & CO.

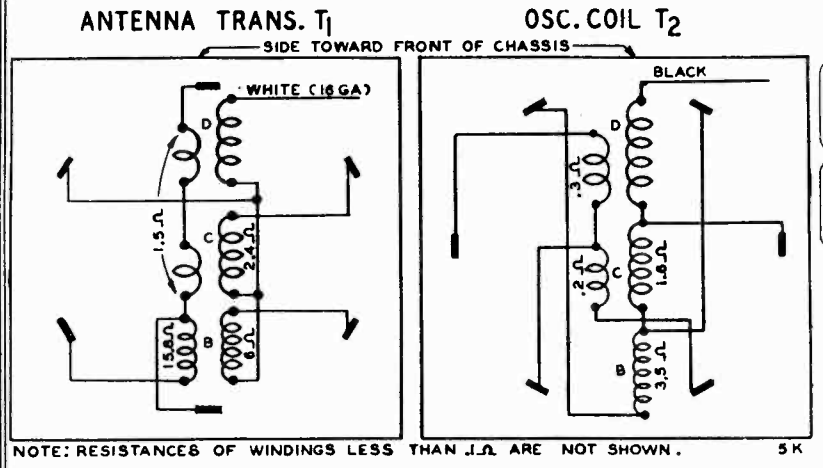


Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

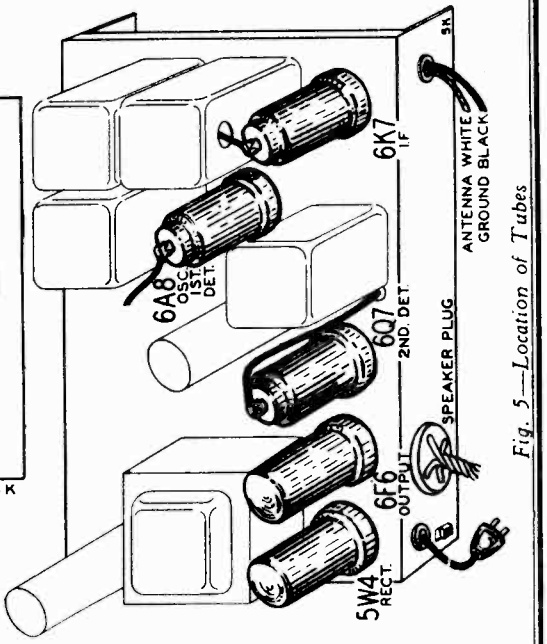
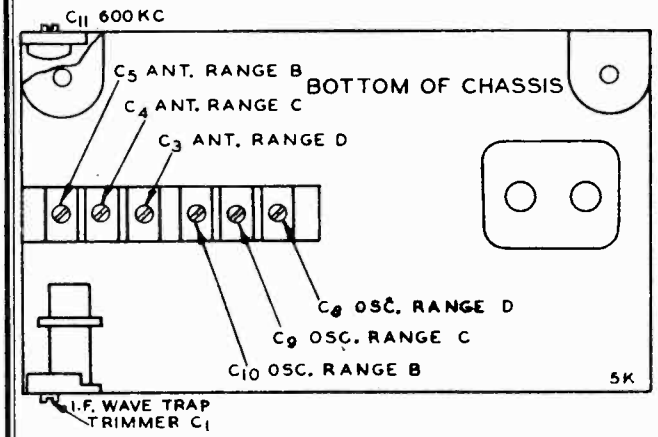


Fig. 5—Location of Tubes



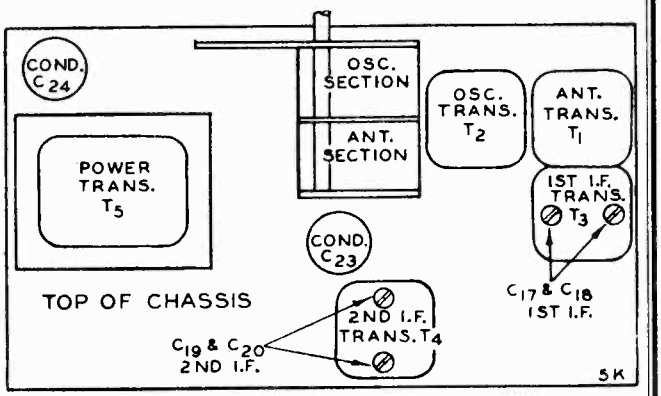


Fig. 3—Location of Trimmers

VOLTAGES AT SOCKETS

Line Voltage: 115 | Volume Control: Maximum | Antenna Shorted to Ground

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6A8	1st Det.-Osc.	0	6.3(1)	200	110		160	6.3(1)	3
6K7	I.F.	0	6.3(1)	200	110	3		6.3(1)	3
6Q7	2nd Det.	0	6.3(1)	110	0	0		6.3(1)	0(2)
6F6	Output	0	6.3(1)	185	200	12.5(3)		6.3(1)	0
5W4	Rectifier	0	5.1(4)		620(5)		620(5)		5.1(4)
6G5	Tuning Indicator ...	Plate to Ground 18		Target to Ground 200		Cathode to Ground 0		Across Heater 6.3 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R12.
(3) Read across resistor R12 and R13.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage read across terminals 4 and 6.

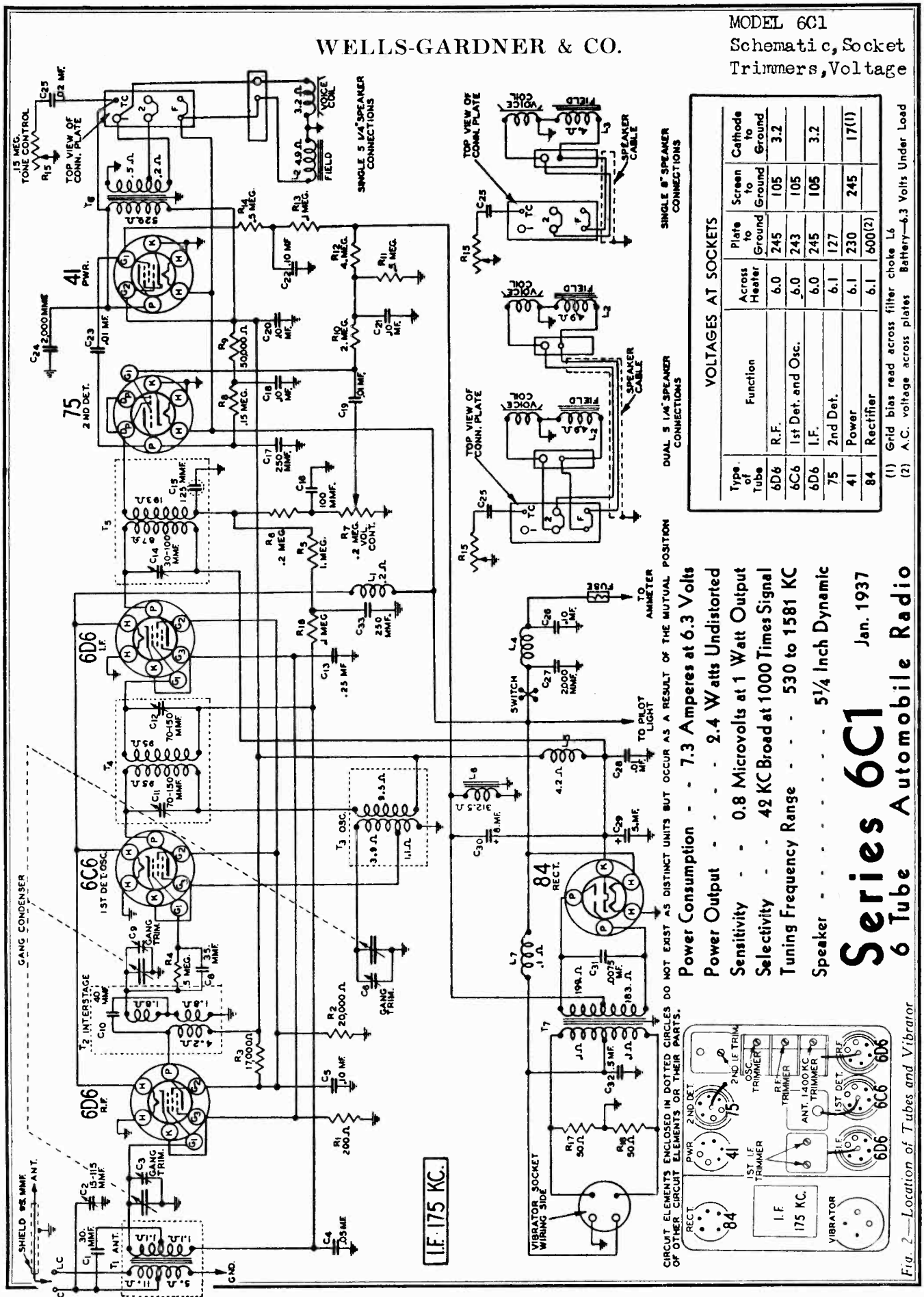


Fig. 2—Location of Tubes and Vibrator

MODEL 6C1
Coils, Mounting Data

WELLS-GARDNER & CO.

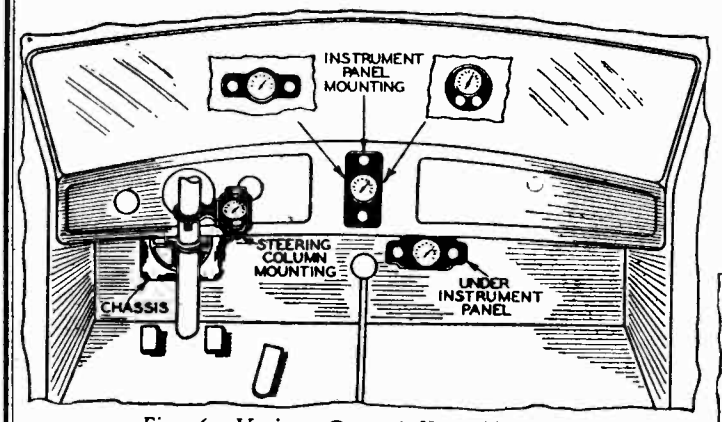


Fig. 6—Various Control Head Mountings

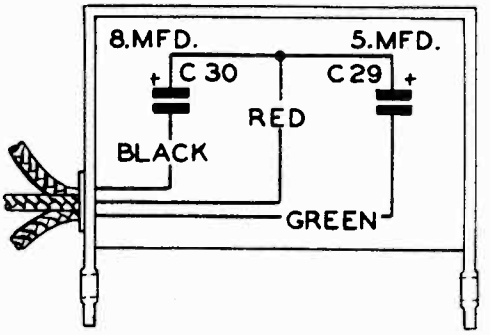


Fig. 5—Condenser Block—Internal Wiring

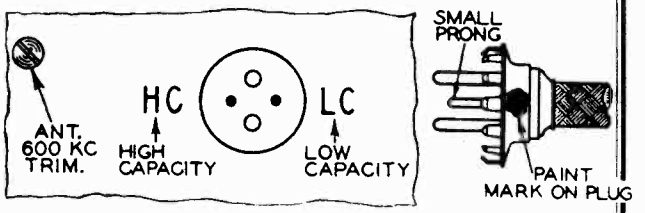


Fig. 3—Antenna Plug Insertion

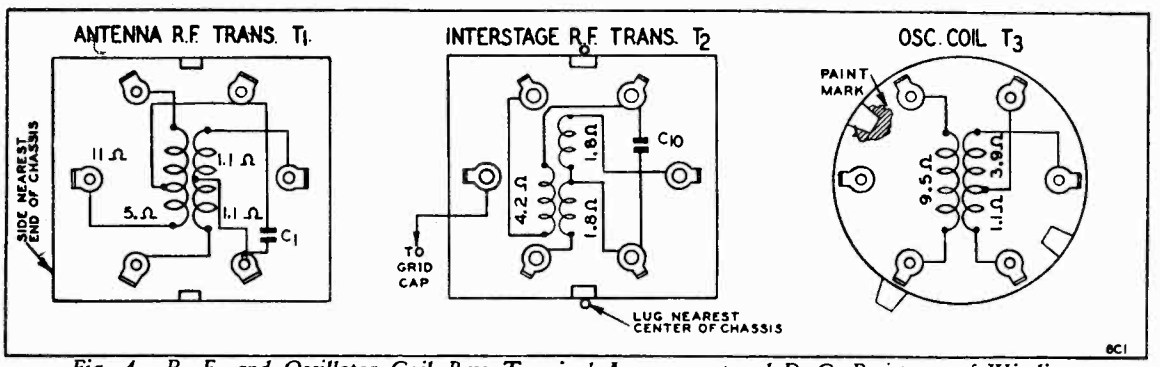


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Instrument Panel Mounting Kits

Car	Year & Model	Kit No.
Buick	1937 40-60 Series	21A68
	1937 80-90 Series	21A69
	1936	21A16
Cadillac	1937	21A70
	1936	21A39
Chevrolet	1937 All Models	21A58
	1936-35 Standard & Master	21A11
Chrysler	1937 Royal	21A59
	1937 Imperial	21A71
	1937 Airflow	21A72
	1936 Six	21A19
	1936 Eight	21A30
	1936 Airflow	21A31
	1935-34 Except Imperial	21A47
DeSoto	1937	21A60
	1936 Airflow & Airstream Custom	21A22
	1936 Airstream DeLuxe	21A26
	1935 DeLuxe	21A46
	1934	21A47
Dodge	1937	21A61
	1936 DeLuxe	21A13
	1935	21A45
	1934	21A49

Car	Year & Model	Kit No.
Ford	1937 DeLuxe	21A74
	1937 Standard	21A73
	1936 Std. & DeLuxe	21A10
	1935 DeLuxe	21A10
	1935 Standard	21A32
	1934	21A38
Graham	1937 Cavalier & Supercharger	21A87
	1937 Crusader	21A86
Hudson	1937	21A75
	1936	21A17
	1935	21A48
	1934	21A35
LaFayette	1936-35	21A50
LaSalle	1937	21A89
	1936	21A40
Lincoln	Zephyr 1937	21A76
	Zephyr 1936	21A10
Nash	1937 Ambassador	21A63
	1936-35	21A36
Nash Laf. 400	1937	21A62
Oldsmobile	1937	21A88
	1936	21A14
	1935	21A34

Car	Year & Model	Kit No.
Packard	Six	21A56
	1937 120-C	21A57
	Super 8 & 12	21A77
	1936 120-8	21A21
	1935 120	21A41
Plymouth	1937 DeLuxe	21A78
	1937 Standard	21A64
	1936 DeLuxe	21A12
	1936-35 Standard	21A37
	1935 DeLuxe	21A33
	1934	21A49
Pontiac	1937	21A79
	1936-35 Standard-DeLuxe 6 & 8	21A15
Studebaker	Dictator Coupe	21A65
	1937 Dictator	21A54
	President	21A55
	1936 Dictator	21A20
	President	21A24
Terraplane	1937	21A80
	1936	21A18
	1935	21A48
	1934	21A35
Steering column and under panel kit.	Chromium	21A66
	Black	21A67

1934, 1935, 1936 and No. 21A67 Steering Column Kits..... Net Price..... ea. $0.60
1937 and No. 21A66 Steering Column Kits..... Net Price..... ea. .75

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the R.F. interstage section of the tuning condenser. (See Fig. 2 for location of this section.)

Connect the ground lead of the signal generator to the chassis. The chassis should be in the case.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1581 KC Adjustment

Set the signal generator for 1581 KC.

Turn the rotor of the tuning condenser to the full open position.

Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Tune in this signal and adjust the 600 KC antenna trimmer to maximum (See Fig. 3 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

Adjusting Antenna 600 KC Trimmer

After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

A very short insulated screwdriver will be helpful.

Inserting Antenna Plug

IMPORTANT—The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 3.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as may be the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

The 1936 Chrysler Motors cars (except Plymouth —but including Chrysler, Dodge and DeSoto) have a steel roof, separated from the body proper, which is used as an antenna. The capacity of these antennas is about 1500 mmf. If this radio is installed in these cars, it will be necessary to use a running board or "fish pole" antenna.

Most 1937 General Motors cars are equipped with an antenna built into the running board which is insulated from the body proper.

If a running board or under-car antenna is used, it must be one which is covered with a suitable insulation, to prevent short circuiting in wet weather.

Control Head Mounting

This auto radio is supplied with a Universal control head. This head, in conjunction with suitable escutcheon plates and mounting brackets, can be mounted in the instrument panel of practically all widely sold 1936 and 1937 automobiles. If the head cannot be mounted in the instrument panel of the car, it may be mounted under the panel or on the steering column.

The escutcheon plates for the various cars, knobs, special mounting brackets and small items such as screws, are put up in kit form.

The control head, volume control fitting, flexible shafts, pilot lamp assembly, dial scale, retaining ring and pointer disc are packed with each radio.

In Fig. 6 are shown the various locations at which the control head is mounted. The head is intended for installation primarily in the instrument panel of the car. Most 1936 and 1937 cars have a name plate or ash receiver on the instrument panel, the removal of which permits installation of the radio control head.

Complete installation data is contained in the instruction booklet packed with each radio.

Panel Kits

1936 Radios—Series 6N, 6P, 6L, 6K, 6J ["A" Issue)
1937 Radios—Series 6J ["B" or Later Issues), 6C1

The following points must be observed when 1937 radios are used with 1936 or previous panel kits and also when 1936 radios are used with 1937 panel kits.

Dial Scale Kit

The dial scale, pointer disc and retaining ring (for 1937 panel kits) are packed with each 1937 radio and are not included in the panel kit. If a 1937 panel kit is ordered and is to be used with a radio manufactured in 1936, it will be advisable to order the "Dial Scale Kit" consisting of:

1—Dial Scale
1—Retaining Ring
1—Pointer Disc

} The net price for this kit is 10c. Specify name and model of radio when ordering the kit.

Pointer Screw and Spacer Washer

A few of the first shipments of 1937 panel kits did not contain the pointer screw and spacer washer. It may, therefore, be necessary to order these items in some instances.

The pointer screws furnished prior to the 1937 radios have a slotted round head and cannot be satisfactorily used with the dial scales furnished with the 1937 radios. The pointer screw for the latter has an oval or flat head and may be used on either type.

If a panel kit purchased prior to 1937 is used with a 1937 radio, it will be necessary to order the new type pointer screw and special spacer washer. When ordering give kit number or name, model and year of car.

Roof Speaker and Dual Speakers (1936 Cars)

The Ford and General Motors 1936 automobiles have provision for mounting a speaker in the car roof (Ford 5¼ inch speaker, General Motors 5¼ or 8 inch speaker). This radio is so designed that roof speaker installations in these cars can readily be made.

Four types of speaker installations can be made as follows:

Single 5¼ inch Speaker on Chassis Case Cover
Single 5¼ inch Roof Speaker
Single 8 inch Roof Speaker
Dual 5¼ inch Roof and 5¼ inch Chassis Speakers

The electrical connections of the different speaker installations are shown in the schematic—Fig. 1.

Replacement Parts List

... here is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A247	6 Prong Tube Sockets	$0.10
3A284	6 Prong Tube Socket	.10
3A188	Vibrator Socket	.10
3A277	Speaker Socket (In chassis)	.20
3A276	Antenna Cable Socket	.10

SPEAKER

12A234	8¼" Dynamic Speaker	3.05
13K261	Red Chassis Speaker Lead	.10
13K262	Green Chassis Speaker Lead	.10
13K263	White Tone Control Lead	.10

GENERAL

19A26	Vibrator Unit	3.40
28X62	Spring Clamp for Vibrator	.10
34X233	Chassis Case Only	3.15
28X118	Spring Clamp Buttons Doz.	.30
34X232	Chassis Case Cover Only	1.95
	8-32 x 3/16" Set Screws to Secure Flexible Shafts in Chassis Anchor Bushings Doz.	.15
10A58	Tone Control Knob	$0.10
30X14	Grid Clip Only Doz.	.10
22X30	Tube Shield Base	.10
22X58	Tube Shield	.15
4A50	Two Lug Terminal Strip (Both lugs insulated—Center mounting hole not used)	.10
4A41	Single Lug Terminal Strip with Mounting Foot	.10
20X39	Hex Shoulder Nuts for Gang Condenser Mounting	.10
25X370	Stabilizer Bracket for Gang Condenser	.10
20X169	Brass Stud for above Bracket	.10
6X8	Rubber Grommet for above Bracket and for Gang Condenser Mounting	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A759	T1	Antenna Transformer and Can Assembly	$1.65
9A760	T2	Interstage Transformer and Can Assembly	1.65
9A766	T3	Oscillator Coil and Can Assembly	.80
9A761	T4	1st I.F. Transformer and Can Assembly	1.45
9A762	T5	2nd I.F. Transformer and Can Assembly	1.70
51X47	T6	Output Transformer	1.10
51X123	T7	Power Transformer	2.95
9A568	L1 L5	Filament Reactor / R.F. "6" Plate Reactor — One Assembly	.55
9A566	L4	Motor Noise Reactor	.25
52X42	L6	Filter Choke	.90
9A773	L7	Vibrator Reactor	.35

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A96201	R1	200 Ohms	0.2	$0.15
894203	R2	20,000 Ohms	0.5	.15
C94173	R3	17,000 Ohms	1.0	.15
A94504	R4	500,000 Ohms	0.2	.15
A95105	R5	1 Megohm	0.2	.10
A95204	R6	200,000 Ohms	0.2	.10
A95154	R8	150,000 Ohms	0.2	.10
A95503	R9	50,000 Ohms	0.2	.10
A95206	R10	2 Megohms	0.2	.10
A94604	R11	600,000 Ohms	0.2	.15
A94405	R12	4 Megohms	0.2	.15
A94104	R13	100,000 Ohms	0.2	.15
A95604	R14	500,000 Ohms	0.2	.10
B94800	R15	50 Ohms	0.5	.15
B94600	R17	60 Ohms	0.5	.15
A95104	R18	100,000 Ohms	0.2	.10

VARIABLE

36X234	R7	.2 Megohm	Volume Control & On-Off Switch	.95
40X207	R16	.15 Megohm	Tone Control	.70

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
44X86	C4	.05 mf.	180	$0.15
44X98	C5	.10 mf.	180	.20
46X197	C13	.25 mf.	180	.25
46X106	C10	.10 mf.	360	.20
46X120	C19	.01 mf.	360	.15
46X106	C20	.10 mf.	360	.20
49X4	C21 C22	.10 mf. / .10 mf.	180 / 180	.35
46X120	C23	.01 mf.	360	.15
46X180	C25	.02 mf.	600	.15
46X98	C26	.10 mf.	180	.20
46X120	C28	.01 mf.	360	.15
46X177	C31	.0075 mf.	1600	.20
46X186	C32	.50 mf.	180	.40

ELECTROLYTIC

18X218	C29 C30	8.0 mf. / 8.0 mf.	Dry Electrolytic Block	1.70

MOLDED

47X66	C1	30 mmf.	.15
47X83	C8	35 mmf.	.10
47X78	C16	60 mmf.	.15
47X87	C14	100 mmf.	.10
47X82	C17	250 mmf.	.15
47X41	C24	2000 mmf.	.20
47X41	C27	2000 mmf.	.20
47X46	C33	750 mmf.	.15

TRIMMER

17A48	C2	25-115 mmf. Antenna 600 KC Trimmer	.20
	C3	Antenna Trimmer—Part of Gang Condenser	
	C5	Oscillator Trimmer—Part of Gang Condenser	
	C6	Interstage Trimmer—Part of Gang Condenser	
17A31	C11 C12	60-150 mmf. / 56-158 mmf. 1st I.F. Trimmers	.35
17A46	C14	30-100 mmf. 2nd I.F. Trimmer	.20

MISCELLANEOUS

C15	125 mmf.	Integral Part of 2nd I.F. Transformer
14A65	Three Section Gang Condenser Assembly Complete with Drive Gears	4.55

INSTALLATION ITEMS

CABLE AND FLEXIBLE SHAFT ASSEMBLIES

Part No.	Quan. Used	Description	List Price
18A40	2	20" Volume or Tuning Control Flexible Drive Shaft Ea.	$1.10
18A42	2	25" Volume or Tuning Control Flexible Drive Shaft Ea.	1.30
18A44	2	36" Volume or Tuning Control Flexible Drive Shaft Ea.	1.65
13X252	1	Pilot Light Cable Assembly less Lamp	.45
13X292	1	40" Antenna Cable and Plug	.95
13X227	1	Battery Cable (Long Section with Fuse Receptacle)	$0.85
13X234	1	"A" Cable—Short Section Connected to Chassis (Part of Chassis Assembly)	.35

MOUNTING BOLT ASSEMBLY

20X59	3	Double End Hexagon Bolts for Mounting Chassis to Dash	.10
	3	6/16"-18 Spring Lockout for above Mounting Assembly	.10
19X18	6	Flat Washers for above Mounting Assembly Doz.	.15
	6	6/16"-18 Hexagon Nuts for above Mounting Assembly Doz.	.15
	1	5/16" Shakeproof Lockwasher to Ground Chassis Case to Metal Dash Surface on Engine Side Doz.	.10

MISCELLANEOUS MOUNTING ITEMS

7A32	1	Pilot Light Bulb	.20
16X14	1	20 Ampere Fuse	.10
16X3	1	Fuse Shield	.10
21A6	1	Distributor Suppressor	.35
48X27	1	Generator Condenser	.45
21A8	1	Choke-Condenser Unit (Not Shipped With Set)	1.50
21A7	1	Spark Plug Suppressor (Not Shipped With Set)	.35

CONTROL HEAD AND PLATE ASSEMBLY

Part No.	Description	List Price
*20A27	No. 4 Control Head Only with ⅝" Hex. Nut	$3.00
*20A28	Volume Control Fitting complete with Retaining Spring, ⅝" Hex. Nut and Lockwasher	.35
*	Dial Scale (Specify Name and Model Number)	.60
*15X93	Pointer Disc	.10
*28X117	Retaining Ring Doz.	.70
†	Pointer Screw 3-48 x 5/16" Doz.	.70
†	Control Knobs—Specify Car, Year and Model Molded Type Ea.	.25
	Chromium Type Ea.	.50

Note: Prices of Instrument Panel Plate Kits are shown below the Chart on Page 6.
*Shipped with each set.
†Shipped with Panel Kit.

ROOF SPEAKER MOUNTING KITS

1936 BUICK, CHEVROLET, PONTIAC, OLDSMOBILE

Part No.	Description	List Price
21A27	SPEAKER KIT ASSEMBLY COMPLETE Includes	$5.35
12A234	5¼" Dynamic Speaker	3.05
23A56	Mounting Accessories—Includes Trim Ring, Speaker Housing, Self Tapping Screws and Clamp Springs	2.00
13X248	Speaker Cable Assembly Complete	1.05
21A42	SINGLE ROOF SPEAKER KIT LESS SPEAKER	2.30
9X19	Cardboard Disc—to replace Speaker removed from Chassis Cover	.10
	For Mounting Accessories and Roof Speaker Cable, see Kit No. 21A27 above.	
21A28	SPEAKER KIT ASSEMBLY COMPLETE Includes	10.50
12A233	8" Dynamic Speaker	7.40
23A57	Mounting Accessories—Includes Trim Ring and Self Tapping Screws	3.00
13X248	Speaker Cable Assembly Complete	1.05

1936 FORD—STANDARD AND DELUXE

21A29	SPEAKER KIT ASSEMBLY COMPLETE Includes	4.15
12A234	5¼" Dynamic Speaker	3.05
23A58	Mounting Accessories — Includes Hex Nuts, Lockwashers and Bolts	.40
13X248	Speaker Cable Assembly Complete	1.05
21A43	SINGLE ROOF SPEAKER KIT LESS SPEAKER	1.10
9X19	Cardboard Disc—to replace Speaker removed from Chassis Cover	.10
	For Mounting Accessories and Roof Speaker Cable, see Kit No. 21A29 above.	

Prices Subject to Change Without Notice.

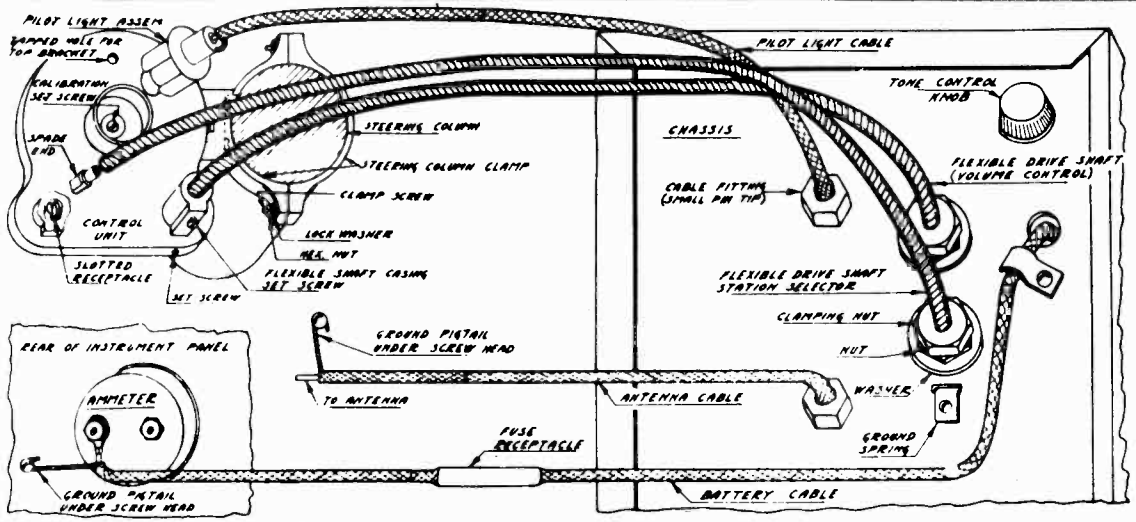


Fig. 4—General Installation View—Control Unit on Steering Column

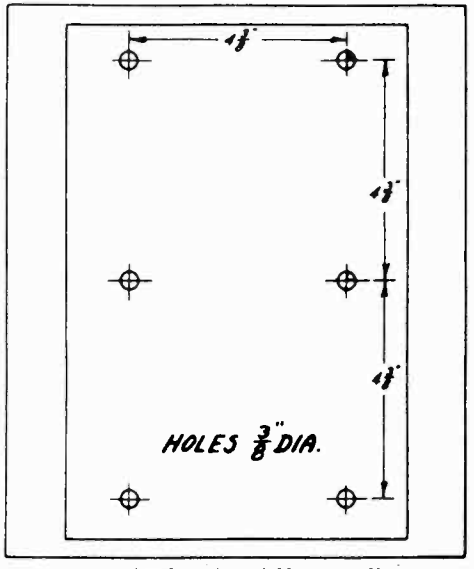


Fig. 2—Location of Mounting Holes

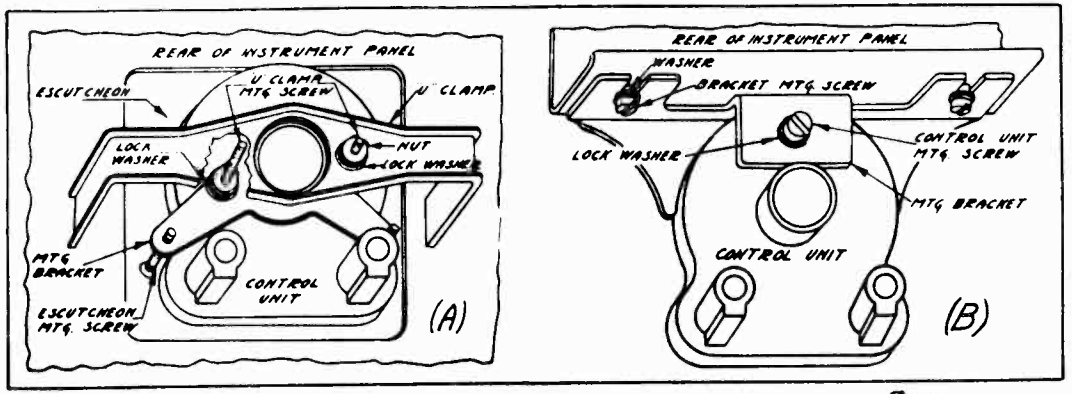


Fig. 5—Mounting Control Unit In and Under the Instrument Panel

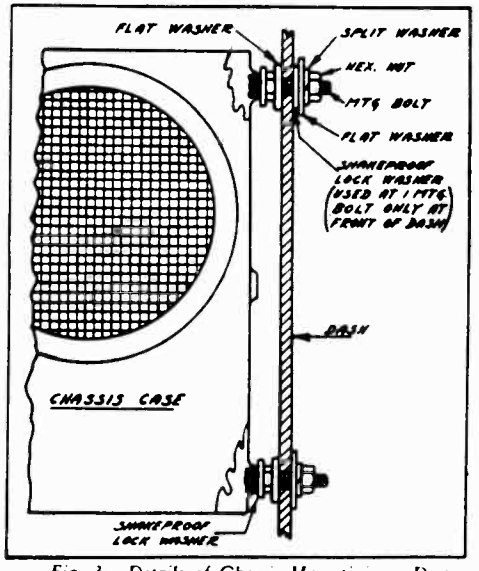


Fig. 3—Details of Chassis Mounting on Dash

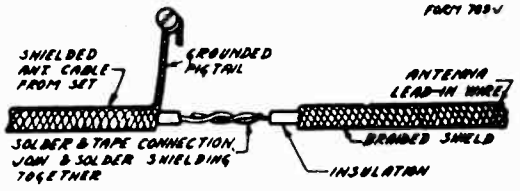
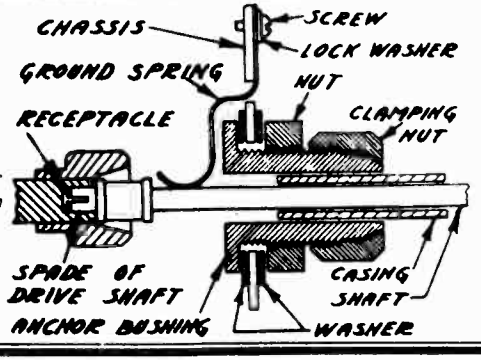


Fig. 7—Extension of Antenna Cable Shield

Fig. 6—Details of Flexible Shaft Connection at the Chassis



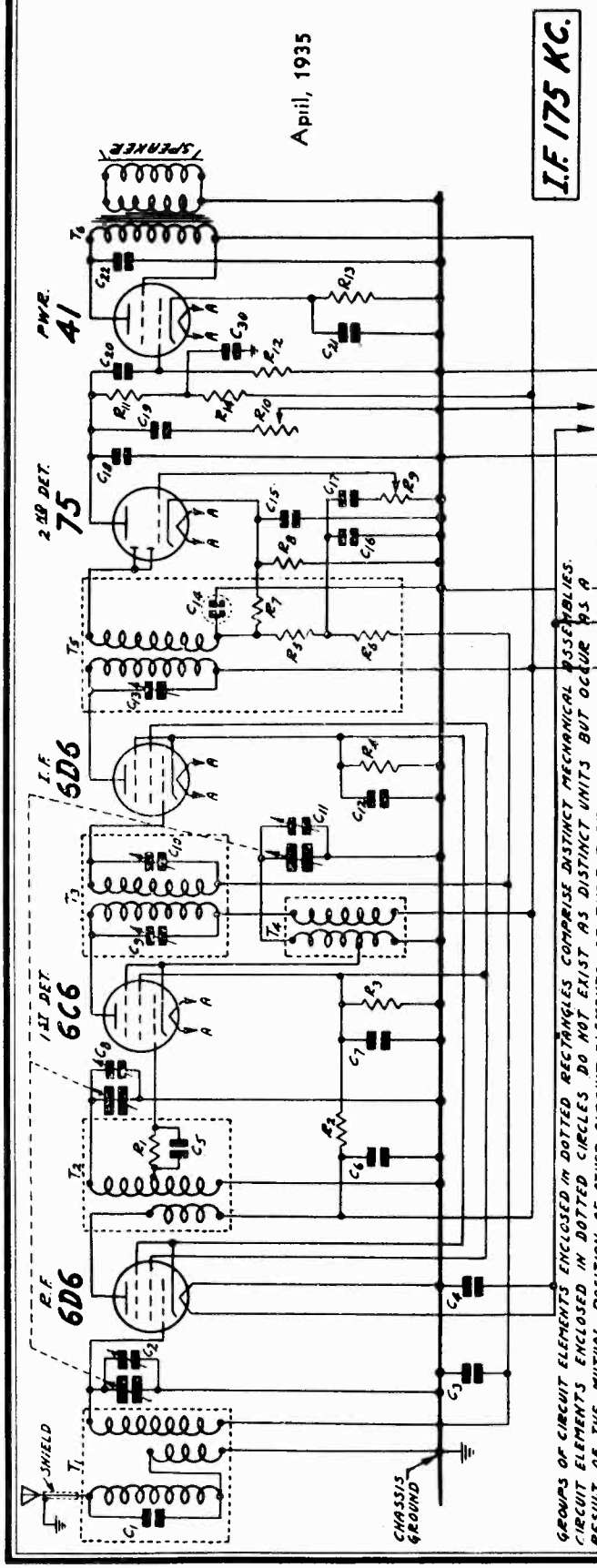
WELLS-GARDNER & CO., INC.

MODEL 6S
Schematic
Parts

April, 1935

I.F. 175 KC.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



TRANSFORMERS AND COILS

Old Part No.	New Part No.	Description	Code	List Price
50632	51X17-6S	Output Transformer	T6	1.65
	9A368-6S	Antenna Coil Assembly (Less Can)	T1	.95
	9A369-6S	R.F. Interstage Coil Assembly (Less Can)	T2	1.25
	1A23-6S	Dual-Coil Can Assembly Only (for above two coils)		.30
	9A371-6S	1st I.F. Coil & Can Assembly Complete	T3	1.70
	9A370-6S	Oscillator Coil & Can Assembly Complete	T4	.60
	9A372-6S	2nd I.F. Coil & Can Assembly Complete	T5	2.05
	9A375-6S	Pilot Light Choke Assembly	L4	.15
	9A373-6S	Motor Noise Choke	L6	.25
5174	9A268-6S	R.F. "B" Choke Coil Assembly	L3	.10
	9A374-6S	Filament Reactor	L2	.30
50633	53X72-6S	Power Transformer	T7	3.50
50637	52X24-6S	Filter Choke	L1	.90

Old Part No.	New Part No.
	47X34
	46X30
	47X30
	47X53
	46X81
	46X83
*17A32	
†17A33	
1965	46X82
	17A18
	45X203
	4 X32
	46X84
	4 X32

CONDENSERS

Code	Capacity	Voltage	Type	List Price	New Part No.
C1	.0005 mf.		Moulded	.15	46X92
C2	Antenna Trimmer Part of Gang Condenser				46X86
C3	.05 mf.	180	Tubular	.15	46X85
C4	.003 mf.		Moulded	.25	46X93
C5	.000055 mf.		Moulded	.10	46X89
C6	.10 mf.	400	Tubular	.25	46X88
C7	.10 mf.	180	Tubular	.25	45X204
C8	1st Detector Trimmer Part of Gang Condenser				46X93
C9	130-360 mmf.	1st I. F. Trimmer Con-		.50	4 X50
C10	130-360 mmf.	densers			46X94
C9	70-150 mmf.	1st I. F. Trimmer Con-		.50	14A39
C10	70-150 mmf.	densers			
C11	Oscillator Trimmer Part of Gang Condenser			.25	
C12	.10 mf.	180	Tubular Condenser		
C13	70-140 mmf.	2nd I.F. Trimmer Condenser		.35	46X200
C14	.00025 mf.	Part of 2nd I.F. Coil Assembly			
C15	12.00 mf.	25	Dry Electro		40X201
C21	12.00 mf.	25	Lyric Block	1.05	†A95301
C16	.00025 mf.		Moulded	.15	†A95154
C17	.01 mf.	180	Tubular	.15	A95504
C18	.00025 mf.		Moulded	.15	†A95503

C19	.006 mf.	600	Tubular	.20
C20	.01 mf.	400	Tubular	.20
C22	.002 mf.	600	Tubular	.20
C23	.50 mf.	180	Tubular	.35
C24	1.65 mf.	140	Tubular	.80
C25	.01 mf.	1800	Tubular	.30
C26	6.00 mf.	350	Dry Electro	2.10
C27	8.00 mf.	350	Lyric Block	
C28	.50 mf.	180	Tubular	.15
C29	.003 mf.		Moulded	.25
C30	.25 mf.	300	Tubular	.36
			3 Section Gang Condenser	4.20

RESISTORS

Code	Resistance	Wattage	Type	List Price
R1	300,000 Ohm	0.2	Carbon	.10
R2	15,000 Ohm	0.5	Carbon	.15
R3	20,000 Ohm	0.5	Carbon	.15
R4	450 Ohm	0.2	Armored Wire Wound	.30
R13	800 Ohm	0.5		
R5	50,000 Ohm	0.2	Carbon	.10
R6	1.0 Megohm	0.2	Carbon	.10
R7	500,000 Ohm	0.2	Carbon	.10
R8	7,500 Ohm	0.2	Carbon	.10
R9	2.0 Megohm		Volume Control & Switch	1.15
R10	100,000 Ohm	0.2	Tone Control	.75
R11	200,000 Ohm	0.2	Carbon	.10
R12	150,000 Ohm	0.2	Carbon	.10
R14	50,000 Ohm	0.2	Carbon	.10

MODEL 6S
Alignment, Voltage
Socket, Trimmers
Resistance, Notes

WELLS-GARDNER & CO.

Remove chassis from case.

Establish ground connection between chassis and power supply.

Reconnect A and B wires from power supply to chassis.

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the stator of the 1st detector (middle) section of the tuning condenser. This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire thru the hole in the shield over the stator and pushing the wire thru the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling off action of the A.V.C.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers are shown in Fig. 2.

1650 KC. Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the shielded antenna lead from the chassis through a 250 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A. V. C. action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 K C. Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Voltages at Sockets
Antenna Disconnected - Voltage at Battery 6.1

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cath. to Ground	Normal Plate M.A.
6D6	R. F.	5.8	218	100	5.2	5.8
6C6	1st Det. and Osc.	5.8	218	100		2.0
6D6	I. F.	5.8	218	100	5.2	5.8
75	2nd Det. & 1st A. F.	5.8	160 (1)		1.4	2.8
41	Output	5.8	210	220	16.0	16.0
84	Rectifier	5.8				20.0 per plate

Speaker Field ..1.15 Amperes "b" Unit .....3.89 Amperes
Chassis ..... 1.58 Amperes Pilot Lamp .....0.1 Amperes

(1) Measured on 1000 V. Scale (1000 Ohms per volt)

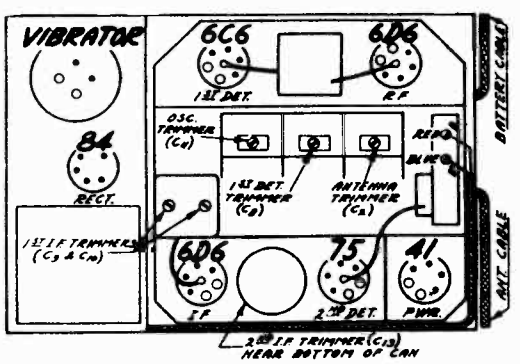


Fig. 2—Tube Arrangement and Trimmers

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC. with the volume control about three-fourths on. Remove the cover of the chassis case. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Calibrating the Receiver

After installing the receiver in the car, it will be necessary to calibrate the control unit. Tune in a station of known frequency at about the center of the dial. At the back of the control unit is a calibration screw—See Fig. 4 in the installation manual enclosed with each receiver. Remove the pilot light assembly.

The calibration screw will be seen at the bottom of the receptacle from which the pilot light assembly is withdrawn. Insert a screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. **The knob must be held during this adjustment.**

Voltages At Sockets

On the voltage chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the case, by means of an analyzer plug.

If the chassis unit is taken out of the case all of the socket terminals can easily be reached under the chassis with test prods.

If the chassis is taken out, a jumper wire must be connected from the chassis base to the metal wall of the "B" power unit, in order to complete the ground circuit.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

New Part No.	ITEM	Code	D. C. Resistance in Ohms
9A368-6S	Antenna Trans. Primaries in Series	T1	6.3
	Antenna Trans. Secondary	T1	2.5
9A369-6S	R.F. Interstage Trans. Pri.	T2	4.5
	R.F. Interstage Trans. Sec. (Center Tap to inside)	T2	1.8
	(Center Tap to ground)		1.3
9A371-6S	1st I.F. Trans. Primary	T3	58.
	1st I.F. Trans. Secondary	T3	58.
9A370-6S	Oscillator Cathode Coil (Total)	T4	3.
	Oscillator Plate Coil	T4	6.
9A372-6S	2nd I.F. Trans. Primary	T5	46.
	2nd I.F. Trans. Secondary	T5	46.
9X17-6S	Output Trans. Primary	T6	440.
	Output Trans. Sec. and Voice coil in paralle	T6	.4
9X72-6S	Power Trans. Primary	T7	.3
	Power Trans. Secondary	T7	500.
52X27-6S	Filter Choke	L1	300.
9A374-6S	Filament Reactor	L2	Small
9A268-6S	R.F. "B" Choke	L3	3.5
9A375-6S	Pilot Light Choke Assembly	L4	Small
12A62A	Speaker Field	L5	5.
9A376-6S	Motor Noise Choke	L6	Small

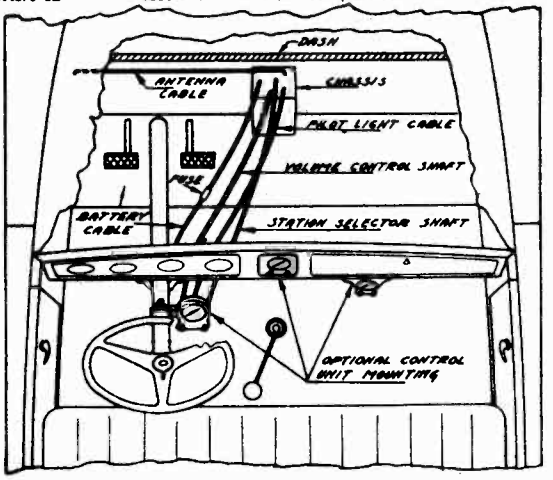


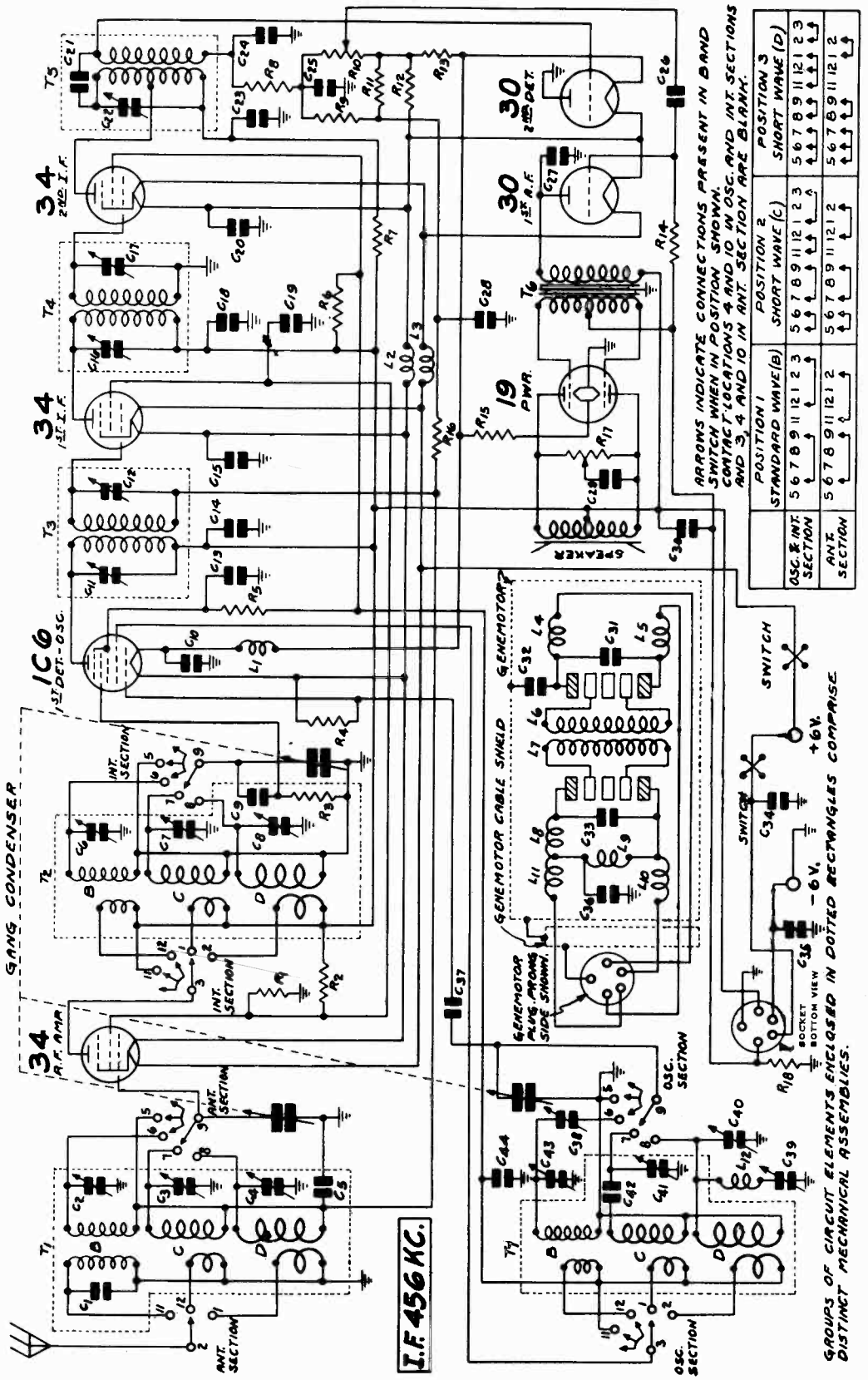
Fig. 1—General Mounting Position

MODEL 7E
Schematic

WELLS - GARDNER & CO.

Power Consumption - 1.8 Amperes at 6.3 Volts
Power Output - - - - - - 1 Watt Undistorted

Tuning Frequency Range
B Range - - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - - 1680 to 4800 KC.
D Range - - - - - - - - - - 5650 to 16000 KC.



C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 2-25 mmf.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 35 mmf.
C10 .25 mf. 180 V.
C11 70-150 mmf. } ONE
C12 70-150 mmf. } UNIT
C13 .05 mf. 180 V.
C14 20.0 mf. 150 V. Electrolytic
C15 .25 mf. 180 V.
C16 70-150 mmf. } ONE
C17 70-150 mmf. } UNIT
C18 .50 mf. 180 V.
C19 .85 mf. 180 V.
C20 .05 mf. 180 V.
C21 50 mmf.
C22 40-100 mmf.
C23 .05 mf. 180 V.
C24 100 mmf.
C25 50 mmf.
C26 .002 mf. 600 V.
C27 250 mmf.
C28 .01 mf. 180 V.
C29 .05 mf. 240 V.
C30 20.0 mf. 150 V. Electrolytic
C31 .25 mf. 180 V.
C32 .05 mf. 180 V.
C33 .25 mf. 180 V.
C34 .25 mf. 180 V.
C35 .25 mf. 180 V.
C36 .50 mf. 180 V.
C37 35 mmf.
C38 300-600 mmf. } ONE
C39 40-100 mmf. } UNIT
C40 2-25 mmf.
C41 2-25 mmf.
C42 1400 mmf.
C43 2-25 mmf.
C44 .25 mf. 18 V.
R 1 100,000 ohm .2 W.
R 2 60,000 ohm .2 W.
R 3 1 megohm .2 W.
R 4 100,000 ohm .2 W.
R 5 5,000 ohm .2 W.
R 6 10,000 ohm .5 W.
R 7 1,000 ohm .2 W.
R 8 60,000 ohm .2 W.
R 9 3 megohm .2 W.
R10 1 megohm Vol. Control
R11 1 megohm .2 W.
R14 3 megohm .2 W.
R16 500,000 ohm .2 W.
R17 150,000 ohm Tone Control
R12 12.5 ohm 1.0 W. } ARMORED
R13 12.5 ohm 1.0 W. } WIRE WOUND
R15 70 ohm .50 W. } RESISTOR
R18 150 ohm 2.0 W. }
T 1 Ant. R. F. Trans.
T 2 Interstage R. F. Trans.
T 3 1st I. F. Trans.
T 4 2nd I. F. Trans.
T 5 3rd I. F. Trans.
T 6 Push Pull Input Trans.
T 7 Osc. Inductors
L 1 Single Filament Reactor
L 2 } Double Filament
L 3 } Reactor
L 4 "B" Choke
L 5 "B" Choke
L6, L7, L8 & L9 Genemotor Windings
L10 "A" Choke
L11 "A" Choke
L12 Osc. Tracking Coil

Nov., 1935

MODEL 7E
Socket, Trimmers
Voltage, Data

WELLS - GARDNER & CO.

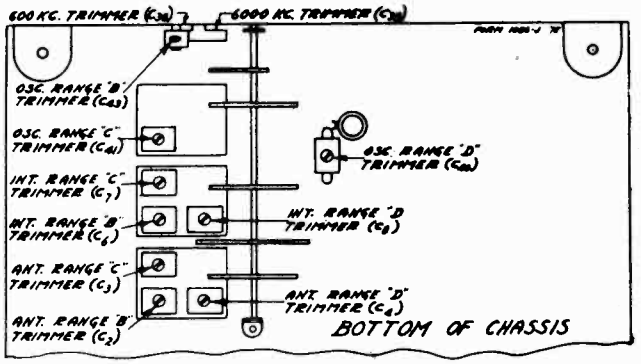


Fig. 3—Arrangement of Trimmers

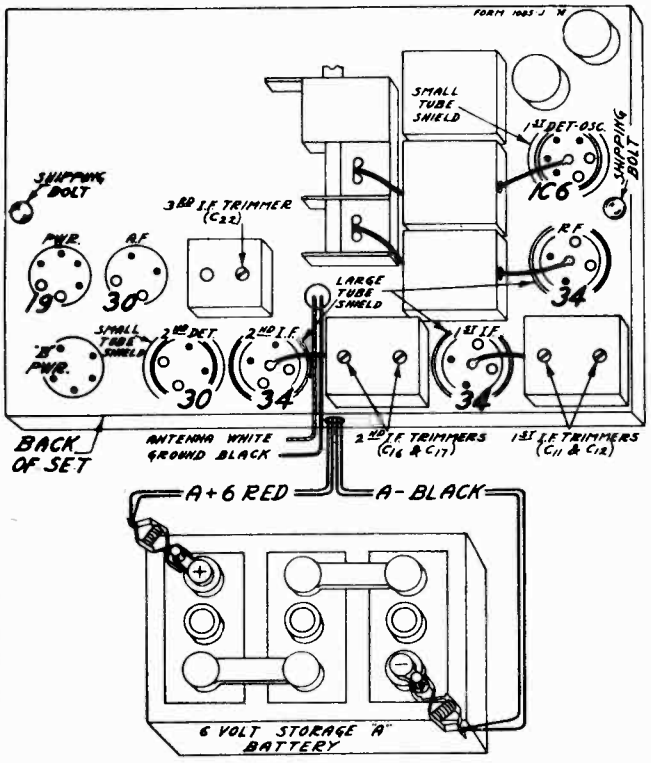


Fig. 4—Tube Arrangement and Battery Connections

VOLTAGES AT SOCKETS
Antenna Shorted to Ground—Battery 6 Volts under load
Volume Control at Maximum

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage (see Notes)	Normal Plate M. A.
34	R. F.	2.0	135	45	1.5(1)	1.7
1C6	1st Det.	2.0	135 80(2)	70	2.0(3)	3.2 1.7(2)
34	1st I. F.	2.0	135	45	1.5(1)	1.7
34	2nd I. F.	2.0	135	80	4.0(3)	3.2
30	2nd Det.	2.0				
30	1st A. F.	2.0	135		8.0(4)	2.3
19	Power	2.0	135		3.9(5)	2.3 (per plate)

(1) As read from negative filament leg to low potential end of resistor R12.
(2) Anode Grid
(3) As read from negative filament leg to ground.
(4) Total voltage drop from negative filament leg to ground and across R18.
(5) As read across R18.

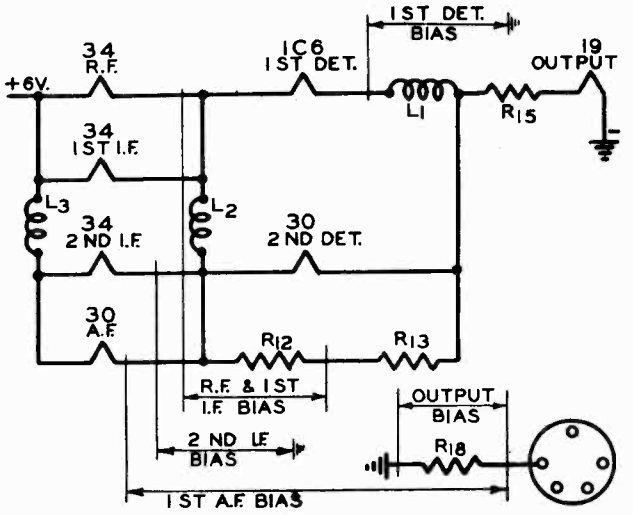


Fig. 6—Abridged Wiring Diagram showing Filament Wiring System and Points at which No-Signal Bias Voltages are obtained.

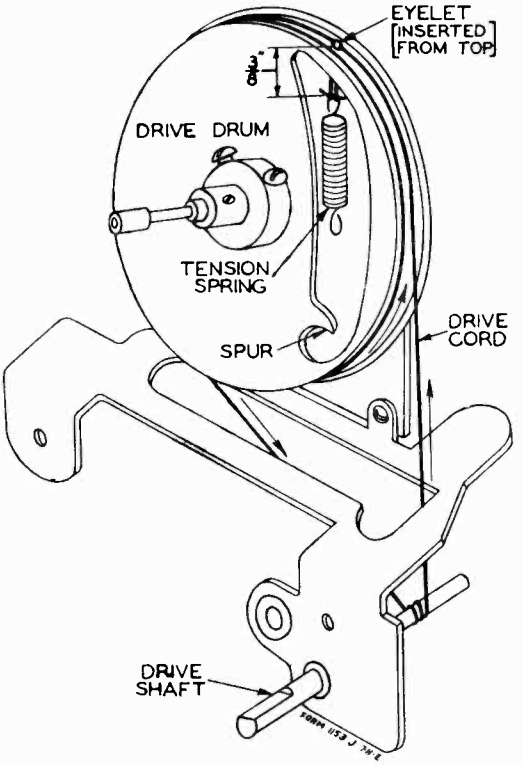


Fig. 7—Drive Cord Replacement

Battery Connections—CAUTION

CAUTION: Do not turn the switch on unless ALL the tubes are in the sockets.

CAUTION: Be sure that the battery clips are properly connected to the battery. If the connections are reversed, the receiver may be damaged.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 4800, 4200, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I.F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the switch end of condenser C9—see Fig. 2. There is a lead which goes to the lug on the top of the center stator section of the tuning condenser—see Fig. 4. The connection can be made at this lug.

Connect the ground lead of the receiver to the ground post of the signal generator

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 4.

RANGE B ALIGNMENT

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C43) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C6) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of the greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

RANGE C ALIGNMENT

4800 KC Adjustment

Set the signal generator for 4800 KC.

Connect the antenna lead of the receiver through a 400-ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band — green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C41) until maximum output is obtained. See Fig. 3 for location of this trimmer.

4200 KC Adjustment

Set the signal generator for 4200 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C7) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

RANGE D ALIGNMENT

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Keep the antenna lead of the receiver connected through the 400-ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C40) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of the greatest intensity is obtained.

Then go back and repeat the procedure as given for the 16,000 KC adjustment. If it is found necessary to make any appreciable change in the settings of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

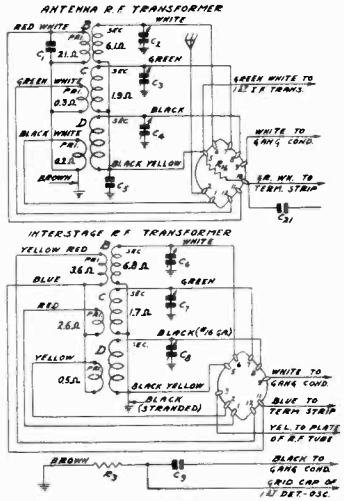
Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.



REPLACING DRIVE CORD

Remove the chassis from the cabinet. Take off the station pointer by removing the screw at the center of dial. Loosen the two set screws in the collar on the band selector switch shaft. Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis and one screw at the top which secures this assembly to the bracket. Pull the dial assembly forward until the collar is free of the band selector shaft; and lay the assembly face downward in front of the chassis.

Turn the dial drum until the opening in this drum is approximately vertical and with the hole at the top. Remove the tension spring and the old drive cord. When replacing this drive cord a 30 pound test cord as regularly supplied by the factory should be used .

See that the eyelet is in the hole in the drive drum. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum. Tie the end of the cord, which has been inserted through the hole, to one end of the tension spring. Now wrap the cord in a counter clock-wise direction (facing the front of the chassis) around the drive drum for approximately one and one half turns, progressing towards the front. Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and onehalf times around this shaft, progressing toward the back of the chassis. Wrap the cord on directly in line with the drive drum above. Then bring this cord up to the drive drum until it is up to the eyelet in the drive drum .

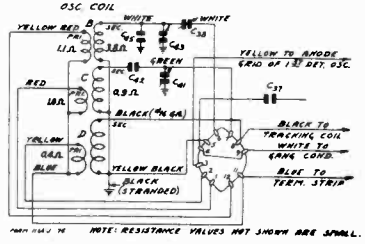
Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring when hanging free and with the slack taken out of the drive cord should be three eights or less from the flang of the drum. Cut off the surplus length of the cord after it has been knotted.

Now secure the other end of the tension spring over the spur on the drive drum. Turn the drive shaft back and forth several times.

Replace the disl assembly and pointer.

Replace the chassis in the cabinet.

Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings. (Also see complete D. C. Resistance List Below)



MODEL 7E
Parts, Resistance

WELLS - GARDNER & CO.

Series 7E—Replacement Parts

RESISTORS

New Part No.	Code	Resistance	Wattage	Type	List Price
P-A94104	R1	100,000 Ohms	0.2	Carbon	$ .15
P-A94603	R2	60,000 Ohms	0.2	Carbon	.15
P-A95105	R3	1.0 Megohm	0.2	Carbon	.10
P-A94104	R4	100,000 Ohms	0.2	Carbon	.15
P-A95502	R5	5,000 Ohms	0.2	Carbon	.10
P-B94103	R6	10,000 Ohms	0.5	Carbon	.15
P-A95102	R7	1,000 Ohms	0.2	Carbon	.10
P-A95603	R8	60,000 Ohms	0.2	Carbon	.10
P-A94305	R9	3.0 Megohms	0.2	Carbon	.15
P-36X209	R10	1.0 Megohm	Volume Control and Switch		1.15
P-A94105	R11	1.0 Megohm	0.2	Carbon	.15
P-43X43	R12	12.5 Ohms	1.0	Armored Wire Wound	.65
	R13	12.5 Ohms	1.0		
	R15	0.7 Ohms	0.5		
	R18	150.0 Ohms	2.0		
P-A95305	R14	3.0 Megohms	0.2	Carbon	.10
P-A95504	R16	500,000 Ohms	0.2	Carbon	.10
P-40X203	R17	150,000 Ohms	Tone Control		.75

CONDENSERS

New Part No.	Code	Capacity	Voltage	Type	List Price
P-47X59	C1	250 mmf.		Moulded	$ .15
P-17A36	C2	2-25 mmf.		Antenna Range B Trimmer	.10
P-17A36	C3	2-25 mmf.		Antenna Range C Trimmer	.10
P-17A36	C4	2-25 mmf.		Antenna Range D Trimmer	.10
P-46X80	C5	0.05 mf.	180	Tubular	.15
P-17A36	C6	2-25 mmf.		Interstage Range B Trimmer	.10
P-17A36	C7	2-25 mmf.		Interstage Range C Trimmer	.10
P-17A36	C8	2-25 mmf.		Interstage Range D Trimmer	.10
P-47X53	C9	35 mmf.		Moulded	.10
P-46X117	C10	0.25 mf.	180	Tubular	.25
P-17A33	C11	70-150 mmf.		1st I.F. Trimmer Condensers	.40
	C12	70-150 mmf.			
P-46X80	C13	0.05 mf.	180	Tubular	.15
P-44X17	C14	20.0 mf.	150	Wet Electrolytic	.95
P-46X117	C15	0.25 mf.	180	Tubular	.25
P-17A33	C16	70-150 mmf.		2nd I.F. Trimmer Condensers	.40
	C17	70-150 mmf.			
P-46X123	C18	0.50 mf.	180	Tubular	.30
P-46X125	C19	0.85 mf.	180	Tubular	.50
P-46X80	C20	0.05 mf.	180	Tubular	.15
P-47X56	C21	50 mmf.		Moulded	.10
P-17A38	C22	40-100 mmf.		3rd I.F. Primary Trimmer	.25
P-46X80	C23	0.05 mf.	180	Tubular	.15
P-47X57	C24	100 mmf.		Moulded	.10
P-47X56	C25	50 mmf.		Moulded	.10
P-46X100	C26	0.002 mf.	600	Tubular	.15
P-47X52	C27	250 mmf.		Moulded	.15
P-46X124	C28	0.01 mf.	180	Tubular	.15
P-46X103	C29	0.05 mf.	240	Tubular	.15
P-44X17	C30	20.0 mf.	150	Wet Electrolytic (Insulated Mtg.)	.95
P-46X117	C31	0.25 mf.	180	Tubular (In Genemotor)	.25
P-46X80	C32	0.05 mf.	180	Tubular (In Genemotor)	.15
P-46X117	C33	0.25 mf.	180	Tubular (In Genemotor)	.25
P-46X117	C34	0.25 mf.	180	Tubular	.25
P-46X117	C35	0.25 mf.	180	Tubular	.25
P-46X123	C36	0.50 mf.	180	Tubular (In Genemotor)	.30
P-47X53	C37	35 mmf.		Moulded	.10
P-17A35	C38	300-600 mmf.	600	KC Osc. Padding Cond.	.45
	C39	40-100 mmf.	6000	KC Osc. Padding Cond.	
P-17A41	C40	2-25 mmf.		Oscillator Range D Trimmer	.10
P-17A36	C41	2-25 mmf.		Oscillator Range C Trimmer	.10
P-47X60	C42	1400 mmf.		Moulded	.30
P-17A41	C43	2-25 mmf.		Oscillator Range B Trimmer	.10
P-46X117	C44	0.25 mf.	180	Tubular	.25
P-47X64	C45	5 mmf.		Moulded	.15
P-14A41	3 Section Gang Condenser				3.80

DIAL AND DRIVE ASSEMBLY

New Part No.	Old Part No.	Description	List Price
P-5A27		Gang Support and Bearing Assembly	$ .45
P-26X208		Drive Shaft	.15
P-19X21	20953	Horse Shoe Washer	.10
P-26X212		Pointer Shaft	.10
P-24X204		Drive Drum and Hub with Set Screw	.35
P-28X27		Drive Tension Spring	.10
P-10X13		26 inch Black Drive Cord	.10
P-28X34		Pointer Slide Take-Up Spring	.10
P-10X9		4½ Inch Black Indicator Drive Cord	.05
P-29X42		Brass Collar and Set Screw for securing above cords to shaft	.10
		Dial Strip (Specify Name and Series No. of Receiver—also Std. Wave Band Dial Color)	.55
P-30X36		Dial Clamp and Mtg. Screw	.10
P-15X22		Large Double End Pointer	.10

TRANSFORMERS AND COILS

New Part No.	Old Part No.	Code	Description	List Price
P-9A419		T1	Antenna R.F. Transformer and Can Assembly	$3.00
P-9A420		T2	Interstage R.F. Transformer and Can Assembly	3.10
P-9A421		T7	Oscillator Coil and Can Assembly	2.65
P-9A422		T3	1st I.F. Transformer and Can Assembly	1.70
P-9A423		T4	2nd I.F. Transformer and Can Assembly	1.70
P-9A424		T5	3rd I.F. Transformer and Can Assembly	1.70
P-50X11		T6	Audio Input Transformer	2.10
P-9A403		L1	Single Filament Reactor	.20
P-9A404		L2	Double Filament Reactor	.50
		L3		
P-9A268	5174	L4	"B" R.F. Choke Coil (in Genemotor)	.10
P-9A268	5174	L5	"B" R.F. Choke Coil (in Genemotor)	.10
P-9A402		L10	"A" Choke Coil (in Genemotor)	.55
P-9A402		L11	"A" Choke Coil (in Genemotor)	.55
P-9A391		L12	High Frequency Oscillator Tracking Coil	.25

GENEMOTOR AND PARTS

New Part No.	Old Part No.	Description	List Price
P-22A203		Genemotor Complete with Filter Units, Case and Cover	$18.85
P-22A202		Genemotor in Case with Cover and Condenser (C31 and C33) Less Filter	16.00
P-13X216		Shielded, Four Wire Cable and Plug	.70
P-46X117		0.25 mf. 180 Volt Tubular Condensers (C31 & C33), ea.	.25
P-46X123		0.50 mf. 180 Volt Tubular Condenser (C36)	.30
P-46X80		0.05 mf. 180 Volt Tubular Condenser (C32)	.15
P-9A268	5174	"B" R.F. Choke Coils (L4 and L5), each	.10
P-9A402		"A" Choke Coils (L10 and L11), each	.55

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

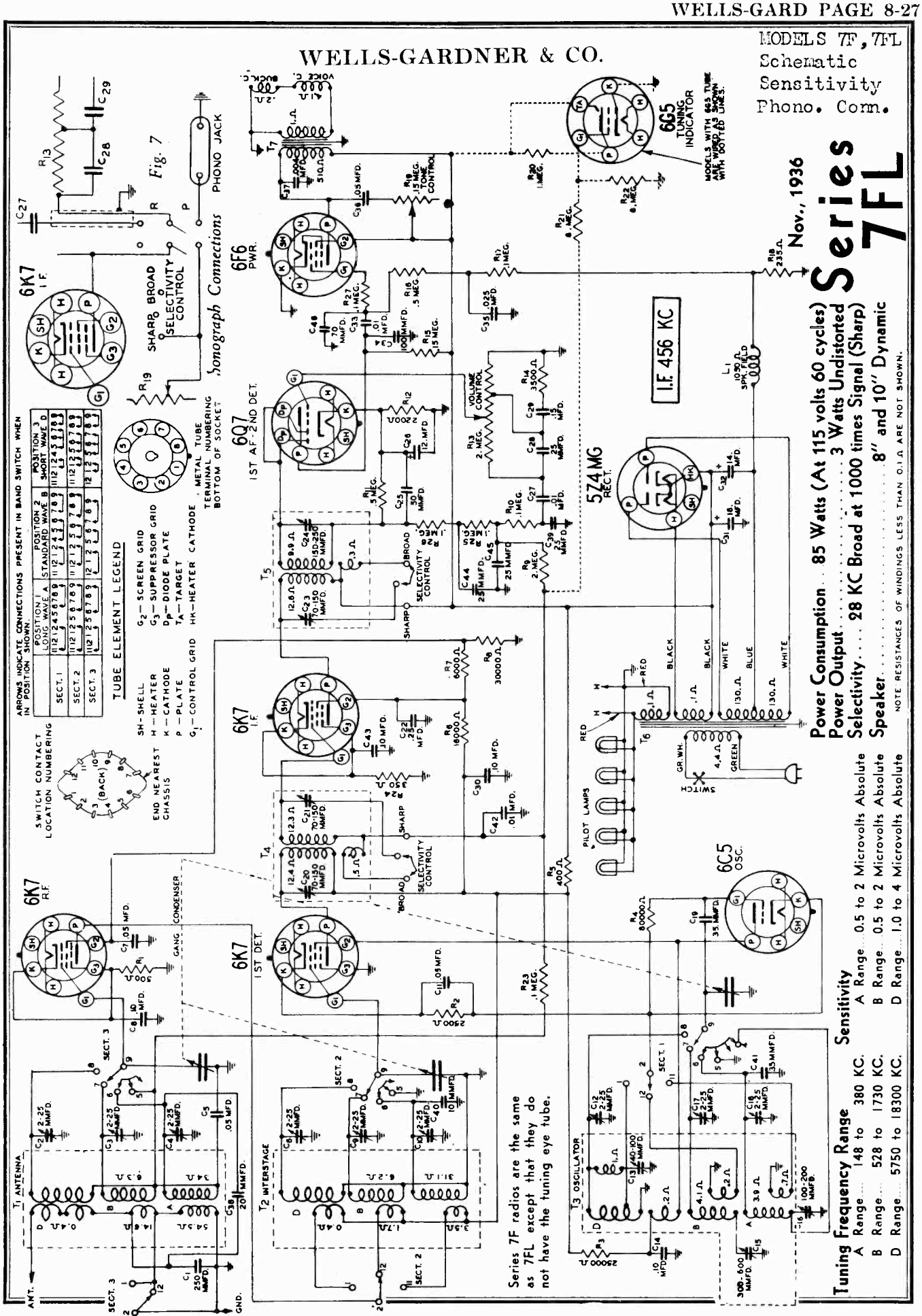
D. C. Resistance of Windings

Refer to Figs. 5 & 2

Following are the D. C. resistances of the various coil windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A419	Antenna R. F. Transformer	T1	
	Range B Primary Winding		21.0
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		1.9
	Range D Secondary Winding		Small
P-9A420	Interstage R. F. Transformer	T2	
	Range B Primary Winding		3.6
	Range C Primary Winding		2.6
	Range D Primary Winding		0.5
	Range B Secondary Winding		6.8
	Range C Secondary Winding		1.7
	Range D Secondary Winding		Small
P-9A421	Oscillator Coils	T7	
	Range B Plate Coil		1.1
	Range C Plate Coil		1.0
	Range D Plate Coil		0.4
	Range B Grid Coil		3.8
	Range C Grid Coil		0.9
	Range D Grid Coil		Small
P-9A422	1st I. F. Transformer	T3	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A423	2nd I. F. Transformer	T4	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A424	3rd I. F. Transformer	T5	
	Primary Winding (either section)		8.4
	Secondary Winding		130.8
P-50X11	Audio Input Transformer	T6	
	Primary Winding		1005.0
	Secondary Winding		
	Center Tap to Inside		580.0
	Center Tap to Outside		630.0
*P-12A218	8 Inch Magnetic Speaker		
	Speaker Coil		
	Center Tap to Inside		275.0
	Center Tap to Outside		300.0
P-9A403	Single Filament Reactor	L1	.65
P-9A404	Double Filament Reactor (either section)	L2 & L3	.65
P-9A391	High Frequency Oscillator Tracking Coil	L12	0.7

*Speakers with other part numbers may have slightly different values of D. C. Resistance.



MODELS 7F, 7FL
Socket, Trimmers

WELLS-GARDNER & CO.

Voltage, Coils

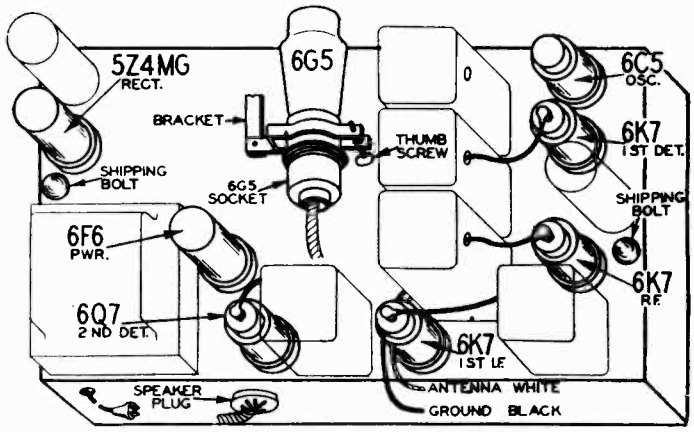


Fig. 6—Location of Tubes

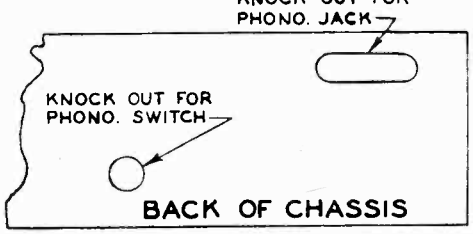


Fig. 8—Location of Phono Knockouts

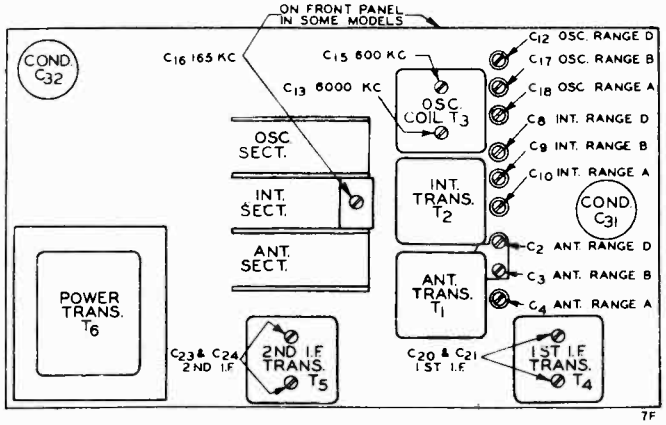


Fig. 3—Location of Trimmers

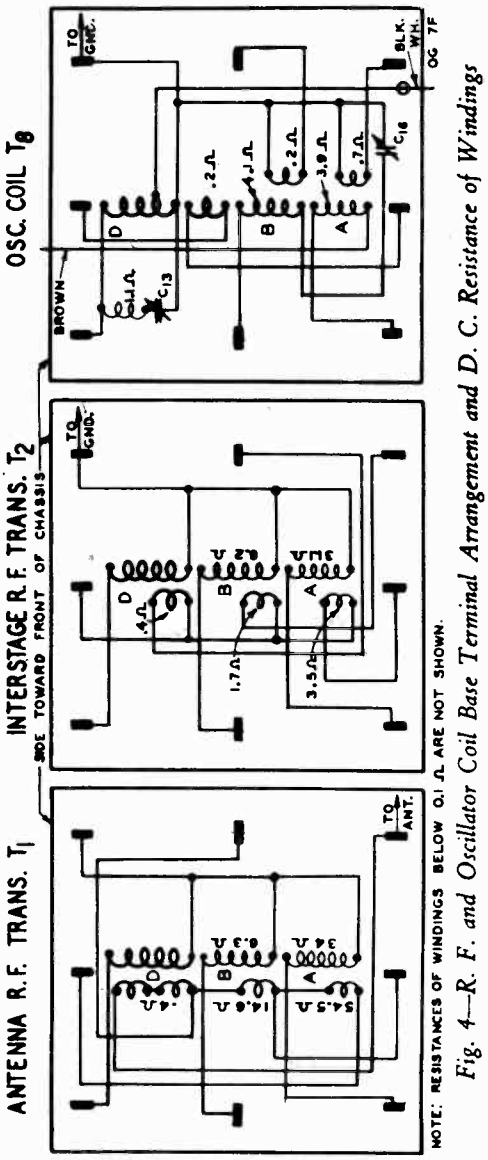


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	RF	0	6.1(1)	260	100	4.0	....	6.1(1)	4.0
6K7	1st Det.	0	6.1(1)	260	118	0	....	6.1(1)	9.0
6C5	Osc.	0	6.1(1)	120	...	0	....	6.1(1)	0
6K7	I F	0	6.1(1)	260	138	4.0	....	6.1(1)	4.0
6Q7	1st A.F.—2nd Det.	0	6.1(1)	105	0	0	....	6.1(1)	1.4
6F6	Power Amp.	0	6.1(1)	238	260	18	....	6.1(1)	0
5Z4MG	Rect.	0	4.9(2)	...	680(3)	...	680(3)	....	4.9(2)
6G5	Tuning Indicator	Plate to Ground 30(4)		Target to Ground 270		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (medium wave band)

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range A Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

380 KC Adjustment

Set the signal generator for 380 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range A position (long wave band).

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and *all* subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range A trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

350 KC Adjustment

Set the signal generator for 350 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range A trimmer (C10) and antenna Range A trimmer (C4) to maximum.

Do not change the setting of the oscillator Range A trimmer.

165 KC Adjustment

Set the signal generator for 165 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 165 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range B position (medium wave band).

Keep the antenna lead of the receiver connected through the 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Re-tighten the screw.

In sets using the moving beam of light, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Re-tighten the screw.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the radio through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Phonograph Connections

Switch on Back Panel of Chassis

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —See Fig 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 2¾ inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are connected to the switch terminals nearest the chassis base. Before connecting the cable leads to the phono switch, it will be necessary to slip a piece of varnished tubing over the portion of the cable that passes near the 6K7 1st I.F. tube socket.

Now ground the shielding by soldering it to the lugs on the chassis base. One of these lugs is located just below the planetary drive; the other is near the rear mounting foot of the gang condenser.

Complete the other connections as illustrated in Fig. 7. The lead between the tone control and the .05 mf. tubular condenser C36 mounted on the back of the chassis base, should be covered with a piece of varnished tubing.

The tin plate shield is soldered to the tone control mounting bracket in such a way that when it is bent down toward the bottom and back of the chassis it will shield the lower leads of the phono switch and the lead between the tone control and tubular condenser C36.

After making the phono connections, the I.F. stages should be realigned.

Switch Mounted Externally

The procedure for making the connections for this arrangement is the same as explained previously with the following exceptions: The switch being mounted externally, it is unnecessary to mount it with the terminals in a particular position.

The single unshielded flexible wire is run through a small hole which must be drilled in the back of the chassis base near the phono jack and is then connected to one terminal of this jack. The other end of this wire is connected to the phono switch as shown in Fig. 7.

Important—Instead of connecting the center terminal of the switch to the plate of the 6K7 I.F. tube as shown, this switch terminal is connected to the braided shielding of the cable. The switch terminal shown connected to the tone control R19 in Fig. 7, should be connected to the switch terminal which connects to the .01 condenser C27.

The braided shielding is run through the hole in the chassis base which is provided by the phono switch knockout. The shield is soldered to the base at this point and also to the bottom of the base at the lugs located just beneath the gang condenser. The tin plate mentioned previously is not used.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Across the volume control resistor R13 is a filter composed of condensers C28 and C29 and resistor R14. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the pointer approaches the tap, the higher frequencies are bypassed through condenser C29. Very high frequencies are transmitted through condenser C28 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A242	7 Prong Tube Socket	$0.15
3A243	6 Prong Tube Socket	.15
3A256	7 Prong Coil Base Tube Socket	.15
3A58	5 Prong Speaker Socket	.10
13X255	Tuning Indicator Tube Socket and Cable Assembly	.65

SPEAKERS

12A211	8" Dynamic Speaker Compl. with Output Transformer (T7)	5.95
12A221	10" Dynamic Speaker Compl. with Output Transformer (T7)	6.45
12A249	12" Dynamic Speaker Compl. with Output Transformer (T7)	6.95

KNOBS

Specify Name of Knob and Model of Radio	Tone Control—Small Push-On Type	.15
	Volume Control—Small Push-On Type	.15
	Tuning Control—Large Push-On Type	.15
	Band Switch—Large Set Screw Type	.20

GENERAL

2K38	Felt Washers (Used Behind Knobs)	doz.	.10
8X23	Rubber Chassis Mounting Cushions	ea.	.10
4A18	Terminal Strip—Two Insulated Lugs		.10
4A49	Terminal Strip—Single Lug Insulated (With Mounting Hole at One End)		.10
4A50	Terminal Strip—Two Lugs Insulated (With Mounting Hole in Center)		.10
30X44	Grid Clip Only	doz.	.10
2A64	3 Section, 3 Position, Band Change Switch		1.80
13X81	Line Cord and Plug		.55
13X214	Antenna and Ground Lead Assembly		.30
32X69	Tube Shield (Tuning Eye)		.15
32X70	Tube Shield Basis (Tuning Eye)		.10
25X221	Front Chassis Mounting Feet	ea.	.10
15X231	Rear Chassis Mounting Feet	ea.	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A670	T1	Antenna Transformer and Can Assembly	$2.40
9A671	T2	R.F. Interstage Transformer and Can Assembly	2.15
9A672	T3	Oscillator Coil and Can Assembly	2.40
9A673	T4	1st I.F. Transformer and Can Assembly	1.60
9A674	T5	2nd I.F. Transformer and Can Assembly	1.65
53X211	T6	115-230 Volt 40-60 Cycle Power Transformer	4.80
51X31	T7	Output Transformer (Part of Speaker Assembly)	2.45

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C5	.05 mf.	180	$0.15
46X98	C6	.10 mf.	180	.20
46X103	C7	.05 mf.	360	.15
46X80	C11	.05 mf.	180	.15
46X105	C14	.10 mf.	360	.20
46X104	C22	.25 mf.	240	.25
46X120	C27	.01 mf.	360	.15
46X178	C29	.15 mf.	180	.20
46X105	C30	.10 mf.	360	.20
46X120	C33	.01 mf.	360	.15
46X173	C35	.025 mf.	180	.15
46X108	C36	.05 mf.	600	.20
46X114	C37	.004 mf.	600	.15
46X174	C42	.01 mf.	180	.15
46X98	C43	.10 mf.	180	.20

ELECTROLYTIC

45X209	C26	12 mf.	25	Dry	.65
44X111	C31	18 mf.	300	Wet	1.10
44X10	C32	14 mf.	400	Wet	1.25

MOLDED

47X59	C1	250	mmf.	.15
47X51	C19	15	mmf.	.10
47X56	C25	50	mmf.	.10
47X71	C28	25	mmf.	.15
47X57	C34	100	mmf.	.10
47X48	C38	20	mmf.	.15
47X72	C39	25	mmf.	.10
47X63	C40	10	mmf.	.15
47X53	C41	35	mmf.	$0.10
47X72	C44	25	mmf.	.10
47X72	C45	25	mmf.	.10
47X62	C46	70	mmf.	.10

TRIMMER

17A45 Trimmer Strip	C2	2-25 mmf.	Range "D" Antenna Trimmer	.95
	C3	2-25 mmf.	Range "B" Antenna Trimmer	
	C4	2-25 mmf.	Range "A" Antenna Trimmer	
	C8	2-25 mmf.	Range "D" Interstage Trimmer	
	C9	2-25 mmf.	Range "B" Interstage Trimmer	
	C10	2-25 mmf.	Range "A" Interstage Trimmer	
	C12	2-25 mmf.	Range "D" Oscillator Trimmer	
	C17	2-25 mmf.	Range "B" Oscillator Trimmer	
	C18	2-25 mmf.	Range "A" Oscillator Trimmer	
	See Part Number 17A36 for replacement of any one section			
17A35	C13	40-100 mmf.	Range "D" Oscillator Padding Condenser	.45
	C15	300-600 mmf.	Range "B" Oscillator Padding Condenser	
17A42	C16	100-300 mmf.	Range "A" Oscillator Padding Condenser	.25
17A33	C20	70-150 mmf.	1st I.F. Trimmer Condenser	.40
	C21	70-150 mmf.		
17A34	C23	70-150 mmf.	2nd I.F. Trimmer Condensers	.40
	C24	150-250 mmf.		

MISCELLANEOUS

14A57	3 Gang Condenser less Dial and Drive Assembly	3.60
17A36	2-25 mmf. (To be used for replacement of any one section of Trimmer Strip (17A45)	.10

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94561	R1	500 Ohm	0.2	$0.15
A94252	R2	2,500 Ohm	0.2	.15
C94253	R3	25,000 Ohm	1.0	.15
A94803	R4	80,000 Ohm	0.2	.15
A95401	R5	400 Ohm	0.2	.10
D93163	R6	16,000 Ohm	2.0	.45
B94602	R7	6,000 Ohm	0.5	.15
B94303	R8	30,000 Ohm	0.5	.15
A95295	R9	2 Megohm	0.2	.10
A95104	R10	100,000 Ohm	0.2	.10
A94504	R11	500,000 Ohm	0.2	.15
A94272	R12	7,000 Ohm	0.2	.15
A94352	R14	3,500 Ohm	0.2	.15
A95154	R15	150,000 Ohm	0.2	.10
A95604	R16	500,000 Ohm	0.2	.10
A95104	R17	100,000 Ohm	0.2	.10
A95105	R20	1 Megohm	0.2	.10
A95805	R21	8 Megohm	0.2	.10
A95804	R23	8 Megohm	0.2	.10
A95104	R23	100,000 Ohm	0.2	.15
A94351	R24	350 Ohm	0.2	.15
A95104	R25	100,000 Ohm	0.2	.10
A94104	R26	100,000 Ohm	0.2	.10
A94104	R27	100,000 Ohm	0.2	.15

WIRE WOUND

43X42	R18	235 Ohm	2.0	.75

VARIABLE

26X215	R13	2.0 Megohm	Tapped Volume Control and On-Off Switch	1.05
40X211	R19	.15 Megohm	Tone Control and Selectivity Switch	1.15

PHONO ATTACHMENT PARTS

WITH SWITCH MOUNTED ON CHASSIS

Part No.	Description	List Price
2A31	Phono Switch (Double Pole Double Throw Switch)	$0.60
3A12	Phono Jack	.10
10A94	Switch Knob	.20
32X77	Shield Plate 2 x 11⅝ x .015	.10
	11⅝" No. 746-G Shielded Cable	.10
	3" No. 6 Varnished Tubing	.10
	2" No. 2 Varnished Tubing	.10

WITH SWITCH MOUNTED EXTERNALLY

2A50	Phono Switch	.70
3A12	Phono Jack	.10
10A100	Switch Knob	.10
4X169	One Set of "P" and "B" Stickers	.10
	31" 866-G Shielded Sleeving 5/16" Inside Diameter	.65
	37" 749-G No. 22 Solid Wire (Red-White)	.10
	40" 749-G No. 22 Solid Wire (White)	.10
	40" 749-G No. 20 Stranded Wire (Black)	.10

Prices Subject to Change Without Notice

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —see Fig. 8.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis base directly below the wet electrolytic condensers. These holes are 1¼" from

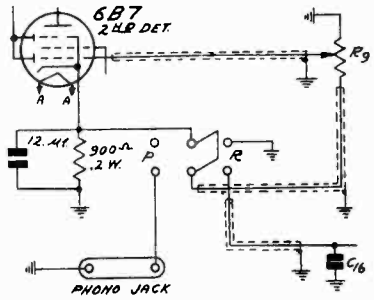


Fig. 7—Phonograph Connections

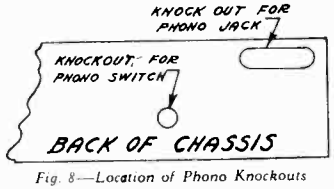


Fig. 8—Location of Phono Knockouts

the bottom, 7/8" and 3¾" from the front of the chassis.

The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

The connections are made by opening the diode return circuit at the volume control. Unsolder the shielded lead which runs from the I. F. transformer to the volume control at the lug on the volume control. Cut this lead to length and connect it to the switch as shown in Fig. 7. The extra length of shielded lead which is provided, is connected from the volume control R9 to the phono switch as illustrated.

Remove the ground from the cathode terminal of the 6B7 2nd detector tube by bending the chassis ground lug away from this terminal. Be sure to solder back to this ground lug any leads that were connected to it (not including cathode connection of socket).

Connect one side of the 12 mfd. 25 volt electrolytic condenser to ground and the other side of the condenser to the cathode terminal of the 6B7 2nd detector and the phono switch as shown in Fig. 7. To this same terminal on the phono switch connect the 900 ohm .2 watt resistor. The other side of this resistor goes to ground. Complete the other connections as illustrated.

A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control and tone control of the set will regulate the phono volume and tone.

Servicing R. F. Coil Assemblies

The R. F. coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 3.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Replacement Parts List

TRANSFORMERS AND COILS

Code	Description	Part No.	Selling Price
T1	Antenna Trans. and Can Assembly	P-9A386	$1.12
T2	R.F. Interstage Trans. and Can Assembly	P-9A387	.84
T3	1st I.F. Coil and Can Assembly	P-9A389	.72
T4	2nd I.F. Coil and Can Assembly	P-9A390	1.00
T5	Oscillator Coil and Can Assembly	P-9A388	.82
T6	Power Transformer - 115 Volt; 60 cycles		2.34
T6	Power Transformer - 115 Volt; 25 cycles		3.84
T6	Power Transformer - 230 Volt; 50 cycles		2.64
L1	High Frequency Oscillator Tracking Coil Assembly		.12

RESISTORS

Code	Resistance	Wattage	Type	Selling Price
R1	25,000 ohms	1.0	Carbon	$ .08
R2	30,000 ohms	.5	Carbon	.10
R3	6,000 ohms	.5	Carbon	.08
R4	2,500 ohms	.2	Carbon	.08
R5	16,000 ohms	2.0	Carbon	.20
R6	150 ohms	.2	Carbon	.08
R7	2.0 Megohms	.2	Carbon	.05
R8	300,000 ohms	.5	Carbon	.03
R9	500,000 ohms		Volume Control & Switch	.50
R10	20,000 ohms	.2	Carbon	.08
R11	60,000 ohms	.5	Carbon	.08
R12	80,000 ohms	.2	Carbon	.08
R13	235 ohms	2.0	Armored Wire Wound	.12
R14	100,000 ohms	.2	Carbon	.03
R15	500,000 ohms	.2	Carbon	.05
R16	150,000 ohms		Tone Control	.36

CONDENSERS

Code	Capacity	Voltage	Type	Selling Price
C1	250 mmfd.		Moulded	$ .08
C2	2-25 mmfd.		Antenna Standard Wave Trimmer	.06
C3	2-25 mmfd.		Antenna Short Wave Trimmer	.06
C4	.050 mfd.	180	Tubular	.03
C5	.050 mfd.	240	Tubular	.03
C6	.100 mfd.	360	Tubular	.10
C7	2-25 mmfd.		R.F. Interstage Standard Wave Trimmer	.05
C8	2-25 mmfd.		R.F. Interstage Short Wave Trimmer	.05
C9	.250 mfd.	240	Tubular	.12
C10	.050 mfd.	180	Tubular	.08
C11	70-150 mmfd.		1st I.F. Trimmers	.18
C12	70-150 mmfd.			
C13	.250 mfd.	180	Tubular	.14
C14	70-150 mmfd.		2nd I.F. Trimmers	.20
C15	150-250 mmfd.			
C16	50 mmfd.		Moulded	.06
C17	.250 mfd.	360	Tubular	.14
C18	.250 mfd.	360	Tubular	.16
C19	2-25 mmfd.		Oscillator Standard Wave Trimmer	.05
C20	2-25 mmfd.		Oscillator Short Wave Trimmer	.05
C21	.100	360	Tubular	.10
C22	300-690 mmfd.		Oscillator 600 KC Padding Trimmer	.22
C23	40-100 mmfd.		Oscillator 600 KC Padding Trimmer	
C24	35 mmfd.		Moulded	.06
C25	14.00 mfd.	400	Wet Electrolytic	.60
C26	18.00 mfd.	300	Wet Electrolytic	.52
C27	.050 mfd.	600	Tubular	.10
C28	.002 mfd.	600	Tubular	.08
C29	.030 mfd.	180	Tubular	.05
C30	.010 mfd.	480	Tubular	.06
C31	.002 mfd.	600	Tubular	.08
C32	10 mmfd.		Moulded	.06
	3 Section Gang Condenser			1.84

PHONO ATTACHMENT PARTS

Description	Selling Price
Phono Switch (Double Pole Double Throw Switch)	$ .30
Phono Jack	.06
Switch Knob	.10
12.0 Mf. - 25 Volt - Dry Electrolytic Condenser	.36
900 Ohm - 0.2 Watt Resistor	.08
12 Inches of No. 722G Shielded Hookup Wire	.04

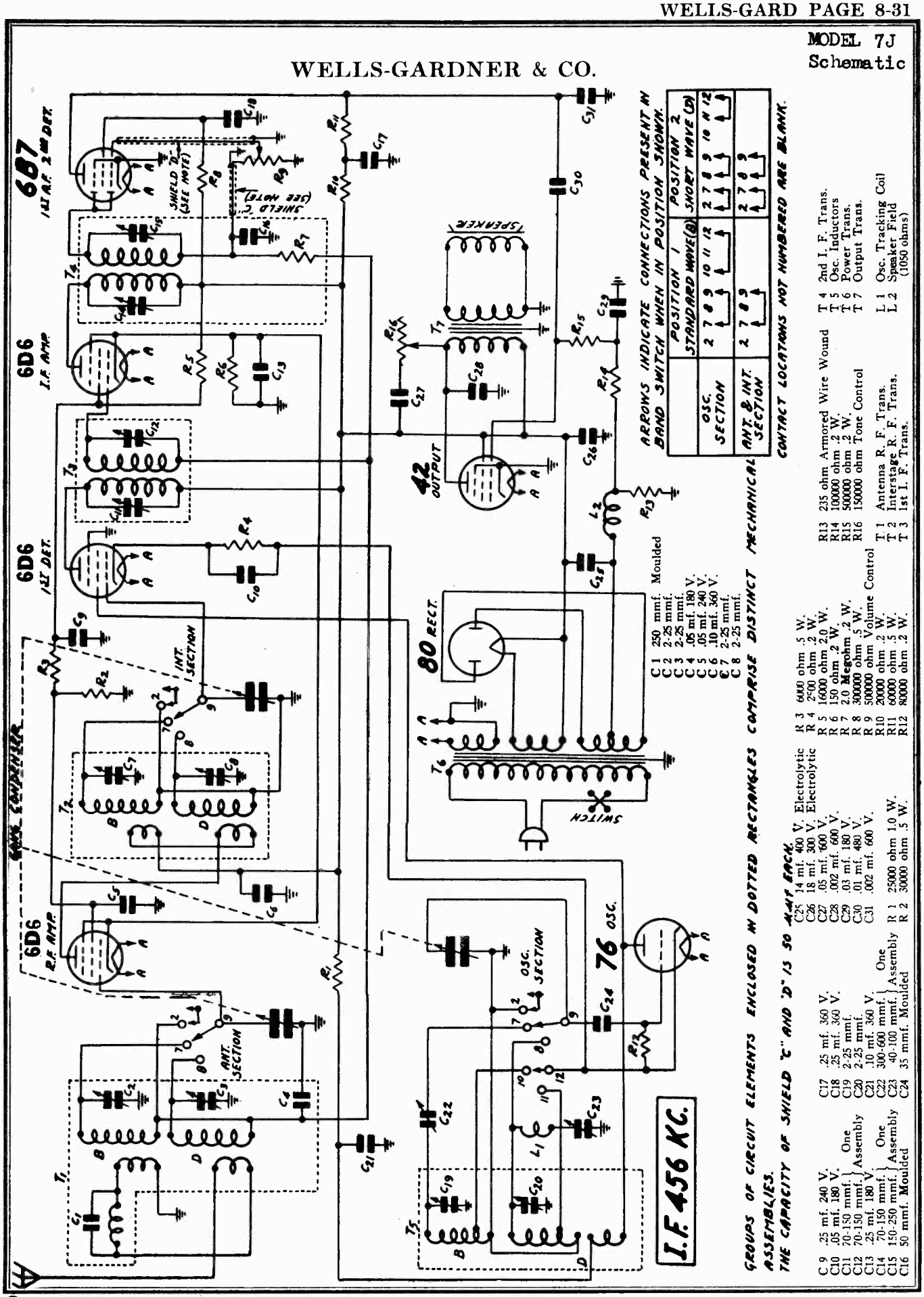
MISCELLANEOUS

Part No.	Description	Selling Price
P-3A129	Type 80 Tube Socket (4 Prong)	$ .06
P-3A112	Type 42 Tube Socket (6 Prong)	.06
P-3A126	Type 76 Tube Socket (5 Prong)	.05
P-3A120	Type 6B7 Tube Socket (7 Prong)	.08
P-3A113	Type 6D6 Tube Socket (6 Prong)	.05
P-3A58	5 Prong Speaker Socket	.05
P-12A222	6" Dynamic Speaker Comp. with Output Trans. T7	2.68
P-12A223	8" Dynamic Speaker Comp. with Output Trans. T7	3.16
P-12A221	10" Dynamic Speaker Comp. with Output Trans. T7	4.18
P-32X32	Tube Shield	.08
P-32X30	Tube Shield Base	.04
P-8X23	Rubber Chassis Mounting Cushions	.04
P-10A32	Knobs, Large, Push-on Type	.10
P-10A33	Knobs, Large, Set Screw Type	.10
P-17X1	Glass Dial Cystal	.08
P-28X25	Crystal Retainer Ring	.04
P-2A41	Two Section Band Change Switch	.80
P-25X221	Chassis Mounting Feet	.04
P-30X14	Grid Clip	.04
P-4A38	Two Lug Terminal Strip (1 Lug Insulated)	.04
P-4A17	Single Lug Terminal Strip	.04
P-4A49	Single Lug Terminal Strip (Mtg. hole used)	.04
P-4A50	Two Lug Terminal Strip (Both Lugs Insulated - Mtg. Foot in Center)	.04
P-7A24	Pilot Light Socket and Spring Clip	.06
P-7A26	Pilot Light Bulb (6-8 Volt)	.08
P-13X214	Antenna and Ground Lead Assembly	.14
P-13X80	Line Cord and Plug	.28
P-15A35	Dial and Drive Assembly	1.14
P-58X71	Dial Strip Only	.26

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 7J
Schematic

WELLS-GARDNER & CO.



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (D)
OSC. SECTION	2 7 8 9 10 11 12	2 7 8 9 10 11 12
ANT. & INT. SECTION	2 7 8 9	2 7 8 9

CONTACT LOCATIONS NOT NUMBERED ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
THE CAPACITY OF SHIELD "C" AND "D" IS 50 MMF. EACH.

C 1 250 mmf. Moulded
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 .05 mf. 180 V.
C 5 .05 mf. 240 V.
C 6 .10 mf. 360 V.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 .25 mf. 240 V.
C10 .05 mf. 180 V.
C11 70-150 mmf. } One
C12 70-150 mmf. } Assembly
C13 .25 mf. 180 V.
C14 70-150 mmf. } One
C15 150-250 mmf. } Assembly
C16 50 mmf. Moulded
C17 .25 mf. 360 V.
C18 .25 mf. 360 V.
C19 2-25 mmf.
C20 2-25 mmf.
C21 .10 mf. 360 V.
C22 300-600 mmf. } One
C23 40-100 mmf. } Assembly
C24 35 mmf. Moulded
C25 14 mf. 400 V. Electrolytic
C26 18 mf. 300 V. Electrolytic
C27 .05 mf. 600 V.
C28 .002 mf. 600 V.
C29 .03 mf. 180 V.
C30 .01 mf. 480 V.
C31 .002 mf. 600 V.
R 1 25000 ohm 1.0 W.
R 2 30000 ohm .5 W.
R 3 6000 ohm .5 W.
R 4 2500 ohm .2 W.
R 5 16000 ohm 2.0 W.
R 6 150 ohm .2 W.
R 7 2.0 Megohm .2 W.
R 8 300000 ohm .5 W.
R 9 500000 ohm Volume Control
R10 20000 ohm .2 W.
R11 60000 ohm .5 W.
R12 80000 ohm .2 W.
R13 235 ohm Armored Wire Wound
R14 100000 ohm .2 W.
R15 500000 ohm .2 W.
R16 150000 ohm Tone Control
T 1 Antenna R. F. Trans.
T 2 Interstage R. F. Trans.
T 3 1st I. F. Trans.
T 4 2nd I. F. Trans.
T 5 Osc. Inductors
T 6 Power Trans.
T 7 Output Trans.
L 1 Osc. Tracking Coil
L 2 Speaker Field (1050 ohms)

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the grid of the 1st detector.

Connect the ground lead of the signal generator to the chassis ground.

Turn the band switch to the standard wave position.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 250 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator standard wave trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

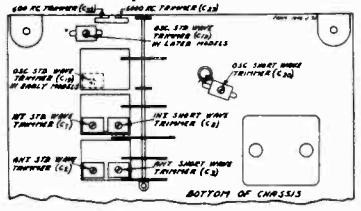


Fig 4—Location of Trimmers

Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage standard wave trimmer (C7) and antenna standard wave trimmer (C2) until maximum output is obtained.

Do not change the setting of the oscillator standard wave trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Be sure to use a non-metallic screw driver for this adjustment.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the short wave position.

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator short wave trimmer (C20) until maximum output is obtained. See Fig. 4 for location of this trimmer.

If a maximum output peak cannot be reached, it may be due to the fact that the antenna and interstage short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum ouptut.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage short wave trimmer (C8) and antenna short wave trimmer (C3) until maximum output is obtained.

When adjusting the interstage short wave trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator short wave trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator short wave trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Use a non-metallic screw driver for this adjustment.

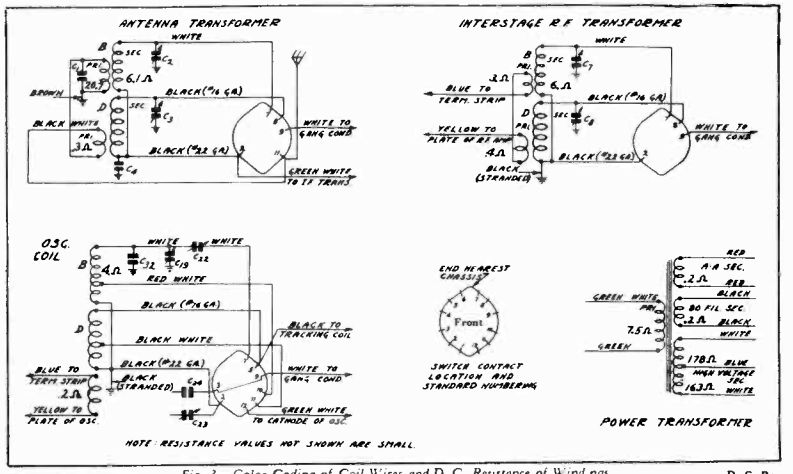


Fig. 3—Color Coding of Coil Wires and D. C. Resistance of Windings

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets. Refer to Fig. 3.

New Part No.	Item	Code	D. C. Resistance in Ohms
9A368	Antenna Transformer		
	Range B Primary Winding	T1	20.7
	Range D Primary Winding	T1	0.3
	Range B Secondary Winding	T1	6.1
	Range D Secondary Winding	T1	Small
9A387	R. F. Interstage Transformer		
	Range B Primary Winding	T2	3.0
	Range D Primary Winding	T2	0.4
	Range B Secondary Winding	T2	6.0
	Range D Secondary Winding	T2	Small
9A388	Oscillator Coils		
	Range B Grid Coil	T5	
	Red White to White		4.0
	Red White to ground		Small
	Range D Grid Coil	T5	
	Black White to Black		Small
	Black White to ground		Small
	Oscillator Plate Coil	T5	0.2
9A389	1st I. F. Transformer		
	Primary Winding	T3	12.0
	Secondary Winding	T3	11.1
9A390	2nd I. F. Transformer		
	Primary Winding	T4	12.0
	Secondary Winding	T4	4.5
	Output Transformer (Part of Speaker Assembly)		
	Primary Winding	T7	510.
	Secondary Winding	T7	1.0
	Dynamic Speaker		
	Speaker Field	L2	1025.
	Speaker Voice Coil		4.1
	Speaker Bucking Coil		0.2

VOLTAGES AT SOCKETS

Line Voltage - 112

Antenna Shorted to Ground

Type of Tube	Function	Heater Volts	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6D6	R. F.	6.1	240	95	3	7.
6D6	1st Det.	6.1	240	100	9	3.5
76	Osc.	6.1	100			5.
6D6	I. F.	6.1	240	120	3	7.5
6B7	2nd Det.	6.1	55	40	0	2.3
42	Power	6.1	225	240	17 (1)	38.0
80	Rectifier	4.6				32.0 per plate

New Part No.	Item	Code	D. C. Resistance In Ohms
5X391	115 volt 60 cycle Power Transformer		
	Primary Winding	T6	7.5
	Tube Filament Secondary (A-A)	T6	0.2
	80 Filament Secondary	T6	0.2
	High Voltage Secondary Winding	T6	
	Center tap to inside		173.
	Center tap to outside		178.
9A391	High Frequency Oscillator		
	Tracking Coil	L1	1.1

Changes in Early Models

In the early models of this receiver the oscillator standard wave trimmer C19 was in the oscillator coil can—see Fig. 4.

In the early models the antenna transformer had two B primary windings as shown in Fig. 5. In later models only one winding was used as shown in Fig. 3.

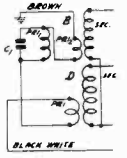


Fig. 5—Antenna Transformer on Early Models

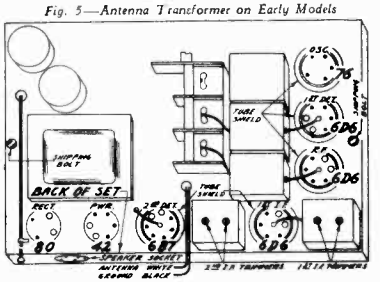


Fig. 6—Location of Tubes

WELLS-GARDNER & CO.

Series 7L - OEL - 2DL

MODEL OEL
MODEL 2DL
MODEL 7L
Dial & Drive Data

October, 1936

DIAL AND DRIVE PARTS LIST SUPPLEMENT

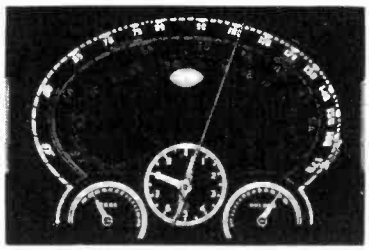
Four distinct types of dials are used in the above series of radios. Each type is supplied in two sizes. When ordering dial parts, specify the items shown to the right to insure getting the correct part.

When ordering parts specify
1—Type of dial.
2—Size of dial.
3—Name on dial or escutcheon.
4—Model or series of radio.

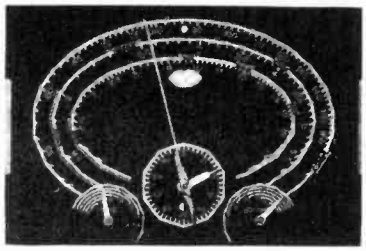
TYPE OF DIAL

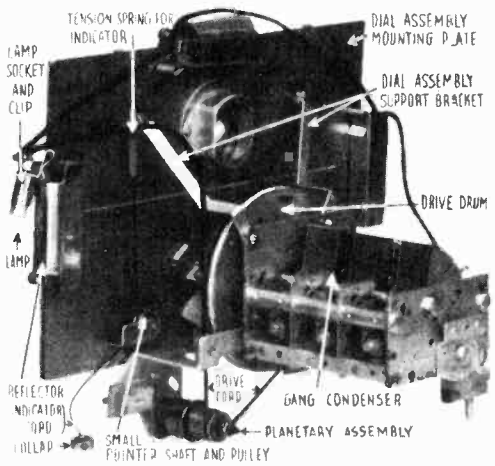
Pointer Dials

No. 2 Dial
External pointers — each dial scale a different color for each band — circular micrometer scale numbered to 10.



No. 4 Dial
External pointers—all dial scales gold etched — ten sided micrometer scale numbered to 100.

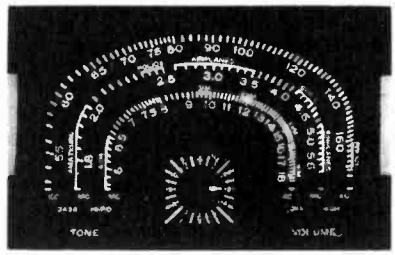




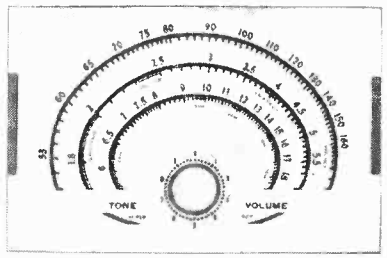
Back View of Pointer Dial

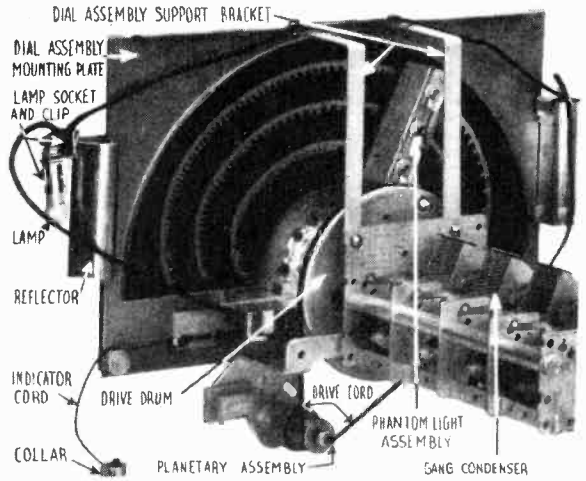
Phantom Light Dials

No. 3 Dial
Moving beam of light indicators — celluloid translucent background.



No. 7 Dial
Moving beam of light indicators — mirror background.

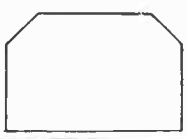




Back View of Phantom Light Dial

SIZE OF DIAL

In each of the above types of dial there are two sizes known as the "7 inch" and "9 inch" size. The size of the dial is determined not by the length of the glass but by the horizontal distance across the opening of the escutcheon.



The "7 inch" dials have the upper corners cut off as shown in the illustration at left, and are approximately 8 inches in length.

The "9 inch" dials are rectangular in shape as shown in the illustration at left, and are approximately 10 inches in length.

MODEL OEL
MODEL 2DL
MODEL 7L

WELLS-GARDNER & CO.

No. 2 and No. 4 POINTER DIALS

Dial & Drive Parts

DIAL ASSEMBLY

	7 INCH PART NO.	7 INCH LIST PRICE	9 INCH PART NO.	9 INCH LIST PRICE
Dial Assembly Complete with Dial Glass; Dial Cardboard; Dial Assembly Mounting Plate; Reflectors; Small Pointers; Cords, Collars, Springs and Pulleys for Small Pointers; and Band Indicator Assembly Less Large Station Pointer and Micrometer Pointer	Specify 4 items listed at top of reverse side—also location of Tun. Eye	$3.85	Specify 4 items listed at top of reverse side—also location of Tun. Eye	$4.30
Dial Glass Only	Same as above	1.75	Same as above	1.75
Dial Cardboard (For Radios with Tuning Eye mounted in Dial)	P-9X21	.10	P-9X22	.10
Dial Cardboard (For Radios without Tuning Eye mounted in Dial)	P-9X16	.10	P-9X23	.10
Dial Assembly Mounting Plate Only (Includes Small Pointer Shafts and Pulleys, and Band Indicator Assembly)	P-25A125	1.20	P-25A126	1.20
Dial Assembly Support Brackets (Attached to Gang Condenser) ea.	P-25X297	.10	P-25X297	.10
Large Station Pointer	P-15X59	.20	P-15X72	.20
Micrometer Pointer (No. 2 Dial)	P-15X60	.10	P-15X60	.10
Micrometer Pointer (No. 4 Dial)	P-15X74	.10	P-15X74	.10
Small Volume or Tone Control Pointer (No. 2 Dial) ea.	P-15X57	.10	P-15X57	.10
Small Volume or Tone Control Pointer (No. 4 Dial) ea.	P-15X73	.10	P-15X73	.10
Fibre Strip (At bottom of Dial Glass)	P-11X41	.10	P-11X41	.10
Dial Lamp Reflectors (At each side of Dial Assembly Mounting Plate) ea.	P-41X12	.10	P-41X12	.10
Dial Lamp Sockets and Clips ea.	P-7A37	.10	P-7A37	.10
Dial Lamps—No. 51 Bayonet Type ea.	P-7A32	.20	P-7A32	.20
10" Black Cord for Small Pointers doz.		.25		.25
Brass Collar with Set Screws for Securing Small Pointer Cords to Shafts ea.	P-29X20	.10	P-29X20	.10
Tension Springs for Small Pointer Cords ea.	P-28X44	.10	P-28X44	.10
Small Pointer Shafts and Pulleys ea.	P-26X229	.10	P-26X229	.10
Glass Crystal (Mounted in Escutcheon Plate)	P-17X15	.35	P-17X18	.45
Retaining Ring (For above Crystal)	P-28X58	.15	P-28X82	.15

DRIVE ASSEMBLY

Planetary Assembly Complete with Hex Nut and Lock Washer (This is the Unit mounted at the front of the Chassis Base. It is integral with the Tuning Shaft)	P-5A34	1.25	P-5A34	1.25
Black Tuning Drive Cord Only	P-10X14	.30	P-10X14	.30
Tension Spring for Tuning Drive Cord	P-28X69	.10	P-28X69	.10
Drive Drum Assembly Complete with Gears and Shafts	P-24X239	1.35	P-24X239	1.35
Spreader Spring for Stationary Gear	P-28X83	.10	P-28X83	.10
Spreader Spring for Rotary Gear	P-28X84	.10	P-28X84	.10
Rubber Cushion (Front) for Gang Condenser	P-8X43	.10	P-8X43	.10
Rubber Cushion (Rear) for Gang Condenser	P-8X44	.10	P-8X44	.10
Rubber Cushion (Rear—under Chassis Base) for Gang Condenser	P-8X45	.10	P-8X45	.10
Rear Mounting Foot for Gang Condenser	P-25X283	.10	P-25X283	.10

No. 3 and No. 7 PHANTOM LIGHT DIALS

DIAL ASSEMBLY

	7 INCH PART NO.	7 INCH LIST PRICE	9 INCH PART NO.	9 INCH LIST PRICE
Dial Assembly Complete with Dial Glass, Dial Assembly Mounting Plate, Reflectors, Micrometer Indicator, Cardboard Reflector, Tone and Volume Indicators, Tension Spring for Tone and Volume Indicators, Indicator Cords, Brass Collars for Indicators, Fibre Dial Strip and Dial Assembly Support Brackets. (This Assembly also includes Celluloid Background for No. 3 Dials only) (No. 3 Dial)	Specify 4 items listed at top of reverse side	$5.60	Specify 4 items listed at top of reverse side	$6.10
Dial Assembly Complete as above (No. 7 Dial)	Same as above	4.85	Same as above	5.30
Dial Glass Only	Same as above	1.75	Same as above	1.75
Celluloid Background for Dial (Used on No. 3 Dial Only)	P-58X141	.60	P-58X142	.70
Dial Assembly Mounting Plate Complete with Tone and Volume Indicators and Indicator Pulleys (No. 3 Dial)	P-25A127	1.45	P-25A128	1.45
Dial Assembly Mounting Plate as above (No. 7 Dial)	P-25A129	1.45	P-25A130	1.45
Dial Assembly Support Brackets (Attached to Gang Condenser) ea.	P-25X321	.10	P-25X322	.10
Tension Spring for Tone and Volume Indicators	P-28X88	.10	P-28X87	.10
10" Black Cord for Tone and Volume Indicators doz.		.25		.25
Brass Collars with Set Screw for Securing Indicator Cords to Shafts ea.	P-29X42	.10	P-29X42	.10
Dial Lamp Reflector (Left from front of Radio)	P-41X14	.10	P-41X14	.10
Dial Lamp Reflector (Right from front of Radio)	P-41X15	.10	P-41X15	.10
Dial Lamp Sockets and Clips (For edge lighting of dial and for Tone and Volume Indicators) ea.	P-7A37	.10	P-7A37	.10
Dial Lamps—No. 51 Bayonet Type (For edge lighting and Phantom Light Assembly) ea.	P-7A32	.20	P-7A32	.20
Phantom Light Assembly Complete with Lamps	P-25A98	1.80	P-25A99	1.90
Springs for Lamps of Phantom Light Assembly ea.	P-28X86	.10	P-28X86	.10
Brass Collars for Lamps of Phantom Light Assembly ea.	P-19X61	.10	P-19X61	.10
Micrometer Indicator (Celluloid and metal disc) (No. 3 Dial)	P-25A131	.35	P-25A131	.35
Micrometer Indicator (Metal disc) (No. 7 Dial)	P-15X85	.10	P-15X85	.10
Cardboard Reflector for Micrometer Indicator (No. 3 Dial)	P-9X28	.10	P-9X28	.10
Cardboard Reflector for Micrometer Indicator (No. 7 Dial)	P-9X31	.10	P-9X31	.10
Fibre Strip (At bottom of Dial Glass)	P-11X48	.10	P-11X49	.10
Switch for Phantom Light Assembly (This switch is not included in any of the above Assemblies)	P-25A134	.75	P-25A134	.75

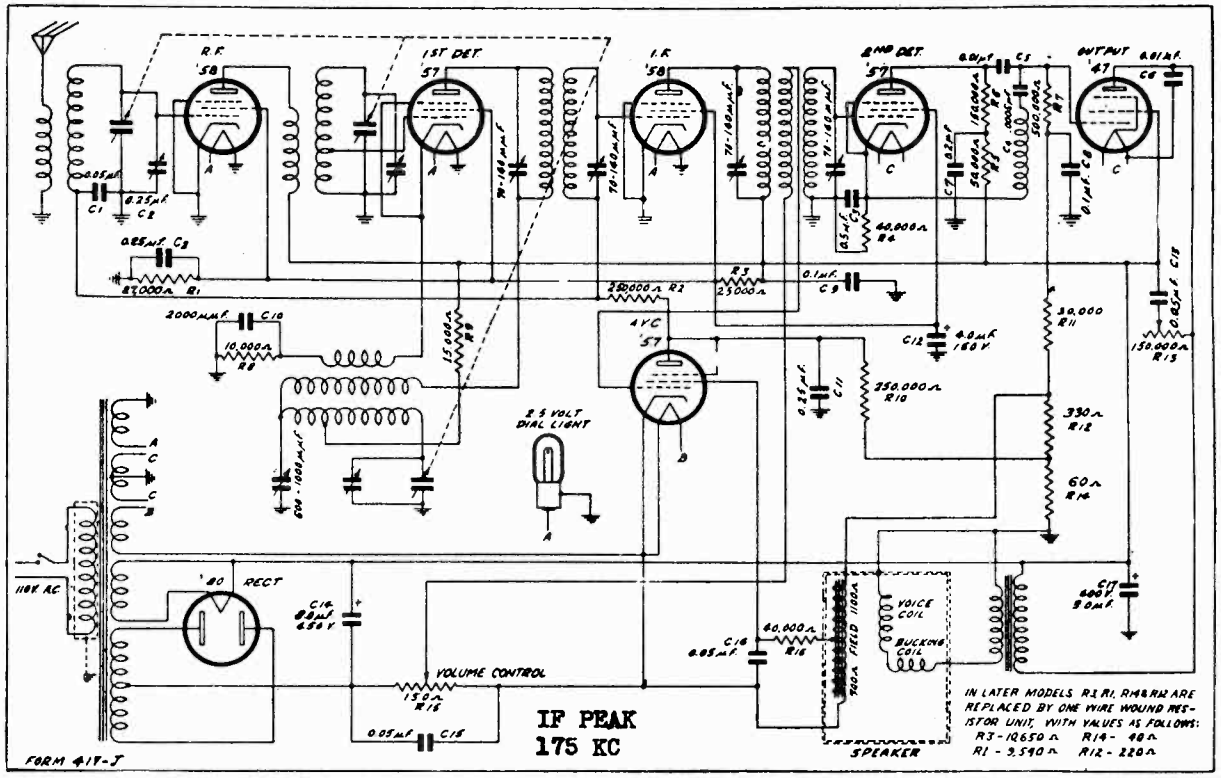
DRIVE ASSEMBLY

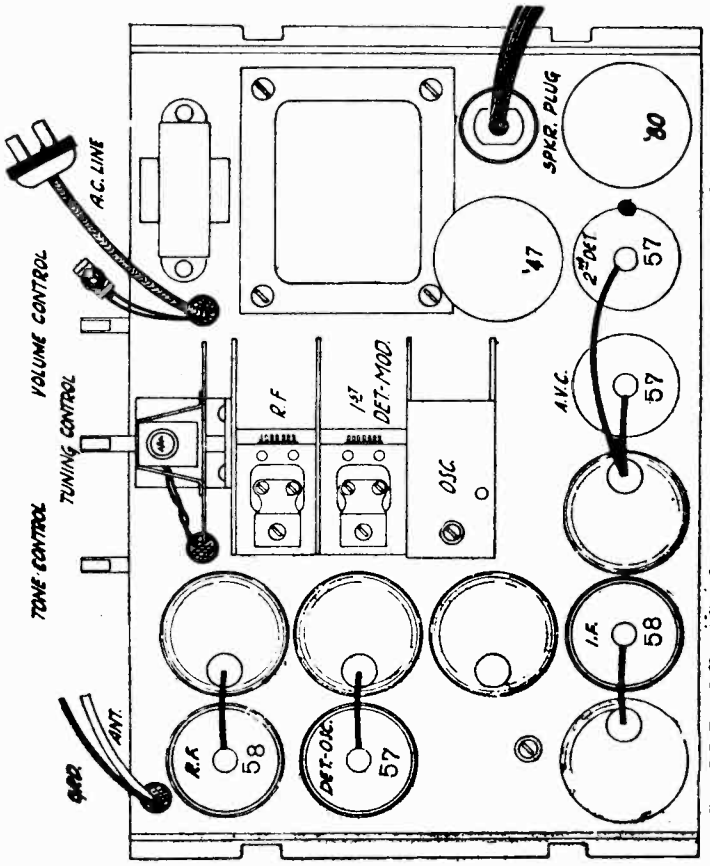
Planetary Assembly Complete with Hex Nut and Lockwasher (This is the unit mounted at the front of the Chassis Base. It is integral with the Tuning Shaft)	P-5A34	1.25	P-5A34	1.25
Black Tuning Drive Cord Only	P-10X14	.30	P-10X14	.30
Tension Spring for Tuning Drive Cord	P-28X69	.10	P-28X69	.10
Drive Drum Assembly Complete with Gears and Gear Spreader Springs	P-24X247	1.40	P-24X247	1.40
Spreader Spring for Stationary Gear	P-28X83	.10	P-28X83	.10
Spreader Spring for Rotary Gear	P-28X84	.10	P-28X84	.10
Rubber Cushion (Front) for Gang Condenser	P-8X43	.10	P-8X43	.10
Rubber Cushion (Rear) for Gang Condenser	P-8X44	.10	P-8X44	.10
Rubber Cushion (Rear—under Chassis Base) for Gang Condenser	P-8X45	.10	P-8X45	.10
Rear Mounting Foot for Gang Condenser	P-25X283	.10	P-25X283	.10

Prices Subject to Change Without Notice

WESTERN AUTO SUPPLY CO.

MODEL S-721
Schematic, Socket
Trimmers, Change





Change in Later Models

In the first models of this chassis, resistors R-1 and R-3 were carbon resistors of the values as shown in Fig 1 Resistors R-12 and R-14, were in one vitreous enamel unit. The voltages for the sets with these resistors are shown in the voltage chart on Page 4 at the left.

In later models the four above mentioned resistors were replaced by one armored wire wound resistor unit New values are used as follows

Code	Resistance
R-12	220 ohms
R-14	40 ohms
R-1	9,540 ohms
R-3	10,650 ohms

The voltages for the sets with the four-section wire wound resistor are shown in the second voltage chart on Page 4 at the right.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and an additional filter condenser are used Also, a slight change is made in the power unit wiring In the twenty-five cycle set, condenser C-17 the dry electrolytic unit is put in parallel with condenser C-14 An 8.0 mfd wet electrolytic condenser is put in place of condenser C-17

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply However, the reverse is not true that is the sixty cycle chassis cannot be operated from a twenty-five cycle power supply

A 110-220 volt 40-60 cycle power transformer is also available for this model

MODEL S-721
Voltage, Parts
Alignment

WESTERN AUTO SUPPLY CO.

REPAIR PARTS LIST FOR 7 TUBE SUPERHETERODYNE RECEIVER

When ordering parts, the part number and the serial number of chassis must be given. If there is a spot of paint on the chassis be sure to give this color. If this information is not available return the old part to insure getting the correct part.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Part No.	Name	List Price
P-1677	No. 57 Tube Socket	$ .15
P-1678	No. 58 Tube Socket	.15
P-1468	No. 47 Tube Socket	.15
P-1474	No. 80 Tube Socket	.15
P-1479	Speaker Socket	.15
P-40420	Aluminum Tube Shield	.20
P-40425	Tube Shield Base	.10
P-40411	Aluminum Coil Shield—R.F. Coils	.20
P-1476	Three-Lug Insulated Terminal Strip	.10
P-1513	Eleven-Lug Insulated Terminal Strip	.15
P-1054	"On-Off" Switch	.80
P-20529	Drive Shaft	.10
P-10224	Rubber Drive Pinion	.10
P-30374	Brass Bushing for Rubber Pinion	.10
P-10191	Rubber Cushions for Channel Brackets	.10
P-1273	Pilot Lamp 2.5 Volt	.25
P-5062	Antenna R.F. Transformer Assembly	.80
P-5057	Interstage R.F. Transformer Assembly	.80
P-5058	Oscillator Coil Assembly	.95
P-5059	1st I.F. Transformer Assembly, complete with can	2.25
P-5060	2nd I.F. Transformer Assembly, complete with can	2.50
P-50541	Output Transformer Assembly	1.75
P-50542	Power Transformer, 60 cycle, 110 volt	5.25
P-50543	Power Transformer, 25 cycle, 110 volt	8.50
P-50545	Power Transformer, 40-60 cycle, 110 volt	8.00
P-1497	Pilot Light Bracket and Drive Gear Assembly	.45
P-1383-C	Drive Bracket and Bearing	.30
P-1684	Celluloid Dial Strip	.20

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80862-C	C-1	.05 mfd.	200 V.	Tubular	$ .30
P-80888-A	C-2	.25 mfd.	200 V.	Tubular	.40
P-80886-C	C-3	.5 mfd.	200 V.	Block	1.60
	C-7	.2 mfd.	400 V.		
	C-11	.25 mfd.	200 V.		
P-80867	C-4	.0005 mfd.	600 V.	Molded	.25
P-80872-B	C-5	.01 mfd.	600 V.	Tubular	.25
P-80872-B	C-6	.01 mfd.	600 V.	Tubular	.25
P-80864-D	C-8	.1 mfd.	200 V.	Tubular	.25
P-80887-B	C-9	.1 mfd.	400 V.	Tubular	.40
P-80914	C-10	.002 mfd.	600 V.	Tubular	.20
P-80891-B	C-12	4.0 mfd.	150 V.	Electrolytic	.85
P-80890-B	C-13	.05 mfd.	400 V.	Tubular	.20
P-80894-B	C-14	8.0 mfd.	450 V.	Electro-lytic Block	2.85
	C-17	8.0 mfd.	450 V.		
P-80862-C	C-15	.05 mfd.	200 V.	Tubular	.30
P-80862-C	C-16	.05 mfd.	200 V.	Tubular	.30
P-80849		8.0 mfd.	450 V.	Wet Electrolytic (25 Cycle only)	2.20
P-1385-B	600 K.C Trimmer Condenser				.75
P-80882	Three-Gang Condenser				5.70

RESISTORS

Part No.	Code	Resistance	Wattage	Type	List Price
*P-91003	R-1	27,000 ohms	.5 Watts	Carbon	$ .25
P-90954	R-2	250,000 ohms	.2 Watts	Carbon	.25
*P-91002	R-3	25,000 ohms	1.0 Watts	Carbon	.25
P-90916	R-4	40,000 ohms	.2 Watts	Carbon	.25
P-90941	R-5	50,000 ohms	.2 Watts	Carbon	.25
P-90963	R-6	150,000 ohms	.2 Watts	Carbon	.25
P-90929	R-7	500,000 ohms	.2 Watts	Carbon	.25
P-90930	R-8	10,000 ohms	.2 Watts	Carbon	.20
P-90905	R-9	15,000 ohms	.2 Watts	Carbon	.25
P-90954	R-10	250,000 ohms	.2 Watts	Carbon	.25
P-90956	R-11	30,000 ohms	.2 Watts	Carbon	.25
P-91040	R-12	330 ohms		Vitreous Enamel	.50
	R-14	60 ohms			
P-90993	R-13	150,000 ohms		Tone Control	.90
P-91041	R-15	150 ohms		Volume Control	.80
P-90916	R-16	40,000 ohms	.2 Watts	Carbon	.25
†P-91048	R12	220 ohm	1.0 Watts	Armored Wire-wound Resistor	1.05
	R14	40 ohm	.2 Watts		
	R1	9540 ohm	1.0 Watts		
	R3	10650 ohm	2.5 Watts		

* Used in early models—in later models these resistors are replaced by resistor P-91048.
† See above.

Voltages at Sockets

LINE VOLTAGE 115—ANTENNA LEAD SHORTED TO GROUND—VOLUME CONTROL AT MAXIMUM

			For early Models with 2-section vitreous enamel resistor.				For later Models with 4-section armoured wire-wound resistor.			
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
'58	R.F.	2.4	282	107	4(1)	8.	258	106	2.8(1)	8.0
'57	1st Det.	2.4	270	100	5	.4	250	103	5	.4
'58	I.F.(2)	2.4	282	107	4(1)	8.	258	106	2.8(1)	8.0
'57	A.V.C.	2.4	90	40	9.5	0	103	45	10	0
'57	2nd Det.	2.4	207	98	6	.15	190	101	6	.15
'47	Audio	2.4	262	280	24(3)	31	242	260	17(3)	30
'80	Rect.	4.8				30 per plate				34 per plate

(1) Read Across R-14.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation.
(3) Read Across R12 and R14.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are necessary. The procedure is as follows:

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator, is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

WESTERN AUTO SUPPLY CO.

MODEL S-724
Schematic, Socket
Parts

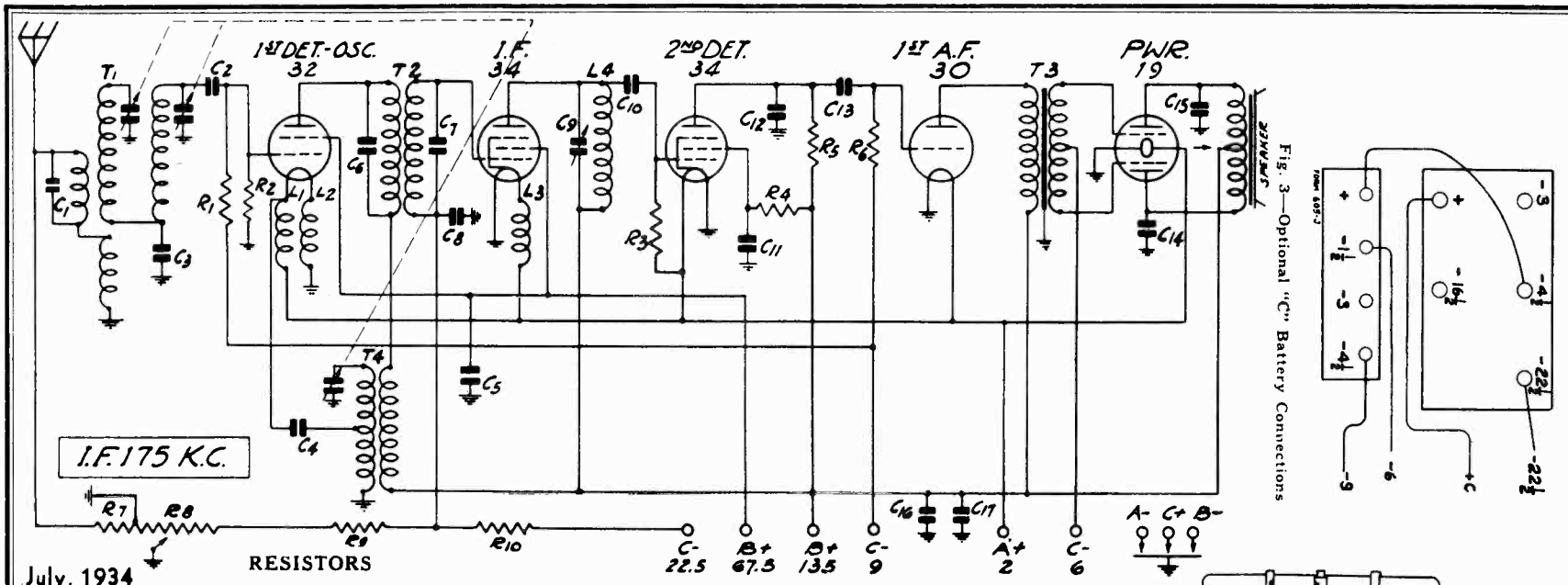


Fig. 1—Schematic Circuit Diagram.

Fig. 3—Optional "C" Battery Connections

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A94505	R1	5 Megohm	0.2	Carbon
P-A94105	R2	1 Megohm	0.2	Carbon
P-A94205	R3	2 Megohm	0.2	Carbon
P-B94104	R4	100,000 Ohm	0.5	Carbon
P-B94403	R5	40,000 Ohm	0.5	Carbon
P-A95105	R6	1 Megohm	0.2	Carbon
P-96001	R7	3,000 Ohm		Volume Control
	R8	60,000 Ohm		
P-A94901ww	R9	900 Ohm	0.2	Wire Wound
P-A94652	R10	6,500 Ohm	0.2	Carbon
*P-A94106	R1	10 Megohm	0.2	Carbon
*P-A94205	R2	2 Megohm	0.2	Carbon

*These resistors were used on first models.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81812	C1	200 mmf		Wire—Part of Ant. Assem
P-81801	C2	35 mmf		Wire—Part of Ant. Assem.
P-80862	C3	0.05 mf	200V	Tubular
P-80862	C4	0.05 mf	200V	Tubular
P-80862	C5	0.05 mf	200V	Tubular
P-81806	C6	70 mmf		Wire
P-81804	C7	45 mmf		Wire
P-80862	C8	0.05 mf	200V	Tubular
P-1685	C9	70± 30 mmf		I. F. Trimmer
P-81800	C10	50 mmf		Wire
P-81045	C11	0.25 mf	200V	Tubular
P-80863	C12	0.004 mf	600V	Tubular
P-80898	C13	0.006 mf	600V	Tubular
P-80969	C14	0.01 mf	400V	Dual Tubular
	C15	0.01 mf	400V	
P-80864	C16	0.1 mf	200V	Tubular
P-80968	C17	4.0 mf	150V	Electrolytic
P-81036	3 Gang Condenser			

MISCELLANEOUS

Part No.	ITEM
P-2131	No. 32 Socket
P-1645	No. 34 Socket
P-1644	No. 30 Socket
P-1833	No. 19 Socket
P-1640	Speaker Socket
P-20406-A	Tube Shield for 34 and 32 Tubes
P-20786	Tube Shield Base
P-50586-D	Audio Input Transformer T3
P-5168	Double Tuned Ant. Trans. Assem. Comp. with resistors and condensers T1 less can
P-40432	Can for above Assem.
P-5199	1st I.F. Coil and Can Assem. T2
P-5187	Oscillator Coil and Can Assem. T4
P-5188	2nd I.F. Coil and Can Assem. L4
P-5172	Double Filament Reactor L1, L2
P-5189	Single Filament Reactor L3
P-30342-A	Grid Cap Only
P-2060	Knob, plain
P-2122	Knob, Arrow Indicator
P-1441-A	Double Insulated Terminal Strip
P-1786	Five Lug Terminal Strip
P-1831	On-Off Switch
P-20711	Gang Condenser Shield
P-10272	Rubber Chassis Cushions
P-70703	Antenna and Ground Wire
P-70749	"B" Battery Wire Assem.
P-70771	"A" Battery Wire Assem.
P-70772	"C" Battery Wire Assem.
P-2124	Speaker 6"
P-2125	Speaker 8"

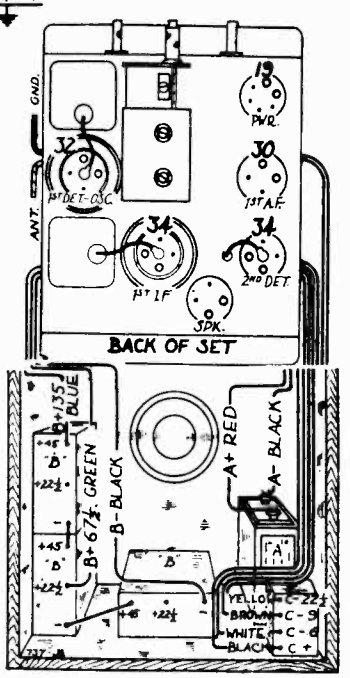


Fig. 2—Tube Arrangement and Battery Connections.

July, 1934

MODEL S-724
Circuit Data
Alignment, Voltage
Resistance

WESTERN AUTO SUPPLY CO.

Circuit

This receiver is designed to operate from a battery power supply the values of which are shown in Fig. 1. All of the tubes used are of the 2 volt type. The receiver is designed to operate at a very low current drain from the batteries and still have a very satisfactory quality of output.

The circuit has a preselector stage incorporating 2 tuned circuits for image rejection. This couples into the type 32 first detector-oscillator tube through a combination of inductive coupling in T1 and capacitive coupling through C3. In Fig. 1 the two coils to the right of the 32 1st detector tube are the primary and secondary of the 1st I. F. transformer while below this tube are the oscillator coils. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency of 175 K. C. above the frequency to which the R. F. circuit is tuned.

One stage of I. F. amplification is employed using a 34 tube. Fixed condensers tune the primary and secondary of the first I. F. transformer. A second I. F. unit of the impedance coupled type is provided in which the inductance L4 is tuned by a trimmer condenser C9. The volume control is of the variable antenna input and I. F. bias type. Referring to Fig 1 it will be noted that one end of the volume control strip is connected to the antenna and the other end is connected to resistor R9. Also note that the volume control strip is tapped. Bias voltage for the 34 I. F. tube is obtained from a potentiometer consisting of resistors R9, R10 and the 60,000 ohm section of the volume control R8 which resistors are connected across the 22½ volt "C" battery.

As the slider of the volume control is moved away from the antenna end, the signal input to the antenna stage is increased. The bias voltage of the I. F. tube is not affected until the tap is reached. As the slider moves from this point to the end of the strip the I. F. bias is decreased, thus increasing the sensitivity. When this happens the plate current goes up and more battery current is used.

A 34 tube is used as the 2nd detector or demodulator. Demodulation takes place in the grid circuit of this tube.

Resistance coupling is used between the 2nd detector and the 1st audio stage which uses a 30 tube. The 1st audio stage is transformer coupled to the output stage. Class "B" amplification is employed in the output stage which uses a type 19 tube. This consists of two output tubes in one envelope. A magnetic reproducer is used.

A 3 pole switch controls all three sources of battery supply.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 K. C. signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

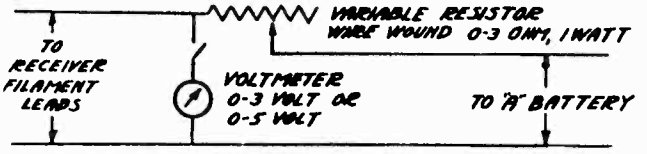


Fig. 4—Using Voltage Regulator with 3 Volt "A" Battery

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and no adjustment at this frequency, therefore, is required.

D. C. Resistance of Windings

Following are the D.C. resistances of the various windings in the chassis.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5168	Double Tuned Ant. Coil Pri.	T1	19.2
	Double Tuned Ant. Coil Sec. (Preselector)	T1	3.2
	Double Tuned Ant. Coil Sec. (1st Det.)	T1	3.2
P-5199	1st I.F. Coil Pri.	T2	90.0
	1st I.F. Coil Sec.	T2	116.0
P-50586-D	Audio Input Trans. Pri.,	T3	1010.
	Audio Input Trans. Sec. Cent. Tap to outside end	T3	648.
	Audio Input Trans. Sec. Cent. Tap to inside end	T3	588.
P-5187	Oscillator Coil, Grid Winding	T4	4.1
	Oscillator Coil, Plate Winding	T4	10.4
P-5172	Double Filament Reactor Assem.	L1	.61
	Double Filament Reactor Assem.	L2	.61
P-5189	Single Filament Reactor Assem.	L3	.61
P-5188	2nd I.F. Reactor Coil	L4	52.1
P-2124	6" Magnetic Speaker, Center Tap to outside end		272.
	6" Magnetic Speaker, Center Tap to inside end		225.
P-2125	8" Magnetic Speaker (same as P-2124)		

VOLTAGES AT SOCKETS

Volume Control at Maximum—Antenna Shorted to Ground
B+135 Volts
Voltages to Chassis

Type of Tube	Function	Across Filament	Plate to Cath.	Screen to Cath	Grid to Cath.	Normal Plate M. A.
32	1st Det. & Osc.	2.0	135	67.5	7.5(1)(2)	2.5
34	I. F.	2.0	135	67.5	2.5(3)	2.8
34	2nd Det.	2.0	50	40(1)	0	1.8
30	1st Audio	2.0	135		9(4)	3.0
19	Output	2.0	135		6	1.8 Total

(1) With 250,000 ohm meter.
(2) Subject to variation due to oscillatory current.
(3) With 25,000 ohm meter.
(4) As read at "C" battery.

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

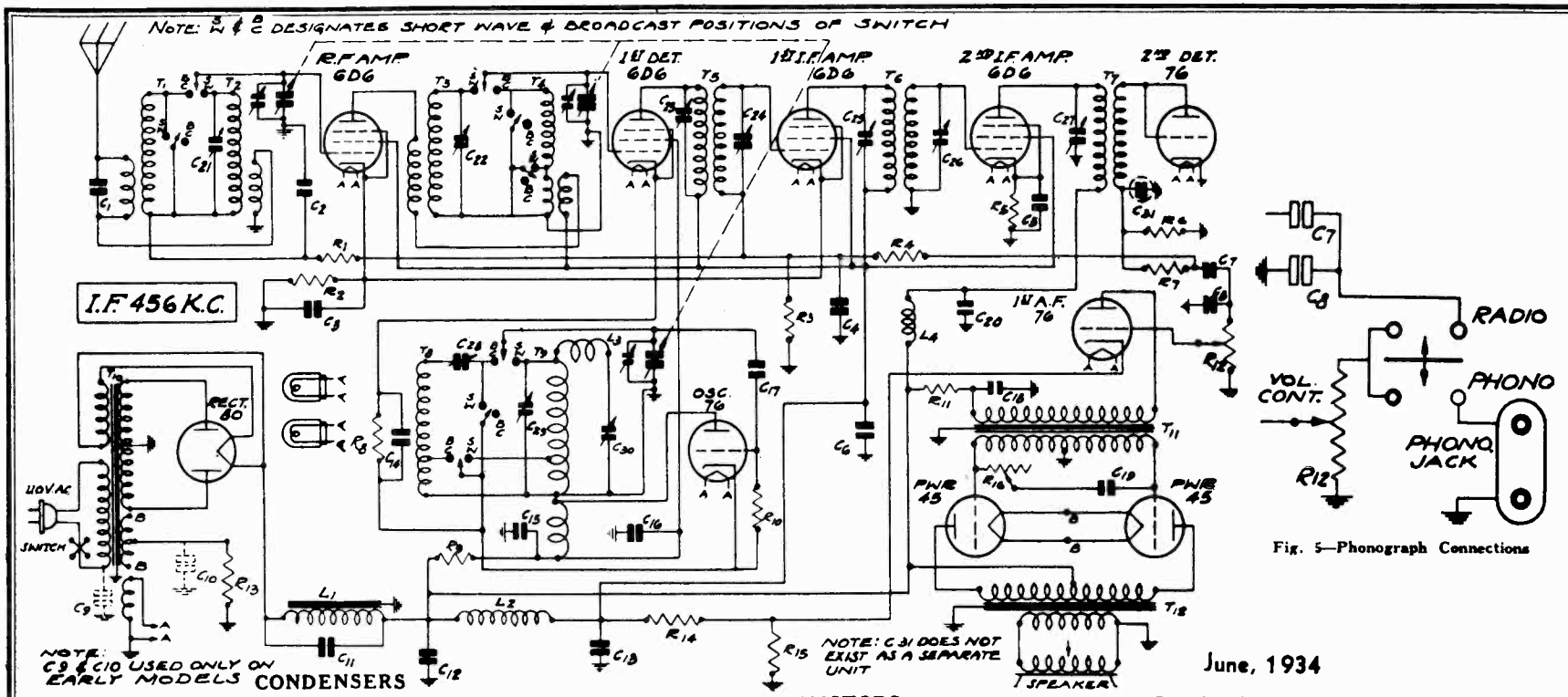


Fig. 1—Schematic Circuit Diagram

Fig. 5—Phonograph Connections

June, 1934

CONDENSERS

Part No.	Code	Capacity	Volts	Type
P-80919	C1	250 mmfd.		Moulded
P-80862	C2	.05 mfd.	200V.	Tubular
P-80888	C3	.25 mfd.	200V.	Tubular
P-80862	C4	.05 mfd.	200V.	Tubular
P-80862	C5	.05 mfd.	200V.	Tubular
P-80888	C6	.25 mfd.	200V.	Tubular
P-80862	C7	.05 mfd.	200V.	Tubular
P-81005	C8	35 mmfd.	600V.	Moulded
*P-80997	C9	.01 mfd.	600V.	Condenser in metal can
*P-80888	C10	.25 mfd.	200V.	Tubular
P-80985	C11	.15 mfd.	200V.	Tubular
P-81039	C12	16.0 mfd.	400V.	Wet Electrolytic
P-81018	C13	6.0 mfd.	150V.	Dry Electrolytic
	C16	2.0 mfd.	300V.	
	C18	2.0 mfd.	300V.	
P-80862	C14	.05 mfd.	200V.	Tubular
P-80864	C15	.10 mfd.	200V.	Tubular
P-81005	C17	35 mmfd.	600V.	Moulded
P-80863	C19	.004 mfd.	600V.	Tubular
P-81041	C20	.10 mfd.	400V.	Tubular
P-2102	C21	3-40 mmfd.		Ant. S.W. Trimmer
P-2102	C22	3-40 mmfd.		1st Det. S.W. Trimmer
P-2103	C23	200± 50 mmfd.		Dual Trimmer
	C24	200± 50 mmfd.		Part of I.F. Assem.
P-2103	C25	200± 50 mmfd.		Dual Trimmer
	C26	200± 50 mmfd.		Part of I.F. Assem.
P-1685	C27	70± 30 mmfd.		3rd I.F. Coil Trimmer
P-2112	C28	300-500 mmfd.		600 K.C. Trimmer
P-2102	C29	3-40 mmfd.		Osc. S.W. Trimmer
P-1685	C30	70± 30 mmfd.		6000 K.C. Trimmer
P-81027		Three Gang Condenser		

RESISTORS

Part No.	Code	Resistance	Watts	Type
P-A95204	R1	200,000 ohm	.2	Carbon
P-98023	R2	150 ohm	.5	Flex. Wire Wound
P-A95105	R3	1 megohm	.2	Carbon
P-A95205	R4	2 megohm	.2	Carbon
P-98024	R5	400 ohm	.5	Flex. Wire Wound
P-A94304	R6	300,000 ohm	.2	Carbon
P-A95104	R7	100,000 ohm	.2	Carbon
P-A94252	R8	2,500 ohm	.2	Carbon
P-98022	R9	30,000 ohm	2.0	Carbon
P-A95104	R10	100,000 ohm	.2	Carbon
P-C94303	R11	30,000 ohm	1.0	Carbon
P-96005	R12	2 megohm		Volume Control and Switch
P-98006	R13	780 ohm	3.0	Armored Wire Wound
	R14	6000 ohm	1.4	
	R15	460 ohm	.2	
P-97003	R16	3 megohm		Tone Control

*Used in Early Models only.

Part No.	Item
P-50638	Power Transformer 115V. 60 cycles T 10
P-50639	Power Transformer 115V. 25 cycles T 10
P-50640	Power Transformer 115-230V. 40-60 cycles T 10
P-50641	Power Choke L 1
P-50642	Audio Output Transformer T 12
P-50643	Audio Input Transformer T 11
P-5176	Antenna R.F. Trans. T 1 and T 2 less can
P-5177	Interstage R.F. Trans. T3 and T4 less can
P-5178	Oscillator Coil Assembly T8 and T9 less can
P-5186	3rd I. F. Coil T7 less can
P-40433	Cans for the above coils
P-5184	1st I.F. Coil & Can Assembly T5
P-5185	2nd I.F. Coil & Can Assembly T6
P-5190	H. F. Oscillator Tracking Coil L3
P-5151	I.F. Plate Isolating Reactor L4
P-70702	A.C. Cord & Plug
P-1421	Single Insulated Terminal Strip
P-1441	Double Insulated Terminal Strip
P-2060	Small Knob
P-2062	Large Knob
P-30342A	Grid Cap only
P-30456	Small Pointer
P-20912	Large Double End Pointer
P-2012	Pilot Light Bulb
P-10272	Rubber Mounting Feet
P-10320	Glass Crystal
P-20875	Crystal Retaining Ring
P-2152	8" Dynamic Speaker Mantel L2
P-1968	10" Dynamic Speaker Console L2
P-2101	Three Position Band Change Switch
P-20905	Condenser Shield
	8" Black Drive Cord (V.C. or T.C. Ind.)
	29" Black Drive Cord (Cond. Drive)
P-2126	Pilot Lamp Socket & Clip Assembly
P-20911	Bottom Shield
P-1011A	Phono-Radio Switch
P-1193	Phono Jack
P-2025	No. 80 Socket
P-1643	No. 45 Socket
P-2022	No. 76 Socket
P-1885	No. 6D6 Socket
P-1637	Speaker Socket
P-40434	Tube Shield—Aluminum (for earlier models)
P-40424	Tube Shield Base—Aluminum (for earlier models)

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth

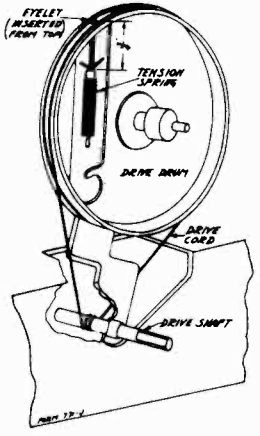


Fig. 4—Drive Cord Replacement

turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

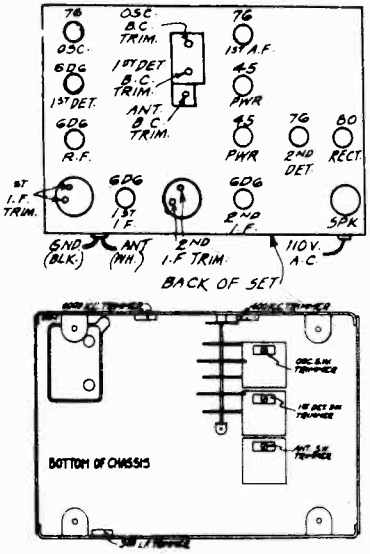


Fig. 2—Tube Arrangement & Location of Trimmers

Voltages at Sockets

LINE VOLTAGE — 115

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M. A.
6D6	R. F.	6.3	95	95	2.8	7.0
6D6	1st Det.	6.3	88	95	9.2	2.9
76	Osc.	6.3	110	—	—	5.0
6D6	1st I. F.	6.3	95	95	2.8	7.0
6D6	2nd I. F.	6.3	300	95	3.3	6.0
76	2nd Det.	6.3	—	—	—	—
76	1st Audio	6.3	160	—	9.0	4.0
45	Output	2.5	245	—	48.0	30.0
80	Rectifier	5.0	890 V. A. C. pl. to pl.			58.0 per plate

Phono Connections

Phonograph connections can be made as shown in Fig. 5. A single pole double throw switch and double pin jack are required. These should be mounted on the back panel of the chassis close to the 2nd detector. The connections are made by opening the diode circuit at the point shown in the illustration and completing the connections to the switch and pin jacks as indicated. A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control of the set will regulate the phono volume.

Change in Early Models

In the early models of this receiver the side of the trimmer condenser C27 which is shown in Fig. 1 as connected to ground was connected to the B+ side of the 3rd I. F. coil primary.

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans - See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the back panel.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

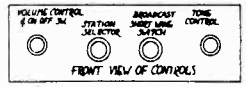


Fig. 3—Arrangement of Controls

D. C. Resistance of Windings

Following are the D.C. resistances of the various windings in the chassis.

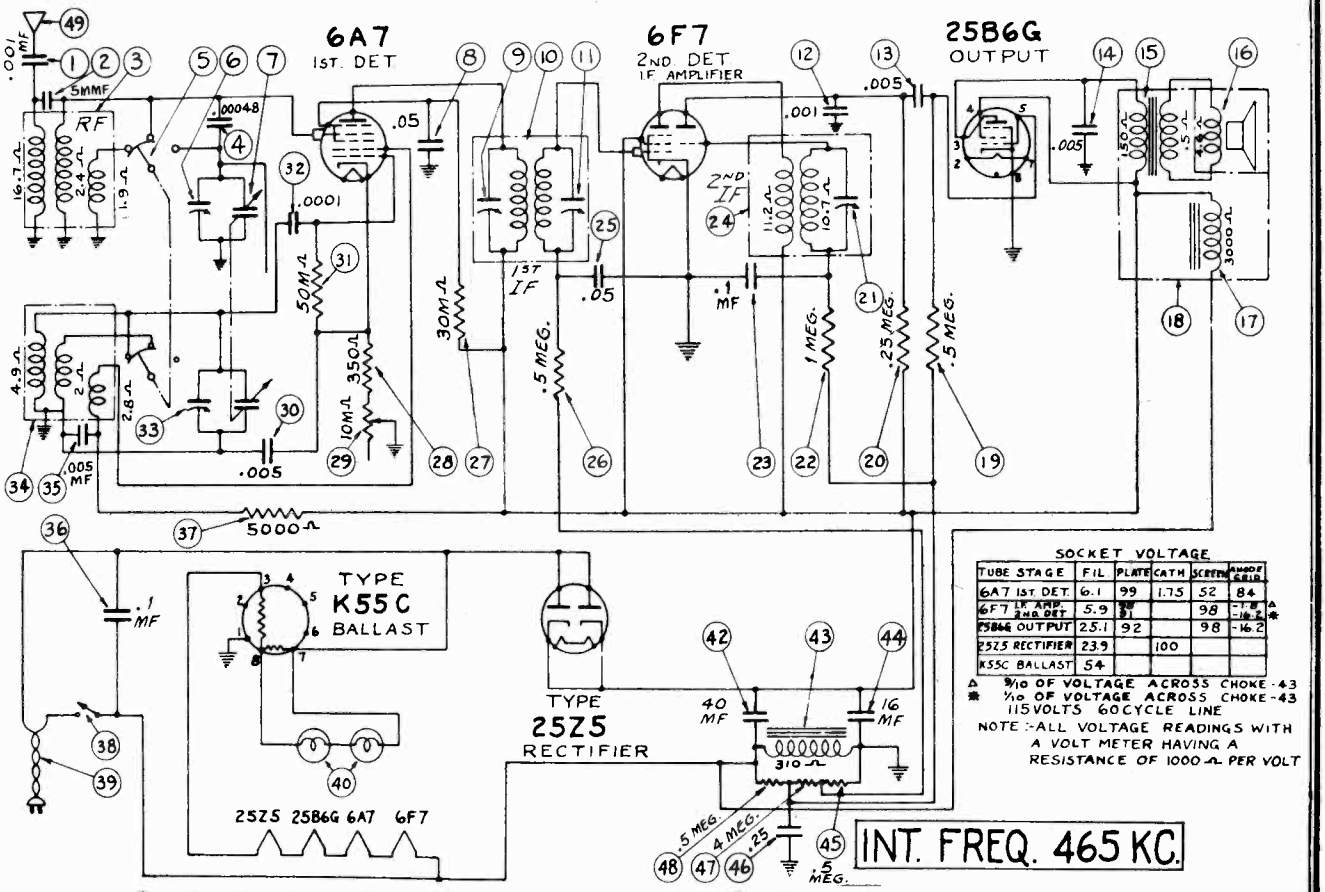
Part No.	Item	Code		D.C. Resistance in Ohms
P-5176	S.W. and B.C. Antenna R.F. Transformer Primaries (in series)	T1	T2	27.9
	B.C. Antenna R.F. Transformer Secondary	T1		5.0
	S.W. Antenna R.F. Transformer Secondary	T2		Small
P-5177	S.W. and B.C. Interstage R.F. Transformer Primaries (in series)	T3	T4	2.7
	B.C. Interstage R.F. Transformer Secondary	T4		4.4
	S.W. Interstage R.F. Transformer Secondary	T3		Small
P-5178	S.W. Oscillator Grid Coil	T9		Small
	S.W. Oscillator Plate Coil	T9		.25
	B.C. Oscillator Grid Coil	T8		3.5
P-5190	S.W. Oscillator Tracking Coil	L3		1.27
P-5184	1st I.F. Coil Primary	T5		5.0
	1st I.F. Coil Secondary	T5		5.0
P-5185	2nd I.F. Coil Primary	T6		5.0
	2nd I.F. Coil Secondary	T6		5.0
P-5186	3rd I.F. Coil Primary	T7		9.3
	3rd I.F. Coil Secondary	T7		26.3
P-50643	Audio Input Transformer Primary	T11		2400.
	Audio Input Transformer Secondary Center Tap to Outside	T11		2600.
	Audio Input Transformer Secondary Center Tap to Inside	T11		2008.
P-50642	Audio Output Transformer Primary Center Tap to Outside	T12		360.
	Audio Output Transformer Primary Center Tap to Inside	T12		320.
	Audio Output Transformer Secondary	T12		.44
P-1968	Speaker Voice Coil			3.0
	Speaker Field Coil	L4		5000.
P-50641	Filter Choke	L1		150.
P-50638	Power Transformer 115V. 60 Cycles Pri.	T10		5.3
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Outside	T10		120.
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Inside	T10		110.
	Power Transformer 115V. 60 Cycles Sec. (80 Fil.)	T10		Small
	Power Transformer 115V. 60 Cycles Sec. (AA Fil.)	T10		Small
	Power Transformer 115V. 60 Cycles Sec. (BB Fil.)	T10		Small

Trimmers, Voltage Alignment, Chassis

MODEL WR-102-A

WESTINGHOUSE ELEC. SUPPLY CO.

Schematic, Socket



SOCKET VOLTAGE

TUBE STAGE	FIL	PLATE	CATH	SCREEN	ANODE GRID
6A7 1ST. DET.	6.1	99	1.75	52	84
6F7 1R. AMP. 2ND DET	5.9	250 91		98	-1.8 Δ -16.2 *
25B6G OUTPUT	25.1	92		98	-16.2
25Z5 RECTIFIER	23.9		100		
K55C BALLAST	54				

Δ 9/10 OF VOLTAGE ACROSS CHOKE-43
* 1/10 OF VOLTAGE ACROSS CHOKE-43
115 VOLTS 60 CYCLE LINE
NOTE:-ALL VOLTAGE READINGS WITH A VOLT METER HAVING A RESISTANCE OF 1000Ω PER VOLT

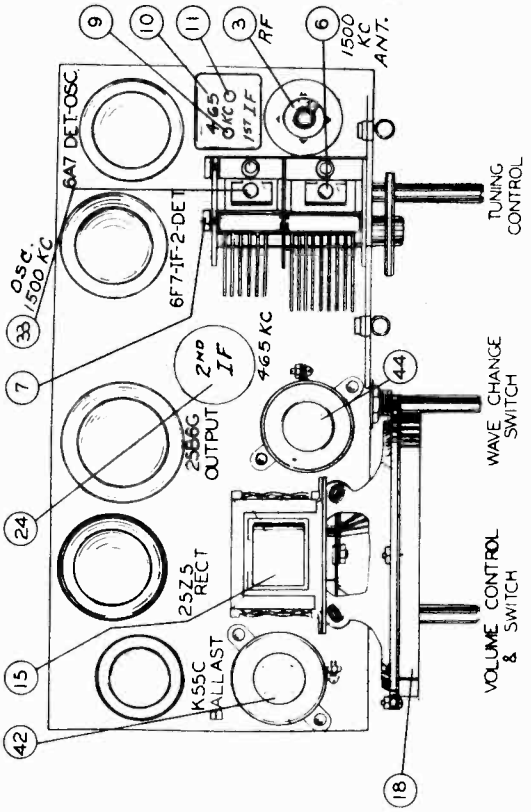


Figure No. 1

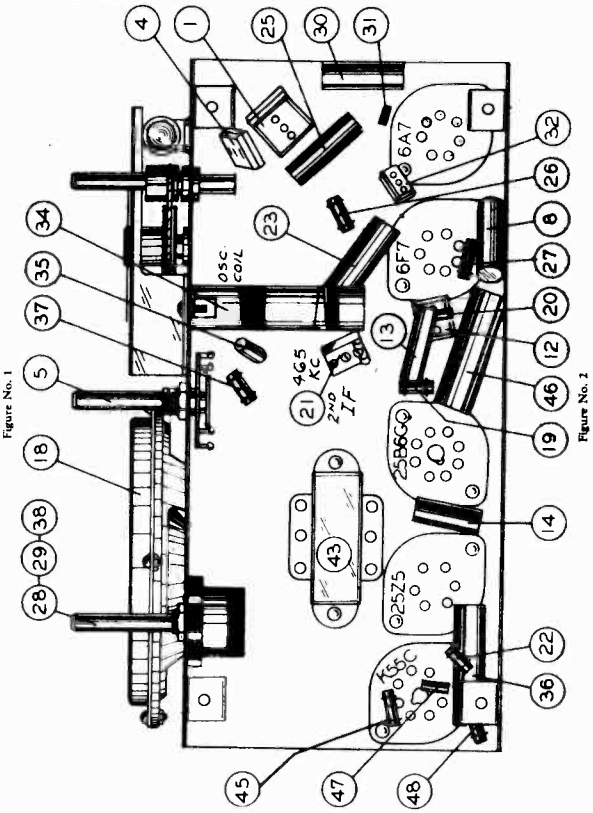
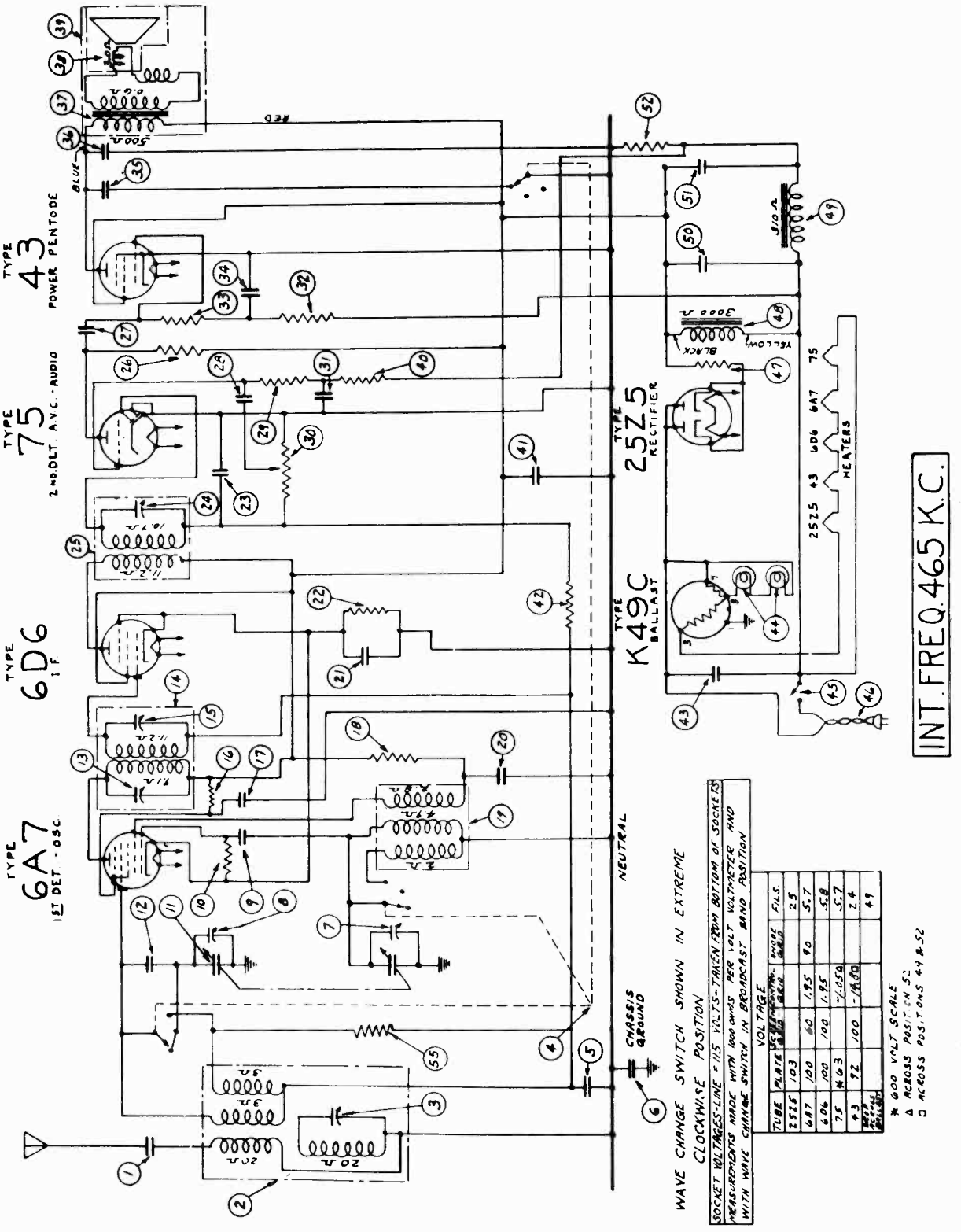


Figure No. 2

MODELS WR-103, WR-103-A

Schematic, Voltage **WESTINGHOUSE ELEC. SUPPLY CO.**



WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR-103
WR-103-A
Socket, Trimmers
Chassis

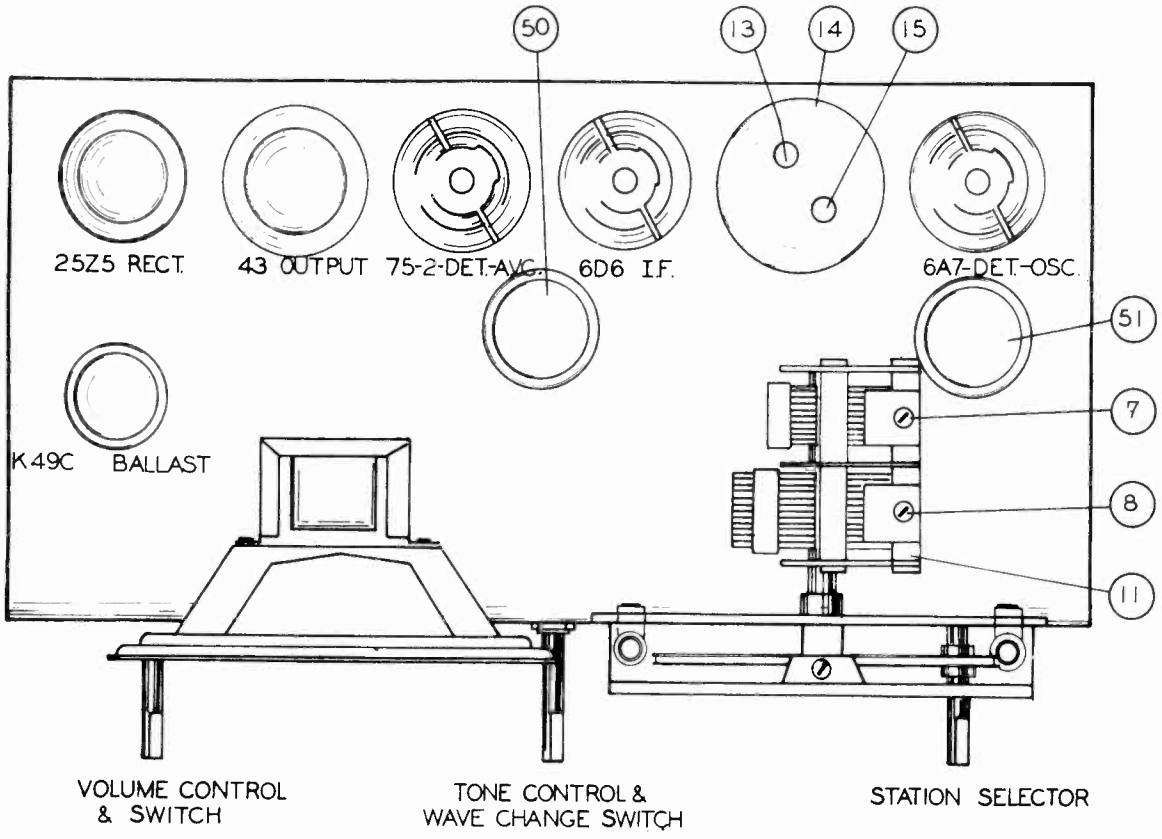


Figure No. 1

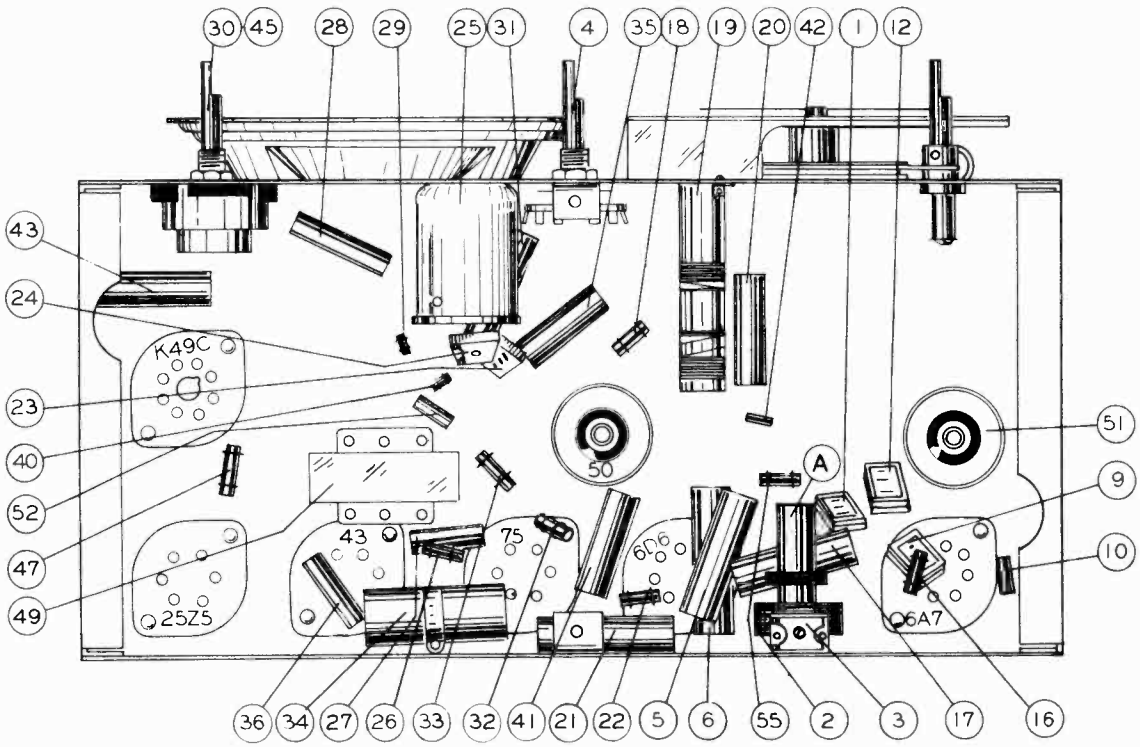


Figure No. 2

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	1 #6A7, 1 #6D6, 1 #75, 1 #43, 1 #25Z5, 1 #K49C - Total 6
Power Supply	105 to 125 volt, D.C., or 105 to 125 volt, 50 to 60 cycle A.C.
Power Consumption	47 Watts
Tuning Ranges	540 to 1550 and 1500 to 3200 KC.
Maximum Output	.75 Watt
Maximum Undistorted Output	1 Watt
Line-Up Frequencies	I.F. 465 KC., 1400 KC.

LINE-UP CAPACITOR ADJUSTMENTS

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full, the wave-change switch on the Broadcast (treble position) and the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC., and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust #24 (see Fig. #2) to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A7 first detector-oscillator tube and adjust #13 and #15 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.
7. Apply strong 465 KC. signal to the antenna and adjust trap coil trimmer #3 to a minimum output.

ADJUSTMENT OF BROADCAST BAND

1. Apply test signal on grid of 6A7 tube and set the test oscillator to 1400 KC.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 KC.
3. Adjust trimmer #7 to maximum output.
4. Apply test signal to antenna of set through a .0002 mfd. condenser and adjust trimmer #8 to maximum output.

ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the Broadcast Band are completed, the Police Band requires no adjustment unless the coil has been changed. In this event, set test oscillator and station indicator to 1700 KC., and apply test signal to antenna lead. The Police Band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the coil until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

Dia. #	Part #	Description of Parts	List Price
1	CM 9519	.0005 mfd. mica condenser	$ .20
2	RC 95165	Antenna coil assembly	1.50
3		30-60 mmf. trimmer condenser - part of RC 95165	
4	SW 9562	Wave-change switch	.75
5	CW 2-10	.1 mfd., 200 V. condenser	.15
6	CW 6-10	.1 mfd., 600 V. condenser	.20
7		Trimmer condenser - part of CG 9547	
8		Trimmer condenser - part of CG 9547	
9	SA 106417	.0001 mfd. mica condenser	.20
10	RE 9581	50,000 ohm, 1/4 W. resistor	.15
11	CG 9547	Variable condenser - 2 gang	2.50
12	CM 9522	.00048 mfd. mica condenser	.20
13		35-130 mmf. trimmer condenser - part of IC 9586	
14	IC 9586	First I.F. coil - 465 KC.	2.00
15		35-130 mmf. trimmer condenser - part of IC 9586	
16	RE 9536	20,000 ohm, 1/4 W. resistor	.10
17	CW 2-10	.1 mfd., 200 V. condenser	.15
18	SA 105249	5000 ohm, 1/4 W. resistor	.15
19	RC 95166	Oscillator coil assembly	.70
20	CW 2-10	.1 mfd., 200 V. condenser	.15
21	CW 2-10	.1 mfd., 200 V. condenser	.15
22	RE 9570	180 ohm, 1/8 W. resistor	.10
23	CM 9519	.0005 mfd. mica condenser	.20
24		30-60 mmf. trimmer condenser - part of IC 9595	
25	IC 9595	Second I.F. coil - 465 KC.	1.60
26	SA 105279	.25 meg., 1/4 W. resistor	.15
27	CW 4-005	.005 mfd., 400 V. condenser	.15
28	CW 4-005	.005 mfd., 400 V. condenser	.15
29	RE 9572	500,000 ohm, 1/4 W. resistor	.15
30	VR 957	.5 meg. volume control	1.25
31	CW 2-10	.1 mfd., 200 V. condenser	.15
32	RE 9572	.5 meg., 1/4 W. resistor	.15
33	RE 9572	.5 meg., 1/4 W. resistor	.15
34	CW 9525	.1 mfd., 100 V. condenser	.40
35	CW 2-05	.05 mfd., 200 V. condenser	.15
36	CW 4-005	.005 mfd., 400 V. condenser	.15
37	TR 9583	Output transformer	1.25
38	DM 9514	Diaphragm and voice coil assembly	1.15
39	SK 9544	Speaker	4.50
40	RE 9572	.5 meg., 1/4 W. resistor	.15
41	CW 2-10	.1 mfd., 200 V. condenser	.15
42	RE 9572	.5 meg., 1/4 W. resistor	.15
43	CW 2-10	.1 mfd., 200 V. condenser	.15
44	LP 9516	Dial lamp, 6.3 V., .15 amp.	.20
45		On-off switch - part of VR 957	
46	CB 9512	Line cable	.50
47	RE 9564	25 ohm, 1/2 W. resistor	.20
48		Field coil	
49	SA 105311	Choke coil assembly	.95
50	CE 9545	20 mfd., 150 V. electrolytic condenser	.85
51	CE 9546	12 mfd., 150 V. electrolytic condenser	.85
52	RE 9566	25 ohm, 1/4 W. resistor	.15
55	SA 105277	75,000 ohm, 1/4 W. resistor	.15

MAIN ASSEMBLIES

CH 95148	Chassis assembly	
SK 9544	Speaker	$ 4.50
KA 9569	Cabinet	

CABLES

CB 95128	Antenna cable	.10
PR 97160	Dial drive cable - 18"	Per Yard .05

TUBE SOCKETS & TUBE SHIELDS

CV 9560	Tube shield - plain top	.05
CV 9559	Tube shield - slotted top	.05
FP 105947	Tube shield ring	.05
SA 105461	Tube socket - 7 prong	.20
SA 104617	Tube socket - 6 prong	.20
SO 956	Tube socket - 8 prong	.20
BE 9536	Tube shield base	.05

SCREWS

SC 953	Mounting screw and felt foot	.05
SC 97061	Set screw - dial pulley	.05
SC 102441	Set screw - dial drive pulley	.05
SC 952	Dial indicator screw	.05
SC 958	Escutcheon plate screw	.05

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

The Model WR 103-A is the same as the Model WR 103, except for the following items:

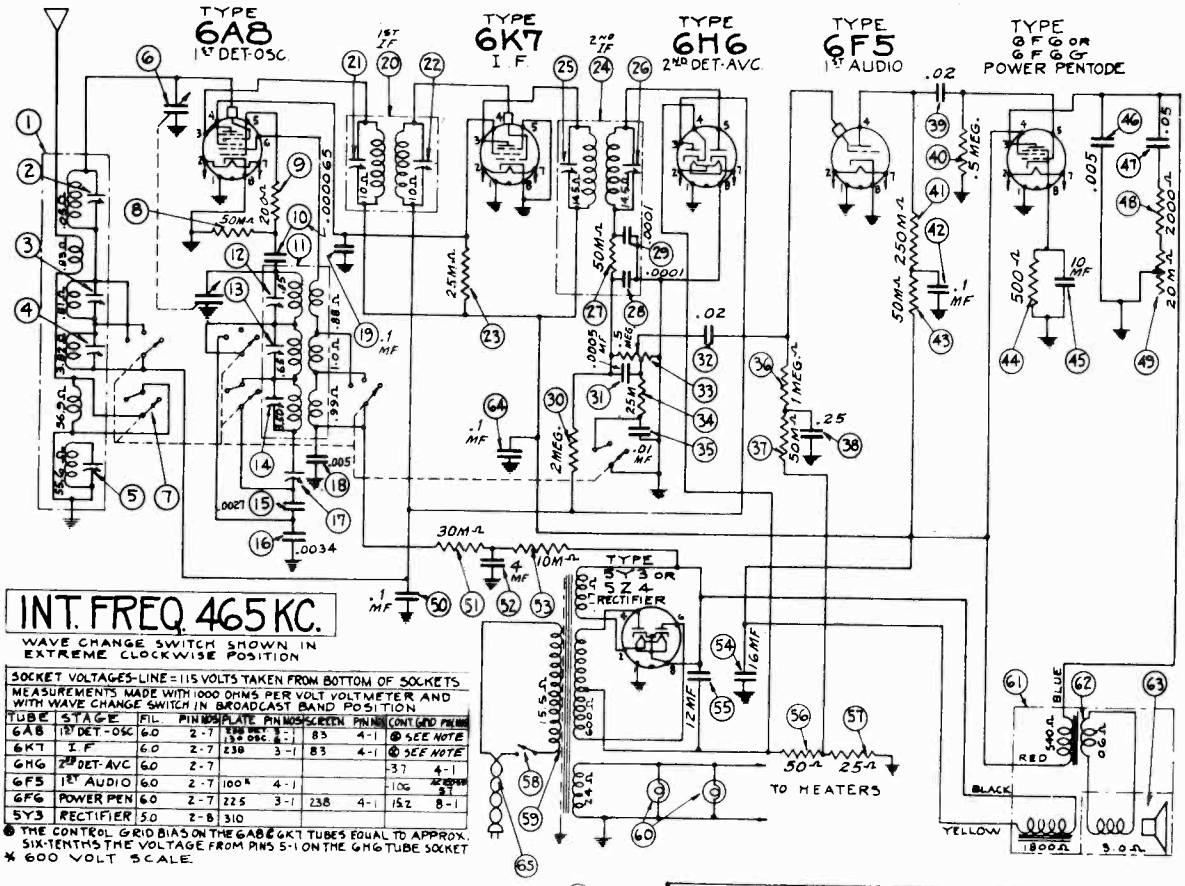
Power Tube	25B6G
Power Consumption	48 Watts
Maximum Output	1.5 Watts
Maximum Undistorted Output	1 Watt

Part #	Description of Parts	List Price
CH 95180	Chassis assembly	
SK 9549	Speaker	$ 4.50

Dia. #	Part #	Description of Parts	List Price
35	CW 2-10	.1 mfd., 200 V. condenser	$ .15
37	TR 9590	Output transformer	1.25
39	SK 9549	Speaker	4.50
47		Omitted	
50	CE 9553	40 mfd., 150 V. electrolytic condenser	.80
55	RE 95121	13 ohm, 1/2 W. resistor	.10
56	CM 952	.00001 mfd. mica condenser	.20
57	RE 95119	4 meg., 1/2 W. resistor	.10

MODEL WR-211
Schematic, Socket
Trimmers, Chassis
Alignment, Voltage

WESTINGHOUSE ELEC. SUPPLY CO.



SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS
MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CONT. GRID	PIN NOS.
6A8	1ST DET-OSC	6.0	2-7	230 / 230 OSC.	3-1	83	4-1	● SEE NOTE	
6K7	I F	6.0	2-7	230	3-1	83	4-1	● SEE NOTE	
6H6	2ND DET-AVC	6.0	2-7					-3.7	4-1
6F5	1ST AUDIO	6.0	2-7	100*	4-1			-10.6	3-1
6F6	POWER PEN	6.0	2-7	225	3-1	238	4-1	15.2	8-1
5Y3	RECTIFIER	5.0	2-8	310					

● THE CONTROL GRID BIAS ON THE 6A8 & 6K7 TUBES EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET
* 600 VOLT SCALE.

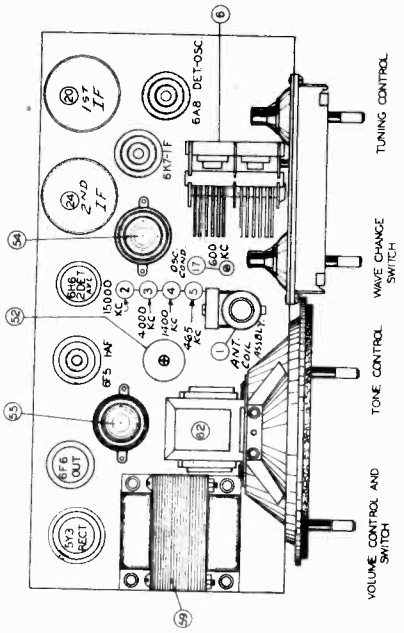


Figure No. 1

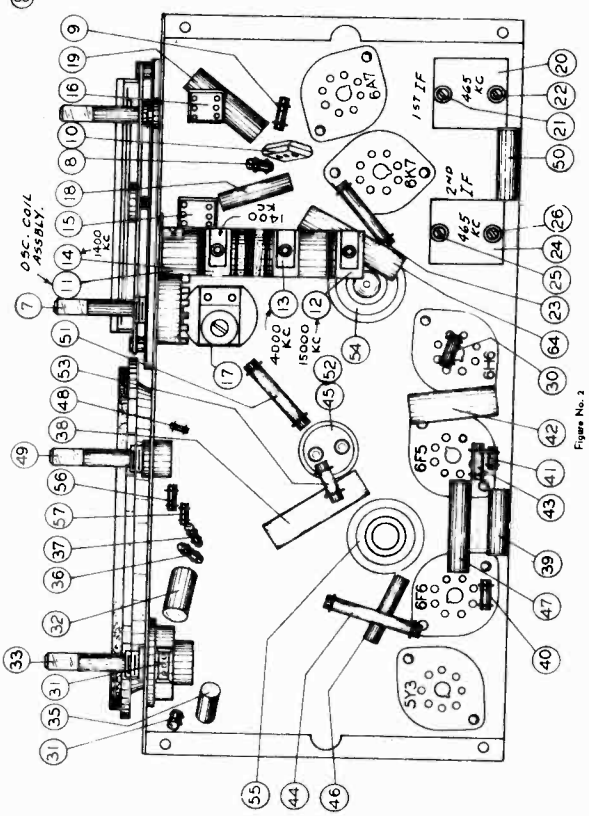


Figure No. 2

MODEL WR-315
Socket, Trimmers
Chassis

WESTINGHOUSE ELEC. SUPPLY CO.

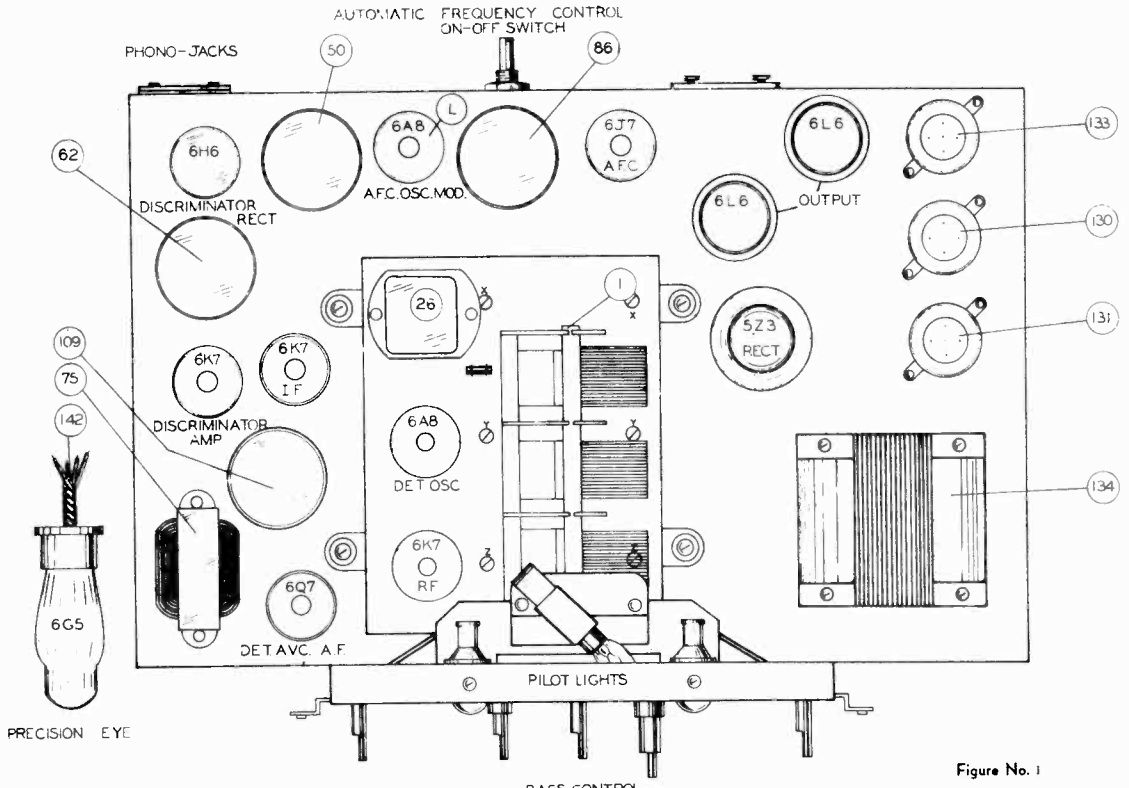


Figure No. 1

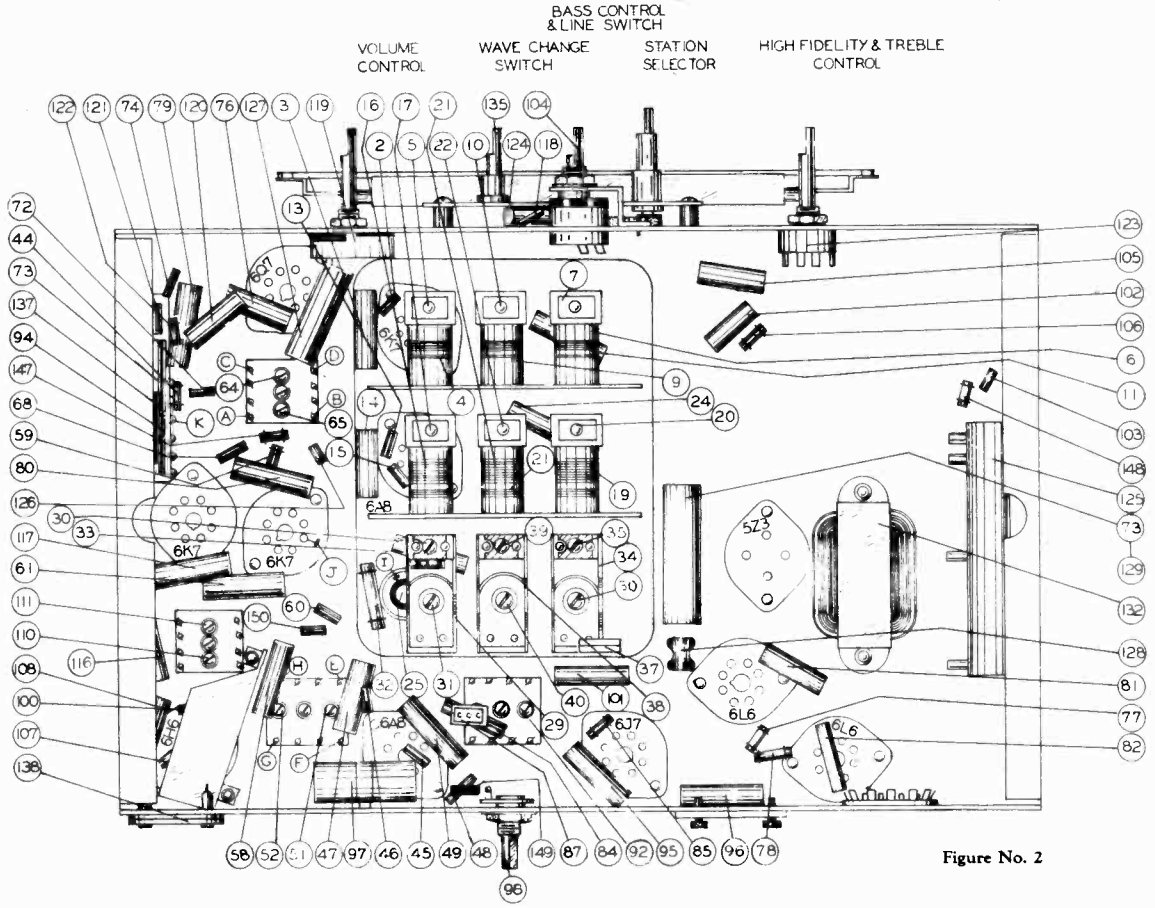
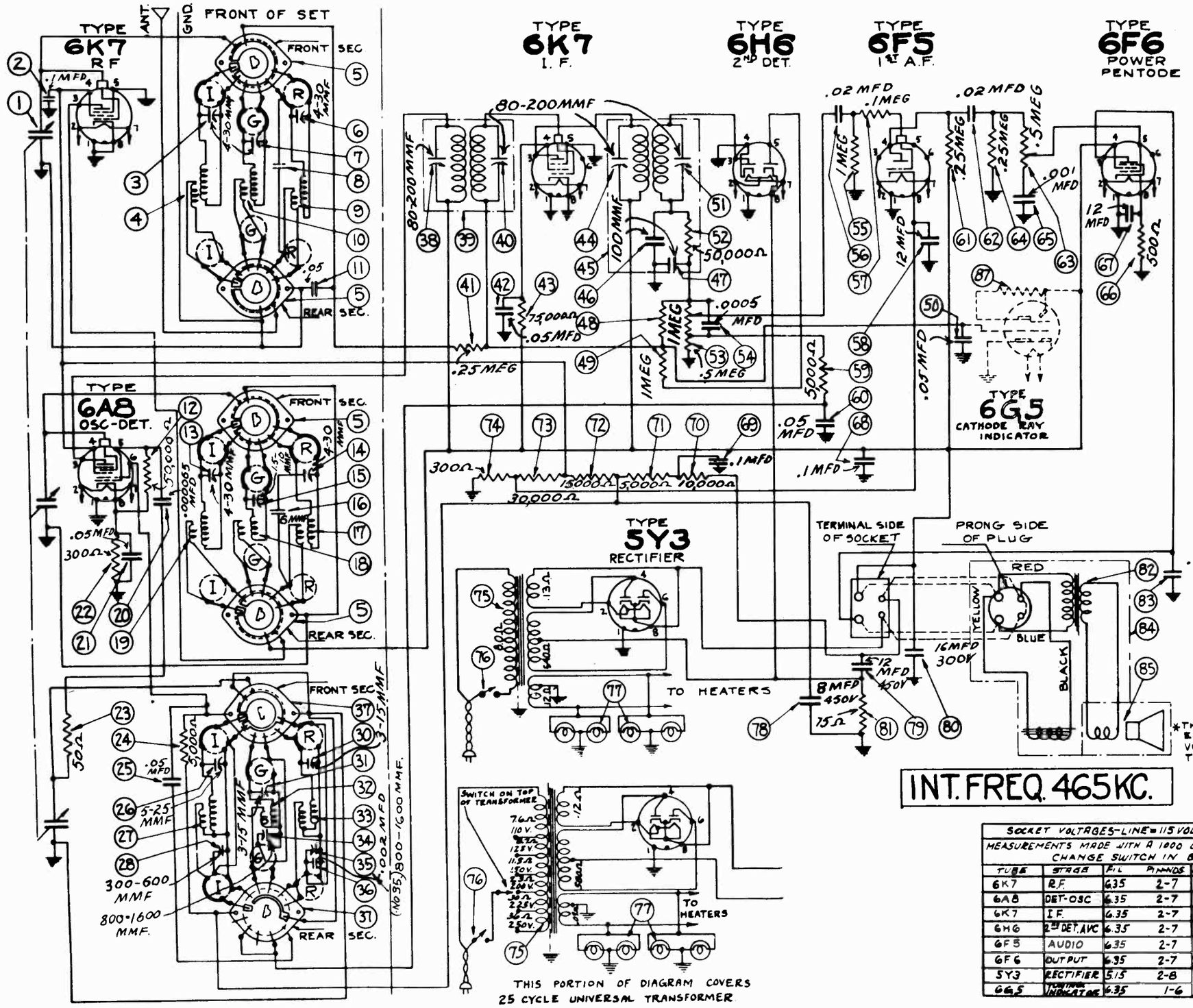


Figure No. 2

MODELS WR-212, WR-312
Schematic, Voltage
Resistance

WESTINGHOUSE ELEC. SUPPLY CO.



DC RESIST. N.E.
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION

COIL	D.A.N.º	PRIM	SEC.
I-ANT	4	18.5Ω	3.8Ω
I-RF	.9	0.8	10.7
I-OSC	27	1.4	2.3
G-ANT	10	2.1	1.0
G-RF	18	1.8	1.0
G-OSC	32	0.8	0.8
R-ANT	9	0.7	0.03
R-RF	17	2.0	0.03
R-OSC	33	0.5	0.05
1ST IF	39	8.6	8.6
2ND IF	45	8.6	8.6
OUTPUT TRANS	82	480	0.5
SPKR FIELD		1900	
VOICE COIL	85	3	

*THE CONTROL GRID BIAS ON THE 6K7 & 6G5 TUBES EQUAL TO APPROXIMATE SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.

SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL	PINNOS	PLATE	PINNOS	SCREEN	PINNOS	BIAS	PINNOS
6K7	R.F.	6.35	2-7	263	3-1	94	4-1	* SEE NOTE	
6A8	DET-OSC	6.35	2-7	263 DET. / 247 OSC	3-1 DET. / 4-1 OSC	94	4-1	3.7	8-1
6K7	I.F.	6.35	2-7	263	3-1	103	4-1	* SEE NOTE	
6H6	2ND DET. AVC	6.35	2-7					-5.5	8-1
6F5	AUDIO	6.35	2-7	111	4-1			1.1	8-1
6F6	OUTPUT	6.35	2-7	247	3-1	263	4-1	17.5	8-1
5Y3	RECTIFIER	5.15	2-8	380	8-1				
6G5	TUNING INDICATOR	6.35	1-6	263	2-5			* SEE NOTE	

MODELS WR-212,WR-312

WESTINGHOUSE ELEC. SUPPLY CO.

Socket,Trimmers
Chassis

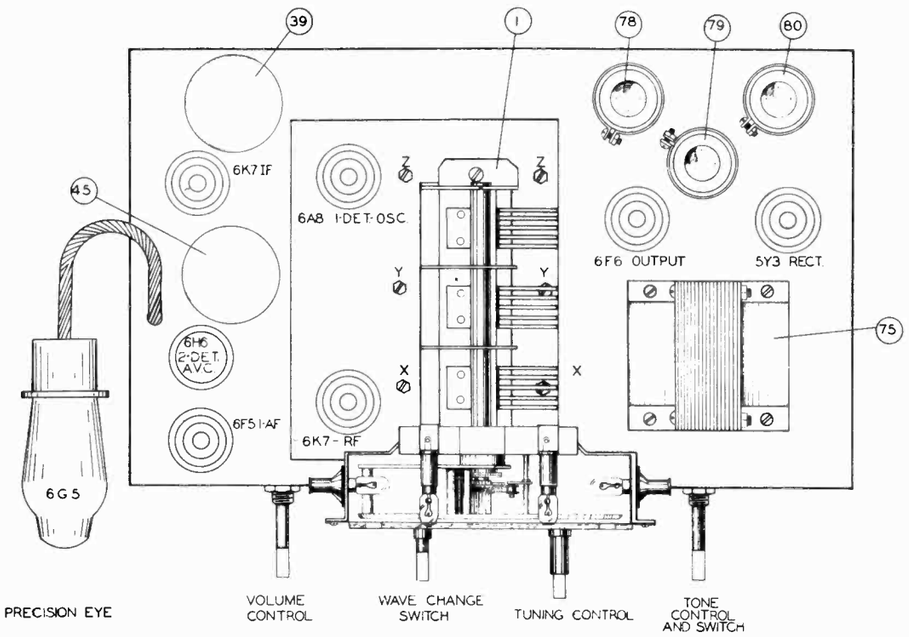


Figure No. 1

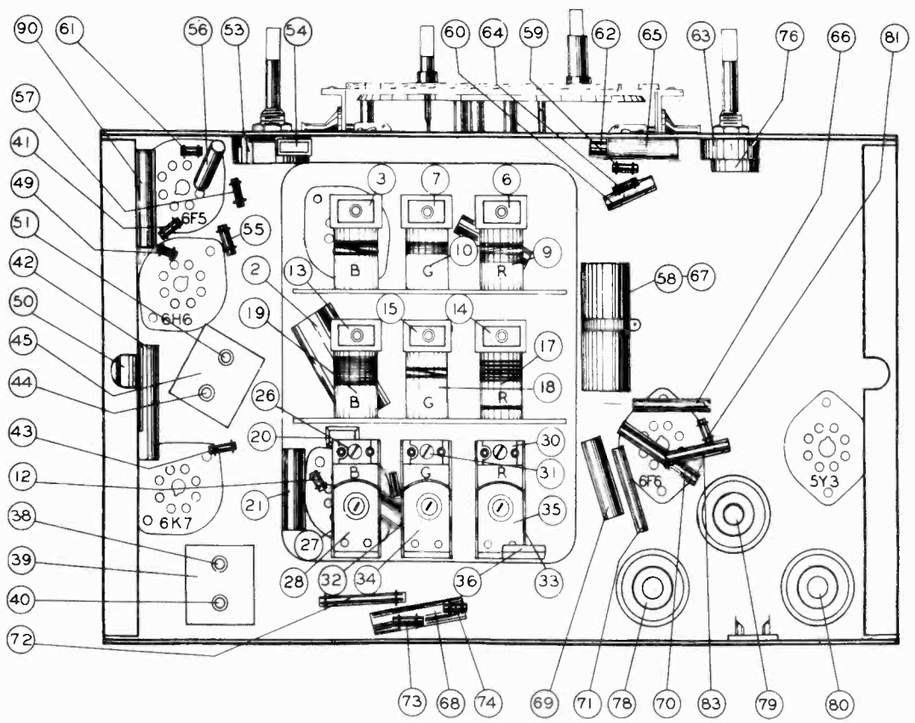


Figure No. 2

MODELS WR-212,WR-312
Alignment,Parts

WESTINGHOUSE ELEC. SUPPLY CO.

Dia.-#	Part #	Description of Parts	List Price
	RC 95214	R.F. coil assembly - green	1.00
	RC 95210	R.F. coil assembly (broadcast)	1.00
	CM 9511	.000065 mfd.mica condenser	.15
	CW 2-05	.05 mfd., 200 V. condenser	.15
	RE 9529	300 ohm, 1/4 W. resistor	.10
	RE 9537	50 ohm, 1/4 W. resistor	.10
	RE 9526	5,000 ohm, 1 W. resistor (1/2 W. size)	.20
	CW 9513	.05 mfd., 200 V. condenser	.25
	RC 95211	5-25 mmf. trimmer condenser - part of CS 9540	.60
		300-600 mmf. oscillator series cond. - part of CS 9540	1.75
		3-15 mmf. trimmer condenser - part of CS 9520	.60
		3-15 mmf. trimmer condenser - part of CS 9520	.75
	RC 95213	Oscillator coil - green	.75
	RC 95208	Oscillator coil (broadcast)	1.75
		800-1600 mmf. oscillator series cond. - part of CS 9520	2.25
		800-1600 mmf. oscillator series cond. - part of CS 9520	.75
	CM 959	.002 mfd. mica condenser	.25
	SW 9554	Switch and bracket assembly - oscillator section	1.50
	IC 9576	First I.F. coil assembly - 465 KC.	1.50
		80-200 mmf. trimmer condenser - part of IC 9576	
	RE 9573	.25 meg., 1/8 W. resistor	.10
	CW 2-25	.25 mfd., 200 V. trimmer condenser	.20
	SA 105277	75,000 ohm, 1/4 W. resistor	.15
		80-200 mmf. trimmer condenser - part of IC 9577	
	IC 9577	Second I.F. coil assembly - 465 KC.	1.85
		100 mmf. mica condenser - part of IC 9577	
		1 meg., 1/4 W. resistor - part of IC 9577	.15
	SA 105281	1 meg., 1/4 W. resistor	.15
	SA 105281	80-200 mmf. trimmer condenser - part of IC 9577	.15
	CW 2-05	.06 mfd., 200 V. condenser	.15
		50,000 ohm, 1/4 W. resistor - part of IC 9577	
	VR 9536	Volume control - .5 meg.	.85
	CM 9519	.0005 mfd. mica condenser	.20
	SA 105281	1 meg., 1/4 W. resistor	.15
	CW 2-02	.02 mfd., 200 V. condenser	.15
	RE 9584	.1 meg., 1/4 W. resistor	.15
		12 mfd., 25 V. condenser - part of CE 9526	.90
	SA 105849	5,000 ohm, 1/4 W. resistor	.15
	CW 2-05	.05 mfd., 200 V. condenser	.15
	RE 9573	.25 meg., 1/8 W. resistor	.10
	CW 4-02	.02 mfd., 400 V. condenser	.15
	VR 9512	Tone control - .5 meg.	1.10
	RE 9585	.25 meg., 1/4 W. resistor	.15
	CW 2-001	.001 mfd., 200 V. condenser	.15
	SA 107591	500 ohm, 1 W. resistor	.20
		12 mfd., 25 V. condenser - part of CE 9526	.90
	CM 4-10	.1 mfd., 400 V. condenser	.15
	CW 4-10	.1 mfd., 400 V. condenser	.25
	SA 103835	10,000 ohm, 2 W. resistor	.20
	SA 107572	5,000 ohm, 1 W. resistor	.20
	SA 101404	15,000 ohm, 1 W. resistor	.20
	SA 104966	30,000 ohm, 1/2 W. resistor	.15
	SA 105260	300 ohm, 1/4 W. resistor	.15
	TR 9557	Power transformer - 105-125 V., 50-60 cycle	4.00
		Switch (On & Off) - part of VR 9512	
	LP 9515	Dial lamp - 3.5 V., .35 amp.	.20
	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
	CE 9535	12 mfd., 450 V. electrolytic condenser	.80
	CE 9536	12 mfd., 25 V. electrolytic condenser	.75
		37 mfd., 25 V. electrolytic condenser	.75
	TR 9558	Output transformer	.15
	CW 4-005	.005 mfd., 400 V. condenser	1.25
	SK 9511	Speaker	7.50
	SA 107282	Diaphragm	1.15
		1 meg., 1/4 W. resistor - part of CB 9598	
	CB 9512	Line cable assembly	.50
	CB 9598	"Precision eye" cable assembly	.70
	CW 2-05	.05 mfd., 200 V. condenser	.15

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ... 2 #6K7,1 #6A8,1 #6H6,1 #6F5,1 #6F6,1 #6G5,1 #5Y3 - Total 8
Power Supply ..... 105 to 125 volts, 50 to 60 cycles, A.C.
Power Consumption ..... 75 Watts
Maximum Output ..... 2.5 Watts
Maximum Undistorted Output ..... (White Band - 525 to 1800 KC.
Tuning Ranges ..... (Green Band - 1750 to 6000 KC.
(Red Band - 5800 to 18500 KC.
Line-Up Frequencies .. I.F.465 KC.,1600 KC.,570 KC.,5500 KC.,1900 KC.,17000 KC.,&6000 KC.

LINE-UP CAPACITOR ADJUSTMENTS

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on fully turn tone control to the high position, the wave change switch to the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC. and adjust its output to produce a measureable reading on output meter when test signal is applied to the grid of the 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmers #44 and #51 to maximum output of test oscillator as required.
5. Apply signal to grid of 6A8 detector-oscillator and adjust #38 and #40 to maximum output.

ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to the White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 KC.
3. Apply test signal to antenna terminal of chassis through a .0002 mfd. series condenser and adjust #26, #13 and #3 to maximum output.
4. Set test oscillator and dial indicator to 570 KC. and adjust #28 to maximum output, at the same time rocking the variable tuning condenser.
5. Return to 1600 KC. setting with both test oscillator and dial indicator and readjust #26, #13 and #3 for accuracy.

ADJUSTMENT OF GREEN BAND

NOTE: In adjusting the two short-wave bands (Green and Red) a .0002 mfd. conden-

ser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set wave change switch to the Green Band position.
2. Set test oscillator and dial indicator to 5800 KC. and adjust #31, #15 and #7 to maximum output.
3. Set test oscillator and dial indicator to 1900 KC. and adjust #34 to maximum output, at the same time rocking the variable tuning condenser.
4. Return to 5500 KC. setting and make readjustment of #31, #15 and #7.

ADJUSTMENT OF RED BAND

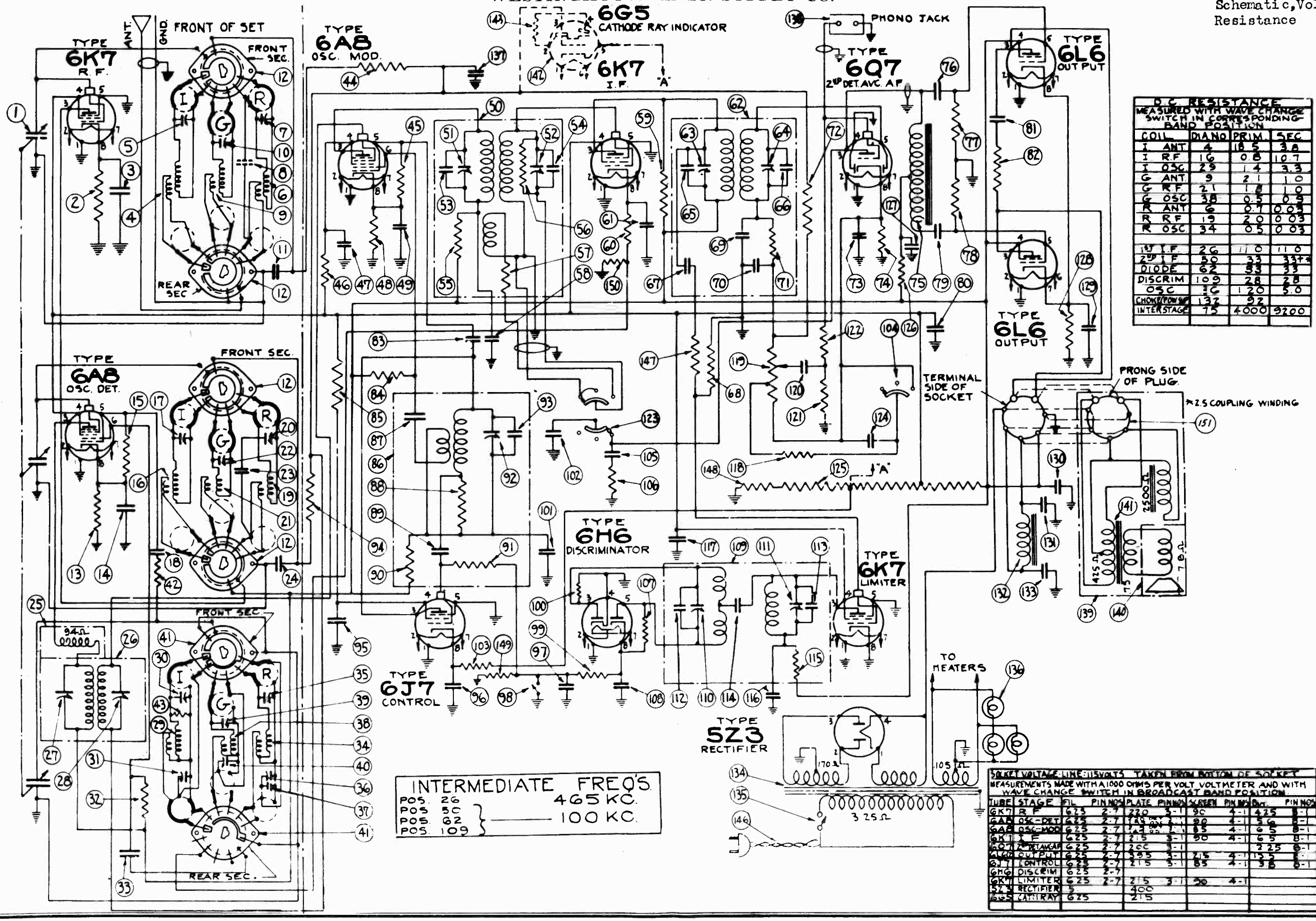
1. Set wave change switch to the Red Band position.
2. Set test oscillator and dial indicator to 17000 KC. and adjust #30, #14 and #6 to maximum output.
3. Set test oscillator and dial indicator to 6000 KC. and adjust #35 to maximum output, at the same time rocking the variable tuning condenser.
4. Return to 17000 KC. setting and make readjustment of #30, #14 and #6.

IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic condenser will come out through the air vents making the condenser appear to be defective. If this position too long the condenser may be injured.

Dia.-#	Part #	Description of Parts	PRICES SUBJECT TO CHANGE WITHOUT NOTICE
1	CG 9550	Variable condenser	4.50
2	CW 2-50	.5 mfd., 200 V. condenser	.15
3	CS 9554	4-30 mmf. trimmer condenser	.15
4	RC 95209	Antenna coil (broadcast)	1.00
5	SW 9563	Switch and bracket assembly - Antenna & R.F. Sections	1.40
6	CS 9554	4-30 mmf. trimmer condenser	.15
7	CS 9554	4-30 mmf. trimmer condenser	.15
8		Twisted wire - part of RC 95206	
9	RC 95208	Antenna coil - red band	.95
10	RC 95212	Antenna coil - green band	.80
11	CW 9513	.05 mfd., 200 V. condenser	.25
12	RE 9563	50,000 ohm, 1/4 W. resistor	.10
13	CS 9554	4-30 mmf. trimmer condenser	.15
14	CS 9554	4-30 mmf. trimmer condenser	.15
15	CS 9553	1.5-10 mmf. trimmer condenser	.15
16	CM 9512	6 mmf. mica condenser	.15
17	RC 95207	R.F. coil assembly - red	1.25

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR-315
Schematic, Voltage
Resistance



D.C. RESISTANCE MEASURED WITH WAVE CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIANO	PRIM	SEC
I ANT	4	18 5	3.8
I RF	16	0 8	10.7
I OSC	29	1.4	3.3
G ANT	9	2.1	1.0
G RF	21	1.8	1.0
G OSC	38	0.5	0.9
R ANT	6	0.7	0.05
R RF	19	2.0	0.03
R OSC	34	0.5	0.03
1ST I.F.	26	11.0	11.0
2ND I.F.	50	33	33Ω
DIODE	62	33	33
DISCRIM	109	28	28
OSC	16	1.20	5.0
CHOKE/POWER	137	92	
INTERSTAGE	75	4000	9200

INTERMEDIATE FREQ'S.
POS. 26 } 465 KC.
POS. 50
POS. 62 } 100 KC.
POS. 109

SOCKET VOLTAGE-LINE: 115 VOLTS TAKEN FROM BOTTOM OF SOCKET
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL	PIN NO'S	PLATE	PIN NO'S	SCREEN	PIN NO'S	CAT.	PIN NO'S
6K7	R F	6.25	2-7	220	5-1	90	4-1	4.25	8-1
6A8	OSC-DET	6.25	2-7	180 MAX	5-1	80	4-1	3.6	8-1
6A8	OSC-MOD	6.25	2-7	1.3 MA	5-1	65	4-1	6.5	8-1
6K7	I F	6.25	2-7	215	5-1	90	4-1	6.5	8-1
6Q7	2ND DET AVC AF	6.25	2-7	100	5-1			2.25	8-1
6L6	OUTPUT	6.25	2-7	395	5-1	215	4-1	13.2	8-1
6J7	CONTROL	6.25	2-7	215	5-1	85	4-1	3.6	8-1
6H6	DISCRIM	6.25	2-7						
6K7	LIMITER	6.25	2-7	215	5-1	90	4-1		
5Z3	RECTIFIER	5		400					
6G5	CATH RAY	6.25		275					

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ------ 3 #6K7, 2 #6A8, 1 #6Q7, 2 #6L6, 1 #6H6, 1 #6J7, 1 #5Y3, 1 #6G5 - Total 12

Power Supply Characteristics ---------- 105 to 125 volt, 50 to 60 cycle A.C.
Power Consumption ---------- 125 Watts
Maximum Output ---------- 21 Watts
Maximum Undistorted Output ---------- 12.5 Watts

Tuning Ranges ---------- (White Band - 525 to 1,800 KC. (Green Band - 1750 to 6,000 KC. (Red Band - 5800 to 18,500 KC.

Line-Up Frequencies ---------- 100 KC., 465 KC., 1600 KC., 570 KC., 5500 KC., 1900 KC., 17,000 KC., and 6000 KC.

GENERAL DESCRIPTION

This model is a twelve-tube, three-band, superheterodyne receiver and incorporates a new feature known as automatic frequency control. With this type of circuit, when the receiver is tuned within 7 kilocycles either side of the station being received, the station automatically will be brought into almost perfect tune or in better tune than is usually possible with the eye or ear. This feature will overcome considerable distortion which is caused by the customer's tuning the receiver on one of the side bands.

The receiver is a double superheterodyne and is conventional to the grid of the type 6A8 oscillator-modulator. This tube converts the 465 KC. I.F. to a second I.F. frequency of 100 KC. The automatic frequency control works by automatically changing the frequency of this second oscillator.

From the output of the oscillator-modulator the signal is fed through a conventional 1.F. to the A.V.C., detector and audio system.

The signal is also fed from the output of the I.F. to the type 6K7 limiter tube which is so connected as to give fairly even output, regardless of input. This will then give the same amount of control, regardless of the strength of the station being received. The signal is then fed to the discriminator type 6H6 tube which is connected to the grid of the type 6J7 control tube. In the discriminator circuit voltages are developed either positive or negative, depending on which side of resonance the set is tuned. This change of bias on the control tube (6J7) will cause this tube to change the frequency of the oscillator to bring the set into tune.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of the receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied when the individual circuits are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal. It is also necessary to use an 0-5 microammeter in order to align the discriminator circuits.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F., CONTROL OSCILLATOR AND DISCRIMINATOR

1. Set the volume control on full and turn the bass control to the bass position (position immediately after set is turned .

2. Connect the output meter across the voice coil of the speaker.

3. Set the test oscillator to 100 KC., and adjust the output to give a readable deflection on the output meter when the signal is applied to the grid of the 6K7 I.F. amplifier tube through a 0.5 mfd. blocking condenser.

4. Connect a 10,000 ohm resistor across the primary winding of the third I.F. coil #62. This should be connected to terminals marked "A" and "B" in Figure #2.

5. Adjust trimmer #64 to maximum output, reducing the output of the test oscillator as required.

6. Remove the 10,000 ohm resistor from the primary side of I.F. coil #62 and connect across the secondary winding from terminals marked "C" and "D".

7. Adjust trimmer #63 to maximum output, reducing the output of the test oscillator as required. Remove 10,000 ohm resistor.

8. Turn switch #98 to the left-hand position (viewed from rear of chassis).

9. Set the output of the test oscillator to a high level.

10. Connect a 0 to 5 microammeter across resistor #149 and adjust trimmer condenser #111 to maximum swing of the microammeter, keeping the output of the signal generator set to apoint which will give a deflection of approximately 5 microamperes when condenser #111 is tuned to maximum deflection. WHEN THE SIGNAL GENERATOR IS SET TO THIS OUTPUT, DO NOT ALTER THE OUTPUT OF THE SIGNAL GENERATOR UNTIL THE ALIGNMENT OF THE DISCRIMINATOR CIRCUIT IS COMPLETED.

11. Adjust trimmer #110 until the microammeter reading is reduced exactly to zero.

12. Turn switch #98 to the right-hand position and proceed with the alignment of the I.F.

13. Apply the test signal to the grid of the 6A8 oscillator-modulator tube.

14. Connect the 10,000 ohm resistor across the primary of I.F. coil #50 by connecting it to the terminals marked "E" and "F" in Figure #2.

15. Adjust trimmer #52 to maximum output, reducing the output of the test oscillator as required.

16. Remove the 10,000 ohm resistor and connect across the secondary of I.F. transformer #50. Connect to terminals marked "G" and "H".

17. Adjust trimmer #51 to maximum output, reducing the output of the test oscillator as required.

18. Remove the 10,000 ohm resistor.

19. Set the test oscillator to 465 KC., and adjust the control oscillator trimmer #92 to maximum output.

20. Apply the test signal to the grid of the type 6A8 oscillator-detector tube.

21. Connect the 10,000 ohm resistor across the primary of I.F. transformer #26 by connecting it to the points marked "J" and "K" in Figure #2.

22. Adjust trimmer #28 to maximum output, reducing the output of the test oscillator as required.

23. Remove the 10,000 ohm resistor and connect across the secondary of the I.F. transformer #26 by connecting it to the points marked "L" and "M" in Figures #1 and #2.

24. Adjust trimmer #27 to maximum output, reducing the output of the test oscillator as required. Remove the 10,000 ohm resistor.

ADJUSTMENT OF BROADCAST BAND

1. Set the wave-change switch to the White or Broadcast Band position.

2. Set the test oscillator and dial indicator to 1600 KC.

3. Apply the test signal to the antenna terminal of the chassis through a .0002 mfd. series condenser and adjust the oscillator trimmer condenser #30 until the signal is received at a maximum.

4. Adjust trimmers #17 and #5 to maximum output.

5. Set the test oscillator and dial indicator to 570 KC., and adjust the oscillator series condenser #31 to maximum output, at the same time rocking the condenser gang.

6. Return both the test oscillator and dial indicator to 1600 KC., and check the adjustment of trimmers #30, #17 and #5 for accuracy.

ADJUSTMENT OF GREEN BAND

NOTE: In adjusting the two short-wave bands (Green and Red) a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set the wave-change switch to the Green Band position.

2. Set the test oscillator and dial indicator to 5500 KC., and adjust the oscillator trimmer condenser #39 until the signal is received at a maximum.

3. Adjust trimmer condensers #22 and #10 to maximum output.

4. Set the test oscillator and dial indicator to 1900 KC., and adjust the oscillator series condenser #40 to maximum output, at the same time rocking the condenser gang.

5. Return both the test oscillator and dial indicator to 5500 KC., and check the adjustment of trimmers #39, #22 and #10 for accuracy.

ADJUSTMENT OF RED BAND

1. Set the wave-change switch to the Red Band position.

2. Set the test oscillator and dial indicator to 17000 KC., and adjust the oscillator trimmer condenser #35 until the signal is received.

NOTE: When adjusting the oscillator trimmer condenser #35 it will be possible to secure two peaks. The peak secured with the trimmer screw turned farthest out should be used. When aligned on the correct peak a strong signal will be heard at 17000 KC., and a weaker signal at approximately 16000 KC. No signal should be heard at 18000 KC.

3. Adjust trimmer condensers #20 and #7 to maximum output.

4. Set the test oscillator and dial indicator to 6000 KC., and adjust the oscillator series condenser #36 to maximum output, at the same time rocking the condenser gang.

5. Return both the test oscillator and dial indicator to 17000 KC., and check adjustment of trimmers #35, #20 and #7 for accuracy.

IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condensers will come out through the air vents, making the condenser appear to be defective. If left in this position too long the condenser may be injured.

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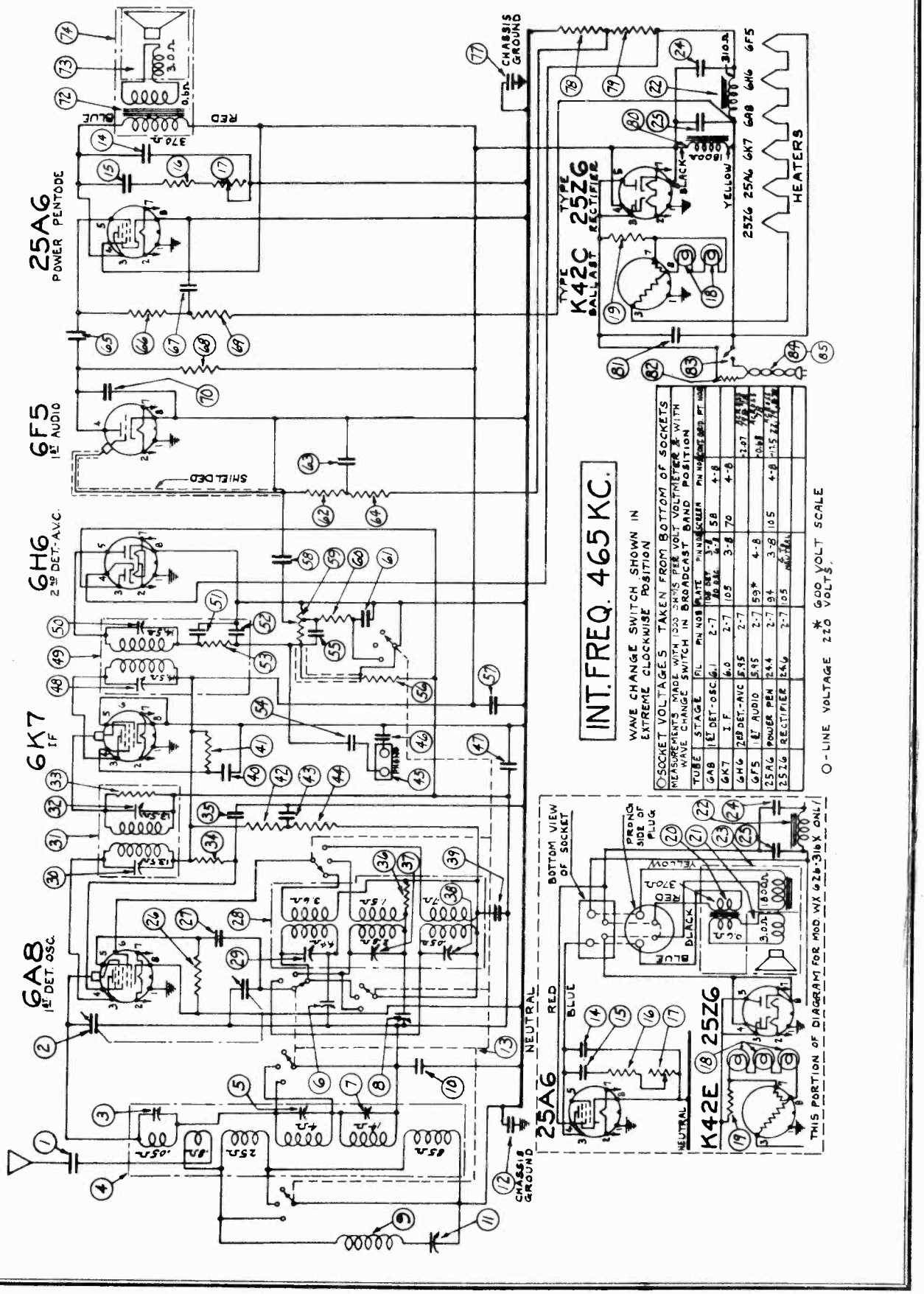
Dia. #	Part #	Description of Parts	List Price
1	CG 9551	Variable condenser	$ 4.50
2	RE 95102	600 ohm, 1/4 W. resistor	.15
3	CW 2-05	.05 mfd., 200 V. condenser	.15
4	RC 95209	Antenna coil - Broadcast	1.00
5	CS 9554	4-30 mmf. trimmer condenser	.15
6	RC 95206	Antenna coil - Red Band	.95
7	CS 9554	4-30 mmf. trimmer condenser	.15
8		Twisted wire - part of RC 95206	
9	RC 95212	Antenna coil - Green Band	.80
10	CS 9554	4-30 mmf. trimmer condenser	.15
11	CW 9513	.05 mfd., 200 V. condenser	.25
12	SW 9553	Switch and bracket assembly - antenna and R.F. sections	1.40
13	RE 95102	600 ohm, 1/4 W. resistor	.15
14	CW 2-05	.05 mfd., 200 V. condenser	.15
15	RE 9563	50,000 ohm, 1/2 W. insulated resistor	.15
16	RC 95210	R.F. coil - Broadcast	1.00
17	CS 9554	4-30 mmf. trimmer condenser	.15
18	CM 9511	.000065 mfd. mica condenser	.15
19	RC 95207	R.F. coil - Red Band	1.25
20	CS 9554	4-30 mmf. trimmer condenser	.15
21	RC 95214	R.F. coil - Green Band	1.00
22	CS 9553	1.5-10 mmf. trimmer condenser	.15
23	CM 9512	6 mmf. mica condenser	.15
24	CW 9513	.05 mfd., 200 V. condenser	.25
25	RC 95266	Choke coil assembly	.60
26	IC 9582	1st I.F. coil (465 KC.)	2.35
27		35-130 mmf. trimmer condenser - part of IC 9582	
28		35-130 mmf. trimmer condenser - part of IC 9582	
29	RC 95272	Oscillator coil - Broadcast	2.25
30		5-25 mmf. trimmer condenser - part of CS 9540	.60
31		300-600 mmf. trimmer condenser - part of CS 9540	.60
32	RE 9526	5000 ohm, 1 W. resistor	.20
33	CW 9513	.05 mfd., 200 V. condenser	.25
34	RC 95208	Oscillator coil - Red Band	2.25
35		3-15 mmf. trimmer condenser - part of CS 9520	.75
36		800-1600 mmf. trimmer condenser - part of CS 9520	.75
37	CM 959	.002 mfd. mica condenser	.25
38	RC 95213	Oscillator coil - Green Band	1.75
39		3-15 mmf. trimmer condenser - part of CS 9520	.75
40		800-1600 mmf. trimmer condenser - part of CS 9520	.75
41	SW 9554	Switch and bracket assembly - oscillator section	1.50
42	RE 9537	50 ohm, 1/4 W. resistor	.10
43	RE 95125	20,000 ohm, 1/2 W. insulated resistor	.10
44	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
45	RE 9563	50,000 ohm, 1/2 W. insulated resistor	.15
46	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
47	CW 2-05	.05 mfd., 200 V. condenser	.15
48	RE 9567	600 ohm, 1/2 W. insulated resistor	.15
49	CW 2-05	.05 mfd., 200 V. condenser	.15
50	IC 9584	2nd I.F. coil (100 KC.)	2.60
51		80-200 mmf. trimmer condenser - part of IC 9584	
52		80-200 mmf. trimmer condenser - part of IC 9584	
53	CM 9528	350 mmf. mica condenser	.20
54	CM 9528	350 mmf. mica condenser	.20
55	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
56	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
57	RE 95104	75 ohm, 1/2 W. insulated resistor	.10
58	CW 4-05	.05 mfd., 400 V. condenser	.15
59	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
60	RE 9567	600 ohm, 1/2 W. insulated resistor	.15
61	CW 2-05	.05 mfd., 200 V. condenser	$ .15
62	IC 9585	3rd I.F. coil (100 KC.)	2.75
63		80-200 mmf. trimmer condenser - part of IC 9585	
64		80-200 mmf. trimmer condenser - part of IC 9585	
65	CM 9528	350 mmf. mica condenser	.20
66	CM 9528	350 mmf. mica condenser	.20
67	CM 953	50 mmf. mica condenser	.15
68	RE 95105	1 meg., 1/2 W. insulated resistor	.15
69		100 mmf. mica condenser - part of IC 9585	
70		100 mmf. mica condenser - part of IC 9585	
71	RE 9524	50,000 ohm, 1/4 W. resistor	.10
72	RE 95113	1/2 meg., 1/2 W. insulated resistor	.10
73	CE 9515	12 mfd., 25 V. electrolytic condenser	.65
74	RE 95114	2000 ohm, 1/2 W. insulated resistor	.10
75	TR 9579	Interstage transformer	3.00
76	CW 4-02	.02 mfd., 400 V. condenser	.15
77	RE 95112	1/4 meg., 1/2 W. insulated resistor	.10
78	RE 95112	1/4 meg., 1/2 W. insulated resistor	.10
79	CW 4-02	.02 mfd., 400 V. condenser	.15
80	CW 2-05	.05 mfd., 200 V. condenser	.15
81	CW 4-005	.005 mfd., 400 V. condenser	.15
82	RE 95111	20,000 ohm, 1 W. insulated resistor	.15
83	CM 953	50 mmf. mica condenser	.15
84	RE 95110	15,000 ohm, 1 W. insulated resistor	.15
85	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
86	RC 95265	Oscillator coil (365 KC.)	2.40
87	CM 9519	500 mmf. mica condenser	.20
88	RE 95107	75 ohm, 1/8 W. resistor	.10
89	CM 953	50 mmf. mica condenser	.15
90	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
91	RE 95105	1 meg., 1/2 W. insulated resistor	.15
92		45-135 mmf. trimmer condenser - part of RC 95265	
93	CM 956	250 mmf. mica condenser	.20
94	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
95	CW 2-05	.05 mfd., 200 V. condenser	.15
96	CW 2-05	.05 mfd., 200 V. condenser	.15
97	CW 9525	1 mfd., 100 V. condenser	.40
98	SW 9563	A. F. C. switch	.45
99	RE 95105	1 meg., 1/2 W. insulated resistor	.15
100	RE 95105	1 meg., 1/2 W. insulated resistor	.15
101	CW 4-05	.05 mfd., 400 V. condenser	.15
102	CW 4-01	.01 mfd., 400 V. condenser	.15
103	RE 95126	300 ohm, 1/2 W. insulated resistor	.10
104	VR 9542	Bass control	.70
105	CW 4-02	.02 mfd., 400 V. condenser	.15
106	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
107	RE 95105	1 meg., 1/2 W. insulated resistor	.15
108	CW 2-05	.05 mfd., 200 V. condenser	.15
109	IC 9583	Discriminator coil	3.75
110		80-200 mmf. trimmer condenser - part of IC 9583	
111		80-200 mmf. trimmer condenser - part of IC 9583	
112	CM 9528	350 mmf. mica condenser	.20
113	CM 9528	350 mmf. mica condenser	.20
114	CM 9519	500 mmf. mica condenser	.20
115	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
116	CW 4-05	.05 mfd., 400 V. condenser	.15
117	CW 2-05	.05 mfd., 200 V. condenser	.15
118	RE 95124	5000 ohm, 1/2 W. insulated resistor	.10
119	VR 9536	Volume control - 1/2 meg.	.85
120	CW 4-02	.02 mfd., 400 V. condenser	.15
121	RE 95105	1 meg., 1/2 W. insulated resistor	.15
122	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
123	SW 9564	Treble control	.60
124	CW 2-05	.05 mfd., 200 V. condenser	.15
125	RE 9597	140-4500-4500 ohm tapped resister	1.10
126	RE 95124	5000 ohm, 1/2 W. insulated resistor	.10
127	CW 4-25	.25 mfd., 400 V. condenser	.20
128	RE 9598	170 ohm, 4 W. resistor	.35
129	CE 9515	12 mfd., 25 V. electrolytic condenser	.65
130	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
131	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
132	TR 9573	Choke coil	1.65
133	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
134	TR 9580	Power transformer	6.75
135		On-Off switch - part of VR 9542	
136	LP 9515	Dial lamp (3.2 V., - 0.35 amp.)	.20
137	CW 2-05	.05 mfd., 200 V. condenser	.15
138	SA 100050	Phono-jack	.10
139	SK 9546	Speaker	12.50
140	DM 9518	Diaphragm and voice coil	4.75
141	TR 9595	Output transformer	2.25
142	CB 9598	Cable to "precision eye"	.70
143		1 meg., 1/4 W. resistor - part of CB 9598	
146	CB 9512	Line cable	.50
147	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
148	RE 9556	25 ohm, 1/4 W. resistor	.15
149	RE 95113	1/2 meg., 1/2 W. insulated resistor	.10
150	RE 95108	3000 ohm, 1/2 W. insulated resistor	.10
151	PG 9567	Speaker plug	.30

WESTINGHOUSE ELEC. INTERNATIONAL CO.

MODELS WR-116, WR-116X, WR-316, WR-316X

Schematic, Voltage



LINE-UP CAPACITOR ADJUSTMENTS
MODELS WR-116X and WR-316X

ADJUSTMENT OF I.F. (465 KC.)

1. Set the volume control to maximum position, the tone control to treble position, the wave-change switch on Broadcast and the dial indicator at approximately 600 KC.
2. Connect the output meter to the terminals of the voice coil.
3. Set the test oscillator to 465 KC., and apply the test signal to the grid of the type 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmer condensers #48 (#36 position on Figure 2 of Form #2563) and #50 (#37 position on Figure 2 of Form #2563) to maximum output.
5. Apply the test signal to the grid of the type 6A8 first detector-oscillator tube and adjust trimmer condensers #30 (#22 position on Figure 2 of Form #2563) and #32 (#23 position on Figure 2 of Form #2563) to maximum output.
6. Connect the test oscillator to the antenna of the receiver and with a strong input signal adjust wave trap trimmer condenser #6 to minimum output.

LONG-WAVE BAND ADJUSTMENT

1. Set the wave-change switch to the long-wave band (White)
2. Set the test oscillator and dial indicator to 350 KC.
3. Apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.
4. Adjust the oscillator trimmer condenser #29 (#14 on Figure 2 of Form #2563) until the signal is received.
5. Adjust the antenna trimmer condenser #7 (#5 on Figure 1 of Form #2563) to maximum output.
6. Set the test oscillator and dial indicator to 165 KC., and adjust the oscillator series condenser #6 (located under chassis in front right-hand corner, viewing the set from the rear) to maximum output, at the same time rocking the variable tuning condenser.
7. Return both the test oscillator and dial indicator to 1400 KC., and check the adjustment of trimmers #29 and #7.

BROADCAST BAND ADJUSTMENT

1. Set the test oscillator and dial indicator to 1400 KC.
2. Apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.
3. Adjust oscillator trimmer condenser #37 (#13 position on Figure 2 of Form #2563) until the signal is received.
4. Adjust the preselector trimmer condenser #5 (#4 position on Figure 1 of Form #2563) to maximum output.
5. Set test oscillator and dial indicator to 600 KC., and adjust the oscillator series condenser #6 (#16 position on Figure 1 of Form #2563) until the signal is received. Tune the receiver to a slightly lower frequency and readjust trimmer #8 to maximum output. If the sensitivity increases, continue this procedure in the same direction until maximum sensitivity is reached. If the sensitivity decreases, try this procedure at slightly higher frequencies until maximum sensitivity is reached.
6. Return test oscillator and dial indicator to 1400 KC., and check adjustment of the oscillator and preselector trimmer condensers.

RED BAND ADJUSTMENT

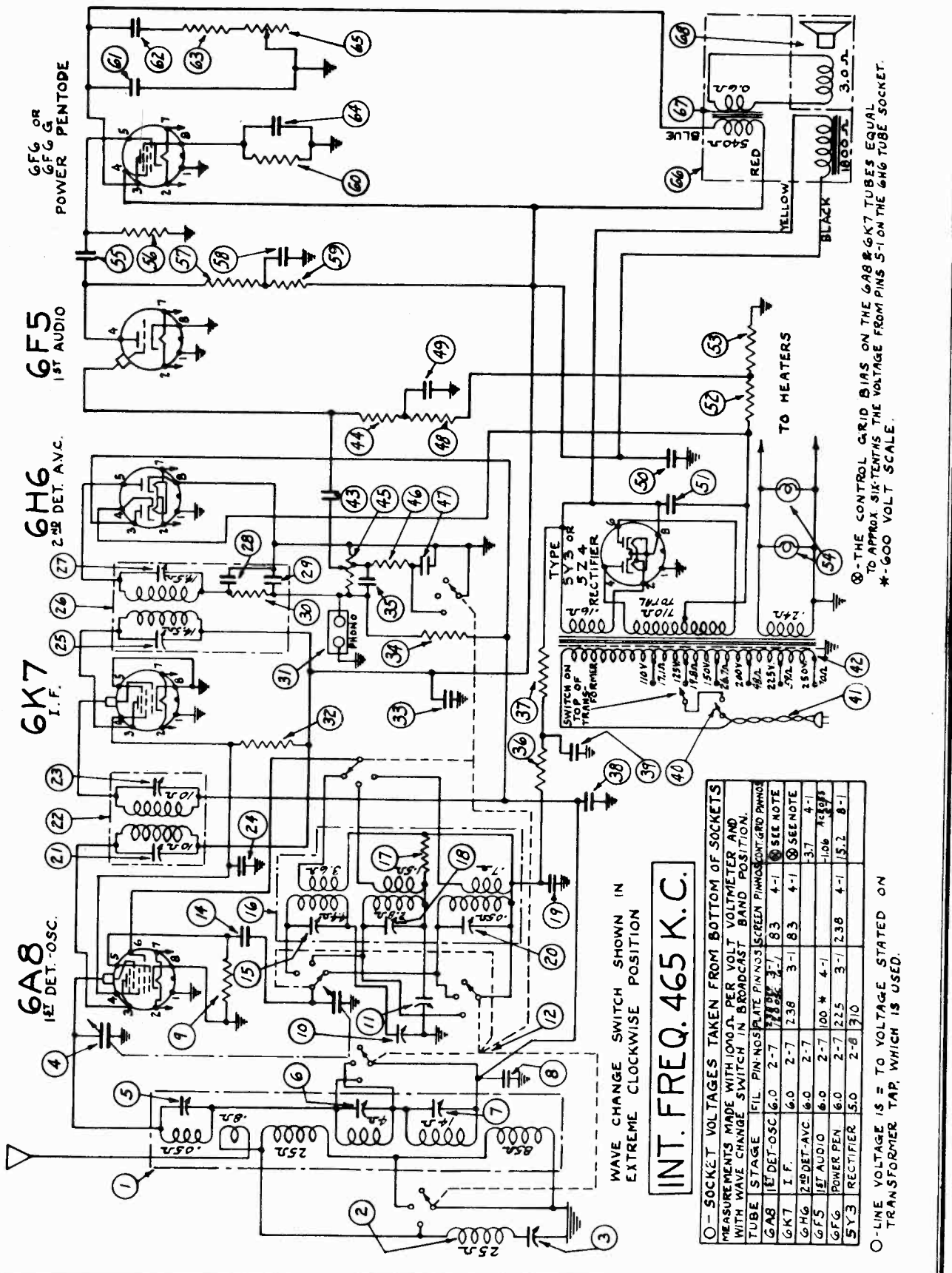
1. Set the wave-change switch to the Red Band position.
2. Set the test oscillator and dial indicator to 15,000 KC., and adjust the oscillator trimmer condenser #58 (#12 position on Figure 2 of For #2563) until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #3 to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

Dia. #	Part #	Description of Parts	List Price
1	SA 103775	.001 mfd. mica condenser	$ .20
2	CG 9549	Variable condenser	2.50
3		4-25 mmf. trimmer condenser - part of RC 95263	
4	RC 95263	Preselector coil assembly	3.50
5		1.5-10 mmf. trimmer condenser - part of RC 95263	
6	CS 9566	150-300 mmf. trimmer condenser	.30
7		4-25 mmf. trimmer condenser - part of RC 95263	
8	CS 9545	300-600 mmf. trimmer condenser	.40
9	RC 9587	Trap coil assembly	.55
10	CW 4-005	.005 mfd., 400 V. condenser	.15
11		30-60 mmf. trimmer condenser - part of RC 9587	
12	CW 6-10	.1 mfd., 600 V. condenser	.20
13	SW 9548	Wave-change switch	1.00
14	CW 4-01	.01 mfd., 400 V. condenser	.15
15	CW 2-05	.05 mfd., 200 V. condenser	.15
16	RE 9550	2000 ohm, 1/4 W. resistor	.15
17	VR 9534	Tone control - 20,000 ohm	.55
18	LP 9516	Dial lamp - (6.3 V., 0.15 Amp.)	.20
19	RE 9520	130 ohm, 25 W. resistor (220-volt models only)	.70
20	TR 9556	Output transformer (Model WR-316X only)	1.35
21	DM 956	Diaphragm and voice coil assembly (Model WR-316 only)	1.25
22	TR 9553	Choke coil	1.10
23	SK 9538	Speaker (Model WR-316X only)	10.00
24	CE 9538	20 mfd., 150 V. electrolytic condenser	.85
25	CE 9539	30 mfd., 150 V. electrolytic condenser	.90
26	RE 9581	50,000 ohm, 1/4 W. resistor	.15
27	SA 106417	.0001 mfd. mica condenser	.20
28	RC 95264	Oscillator coil assembly	2.75
29		30-60 mmf. trimmer condenser - part of RC 95264	
30		30-100 mmf. trimmer condenser - part of IC 9573	
31	IC 9573	1st I.F. coil	2.00
32		30-100 mmf. trimmer condenser - part of IC 9573	
33	RE 9572	500,000 ohm, 1/4 W. resistor	.15
34	RE 9536	20,000 ohm, 1/4 W. resistor	.10
35	CW 2-05	.05 mfd., 200 V. condenser	.15
36	SA 105249	5000 ohm, 1/4 W. resistor	.15
37		4-25 mmf. trimmer condenser - part of RC 95264	
38		1.5-10 mmf. trimmer condenser - part of RC 95264	
39	CM 9524	.0034 mfd. mica condenser	.35
40	CW 2-05	.05 mfd., 200 V. condenser	.15
41	RE 9568	25,000 ohm, 1/4 W. resistor	.10
42	SA 105249	5000 ohm, 1/4 W. resistor	.15
43	CE 9540	4 mfd., 150 V. condenser	.95
44	SA 105249	5000 ohm, 1/4 W. resistor	.15
45	SA 100050	Phono-jack	.10
46	CW 4-25	.25 mfd., 400 V. condenser	.20
47	CW 2-10	.1 mfd., 200 V. condenser (Model WR-116X, 220 V. only)	.15
48		30-100 mmf. trimmer condenser - part of IC 9574	
49	IC 9574	2nd I.F. coil	1.75
50		30-100 mmf. trimmer condenser - part of IC 9574	
51		100 mmf. mica condenser - part of IC 9574	
52		100 mmf. mica condenser - part of IC 9574	
53	RE 9524	50,000 ohm, 1/4 W. resistor	.10
54	CW 6-01	.01 mfd., 600 V. condenser	.15
55	CM 9519	.0005 mfd. mica condenser	.20
56	RE 9577	2 meg., 1/2 W. resistor	.15
57	CW 2-10	.1 mfd., 200 V. condenser	.15
58	CW 4-005	.005 mfd., 400 V. condenser	.15
59	VR 9533	Volume control, 1/2 meg. (Model WR-116X - for 220-Volt operation only)	1.10
60	RE 9568	25,000 ohm, 1/4 W. resistor (Model WR-116X - for 220-Volt operation only)	.10
61	CW 4-01	.01 mfd., 400 V. condenser (Model WR-116X for 220-Volt operation only)	.15
62	RE 9572	500,000 ohm, 1/4 W. resistor	.15
63	CW 2-10	.1 mfd., 200 V. condenser	.15
64	RE 9572	500,000 ohm, 1/4 W. resistor	.15
65	CW 4-01	.01 mfd., 400 V. condenser	.15
66	RE 9572	500,000 ohm, 1/4 W. resistor	.15
67	CW 9525	1 mfd., 100 V. condenser	.40
68	RE 9531	250,000 ohm, 1/4 W. resistor	.10
69	RE 9534	100,000 ohm, 1/4 W. resistor	.10
70	CM 9519	.0005 mfd. mica condenser	.20
72	TR 9554	Output transformer (Model WR-116X for 220-Volt operation only)	1.25
73	SA 106617	Diaphragm and voice coil assembly (Model WR-116X for 220-Volt operation only)	1.15
74	SK 9532	Speaker assembly (Model WR-116X for 220-Volt operation only)	6.50
77	CW 6-10	.1 mfd., 600 V. condenser	.20
78	RE 9571	15 ohm, 1/4 W. resistor	.15
79	RE 9556	25 ohm, 1/4 W. resistor	.15
80		Field coil - part of SK 9532	
81	CW 2-10	.1 mfd., 200 V. condenser	.15
82		160 ohm resistor - part of CB 9597 (Models WR-116X and WR-316X for 220-Volt operation)	
83		On-off switch - part of VR 9535 (Model WR-316X only)	
84	CB 95113	Line cable (Models WR-116X and WR-316X for 220-Volt operation only)	2.00
83		On-off switch - part of VR 9533 (Model WR-116X for 220-Volt operation only)	
59	VR 9535	Volume control, 1/2 meg. (Model WR-316X only)	1.10
60	RE 9527	5000 ohm, 1/4 W. resistor (Model WR-316X only)	.10
61	CW 2-05	.05 mfd., 200 V. condenser (Model WR-316X only)	.15
47	CW 2-25	.25 mfd., 200 V. condenser (Model WR-316X only)	.20
85	CB 9512	Line cable (Model WR-116X for 110-Volt operation only)	.50

MODELS WR-211, WR-211A
WR-211X

WESTINGHOUSE ELEC. INTERNATIONAL CO.

Schematic, Voltage



○- SOCKET VOLTAGES TAKEN FROM BOTTOM OF SOCKETS
MEASUREMENTS MADE WITH 1000Ω PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION.

TUBE	STAGE	FIL.	PIN-NOS	PLATE	PIN-NOS	SCREEN	PIN-NOS	CONT. GRID	PIN-NOS
6A8	1ST DET.-OSC	6.0	2-7	270	3-1	83	4-1	⊗ SEE NOTE	
				250	4-1				
6K7	I.F.	6.0	2-7	238	3-1	83	4-1	⊗ SEE NOTE	
6H6	2ND DET.-AVC.	6.0	2-7					-3.7	4-1
6F5	1ST AUDIO	6.0	2-7	100 *	4-1			-1.06 *	
GFG	POWER PEN	6.0	2-7	225	3-1	238	4-1	-15.2	8-1
5Y3	RECTIFIER	5.0	2-8	310					

Type and Number of Tubes	1 #6A8, 1 #6K7, 1 #6H6, 1 #6F5, 1 #6F6, 1 #5Y3 - Total 6
Power Supply Characteristics	(Model WR-211 - - - 120-140 volts, 50-60 cycle A.C. (Models WR-211 and WR-211X - 110-250 volts, 25-60 cycle A.C. (Model WR-211A - - - 105-125 volts, 50-60 cycle A.C.
Power Consumption	(Models WR-211 and WR-211X - 47 Watts (Model WR-211A - - - 62 Watts
Maximum Output	(Models WR-211 and WR-211X - 3 Watts (Model WR-211A - - - 3.6 Watts
Maximum Undistorted Output	(Models WR-211 and WR-211X - 2.4 Watts (Model WR-211A - - - 2.5 Watts

LINE-UP CAPACITOR ADJUSTMENTS MODEL WR-211X

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control to maximum position, the tone control to treble, the wave-change switch on Broadcast and the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC., and apply signal to grid of 6K7 I.F. tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #25 and #27 (#26 position on Figure 2 of Form #2565) to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector-oscillator tube and adjust trimmers #21 and #23 (#22 position on Figure 2 of Form #2565) to maximum output.
6. Apply test signal to antenna of receiver.
7. Adjust trap coil trimmer #3 (#5 position on Figure 1 of Form #2565) to minimum output.

ADJUSTMENT OF LONG-WAVE BAND

1. Set the wave-change switch to the long-wave band position.
2. Set the dial scale and test oscillator to 350 KC., and apply the test signal to the antenna of the receiver through a .0002 mfd. series condenser.
3. Adjust the oscillator trimmer condenser #15 (#14 on Figure 2 of Form #2565) until the signal is received at a maximum.
4. Adjust antenna trimmer #7 (#4 on Figure 1 of Form #2565) to maximum output.
5. Set the test oscillator and dial indicator to 165 KC., and adjust oscillator series condenser #10 (located under base in front right-hand corner, viewing set from rear) to maximum output, at the same time rocking the variable tuning condenser.
6. Return both the test oscillator and dial indicator to 350 KC., and check adjustment of trimmers #15 and #7.

ADJUSTMENT OF BROADCAST BAND (540 to 1500 KC.)

1. Set wave-change switch to standard Broadcast Band position.
2. Set test oscillator and dial indicator to 1400 KC.
3. Apply the test signal to the antenna of the receiver through a .0002 mfd. blocking condenser and adjust the oscillator trimmer condenser #18 (#13 on Figure 2 of Form #2565) until the signal is received.
4. Adjust the preselector trimmer #6 (#3 on Figure 1 of Form #2565) to maximum output.
5. Set the test oscillator and dial indicator to 600 KC., and adjust the oscillator series condenser #11 (#17 on Figure 1 of Form #2565) until the signal is received. Tune the variable condenser to a slightly lower frequency and readjust trimmer #17 to maximum output. If the sensitivity increases, continue this trial and error method in the same direction until no further improvement in sensitivity can be made. If the sensitivity decreases, try this adjustment at slightly higher frequencies.

ADJUSTMENT OF RED BAND

1. Set the wave-change switch to the Red Band position.
2. Set the test oscillator and dial indicator to 15,000 KC., and adjust the oscillator trimmer condenser #15 (#12 on Figure 2 of Form #2565) until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #5 (#5 on Figure 1 of Form #2565) to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

MODEL WR-211A

Position #30 of the wiring diagram of Form #2565 has been replaced by two 1 meg., ½ W. resistors (part #RE 95105) in series and bypassed from the mid-point of these resistors with a .25 mfd., 200 V. condenser (part #CW 2-25) to ground.

Dia. #	Part #	Description of Parts	List Price
36	RE 95105	1 meg., ½ W. insulated resistor	$ .15
39	TR 9586	Power transformer	4.00
55	CE 9554	18 mfd., 450 V. electrolytic condenser	.85
57	RE 95129	18 ohm, ½ W. insulated resistor	.10

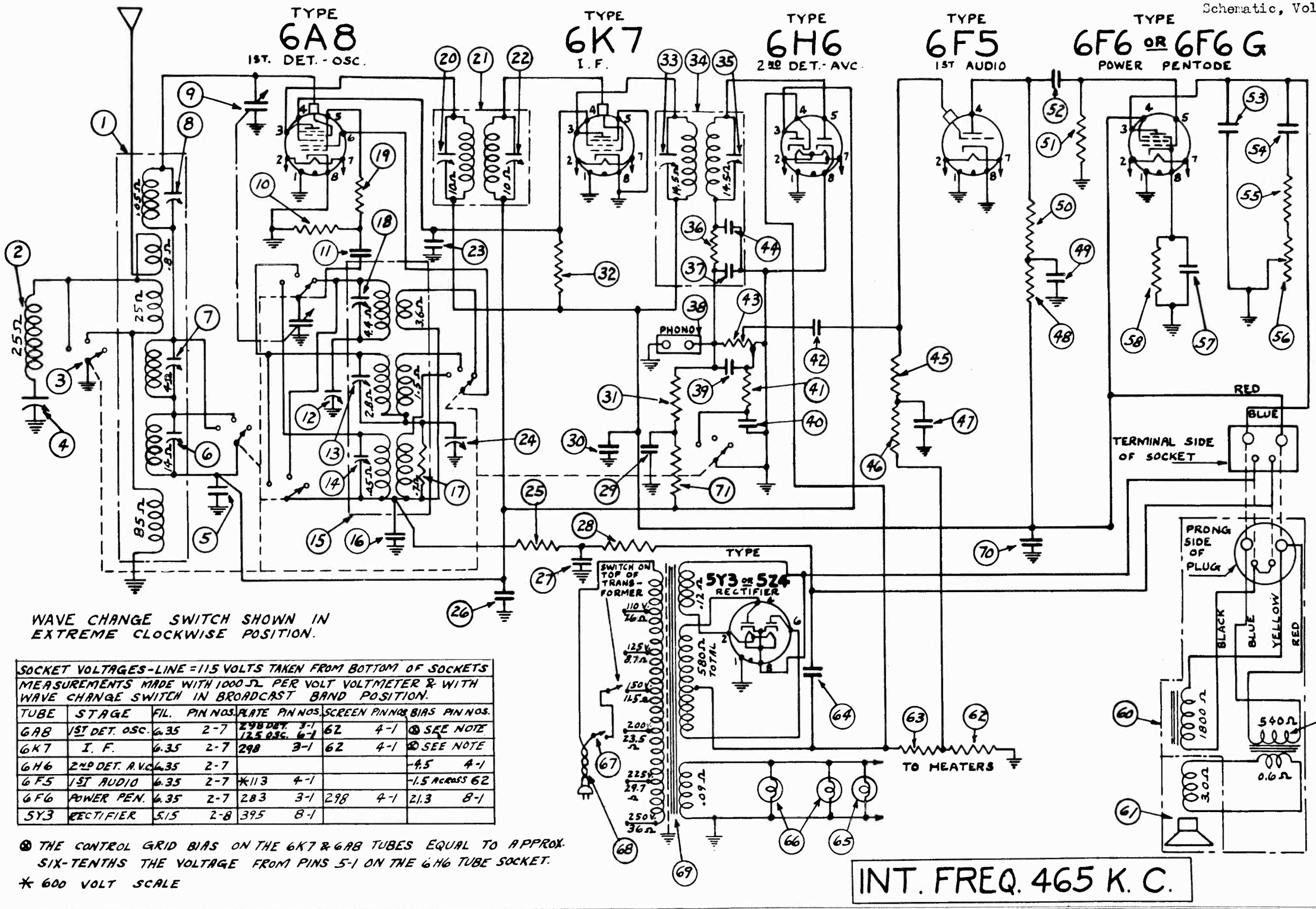
SERVICE PARTS LIST MODEL WR-211X

Dia. #	Part #	Description of Parts	List Price
1	RC 95263	Preselector coil	$ 3.50
2	RC 9587	Trap coil	.55
3		30-60 mmf. trimmer condenser - part of RC 9587	
4	CG 9549	Variable tuning condenser	2.50
5		4-25 mmf. trimmer condenser - part of RC 9563	
6		1.5-10 mmf. trimmer condenser - part of RC 9563	
7		4-25 mmf. trimmer condenser - part of RC 9563	
8	CW 4-005	.005 mfd., 400 V. condenser	.15
9	RE 9575	50,000 ohm, 1/4 W. resistor	.15
10	CS 9566	150-300 mmf. trimmer condenser	.30
11	CS 9545	300-600 mmf. trimmer condenser	.40
12	SW 9548	Wave-change switch	1.00
14	CM 9511	65 mmf. mica condenser	.15
15		30-60 mmf. trimmer condenser - part of RC 95264	
16	RC 95264	Oscillator coil assembly	2.75
17	SA 105249	5000 ohm, 1/4 W. resistor	.15
18		4-25 mmf. trimmer condenser - part of RC 95264	
19	CM 9524	.0034 mfd. mica condenser	.35
20		1.5-10 mmf. trimmer condenser - part of RC 95264	
21		45-135 mmf. trimmer condenser - part of IC 9572	
22	IC 9572	1st I.F. coil	1.35
23		45-135 mmf. trimmer condenser - part of IC 9572	
24	CW 2-10	.1 mfd., 200 V. condenser	.15
25		30-100 mmf. trimmer condenser - part of IC 9574	
26	IC 9574	2nd I.F. coil	1.75
27		30-100 mmf. trimmer condenser - part of IC 9574	
28		100 mmf. mica condenser - part of IC 9574	
29		100 mmf. mica condenser - part of IC 9574	
30	RE 9524	50,000 ohm, 1/8 W. resistor	.10
31	SA 100050	Phono-jack	.10
32	SA 99777	25,000 ohm, 1 W. resistor	.20
33	CW 4-10	.1 mfd., 400 V. condenser	.15
34	RE 9577	2 meg., 1/2 W. insulated resistor	.15
35	CM 9519	.0005 mfd. mica condenser	.20
36	SA 101722	30,000 ohm, 1 W. resistor	.20
37	SA 100825	10,000 ohm, 1/2 W. resistor	.15
38	CW 2-10	.1 mfd., 200 V. condenser	.15
39		4 mfd., 450 V. electrolytic condenser - part of CE 9537	1.25
40		On-off switch - part of VR 9533	
41	CB 9512	Line cable	.50
42	TR 9566	Power transformer	7.00
43	CW 4-02	.02 mfd., 400 V. condenser	.15
44	RE 9574	1 meg., 1/4 W. resistor	.15
45	VR 9533	Volume control - 1/2 meg.	1.10
46	RE 9568	25,000 ohm, 1/4 W. resistor	.10
47	CW 4-01	.01 mfd., 400 V. condenser	.15
48	RE 9575	50,000 ohm, 1/4 W. resistor	.15
49	CW 2-25	.25 mfd., 200 V. condenser	.20
50	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
51	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
52	RE 9537	50 ohm, 1/4 W. resistor	.10
53	RE 9556	25 ohm, 1/4 W. resistor	.15
54	LP 951	Dial lamp - (6-8 Volt, .20 Amp.)	.20
55	CW 4-02	.02 mfd. 400 V. condenser	.15
56	RE 9572	500,000 ohm, 1/4 W. resistor	.15
57	RE 9531	250,000 ohm, 1/8 W. resistor	.10
58	CW 2-10	.1 mfd., 200 V. condenser	.15
59	RE 9581	50,000 ohm, 1/8 W. insulated resistor	.15
60	SA 107391	500 ohm, 1 W. resistor	.20
61	CW 4-005	.005 mfd., 400 V. condenser	.15
62	CW 4-05	.05 mfd., 400 V. condenser	.15
63	RE 9550	2000 ohm, ½ W. resistor	.15
64		10 mfd., 25 V. elect. condenser - part of CE 9537	1.25
65	VR 9534	Tone control - 20,000 ohm	.55
66	SK 9536	Speaker	6.50
67	SA 107357	Output transformer	1.25
68	SA 106617	Diaphragm and voice coil assembly	1.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

WESTINGHOUSE ELEC. INTERNATIONAL CO.

MODELS WR-211U, WR311(Final)
WR-311X
Schematic, Voltage



WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION.

SOCKET VOLTAGES - LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS MEASUREMENTS MADE WITH 1000 Ω PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION.									
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	BIAS	PIN NOS.
6A8	1ST DET. OSC.	6.35	2-7	298 DET. 125 OSC.	3-1 6-1	62	4-1	⊗ SEE NOTE	
6K7	I. F.	6.35	2-7	298	3-1	62	4-1	⊗ SEE NOTE	
6H6	2ND DET. A.V.C.	6.35	2-7					-4.5	4-1
6F5	1ST AUDIO	6.35	2-7	*113	4-1			-1.5 Across 62	
6F6	POWER PEN.	6.35	2-7	283	3-1	298	4-1	21.3	8-1
5Y3	RECTIFIER	5.15	2-8	395	8-1				

⊗ THE CONTROL GRID BIAS ON THE 6K7 & 6A8 TUBES EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.

* 600 VOLT SCALE

WESTINGHOUSE ELEC. INTERNATIONAL CO

Type and Number of Tubes ..... 1 #6A8, 1 #6K7, 1 #6H6, 1 #6P5, 1 #6F6, 1 #5Y3 - Total 6
Power Supply Characteristics ..... 110 to 250 volt, 25 to 60 cycle A.C.
Power Consumption ..... 62 Watts
Maximum Output ..... 3.5 Watts
Maximum Undistorted Output ..... 2.6 Watts

Tuning Ranges ..... (Models WR-311, WR-211U (White Band - 540 to 1,550 KC. (Green Band - 1,500 to 4,500 KC. (Red Band - - 5,500 to 16,500 KC.
(Model WR-311X (White Band - 150 to 370 KC. (Green Band - 540 to 1,500 KC. (Red Band - - 5,500 to 16,500 KC.

Line-Up Frequencies . Models WR-311, WR-211U - I.F. 465 KC., 1400 KC., 600 KC., 4000 KC., 15,000 KC. - Model WR-311X - I.F. 465 KC., 350 KC., 165 KC., 1400 KC., 600 KC., 15,000 KC.

LINE-UP CAPACITOR ADJUSTMENTS
MODEL WR 311X

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control to maximum position, tone control to treble, wave-change switch on Broadcast (Green) and indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC., and apply signal to grid of 6K7 I.F. tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #33 (#26 position on Figure 1 of Form #2567) and #35 (#25 position on Figure 1 of Form #2567) to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector-oscillator tube and adjust trimmers #20 (#21 position on Figure 1 of Form #2567) and #22 to maximum output.
6. Apply test signal to antenna of receiver.
7. Adjust trap coil trimmer #4 (#5 position on Figure 1 of Form #2567) to minimum output.

ADJUSTMENT OF LONG-WAVE BAND (150-370 KC.)

1. Set the wave-change switch to the long-wave band position and apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.
2. Set the dial indicator and test oscillator to 350 KC., and adjust trimmer condenser #18 (#14 on Figure 2 of Form #2567) until the signal is received at a maximum.
3. Adjust trimmer condenser #6 (#4 on Figure 1 of Form #2567) to maximum output.
4. Set the test oscillator and dial indicator to 165 KC., and adjust trimmer condenser #12 (located on front right-hand corner of chassis, viewed from rear of chassis) to maximum output, at the same time rocking the variable tuning condenser.
5. Return both the test oscillator and dial indicator to 350 KC., and check adjustment of trimmers #18 and #6.

ADJUSTMENT OF BROADCAST BAND (540-1500 KC.)

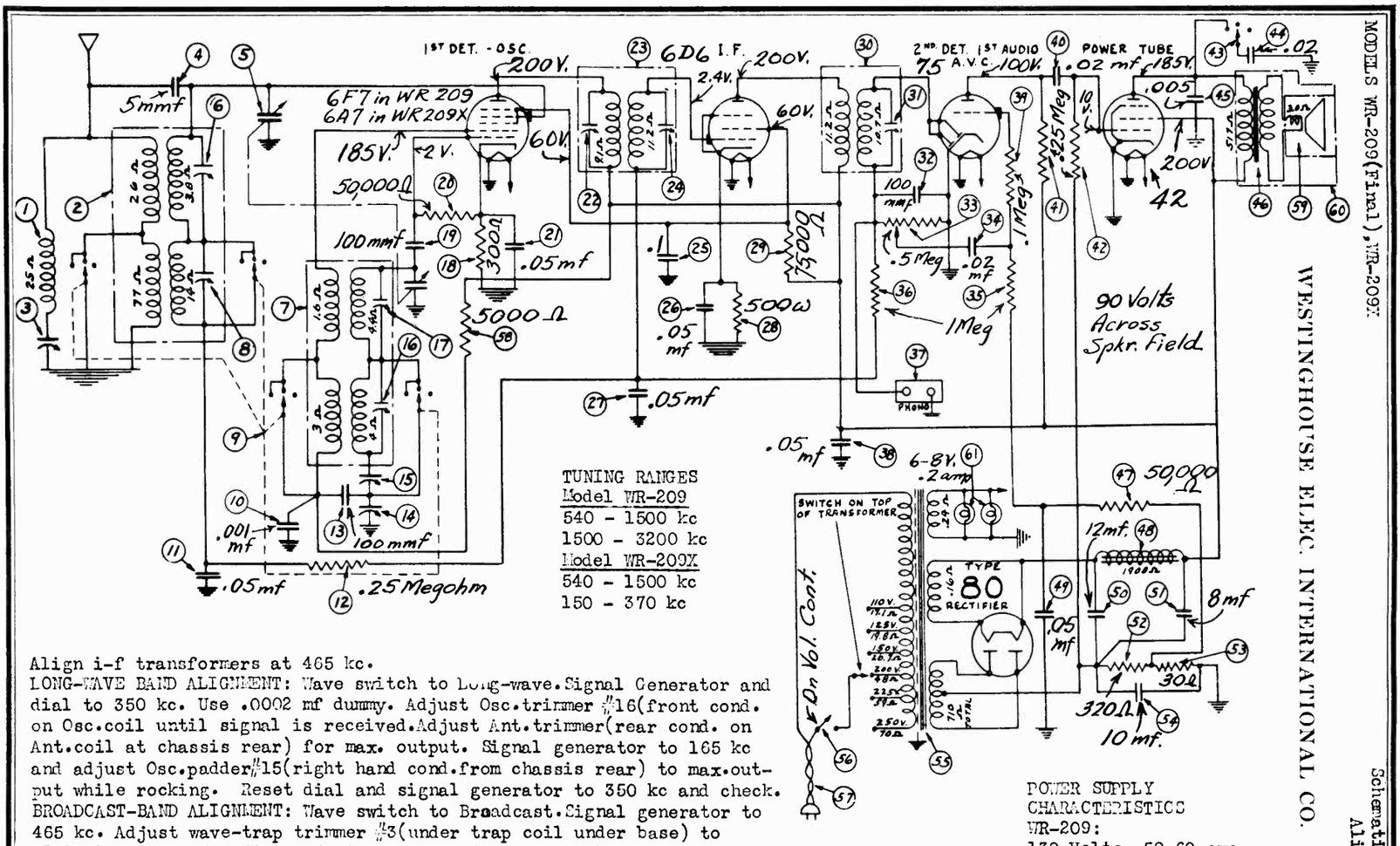
1. Set wave-change switch to standard Broadcast Band position.
2. Set test oscillator and dial indicator to 1400 KC.
3. Apply the test signal to the antenna of the receiver through a .0002 mfd. condenser and adjust the oscillator trimmer condenser #13 (#13 position on Figure 2 of Form #2567) until the signal is received.
4. Adjust the preselector trimmer #7 (#3 position on Figure 1 of Form #2567) to maximum output.
5. Set the test oscillator and dial indicator to 600 KC., and adjust the oscillator series condenser #24 (#17 position on Figure 1 of Form #2567) until the signal is received. Tune the variable condenser to a slightly lower frequency and readjust trimmer #24 to maximum output. If the sensitivity increases, continue this trial and error method in the same direction until no further improvement in sensitivity can be made. If the sensitivity decreases, try this adjustment at slightly higher frequencies.

ADJUSTMENT OF RED BAND (5,500-16,500 KC.)

1. Set the wave-change switch to the Red Band position.
2. Set the test oscillator and dial indicator to 15,000 KC., and adjust the oscillator trimmer condenser #14 (#12 position on Figure 2 of Form #2567) until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #8 (#2 position on Figure 1 of Form #2567) to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

Dia. #	Part #	Description of Parts	List Price
1	RC 95263	Preselector coil	$ 3.50
2	RC 9587	Trap coil	.55
3	SW 9548	Wave-change switch	1.00
4		10-55 mmf. trimmer condenser - part of RC 9587	
5	CW 4-01	.01 mfd., 400 V. condenser	.15
6		4-25 mmf. trimmer condenser - part of RC 95263	
7		1.5-10 mmf. trimmer condenser - part of RC 95263	
8		4-25 mmf. trimmer condenser - part of RC 95263	
9	CG 9549	Variable tuning condenser - 2-gang	2.50
10	RE 9575	50,000 ohm, 1/4 W. resistor	.15
11	CM 9511	65 mmf. mica condenser	.15
12	CS 9566	150-300 mmf. trimmer condenser	.30
13		4-25 mmf. trimmer condenser - part of RC 95264	
14		1.5-10 mmf. trimmer condenser - part of RC 95264	
15	RC 95264	Oscillator coil assembly	2.75
16	CM 9524	.0034 mfd. mica condenser	.35
17	SA 105249	5000 ohm, 1/4 W. resistor	.15
18		60-90 mmf. trimmer condenser - part of RC 95264	
20		45-135 mmf. trimmer condenser - part of IC 9572	
21	IC 9572	1st I.F. coil (465 KC.)	1.35
22		45-135 mmf. trimmer condenser - part of IC 9572	
23	CW 2-10	.1 mfd., 400 V. condenser	.15
24	CS 9545	300-600 mmf. oscillator series condenser	.40
25	RE 95116	50,000 ohm, 1 W. resistor	.20
26	CW 2-05	.05 mfd., 200 V. condenser	.15
27		4 mfd., 450 V. electrolytic condenser - part of CE 9537	1.25
28	SA 100825	10,000 ohm, 1/2 W. resistor	.15
29	CW 2-10	.1 mfd., 200 V. condenser	.15
30	CW 4-10	.1 mfd., 400 V. condenser	.15
31	RE 9574	1 meg., 1/4 W. resistor	.15
32	SA 99957	40,000 ohm, 1 W. resistor	.25
33		30-100 mmf. trimmer condenser - part of IC 9574	
34	IC 9574	2nd I. F. coil (465 KC.)	1.75
35		30-100 mmf. trimmer condenser - part of IC 9574	
36	RE 9524	50,000 ohm, 1/8 W. resistor	.10
37		100 mmf. mica condenser - part of IC 9574	
38	SA 100050	Phono-jack	.10
39	CM 9519	500 mmf. mica condenser	.20
40	CW 2-05	.05 mfd., 200 V. condenser	.15
41	RE 9527	5000 ohm, 1/8 W. resistor	.10
42	CW 4-02	.02 mfd., 400 V. condenser	.15
43	VR 9535	Volume control - 1/2 meg.	1.10
44		100 mmf. mica condenser - part of IC 9574	
45	RE 9574	1 meg., 1/4 W. resistor	.15
46	RE 9575	50,000 ohm, 1/4 W. resistor	.15
47	CW 2-25	.25 mfd., 200 V. condenser	.20
48	RE 9563	50,000 ohm, 1/4 W. insulated resistor	.15
49	CW 4-10	.1 mfd., 400 V. condenser	.15
50	RE 9531	.25 meg., 1/8 W. resistor	.10
51	RE 9572	.5 meg., 1/4 W. resistor	.15
52	CW 4-02	.02 mfd., 400 V. condenser	.15
53	CW 6-005	.005 mfd., 600 V. condenser	.15
54	CW 4-05	.05 mfd., 400 V. condenser	.15
55	RE 9550	2000 ohm, 1/4 W. resistor	.15
56	VR 9534	Tone control - 20,000 ohm	.55
57		10 mfd., 25 V. electrolytic condenser - part of CE 9537	1.25
58	SA 107391	500 ohm, 1 W. resistor	.20
59	TR 9558	Output transformer	1.25
60	SK 9512	Speaker	10.75
61	DM 956	Diaphragm and voice coil assembly	1.25
62	RE 9556	25 ohm, 1/2 W. resistor	.15
63	RE 9537	50 ohm, 1/2 W. resistor	.10
64	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
65	LP 9510	Dial lamp - 6.3 V., .25 Amp.	.15
66	LP 951	Dial lamp - 6-8 V., .20 Amp.	.20
67		On-off switch - part of VR 9535	
68	CB 9512	Line cable	.50
69	TR 9567	Power transformer	9.50
70	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
71	RE 9574	1 meg., 1/2 W. resistor	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



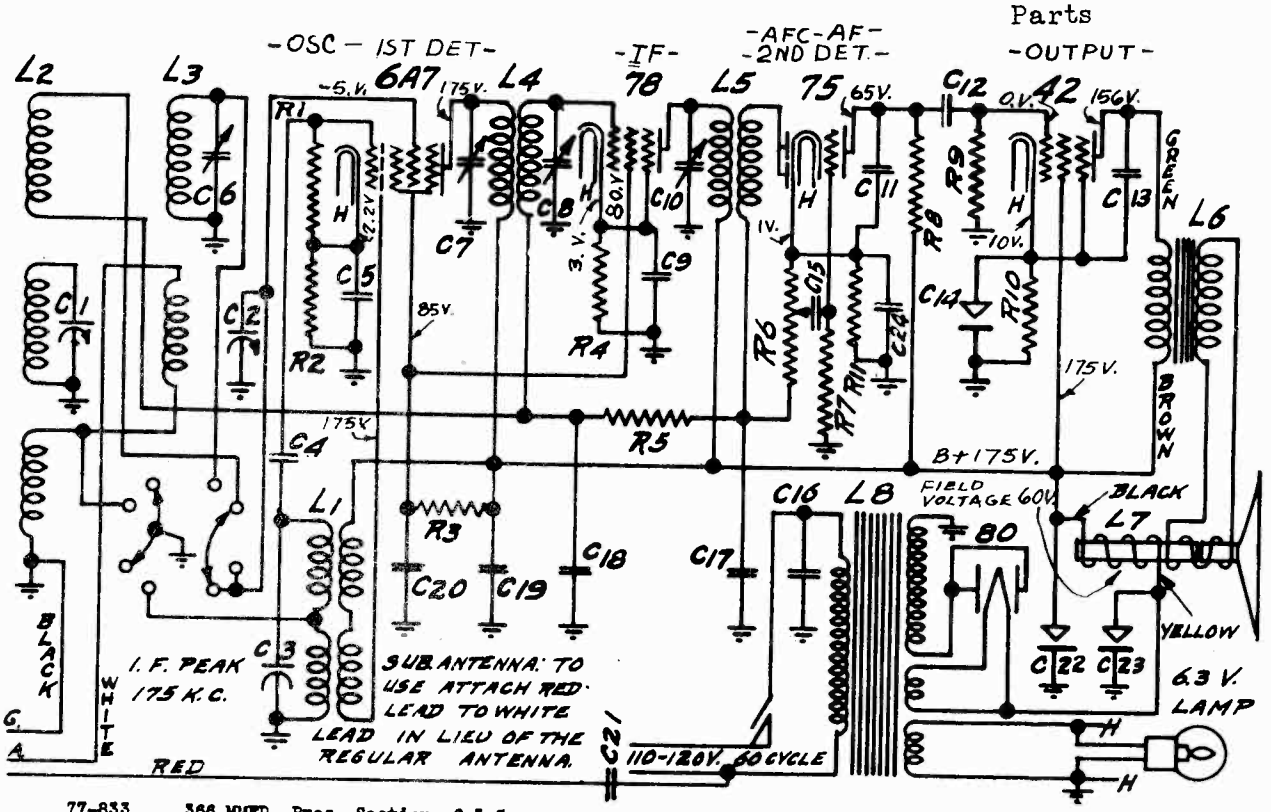
TUNING RANGES
Model WR-209
540 - 1500 kc
1500 - 3200 kc
Model WR-209X
540 - 1500 kc
150 - 370 kc

POWER SUPPLY CHARACTERISTICS
WR-209:
130 Volts- 50-60 cyc.
220 Volts- 50-60 cyc.
WR-209X:
110-250 Volts
25-60 cyc.

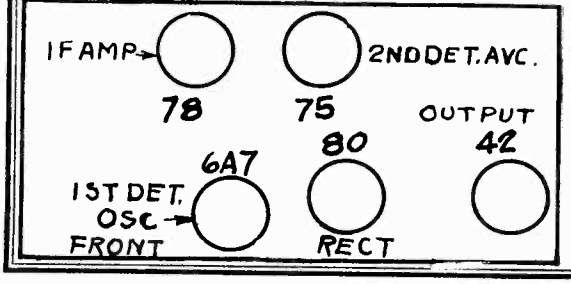
Align i-f transformers at 465 kc.
LONG-WAVE BAND ALIGNMENT: Wave switch to Long-wave. Signal Generator and dial to 350 kc. Use .0002 mf dummy. Adjust Osc.trimmer #16(front cond. on Osc.coil until signal is received. Adjust Ant.trimmer(rear cond. on Ant.coil at chassis rear) for max. output. Signal generator to 165 kc and adjust Osc.padder #15(right hand cond.from chassis rear) to max.output while rocking. Reset dial and signal generator to 350 kc and check.
BROADCAST-BAND ALIGNMENT: Wave switch to Broadcast. Signal generator to 465 kc. Adjust wave-trap trimmer #3(under trap coil under base) to MINIMUM output. Set dial and signal generator to 1400 kc and adjust the Osc.trimmer(rear cond.on Osc.coil) until signal is received. Adjust trimmer #6 to maximum output. Set signal generator and dial to 600 kc and adjust Osc.padder #14(to left of #15 viewed from rear) to maximum output while rocking. Return signal generator and dial to 1400 kc and check alignment.

WILCOX-GAY CORP.

MODEL 6A5
Schematic, Voltage
Socket, Alignment
Parts



C1	77-833	366 MMFD. Pres. Section of 3 Gang
C2	77-833	366 MMFD. Pres. Section of 3 Gang
C3	77-833	328 MMFD. Osc. Section of 3 Gang
C4	76-2002	.00005 Mfd. Mica Osc. Grid Condenser
C5	75-2005	.1 Mfd. 200 V. Paper 6A7 Cathode By-Pass Cond.
C6	78-2010	3-30 MMFD. Police Band Pres. Trimmer Cond.
C7	78-2008	First I.F. Primary Trimmer Condenser
C8	78-2011	First I.F. Secondary Trimmer Condenser
C9	75-2005	.1 Mfd. 200 V. Paper 78 Cathode By-Pass Cond.
C10	78-2009	Second I.F. Trimmer Condenser
C11	76-662	.002 Mfd. Mica 75 Plate Filter Condenser
C12	75-2005	.01 Mfd. 400 V. Paper Audio Feed Cond.
C13	75-2001	.002 Mfd. 600 V. Paper 42 Plate Filter Cond.
C14	18-928	25 Mfd. 25 V. Dry Electrolytic Condenser
C15	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C16	75-2003	.01 Mfd. 400 V. Paper Line By-Pass Cond.
C17	76-307	.0005 Mfd. Mica Diode Filter Condenser
C18	75-2005	.1 Mfd. 200 V. Paper A.V.C. By-Pass Cond.
C19	75-2011	.5 Mfd. 200 V. Paper B Supply By-Pass Cond.
C20	75-2005	.1 Mfd. 200 V. Paper 6A7 & 78 Screen By-Pass Cond.
C21	75-2003	.01 Mfd. 400 V. Paper Sub. Antenna Condenser
C22	18-2006	16 Mfd. 250 W.V. Electrolytic Condenser
C23	18-2005	12 Mfd. 325 W.V. Electrolytic Condenser
C24	75-2006	.1 Mfd. 200 V. Paper 75 Cathode By-Pass Cond.
R1	53-898	50,000 Ohm 6A7 Grid Resistor
R2	53-1062	250 Ohm 6A7 Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm A.V.C. Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm 75 Grid Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-925	500,000 Ohm 42 Grid Resistor
R10	53-1063	500 Ohm 42 Cathode Resistor
R11	53-919	5,000 Ohm 75 Cathode Resistor
L1	17-2101	Oscillator Coil Assembly
L2	17-2100	Broadcast Preselector Coil Assembly
L3	17-2103	Police Band Preselector Coil Assembly
L4	66-2012	First I. F. Transformer Assembly
L5	17-2102	Second I. F. Transformer Coil Assembly
L6	64-2021	5" Speaker 42 Tube Output Trans. on L7
L7	64-2021	5" Speaker 1500 Ohm Field
L8	80-2009	Power Transformer for 110-120 V. 60 Cycle



MODEL 6A5

FREQUENCY RANGE -
1500 to 550 KC
4.0 to 1.5 MC
15.5 to 5.5 MC

BROADCAST - Gen. to ANT lead thru standard dummy antenna, set at 1400 KC, adjust OSC trim (rear of gang), then pre-selector trimmers to maximum peak. Pad OSC circuit at 600 KC. FOREIGN - Generator to 15 MC, locate signal on dial, peak PRE-SELECTOR trimmers, , and then check at 6 MC.

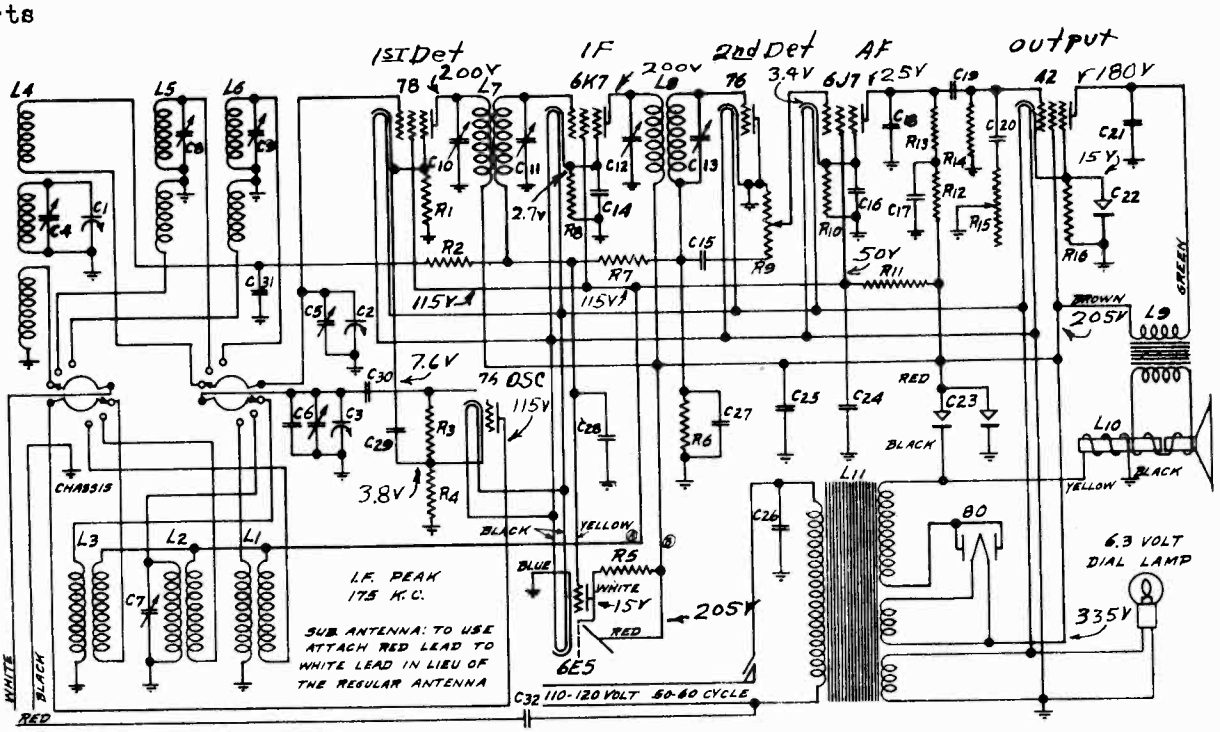
POLICE - Generator to 3.5 MC, locate signal on dial, then adjust PRE-SELECTOR trimmers to maximum peak.

During Broadcast padding rock gang condenser.

CONVENTIONAL ALIGNMENT
(see special section)

MODEL 6B8
Schematic, Voltage
Socket, Alignment
Parts

WILCOX-GAY CORP.



R1	53-1065	1,000 Ohm First Detector Cathode Resistor
R2	53-923	100,000 Ohm A.V.C. Network Resistor
R3	53-941	20,000 Ohm Oscillator Grid Resistor
R4	53-1062	250 Ohm Oscillator Cathode Resistor
R5	53-926	1 Meg Ohm 6E5 Triode Plate Resistor
R6	53-925	500,000 Ohm Diode Load Resistor
R7	53-926	1 Meg Ohm A.V.C. Network Resistor
R8	53-1062	250 Ohm I.F. Amplifier Cathode Resistor
R9	19-1291	500,000 Ohm Volume Control & Switch
R10	53-920	10,000 Ohm First Audio Cathode Resistor
R11	53-280	5,000 Ohm Screen Resistor
R12	53-923	100,000 Ohm First Audio Plate Hum Resistor
R13	53-924	250,000 Ohm First Audio Plate Resistor
R14	53-925	500,000 Ohm Output Grid Resistor
R15	19-1317	250,000 Ohm Tone Control
R16	53-1426	750 Ohm Output Cathode Resistor
C1	77-833	16-366 MMFD. Preselector Section of 3 Gang
C2	77-833	16-366 MMFD. Preselector Section of 3 Gang
C3	77-833	16-328 MMFD. Oscillator Section of 3 Gang
C4	77-833	First Preselector Trimmer on C1
C5	77-833	Second Preselector Trimmer on C2
C6	77-833	Oscillator Trimmer on C3
C7	78-1588	3-30 MMFD. Police Band Oscillator Trimmer
C8	78-1588	3-30 MMFD. Police Band Preselector Trimmer
C9	78-1588	3-30 MMFD. Foreign Band
C10	78-2008	First I.F. Primary Trimmer Condenser
C11	78-2011	First I.F. Secondary Trimmer Condenser
C12	78-2008	Second I.F. Primary Trimmer Condenser
C13	78-2013	Second I.F. Secondary Trimmer Condenser
C14	76-2005	.1 Mfd. 600 Volt I.F. Cathode By-Pass Cond.
C15	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C16	75-2011	.5 Mfd. 200 Volt First Audio Cathode By-Pass
C17	76-2005	.1 Mfd. 200 Volt First Audio Plate Hum Filter
C18	76-265	.001 Mfd. Mica First Audio Plate By-Pass Cond.
C19	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C20	75-2003	.01 Mfd. 400 Volt Tone Control Condenser
C21	75-2001	.002 Mfd. 600 Volt Output Plate By-Pass Cond.
C22	18-928	.25 Mfd. 25 Volt Dry Electrolytic Condenser
C23	18-2002	4-4 Mfd. 450 W.V. Dry Electrolytic Condenser
C24	75-2005	.1 Mfd. 200 Volt Screen By-Pass Condenser
C25	75-2013	1. Mfd. 400 Volt B Supply By-Pass Condenser
C26	75-2003	.01 Mfd. 400 Volt Line By-Pass Condenser
C27	76-307	.0005 Mfd. Mica Diode Filter Condenser
C28	75-2005	.1 Mfd. 200 Volt A.V.C. Network By-Pass Cond.
C29	75-2003	.01 Mfd. 400 Volt Oscillator Coupling Cond.
C30	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C31	75-2003	.01 Mfd. 400 Volt A.V.C. Network By-Pass Cond.
C32	75-2003	.01 Mfd. 400 Volt Sub Antenna Condenser

INDUCTANCES

L1	17-2077	Foreign Band Oscillator Coil Assembly
L2	17-1647	Police Band Oscillator Coil Assembly
L3	17-2030	Broadcast Oscillator Coil Assembly
L4	17-2052	Broadcast Preselector Coil Assembly
L5	17-1648	Police Band Preselector Coil Assembly
L6	17-2078	Foreign Band Preselector Coil Assembly
L7	68-2025	First I.F. Trans. Assembly
L8	68-2024	Second I.F. Trans. Assembly
L9	64-2025	Speaker With #42 Output Trans.
L10	64-2028	Speaker With 2500 Ohm Field
L11	80-2010	Power Transformer (Unless Special)

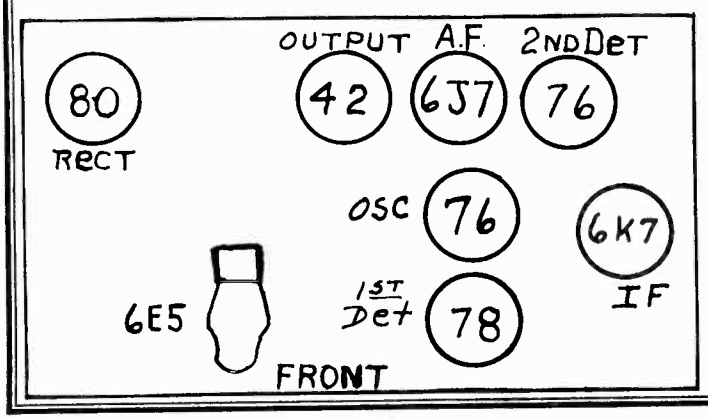
MODEL 6B8

FREQUENCY RANGE -
1500 to 550 KC
4 to 1.5 MC
15.5 to 5.5 MC

ALIGNMENT

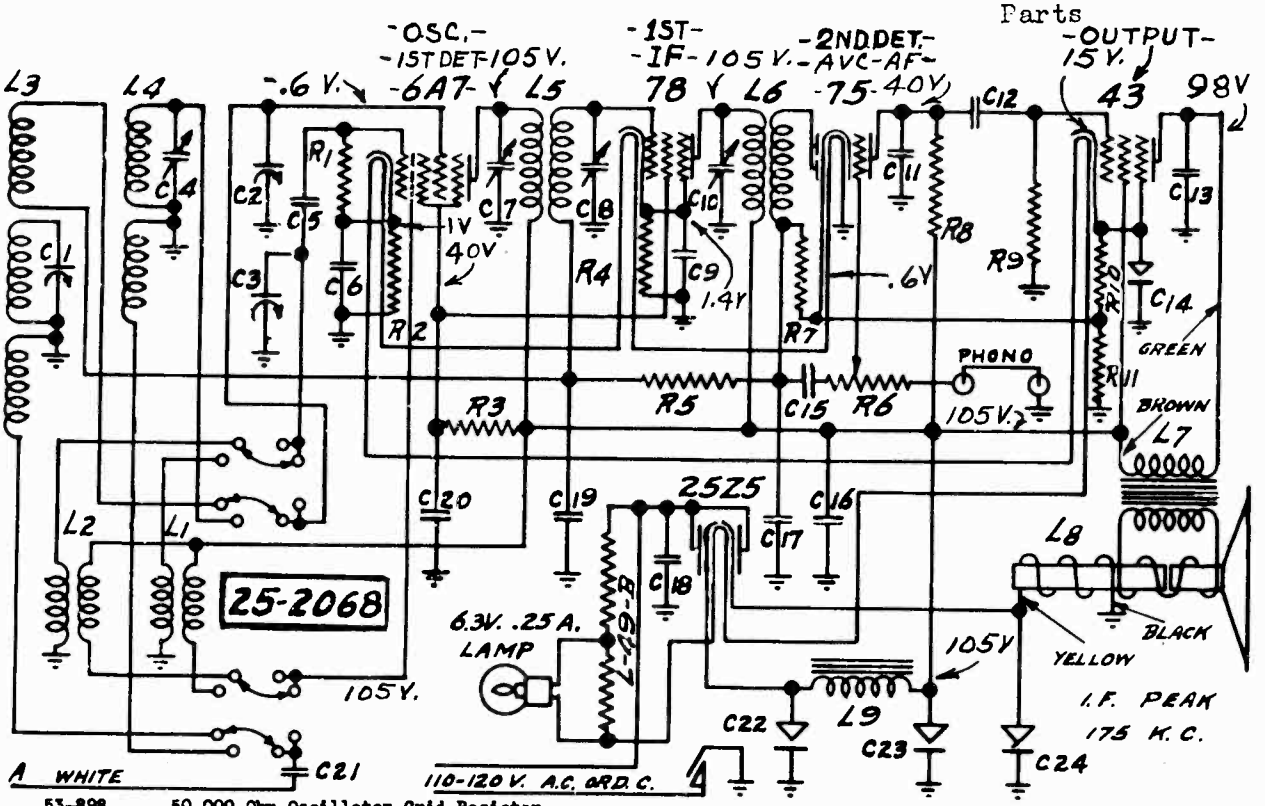
BROADCAST - Generator is connected to ANT lead thru a standard dummy antenna, set at 1400 KC, trim the Oscillator trimmer, then the Pre-selector trimmers to maximum peak. Pad the Oscillator circuit at 600 KC while rocking the rotor of gang condenser.
FOREIGN - Generator is connected in same manner, set at 15 MC, locate signal on dial, trim Pre-selector trimmers to peak. Check at 6 MC
POLICE - Generator to 3.5 MC, locate signal on dial, then trim Pre-selector trimmers to peak. Repeat adjustments.

CONVENTIONAL ALIGNMENT
(See special section)

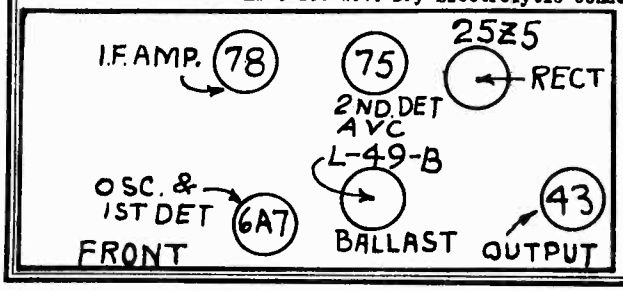


WILCOX-GAY CORP.

MODEL 6D6
Schematic, Voltage
Socket, Alignment
Parts



R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm AVC Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm Diode Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-925	500,000 Ohm 43 Grid Resistor
R10	53-1062	500 Ohm 43 Cathode Resistor
R11	53-1122	40 Ohm 75 Cathode Resistor
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	78-2010	3-30 MMFD. Foreign Band Preselector Trimmer Cond.
C5	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C6	75-2005	.1 Mfd. 200 Volt Paper 6A7 Cathode By-Pass Cond.
C7	78-2008	First I.F. Primary Trimmer Condenser
C8	78-2011	First I.F. Secondary Trimmer Condenser
C9	75-2005	.1 Mfd. 200 Volt Paper 78 Cathode By-Pass Cond.
C10	78-2009	Second I.F. Trimmer Condenser
C11	76-265	.001 Mfd. Mica 75 Plate Filter Condenser
C12	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C13	75-2002	.004 Mfd. 600 Volt Paper 43 Plate Filter Condenser
C14	18-928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C15	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C16	75-2011	.5 Mfd. 200 Volt Paper B Supply By-Pass Condenser
C17	76-307	.0005 Mfd. Mica Diode Filter Condenser
C18	75-2005	.1 Mfd. 200 Volt Paper Line By-Pass Condenser
C19	75-2005	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass Cond.
C20	75-2005	.1 Mfd. 200 Volt Paper 6A7 & 78 Screen By-Pass Cond.
C21	75-2003	.01 Mfd. 400 Volt Paper Antenna Series Condenser
C22	18-2003	11 Mfd. 150 W.V. Dry Electrolytic Condenser
C23	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Condenser
C24	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Condenser
L1	17-2077	Foreign Band Oscillator Coil Assembly
L2	17-2079	Broadcast Oscillator Coil Assembly
L3	17-2080	Broadcast Preselector Coil Assembly
L4	17-2078	Foreign Band Preselector Coil Assembly
L5	68-2012	First I.F. Transformer Assembly
L6	17-2064	Second I.F. Transformer Assembly
L7	64-2006	5" Speaker 43 Output Transformer on L8
L8	64-2006	5" Speaker 3000 Ohm Field
L9	14-940	20 Henry Filter Choke



MODEL 6D6

FREQUENCY RANGE -
1500 to 550 KC
5.5 to 15.5 MC

BROADCAST BAND ALIGNMENT :

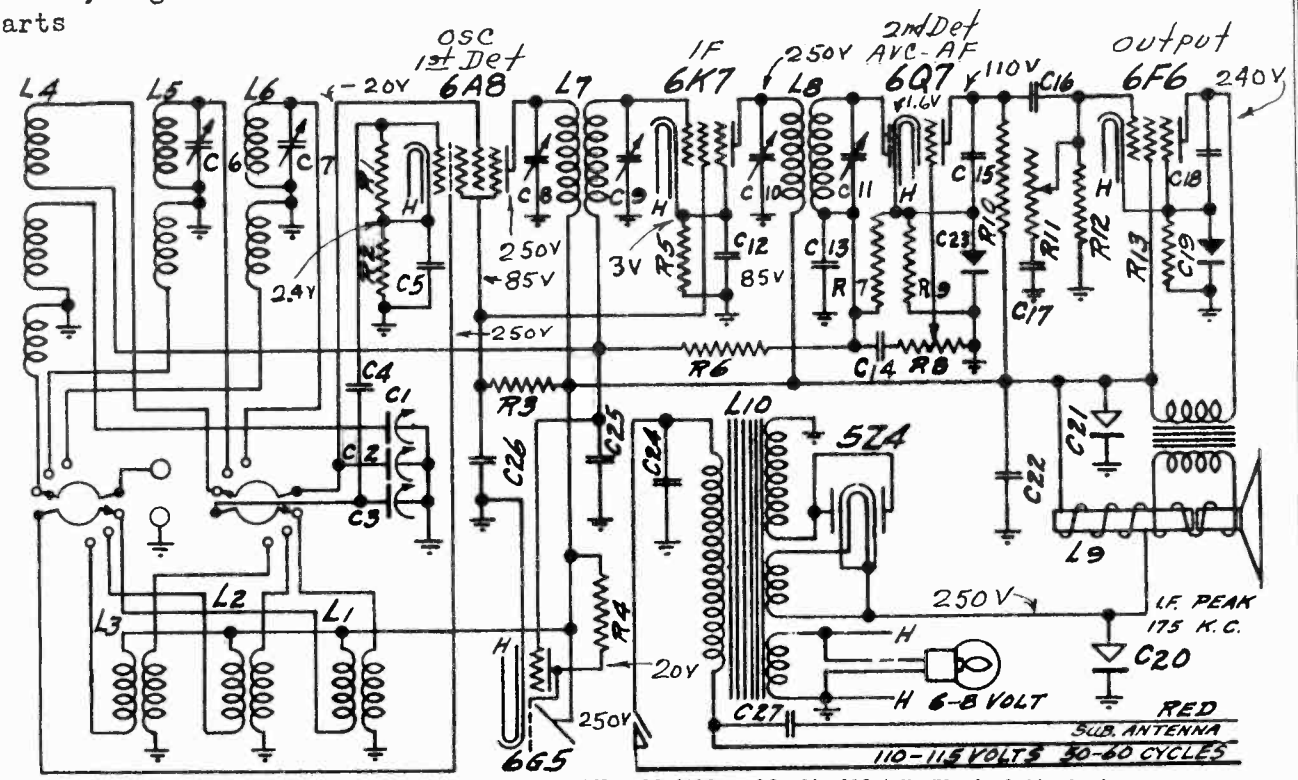
Wave change switch in counter clockwise position, generator to antenna lead thru standard dummy antenna. Adjust OSC trimmer (rear of gang) to 1400 KC peak. Then adjust the ANT and Pre-selector trimmers to peak. Pad the OSC circuit at 600 KC.

SHORT WAVE BAND - Wave change switch in clockwise position. Generator to 15 MC, locate signal on dial, then peak ANT and Pre-selector trimmers. No padding of oscillator circuit required on band.

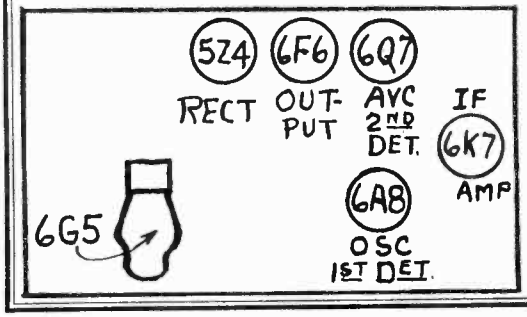
CONVENTIONAL ALIGNMENT -
(see the special section)

MODELS 6F6, 6FB6
Schematic, Voltage
Socket, Alignment
Parts

WILCOX-GAY CORP.



R1	53-898	50,000 Ohm Oscillator Grid Resistor	C21	18-2006	16 Mfd. 250 W.V. Electrolytic Condenser		
R2	53-1062	250 Ohm Oscillator Cathode Resistor	C22	75-2012	.5 Mfd. 400 Volt Paper B Supply By-Pass Cond.		
R3	53-898	50,000 Ohm R.F. & I.F. Screen Resistor	C23	18-928	25 Mfd. 25 Volt Elect. 6Q7 Cathode By-Pass Cond.		
R4	53-926	1 Meg Ohm 6G5 Triode Plate Resistor	C24	75-2003	.01 Mfd. 400 Volt Paper Line By-Pass Cond.		
R5	53-1063	800 Ohm I.F. Cathode Resistor	C25	75-2005	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass Cond.		
R6	53-926	1 Meg Ohm A.V.C. Network Resistor	C26	75-2005	.1 Mfd. 200 V. Paper R.F. & I.F. Screen By-Pass Cond.		
R7	53-925	500,000 Ohm Diode Load Resistor	C27	75-2003	.01 Mfd. 400 Volt Paper Sub. Antenna Cond.		
R8	19-1311	500,000 Ohm Volume Control 19-2006 on Model 6FB6				L1	17-2106 Broadcast Oscillator Coil Assembly
R9	53-919	5,000 Ohm 6Q7 Cathode Resistor				L2	17-2106 Police Band Oscillator Coil Assembly
R10	53-924	250,000 Ohm 6Q7 Plate Resistor				L3	17-2095 Foreign Band Oscillator Coil Assembly
R11	19-1317	250,000 Ohm Tone Control				L4	17-2100 Broadcast Preselector Coil Assembly
R12	53-925	500,000 Ohm 6F6 Grid Resistor				L5	17-2104 Police Band Preselector Coil Assembly
R13	53-1063	500 Ohm 6F6 Cathode Resistor				L6	17-2096 Foreign Band Preselector Coil Assembly
C1	77-833	366 MMFD. Preselector Section of 3 Gang				L7	68-2026 First I.F. Transformer Assembly
C2	77-833	366 MMFD. Preselector Section of 3 Gang				L8	68-2024 Second I.F. Transformer Assembly
C3	77-833	328 MMFD. Oscillator Section of 3 Gang				L9	64-2030 12" Speaker 1500 Ohm Field, 6F6 Trans.
C4	76-2002	.00005 Mfd. Mica Osc. Grid Condenser					64-2022 8" Speaker, 1500 Ohm Field, 6F6 Trans.
C5	75-2005	.1 Mfd. 200 Volt Paper 6A8 Cathode Cond.				L10	80-2017 Power Transformer
C6	78-1587	3-30 MMFD. Police Band Pres. Trimmer Cond.					
C7	78-1587	3-30 MMFD. Foreign Band Pres. Trimmer Cond.					
C8	78-2008	First I.F. Primary Trimmer Condenser					
C9	78-2011	First I.F. Secondary Trimmer Condenser					
C10	78-2008	Second I.F. Primary Trimmer Condenser					
C11	78-2013	Second I.F. Secondary Trimmer Condenser					
C12	75-2005	.1 Mfd. 200 Volt Paper 6K7 Cathode Cond.					
C13	76-307	.0005 Mfd. Diode Filter Condenser					
C14	75-2005	.1 Mfd. 200 Volt Paper Audio Feed Cond.					
C15	76-265	.001 Mfd. Mica 6Q7 Plate Filter Cond.					
C16	75-2005	.1 Mfd. 200 Volt Paper Audio Feed Cond.					
C17	75-2003	.01 Mfd. 400 Volt Tone Control Cond.					
C18	75-2001	.002 Mfd. 600 Volt Paper 6F6 Plate Filter Cond					
C19	18-928	25 Mfd. 25 Volt Dry Electrolytic Condenser					
C20	18-2005	12 Mfd. 325 W.V. Electrolytic Condenser					



MODEL 6F6, 6FB6

FREQUENCY RANGE -

1500 to 550 KC
4 to 1.5 MC
15.5 to 5.5 MC

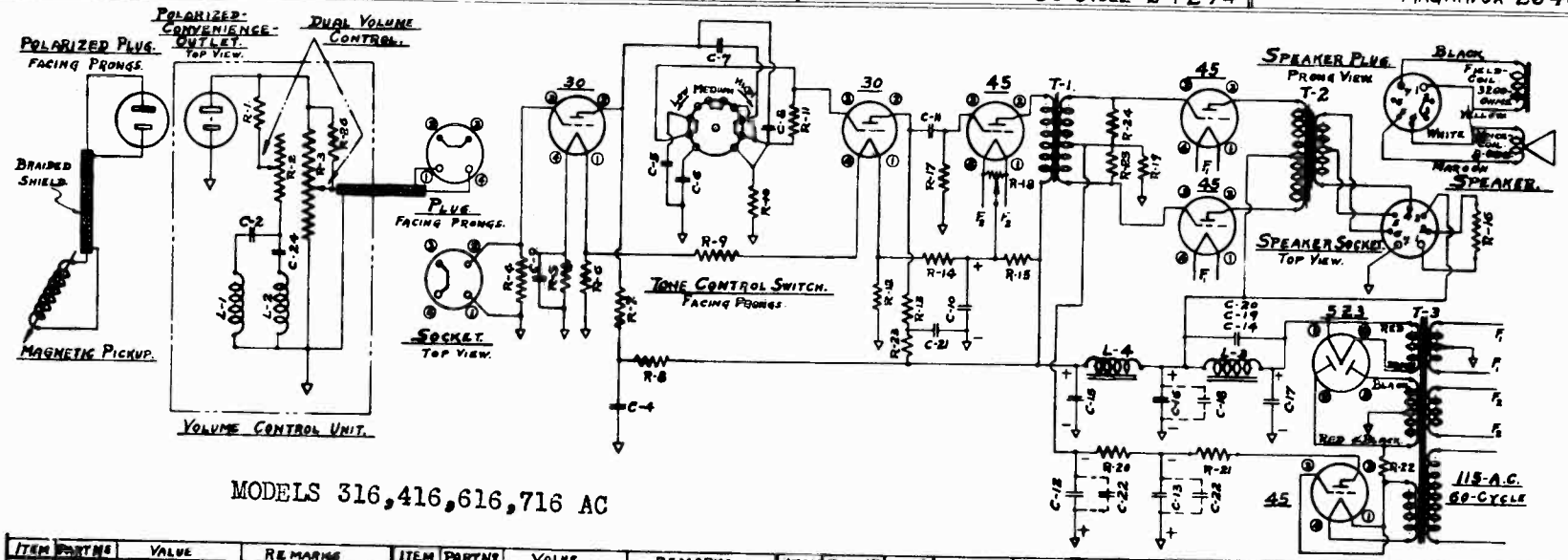
BROADCAST - Gen. to ANT lead thru standard dummy antenna, set at 1400 KC, trim OSC trimmer, then Pre-selector trimmers to maximum peak. Pad OSC circuit at 600 KC while rocking gang.

FOREIGN- Generator to 15 MC, locate signal on dial, peak Pre-selector trimmers to maximum. Check at 6 MC.

POLICE - Generator to 3.5 MC, locate the signal on dial, adjust Pre-selector trimmers to peak. Repeat adjustments for maximum response.

CONVENTION ALIGNMENT PROCEDURE
(see special section)

PICKUP PART Nº 24707 | VOLUME CONTROL #177-AM-PART Nº 24298 | AMPLIFIER #771. 25-CYCLE -#24368. 40-CYCLE #24370. 60-CYCLE #24274 | SPEAKERS. JENSEN #26923. MAGNAVOX-26409.



MODELS 316,416,616,716 AC

ITEM	PART Nº	VALUE	REMARKS
		RESISTORS.	
R-1	22830	1,000-OHMS	±10% 1/4-WATT
R-2	22765	12,000-OHMS	±15% VOLUME CONTROL
R-3		150,000-OHMS	±15% VOLUME CONTROL
R-4	20750	500,000-OHMS	±20% 1/4-WATT
R-5	22354	65-OHMS	± 5% 1/2-WATT
R-6	22323	2,000-OHMS	±10% 1-WATT
R-7	21938	100,000-OHMS	±10% 1/4-WATT
R-8	21937	50,000-OHMS	±10% 1/4-WATT
R-9	23014	100-OHMS	± 5% 1/2-WATT
R-10	20750	500,000-OHMS	±20% 1/4-WATT
R-11	20266	75,000-OHMS	±10% 1/4-WATT
R-12	22333	2,000-OHMS	±10% 1-WATT
R-13	23208	60,000-OHMS	±10% 1/2-WATT
R-14	23015	575-OHMS	BLEEDER - 4-WATT
R-15		9,000-OHMS	BLEEDER -30- WATT
R-16		2,500-OHMS	BLEEDER-33-WATT
R-17	20728	250,000-OHMS	±20% 1/4-WATT
R-18	20445	20-OHMS	HUM CONTROL
R-19	23012	5,000-OHMS	± 5% 10-WATT
R-20	23011	2,000-OHMS	± 5% 10-WATT
R-21	23011	6,000-OHMS	± 5% 10-WATT
R-22	23013	3,500-OHMS	± 5% 10-WATT
R-23	23084	25,000-OHMS	±10% 1/4-WATT
R-24	26358	7,000-OHMS	±10% 1/2-WATT
R-25	26358	7,000-OHMS	±10% 1/2-WATT
R-26	21939	50,000-OHMS	±10% 1/4-WATT

ITEM	PART Nº	VALUE	REMARKS
		CONDENSERS.	
C-1			
C-2	20666	.25-MFD.	±10% 200-VOLT
C-3			
C-4	24321	2. -MFD.	450-VOLT
C-5	24280	.00075-MFD.	±10%-20%-MICA
C-6	22241	.002-MFD.	±10% - MICA
C-7	21933	.05 -MFD.	±20% 400-VOLT
C-8	26560	.004-MFD.	±10% 600-VOLT
C-9	24279	10. -MFD.	25-VOLT
C-10	24775	25. -MFD.	150-VOLT
C-11	21736	.1 -MFD.	±20% 400-VOLT
C-12	23021	8. -MFD.	150-VOLT
C-13		8. -MFD.	150-VOLT
C-14	20668	.25-MFD.	FOR 60-CYCLE.
C-15	21720	25. -MFD.	450-VOLT
C-16	22325	6. -MFD.	300-VOLT
C-17		4. -MFD.	300-VOLT
C-18	21720	25. -MFD.	FOR 25 & 60-CYCLE
C-19	24383	1. -MFD.	FOR 25-30-CYCLE
C-20	24364	.5 -MFD.	FOR 40-CYCLE
C-21	24321	2. -MFD.	450-VOLT
C-22	23021	8-8-MFD.	FOR 25-30-CYCLE
C-23			
C-24	22241	.002-MFD.	±10% - MICA.

ITEM	PART Nº	VALUE	REMARKS
		CHOKES.	
L-1	21693	540-MILLIHENRIES	CHOKE COIL.
L-2	24385	290-MILLIHENRIES	CHOKE COIL.
L-3	21580	8.75-HENRIES.	1-FILTER CHOKE.
L-4	23017	2 - HENRIES.	2-FILTER CHOKE
		SPEAKERS.	
	26394	FIELD-3200-OHMS	VOICE COIL-8-OHMS
	26923	FIELD-3200-OHMS	VOICE COIL-8-OHMS.
		TRANSFORMERS.	
T-1	21548		AUDIO 1ST.
T-2	23019		AUDIO OUTPUT.
T-3	23016		POWER TRANSFORMER.

VOLTAGES AND CURRENTS OF MODEL # 771-AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS.
ALL VOLTAGES MEASURED WITH 1,000-OHMS PER VOLT VOLTMETER.

AVERAGE PLATE VOLTAGE MEASURED FROM PLATE + TO CHASSIS —.

OUTPUT	-45	355-VOLTS D.C.
DRIVER	-45	327-VOLTS D.C.
	-30	175-VOLTS D.C.
	-30	80-VOLTS D.C.

AVERAGE PLATE CURRENT:—

OUTPUT	-45	28.0-M.A.D.C.
DRIVER	-45	38.0-M.A.D.C.
	-30	2.1-M.A.D.C.
	-30	1.5-M.A.D.C.

AVERAGE GRID VOLTAGE MEASURED FROM GRID TO FILAMENT.

OUTPUT	-45	87-VOLTS D.C.
DRIVER	-45	40-VOLTS D.C.

AVERAGE FILAMENT VOLTAGE:—

RECTIFIER	523	5.0-VOLTS A.C.
OUTPUT	-45	2.5-VOLTS A.C.
DRIVER	-45	2.5-VOLTS A.C.
	-30	2.1-VOLTS D.C.

AVERAGE VOLTAGES ACROSS SPEAKER FIELDS AND ELECTROLYTIC CONDENSERS.
3200-OHM SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #7-CONTACT ON SPEAKER SOCKET 205-VOLTS D.C.
2500-OHM AUXILIARY SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #3-CONTACT ON SPEAKER SOCKET 155-VOLTS D.C.

C-18	ELECTROLYTIC	385-VOLTS D.C.
C-17	ELECTROLYTIC	360-VOLTS D.C.
C-16	ELECTROLYTIC	355-VOLTS D.C.

FROM RECTIFIER -45-PLATE- TO CHASSIS + 150-VOLTS D.C.

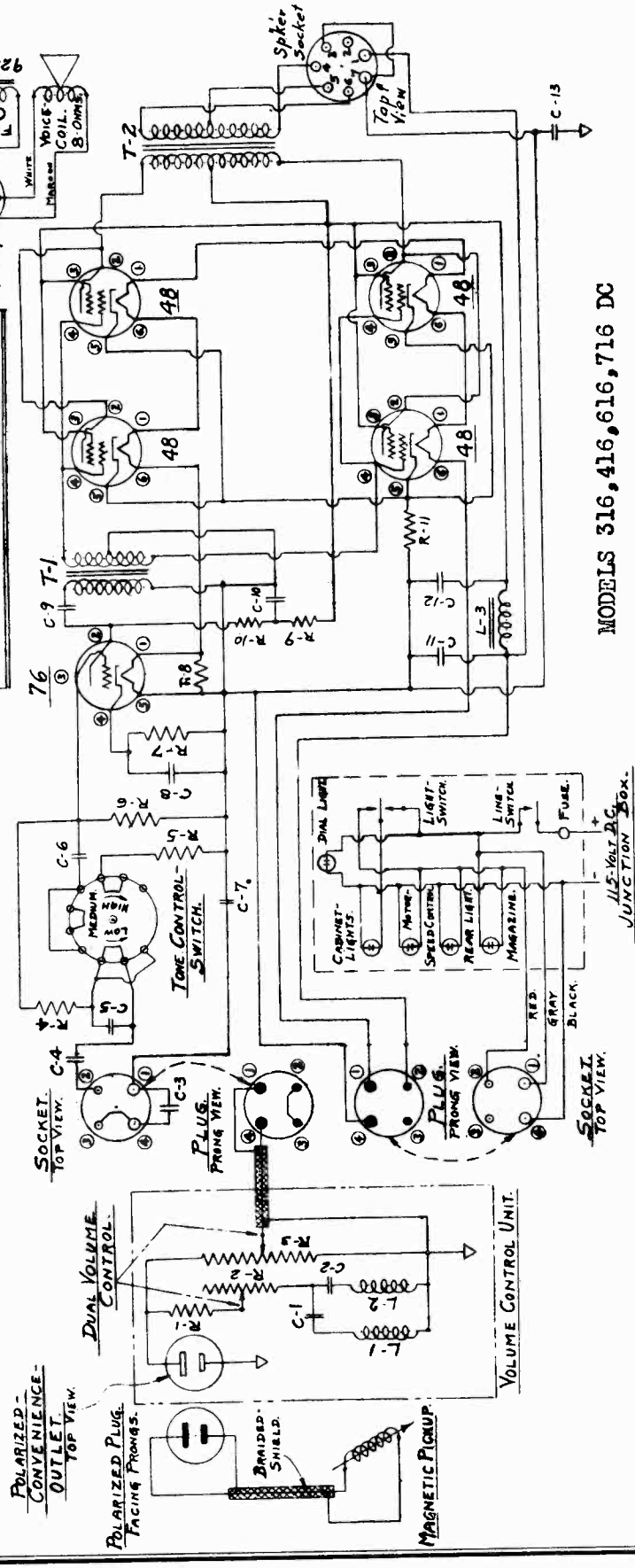
1937

MODELS 316,416,616
716 DC

THE RUDOLPH WURLITZER CO.

Schematic, Voltage
Parts

PICKUP - PART Nº 24707. VOLUME CONTROL-157AM PART Nº 26374 AMPLIFIER-"751.- PART Nº 26367. SPEAKER, PART Nº 27156.



MODELS 316,416,616,716 DC

ITEM	PART Nº	VALUE	REMARKS
		RESISTORS	
R-1	22330	1000-OHM	½-WATT
R-2	26378	7500 OHM	DUAL V.C. REAR SECT.
R-3	26378	150,000 OHM	DUAL V.C. PANEL SECT.
R-4	21939	54,000-OHM	± 10% ½-WATT
R-5	21998	35,000-OHM	± 10% ½-WATT
R-6	20855	150,000-OHM	± 10% ½-WATT
R-7	22529	2,000-OHM	± 10% ½-WATT
R-8	22851	63-OHM	± 5% 10-WATT
R-9	21947	50,000-OHM	± 10% ½-WATT
R-10	21938	100,000-OHM	± 10% ½-WATT
R-11	22331	63-OHM	± 5% 10-WATT
R-12			
R-13			
R-14			
R-15			
R-16			
R-17			
		CONDENSERS	
C-1	22241	.002-MFD.	± 10% MICA
C-2	20665	.25-MFD.	± 10% - 200-W. VOLTS.
C-3	22241	.002-MFD	± 10% MICA.
C-4	24321	.1-MFD	± 10% 200-W. VOLTS
C-5	24372	.0075-MFD	± 10% 200-W. VOLTS
C-6	26372	.0075-MFD	± 10% 200-W. VOLTS
C-7	24363	1.0-MFD.	± 10% 200-W. VOLTS
C-8	24279	10.-MFD.	ELEC. 25-W. VOLTS
C-9	21736	.1-MFD.	± 20% 400-W. VOLTS
C-10	22535	.75-MFD	-10% +50% 200-W. VOLTS
C-11	22865	2.0-MFD.	200-W. VOLTS
C-12		1.0-MFD.	200-W. VOLTS
C-13	21736	.1-MFD.	± 20% 400-W. VOLTS
C-14			
		SPEAKER	
	26394	FIELD-925-OHMS	VOICE COIL-8-OHM
		CHOKES	
L-1	24305	290-MILLIHENRIES	AIR CORE
L-2	21693	540-MILLIHENRIES	AIR CORE
L-3	22866	135-HENRIES.	POWER FILTER
		TRANSFORMERS	
T-1	22867	AUDIO	INPUT
T-2	22864	AUDIO	OUTPUT
T-3			

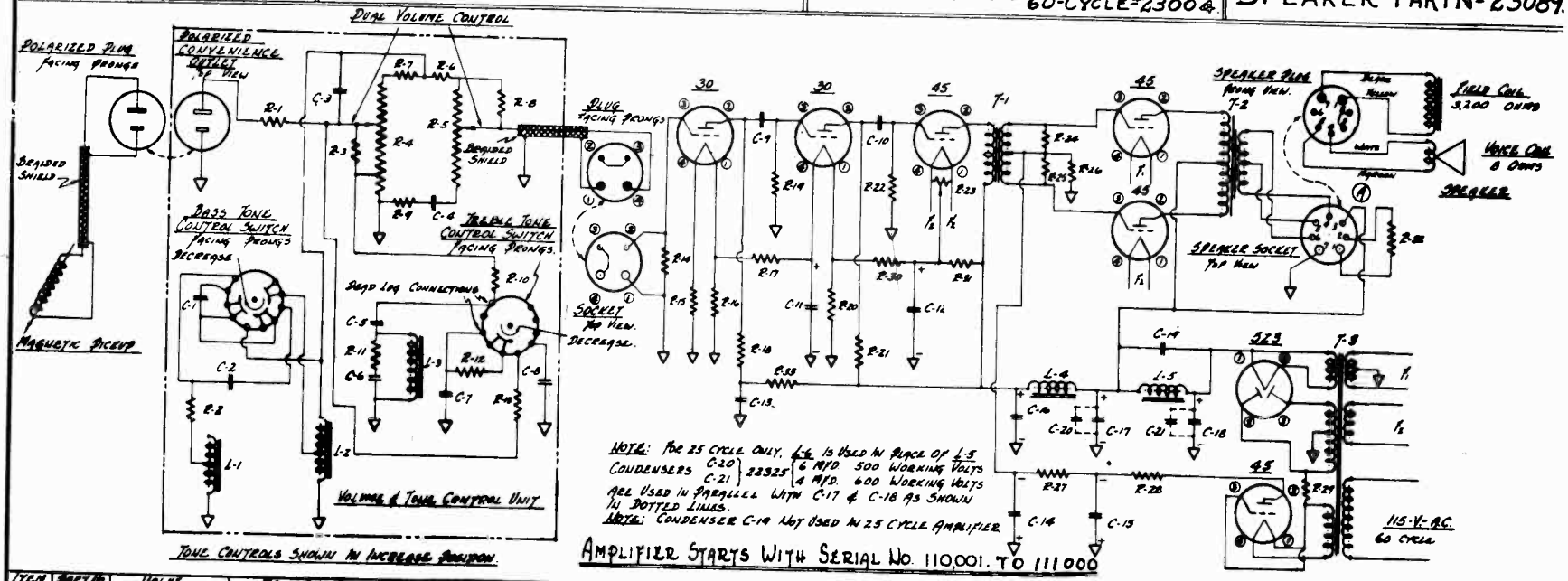
VOLTAGES AND CURRENTS OF MODEL-"751-AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS D.C.

ALL VOLTAGES MEASURED WITH 1000-OHMS PER VOLT VOLTMETER.

AVERAGE PLATE VOLTAGE MEASURED FROM PLATE + TO CONTACT-"7-ON SPEAKER SOCKET:	AVERAGE PLATE CURRENT:-	AVERAGE BIAS VOLTAGE MEASURED FROM CATHODE OF TUBE TO "7-CONTACT ON SPEAKER SOCKET.	AVERAGE FILAMENT VOLTAGE :-
-48 110-VOLTS D.C.	-48 48.0-M.A.	-48 16.0-VOLTS D.C.	-48 27.5-VOLTS D.C.
-76 20-VOLTS D.C.	-76 .6-M.A.	-76 1.0-VOLT D.C.	-76 6.1-VOLTS D.C.

1937

PICKUP PART Nº 23223 | VOLUME CONTROL #176-AM-PART Nº 23209 | AMPLIFIER #671. 25-CYCLE #23744. 60-CYCLE #23004 | SPEAKER PART Nº 23089.



AMPLIFIER STARTS WITH SERIAL NO. 110001. TO 111000

ITEM	PART No.	VALUE	REMARKS
		RESISTORS	
R-1	22329	2,000 OHMS	±10% ½ WATT
R-2	21999	800 OHMS	±10% ½ WATT
R-3	20267	13,000 OHMS	±10% ½ WATT
R-4	23218	100,000 OHMS	±15% VOLUME CONTROL
R-5		150,000 OHMS	±15% VOLUME CONTROL
R-6	23208	60,000 OHMS	±10% ½ WATT
R-7	21988	100,000 OHMS	±10% ½ WATT
R-8	20750	500,000 OHMS	±20% ½ WATT
R-9	22329	2,000 OHMS	±10% ½ WATT
R-10	20787	5,000 OHMS	±10% ½ WATT
R-11	20787	5,000 OHMS	±10% ½ WATT
R-12	20704	3,500 OHMS	±10% ½ WATT
R-13	20704	3,500 OHMS	±10% ½ WATT
R-14	20750	500,000 OHMS	±10% ½ WATT
R-15	22356	65 OHMS	±5% ½ WATT
R-16	22329	2,000 OHMS	±5% 1 WATT
R-17	23014	100 OHMS	±5% ½ WATT
R-18	21938	100,000 OHMS	±10% ½ WATT
R-19	20726	250,000 OHMS	±20% ½ WATT
R-20	22338	2,000 OHMS	±5% 1 WATT
R-21	23224	60,000 OHMS	±10% ½ WATT
R-22	20838	100,000 OHMS	±10% ½ WATT
R-23	20445	20 OHMS	HUM CONTROL
R-24	22322	23,000 OHMS	±10% ½ WATT
R-25	22322	23,000 OHMS	±10% ½ WATT
R-26	23018	5,000 OHMS	±5% 10 WATT
R-27	23011	2,000 OHMS	±5% 10 WATT
R-28	23011	2,000 OHMS	±5% 10 WATT
R-29	23013	3,500 OHMS	±10% 10 WATT
R-30	23013	375 OHMS	BLEEDER 4 WATT
R-31		9,000 OHMS	BLEEDER 30 WATT
R-32		2,500 OHMS	BLEEDER 33 WATT
R-33	20246	75,000 OHMS	±10% ½ WATT

ITEM	PART No.	VALUE	REMARKS
		CONDENSERS	
C-1	21990	.25 MFD.	±10% 200 VOLT
C-2	22535	.75 MFD.	-10%+20% 200 VOLT
C-3	23221	.18 MFD.	±10% 200 VOLT
C-4	22544	.15 MFD.	±10% 200 VOLT
C-5	22544	.15 MFD.	±10% 200 VOLT
C-6	22509	.0023 MFD.	±10%
C-7	22532	.004 MFD.	±10%
C-8	22536	.015 MFD.	±10% 200 VOLT
C-9	21993	.05 MFD.	±20% 400 VOLT
C-10	21734	.1 MFD.	±20% 400 VOLT
C-11	23010	10 MFD.	25 VOLT
C-12	23009	12 MFD.	150 VOLT
C-13	20778	.5 MFD.	±25% 400 VOLT

ITEM	PART No.	VALUE	REMARKS
C-14	23021	8 MFD.	150 VOLT
C-15		8 MFD.	150 VOLT
C-16	23020	28 MFD.	450 VOLT
C-17		6 MFD.	500 VOLT
C-18		4 MFD.	600 VOLT
C-19	22121	1.25 MFD.	±10% 200 VOLT
		CHOKES	
L-1	23214		CHOKE TONE CONTROL
L-2	23216		TREBLE TONE CONTROL
L-3	23217		CHOKE ASSEMBLY
L-4	23018		22 HENRY CHOKE
L-5	23017		4½ HENRY CHOKE
L-6	23746		CHOKE
		TRANSFORMERS	
T-1	21948		AUDIO INPUT
T-2	23014		AUDIO OUTPUT
T-3	23016		POWER TRANSFORMER

VOLTAGES AND CURRENTS OF MODEL #671-AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS.
ALL VOLTAGES MEASURED WITH 1,000-OHMS PER VOLT VOLTMETER.

AVERAGE PLATE VOLTAGE MEASURED FROM PLATE + TO CHASSIS −.		
OUTPUT	-45	355-VOLTS D.C.
DRIVER	-45	327-VOLTS D.C.
	-30	175-VOLTS D.C.
	-30	80-VOLTS D.C.

AVERAGE PLATE CURRENT:-		
OUTPUT	-45	28.0-M.A.D.C.
DRIVER	-45	38.0-M.A.D.C.
	-30	2.1-M.A.D.C.
	-30	1.5-M.A.D.C.

AVERAGE GRID VOLTAGE MEASURED FROM GRID TO FILAMENT.		
OUTPUT	-45	87-VOLTS D.C.
DRIVER	-45	40-VOLTS D.C.

AVERAGE FILAMENT VOLTAGE:-		
RECTIFIER	523	5.0-VOLTS A.C.
OUTPUT	-45	2.5-VOLTS A.C.
DRIVER	-45	2.5-VOLTS A.C.
	-30	2.1-VOLTS D.C.

AVERAGE VOLTAGES ACROSS SPEAKER FIELDS AND ELECTROLYTIC CONDENSERS.
3200-OHM SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #7-CONTACT ON SPEAKER SOCKET 205-VOLTS D.C.
2500-OHM AUXILIARY SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #3-CONTACT ON SPEAKER SOCKET 155-VOLTS D.C.

C-18	ELECTROLYTIC	385-VOLTS D.C.
C-17	ELECTROLYTIC	360-VOLTS D.C.
C-16	ELECTROLYTIC	355-VOLTS D.C.

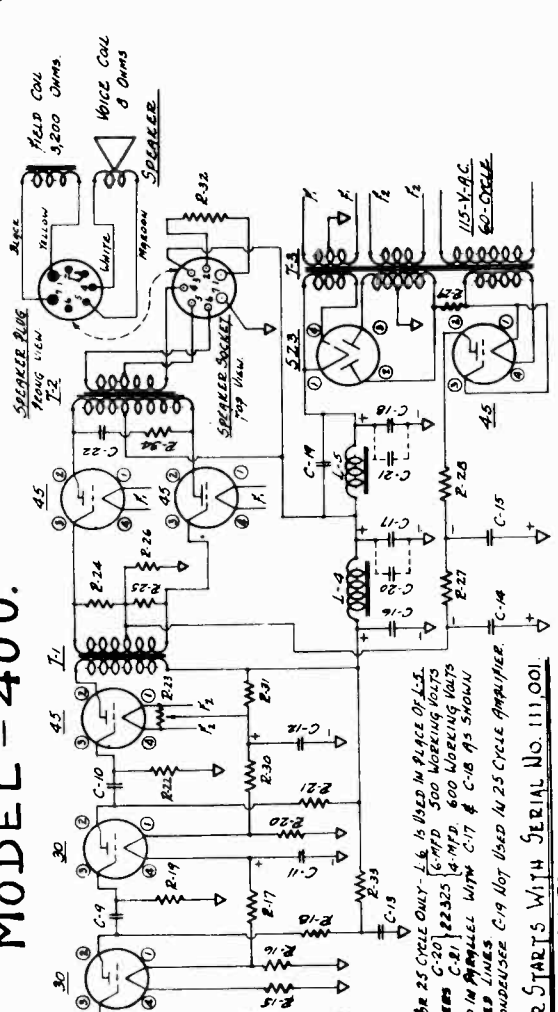
FROM RECTIFIER -45-PLATE- TO CHASSIS + 150-VOLTS D.C.

MODEL 400
Ser #111001-111500
Schematic, Voltage
Parts

THE RUDOLPH WURLITZER CO.

PICKUP PART Nº 23223 | VOLUME CONTROL *276-AM-PART Nº 24065 | AMPLIFIER *672-60 CYCLE *24062 | SPEAKER PART Nº 23089

MODEL - 400.



ITEM	PART NO	VALUE	REMARKS
RESISTORS			
R-1	22368	3,000 OHMS	½ WATT ±10%
R-2	21999	800 OHMS	½ WATT ±10%
R-3	21992	35,000 OHMS	½ WATT ±10%
R-4		100,000 OHMS	±15% VOLUME CONTROL
R-5	23215	150,000 OHMS	±15% VOLUME CONTROL
R-6	23084	25,000 OHMS	½ WATT ±10%
R-7	23084	25,000 OHMS	½ WATT ±10%
R-8			
R-9	20704	3,500 OHMS	½ WATT ±10%
R-10	20787	5,000 OHMS	½ WATT ±10%
R-11	22783	7,000 OHMS	½ WATT ±10%
R-12	20704	3,500 OHMS	½ WATT ±10%
R-13	20704	3,500 OHMS	½ WATT ±10%
R-14	20750	500,000 OHMS	½ WATT ±10%
R-15	22354	65 OHMS	½ WATT ± 5%
R-16	22323	2,000 OHMS	1 WATT ± 5%
R-17	23014	100 OHMS	½ WATT ± 5%
R-18	21956	100,000 OHMS	½ WATT ±10%

ITEM	PART NO	VALUE	REMARKS
RESISTORS			
R-19	20728	250,000 OHMS	½ WATT ±20%
R-20	22323	2,000 OHMS	1 WATT ± 5%
R-21	23208	60,000 OHMS	½ WATT ±10%
R-22	20655	150,000 OHMS	½ WATT ±10%
R-23	2C.145	20 OHMS	HUM CONTROL
R-24	22322	25,000 OHMS	½ WATT ±10%
R-25	22322	25,000 OHMS	½ WATT ±10%
R-26	23012	5,000 OHMS	10 WATT ± 5%
R-27	23011	2,000 OHMS	10 WATT ± 5%
R-28	23011	2,000 OHMS	10 WATT ± 5%
R-29	23013	3,500 OHMS	10 WATT ±10%
R-30		375 OHMS	BLEEDER 4 WATT
R-31	23015	9,000 OHMS	BLEEDER 30 WATT
R-32		2,500 OHMS	BLEEDER 33 WATT
R-33	20266	75,000 OHMS	½ WATT ±10%
R-34	24064	7,000 OHMS	10 WATT ± 5%

ITEM	PART NO	VALUE	REMARKS
CONDENSERS			
C-1	21940	2.5 MFD	±10% 200 VOLT
C-2	22535	.75 MFD	-10% +20% 200 VOLT
C-3	23221	.18 MFD	±10% 200 VOLT
C-4	22564	.15 MFD	±10% 200 VOLT
C-5	22564	.15 MFD	±10% 200 VOLT
C-6	22589	.0025 MFD	±10%
C-7	22532	.004 MFD	±10%
C-8	22536	.015 MFD	±10% 200 VOLT
C-9	21993	.05 MFD	±20% 400 VOLT
C-10	21736	.1 MFD	±20% 400 VOLT
C-11	23010	.10 MFD	25 VOLT
C-12	23009	.12 MFD	150 VOLT
C-13	20775	.5 MFD	±25% 400 VOLT
C-14	23021	8 MFD	150 VOLT
C-15		8 MFD	150 VOLT
C-16		25 MFD	450 VOLT
C-17	23020	6 MFD	300 VOLT
C-18		4 MFD	600 VOLT

ITEM	PART NO	VALUE	REMARKS
C-19	22121	1.25 MFD	±10% 200 VOLT
C-20		6 MFD	300 VOLT
C-21	22325	4 MFD	600 VOLT
C-22	24013	.015 MFD	±10% 600 VOLT
C-23	22531	.003 MFD	± 10%
CHOKES			
L-1	24195		CHOKE TONE CONTROL
L-2	24318		REJECTOR TONE CONTROL
L-3	21693		CHOKE ASSEMBLY
L-4	23018		#2 FILTER CHOKE
L-5	23017	60 CYCLE ONLY	#1 FILTER CHOKE
L-6	23.746	25 CYCLE ONLY	#1 FILTER CHOKE
TRANSFORMERS			
T-1	21548		AUDIO INPUT
T-2	23019		AUDIO OUTPUT
T-3	23016		POWER TRANSFORMER

VOLTAGES AND CURRENTS OF MODEL #672-AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS.

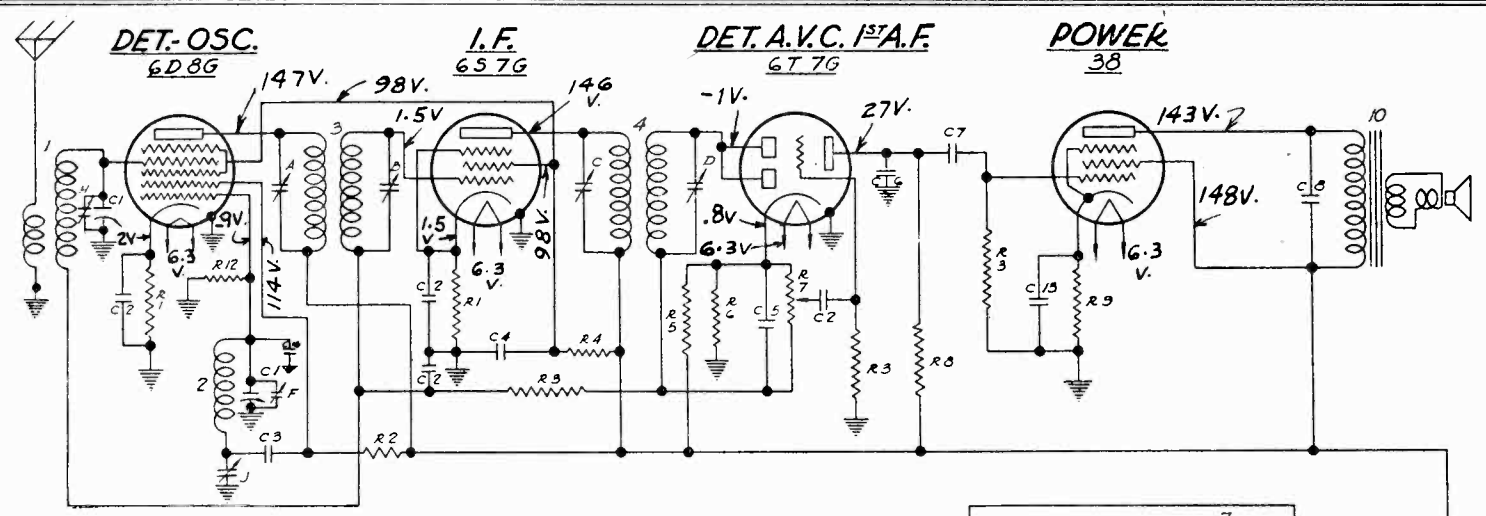
ALL VOLTAGES MEASURED WITH 1,000-OHMS PER VOLT VOLTMETER.

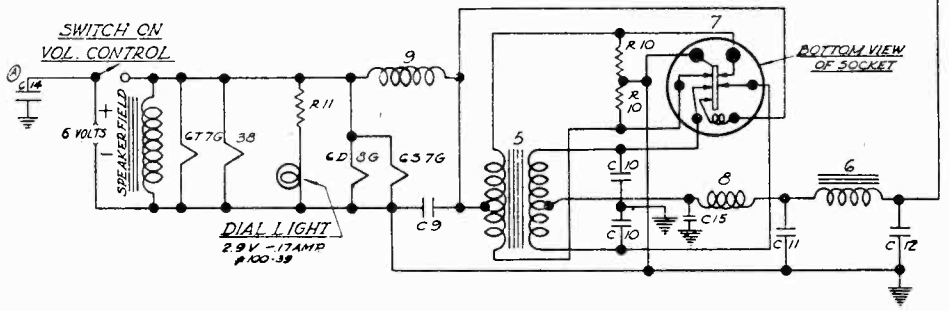
AVERAGE PLATE VOLTAGE MEASURED FROM	AVERAGE PLATE CURRENT:-	AVERAGE GRID VOLTAGE MEASURED FROM GRID TO FILAMENT.	AVERAGE FILAMENT VOLTAGE:-
PLATE + TO CHASSIS —.	OUTPUT -45 28.0-M.A.D.C.	OUTPUT -45 87-VOLTS D.C.	RECTIFIER 523 5.0-VOLTS A.C.
OUTPUT - 45 355-VOLTS D.C.	DRIVER -45 38.0-M.A.D.C.	DRIVER -45 40-VOLTS D.C.	OUTPUT -45 2.5-VOLTS A.C.
DRIVER -45 327-VOLTS D.C.	-30 2.1-M.A.D.C.	-30	DRIVER -45 2.5-VOLTS A.C.
-30 175-VOLTS D.C.	-30 1.5-M.A.D.C.		-30 2.1-VOLTS D.C.
-30 80-VOLTS D.C.			

AVERAGE VOLTAGES ACROSS SPEAKER FIELDS AND ELECTROLYTIC CONDENSERS.
3200-OHM SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #7-CONTACT ON SPEAKER SOCKET 205-VOLTS D.C.
2500-OHM AUXILIARY SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #3-CONTACT ON SPEAKER SOCKET 155-VOLTS D.C.

C-18	ELECTROLYTIC 385-VOLTS D.C.	FROM RECTIFIER -45-PLATE — TO CHASSIS + 150-VOLTS D.C.
C-17	ELECTROLYTIC 360-VOLTS D.C.	
C-16	ELECTROLYTIC 355-VOLTS D.C.	

ZENITH RADIO CORP.



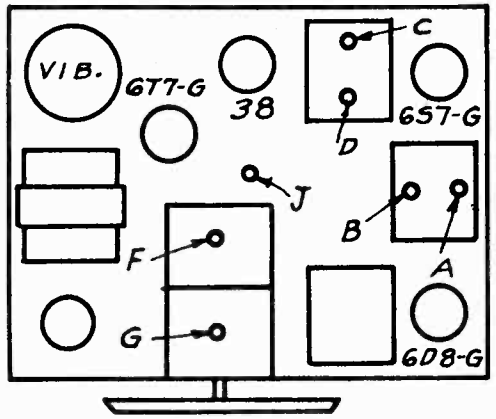


DIAG Nº	PART Nº	DESCRIPTION	DIAG Nº	PART Nº	DESCRIPTION
C-1	22-406	TWO GANG VARI COND.	1	5-5215	ANT. COIL & SHIELD ASSEM.
C-2	22-250	.05 MFD. 200V.	2	5-4662	OSCIL. COIL ASSEMBLY
C-3	22-358	.002 MFD. 600V.	3	95-443	1ST I.F. TRANSFORMER
C-4	22-243	.01 MFD. 400V.	4	95-444	2ND I.F. TRANSFORMER
C-5	22-162	.0001 MFD. 600V.	5	95-445	POWER TRANSFORMER
C-6	22-147	.0005 MFD. 600V.	6	95-298	POWER CHOKE
C-7	22-212	.05 MFD. 400V.	7	190-6	VIBRATOR
C-8	22-492	.002 MFD. 600V.	8	20-82	R.F. CHOKE
C-9	22-199	.5 MFD. 200V.	9	5-2778	R.F. CHOKE
C-10	22-455	.01 MFD. 1200V.	10		SPEAKER TRANSFORMER
C-11		2 MFD. ELECTROLYTIC 250V.			
C-12	22-582	8 MFD. ELECTROLYTIC 250V.			
C-13		10 MFD. ELECTROLYTIC 25 V.			
C-14	22-330	.25 MFD. 200 V.			
C-15	22-179	1 MFD. 400 V.			
R-1	63-632	560 OHM ½W. ±10			VARIABLE TRIMMERS
R-2	63-150	10 M OHM ½W. ±20	A		1ST I.F. TRANSF. PRIMARY
R-3	63-271	1 MEGOHM ½W. ±20	B		1ST I.F. TRANSF. SECONDARY
R-4	63-681	56 M ½W. ±10	C		2ND I.F. TRANSF. PRIMARY
R-5	63-160	100 M ½W. ±10	D		2ND I.F. TRANSF. SECONDARY
R-6	63-634	820 OHM ½W. ±10	F		BROADCAST OSCIL. (ON GANG)
R-7	63-547	400 MOHM VOLUME CONTROL	H		ANT. BROADCAST (ON GANG)
R-8	63-597	470 M OHM ½W. ±20	J	22-519	OSCILLATOR PADDER
R-9	63-418	1500 OHM ½W. ±10			
R-10	63-577	100 OHM ½W. ±20			
R-11	63-800	2.6 OHM WIREWOUND 1 W. ±5			
R-12	63-593	47 M OHM ½W. ±20			
C-16	22-585	5 MMFD CERAMIC			

4 TUBE BATTERY SUPERHETERODYNE
I.F. - FREQUENCY 456 K.C.

FOR PHONO. DATA, SEE INDEX

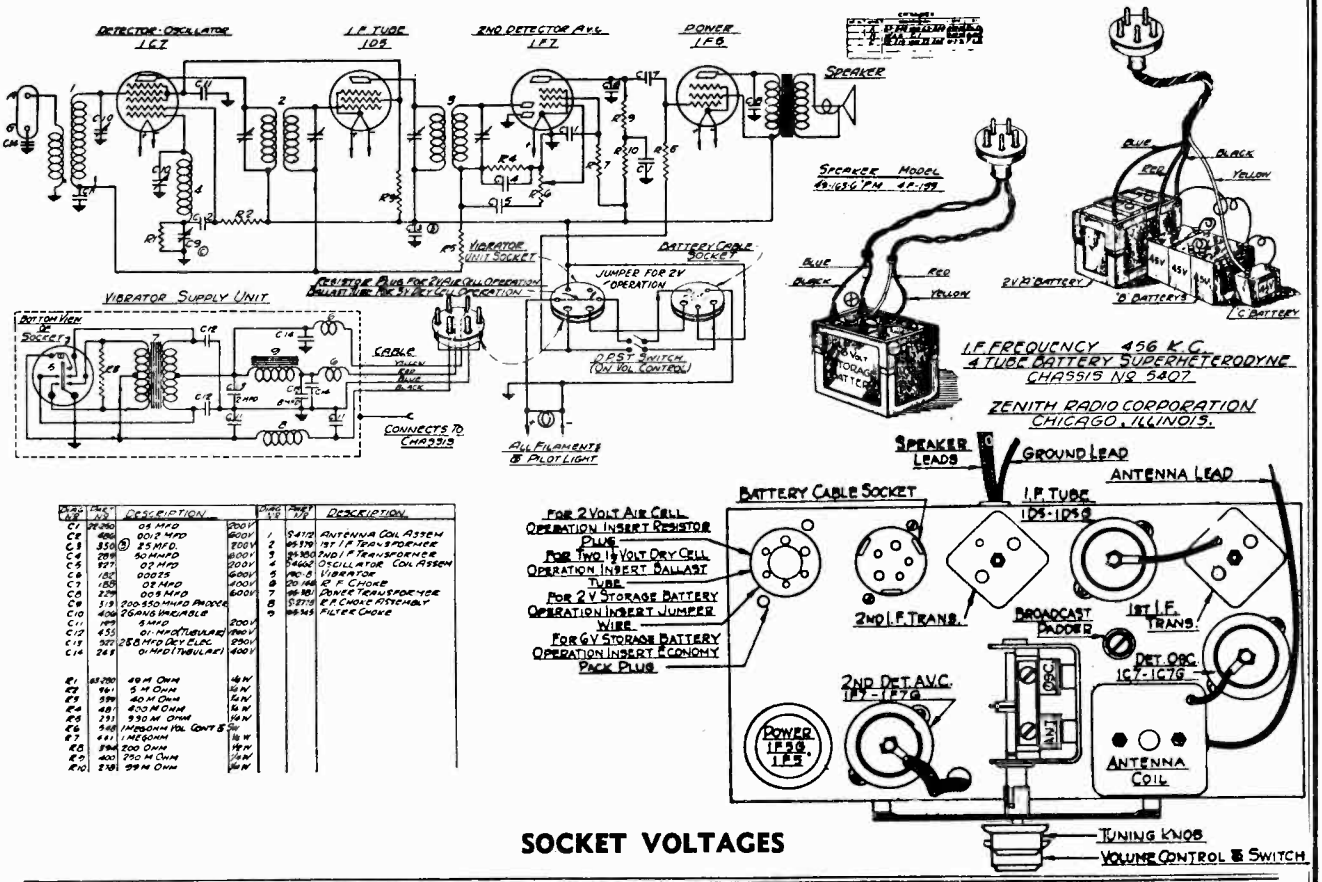
ALIGNMENT PROCEDURE



Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.	1500	"	1500	FG	Repeat 3 & 4.

MODEL 4F133
Chassis 5407
Schematic, Voltage
Socket, Trimmers
Alignment, Parts
Battery Conn.

ZENITH RADIO CORP.



SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
1C7	1st Det. Osc.	0	2	128	48	—2	112	0	0	0
1D5	I.F.	0	2	126	48	—	—	0	0	0
1F7	2nd Det. A.V.C.	0	2	27	0	0	9	0	0	0
1F5	Power	0	2	122	126	0	—	0	0	—

All voltages measured with a 1000 ohm per volt D.C. meter and using the Zenith 6 V Economy Pack—Antenna and ground disconnected.

Battery Voltage—6.3 V.

Battery Drain—.98 amp.

ALIGNMENT

Connect the output leads of the signal generator to the grid of the first detector and receiver ground lead. Also connect an output meter across the speaker leads.

Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the greatest output reading. These I.F. transformers are of a very high gain, selective type, and the adjustments should be repeated several times for greatest accuracy.

Change the signal generator leads to the antenna and ground terminals of the receiver.

Set the signal generator at 1400 K.C. Set the pointer on the receiver dial at the same frequency.
First adjust the oscillator and then the detector trimmers on the gang condenser to the point giving the maximum reading on the output meter, using as small a signal from the generator as possible so as to prevent the A.V.C. action from affecting the output readings.

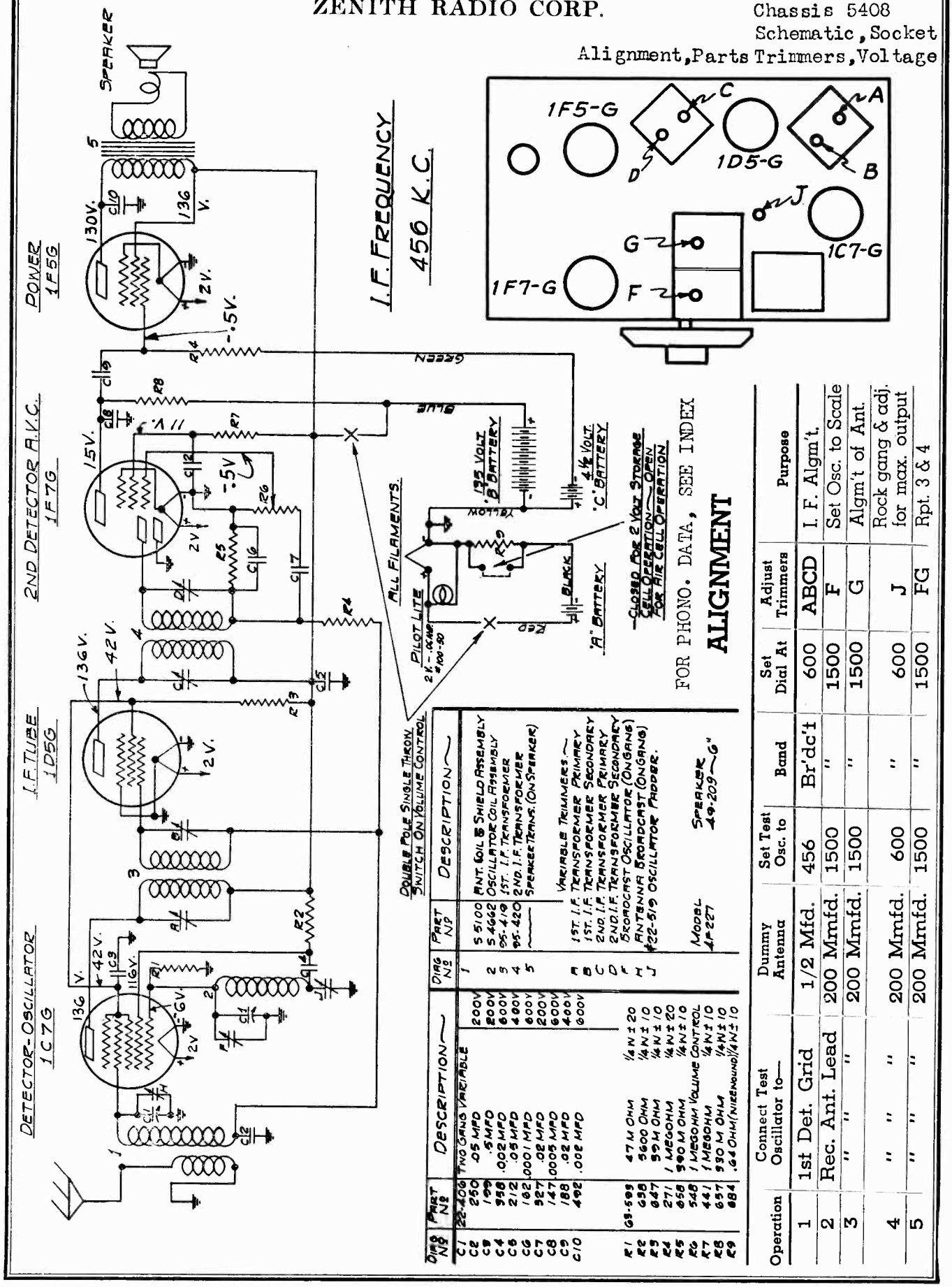
Reset the signal generator to 600 K.C.

Slowly rock the pointer past 600 K.C. on dial meanwhile adjusting the osc. padder (located in rear of gang condenser) to the combination giving the greatest output reading.

Repeat operation No. 4.

ZENITH RADIO CORP.

MODEL 4F227
Chassis 5408
Schematic, Socket
Alignment, Parts Trimmers, Voltage

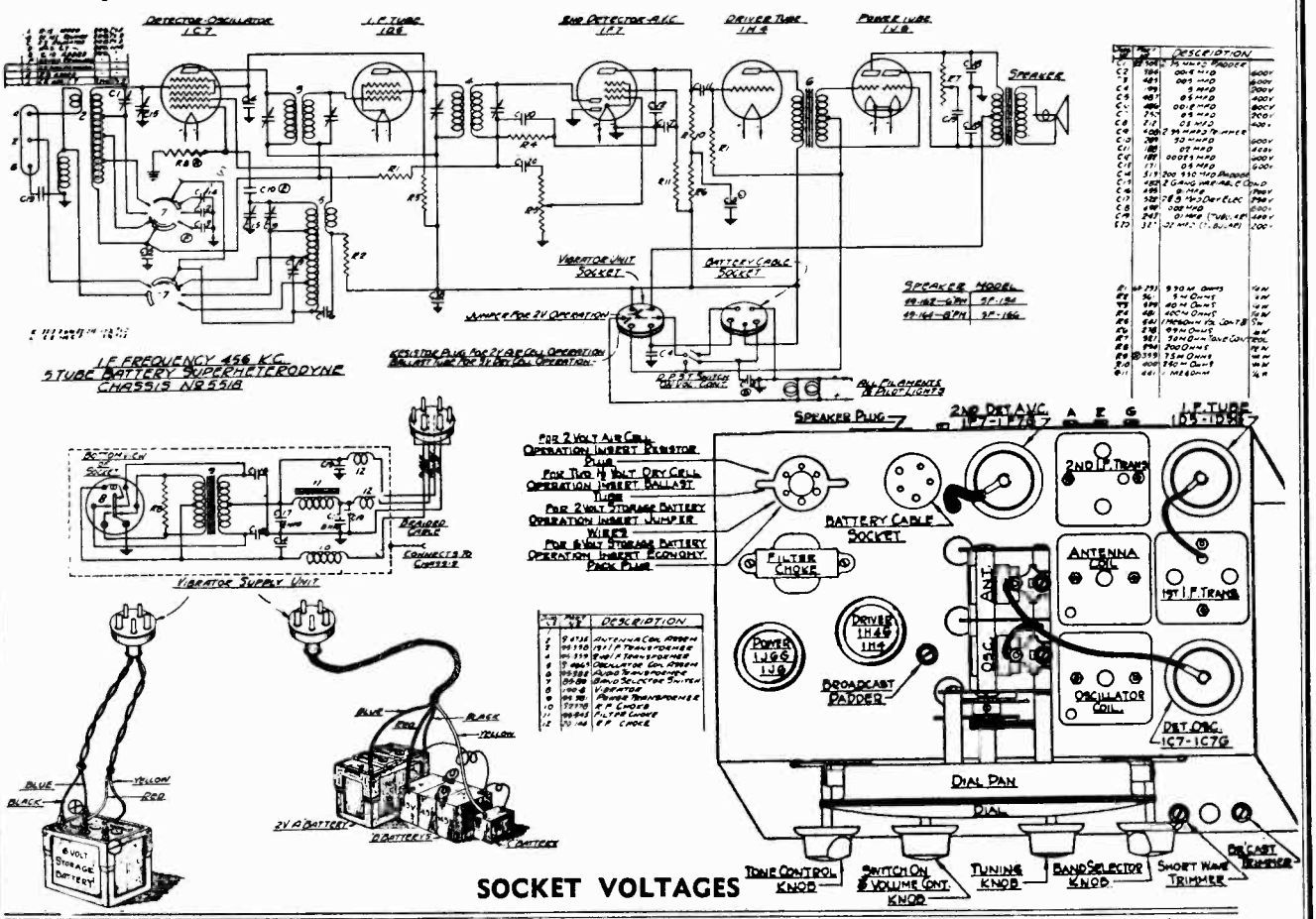


Dwg No	Part No	Description	Dwg No	Part No	Description
C1	22-406	TWO GANG VARIABLE	1		
C2	250	.05 MFD 200V	2	S 5100	ANT. COIL & SHIELD ASSEMBLY
C3	199	.5 MFD 200V	3	S 4662	OSCILLATOR COIL ASSEMBLY
C4	198	.002 MFD 600V	4	95-419	1ST. I.F. TRANSFORMER
C5	212	.05 MFD 400V	5	95-420	2ND. I.F. TRANSFORMER
C6	102	.0001 MFD 600V	~~~	~~~	SPEAKER TRANS. (ON SPEAKER)
C7	327	.02 MFD 200V			VARIABLE TRIMMERS —
C8	147	.0005 MFD 600V	A		1ST. I.F. TRANSFORMER PRIMARY
C9	188	.02 MFD 400V	B		1ST. I.F. TRANSFORMER SECONDARY
C10	492	.002 MFD 600V	C		2ND I.F. TRANSFORMER PRIMARY
			D		2ND I.F. TRANSFORMER SECONDARY
			F		BROADCAST OSCILLATOR (ON GANG)
			H		ANTENNA BROADCAST (ON GANG) #22-519 OSCILLATOR PADDER.
			J		
				MODEL 4F227	SPEAKER 49-209 — 6"
R1	GS-593	47 M OHM ¼ W ± 20			
R2	638	5600 OHM ¼ W ± 10			
R3	647	99 M OHM ¼ W ± 10			
R4	271	1 MEGOHM ¼ W ± 20			
R5	658	990 M OHM ¼ W ± 10			
R6	548	1 MEGOHM VOLUME CONTROL ¼ W ± 10			
R7	441	1 MEGOHM ¼ W ± 10			
R8	657	930 M OHM ¼ W ± 10			
R9	684	.44 OHM (NICHROME WIRE) ¼ W ± 10			

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Algm't.
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" "	200 Mmfd.	1500	"	1500	G	Algm't of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.	1500	"	1500	FG	Rpt. 3 & 4

MODELS 5F134, 5F166
Chassis 5518
Schematic, Voltage
Socket, Trimmers
Alignment, Parts
Battery Conn.

ZENITH RADIO CORP.



SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
1C7	1st Det. Osc.	0	2	130	53	0	115	0	0	0
1D5	I.F.	0	2	130	53	—	—	0	0	0
1F7	2nd Det. A.V.C.	0	2	24	0	0	15	0	0	0
1H4	Driver	0	2	120	—	0	—	0	0	—
1J6	Power	0	2	143	—1	—1	143	0	0	—

All voltages measured with a 1000 ohm per volt D.C. meter and using the Zenith 6 V Economy Pack—Antenna and ground disconnected.

Battery Voltage—6.3 V.

Battery Drain—1.1 ampere

ALIGNMENT PROCEDURE

Connect the output leads of the signal generator to grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading on the output meter. The I. F transformers are of a very high gain, selective type, and these adjustments should be repeated several times in order to secure maximum accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

Change the signal generator leads to the antenna and ground terminals of the receiver.

Set signal generator at 5 M.C. Switch receiver to band B and adjust osc. trimmer on gang for correct dial reading.

Set signal generator at 1400 K.C. Switch receiver to band A and adjust broadcast trimmer (located at front of chassis—see diagram below) for correct dial reading. Also adjust antenna trimmer on gang to resonance.

Set signal generator at 18 M.C.—Switch receiver to band C and adjust the short wave trimmer while rocking the pointer past 18 M.C. on the dial to the combination giving the greatest output.

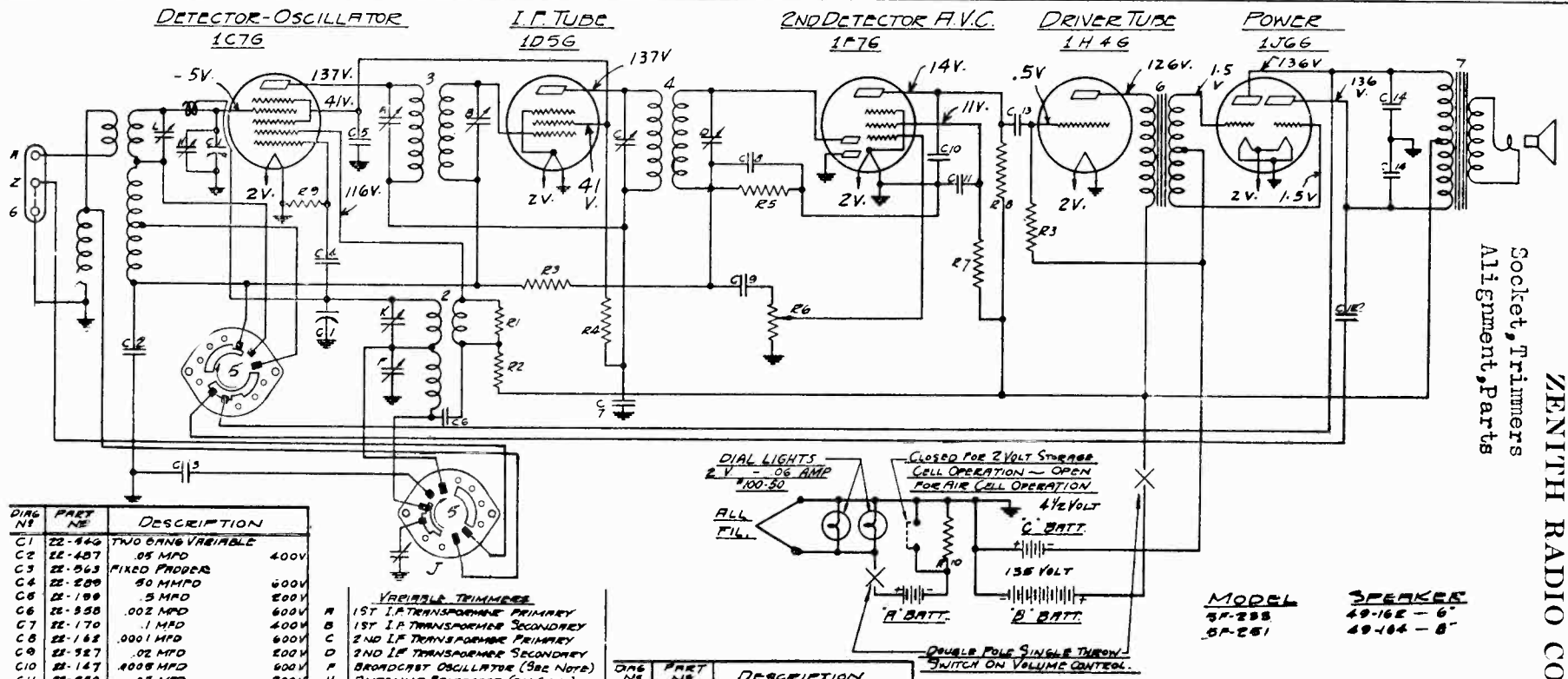
Set signal generator at 600 K.C.—Switch receiver to band A and rock pointer past 600 on dial while adjusting the broadcast padder (located adjacent to gang condenser) to combination giving the greatest output reading.

Readjust broadcast and ant trimmers at 1400 K.C. (Same as No. 5).

ZENITH RADIO CORP.

Socket, Trimmers
Alignment, Parts

MODELS 5F233, 5F251
Chassis 5522
Schematic, Voltage



DIAG No	PART No	DESCRIPTION	
C1	22-446	TWO GANG VARIABLE	
C2	22-487	.05 MFD	400V
C3	22-563	FIXED PADDER	
C4	22-288	50 MMFD	600V
C5	22-199	.5 MFD	200V
C6	22-358	.002 MFD	600V
C7	22-170	.1 MFD	400V
C8	22-162	.0001 MFD	600V
C9	22-327	.02 MFD	200V
C10	22-167	.0008 MFD	600V
C11	22-290	.03 MFD	200V
C12	22-171	.05 MFD	600V
C13	22-188	.02 MFD	400V
C14	22-492	.002 MFD	600V
R1	63-559	10 M OHM	½W ± 20
R2	63-638	5600 OHM	½W ± 10
R3	63-671	1 MEGOHM	½W ± 20
R4	63-648	47 M OHM	½W ± 10
R5	63-668	390 M OHM	½W ± 10
R6	63-541	1 MEGOHM VOLUME CONTROL	
R7	63-641	1 MEGOHM	½W ± 10
R8	63-667	330 M OHM	½W ± 10
R9	63-646	93 M OHM	½W ± 10
R10	63-612	24 OHM (WIREWOUND)	1W ± 10

VARIABLE TRIMMERS

A	1ST I.P. TRANSFORMER PRIMARY
B	1ST I.P. TRANSFORMER SECONDARY
C	2ND I.F. TRANSFORMER PRIMARY
D	2ND I.F. TRANSFORMER SECONDARY
F	BROADCAST OSCILLATOR (SEE NOTE)
H	ANTENNA BROADCAST (ON GANG)
J	PEE-510 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR 22-305

NOTE: TRIMMERS F & K MOUNTED ON BAKELITE STRIP PART # 22-408

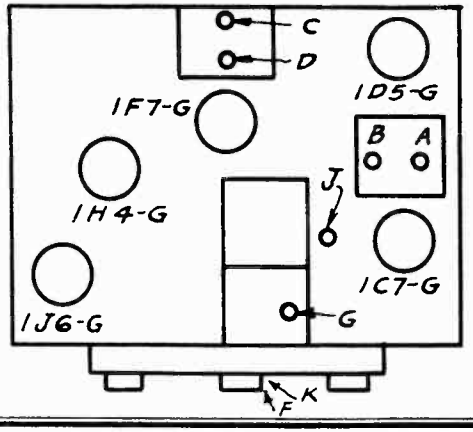
DIAG No	PART No	DESCRIPTION
1	55183	ANT. COIL & SHIELD ASSEMBLY
2	54909	OSCILLATOR COIL ASSEMBLY
3	98-407	1ST I.F. TRANSFORMER
4	98-408	2ND I.F. TRANSFORMER
5	85-104	BAND SELECTOR SWITCH
6	98-440	AUDIO TRANSFORMER
7		SPEAKER TRANSFORMER (ON SP'KR)

MODEL	SPEAKER
5F-233	49-162 — 6"
5F-251	49-164 — 8"

I.F. FREQUENCY 456 K.C.

5 TUBE BATTERY SUPERHETERODYNE

FOR PHONO. DATA, SEE INDEX



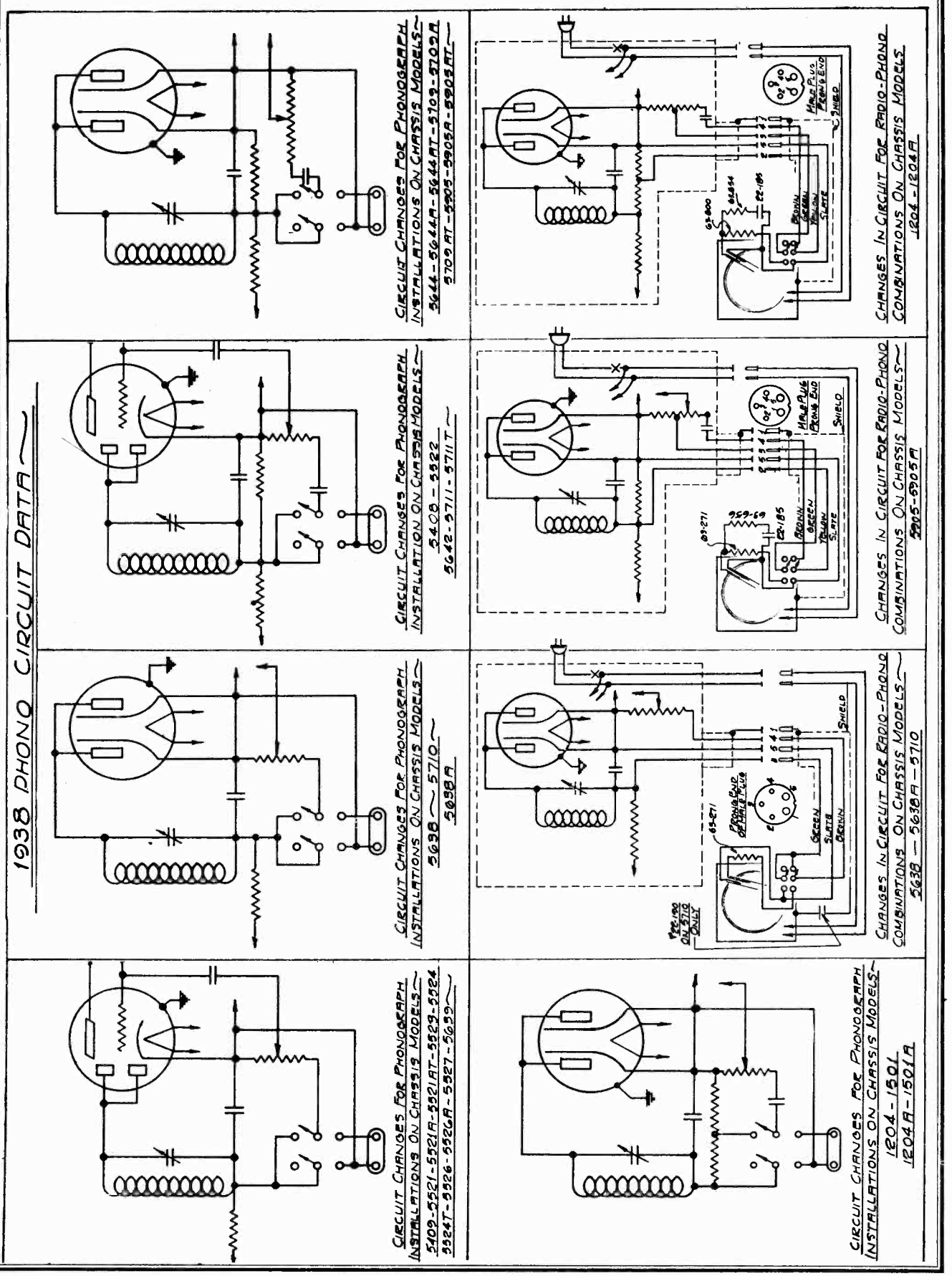
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
5				"		FG	Repeat 3 & 4.
6	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output.

MODELS 1938 Receivers
Phono.Circuits

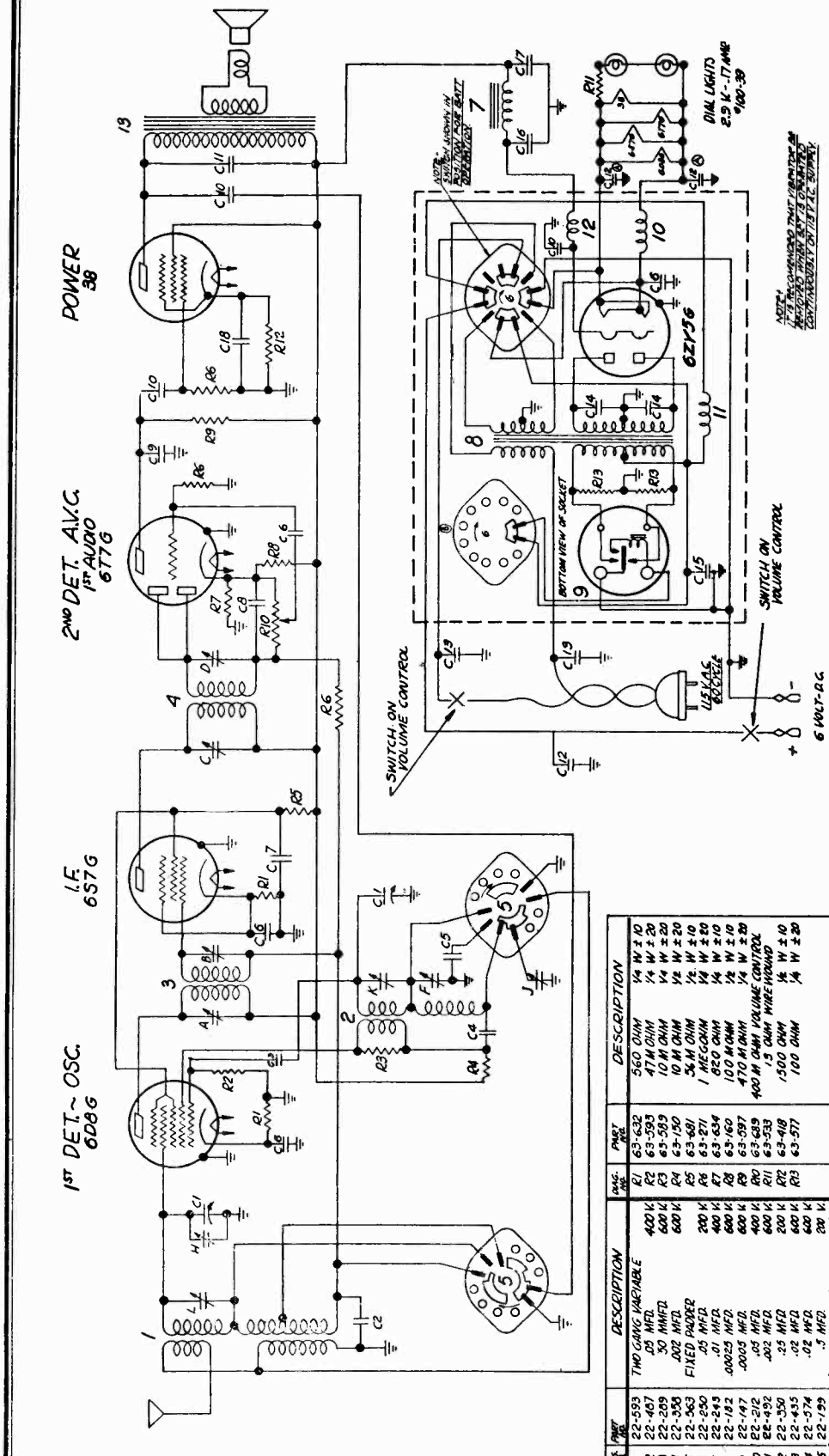
ZENITH RADIO CORP.

1938 PHONO CIRCUIT DATA



ZENITH RADIO CORP.

MODELS 5J217, 5J247, 5J255
Chassis 5524
Schematic, Parts



MFG. DES.	PART NO.	DESCRIPTION
C1	22-593	.05 MFD. TWO GANG VARIABLE 400 V.
C2	22-467	.00 MFD. " " 400 V.
C3	22-269	30 MMFD. " " 600 V.
C4	22-358	.002 MFD. " " 600 V.
C5	22-363	FIXED PADDER
C6	22-230	.05 MFD. 200 V.
C7	22-243	.01 MFD. 400 V.
C8	22-182	.00025 MFD. 600 V.
C9	22-147	.0005 MFD. 600 V.
C10	22-212	.05 MFD. 400 V.
C11	22-492	.002 MFD. 600 V.
C12	22-350	.25 MFD. 200 V.
C13	22-435	.02 MFD. 600 V.
C14	22-574	.02 MFD. 600 V.
C15	22-199	.5 MFD. 200 V.
C16	22-577	8 MFD ELECTROLYTIC 250 V.
C17		8 MFD " 250 V.
C18		(10 MFD " 25 V.
		VARIABLE TRIMMERS
A		1ST I.F. TRANSFORMER PRIMARY
B		1ST I.F. TRANSFORMER SECONDARY
C		2ND I.F. TRANSFORMER PRIMARY
D		2ND I.F. TRANSFORMER SECONDARY
E		BROADCAST OSCILLATOR (see note)
H		ANTENNA BROADCAST (AV trim)
J		*22-519 BROADCAST PADDER
K		SHORT WAVE OSCILLATOR (see note)
L		SHORT WAVE DETECTOR (see note)

NOTE— TRIMMERS F, K, & L MOUNTED ON BAKELITE STRIP *22-324

MFG. DES.	PART NO.	DESCRIPTION
R1	63-632	560 OHM ¼ W ± 10
R2	63-593	47 M OHM ¼ W ± 20
R3	63-589	10 M OHM ¼ W ± 20
R4	63-150	10 M OHM ½ W ± 20
R5	63-681	34 M OHM ½ W ± 10
R6	63-271	1 MEGOHM ¼ W ± 20
R7	63-634	820 OHM ¼ W ± 10
R8	63-160	100 M OHM ½ W ± 10
R9	63-597	470 M OHM ¼ W ± 20
R10	63-639	400 M OHM VOLUME CONTROL
R11	63-533	15 OHM WIREWOUND
R12	63-418	1500 OHM ½ W ± 10
R13	63-577	100 OHM ¼ W ± 20
1	5-5303	ANT. COIL & SHIELD ASSEMBLY
2	5-4909	OSCILLATOR COIL ASSEMBLY
3	95-443	1ST I.F. TRANSFORMER
4	95-444	2ND I.F. TRANSFORMER
5	85-104	BAND SELECTOR SWITCH
6	85-425	POWER SUPPLY SWITCH
7	95-298	POWER CHOKE
8	95-425	POWER TRANSFORMER
9	190-11	VIBRATOR
10	5-2178	R.F. CHOKE ASSEMBLY
11	5-5040	R.F. CHOKE ASSEMBLY
12	20 82	R.F. CHOKE
13		SPEAKER TRANSFORMER

MODEL	SPEAKER	
5-J-217	49-153	6"
5-J-247	49-153	6"
5-J-255	49-230	8"

FOR PHONO. DATA, SEE INDEX

I.F. FREQUENCY 456 K.C.
5 TUBE BATTERY SUPERHETERODYNE
6 VOLT D.C. # 115 VOLT A.C.
Models 5-J-217, 5-J-247, 5-J-255 (5524 Chassis)

ZENITH RADIO CORP.
CHICAGO, ILLINOIS

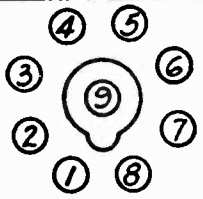
MODELS 5J217, 5J247, 5J255
Chassis 5524

ZENITH RADIO CORP.

Voltage, Socket, Trimmers Alignment

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6D8	Converter Osc.	0	0	129	42.5	—2	110	6.3	1.5	0
6S7	I. F.	0	0	130	42.5	1.5	—	6.3	1.5	0
6T7	2nd Det. A.V.C. 1st Audio	0	0	23	.1	.1	—	6.3	.5	0
6ZY5G	Rect.	0	6.3	—3.5	—	—3.5	—	0	140	—
		H	P	S	K	H	G			
38	Power	0	124	129	12	6.3	0			



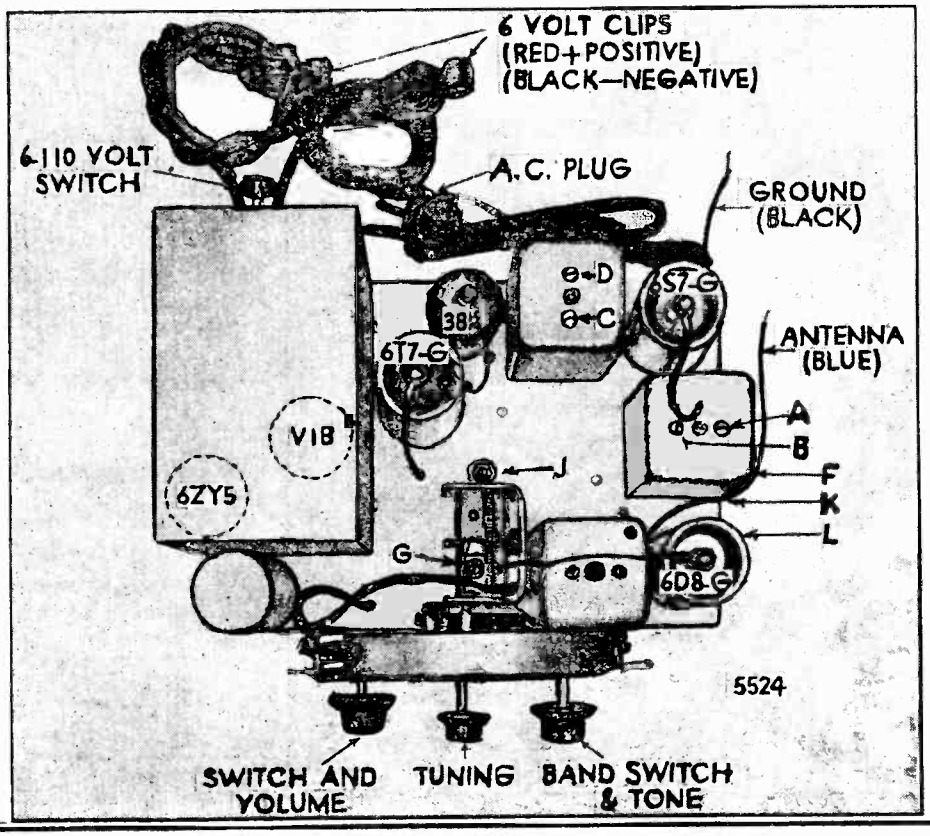
BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 16W. Battery voltage 6.3V consumption 2.1 Amp. Power Output .84W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
5				"		FG	Repeat 2 & 3.
6	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output.

LOCATION OF TRIMMERS



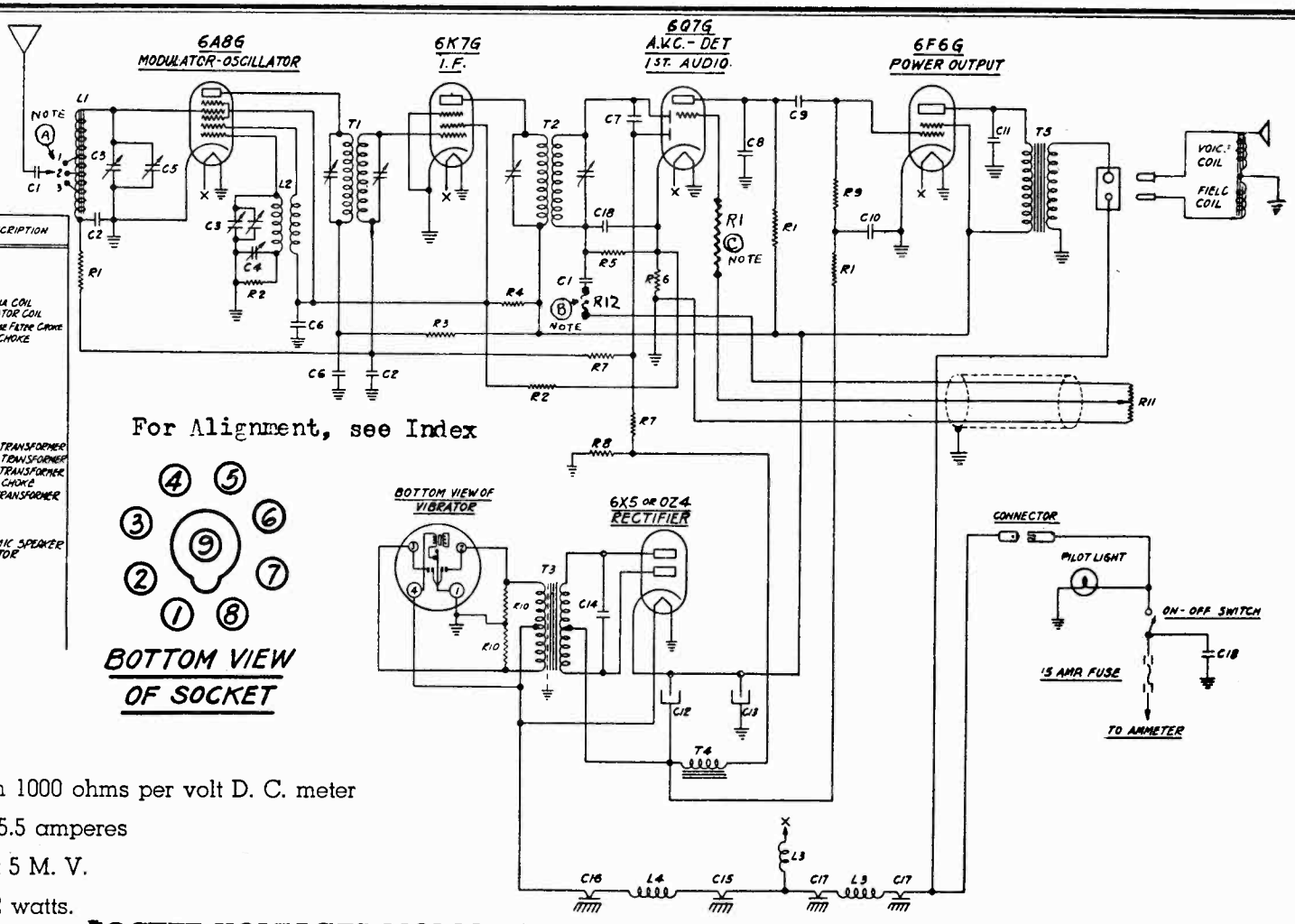
MODEL 5M191
Chassis 5520
Schematic, Voltage
Changes, Parts

ZENITH RADIO CORP

CHANGES ON 5M-191

LETTER	DESCRIPTION	DATE
A	TAPS REVISED	1-4-37
B	RESISTOR ADDED (R12)	1-4-37
C	RESISTOR ADDED (R 1)	1-4-37

DIAG. NO.	PART NUMBER	DESCRIPTION	DIAG. NO.	PART NUMBER	DESCRIPTION
R1	63-550	2.40M OHMS 1/4W.			
R2	63-490	49M OHMS 1/4W.			
R3	63-506	1500 OHMS 1/4W.			
R4	63-555	9500 OHMS 2W			
R5	63-491	490M OHMS 1/4W.	L1	20-152	ANTENNA COIL
R6	63-423	600 OHMS 1/4W.	L2	5-4778	OSCILLATOR COIL
R7	63-464	1 MEG 1/4W.	L3	5-4791	NOISE FILTER CHOKE
R8	63-554	40 OHMS 1/4W	L4	3-2778	HASH CHOKE
R9	63-427	500M OHMS 1/4W.			
R10	63-563	80 OHMS 1/4W.			
R11	63-551	1 MEG VOL. CONTROL			
R12	63-552	99m ohms 1/4W			
C1	22-327	.02 MFD. 200V.	T1	95-400	1ST I.F. TRANSFORMER
C2	22-250	.05 MFD. 200V.	T2	95-401	2ND I.F. TRANSFORMER
C3	22-533	2 GANG VAR. COND. (365 I.S.)	T3	95-389	POWER TRANSFORMER
C4	22-463	800-740 MMFD. PADDER	T4	95-396	POWER CHOKE
C5	22-538	1-12MMFD AIR TRIMMER	T5	95-399	AUDIO TRANSFORMER
C6	22-170	.1 MFD. 400V.			
C7	22-289	.00005 MFD 600V			
C8	22-162	.0001 MFD 600V			
C9	22-212	.05 MFD. 400V.		49-170	DYNAMIC SPEAKER
C10	22-540	.25 MFD. 200V.		190-9	VIBRATOR
C11	22-229	.005 MFD. 600V.			
C12	22-528	4 MFD 350V.			
C13		8 MFD. 350V.			
C14	22-535	.008 MFD. 1400V.			
C15	22-468	.5 MFD. 200V.			
C16	22-589	.5 MFD 200V.			
C17		250 MMFD. LO-REACT.			
C18	22-182	.00025 MFD. 600V.			



For Alignment, see Index

Voltage at Battery 6V.

Voltage at Receiver 5.9 V.

Antenna disconnected

All voltages measured with 1000 ohms per volt D. C. meter

Total current consumption 5.5 amperes

Sensitivity at 1 watt out put 5 M. V.

Maximum power output 3.2 watts.

SOCKET VOLTAGES MODEL 5-M-191

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Mixer Osc.	0	0	190	90	—4	90	5.9	0	0
6K7	I. F.	0	0	195	90	0	—	5.9	0	0
6Q7	Det. A. V. C. Audio	0	0	80	0	—.1	—	5.9	.8	0
6F6	Power	0	0	185	195	—3.5	—	5.9	0	—
OZ4	Rectifier			Inacessible						

I.F FREQUENCY 456K.C

ZENITH AUTO RADIO
MODEL 5M191 CHASSIS 5520
ZENITH RADIO CORPORATION
CHICAGO, ILL.

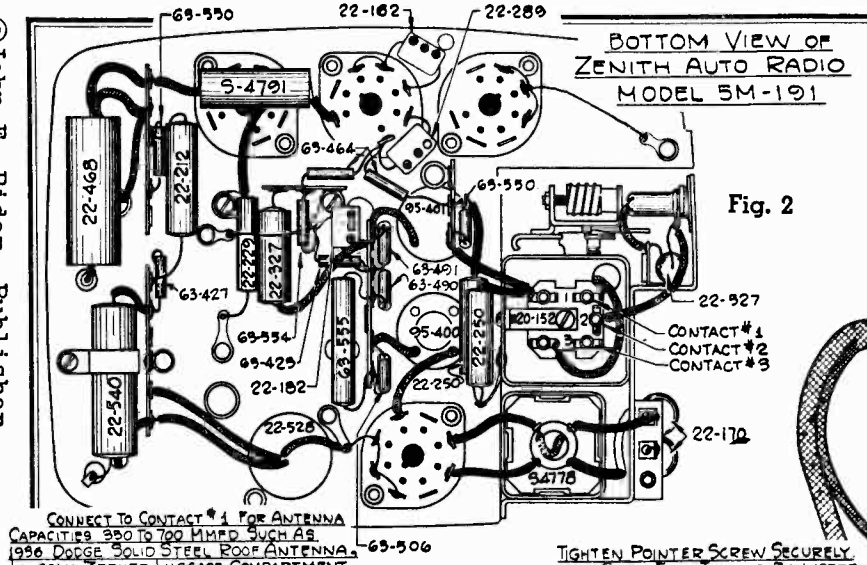


Fig. 2

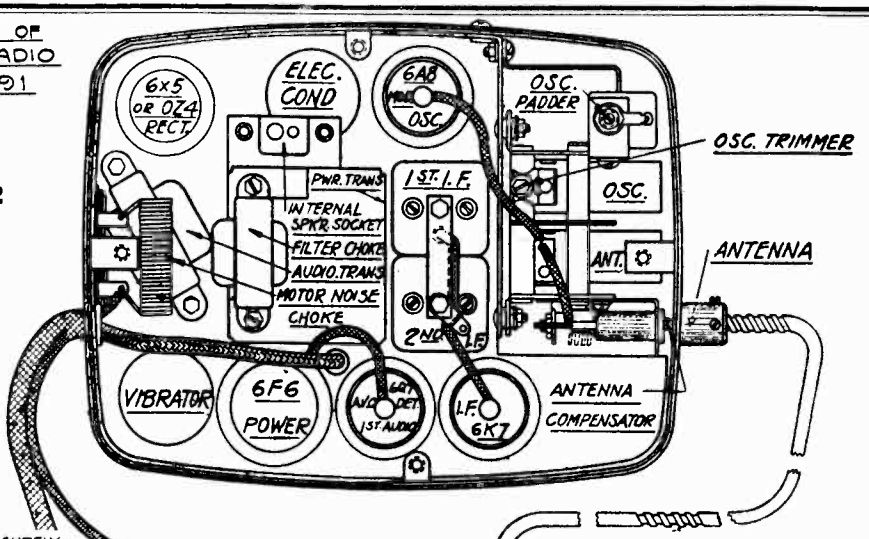
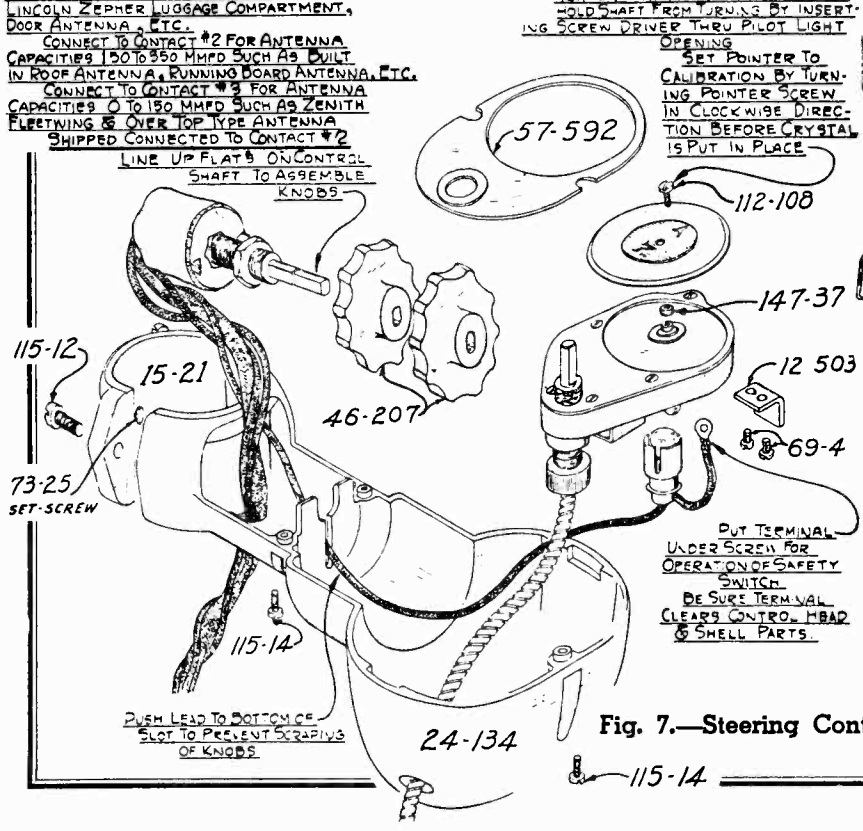


Fig. 3.—Tube Position 5-M-191



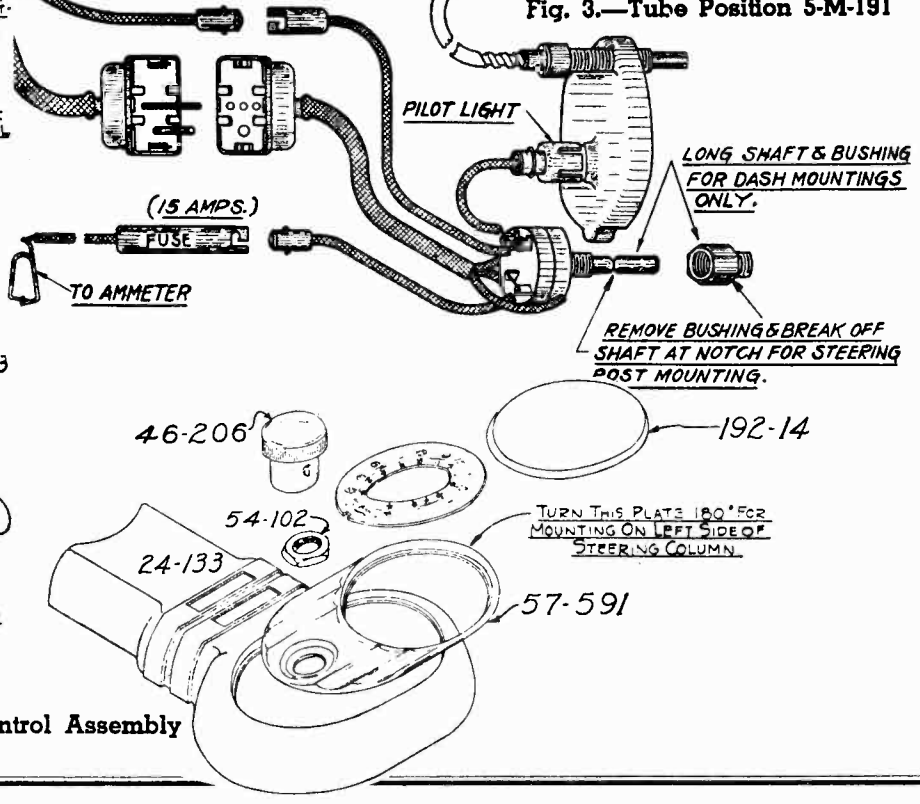


Fig. 7.—Steering Control Assembly

ALIGNMENT

5-M-91

"A" Connect the service oscillator output leads to the control grid of the 6A8 tube, and to the chassis. If the oscillator output is a single shielded lead the shield should connect to the chassis.

Connect an output meter across the primary of the speaker transformer.

Set the service oscillator at 456 K.C. and adjust the trimmers on the I.F. transformers to the point giving the greatest reading on the output meter. These, as well as the following adjustments should be made using as small an output from the signal generator as possible so that the A.V.C. action will be least effective.

"B" Change the service oscillator lead from the grid of the 6A8 to the antenna connection. A male Delco Remy connector may be used in making a connection to the antenna lead.

Set the service oscillator at 1600 K.C. and rotate the gang condenser until the plates are entirely out of mesh. Adjust the oscillator section trimmer until the 1600 K.C. signal is tuned in.

"C" Set the service oscillator to 600 K.C. and rock the gang condenser slowly to and fro past the point where this signal is received, meanwhile adjusting the padder condenser for a setting which gives the greatest output reading.

"D" Repeat operation "B". See antenna instruction page 379 for correct alignment of antenna stage.

6-M-192 — 6-M-193 — 6-M-194 — 8-M-195

"A" Connect the service oscillator to the control grid of the 6A8 tube and the chassis.

Connect the output meter across the primary of the speaker transformer.

Set the service oscillator to 252.5 K.C. and adjust the trimmers on the I.F. transformers for the greatest output reading. These adjustments should be repeated several times using as weak an input signal as possible so as to obtain greater accuracy.

"B" Change the service oscillator lead from the grid of the 6A8 to the antenna connection. A male Delco Remy connector may be used in making a connection to the antenna lead.

Set the service oscillator at 1600 K.C. and rotate the gang condenser until the plates are entirely out of mesh. Adjust the oscillator section trimmer until the 1600 K.C. signal is tuned in.

Change the service oscillator to 1400 K.C. Rotate the gang condenser until this signal is tuned in, and then adjust the R.F. trimmer on the gang condenser to the point giving the greatest output reading.

"C" Set the service oscillator to 600 K.C. and rock the gang condenser slowly to and fro past the point where this signal is received, meanwhile adjusting the padder condenser for a setting which gives the greatest output reading.

"D" Repeat operation "B".

The sensitivity control should be in the extreme clockwise position when making all adjustments.

NOTE — Due to the high gain type of I.F. transformers used in these receivers it is essential that a non metallic screw driver be used in making all adjustments. See antenna instructions for correct alignment of antenna stage.

SERVICE NOTE

The 0Z4 rectifier tube used in the 5 and 6 tube models may be replaced with a 6X5 rectifier, providing the 6X5 tube is inclosed in a grounded tube shield.

The Goat shield with a groun ` clip which connects to the shield contact pin of the tube is the most convenient type to use.

IMPORTANT ANTENNA INFORMATION
(All Models)

Some cars are factory equipped with an antenna. If this is the case, the lead should be checked to make certain that it is not grounded, and after being shielded by a large diameter loom, ground this loom to the instrument panel, and attach the Delco-Remy male connector to the end of the antenna wire. This should be done carefully so as to insure a good solder joint, and prevent any grounding at this point to the braided shielding. Insert the antenna lead-in connector into the female Delco-Remy receptacle directly below the tuning cable shoulder on the receiver case.

Where a car is not equipped with an antenna, such as convertible models, or those with all steel turret top, any one of the following Zenith antennas may be used:

Undercar antenna—part No. S-4800 and S-4801.
Over the Top Antenna (Sedan) S-4802.
Over the Top Antenna (Coupe) S-4803.
Zenith Fleet Wing Antenna S-4821.
Zenith Bumper Pole Antenna S-4822.

Complete instructions covering the installation of each of the above antennas is furnished with the various kits.

IMPORTANT: BALANCING SET TO ANTENNA. There is such an extremely wide variation in antenna capacities that it is difficult to match this condition without some means of variable antenna alignment. To accomplish this, an antenna compensating adjustment is provided through the small hole directly above the antenna cable connector on the receiver case. In addition to this, a tapped antenna transformer is also incorporated (see Figure No. 2). The proper method of alignment is as follows: After completely connecting receiver, tune in a signal between 1400 and 1450 K.C. and adjust the antenna compensator shown in Figure 3, for either the roof antenna, or single or double under-car antenna. The receiver is shipped from the factory with the antenna tap shown in Figure 2 set to the No. 2 position, and, therefore, need not be changed for either of the two types of antennas mentioned.

For Zenith Fleet Wing, and Over the Top Antennas, unsolder the antenna lead from the No. 2 lug, and resolder it to the No. 3 lug. After this is done, tune in a station between 1450 and 1400 K.C., and adjust the antenna compensator shown in Figure 3 to resonance.

For high capacity antennas such as the 1936 Dodge solid steel roof, or the Lincoln Zephyr luggage compartment, drawer antenna, etc., remove the antenna lead from the No. 2 lug, as it comes from the factory, and resolder it to the No. 1 connector. After this is done, the same procedure of tuning in a signal from 1450 to 1400 K.C., and balancing to resonance with the antenna compensator, as described above, should be followed.

This system of tapped transformer, and variable compensating adjustment gives an extremely flexible means of resonating the receiver to any type of antenna, and it should be noted that the tap need only be changed in two cases. Of course, it is necessary to remove the bottom cover in order to shift the antenna tap where necessary.

IGNITION INTERFERENCE

Remove the center high tension lead of the distributor and insert the suppressor into the distributor at that point. The wire is then placed in the open end of the suppressor. The generator condenser is fastened under the cut-out housing and the wire connected to the generator connection on the cut-out. The coil condenser is attached to the battery connection of the coil and the other end to the coil case. Make absolutely certain that this condenser is not accidentally connected to the distributor side of the coil since this will increase motor noise terrifically and make operation of the receiver highly unsatisfactory when the motor is running. Where two distributors or two coils are employed a corresponding number of condensers and suppressors must be applied. In some instances it might be of benefit to attach a by-pass condenser from one side of the ammeter to a grounded part of the instrument panel. If the dome light is feeding interference to the antenna the lead should be cut where it comes from the post and a switch inserted on the instrument panel at that point, to turn it off and on. In some cases, a by-pass condenser connected to the dome-light lead and grounded at the post is as effective as a separate switch. Try this first.

If additional attention is necessary to reduce motor interference, the motor block must be securely bonded, both at the rear and front supports with ½ inch copper braid. Also bond or ground all metal control cables or pipes feeding from the motor side into the car. These bonds should be made to the control wire or pipe and soldered to the fire wall immediately adjacent on the motor side. As a further precaution the rotor should be lengthened to reduce the gap between it and the distributor head contacts by either peening the end or applying a small quantity of solder at this point.

PARTS LIST

Coils and Chokes

		8T.	6T.	5T.	PRICE
20-149	Antenna Coil	8	6		$ 1.25
20-150	R.F. Coil	8	6		.60
20-152	Antenna Coil			5	1.25
95-392	1st I.F. Transformer		6		1.25
93-393	2nd I.F. Transformer		6		1.25
95-394	1st I.F. Transformer	8			1.25
95-395	2nd I.F. Transformer	8			1.25
95-400	1st I.F. Transformer			5	1.25
95-401	2nd I.F. Transformer			5	1.25
S-2778	Hash Choke	8	6	5	.15
S-4771	Oscillator Coil	8	6		.45
S-4778	Oscillator Coil			5	.45
S-4791	Motor Noise Filter Choke	8	6	5	.20

Condensers

22-82	.001 mfd. 600 Volt	8	6		.25
22-162	.0001 mfd. 600 Volt	8	6	5	.20
22-170	.1 mfd. 400 Volt	8	6	5	.25
22-182	.00025 mfd. 600 Volt	8	6	5	.12
22-190	.1 mfd. 200 Volt		6		.20
22-212	.05 mfd. 400 Volt	8	6	5	.20
22-229	.005 mfd. 600 Volt		6	5	.15
22-250	.05 mfd. 200 Volt	8	6	5	.15
22-289	.00005 mfd. 600 Volt		6	5	.12
22-327	.02 mfd. 200 Volt	8	6	5	.15
22-336	.005 mfd. 120 Volt (Models 193-194 only)	8	6		.15
22-350	.25 mfd. 200 Volt	8	6		.20
22-463	200-750 mmfd. Osc. Padder	8	6	5	.35
22-468	.5 mfd. 200 Volt	8	6	5	.30
22-470	.00015 mfd. 600 Volt	8	6		.20
22-476	.0035 mfd. 750 Volt	8			.15
22-526	8-8 mfd. Dry Elect. 350 Volt		6		1.25
22-527	8-8 mfd. 350 Volt-20 mfd. 20 Volt	8			2.25
22-528	4-8 mfd. 350 Volt			5	1.25
22-531	.5 mfd. 120 Volt	8			.30
22-532	3 Gang Variable Cond. 365 mmfd.	8	6		4.50
22-533	2 Gang Variable Cond. 362.5 mmfd.			5	3.00
22-534	.25 mfd. 400 Volt	8	6		.25
22-535	.008 mfd. 1400 Volt	8	6	5	.20
22-537	.0005 mfd. 120 Volt	8	6		.15
22-538	1-12 mmfd. Air Trimmer	8	6	5	.20
22-539	.5 mfd. 200 Volt		6	5	.30
22-540	.25 mfd. 200 Volt			5	.25

Resistors

63-422	200 Ohm 1/2 Watt	8	6	5	.20
63-423	600 Ohm 1/4 Watt		6	5	.20
63-425	250 M ohm 1/4 Watt		6		.20
63-427	500 M ohm 1/4 Watt			5	.20
63-443	300 Ohm 1/4 Watt	8			.20
63-446	750 M ohm 1/4 Watt	8			.20
63-464	1 megohm 1/4 Watt		6	5	.20
63-490	49 M ohm 1/4 Watt	8	6	5	.20
63-491	490 M ohm 1/4 Watt	8	6	5	.20
63-493	50 M ohm 1/4 Watt		6		.20
63-494	13 M ohm 2 Watt		6		.25
63-506	1500 ohm 1/4 Watt	8	6	5	.20
63-510	18 M ohm 2 Watt	8			.25
63-512	19 M ohm 1 Watt	8	6		.20
63-549	2 megohm vol. and tone control (dual)	8	6		2.00
63-550	240 M ohm 1/4 Watt	8	6	5	.20
63-551	1 megohm vol. control (6M192 only)		6	5	1.00
63-552	99 M ohm 1/4 Watt	8			.20
63-554	40 ohm 1/4 Watt			5	.20
63-555	9,500 ohm 2 Watt			5	.25
63-557	60 ohm 1/4 Watt		6		.20
63-559	120 ohm wire wound 1/4 Watt	8			.20
63-560	Sensitivity Control	8			.70
63-561	4900 ohm 1/4 Watt	8			.20

		PRICE
	Control Head Assem. Part for Model 5M191	
S-4789	Volume Control and Cable Assembly Above Assembly consists of	$ 3.50
	1 22-182 .00025 mfd. condenser 600 v.	.12
	1 52-93 Control Head Cable and Plug	1.00
	1 52-95 On-Off Switch Cable	.20
	1 52-96 Battery Cable	.20
	1 52-99 Pilot Light Cable and Socket	.20
	1 63-551 Volume Control and Switch	1.00
	1 94-239 Extension Bushing	.15
	1 183-6 Rubber Band	.01
26-140	Calibrated Dial Scale	.10
27-17	Dial Pointer Disc	.10
54-101	Cable Sheath Clamping Nut	.05
76-208	Tuning Control Flexible Shaft 18"	1.00
100-32	Pilot Light Bulb	.15
170-18	Remote Control Drive Mechanism	2.75
	Control Head Assem. Part for Model 6M192	
S-4844	Volume Control and Cable Assembly Above Assembly consists of	$ 4.00
	1 22-182 .00025 mfd. Condenser 600 v.	.12
	1 52-95 On-Off Switch Cable	.20
	1 52-96 Battery Cable	.20
	1 52-98 Control Head Cable and Plug Assem.	1.00
	1 52-99 Pilot Light Cable & Socket	.20
	1 63-551 Volume Control and Switch	1.00
	1 94-239 Extension Bushing	.15
	1 183-6 Rubber Band	.01
26-141	Calibrated Dial Scale	.10
27-17	Dial Pointer Disc	.10
54-101	Cable Sheath Clamping Nut	.05
76-209	Tuning Control Flexible Shaft 24"	1.25
100-32	Pilot Light Bulb	.15
170-19	Remote Control Drive Mechanism	2.75
	Control Head Assembly Parts for Models 6M193 - 6M194 - 8M195	
S-4846	Volume Control and Cable Assembly Above Assembly consists of	$ 5.00
	1 22-182 .00025 mfd. Condenser 600 v.	.12
	1 22-336 .005 mfd. Condenser 120 v.	.15
	1 22-537 .005 mfd. Condenser 120 v.	.15
	1 52-95 On-Off Switch Cable	.20
	1 52-96 Battery Cable	.20
	1 52-98 Control Head Cable and Plug	1.00
	1 52-100 Pilot Light Cable and Socket	.30
	1 63-549 Volume & Tone Control & Switch Assem.	2.00
	1 183-7 Rubber Band	.01
26-141	Calibrated Dial Scale	.10
27-17	Dial Pointer Disc	.10
46-150	Tone Control Knob	.15
54-101	Cable Sheath Clamping Nut	.05
76-223	Tuning Control Flexible Shaft 24" long	1.25
100-32	Pilot Light Bulb Mazda	.15
147-28	Tuning Control Knob Spacer	.15
170-20	Remote Control Drive Mechanism	4.00

These Prices Supersede All Previous Quotations and Are Subject to Regular Discounts and Change Without Notice.

Additional Optional Control Cables

		PRICE
	Models 6M192—5M191 Only	
76-209	Tuning Control Flexible Shaft 24"	1.25
76-214	Tuning Control Flexible Shaft 30"	1.50
76-218	Tuning Control Flexible Shaft 36"	1.75
	Models 6M193—6M194—8M195 Only	
76-223	Tuning Control Flexible Shaft 24"	1.25
76-224	Tuning Control Flexible Shaft 30"	1.50
76-225	Tuning Control Flexible Shaft 36"	1.75
	S-4700 Z-188	
	Steering Column Control Head Accessory Kit (Used on Models 6M193—6M194—8M195 Only)	
12-503	Mechanism Retaining Bracket	.05
15-21	Steering Column Mtg. Cap	.30
24-133	Steering Column Mtg. Cover Upper Half	1.50
24-134	Steering Column Mtg. Cover Lower Half	2.00
46-206	Tuning Control Knob	.20
46-207	Volume & Tone Control Knobs	.15
57-591	Bezel Plate	.45
57-592	Mounting Plate	.30
69-4	No. 6/32 x 3/16" R.H.M.S. N.P.	.01
73-25	No. 10/32 x 5/16" Headless Set Screw	.01
94-238	Paper Bushings	.01
112-108	Dial Pointer Mtg. Screw 3/48" x 7/32	.01
115-12	No. 10/32 x 1/2 F.H.M.S. N.P.	.01
115-14	No. 4/36 x 3/8" F.H.M.S.	.01
147-37	Pointer Screw Spacer	.01
192-14	Unbreakable Dial Glass	.20
	S-4810 R-188	
	Steering Column Mounting Shell (Used with Models 5M191 — 6M192 Only)	
12-459	Control Mechanism Retaining Bracket	.05
12-469	Control Housing Mtg. Bracket	.05
17-38	Control Housing Retaining Clamp	.05
43-11	Control Mechanism Housing	.50
46-160	Tuning & Volume Control Knobs	.25
54-106	No. 10/32 x 3/8" Hex Nuts	.01
57-594	Spacer Plate	.05
69-4	No. 6/32 x 3/16 R.H.M.S. N.P.	.01
69-124	No. 6/32 x 7/8" R.H.M.S. Parkerized	.01
69-125	No. 10/32 x 5/16" R.H.M.S.	.01
93-126	No. 8 Internal Shakeproof Lockwashers	.01
93-127	No. 10 Internal Shakeproof Lockwashers	.01
93-312	Shim Washers	.01
93-322	1/16" x 13/32" x 13/16 Steel Washer	.01
112-108	No. 3/48 x 7/32" B.H.M.S. Black Nickel Finish	.01
192-14	Unbreakable Dial Glass	.20
	Special Cables to Adapt 1936 External Speakers to 1937 Auto Radios	
52-102	Firewall Cable (Used for BH-177 BH-177S Also)	1.50
52-103	Header Cable	2.25
	I.E. Additional of either of the above transforms	
	1936 speaker to X type (GM77+52-103=GM77X)	

Set Mounting Parts

22-193	.5 mfd. Ignition Coil				
	Condenser 200 volts				.45
22-194	.5 mfd. Generator Condenser				.50
52-90	Antenna Cable				.50
52-97	Battery Cable - Ammeter End				.25
54-102	3/8-32 x 1/2" Hex Nuts Cadmium				.01
57-478	Set Mounting Plate				.25
58-26	Delco Remy Fuse Bushing				.01
63-336	15 M ohm Distributor Suppressor				.35
69-84	No. 10/32 x 1/4" R.H.M.S. for Mounting Plate				.30
93-127	No. 10 Internal Shakeproof Lockwasher				.35
93-143	3/8" Internal Shakeproof Lockwasher				.01
93-222	7/16" Internal Shakeproof Lockwasher				.01
93-233	Set Mounting Bolt Washer 2 1/4" Dia.				.02
136-6	15 Amp. Fuse				.06
144-14	7/16" x 3" Carriage Bolt & Nut				.05
193-2	Installation Template				.01
196-1	Mounting Plate Gasket				.03

Miscellaneous

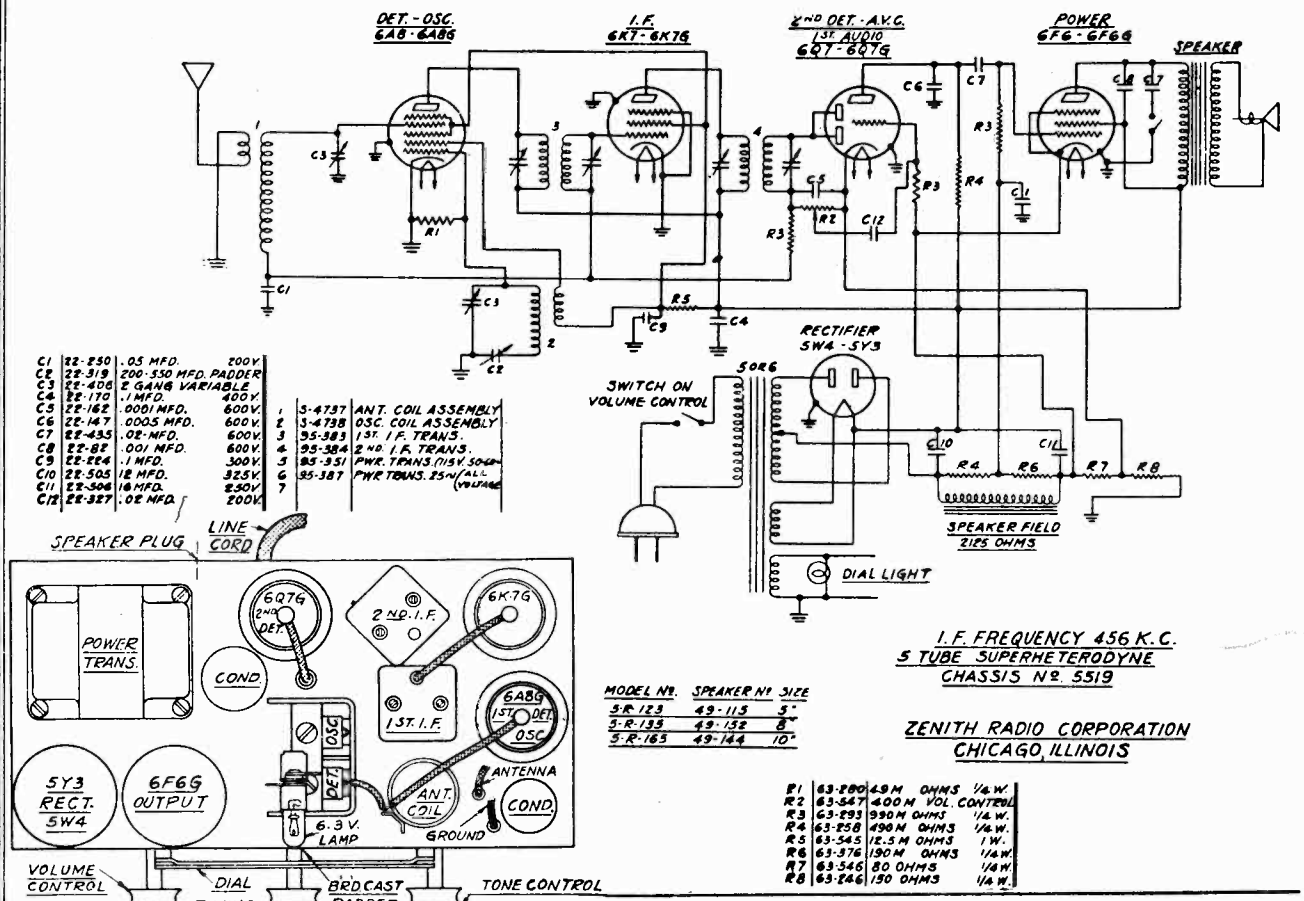
		8T.	6T.	5T.	PRICE
12-502	Spkr. Mtg. Brackets (5M191 - 6M192 Only)		6	5	.03
19-65	Chassis Box Top Cover Grd. Clip Terminal	8	6	5	.01
44-14	Speaker Plug Jack		6	5	.10
46-205	Sensitivity Control Knob	8			.20
49-170	5" Dynamic Speaker (5M191 - 6M192 Only)*				3.50
	Cone & Voice Coil for 49-170				1.50
	Field Coil for 49-170				1.50
49-171	6" P.M. Dynamic Speaker (6M193 Only)				5.00
	Cone & Voice Coil for 49-171				2.00
49-172	8" P.M. Dynamic Speaker (8H-177 Only)				6.00
	Cone & Voice Coil for 49-172				2.00
49-173	6" P. M. Dynamic Speaker (8H-177S Only)				5.00
	Cone & Voice Coil for 49-173				2.00

***IMPORTANT! When ordering speaker parts always give the entire part and code number i.e., 49-138AB or 49-138U.**

52-91	Chassis & Speaker Supply Cable		6		1.75
52-94	Chassis Control Cable & Plug Assem.			5	1.50
52-101	Chassis Control Cable & Plug Assem.	8			1.70
69-129	10/32 x 1" R.H.M.S. Statuary Bronze for Mounting Top Cover	8	6	5	.01
69-130	10/32 x 3/8" R.H.M.S. Statuary Bronze for Mtg. Top Cover		6		.01
73-17	No. 8/32 x 1/4" Headless Set Screw Cuppoint				.01
78-115	Vibrator Wafer Type Socket	8	6	5	.10
78-133	No. 6H6 Wafer Type Socket	8			.15
78-148	No. 6Q7 Wafer Type Socket		6	5	.10
78-149	No. 6 x 5-No. OZ4 Wafer Type Socket	8	6	5	.10
78-150	No. 6K7 Wafer Type Socket	8	6	5	.15
78-151	No. 6A8 Wafer Type Socket	8	6	5	.15
78-152	No. 6F6 Wafer Type Socket		6	5	.10
78-156	No. 6C5 Wafer Type Socket	8			.10
78-157	No. 6N7 Wafer Type Socket	8			.10
95-388	Audio Transformer Assembly	8			4.00
95-389	Power Transformer			5	2.75
95-390	Power Transformer		6		2.75
95-391	Power Transformer	8			3.25
95-396	Power Choke				.75
95-397	Output Transformer		6		1.25
95-398	Power Choke	8			.90
95-399	Audio Transformer			5	1.00
112-130	No. 8 x 1/4" H.H. Slotted Self Tapping Screw Acorn Head	8	6	5	.01
126-131	Tube Shield Complete With Rings	8	6	5	.10
143-31	Insulated Coupling	8			.10
190-9	Vibrator	8	6	5	5.00

ZENITH RADIO CORP.

MODELS 5R123, 5R135, 5R165
Chassis 5519
Schematic, Socket, Voltage
Trimmers, Alignment, Parts



C1	22-250	.05 MFD.	200V.
C2	22-319	200-350 MFD. PADDER	
C3	22-406	2 GANG VARIABLE	
C4	22-170	.1 MFD.	400V.
C5	22-162	.0001 MFD.	600V.
C6	22-147	.0005 MFD.	600V.
C7	22-435	.02-MFD.	600V.
C8	22-82	.001 MFD.	600V.
C9	22-224	.1 MFD.	300V.
C10	22-505	12 MFD.	325V.
C11	22-504	16 MFD.	250V.
C12	22-327	.02 MFD.	200V.

1	3-4737	ANT. COIL ASSEMBLY
2	3-4738	OSC. COIL ASSEMBLY
3	95-383	1ST. I.F. TRANS.
4	95-384	2 ND. I.F. TRANS.
5	85-351	PWR. TRANS. (115V 50~)
6	95-387	PWR TRANS. 25M/ALL. (VOLTAGE)
7		

MODEL Nº.	SPEAKER Nº	SIZE
5-R-123	49-115	5"
5-R-135	49-132	8"
5-R-165	49-144	10"

I.F. FREQUENCY 456 K.C.
5 TUBE SUPERHETERODYNE
CHASSIS Nº. 5519

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

R1	63-280	4.9 M OHMS	1/4 W.
R2	63-547	400 M VOL. CONTROL	
R3	63-293	990 M OHMS	1/4 W.
R4	63-258	490 M OHMS	1/4 W.
R5	63-545	12.5 M OHMS	1 W.
R6	63-376	190 M OHMS	1/4 W.
R7	63-546	80 OHMS	1/4 W.
R8	63-246	190 OHMS	1/4 W.

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8G	1st Det. Osc.	0	0	220	102	—5	97	6.1AC	0	0
6K7G	I. F.	0	0	220	102	0	—	6.1AC	0	0
6Q7G	2nd Det. A. V. C.	0	0	54	—3	—3	—	6.1AC	—.3	0
6F6G	Power	0	0	210	225	—4	—	6.1AC	—5	—
5Y3	Rect.	0	225	—	305AC	—	305AC	—	225	—

Line voltage 115 V. Antenna and ground disconnected. All voltages measured from point indicated to ground, using a 1000 ohm per volt meter.

ALIGNMENT PROCEDURE

Connect the output leads of the signal generator to the grid of the first detector and receiver ground lead. Also connect an output meter across the speaker leads.

Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the greatest output reading. These I.F. transformers are of a very high gain, selectivity type, and the adjustments should be repeated several times for greatest accuracy.

Change the signal generator leads to the antenna and ground leads of the receiver.

Set the signal generator at 1400 K.C. Set the pointer on the receiver dial at the same frequency. First adjust the oscillator and then the detector trimmers on the gang condenser to the point giving the maximum reading on the output meter, using as small a signal from the generator as possible so as to prevent the A.V.C. action from affecting the output readings.

Reset the signal generator to 600 K.C.

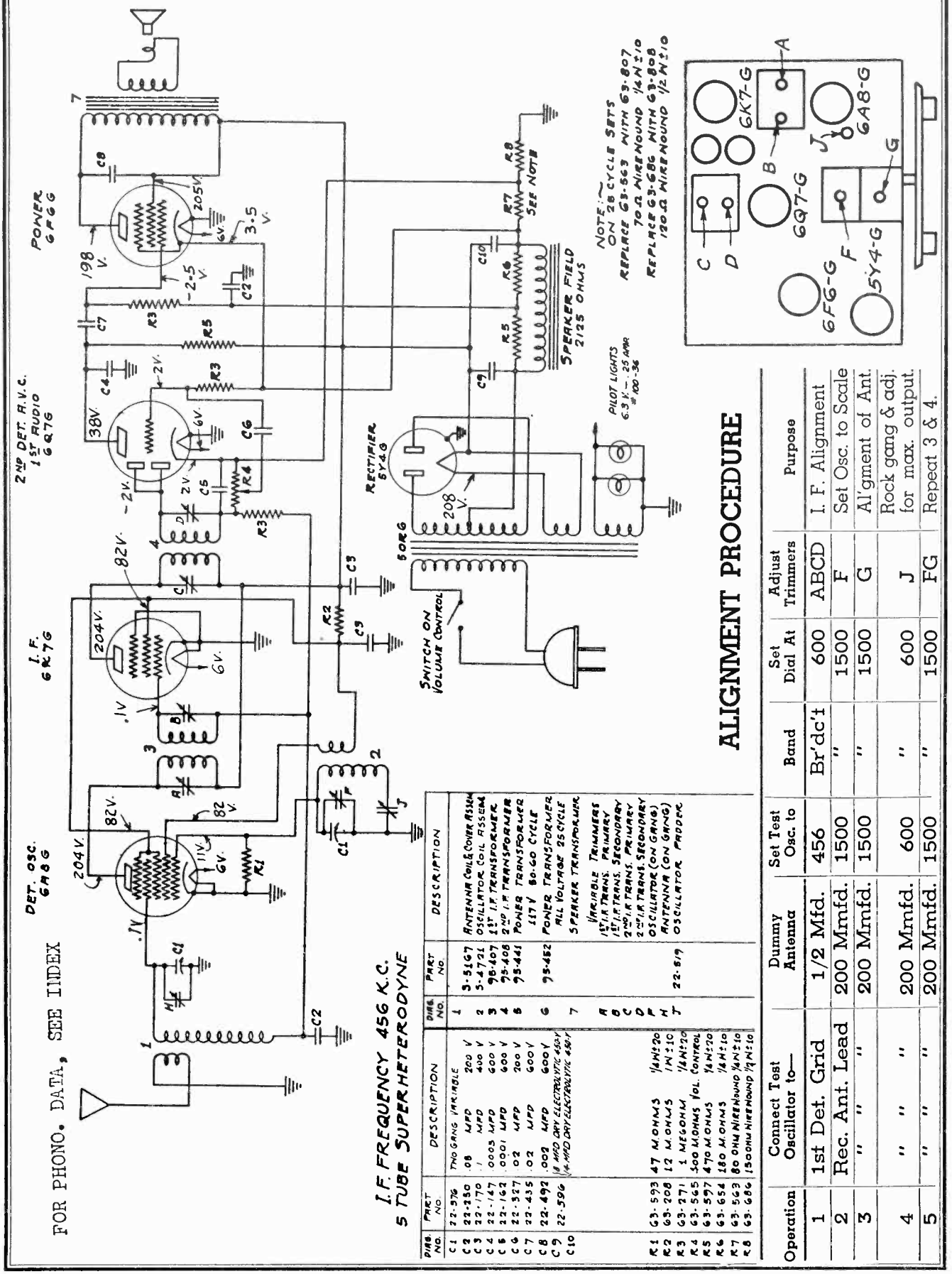
Slowly rock the pointer past 600 K.C. on dial meanwhile adjusting the osc. padder (located beneath dial on front of chassis) to the combination giving the greatest output reading.

Repeat operation No. 4.

MODELS 5R216, 5R226, 5R236
Chassis 5526

ZENITH RADIO CORP.

Schematic, Voltage, Parts
Socket, Trimmers, Alignment



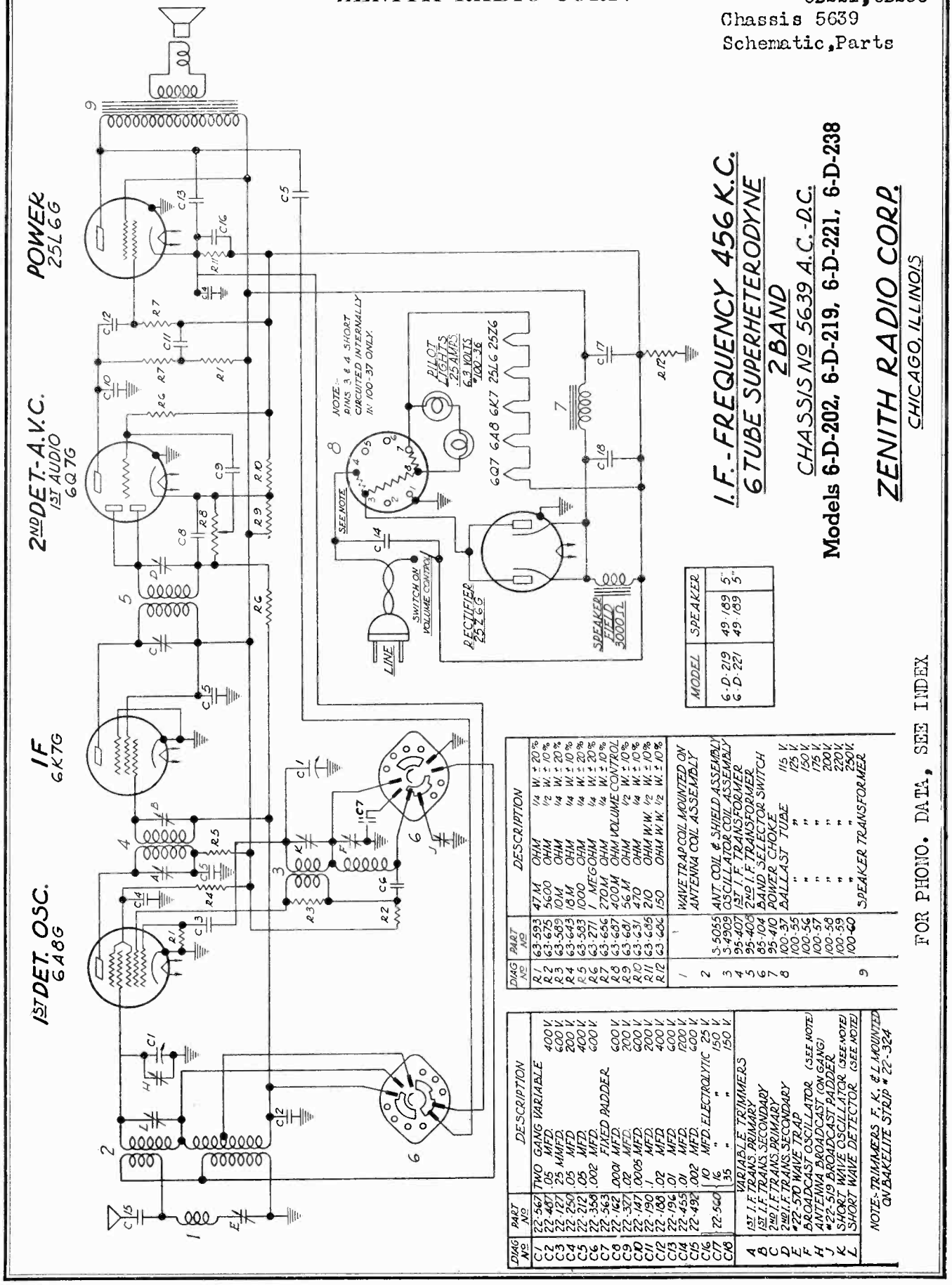
DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	22-376	TWO GANG VARIABLE	1	3-5167	ANTENNA COIL & COVER ASSM.
C2	22-350	.05 MFD 200 V	2	3-4731	OSCILLATOR COIL ASSEM.
C3	22-170	.1 MFD 400 V	3	98-407	1ST I.F. TRANSFORMER
C4	22-147	.0005 MFD 600 V	4	75-408	2ND I.F. TRANSFORMER
C5	22-162	.0001 MFD 600 V	5	75-441	POWER TRANSFORMER 117 V 50-60 CYCLE
C6	22-327	.02 MFD 200 V			
C7	22-435	.02 MFD 600 V	6	75-452	POWER TRANSFORMER ALL VOLTAGE 25 CYCLE
C8	22-492	.002 MFD 600 V			SPEAKER TRANSFORMER
C9	22-596	16 MFD DRY ELECTROLYTIC 450 V	7		
C10		16 MFD DRY ELECTROLYTIC 450 V			
			A		VARIABLE TRIMMER 1ST I.F. TRANS. PRIMARY
			B		1ST I.F. TRANS. SECONDARY
			C		2ND I.F. TRANS. PRIMARY
			D		2ND I.F. TRANS. SECONDARY
R1	63-593	47 M OHMS 1/4 WATT 20	E		OSCILLATOR (ON GANG)
R2	63-208	12 M OHMS 1 WATT 10	F		ANTENNA (ON GANG)
R3	63-271	1 MEGOHM 1/4 WATT 20	H	22-619	OSCILLATOR PADDER
R4	63-565	500 M OHMS VOL. CONTROL			
R5	63-597	470 M OHMS 1/4 WATT 20			
R6	63-654	180 M OHMS 1/4 WATT 10			
R7	63-563	80 OHM WIREWOUND 1/4 WATT 10			
R8	63-686	150 OHM WIREWOUND 1/2 WATT 10			

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
5	" " "	200 Mmfd.	1500	"	1500	FG	Repeat 3 & 4.

ZENITH RADIO CORP.

MODELS 6D202, 6D219, 6D221, 6D238
Chassis 5639
Schematic, Parts



MODEL	SPEAKER	
6-D-219 6-D-221	49-1189 49-1189	5" 5"

DIAG No	PART No	DESCRIPTION	
C1	22-367	TWO GANG VARIABLE	400 V.
C2	22-407	.05 MFD.	600 V.
C3	22-127	.25 MMFD.	600 V.
C4	22-250	.05 MFD.	200 V.
C5	22-212	.05 MFD.	400 V.
C6	22-356	.002 MFD.	600 V.
C7	22-363	FIXED PADDER	
C8	22-142	.001 MFD.	600 V.
C9	22-321	.02 MFD.	200 V.
C10	22-147	.0005 MFD.	600 V.
C11	22-190	.1 MFD.	200 V.
C12	22-188	.02 MFD.	400 V.
C13	22-196	.01 MFD.	600 V.
C14	22-455	.01 MFD.	1200 V.
C15	22-492	.002 MFD.	600 V.
C16	22-560	.10 MFD. ELECTROLYTIC	25 V.
C17		.16 " "	150 V.
C18		.35 " "	150 V.
		VARIABLE TRIMMERS	
A		1ST I.F. TRANS. PRIMARY	
B		1ST I.F. TRANS. SECONDARY	
C		2ND I.F. TRANS. PRIMARY	
D		2ND I.F. TRANS. SECONDARY	
E		*22-570 WAVE TRAP	
F		BROADCAST OSCILLATOR (SEE NOTE)	
H		ANTENNA BROADCAST (ON GANG)	
J		*22-519 BROADCAST PADDER	
K		SHORT WAVE OSCILLATOR (SEE NOTE)	
L		SHORT WAVE DETECTOR (SEE NOTE)	

NOTE:- TRIMMERS F, K, & L MOUNTED ON BAKELITE STRIP * 22-324

DIAG No	PART No	DESCRIPTION	
R1	63-593	47 M	OHM 1/4 W. ± 20%
R2	63-675	5600	OHM 1/2 W. ± 10%
R3	63-569	10M	OHM 1/4 W. ± 20%
R4	63-643	1.8 M	OHM 1/4 W. ± 10%
R5	63-583	1000	OHM 1/4 W. ± 20%
R6	63-271	1 MEG	OHM 1/4 W. ± 20%
R7	63-696	270 M	OHM 1/4 W. ± 10%
R8	63-687	400 M	OHM VOLUME CONTROL
R9	63-681	56 M	OHM 1/2 W. ± 10%
R10	63-631	470	OHM 1/4 W. ± 10%
R11	63-635	210	OHM W.W. 1/2 W. ± 10%
R12	63-606	150	OHM W.W. 1/2 W. ± 10%
	1		WAVE TRAP COIL MOUNTED ON ANTENNA COIL ASSEMBLY
	2	3-5055	ANT. COIL & SHIELD ASSEMBLY
	3	3-4909	OSCILLATOR COIL ASSEMBLY
	4	95-407	1ST I.F. TRANSFORMER
	5	95-408	2ND I.F. TRANSFORMER
	6	85-104	BAND SELECTOR SWITCH
	7	95-410	POWER CHOKE
	8	100-37	BALLAST TUBE 115 V.
		100-55	" " 125 V.
		100-56	" " 150 V.
		100-57	" " 175 V.
		100-58	" " 200 V.
		100-59	" " 220 V.
		100-60	" " 250 V.
	9		SPEAKER TRANSFORMER

FOR PHONO. DATA, SEE INDEX

MODELS 6D202, 6D219
6D221, 6D238
Chassis 5639

ZENITH RADIO CORP.

Voltage, Alignment
Socket, Trimmers

SOCKET VOLTAGES

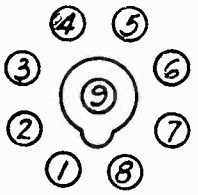
Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	AC	102	55	—1	85	AC	0	—.1
6K7	I.F.	0	AC	104	104	0	—	AC	0	—.1
6Q7	2nd Det. AVC 1st Audio	0	AC	24	—1	—1	—	AC	—1	—1
25L6	Power	0	AC	94	104	—.5	—	AC	—4	—
25Z6	Rect.	0	AC	AC	119	AC	—	AC	119	—
	Ballast									

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 55W. Power output 1.75W.

ALIGNMENT PROCEDURE

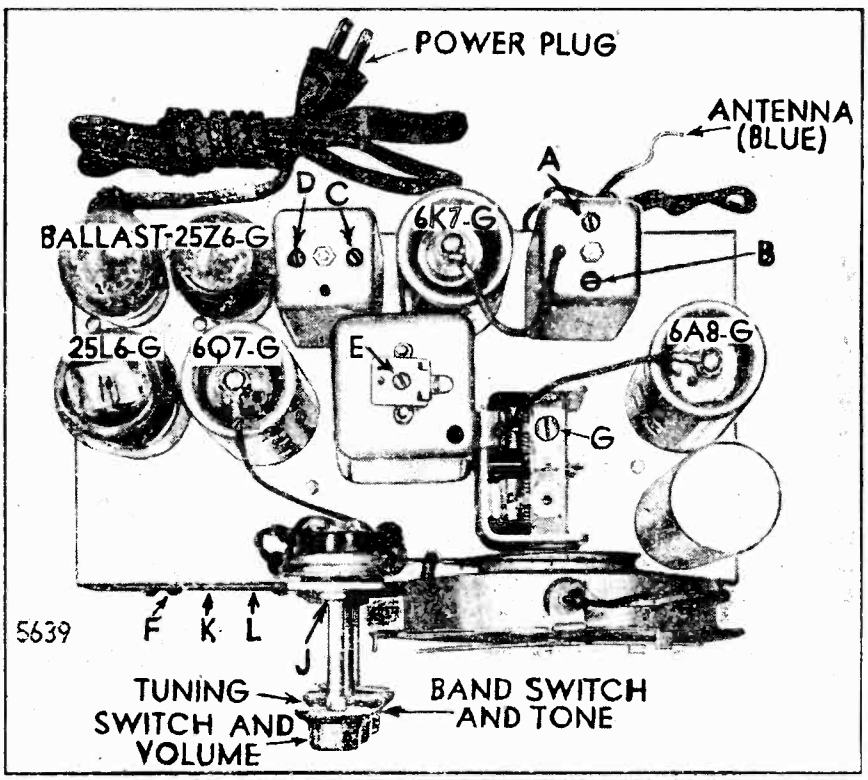
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6						FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.



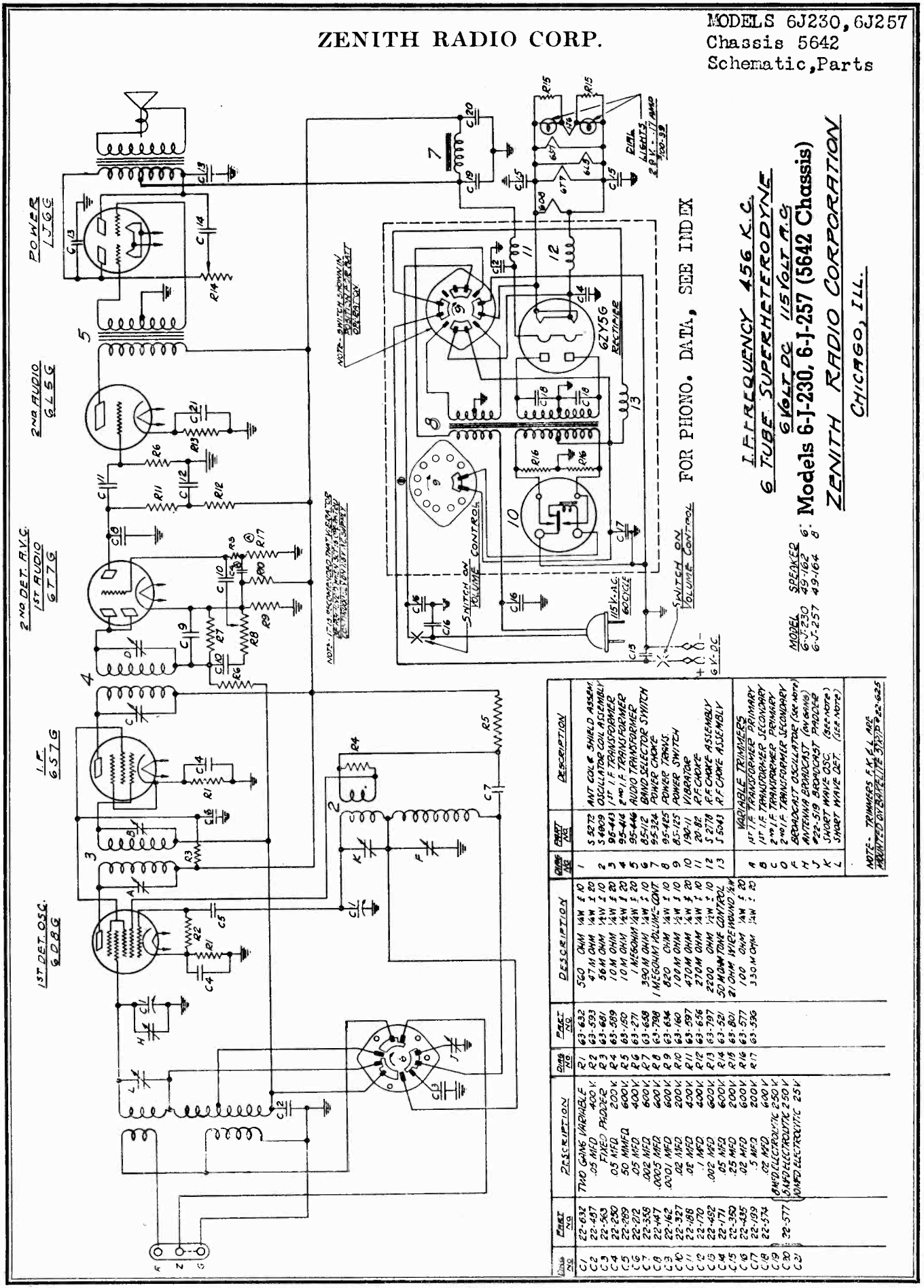
BOTTOM VIEW OF SOCKET

LOCATION OF TRIMMERS



ZENITH RADIO CORP.

MODELS 6J230, 6J257
Chassis 5642
Schematic, Parts



Ohms No	Part No	Description	Ohms No	Part No	Description
C1	22-632	TWO GANG VARIABLE 400 V.	R1	63-632	560 OHM 1/4W ± 10
C2	22-437	.05 MFD 400 V.	R2	63-593	47 M OHM 1/4W ± 20
C3	22-363	FIXED PADDER	R3	63-681	56 M OHM 1/4W ± 10
C4	22-280	.05 MFD 200 V.	R4	65-589	10 M OHM 1/4W ± 20
C5	22-289	50 MMFD 600 V.	R5	65-460	10 M OHM 1/4W ± 20
C6	22-272	.05 MFD 400 V.	R6	63-271	1 MEGOHM 1/4W ± 20
C7	22-359	.002 MFD 600 V.	R7	63-659	330 M OHM 1/4W ± 10
C8	22-447	.0005 MFD 600 V.	R8	63-798	1 MEGOHM VOLUME-CONT
C9	22-162	.0001 MFD 600 V.	R9	63-634	820 OHM 1/4W ± 10
C10	22-327	.02 MFD 200 V.	R10	63-160	100 M OHM 1/4W ± 10
C11	22-188	.05 MFD 430 V.	R11	63-597	470 M OHM 1/4W ± 20
C12	22-170	.1 MFD 400 V.	R12	63-656	270 M OHM 1/4W ± 10
C13	22-452	.002 MFD 600 V.	R13	63-797	2200 OHM 1/2W ± 10
C14	22-171	.05 MFD 600 V.	R14	63-521	50 M OHM TONE CONTROL
C15	22-350	.25 MFD 200 V.	R15	65-801	2 OHM WIREWOUND 3W
C16	22-435	.02 MFD 600 V.	R16	63-577	100 OHM 1/4W ± 20
C17	22-199	.5 MFD 200 V.	R17	63-536	330 M OHM 1/4W ± 20
C18	22-574	.02 MFD 600 V.			
C19	22-577	DUPLEX ELECTROLYTIC 250 V.			
C20		DUPLEX ELECTROLYTIC 250 V.			
C21		DUPLEX ELECTROLYTIC 25 V.			

Ohms No	Part No	Description
1	S 5273	ANT COIL & SHIELD ASSEM
2	S 4909	OSCILLATOR COIL ASSEMBLY
3	95-443	1ST I.F. TRANSFORMER
4	95-444	2ND I.F. TRANSFORMER
5	95-446	AUDIO TRANSFORMER
6	85-12	BAND SELECTOR SWITCH
7	95-324	POWER CHOKE
8	95-425	POWER TRANS.
9	85-125	POWER SWITCH
10	190-11	VIBRATOR
11	20-82	R.F. CHOKE
12	S 2278	R.F. CHOKE ASSEMBLY
13	S 5043	R.F. CHOKE ASSEMBLY

		Description
		VARIABLE TRIMMERS
A		1ST I.F. TRANSFORMER PRIMARY
B		1ST I.F. TRANSFORMER SECONDARY
C		2ND I.F. TRANSFORMER PRIMARY
D		2ND I.F. TRANSFORMER SECONDARY
F		BROADCAST OSCILLATOR (SEE NOTE)
H		ANTENNA BROADCAST (IN GANG)
J		#22-519 BROADCAST PADDER
K		SHORT WAVE OSC. (SEE NOTE)
L		SHORT WAVE DET. (SEE NOTE)

NOTE- TRIMMERS F, K & L ARE MOUNTED ON BATTELITE STRIP #22-625

MODELS 6J230, 6J257
Voltage, Alignment
Socket, Trimmers

ZENITH RADIO CORP.

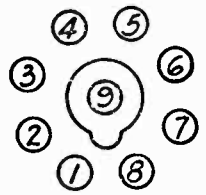
SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6D8	Converter Osc.	0	0	125	35	—1	97	6.3	1.5	0
6S7	I.F.	0	0	124	35	1	—	6.3	1	0
6T7	2nd Det. AVC 1st Audio	0	0	15	.1	.1	—	6.3	.5	0
6L5	2nd Audio	0	0	120	—	0	—	6.3	.2	—
1J6	Power	0	3	137	0	0	137	1	0	—
6ZY5	Rect.	0	6.3	AC	—	AC	—	0	140	—

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 17W. Battery voltage 6.3V consumption 2.04 Amp. Power output 1.75W.

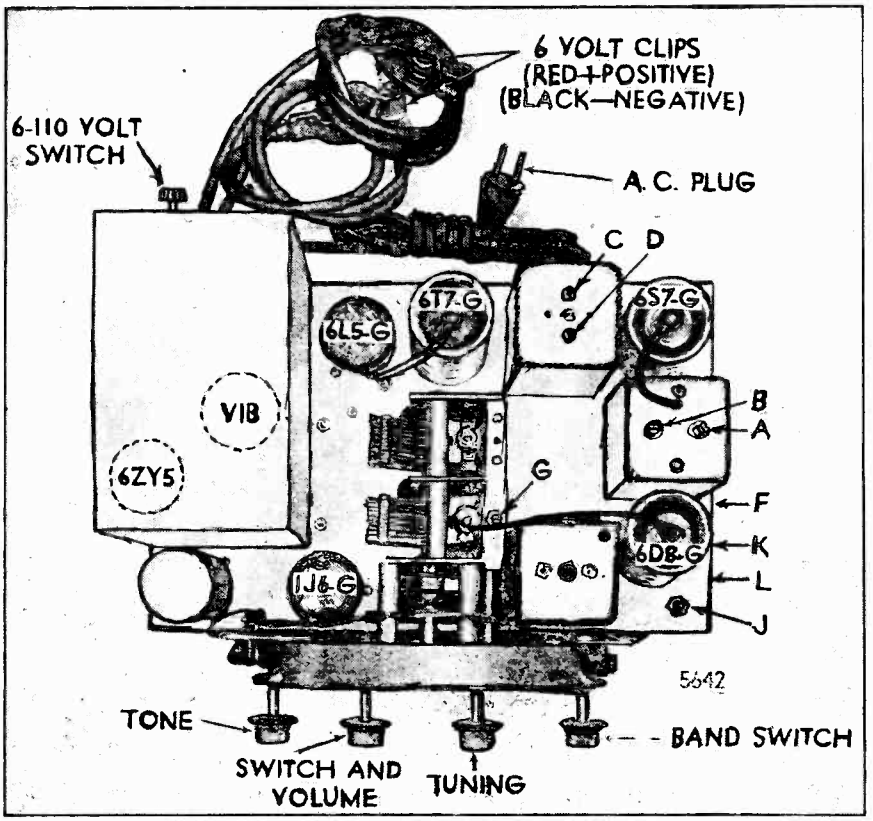
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FG	Repeat 3 & 4
6	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output



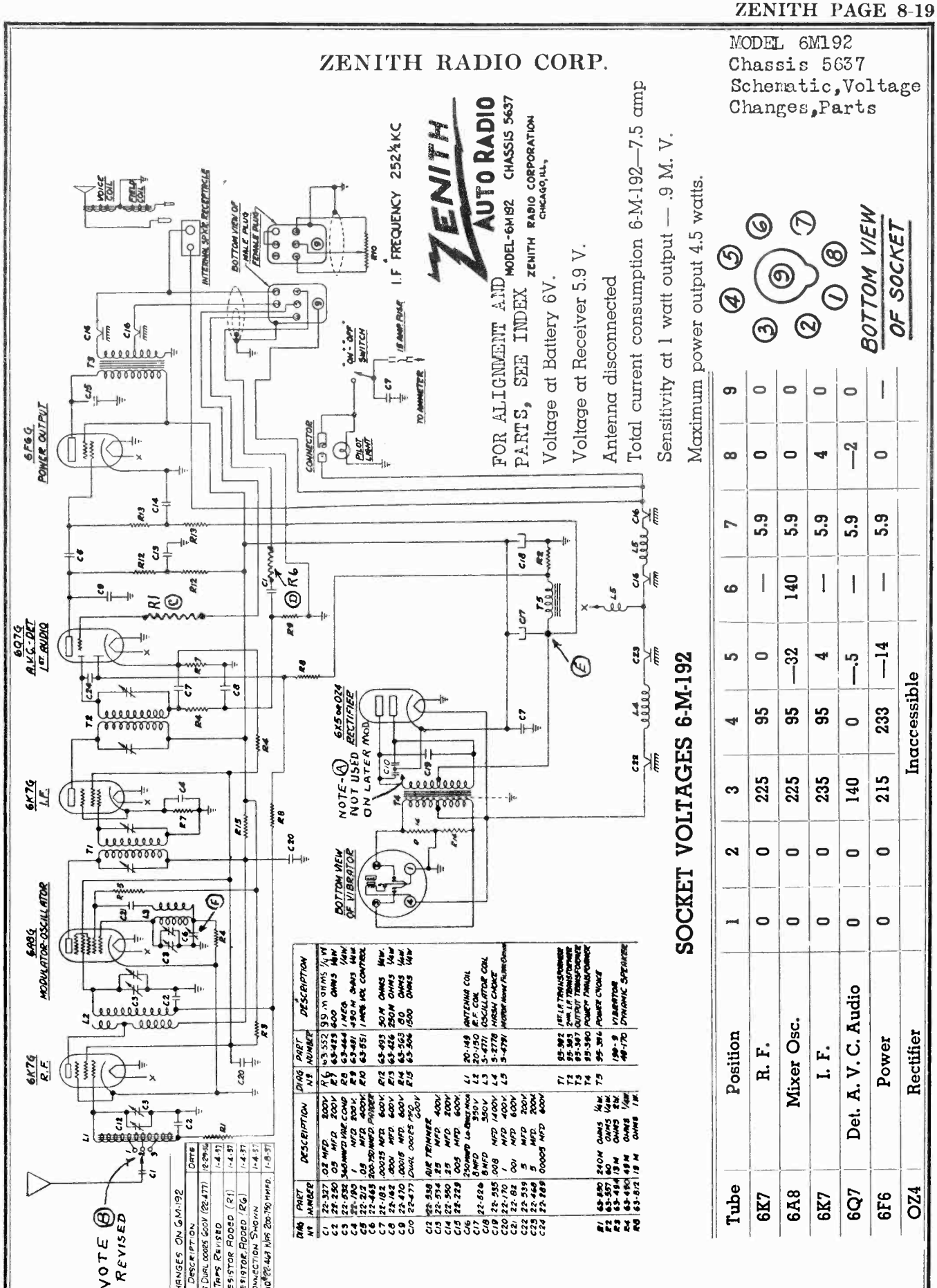
BOTTOM VIEW OF SOCKET

LOCATION OF TRIMMERS



ZENITH RADIO CORP.

MODEL 6M192
Chassis 5637
Schematic, Voltage
Changes, Parts



SOCKET VOLTAGES 6-M-192

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	225	95	0	—	5.9	0	0
6A8	Mixer Osc.	0	0	225	95	—32	140	5.9	0	0
6K7	I. F.	0	0	235	95	4	—	5.9	4	0
6Q7	Det. A. V. C. Audio	0	0	140	0	—.5	—	5.9	—2	0
6F6	Power	0	0	215	233	—14	—	5.9	0	—
OZ4	Rectifier	Inaccessible								

MODELS 6M193, 6M194
Chassis 5637

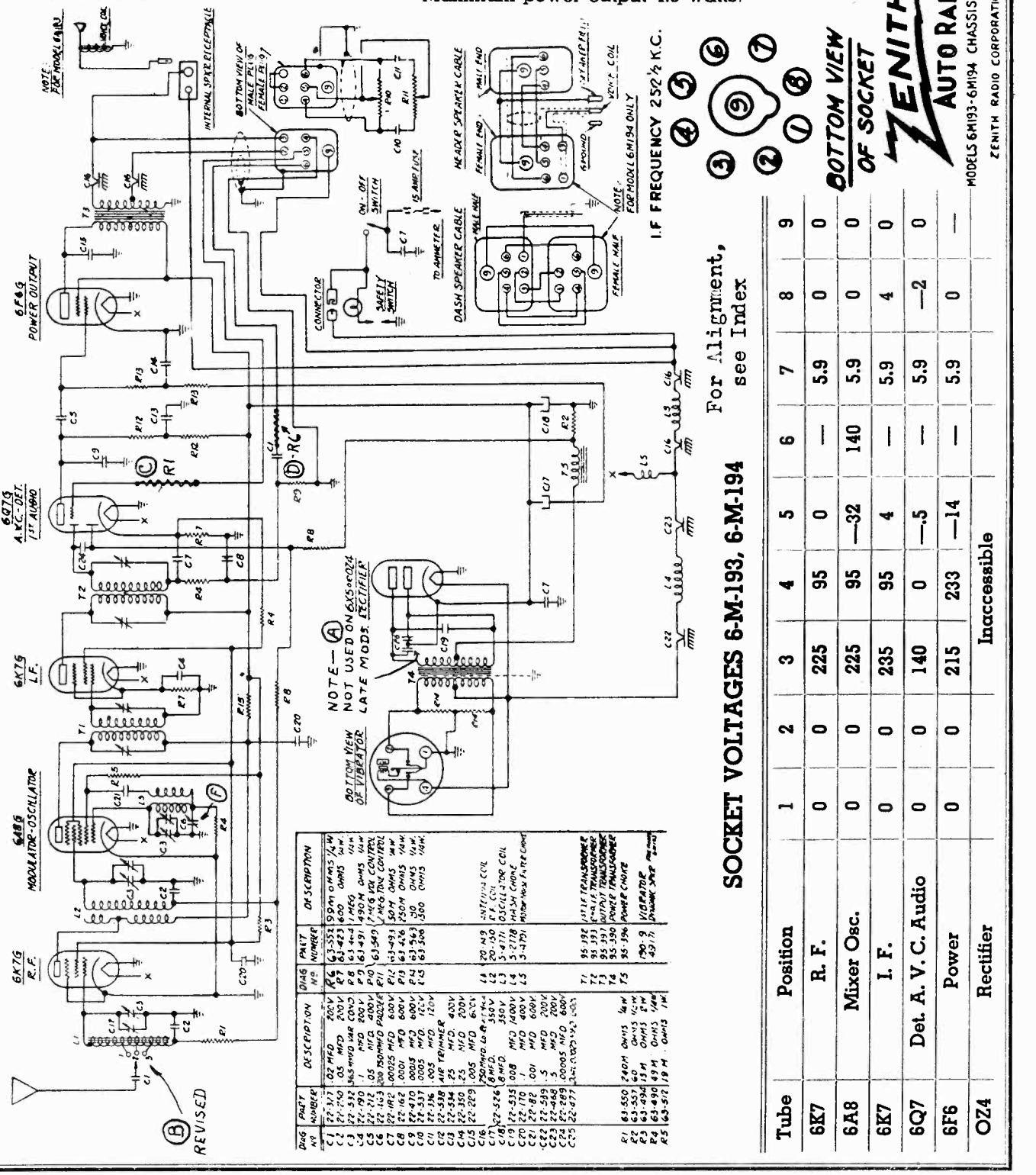
ZENITH RADIO CORP.

Schematic, Voltage
Parts, Changes

CHANGES ON 6M-193-4		
Letter	Description	Date
A	Mfg. Dual condensor (22417)	2-20-56
B	Taps Revised	1-4-57
C	Resistor Added (R1)	1-4-57
D	Resistor Added (R2)	1-4-57
E	Connection Shown	1-4-57
F	Changed 46 Ohms to 150 Ohms	1-8-57

Voltage at Battery 6V.
Voltage at Receiver 5.9 V.
Antenna disconnected

All voltages measured with 1000 ohms per volt D. C. meter
Total current consumption 6-M-193—6-M-194 5.9 amperes
Sensitivity at 1 watt output — .9 M. V.
Maximum power output 4.5 watts.



Diag No.	Part Number	Description	Diag No.	Part Number	Description
C1	22-332	.02 MFD. 200V	R1	63-355	9000 OHMS ½ W.
C2	22-340	.05 MFD. 200V	R2	63-423	600 OHMS ½W
C3	22-332	365 MMFD VAR. COND.	R3	63-444	1 MEG 1/4W
C4	22-190	1 MFD. 200V	R4	63-491	490M OHMS 1/4W
C5	22-212	.05 MFD. 400V	R5	63-549	1.416 MEG. CONTROL
C6	22-163	100 MMFD PADDER	R6	63-549	1.416 MEG. TONE CONTROL
C7	22-182	.00025 MFD. 600V	R12	63-493	50M OHMS ½W
C8	22-162	.0001 MFD. 600V	R13	63-476	250M OHMS ½W
C9	22-410	.0005 MFD. 600V	R14	63-563	30 OHMS 1/4W
C10	22-337	.0005 MFD. 120V	R15	63-506	300 OHMS 1/4W
C11	22-136	.005 MFD. 120V			
C12	22-338	AIR TRIMMER			
C13	22-334	.25 MFD. 400V			
C14	22-350	.25 MFD. 200V			
C15	22-229	.005 MFD. 600V			
C16		250 MMFD LAMINATED	L1	20-419	ANTENNA COIL
C17	22-326	18 MFD. 350V	L2	20-510	R.F. COIL
C18		18 MFD. 350V	L3	5-4171	OSCILLATOR COIL
C19	22-535	.008 MFD. 400V	L4	5-4178	I.F. COIL
C20	22-171	.1 MFD. 400V	L5	5-4191	MIXER GRID FILTER CHOKE
C21	22-82	.001 MFD. 600V			
C22	22-548	.5 MFD. 200V	T1	95-392	1ST I.F. TRANSFORMER
C23	22-549	.5 MFD. 200V	T2	95-393	2ND I.F. TRANSFORMER
C24	22-289	.0005 MFD. 600V	T3	95-397	OUTPUT TRANSFORMER
C25	22-477	DUAL 0.05-0.05 MFD. 600V	T4	95-396	POWER TRANSFORMER
			T5	95-396	POWER CHOKE
R1	63-550	240M OHMS 1/4W		190-9	VIBRATOR
R2	63-537	60 OHMS 1W		45-11	DYNAMIC SPKR. 8" P.M.
R3	63-494	13M OHMS 1W			
R4	63-490	49M OHMS 1/4W			
R5	63-512	119M OHMS 1W			

SOCKET VOLTAGES 6-M-193, 6-M-194

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	225	95	0	—	5.9	0	0
6A8	Mixer Osc.	0	0	225	95	—32	140	5.9	0	0
6K7	I. F.	0	0	235	95	4	—	5.9	4	0
6Q7	Det. A. V. C. Audio	0	0	140	0	—.5	—	5.9	—2	0
6F6	Power	0	0	215	233	—14	—	5.9	0	—
OZ4	Rectifier	Inaccessible								

BOTTOM VIEW OF SOCKET

ZENITH AUTO RADIO

MODELS 6M193-6M194 CHASSIS 5637

ZENITH RADIO CORPORATION

Chassis 5637
Socket, Trimmers
Chassis

ZENITH RADIO CORP.

MODEL 6M192
MODELS 6M193, 6M194

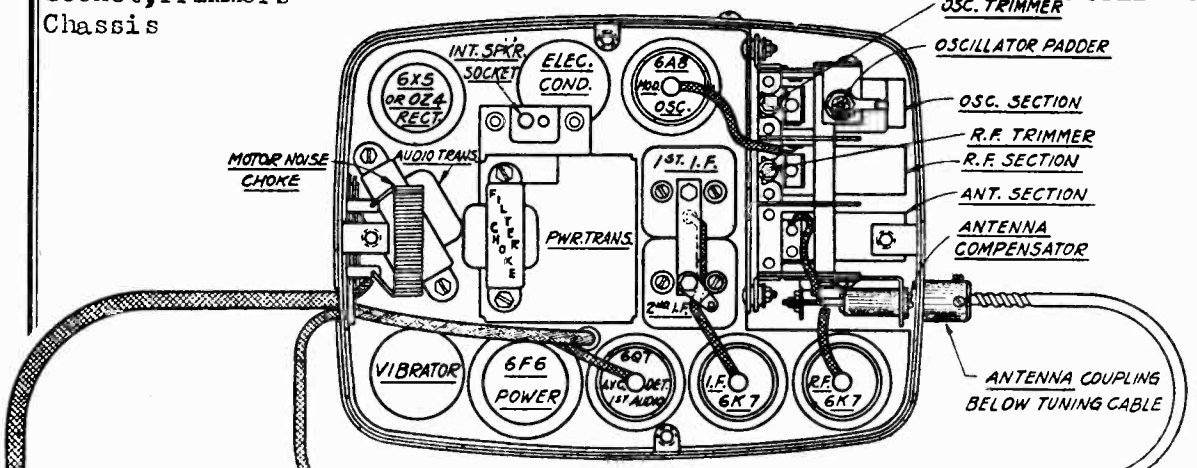


Fig. 9.—Tube Position 6-M-193, 6-M-194

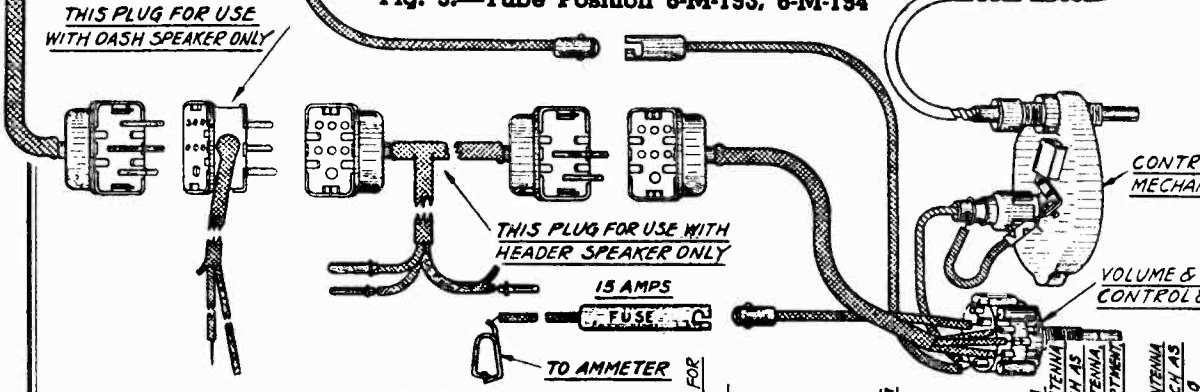


Fig. 6.—Bottom View—6-M-192, 6-M-193, 6-M-194

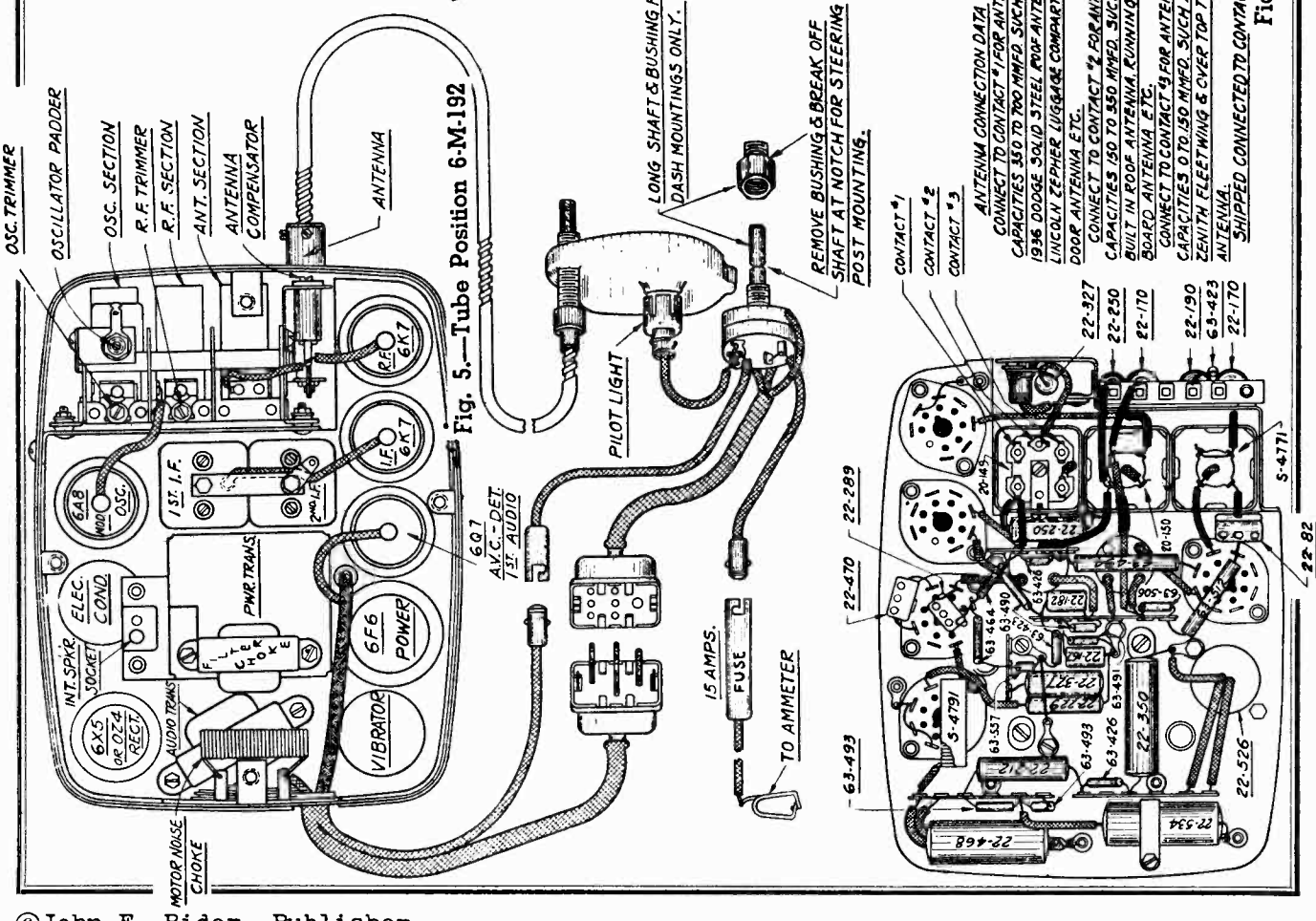
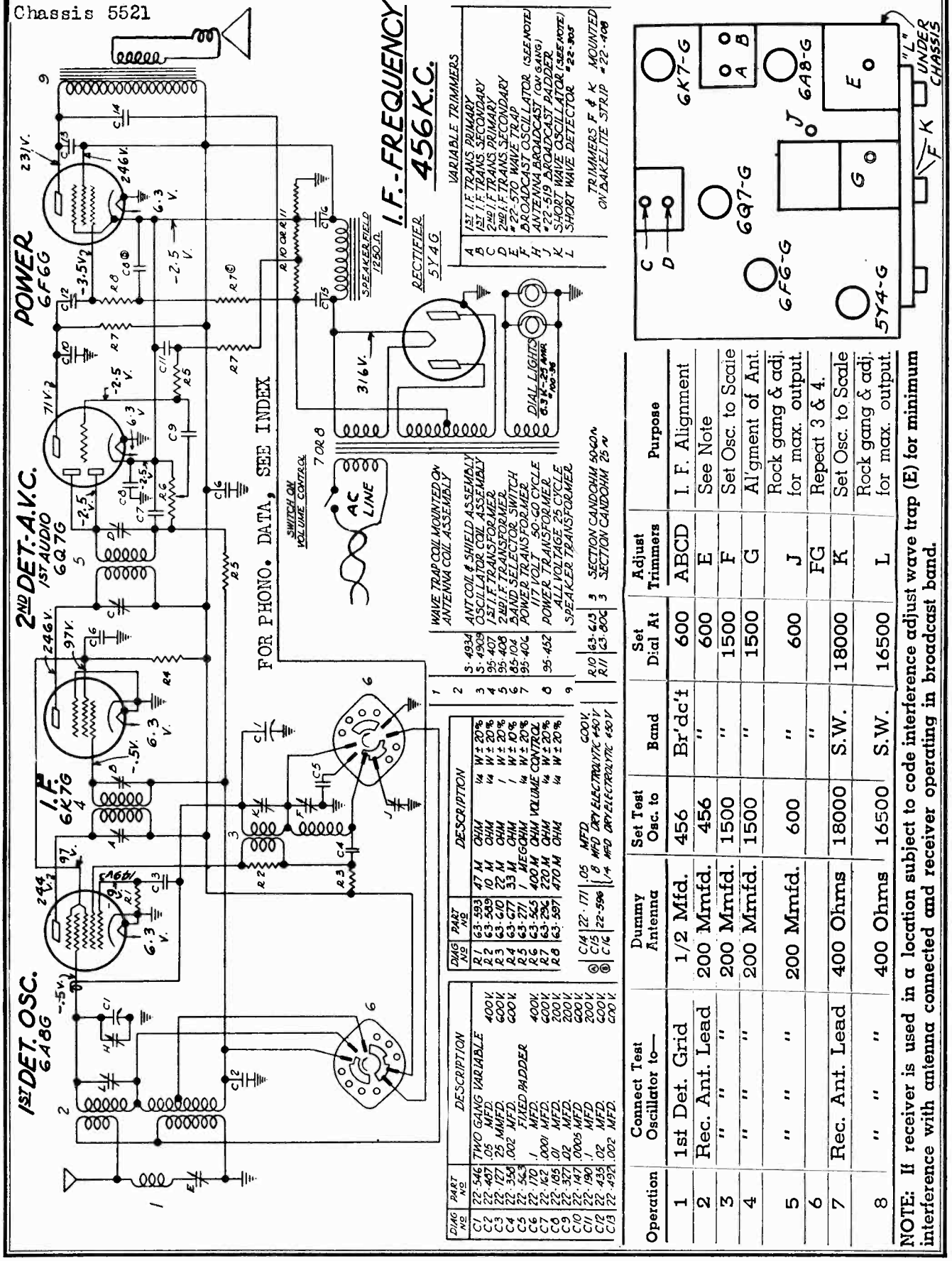


Fig. 5.—Tube Position 6-M-192

MODELS 5S201, 5S218, 5S220
5S228, 5S237, 5S250
5S252
Chassis 5521

ZENITH RADIO CORP

Schematic, Socket, Trimmers
Alignment, Voltage, Parts



DIAG No	PART No	DESCRIPTION
C1	22-546	TWO GANG VARIABLE 400 V.
C2	22-407	.05 MFD. 400 V.
C3	22-127	.25 MMFD. 400 V.
C4	22-358	.002 MFD. 400 V.
C5	22-563	FIXED PADDER 400 V.
C6	22-170	.1 MFD. 400 V.
C7	22-162	.0001 MFD. 200 V.
C8	22-165	.01 MFD. 200 V.
C9	22-327	.02 MFD. 200 V.
C10	22-147	.0005 MFD. 400 V.
C11	22-190	.1 MFD. 200 V.
C12	22-435	.02 MFD. 400 V.
C13	22-492	.002 MFD. 400 V.

DIAG No	PART No	DESCRIPTION
R1	63-593	47 M OHM ½ W ± 20%
R2	63-589	10 M OHM ½ W ± 20%
R3	63-610	22 M OHM 1 W ± 10%
R4	63-611	33 M OHM 1 W ± 10%
R5	63-271	1 MEGOHM ½ W ± 20%
R6	63-565	400 M OHM VOLUME CONTROL
R7	63-296	220 M OHM ½ W ± 20%
R8	63-597	470 M OHM ½ W ± 20%

C14	22-171	.05 MFD.	600 V.
C15	22-596	.8 MFD DRY ELECTROLYTIC	450 V.
C16		.4 MFD DRY ELECTROLYTIC	450 V.

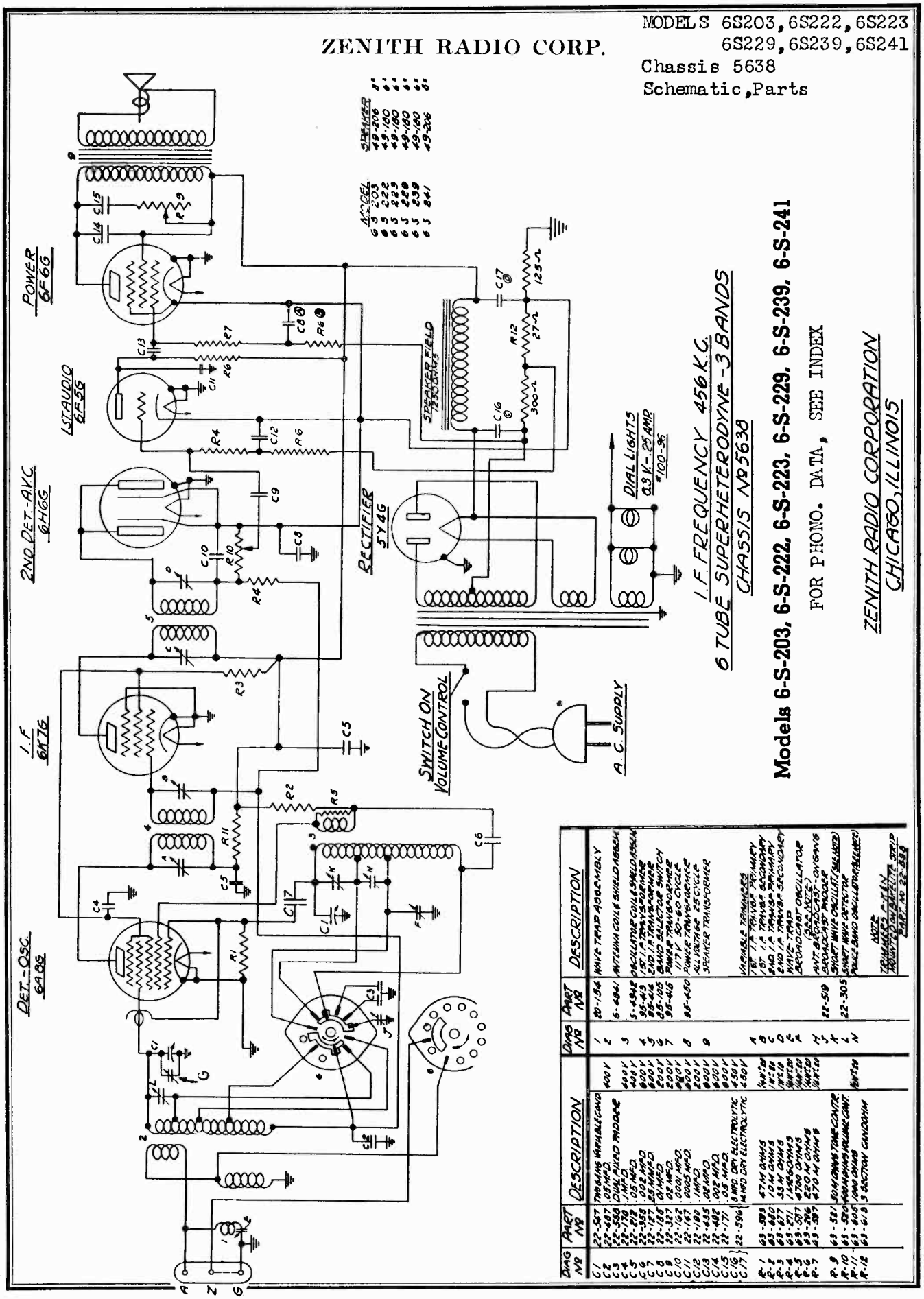
1	95-434	ANT COIL & SHIELD ASSEMBLY
2	95-409	OSCILLATOR COIL ASSEMBLY
3	95-407	1ST I.F. TRANSFORMER
4	95-408	2ND I.F. TRANSFORMER
5	85-104	B AND SELECTOR SWITCH
6	95-404	POWER TRANSFORMER
7	95-432	117 VOLT 50-60 CYCLE POWER TRANSFORMER. ALL VOLTAGE 25 CYCLE SPEAKER TRANSFORMER
8		3 SECTION CANDOHM 50-60Ω
9		3 SECTION CANDOHM 25Ω
R10	63-613	
R11	63-602	

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
6				"		FG	Repeat 3 & 4.
7	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output.

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

ZENITH RADIO CORP.

MODELS 6S203, 6S222, 6S223
6S229, 6S239, 6S241
Chassis 5638
Schematic, Parts



DIAG NO	PART NO	DESCRIPTION		DIAG NO	PART NO	DESCRIPTION
C1	22-567	TRIMMER CAPACITANCE	400 V	1	20-134	WAVE TRAP ASSEMBLY
C2	22-497	.05 MFD.		2	5-4841	ANTENNA COIL SHIELD ASSEMBLY
C3	22-550	DUAL FIXED MODEL	400 V	3	5-4842	OSCILLATOR COIL SHIELD ASSEMBLY
C4	22-178	.1 MFD.	400 V	4	95-413	1ST I.F. TRANSFORMER
C5	22-498	.05 MFD.	400 V	5	95-414	2ND I.F. TRANSFORMER
C6	22-554	.002 MFD.	400 V	6	95-415	3RD I.F. TRANSFORMER
C7	22-121	.05 MFD.	400 V	7	95-416	POWER TRANSFORMER
C8	22-121	.05 MFD.	400 V	8	95-450	105 TO 125 V. 50-60 CYCLE
C9	22-197	.0001 MFD.	400 V			POWER TRANSFORMER
C10	22-197	.0005 MFD.	400 V	9	95-450	117 V. 50-60 CYCLE
C11	22-197	.0001 MFD.	400 V			POWER TRANSFORMER
C12	22-180	.1 MFD.	400 V			ALL ELECTRIC 25 CYCLE
C13	22-435	.02 MFD.	400 V			SPEAKER TRANSFORMER
C14	22-402	.002 MFD.	400 V			
C15	22-171	.05 MFD.	400 V			VARIABLE CONDENSERS
C16	22-596	8 MFD DRY ELECTROLYTIC	450 V			1ST I.F. TRANS. PRIMARY
C17		4 MFD DRY ELECTROLYTIC	450 V			1ST I.F. TRANS. SECONDARY
R-1	63-303	47 M OHMS	WATTS			2ND I.F. TRANS. PRIMARY
R-2	63-660	10 M OHMS	WATTS			2ND I.F. TRANS. SECONDARY
R-3	63-677	33 M OHMS	WATTS			WAVE TRAP
R-4	63-671	1 MEGOHMS	WATTS			BROADCAST OSCILLATOR
R-5	63-597	4700 OHMS	WATTS			(BAND SPREAD)
R-6	63-296	220 M OHMS	WATTS	17	22-519	ANT. BROADCAST-GANGED
R-7	63-307	470 M OHMS	WATTS	18		BROADCAST PRIMARY
R-8	63-521	50 M OHMS TONE CONTROL		19	22-305	SHORT WAVE OSCILLATOR (SHIELDED)
R-10	63-520	500 OHMS HUM BALANCE UNIT		20		SHORT WAVE DETECTOR
R-11	63-605	1500 OHMS	WATTS	21		POLICE BAND OSCILLATOR (SHIELDED)
R-12	63-619	3 SECTION CANDOHM	WATTS			

NOTE
TRIMMERS ARE IN ANTENNA COIL ASSEMBLY AND OSCILLATOR COIL ASSEMBLY PART NO 22-558

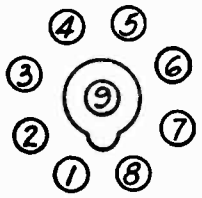
MODELS 6S203, 6S222, 6S223
6S229, 6S239, 6S241

ZENITH RADIO CORP.

Chassis 5638
Voltage, Alignment
Socket, Trimmers

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.1	245	83	—9	200	0	0	—.1
6K7	I.F.	0	6.1	247	83	0	—	0	0	—.1
6H6	2nd Det. AVC	0	0	—2	—2	—2	—	6.1	—2	—
6F5	1st Audio	0	0	—	114	—	—	6.1	—2	—2
6F6	Power	0	0	231	247	—3.5	—	6.1	—2	—
5Y4	Rect.	0	—	AC	—	AC	—	322	322	—



BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 65W. Power Output 4.5W.

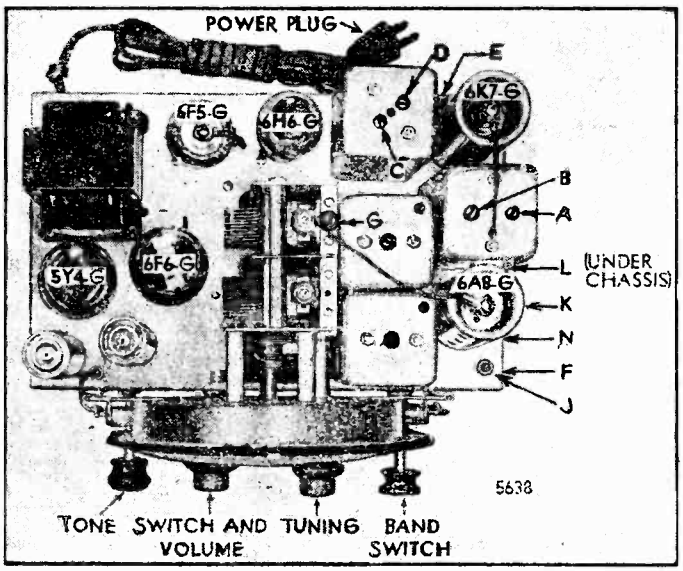
FOR PHONO. DATA, SEE INDEX

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6	" " "	200 Mmfd.				FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
9	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

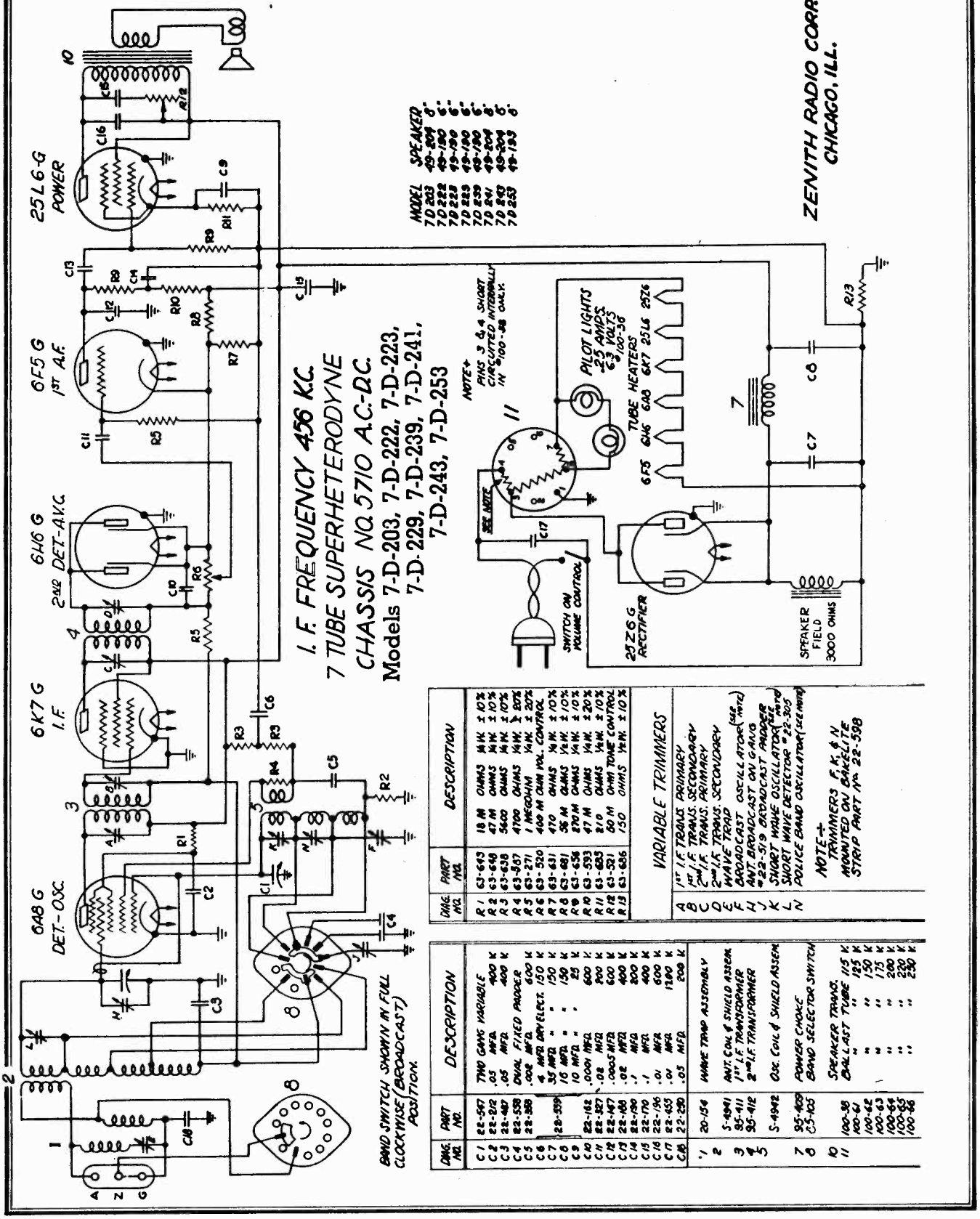
NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

LOCATION OF TRIMMERS



ZENITH RADIO CORP.

MODELS 7D203, 7D222, 7D223
7D229, 7D239, 7D241
7D243, 7D253
Chassis 5710 AC-DC
Schematic, Parts



DIAG. NO.	PART NO.	DESCRIPTION
C 1	22-367	TWO GANG VARIABLE 400 K
C 2	22-212	.05 MFD. 400 K
C 3	22-187	.05 MFD. 400 K
C 4	22-198	DUAL FIXED PADER
C 5	22-188	.002 MFD. 600 K
C 6		4 MFD DRY ELECT. 150 K
C 7	22-199	35 MFD. " " 150 K
C 8		16 MFD. " " 150 K
C 9		10 MFD. " " 25 K
C 10	22-162	.0001 MFD 600 K
C 11	22-327	.02 MFD 200 K
C 12	22-147	.0005 MFD 600 K
C 13	22-188	.02 MFD 400 K
C 14	22-190	.1 MFD 200 K
C 15	22-170	.1 MFD 400 K
C 16	22-196	.01 MFD 600 K
C 17	22-455	.01 MFD 1200 K
C 18	22-230	.05 MFD 200 K
1	20-134	WAVE TRAP ASSEMBLY
2	5-4941	ANT. COIL & SHIELD ASSEM.
3	95-411	1ST I.F. TRANSFORMER
4	95-412	2ND I.F. TRANSFORMER
5	5-4942	OSC. COIL & SHIELD ASSEM.
7	95-409	POWER CHOKE
8	85-105	BAND SELECTOR SWITCH
10	100-38	SPEAKER TRANS.
11	100-61	BALLAST TUBE 115 K
	100-62	" " 125 K
	100-63	" " 150 K
	100-64	" " 175 K
	100-65	" " 200 K
	100-66	" " 230 K

DIAG. NO.	PART NO.	DESCRIPTION
R 1	63-693	18 M OHMS ½ W. ± 10%
R 2	63-648	47 M OHMS ½ W. ± 10%
R 3	63-638	5600 OHMS ½ W. ± 10%
R 4	63-367	4700 OHMS ½ W. ± 20%
R 5	63-271	1 MEGOHM ½ W. ± 20%
R 6	63-520	500 M OHM VOL. CONTROL
R 7	63-631	470 OHMS ½ W. ± 10%
R 8	63-681	56 M OHMS ½ W. ± 10%
R 9	63-656	820 M OHMS ½ W. ± 10%
R 10	63-693	47 M OHMS ½ W. ± 20%
R 11	63-683	270 OHMS ½ W. ± 10%
R 12	63-521	80 M OHM TONE CONTROL
R 13	63-686	150 OHMS ½ W. ± 10%

	VARIABLE TRIMMERS
A	1ST I.F. TRANS. PRIMARY
B	1ST I.F. TRANS. SECONDARY
C	2ND I.F. TRANS. PRIMARY
D	2ND I.F. TRANS. SECONDARY
E	WAVE TRAP
F	BROADCAST OSCILLATOR (MFR.)
H	ANT. BROADCAST ON GANG
J	#22-319 BROADCAST PADER
K	SHORT WAVE OSCILLATOR (MFR.)
L	SHORT WAVE DETECTOR #22-305
N	POLICE BAND OSCILLATOR (SEE NOTE)

NOTE+ TRIMMERS F, K, & N MOUNTED ON BAKELITE STRIP PART No. 22-598

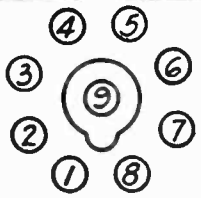
MODELS 7D203, 7D222, 7D223
7D229, 7D239, 7D241
7D243, 7D253

ZENITH RADIO CORP.

Chassis 5710 AC-DC
Voltage, Alignment, Socket
Trimmers

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	AC	104	63	—5.5	74	AC	0	—.1
6K7	I.F.	0	AC	104	104	0	—	AC	0	—.1
6H6	2nd Det. A.V.C.	0	AC	—1.5	—1	—1.5	—	AC	—1	—
6F5	1st Audio	0	AC	—	24	—	—	AC	—1	—1.5
25L6	Power	0	AC	99	100	—.5	—	AC	4.5	—
25Z6	Rect.	0	AC	AC	119	AC	—	AC	119	—
	Ballast									



BOTTOM VIEW OF SOCKET

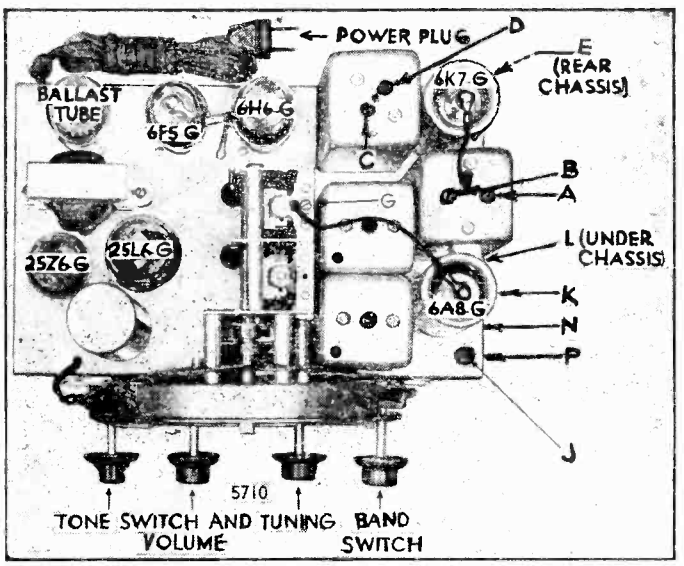
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 55W. Power output 1.75W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6	" " "	200 Mmfd.		"		FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
9	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

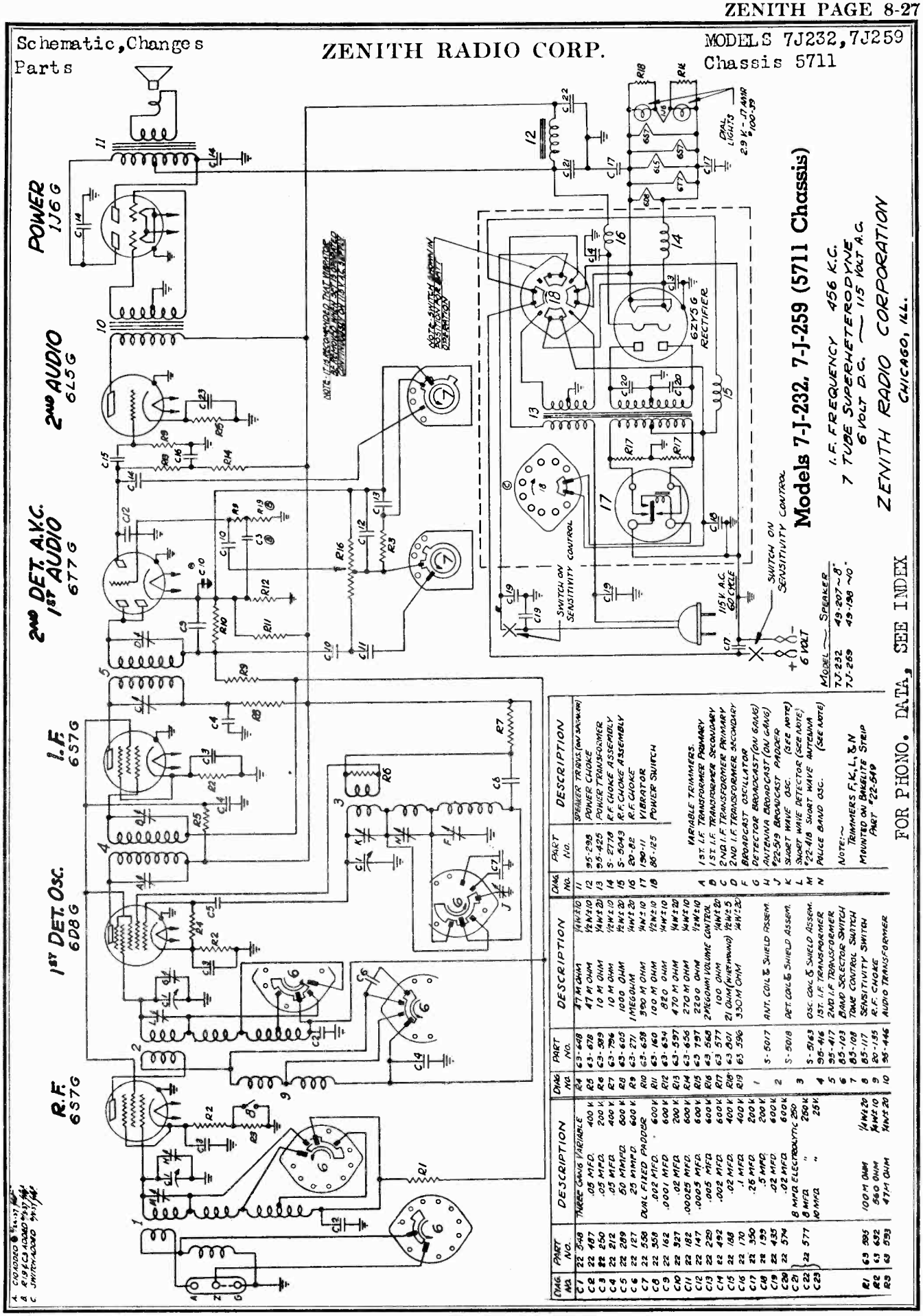
LOCATION OF TRIMMERS



Schematic, Changes
Parts

ZENITH RADIO CORP.

MODELS 7J232, 7J259
Chassis 5711



DIAG NO.	PART NO.	DESCRIPTION
C1	22 348	THREE GANG VARIABLE
C2	22 407	.05 MFD. 400 V.
C3	22 250	.05 MFD. 200 V.
C4	22 212	.05 MFD. 400 V.
C5	22 259	.50 MMFD. 600 V.
C6	22 127	25 MMFD. 600 V.
C7	22 538	DUAL FIXED PADDER
C8	22 358	.002 MFD. 600 V.
C9	22 162	.0001 MFD. 600 V.
C10	22 321	.02 MFD. 200 V.
C11	22 182	.00025 MFD. 600 V.
C12	22 147	.0005 MFD. 600 V.
C13	22 229	.005 MFD. 600 V.
C14	22 492	.002 MFD. 600 V.
C15	22 188	.02 MFD. 400 V.
C16	22 170	.1 MFD. 400 V.
C17	22 350	.25 MFD. 200 V.
C18	22 199	.5 MFD. 200 V.
C19	22 435	.02 MFD. 600 V.
C20	22 574	.02 MFD. 600 V.
C21	22 577	.8 MFD ELECTROLYTIC 250 V.
C22		8 MFD. " 250 V.
C23		40 MFD. " 25 V.
R1	63 595	100 M OHM 1/4 WATT
R2	63 652	560 OHM 1/4 WATT
R3	63 593	47M OHM 1/4 WATT
R4	63-648	47 M OHM 1/4 WATT
R5	63-678	47 M OHM 1/4 WATT
R6	63-589	10 M OHM 1/4 WATT
R7	63-796	10 M OHM 1/2 WATT
R8	63-605	1000 OHM 1/2 WATT
R9	63-271	1 MEGOHM 1/4 WATT
R10	63-658	990 M OHM 1/2 WATT
R11	63-160	100 M OHM 1/2 WATT
R12	63-634	820 OHM 1/4 WATT
R13	63-597	470 M OHM 1/4 WATT
R14	63-656	270 M OHM 1/4 WATT
R15	63 797	2200 OHM 1/2 WATT
R16	63 568	2 MEGOHM VOLUME CONTROL
R17	63 577	100 OHM 1/4 WATT
R18	63 601	21 OHM (WIREWOUND) 1/2 WATT 5
R19	63 596	330 M OHM 1/4 WATT 20
1	5-5017	ANT. COIL & SHIELD ASSEM.
2	5-5018	DET. COIL & SHIELD ASSEM.
3	5-5163	OSC. COIL & SHIELD ASSEM.
4	95-416	1ST I.F. TRANSFORMER
5	95-417	2ND I.F. TRANSFORMER
6	85-103	BAND SELECTOR SWITCH
7	85-108	TONE CONTROL SWITCH
8	85-117	SENSITIVITY SWITCH
9	20-135	R.F. CHOKE
10	90-446	AUDIO TRANSFORMER
11	95-295	SPEAKER TRANS (ON SPEAKER)
12	95-425	POWER CHOKE
13	S-2778	POWER TRANSFORMER
14	S-5043	R.F. CHOKE ASSEMBLY
15	20-82	R.F. CHOKE
16	190-11	VIBRATOR
17	85-125	POWER SWITCH
18		
A		VARIABLE TRIMMERS
B		1ST I.F. TRANSFORMER PRIMARY
C		1ST I.F. TRANSFORMER SECONDARY
D		2ND I.F. TRANSFORMER PRIMARY
F		2ND I.F. TRANSFORMER SECONDARY
G		BROADCAST OSCILLATOR
H		DETECTOR BROADCAST (ON GANG)
J		ANTENNA BROADCAST (ON GANG)
K	#22-519	SHORT WAVE PADDER
L		SHORT WAVE DETECTOR (SEE NOTE)
M	#22-418	SHORT WAVE ANTENNA
N		POLICE BAND OSC. (SEE NOTE)

NOTE:— TRIMMERS F, K, L, & N MOUNTED ON BAKELITE STRIP PART #22-549

MODELS 7J232, 7J259
Chassis 5711
Voltage, Alignment
Socket, Trimmers

ZENITH RADIO CORP.

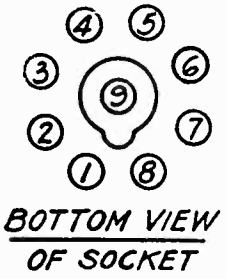
SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6S7	R.F.	0	6.3	126	34	1.5	—	0	1.5	0
6D8	Converter Osc.	0	6.3	126	34	—.1	106	0	1	0
6S7	I.F.	0	6.3	123	34	1	—	0	1	0
6T7	2nd Det. AVC 1st Audio	0	6.3	15	.1	.1	—	0	1	0
6L5	2nd Audio	0	6.3	122	—	0	—	0	4.5	—
1J6	Power	—	1	133	0	0	133	3	—	—
6ZY5G	Rect.	0	6.3	AC	—	AC	—	0	137	—

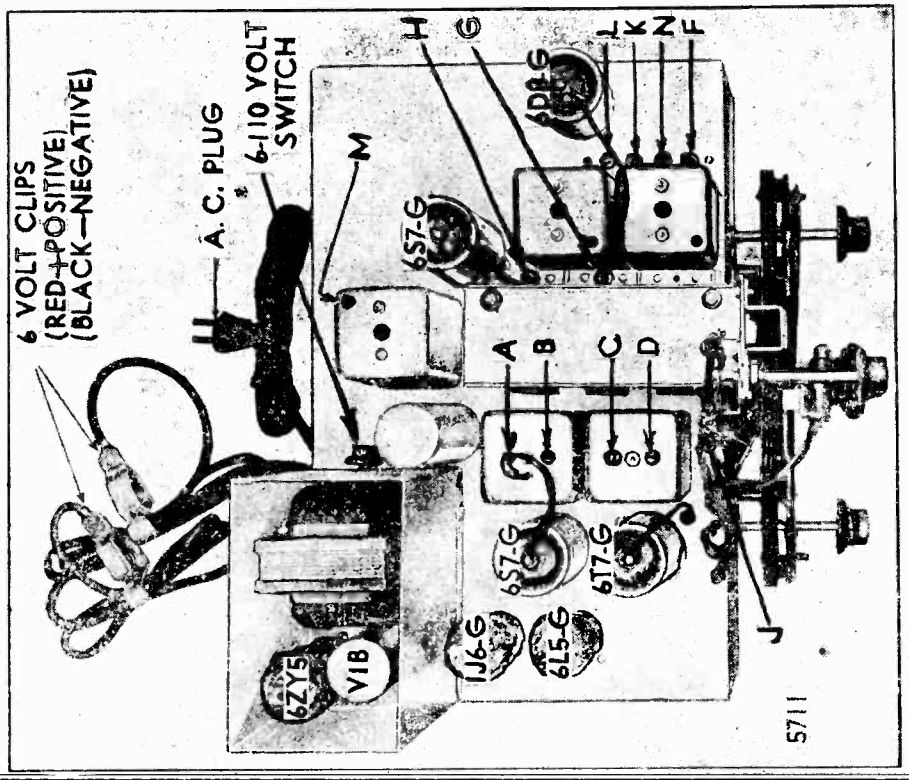
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 19W. Battery voltage 6.3V consumption 2.19 Amp. Power output 1.75W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt.of Ant.&Det
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FGH	Repeat 2 & 3
6	Rec. Ant. Post	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	LM	Rock gang & adj for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output



BOTTOM VIEW OF SOCKET

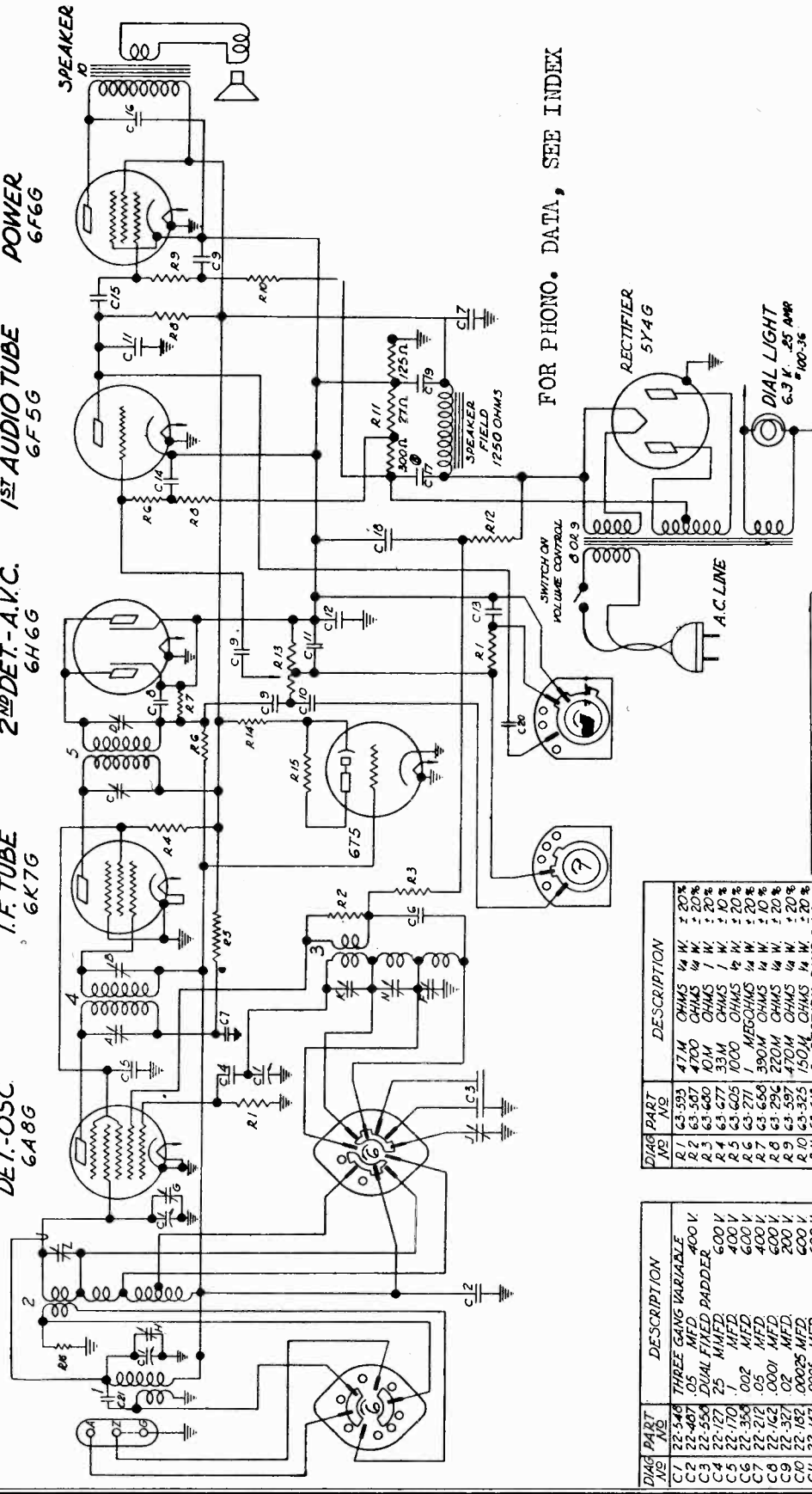


LOCATION OF TRIMMERS

Chassis 5709
Schematic, Parts

ZENITH RADIO CORP.

MODELS 7S204, 7S232, 7S240
7S242, 7S258, 7S260
7S261



I.F. - FREQUENCY 456 K.C.
7 TUBE SUPERHETERODYNE
3 BAND
CHASSIS NO 5709

Models 7-S-204, 7-S-232, 7-S-240, 7-S-242, 7-S-258, 7-S-260, 7-S-261

ZENITH RADIO CORP.
CHICAGO, ILLINOIS

DIAG NO	PART NO	DESCRIPTION
C1	22-548	THREE GANG VARIABLE 400 V.
C2	22-487	.05 MFD 600 V.
C3	22-550	DUAL FIXED PADDER 600 V.
C4	22-127	25 MMFD 600 V.
C5	22-170	.1 MFD 400 V.
C6	22-358	.002 MFD 600 V.
C7	22-212	.05 MFD 400 V.
C8	22-162	.0001 MFD 600 V.
C9	22-327	.02 MFD 200 V.
C10	22-182	.0025 MFD 600 V.
C11	22-147	.005 MFD 200 V.
C12	22-165	.01 MFD 400 V.
C13	22-326	.003 MFD 200 V.
C14	22-190	.1 MFD 600 V.
C15	22-435	.02 MFD 600 V.
C16	22-627	.002 MFD 1000 V.
C17	22-561	12 MFD ELECTROLYTIC 450 V.
C18	22-542	2 MFD " 450 V.
C19		4 MFD " 450 V.
C20	22-446	.004 MFD. 600 V.
1	5-4700	ANTENNA COIL ASSEMBLY
2		
3	5-5054	DETECTOR COIL & SHIELD ASSEM.
	5-4929	OSCILLATOR COIL & SHIELD ASSEM.
4	95-416	1ST I.F. TRANS
5	95-417	2ND I.F. TRANS
6	85-110	BAND SELECTOR SWITCH
7	85-108	TONE CONTROL SWITCH
8	95-418	POWER TRANS. 117V 50-60 CYCLE
9	95-451	POWER TRANS. ALL VOLTAGES 50-60 CYCLE
10		SPEAKER TRANSFORMER

DIAG NO	PART NO	DESCRIPTION
R1	63-593	47 M OHMS ½ W. ± 20%
R2	63-567	4700 OHMS ½ W. ± 20%
R3	63-650	10 M OHMS ½ W. ± 20%
R4	63-677	33 M OHMS 1 W. ± 20%
R5	63-625	1000 OHMS ½ W. ± 10%
R6	63-271	1 MEGOHMS ½ W. ± 20%
R7	63-658	390 M OHMS ½ W. ± 10%
R8	63-296	220 M OHMS ½ W. ± 20%
R9	63-597	470 M OHMS ½ W. ± 20%
R10	63-325	150 M OHMS ½ W. ± 20%
R11	63-673	3 SECTION CANDOHM
R12	63-606	15 M OHMS 1 W. ± 20%
R13	63-611	2 MEGOHM VOLUME CONTROL
R14	63-609	22 M OHMS ½ W. ± 20%
R15		1 MEGOHM MOUNTED IN TUNING TUBE SOCKET

VARIABLE TRIMMERS

A	1ST I.F. TRANS PRIMARY
B	1ST I.F. TRANS SECONDARY
C	2ND I.F. TRANS PRIMARY
D	2ND I.F. TRANS SECONDARY
F	BROADCAST OSCILLATOR (SEE NOTE)
G	DETECTOR BROADCAST (ON GANG)
H	ANTENNA BROADCAST (ON GANG)
J	1ST I.F. BROADCAST PADDER (SEE NOTE)
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR (SEE NOTE)
N	POLICE BAND OSCILLATOR (SEE NOTE)

NOTE:
TRIMMERS F, K, L, & N MOUNTED ON BAKELITE STRIP # 22-549

DIAG NO	PART NO	DESCRIPTION
C21	22-604	10 MFD. CERAMIC
R16	63-583	1000 OHMS ½ W ± 20%

SPEAKERS	MODELS
49-203 8"	7-S-232
49-206 8"	7-S-240
49-206 8"	7-S-242
49-181 10"	7-S-258
49-195 12"	7-S-260
49-195 12"	7-S-261

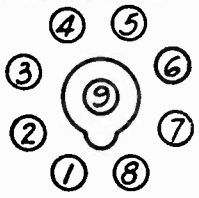
MODELS 7S204, 7S232, 7S240
7S242, 7S258, 7S260
7S261

ZENITH RADIO CORP.

Chassis 5709
Voltage, Alignment, Socket Trimmers

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.4	255	89	—10	182	0	0	—2
6K7	I.F.	0	6.4	243	89	0	—	0	0	—2
6H6	2nd Det. A.V.C.	0	0	—2	—2	—2	—	6.4	—2	—
6F5	1st Audio	0	0	—	117	—	—	6.4	—1.5	—1.5
6F6	Power	0	0	243	255	—2	—	6.4	—2	—
5Y4	Rect.	0	—	AC	—	AC	—	328	328	—
		H	Ep	Eg	Et	Ek	H			
6T5	Target	0	16	—2	255	—2	6.4			



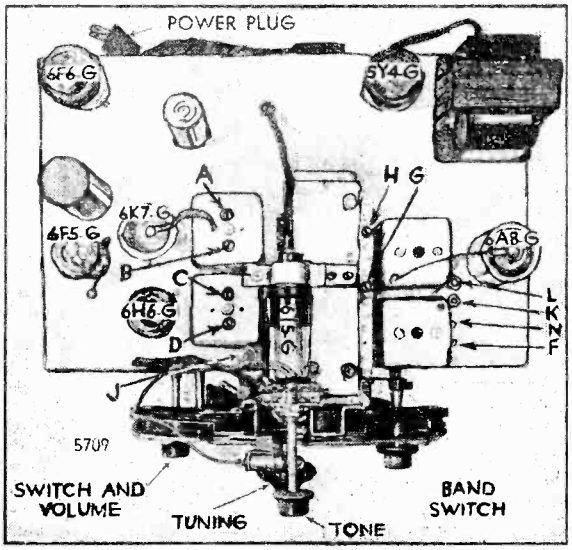
BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 75W. Power output 4.5W.

ALIGNMENT PROCEDURE

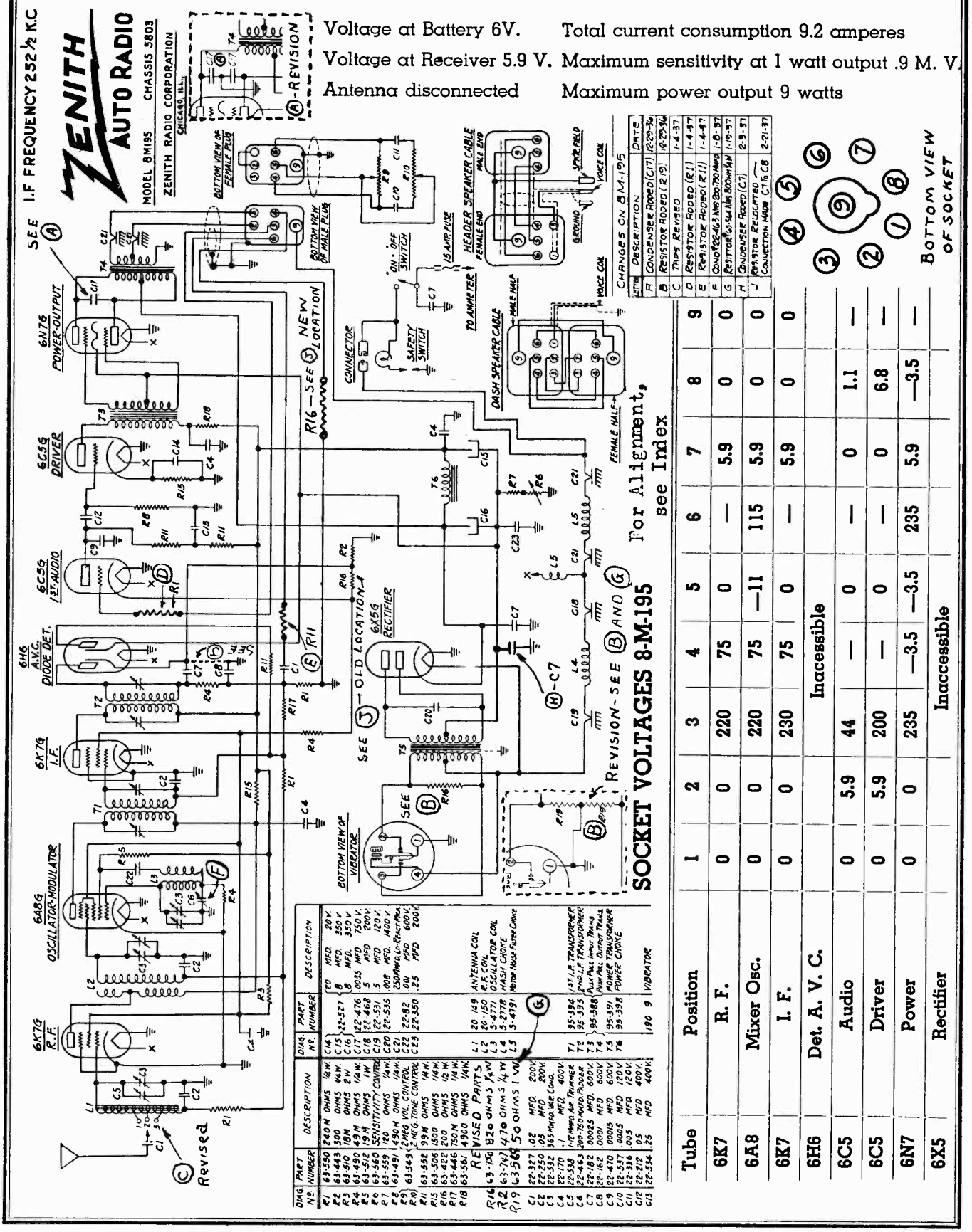
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt.of Ant.&De.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FGH	Repeat 2 & 3
6	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

LOCATION OF TRIMMERS



ZENITH RADIO CORP.

MODEL 8M195
Chassis 5803
Schematic, Voltage
Changes, Parts



SOCKET VOLTAGES 8-M-195

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	220	75	0	—	5.9	0	0
6A8	Mixer Osc.	0	0	220	75	—11	115	5.9	0	0
6K7	I. F.	0	0	230	75	0	—	5.9	0	0
6H6	Det. A. V. C.	Inaccessible								
6C5	Audio	0	5.9	44	—	0	—	0	1.1	—
6C5	Driver	0	5.9	200	—	0	—	0	6.8	—
6N7	Power	0	0	235	—3.5	—3.5	235	5.9	—3.5	—
6X5	Rectifier	Inaccessible								

CHANGES ON 8M-195

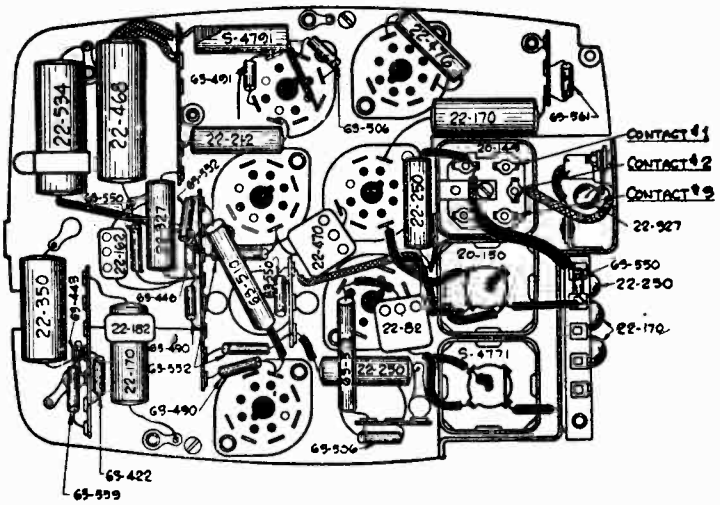
LTR	DESCRIPTION	DATE
A	CONDENSER ADDED (C17)	12-29-36
B	RESISTOR ADDED (R19)	12-29-36
C	TRIPS REVISED	1-4-37
D	RESISTOR ADDED (R11)	1-4-37
E	RESISTOR ADDED (R11)	1-4-37
F	CHANGED 4.5 MEG. TO 2.5 MEG.	1-15-37
G	RESISTOR 0.5-1.5 MEG. TO 0.5 MEG.	1-19-37
H	CONDENSER ADDED (C7)	2-3-37
J	RESISTOR RELOCATED — CONNECTION MADE C17 TO C8	2-21-37

DIAG Nº	PART NUMBER	DESCRIPTION
R1	63-350	240 M OHMS ½ W.
R2	63-443	300 OHMS ½ W.
R3	63-510	18 M OHMS 2 W.
R4	63-490	4.9 M OHMS ½ W.
R5	63-512	1.9 M OHMS 1 W.
R6	63-360	SENSITIVITY CONTROL
R7	63-559	120 OHMS ½ W.
R8	63-491	490 M OHMS ½ W.
R9	63-543	2 MEG VOL. CONTROL
R10		2 MEG. TONE CONTROL
R11	63-558	99 M OHMS ½ W.
R15	63-308	1500 OHMS ½ W.
R16	63-422	200 OHMS ½ W.
R17	63-446	750 M OHMS ½ W.
R18	63-561	4500 OHMS ½ W.
		REVISED PARTS
R14	63-196	820 OHMS ½ W.
R2	63-741	470 OHMS ¼ W.
R19	63-568	50 OHMS 1 W.
C1	22-327	.02 MFD. 200 V.
C2	22-250	.05 MFD. 200 V.
C3	22-532	365 MMFD. VAR. COND.
C4	22-170	.1 MFD. 400 V.
C5	22-538	1-12 MMFD. AIR TRIMMER
C6	22-463	200-750 MMFD. PADDER
C7	22-182	.00025 MFD. 600 V.
C8	22-162	.0001 MFD. 600 V.
C9	22-470	.00015 MFD. 600 V.
C10	22-537	.0005 MFD. 120 V.
C11	22-336	.005 MFD. 120 V.
C12	22-212	.05 MFD. 400 V.
C13	22-534	.25 MFD. 400 V.

DIAG Nº	PART NUMBER	DESCRIPTION
C14		.10 MFD. 20 V.
C15	22-521	.8 MFD. 350 V.
C16		.8 MFD. 350 V.
C17	22-476	.0025 MFD. 750 V.
C18	22-468	.5 MFD. 200 V.
C19	22-531	.5 MFD. 120 V.
C20	22-535	.008 MFD. 400 V.
C21		230 MMFD. LO-REACT. MAX.
C22	22-82	.001 MFD. 600 V.
C23	22-350	.25 MFD. 200 V.
L1	20-149	ANTENNA COIL
L2	20-150	R.F. COIL
L3	54-4771	OSCILLATOR COIL
L4	54-2778	WASH CHOKE
L5	54-4191	MOTOR NOISE FILTER CHOKE
T1	95-394	1ST I.F. TRANSFORMER
T2	95-395	2ND I.F. TRANSFORMER
T3	95-388	PUSH-PULL INPUT TRANS.
T4		PUSH-PULL OUTPUT TRANS.
T5	95-391	POWER TRANSFORMER
T6	95-398	POWER CHOKE
190 9		VIBRATOR

MODEL 8M195
Chassis 5803
Socket, Trimmers
Chassis

ZENITH RADIO CORP.



CONNECT TO CONTACT #1 FOR ANTENNA CAPACITIES 550 TO 700 MMFD SUCH AS 1938 2DOOR SOLID STEEL ROOF ANTENNA, LINCOLN ZEPHER LUGGAGE COMPARTMENT, DOOR ANTENNA ETC. —
CONNECT TO CONTACT #2 FOR ANTENNA CAPACITIES 150 TO 550 MMFD SUCH AS BUILT IN ROOF ANTENNA, RUNNING BOARD ANTENNA ETC. —
CONNECT TO CONTACT #3 FOR ANTENNA CAPACITIES 0 TO 150 MMFD SUCH AS ZENITH FLEETWING OR OVER TOP TYPE ANTENNA. —
SHIPPED CONNECTED TO CONTACT #2

BOTTOM VIEW OF ZENITH AUTO RADIO - MODEL 8M195

Fig. 12.—Bottom View 8-M-195

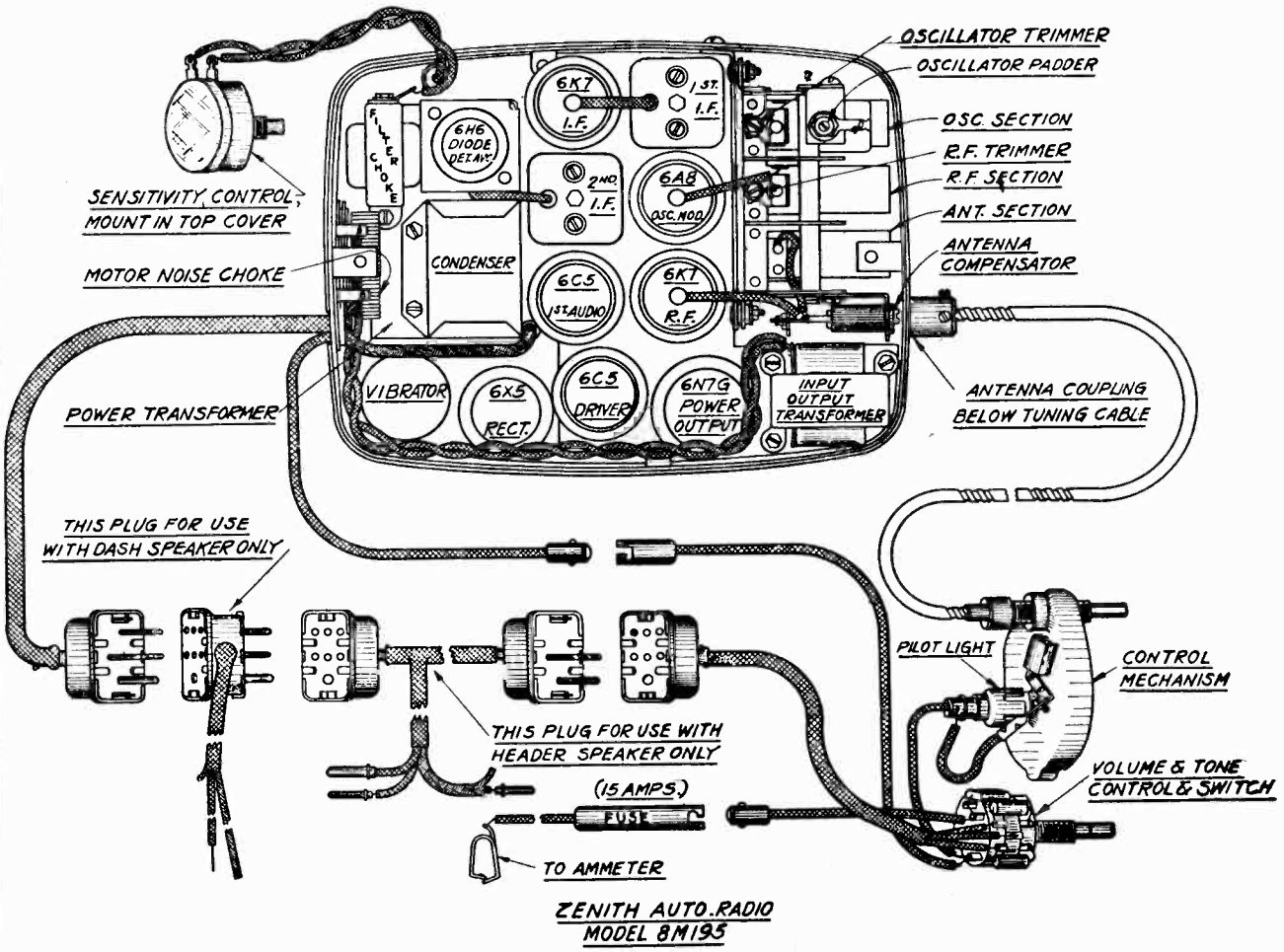


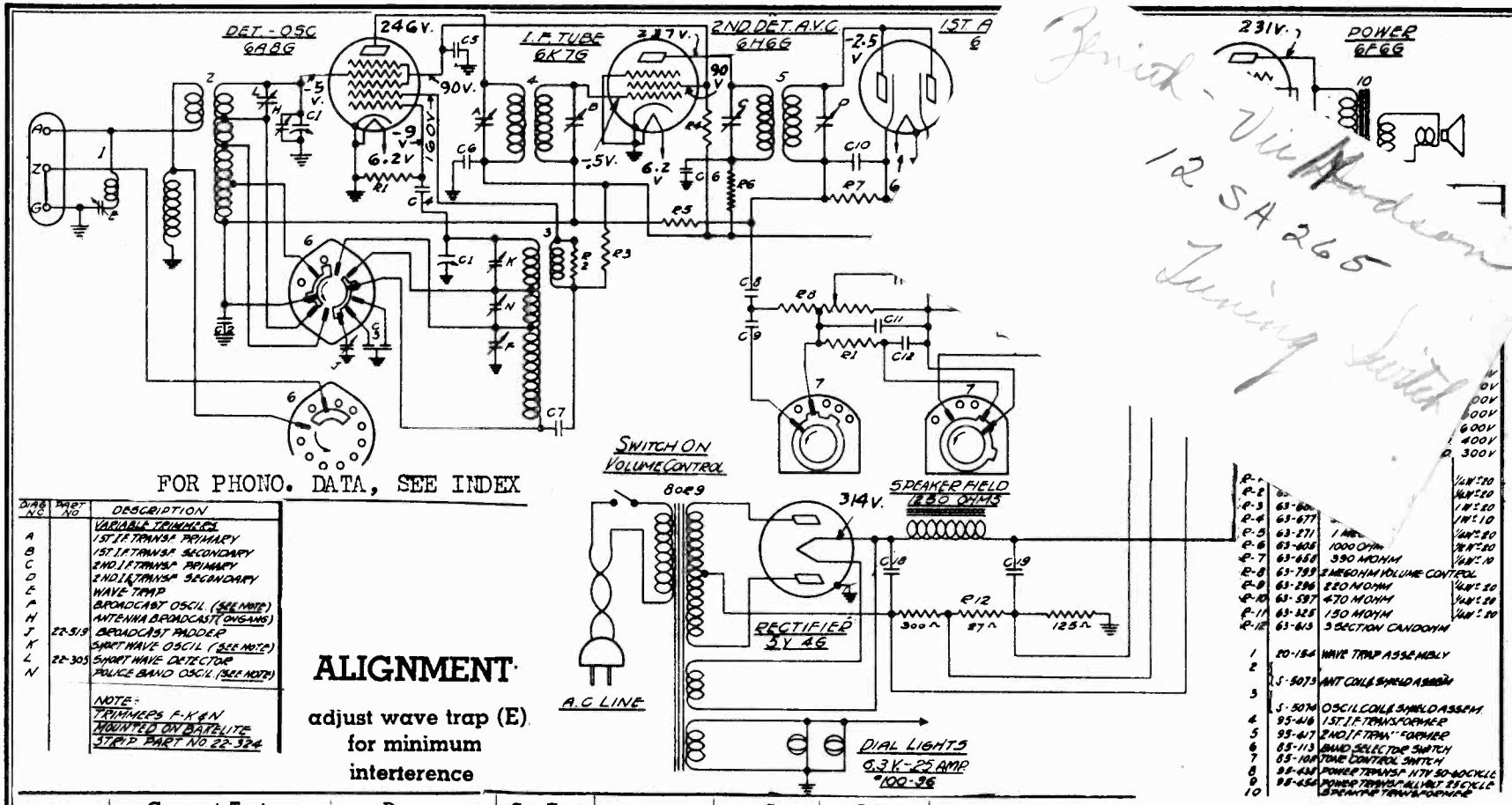
Fig. 11.—Tube Position 8-M-195

ZENITH RADIO CORP.

MODELS 6S254, 6S256
Chassis 5644

Schematic, Voltage
Socket, Trimmers
Alignment, Parts

I.F. FREQUENCY 456 KC
6 TUBE SUPERHETERODYNE - 3 BAND
CHASSIS NO 5644

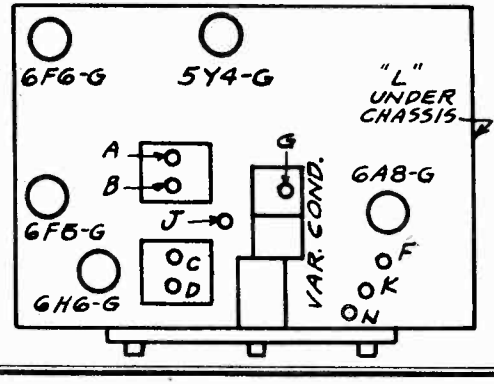


DIAG NO	PART NO	DESCRIPTION
		VARIABLE TRIMMERS
A		1ST I.F. TRANS'R. PRIMARY
B		1ST I.F. TRANS'R. SECONDARY
C		2ND I.F. TRANS'R. PRIMARY
D		2ND I.F. TRANS'R. SECONDARY
E		WAVE TRAP
F		BROADCAST OSCIL. (SEE NOTE)
H		ANTENNA BROADCAST (2 GANG)
J	22-519	BROADCAST PADDER
K		SHORT WAVE OSCIL. (SEE NOTE)
L	22-305	SHORT WAVE DETECTOR
N		POLICE BAND OSCIL. (SEE NOTE)
		NOTE - TRIMMERS F-K & N MOUNTED ON BAKELITE STRIP PART NO 22-324

ALIGNMENT

adjust wave trap (E) for minimum interference

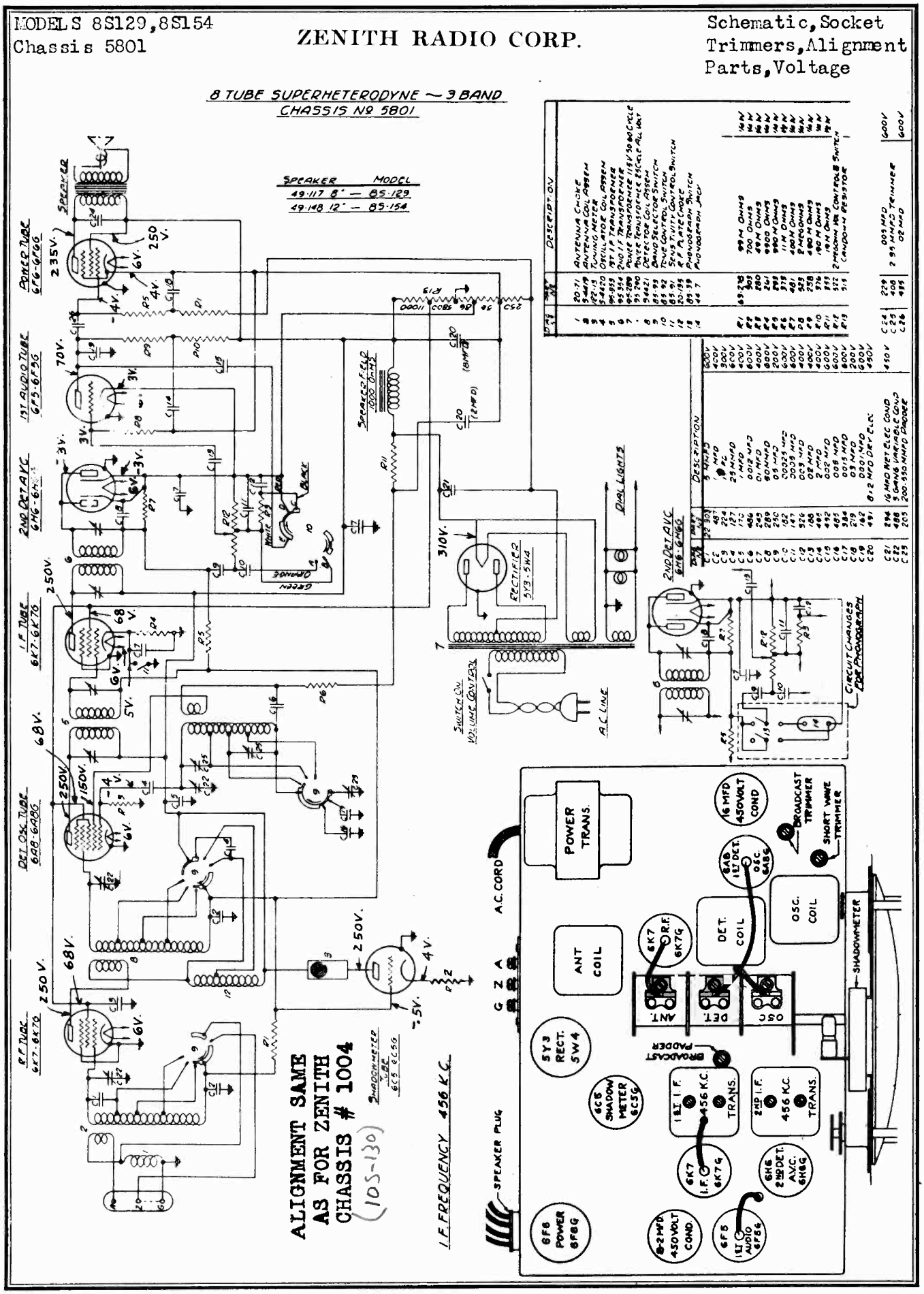
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6	" " "	200 Mmfd.				FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
9	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output



MODELS 8S129, 8S154
Chassis 5801

ZENITH RADIO CORP.

Schematic, Socket
Trimmers, Alignment
Parts, Voltage



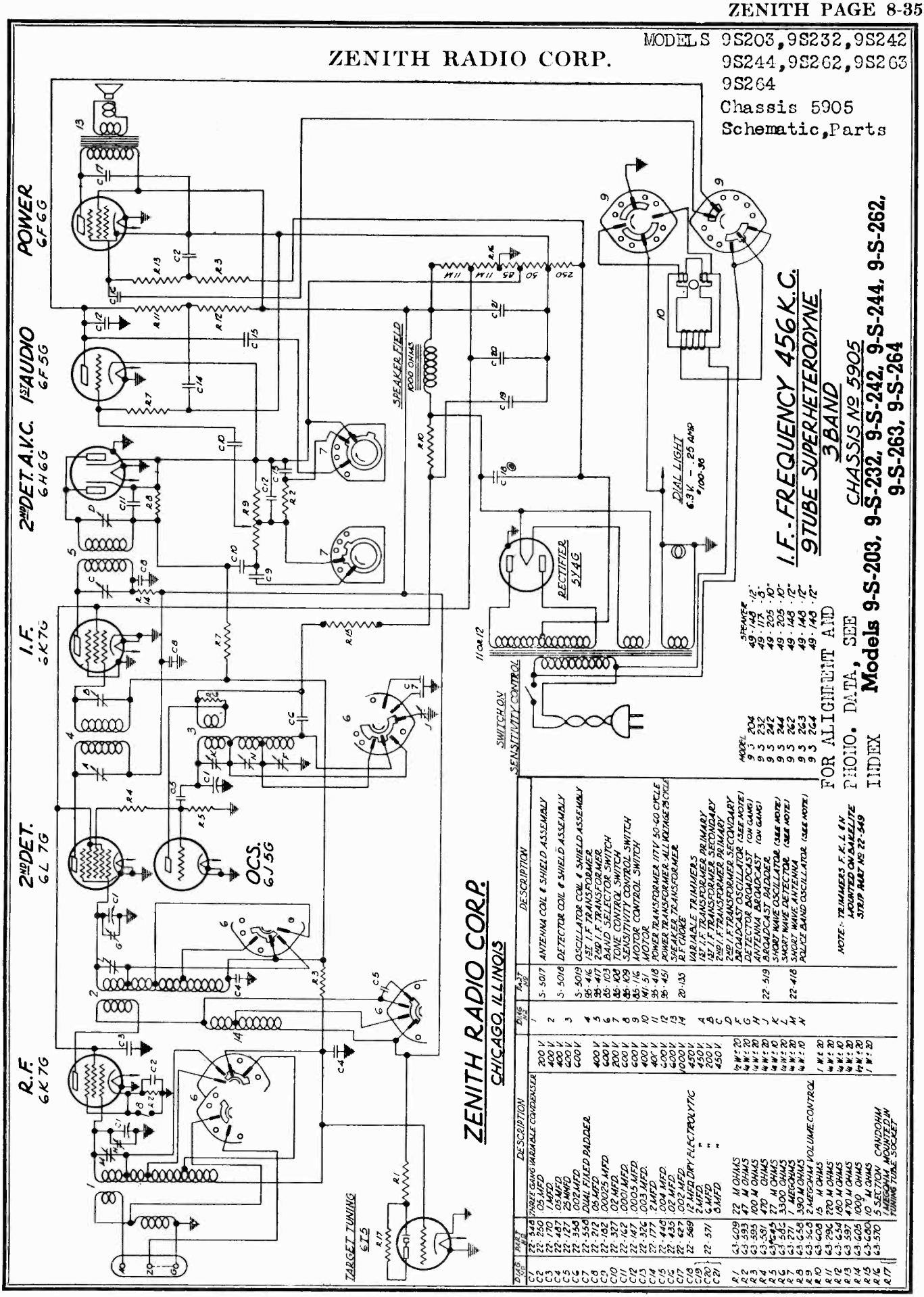


DIAGRAM NO.	PART NO.	DESCRIPTION		DIAG NO.	PART NO.	DESCRIPTION
C1	22-346	THREE GANG VARIABLE CONDENSER		1		
C2	22-250	.05 MFD	200 V	2	S-5017	ANTENNA COIL & SHIELD ASSEMBLY
C3	22-170	.1 MFD	400 V		S-5018	DETECTOR COIL & SHIELD ASSEMBLY
C4	22-167	.05 MFD	400 V	3		
C5	22-165	.25 MFD	600 V		S-5019	OSCILLATOR COIL & SHIELD ASSEMBLY
C6	22-356	.002 MFD		4	96-416	1ST I.F. TRANSFORMER
C7	22-212	DUAL FIXED PADDER		5	96-417	2ND I.F. TRANSFORMER
C8	22-162	.05 MFD	400 V	6	85-103	BAND SELECTOR SWITCH
C9	22-161	.0025 MFD	600 V	7	85-108	TONE CONTROL SWITCH
C10	22-307	.02 MFD	200 V	8	85-109	SENSITIVITY CONTROL SWITCH
C11	22-162	.0001 MFD	600 V	9	85-116	MOTOR CONTROL SWITCH
C12	22-147	.0005 MFD	600 V	10	141-51	MOTOR
C13	22-326	.003 MFD.	400 V	11	96-418	POWER TRANSFORMER 117 V 50-60 CYCLE
C14	22-171	.1 MFD	400 V	12	96-451	POWER TRANSFORMER ALL VOLTAGES 25 CYCLE
C15	22-446	.004 MFD	600 V	13		SPEAKER TRANSFORMER
C16	22-435	.002 MFD	600 V	14	20-135	R.F. CHOKE
C17	22-427	.002 MFD	1000 V			
C18	22-569	12 MFD DRY ELECTROLYTIC	450 V	A		VARIABLE TRIMMERS
C19		2 MFD "	450 V	B		1ST I.F. TRANSFORMER PRIMARY
C20	22-571	4 MFD "	200 V	C		1ST I.F. TRANSFORMER SECONDARY
C21		8 MFD "	450 V	D		2ND I.F. TRANSFORMER PRIMARY
				E		2ND I.F. TRANSFORMER SECONDARY
R1	63-409	.1 MEGOHMS	1 W ± 20	F		BROADCAST OSCILLATOR (SEE NOTE)
R2	63-393	47 M OHMS	½ W ± 20	G		DETECTOR BROADCAST (LOW GANG)
R3	63-395	100 M OHMS	½ W ± 20	H		ANTENNA BROADCAST (LOW GANG)
R4	63-581	470 OHMS	½ W ± 20	I	22-519	BROADCAST PADDER
R5	63-545	27 M OHMS	½ W ± 20	J		S.W.B. WAVE OSCILLATOR (SEE NOTE)
R6	63-582	3300 OHMS	½ W ± 20	K		SHORT WAVE DETECTOR (SEE NOTE)
R7	63-577	1 MEGOHMS	½ W ± 20	L		SHORT WAVE ANTENNA
R8	63-558	390 M OHMS	½ W ± 10	M	22-418	POLICE BAND OSCILLATOR (SEE NOTE)
R9	63-568	2 MEGOHMS VOLUME CONTROL	1 W ± 20			
R10	63-600	15 M OHMS	½ W ± 20			
R11	63-290	220 M OHMS	½ W ± 10			
R12	63-544	180 M OHMS	½ W ± 10			
R13	63-597	470 M OHMS	½ W ± 20			
R14	63-605	1000 OHMS	½ W ± 20			
R15	63-600	10 M OHMS	½ W ± 20			
R16	63-570	5 SECTION CANDOHM				
R17		1 MEGOHM MOUNTED ON TUNING TUBE SOCKET	1 W ± 20			

NOTE:- TRIMMERS F.K.L. IN MOUNTED ON SATELLITE STRIP PART No 22-549

MODEL	SPEAKER		
9 S 204	49-143	.12	.8
9 S 232	49-175	.12	.8
9 S 242	49-205	.10	.10
9 S 244	49-205	.10	.12
9 S 262	49-148	.12	.12
9 S 263	49-148	.12	.12
9 S 264	49-148	.12	.12

ZENITH RADIO CORP.

CHASSIS Nos. 5635-5801-1004

ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading on the output meter. The output transformers are of a very high gain, selective type and these adjustments should be repeated several times in order to secure maximum accuracy. All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set signal generator at 6 M.C.—Switch receiver to band B, and adjust osc. trimmer on gang for correct dial reading.

(5) Set signal generator at 1400 K.C.—Switch receiver to band A and adjust broadcast trimmer (located in front of oscillator tube—see diagram below) for correct dial reading. Also adjust ant. and det. trimmer on gang to resonance, adjust only the det. trimmer on two gang sets.

(6) Set signal generator at 18 M.C.—Switch receiver to band C and adjust the short wave trimmer while rocking the pointer past 18 M.C. on the dial to the combination giving the greatest output.

(7) Set signal generator at 600 K.C.—Switch receiver to band A, and rock pointer past 600 on dial while adjusting the broadcast padder (located adjacent to gang condenser) to combination giving the greatest output reading.

(8) Re-align broadcast trimmers at 1400 K.C. as outlined in operation 5.

SERVICE NOTES 1004 CHASSIS

OFF SCALE AT LOW FREQUENCY END OF DIAL, UNABLE TO ADJUST BY REGULAR ALIGNMENT—Check 600 padder, broken lug, wire, etc. Also check .0012 condenser in oscillator plate circuit C-6 22-486.

LACK OF SENSITIVITY ON ALL BANDS—Check tubes, antenna and ground—all coils. Poor contact on sensitivity switch—rebalance.

LACK OF SENSITIVITY ON BROADCAST BAND—Open radio frequency plate choke.

NOISY—Tubes, check condenser bond wires to clear chassis; dirty gang condenser or wipers; loose lugs on candohm resister; shorted bus bar wires in coil circuits; aerial and ground. Also loose connecting wire between G and Z on aerial strip.

NOISY ON "C" BAND ONLY IN SPOTS—Check dial pulley—move pulley away from dial pan; condenser bonds do not clear chassis hold. Poor contacts on any of the band, tone or sensitivity switches; defective volume control; defective 16 mmfd. condenser—22-506.

HUM—Tubes, oscillator tube shorted or output tubes not matched; open filter, electrostatic shield open in power transformer. This will give carrier hum and can be corrected by by-passing the A.C. line with .001 mica-condenser. Reverse A.C. plug.

STATIONS RIDE IN—Check balance; check .0012 condenser in oscillator plate circuit.

WEAK OR LACK VOLUME—Open 2nd detector cathode resistor or candohm; will also affect tone quality if open; .00025 condenser grounded in tone circuit, noticeable on high fidelity position of switch, with distortion. Repeak I.F.'s to 456 K.C. Defective tubes, in particular 1st and 2nd detector. Switch on normal and with lack volume—check tone switch for short circuit to foreign lug.

FLUTTERING AT LOW FREQUENCY—Tubes, particularly oscillator tube, rebalance I.F.'s to 456.

INTERMITTENT RECEPTION—Tubes, I.F. trimmers short; dirty variable condenser, poor ground at candohm; loose link wire across Z and G on aerial strip. Poor contact on band switch; defective aerial; defective by-pass condenser.

POOR ACTION OF TARGET TUNER—Note: Do not expect target to center exactly in the center of bull's eye, except on very strong input signal. Check 6C5 tube or replace target unit.

IMPORTANT!

Connect ordinary single wire antenna to A with jumper wire placed between Z and G (shipped from factory in this manner.)

When using a ZENITH DOUBLET ANTENNA, remove jumper wire between Z and G and attach doublet lead-in to A and Z.

Although it is not usually necessary to ground the receiver, there may be occasional instances where a ground connection removes noise or may aid reception of signals. It should be tried and left connected if any improvement is noted. Where it does not help, or if it introduces hum, try reversing the wall plug or leave the ground lead off entirely.

CHASSIS No. 1203

ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to the control grid of the first detector and receiver ground. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading on the output meter. The output transformers are of a very high gain, selective type, and these adjustments should be repeated several times in order to secure maximum accuracy. All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set signal generator at 1400 K.C.—Switch receiver to Band A and adjust broadcast oscillator trimmer "A" (located on front of chassis) for correct dial reading. Also adjust the R.F. and det. trimmers on gang condenser for greatest output.

(5) Set signal generator at 600 K.C., and rock pointer past 600 K.C. on dial scale, meanwhile adjusting the broadcast padder until combination is reached which gives the greatest output reading.

(6) Readjust broadcast trimmers as outlined in operation No. 4.

(7) Set signal generator at 5.5 M.C.—Switch receiver to Band B, and adjust trimmer "B" (located on front of chassis) while rocking pointer past 5.5 on dial scale for combination giving the highest output reading.

(8) Set signal generator at 18 M.C.—Switch receiver to Band D and adjust the short wave trimmer "D" (located on front of chassis) while rocking the pointer past 18 M.C. on dial scale to combination giving the highest output reading.

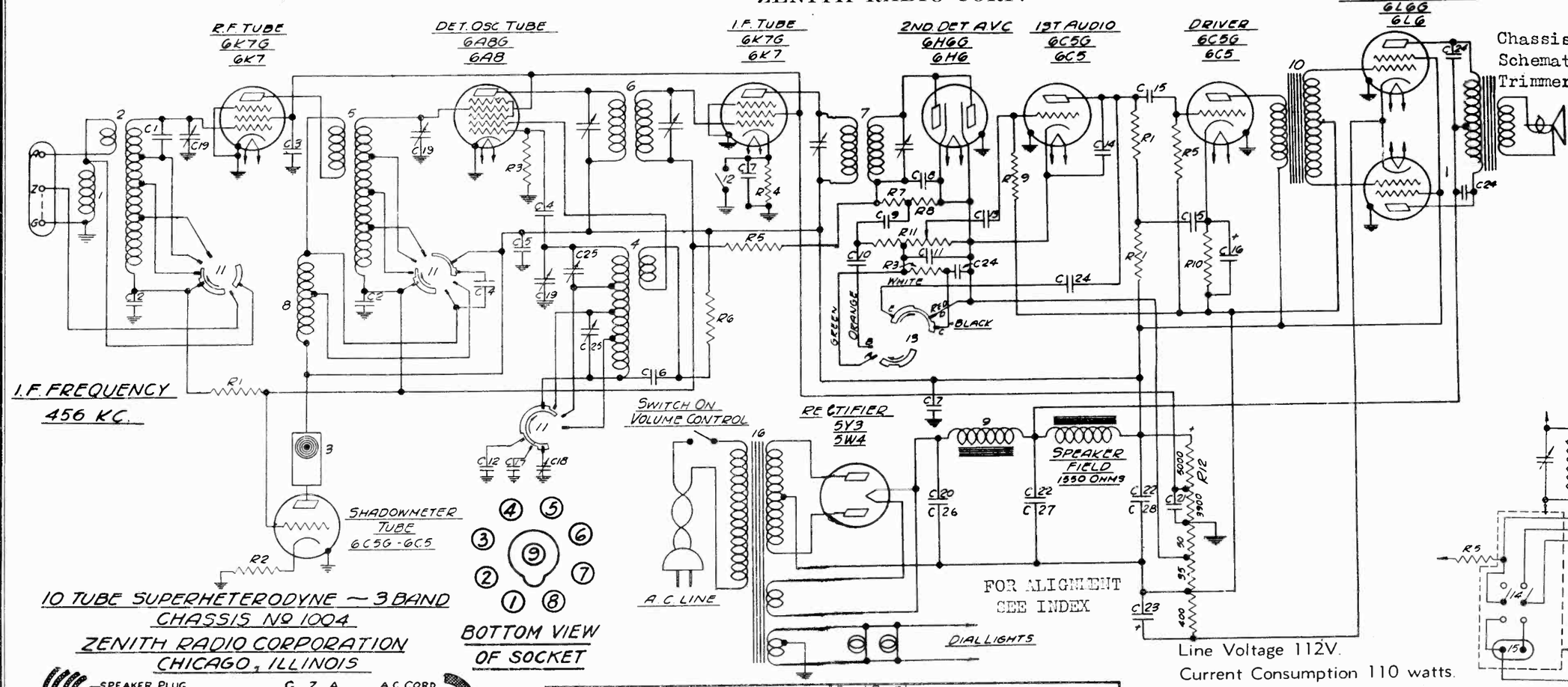
(9) There are no adjustments on the (C) ultra short wave band. Caution! The length and position of the leads on both coil trimmers and band switch greatly affect the tuning on the short wave bands. These leads should not be altered in any way.

SERVICE NOTES ON 1203 CHASSIS

OFF SCALE—Unable to line up and gain drops off—check 20 ohm, resistor in screen of 1st detector for open R-16 63-411.—check 50 mmfd condenser in oscillator circuit C4—22-289.
NOISY—Tubes, antenna and ground. Poor contact on band switch; volume control; coil wires short to band switch; poor contact on sensitivity switch. Noisy air trimmers, 16 mfd. screen condenser noisy, C-21—22-506.
NOISY ON "D" BAND—Clear gang bonds away from chassis, center in chassis holes, wire of "D" band tuned circuit shorting, loose solder lugs or terminals.
LACK SENSITIVITY ON "D" BAND—Open coil winding, defective 6H6, 6L7 tubes, poor contact of tube prongs, poor contact on band switch, check antenna, check I.F. peak, 456 K.C. Shorted 25 mmfd condenser in oscillator circuit; if shorted sensitivity will fall off on all bands, but more noticeable on "D" band. Check coupling of wires in "D" band circuit.
NOISY AND OFF SCALE ON "D" BAND—Replace 50 mmfd. in oscillator circuit, will vary scale reading considerably if defective.
STATIONS RIDE IN—Check balance. Check .0012 in oscillator plate circuit.
LACK SENSITIVITY ON ULTRA SHORT WAVE—Note: Do not expect extreme pick-up on this band. However, the following will affect operation of the band—open oscillator coil, open or shorted .0012 condenser, shorted 50 mmfd across H.F. coil, grounded trimmer on detector section of gang. Do not alter or change length of wires or position of coils, etc., as this will affect entire short wave band operation—leave or replace all units in position shipped from factory. Open 5 ohm resistor at H.F. coil, will give spotty sensitivity; tubes, in particular 1st detector has a great effect on ultra short wave reception; also aerial installation.
DISTORTION—Tubes, open 16 mfd. condenser, output tubes mismatched, 10 mfd. dry electrolytic in cathode circuit shorted; open cathode circuits, defective by-pass condenser; grounded or shorted tone circuit, defective speaker. Distortion only on normal, tone switch lugs are shorted. Also shorted .005 on one of the output tubes, open P.P. transformer.
CARRIER HUM—Open electrostatic shield in power transformer, by-pass A.C. line with approx. .001 micamold. Reverse A.C. plug. Open candohm ground — shorted .005 plate of output tube, grounded tap on volume control, tubes 6C5, 6H6 and output.
LACKS HIGHS—Poor contact on tone switch .00025 open; if tap on volume control is open, tone control will have no effect.
DEAD—Audio but no R.F. signals. 5 meter coil broken loose from gang terminal. Shorted air trimmer, gang trimmer shorted, open resistor in plate 1st audio. Tubes, filters shorted or by-pass condenser. Open coils.
B. C. OFF SCALE—Check pointer—line up across dial scale parallel to line with gang closed. Note: Air trimmer for "B" band as shown in earlier receivers and listed in technical book not used on later models. B.C. and D trimmers in same position as shown—follow usual line up procedure.

ZENITH RADIO CORP.

MODELS 10S130, 10S147, 10S153
10S155, 10S156, 10S157
10S160
Chassis 1004
Schematic, Voltage, Socket
Trimmers, Phono. Data, Parts

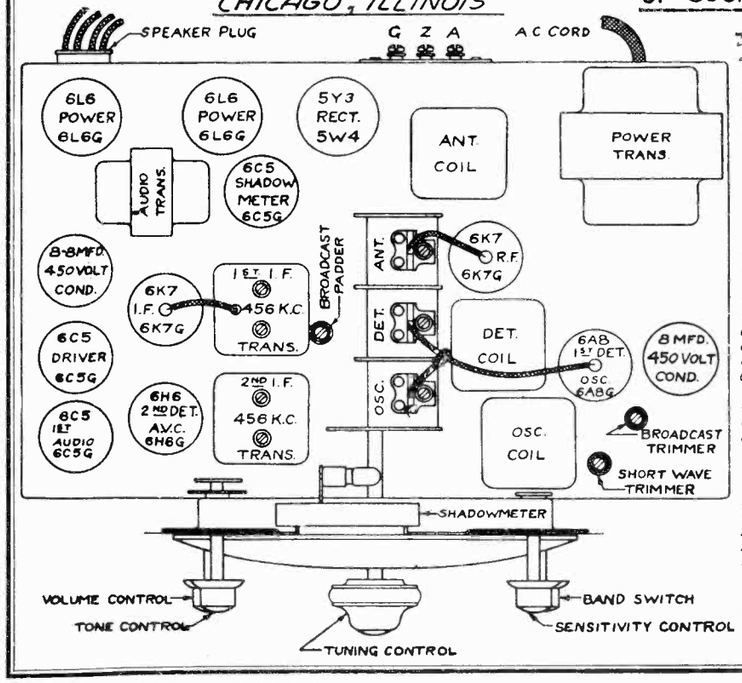


SPEAKER		MODEL
49-146	8"	10S130
49-147	12"	10S155
		10S156
		10S160
49-156	12"	10S147
		10S159
		10S157

10 TUBE SUPERHETERODYNE — 3 BAND CHASSIS NO 1004

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

Line Voltage 112V.
Current Consumption 110 watts.
Power Output 12 watts.



DIAG NO	PART NO	DESCRIPTION		DIAG NO	PART NO	DESCRIPTION	
C1	22-303	5 MMFD	600V	1	20-71	ANTENNA CHOKE	
C2	487	.05 MFD	400V	2	544-9	ANTENNA COIL ASSEM	
C3	224	.1 MFD	300V	3	122-13	TUNING METER	
C4	127	25 MMFD	600V	4	54421	OSCILLATING COIL ASSEM	
C5	170	.1 MFD	400V	5	54420	DETECTOR COIL ASSEM	
C6	496	.0012 MFD	600V	6	95-353	1ST I.F. TRANSFORMER	
C7	243	.01 MFD	400V	7	95-354	2ND I.F. TRANSFORMER	
C8	289	50 MMFD	600V	8	20-135	R.F. PLATE CHOKE	
C9	250	.05 MFD	200V	9	95-356	POWER CHOKE	
C10	182	.00025 MFD	600V	10	95-360	AUDIO TRANSFORMER	
C11	147	.0005 MFD	600V	11	85-93	BAND SELECTOR SWITCH	
C12	485	.005 MFD	600V	12	85-91	SENSITIVITY CONT. SWITCH	
C13	188	.02 MFD	400V	13	85-92	TONE CONTROL SWITCH	
C14	162	.0001 MFD	600V	14	85-39	PHONOGRAPH SWITCH	
C15	435	.02 MFD	600V	15	44-7	PHONOGRAPH JACK	
C16	507	10 MFD DRY ELEC COND	25V	16	95-355	POWER TRANS 115V 50-60 CYCLE	
C17	384	.0015 MFD	600V		95-363	POWER TRANS 25 CYCLE: ALL VOLTAGE	
C18	205	200-550 MMFD OSC. PADDER					
C19	488	3 GANG VARIABLE COND					
C20	504	8 MFD WET ELEC. COND 60 CYCLE	450V				
C21	506	16 MFD WET ELEC COND	250V				
C22	493	8 x 8 MFD DRY ELEC. COND 60N	450V				
C23	405	10 MFD DRY ELEC COND	50V				
C24	229	.005 MFD	600V				
C25	408	2-35 MMFD TRIMMER					
R1	69-278	99 M OHMS	1/4 W				
R2	309	700 OHMS	1/4 W				
R3	280	49 M OHMS	1/4 W				
R4	261	9900 OHMS	1/4 W				
R5	293	990 M OHMS	1/2 W				
R6	373	1 M OHMS	1/2 W				
R7	260	100 M OHMS	1/4 W				
R8	385	900 M OHMS	1/4 W				
R9	529	2 MEGOHMS	1/4 W	C26	22-294	16 MFD WET ELEC COND 25 CYCLE	450V
R10	300	990 OHMS	1/2 W	C27	22-502	16 MFD DRY ELEC COND 25 CYCLE	450V
R11	522	2 MEGOHM VOLUME CONT & SW		C28		8 MFD DRY ELEC COND 25 CYCLE	450V
R12	516	CANOHM RESISTOR					

NOTE —
*22-510 8x8x8 MFD DRY ELECTROLYTIC REPLACES *22-493 & *22-506. *22-512 8 MFD DRY ELECTROLYTIC REPLACES *22-504 8 MFD WET ELECTROLYTIC IN MODEL 10S-147 END TABLE.

SOCKET VOLTAGES

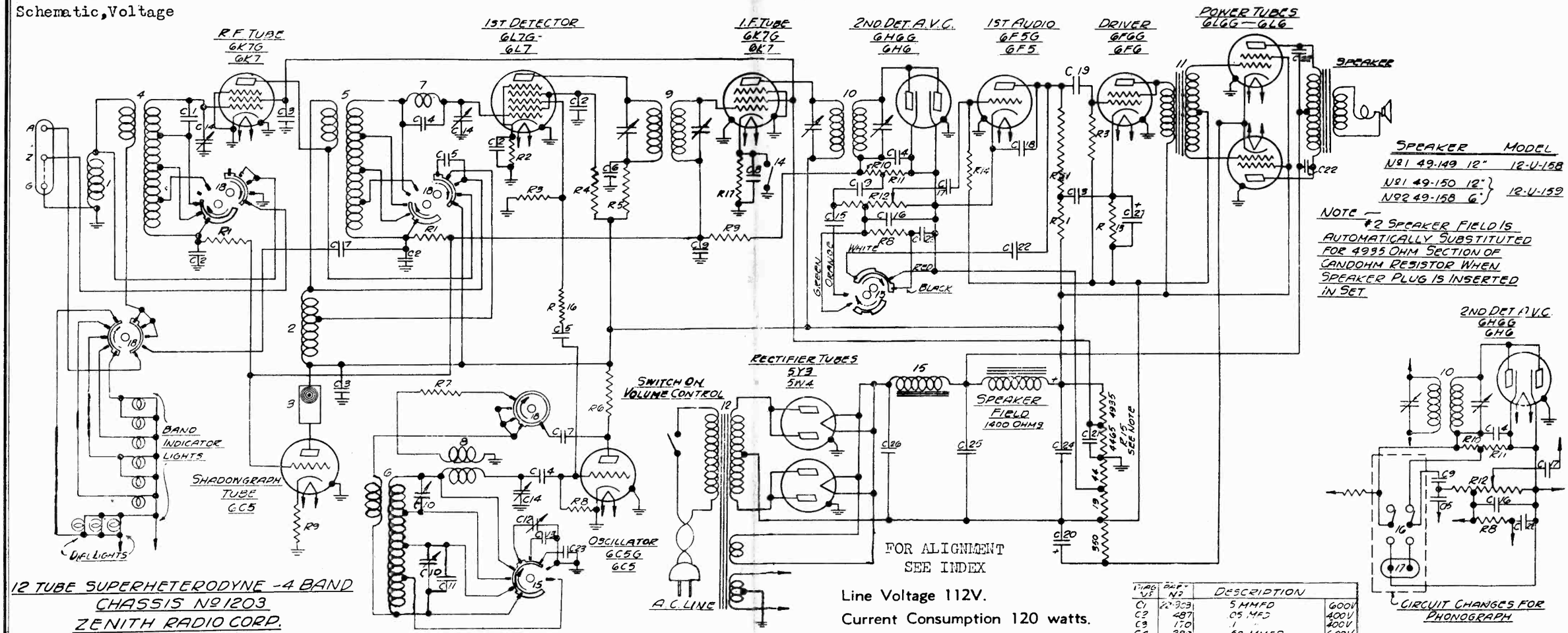
Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	3AC	250	100	0	—	3AC	0	0
6A8	1st Det. Osc.	0	3AC	250	100	–6.5	175	3AC	0	0
6K7	I. F.	0	3AC	250	100	0	—	3AC	Local 9	0
6H6	2nd Det. A.V.C.	0	3AC	–2.5	.25	–2.5	—	3AC	–2.5	—
6C5	1st Audio	0	3AC	45	—	–2	—	3AC	–2.5	—
6C5	Driver	0	3AC	235	—	–2	—	3AC	2	—
6L6	Power	0	3AC	320	120	–4	—	3AC	13	—
6C5	Target Tuning Amp.	0	3AC	250	—	–.5	—	3AC	4	—
5Y3 5W4	Rectifier	0	340	—	AC	—	AC	—	340	—

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected.

MODELS 12U158, 12U159
Chassis 1203
Schematic, Voltage

Socket, Trimmers
Phono. Data, Parts

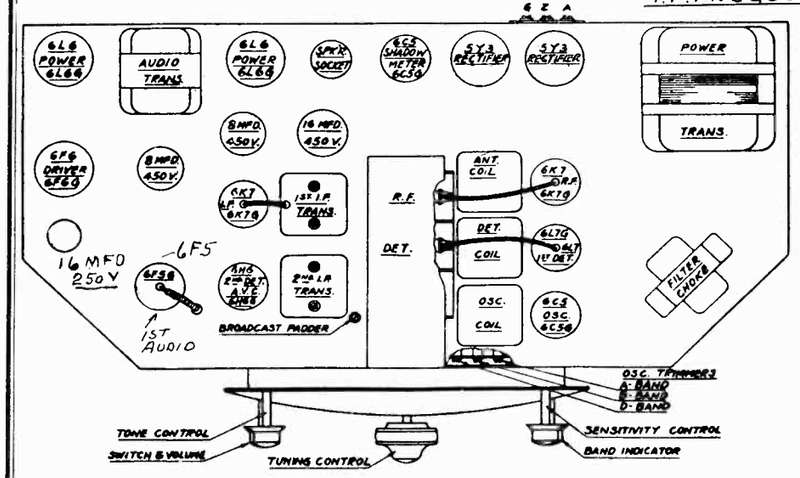
ZENITH RADIO CORP.



12 TUBE SUPERHETERODYNE -4 BAND
CHASSIS Nº 1203
ZENITH RADIO CORP.
CHICAGO, ILL.

Line Voltage 112V.
Current Consumption 120 watts.
Power Output 17 watts.

I.F. FREQUENCY 456 KC



TUBE POSITION

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	3AC	235	100	0	—	3AC	0	0
6L7	1st Det.	0	3AC	230	120	–.5	—	3AC	0	0
6C5	Osc.	0	3AC	185	—	–8	—	3AC	0	—
6K7	I. F.	0	3AC	235	100	0	—	3AC	Local 9	0
6H6	2nd Det. A.V.C.	0	3AC	–2.5	–2.5	–2.5	—	3AC	–2.5	—
6F5	1st Audio	0	3AC	—	90	—	—	3AC	–2.5	—
6F6	Driver	0	3AC	215	215	–.5	—	3AC	11	—
6L6	Power	0	3AC	330	210	–3	—	3AC	14	—
6C5	Target Tuning Amp.	0	3AC	230	—	0	—	3AC	0	—
5Y3 5W4	Rectifier	0	340	—	AC	—	AC	—	340	—

DIAG Nº	PART Nº	DESCRIPTION	
C1	22-303	5 MMFD	600V
C2	487	.05 MFD	400V
C3	170	.1 "	400V
C4	289	50 MMFD	600V
C5	127	25 MMFD	600V
C6	212	.05 MFD	400V
C7	486	.0012 "	600V
C8	243	.01 "	400V
C9	250	.05 "	200V
C10	508	TRIMMER COND	
C11	285	10 MMFD	600V
C12	205	200-550 MFD PADDER	
C13	384	.0015 MFD	600V
C14	499	3 GANG VARIABLE	
C15	182	.00025 MFD	600V
C16	147	.0005 "	600V
C17	188	.02 "	400V
C18	162	.001 "	600V
C19	435	.02	600V
C20	509	10 MFD DRY ELEC COND	50V
C21	506	16 " WET " "	250V
C22	229	.005 MFD (TUBULAR)	600V
C23	485	.005 "	600V
C24	125	8 MFD WET ELEC COND	450V
C25	294	16 " " " "	450V
C26	304	8 " " " (CHROM)	450V
C27	405	10 " DRY " COND.	50V
R1	69-278	99 M OHM	1/4W
R2	35	900 "	1/4W
R3	299	990 M "	1/4W
R4	208	12 M "	1W
R5	436	990 "	1/2W
R6	532	5100 "	1W
R7	550	5 "	1/4W
R8	280	49 M "	1/4W
R9	903	700 "	1/4W

DIAG Nº	PART Nº	DESCRIPTION	
R10	69-260	100 M OHMS	1/4W
R11	385	300 M "	1/4W
R12	522	2 MEGOHM VOL CONT & SW.	
R13	551	650 OHM	1W
R14	523	2 MEGOHM	1/4W
R15	528	CANDOHM	
R16	411	20 OHM	1/4W
R17	261	9900 OHM	1/4W
1	20-71	ANTENNA CHOKE	
2	20-195	R.F. PLATE "	
3	122-14	TUNING METER	
4	54545	ANTENNA COIL ASSEM	
5	54546	DETECTOR " "	
6	54547	OSCILLATOR " "	
7	54387	H.F. DETECTOR " "	
8	54388	H.F. OSCILLATOR " "	
9	95-368	1ST I.F. TRANS	
10	95-369	2ND I.F. "	
11	95-367	AUDIO "	
12	95-370	POWER " 115V 50-60 CYCLE	
	95-373	" " 25 CYCLE ALL VOLT	
13	85-92	TONE CONT SWITCH	
14	85-91	SENSITIVITY CONT SW	
15	95-366	POWER CHOKE	
16	85-39	PHONO SWITCH	
17	44-7	" JACK	
18	85-94	BAND SELECTOR SWITCH	

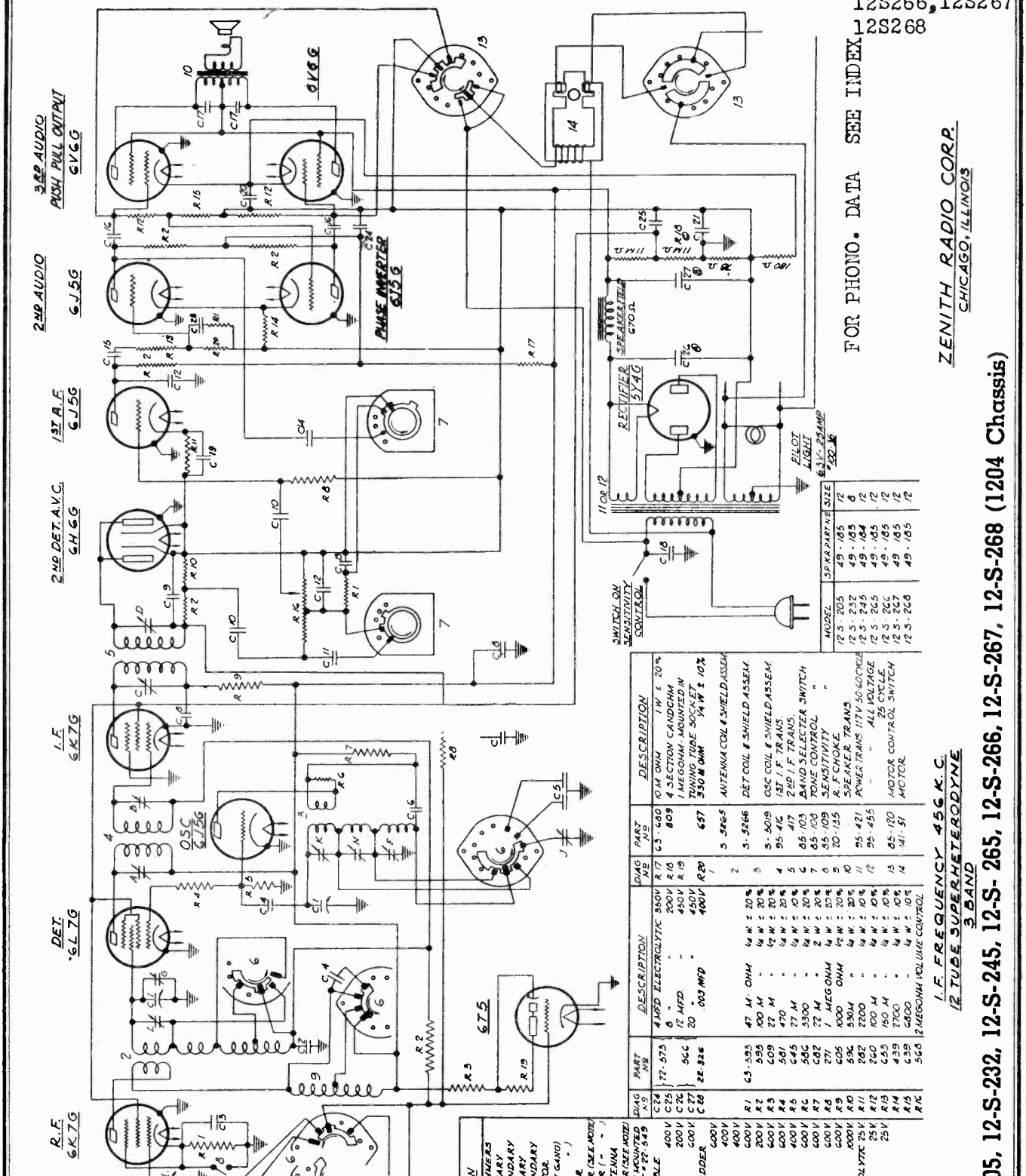
Chassis 1204
Schematic, Parts

ZENITH RADIO CORP.

MODELS 12S205, 12S232
12S245, 12S265
12S266, 12S267
12S268

FOR PHONO. DATA SEE INDEX

ZENITH RADIO CORP.
CHICAGO, ILLINOIS



DIAG NO	PART NO	DESCRIPTION
		VARIABLE TRIMMERS
A		1ST I.F. TRANS. PRIMARY
B		1ST I.F. " SECONDARY
C		2ND I.F. " PRIMARY
D		2ND I.F. " SECONDARY
F		BROAD CAST OSCILLATOR
G		DETECTOR BX CAST (ON GANG)
H		ANTENNA " (" ")
J		22-31 9 BX CAST PADDER
K		SHORT WAVE OSCILLATOR (SEE NOTE)
L		" " DETECTOR (" ")
M		22-418 SHORT WAVE ANTENNA
N		POLICE BAND OSCILLATOR (SEE NOTE)
		NOTE: TRIMMERS ARE MOUNTED ON GANG VARIABLES 22-545
C1	22-545	3 GANG VARIABLE
C2	457	.05 MFD. 400 V
C3	250	.06 MFD. 200 V
C4	127	25 MMFD. 600 V
C5	358	DUAL FIXED PADDER
C6	358	.002 MFD. 600 V
C7	170	.1 MFD. 400 V
C8	212	.05 MFD. 400 V
C9	142	.0001 MFD. 600 V
C10	327	.02 MFD. 200 V
C11	182	.00025 MFD. 600 V
C12	147	.0005 MFD. 600 V
C13	561	.004 MFD. 400 V
C14	156	.01 MFD. 600 V
C15	435	.02 MFD. 600 V
C16	171	.05 MFD. 600 V
C17	229	.006 MFD. 600 V
C18	325	.005 MFD. 1000 V
C19	572	10 MFD ELECTROLYTIC 25 V
C20		10 " " 25 V
C21		10 " " 25 V

DIAG NO	PART NO	DESCRIPTION
C24	72-573	4 MFD ELECTROLYTIC 350 V
C25		8 " " 200 V
C26	566	12 MFD " 450 V
C27		20 " " 450 V
C28	22-326	.003 MFD 400 V
R1	63-593	47 M OHM ½ W ± 20%
R2	595	100 M " ½ W ± 20%
R3	609	22 M " ½ W ± 20%
R4	581	470 " ½ W ± 20%
R5	645	27 M " ¼ W ± 10%
R6	586	3300 " ¼ W ± 20%
R7	582	72 M " 2 W ± 20%
R8	271	1 MEG OHM ½ W ± 20%
R9	605	1000 OHM ½ W ± 20%
R10	596	330M " ¼ W ± 20%
R11	282	2200 " ¼ W ± 10%
R12	240	100 M " ¼ W ± 10%
R13	653	150 M " ¼ W ± 10%
R14	639	2700 " ¼ W ± 10%
R15	639	6800 " ¼ W ± 10%
R16	565	2 MEGOHM VOLUME CONTROL

DIAG NO	PART NO	DESCRIPTION
R17	63-680	10 M OHM 1W ± 20%
R18	809	4 SECTION CANDOHM
R19		1 MEGOHM MOUNTED IN
R20	657	TUNING TUBE SOCKET 14 W ± 10%
1	5-5265	ANTENNA COIL & SHIELD ASSEM.
2	5-5266	DET COIL & SHIELD ASSEM.
3	5-5019	OSC COIL & SHIELD ASSEM.
4	95-416	1ST I.F. TRANS.
5	417	2ND I.F. TRANS.
6	85-103	BAND SELECTER SWITCH
7	85-108	TONE CONTROL "
8	85-109	SENSITIVITY "
9	20-135	R.F. CHOKE
10		SPEAKER TRANS.
11	95-421	POWER TRANS. 117V 50/60CYCLE
12	95-455	" " ALL VOLTAGE 25 CYCLE
13	85-120	MOTOR CONTROL SWITCH
14	141-51	MOTOR

MODEL	SPKR PART NO.	SIZE
12S-205	49-185	12
12S-232	49-185	8
12S-245	49-184	12
12S-265	49-185	12
12S-266	49-185	12
12S-267	49-185	12
12S-268	49-185	12

I.F. FREQUENCY 456 K.C.
12 TUBE SUPERHETERODYNE
3 BAND

Models 12-S-205, 12-S-232, 12-S-245, 12-S- 265, 12-S-266, 12-S-267, 12-S-268 (1204 Chassis)

MODELS 9S203, 9S232, 9S242
9S244, 9S262, 9S263
9S264
Chassis 5905

ZENITH RADIO CORP.

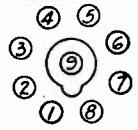
Voltage, Alignment
Socket, Trimmers

MODELS 12S205, 12S232
12S245, 12S265
12S266, 12S267
12S268
Chassis 1204

CHASSIS 5905
MODEL 9S series

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	240	80	0	—	6.2	0	—2
6L7	Converter	0	6.2	240	80	—7	—	0	0	—1
6J5	Osc.	0	6.2	130	—	—8	—	0	0	—
6K7	I.F.	0	6.2	237	80	0	—	0	0	—1
6H6	2nd Det. A.V.C.	0	0	—2.5	—2	—2.5	—	6.2	—2	—
6F5	1st Audio	0	0	—	82	—	—	6.2	—2	—2.5
6F6	Power	0	0	225	240	—3.5	—	6.2	—4.5	—
5Y4	Rect.	0	—	AC	—	AC	—	298	298	—
		H	Ep	Eg	Ef	Ek	H			
6T5	Target	0	10	—2	240	—2	6.2			



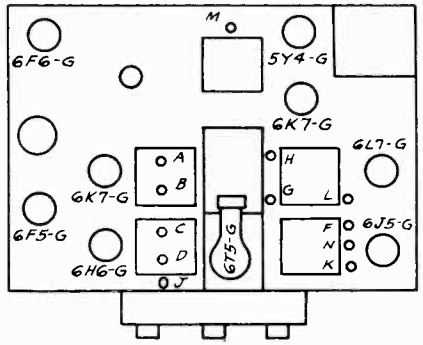
BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 75W. Power output 4.5W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt.of Ant.&Det
4	" " "	200 Mmfd.	600	"		J	Rock gang & adj. for max. output
5				"		FGH	Repeat 2 & 3
6	Rec. Ant. Post	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	LM	Rock gang & adj. for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

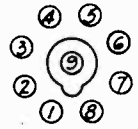
LOCATION OF TRIMMERS



CHASSIS 1204
Model 12S series

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	3.2	246	83	0	—	3.2	0	0
6L7	Converter	0	3.2	243	83	—10	—	3.2	0	0
6J5	Osc.	0	3.2	121	—	—10.5	—	3.2	0	—
6K7	I. F.	0	3.2	237	83	0	—	3.2	0	0
6H6	2nd Det. A.V.C.	0	3.2	—2	—1.5	—2	—	3.2	—1.5	—
6J5	1st Audio	0	3.2	70	—	—.5	—	3.2	—1.5	—
6J5	2nd Audio	0	3.2	74	—	—2	—	3.2	—.5	—
6J5	Inverter	0	3.2	76	—	—2	—	3.2	—.5	—
6V6	Power	0	3.2	231	240	—2.5	—	3.2	8	—
6V6	Power	0	3.2	231	240	—2.5	—	3.2	8	—
5Y4	Rect.	0	—	AC	—	AC	—	318	318	—
		H	Ep	Eg	Ef	Ek	H			
6T5	Target	3.2	13	—1.5	240	—1.5	3.2			



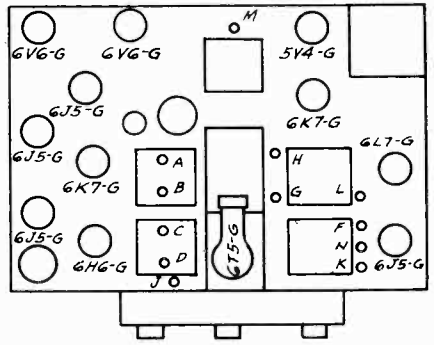
BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 110W. Power output 15W.

ALIGNMENT PROCEDURE

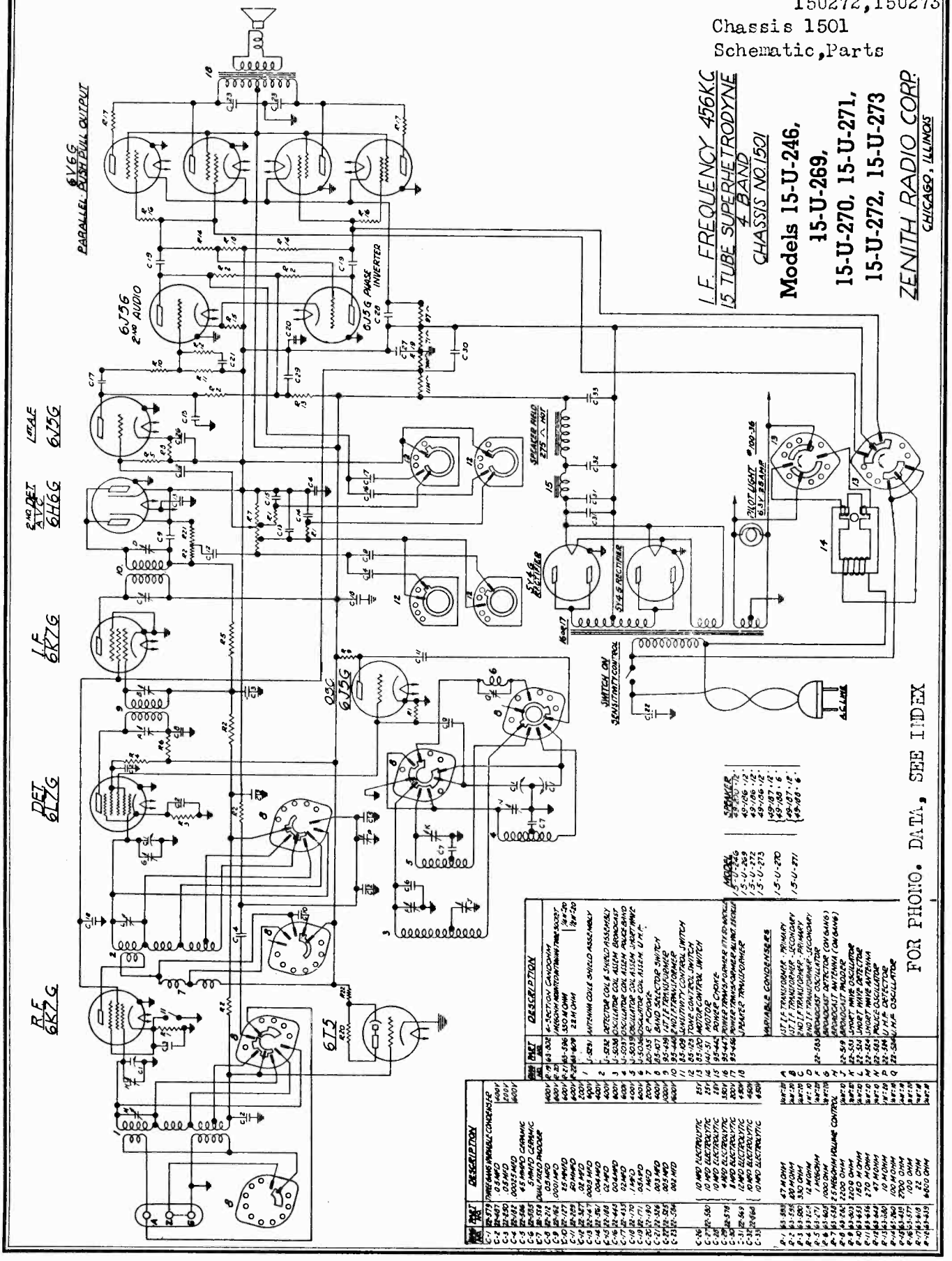
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt.of Ant&Det
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5						FGH	Repeat 2 & 3
6	Rec. Ant. Post	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	LM	Rock gang & adj. for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

LOCATION OF TRIMMERS



ZENITH RADIO CORP.

MODELS 15U246, 15U269
15U270, 15U271
15U272, 15U273
Chassis 1501
Schematic, Parts

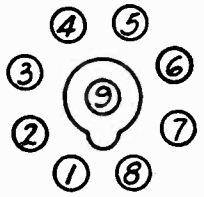


MODELS 15U246,15U269
15U270,15U271
15U272,15U273

ZENITH RADIO CORP.

Chassis 1501
Voltage,Alignment
Socket, Trimmers

SOCKET VOLTAGES



BOTTOM VIEW OF SOCKET

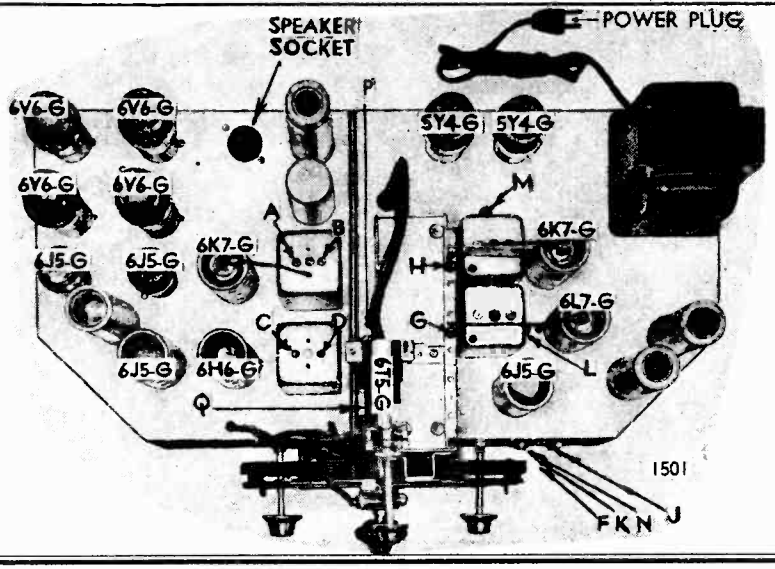
Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	3	250	93	0	—	3	0	—3
6L7	Converter	0	3	250	153	—8	—	3	3	—2
6J5	Osc.	0	3	225	—	—8	—	3	0	—
6K7	I. F.	0	3	250	93	0	—	3	0	—1
6H6	2nd Det. AVC	0	3	—3	—3	—3	—	3	—3	—
6J5	1st Audio	0	3	53	—	—.1	—	3	—.1	—
6J5	2nd Audio	0	3	82	—	—.5	—	3	1.5	—
6J5	Inverter	0	3	82	—	—2.5	—	3	1.5	—
6V6	Power	0	3	243	250	—1	—	3	8	—
6V6	Power	0	3	243	250	—1	—	3	8	—
6V6	Power	0	3	243	250	—1	—	3	8	—
6V6	Power	0	3	243	250	—1	—	3	8	—
5Y4	Rect.	0	—	AC	—	AC	—	320	320	—
5Y4	Rect.	0	—	AC	—	AC	—	320	320	—
		Eh	Ep	Eg	Et	Ek	Eh			
6T5	Target	3	11	—3	216	—3	3			

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 160W. Power output 30W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt.of Ant.&Det
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FGH	Repeat 2 & 3
6	Rec. Ant. Post	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	LM	Rock gang & adj. for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output
9	" " "	400 Ohms	40000	U.H.F.	40000	Q	Set Osc. to Scale
10	" " "	400 Ohms	40000	U.H.F.	40000	P	Rock gang & adj. for max. output

LOCATION OF TRIMMERS



MODELS 258,268,278,280
281,288,289,478
558,568,578,589
590

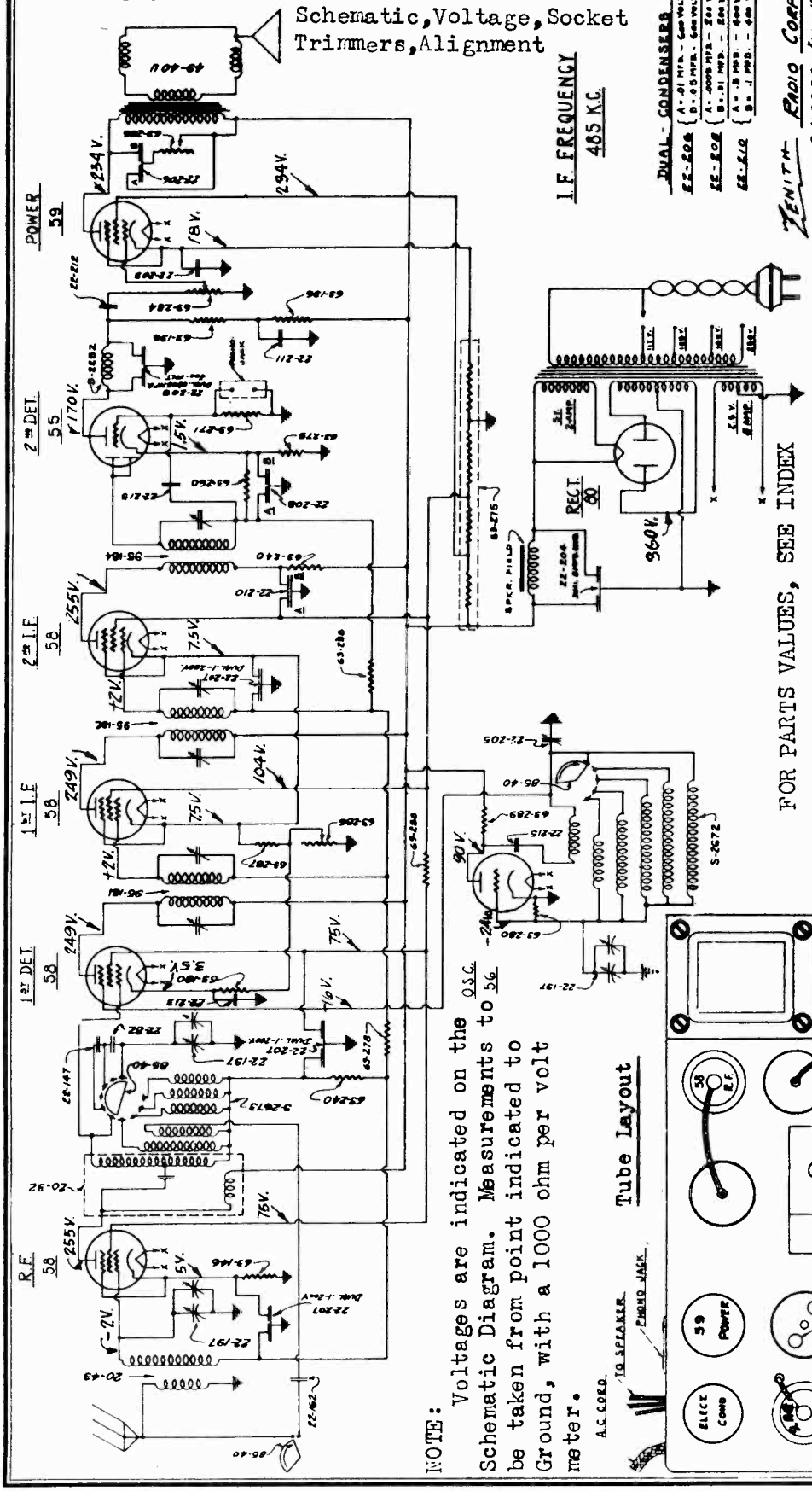
ZENITH RADIO CORP.

Chassis 2051
Schematic, Voltage, Socket
Trimmers, Alignment

I.F. FREQUENCY
485 K.C.

DUAL - CONDENSERS
EZ-202 { A - .01 MFD. - 600 VOLT
B - .05 MFD. - 600 VOLT
EZ-203 { A - .0005 MFD. - 250 VOLT
B - .01 MFD. - 250 VOLT
EZ-212 { A - .1 MFD. - 400 VOLT
B - .1 MFD. - 400 VOLT

ZENITH RADIO CORP.
CHICAGO, ILL. U.S.A.
8 TUBE SUPERHETERODYNE
CHASSIS No. 2051



FOR PARTS VALUES, SEE INDEX

March 10, 1933

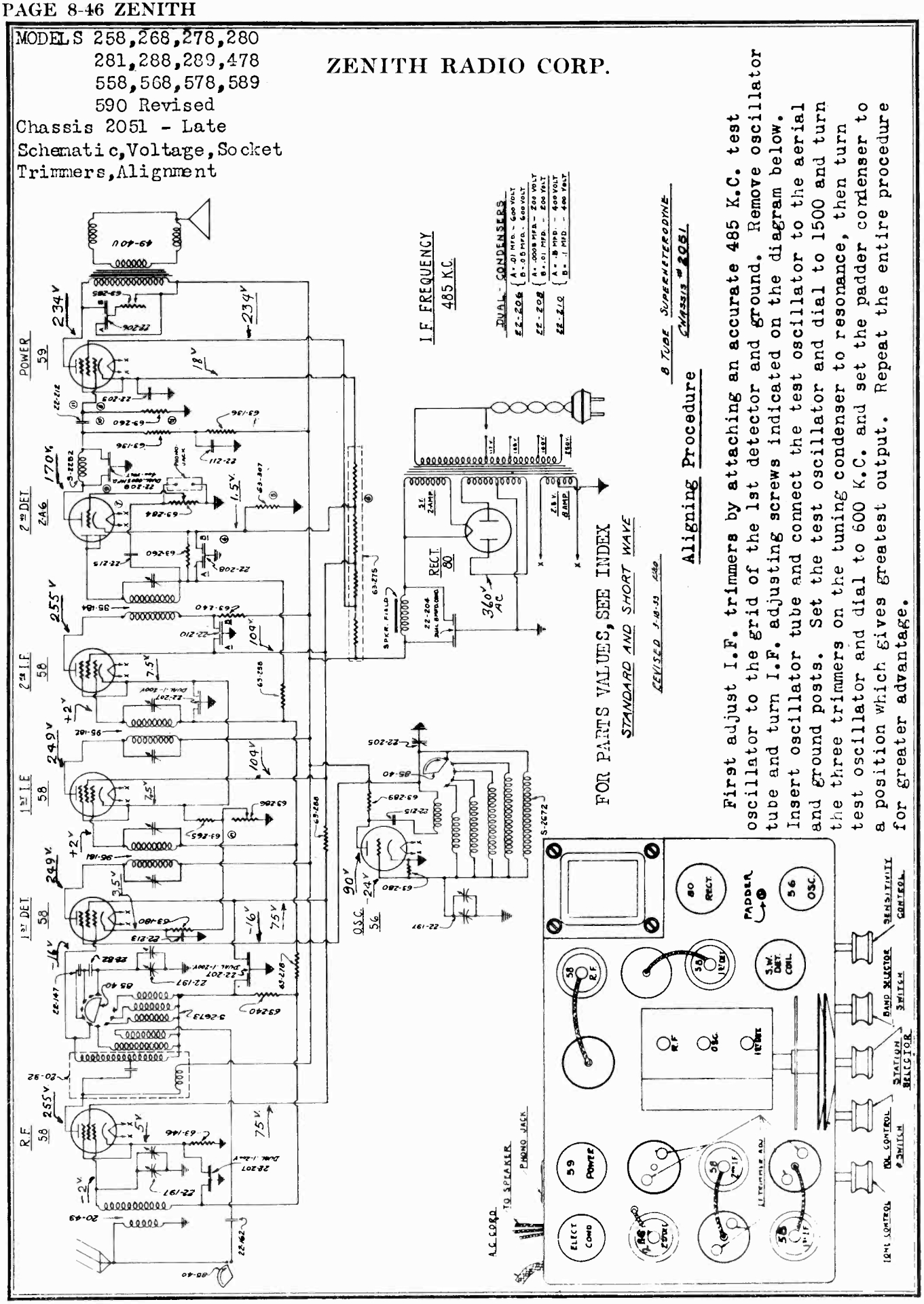
Aligning Procedure

First adjust I.F. trimmers by attaching an accurate 485 K.C. test oscillator to the grid of the 1st detector and ground. Remove oscillator tube and turn I.F. adjusting screws indicated on the diagram below. Insert oscillator tube and connect the test oscillator to the aerial and ground posts. Set the test oscillator and dial to 1500 and turn the three trimmers on the tuning condenser to resonance, then turn the test oscillator and dial to 600 K.C. and set the padder condenser to a position which gives greatest output. Repeat the entire procedure for greater advantage.

NOTE:
Voltages are indicated on the Schematic Diagram. Measurements to 56 OSC. be taken from point indicated to Ground, with a 1000 ohm per volt meter.

MODELS 258,268,278,280
281,288,289,478
558,568,578,589
590 Revised
Chassis 2051 - Late
Schematic, Voltage, Socket
Trimmers, Alignment

ZENITH RADIO CORP.



MODELS 258,268,278,280 281,288,289,478 — 558,568,578,589, 590 — Chassis 2051,Early-Late

ZENITH RADIO CORP.

Parts List

22-82	.001 mfd 500 volt (band switch)	.25
22-113	.05 " 200 " (1st detector cathode)	.35
22-115	.01 " 400 " (oscillator plate & 2nd detector grid)	.35
22-147	.0005 " 600 " (band switch)	.25
22-162	.0001 " 500 " (band switch)	.20
22-197	Variable Condenser	2.75
22-203	10. mfd 25 volt (power cathode)	.60
22-204	Dual 8 " 500 " (filter)	2.00
22-205	Oscillator Padder	.35
22-206	Dual .01 mfd 600 volt(tone control)	.25
22-207	Dual .1 " 200 " (R.F.,1st det. I. F. grid & cathode)	.25
22-208	Dual .01 & .0005 mfd 400 volt(2nd det. grid & cathode)	.20
22-209	Dual .01 mfd 400 volt(2nd det. plate)	.20
22-210	Dual .1 & .5 mfd 400 volt(2nd I. F. screens & plate)	.35
22-211	.1 mfd 300 volt (2nd detector plate)	.20
22-212	.05 " 400 " (audio coupling)	.20
63-136	50M ohm ½ watt...(2nd detector plate)	.20
63-146	2M " ½ " ...(R. F. cathode)	.20
63-180	1M " ½ " ...(1st detector cathode)	.20
63-240	1900 " ¼ " ...(1st detector grid & 2nd I.F. plate)	.20
63-258	490M " ¼ " ...(2nd detector anode)	.20
63-260	100M " ¼ " ...(power grid)	.20
63-265	220 " ½ " ...(I. F. Cathodes)	.20
63-271	1 meg" ¼ " ...(2nd detector grid)	.20
63-275	15500 " ...(voltage divider)	.70
63-278	99M " ¼ " ...(R.F. & 1st detector grid return)	.20
63-280	49M " ¼ " ...(oscillator bias)	.20
63-284	500M " Volume Control	1.00
63-285	50M " Tone Control	.75
63-286	50M " Sensitivity Control	.75
63-288	19M " ¼ watt...(R. F. & 1st detector screens)	.20
63-289	29M " 1 " ...(oscillator plate)	.20
63-307	40 " 1 " ...(2nd detector cathode)..metal	.15
20-32	Standard Wave Detector Coil	1.00
20-43	Antenna Coil	.75
95-181	1st I. F. Transformer.....(485 kilocycle)	1.25
95-182	2nd I. F. Transformer.....(485 kilocycle)	1.25
95-184	3rd I. F. Transformer.....(485 kilocycle)	1.25
S-2252	Plate Choke and Bracket Assembly	.50
S-2672	Short Wave Oscillator Coil	1.25
S-2673	Short Wave Detector Coil	1.25
4-118	Tube Shield Base	.05
8-25	Antenna and Ground Binding Post Assembly	.20
44-4	Phono Connector Jack	.15
46-59	Large Control Knob	.15
46-60	Small Control Knob	.15
49-44	Dynamic Speaker	8.00
	Cone and Voice Coil for above #8304 (3 hole mounting spider)	3.00
	Output Transformer for 49-44 Speaker	2.00
57-342	Escutcheon Plate	.60
85-40	Two Gang Selector Switch	1.50
93-167	Rubber Cushion for Chassis Mounting (lower)	.01
93-168	Rubber Cushion for Chassis Mounting (upper)	.01
95-168	All Voltage, All Cycle Power Transformer	6.00
100-18	2½ volt Dial Lamp	.12
106-109	Tube Shield	.10

ALL PRICES SUBJECT TO REGULAR DISCOUNT AND CHANGE WITHOUT NOTICE.

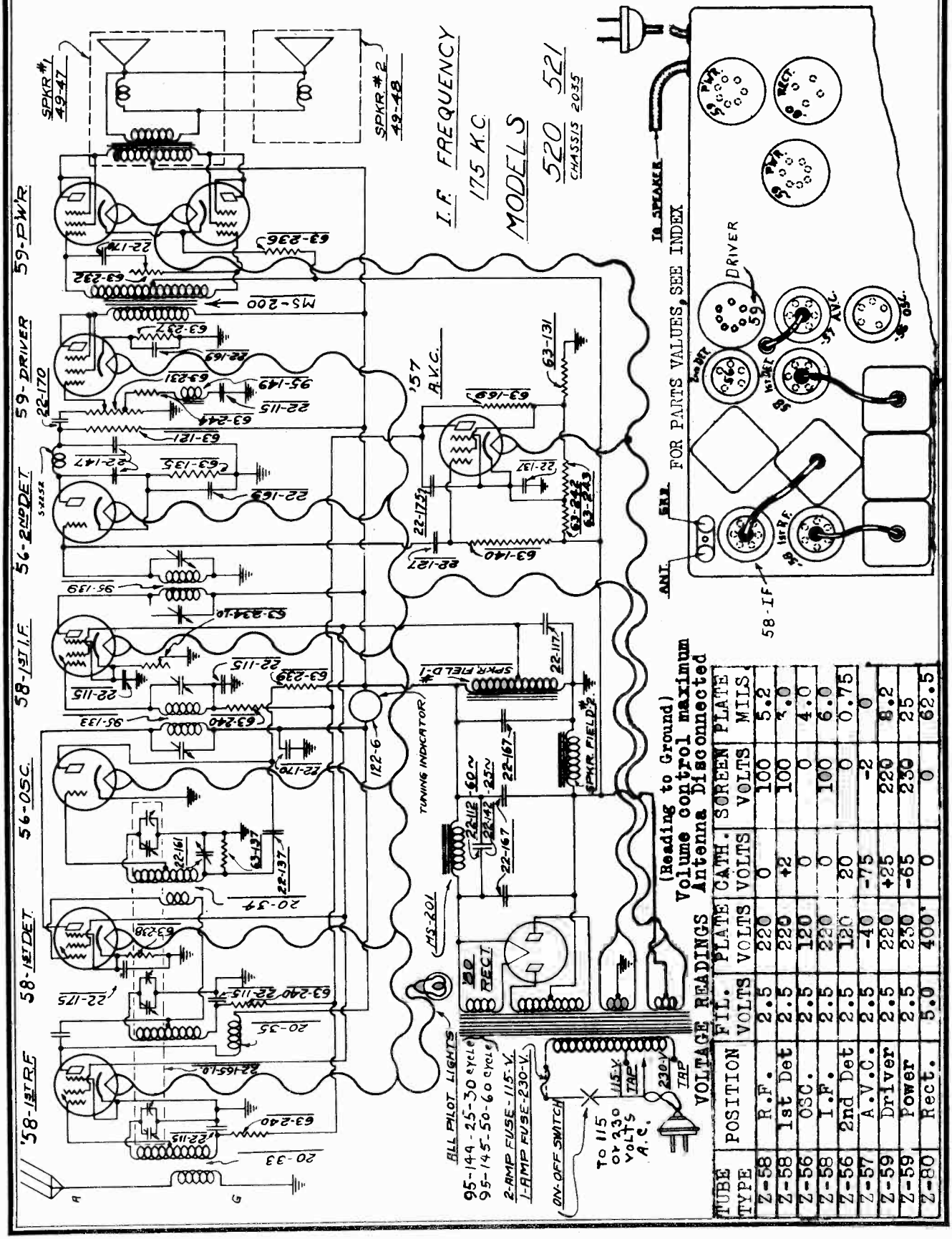
S-2678	Dial Tuning Shaft and Bracket Assembly	.80
S-2679	Dial Strip and Support Assembly(plain)	1.00
S-2680	Dial Mask and Support Assembly	1.25
S-2697	Dial Strip and Support Assembly(colored)	1.00
11-2	Dial Cord.....per ft.	$ .10
12-297	Dial Lamp Bracket	.05
73-19	Dial Bushing Set Screw	.01
S-2677	Dial Socket, Clip and Indicator	.45

MODELS 520,521,602,605
608,611,615
Chassis 2035

ZENITH RADIO CORP.

Schematic, Socket, Voltage
Trimmers, Alignment

BALANCE INTERMEDIATE FREQUENCY AT 175 KC. CONDENSER GANG AT 1500 KC AND THE OSCILLATOR PADDER AT 600 KC.



(Reading to Ground)
Volume control maximum
Antenna Disconnected

VOLTAGE READINGS

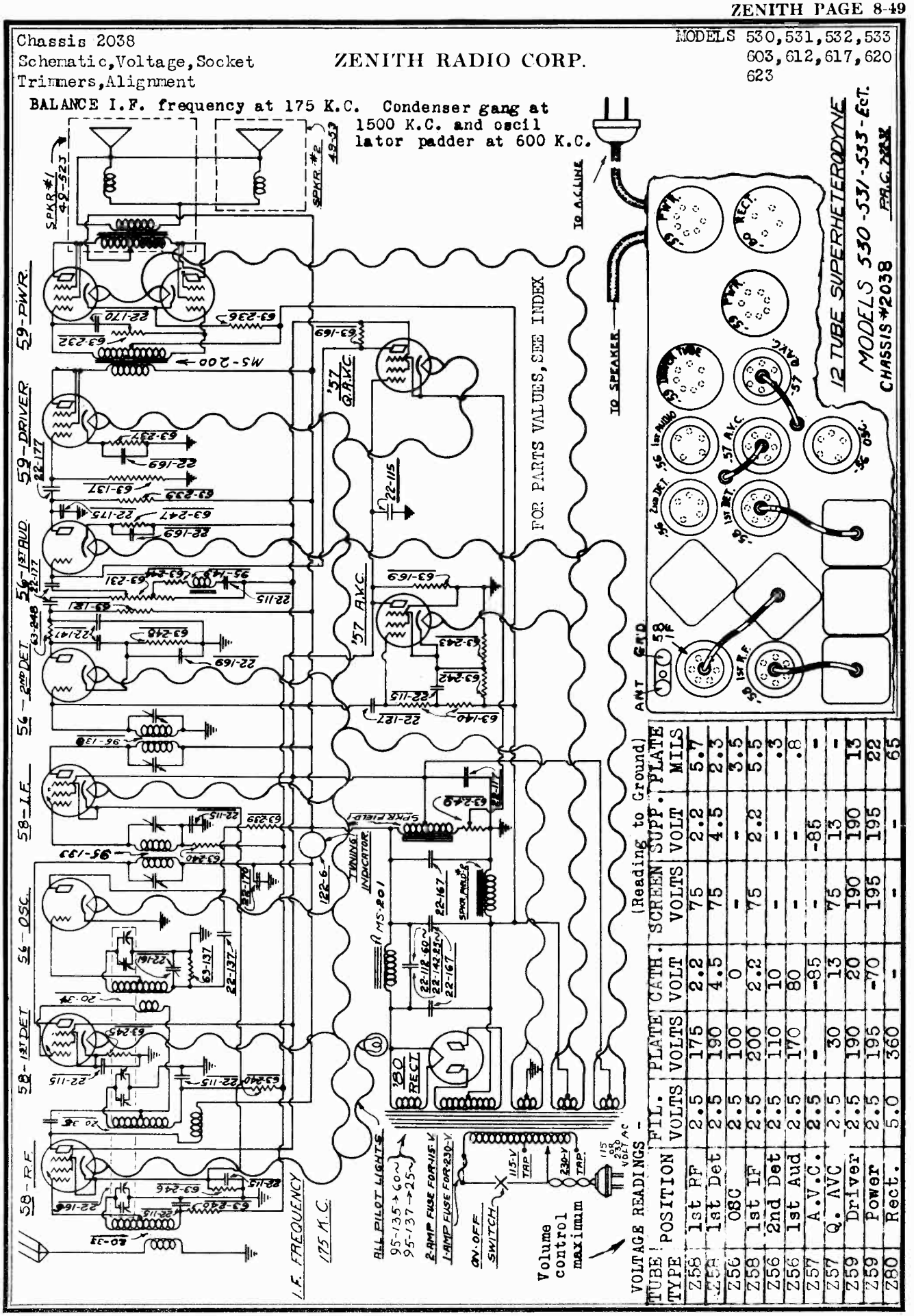
TUBE TYPE	POSITION	FIL. VOLTS	PLATE VOLTS	CATH. VOLTS	SCREEN VOLTS	PLATE MILS
Z-58	R.F.	2.5	220	0	100	5.2
Z-58	1st Det	2.5	220	+2	100	2.0
Z-56	OSC.	2.5	120	0	0	4.0
Z-58	I.F.	2.5	220	0	100	6.0
Z-56	2nd Det	2.5	120	20	0	0.75
Z-57	A.V.C.	2.5	-40	-75	-2	0
Z-59	Driver	2.5	220	+25	220	8.2
Z-59	Power	2.5	230	-65	230	25
Z-80	Rect.	5.0	400*	0	0	62.5

Chassis 2038
Schematic, Voltage, Socket
Trimmers, Alignment

ZENITH RADIO CORP.

MODELS 530, 531, 532, 533
603, 612, 617, 620
623

BALANCE I.F. frequency at 175 K.C. Condenser gang at 1500 K.C. and oscil lator padder at 600 K.C.



VOLTAGE READINGS - (Reading to Ground)

TUBE TYPE	POSITION	FIL. VOLTS	PLATE VOLTS	PLATE CATH. VOLT	SCREEN VOLTS	SUPP. VOLT	PLATE MIS
Z58	1st RF	2.5	175	2.2	75	2.2	5.7
Z58	1st Det	2.5	190	4.5	75	4.5	2.3
Z56	OSC	2.5	100	0	-	-	3.5
Z58	1st IF	2.5	200	2.2	75	2.2	5.5
Z56	2nd Det	2.5	110	10	-	-	.3
Z56	1st Aud	2.5	170	80	-	-	.8
Z57	A.V.C.	2.5	-	-85	-	-85	-
Z57	Q. AVC	2.5	30	13	75	13	-
Z59	Driver	2.5	190	20	190	190	13
Z59	Power	2.5	195	-70	195	195	22
Z80	Rect.	5.0	360	-	-	-	65

ZENITH RADIO CORP.

PARTS LIST

MODELS 520, 521, 602, 608, 611
Chassis 2035

11-3	Dial Pulley String.....per ft.	$ .25
26-38	Calibrated Dial Strip.....	.15
80-69	Dial Cord Tension Spring.....	.01
80-85	Volume and Tone Control Dial Tension Spring.....	.01
83-274	Volume Control Dial Strip.....	.10
83-275	Tone Control Dial Strip.....	.10
100-18	2.5 Volt Pilot Lamp.....	.12
122-6	Shadowgraph Meter.....	2.00
22-112	.1 mfd 300 Volt (Filter).....	.25
22-115	.1 " 200 " (5 used, see footnote).....	.35
22-117	.5 " 300 " (Filter).....	.50
22-137	.05 " 400 " (Oscillator Plate).....	.25
22-142	.4 " 300 " (Filter, 25 Cycle Only).....	.40
22-147	.0005 600 " (2nd Detector Plate).....	.20
22-161	Padder.....	.45
22-165	Three Gang Variable.....	3.50
22-167	8. mfd 500 Volt (Filter).....	1.50
22-169	8. " 50 " (2nd Detector Cathode, Driver Cathode, and 1st Audio Cathode).....	.55
22-170	.1 " 400 " (1st Detector Plate, Audio Coupling and Tone Control).....	.25
63-121	100M Ohm 1 Watt (2nd Detector Plate).....	.25
63-135	50M " 1 " (2nd Detector Cathode).....	.25
63-137	250M " ½ " (Oscillator Grid).....	.25
63-140	1 Meg" ½ " (A. V. C. Grid).....	.25
63-169	400 " ½ " (A. V. C. Plate).....	.25
63-231	Volume Control Assembly.....	1.25
63-232	Tone Control Assembly.....	.75
63-234	Sensitivity Control.....	.75
63-236	500 Ohm.....(Power Bias) (Wide Metal).....	.25
63-237	1500 " .....(Driver Bias)(Narrow Metal).....	.25
63-238	1000 " ¼ Watt (1st Detector Cathode).....	.25
63-239	24M " 1 " (Oscillator Plate).....	.25
63-240	1900 " ½ " (R.F.,1st Detector & I.F. Grids).....	.25
63-242	2500 " ½ " (A. V. C. Cathode).....	.25
63-243	18M " 1 " (A. V. C. Cathode).....	.25
63-244	500 " ¼ " (Acoustic Filter).....	.25
20-33	Antenna Coil.....	.75
20-34	Oscillator Coil.....	.85
20-35	Detector Coil.....	1.00
S-2252	2nd Detector Plate Choke and Bracket.....	.50
95-133	1st I. F. Transformer (with Grid Lead).....	1.25
95-139	2nd I. F. Transformer (without Grid Lead).....	1.25
*22-115	R. F., 1st Detector, I. F. Grid Returns, I. F. Cathode, and Acoustic Filter.	
49-47	Dynamic Speaker with transformer	7.00
49-48	Dynamic Speaker without transformer	8.25
95-144	115 volt 25-30 cycles Power Transformer.....	7.25
95-145	115 Volt 50-60 Cycles Power Transformer.....	5.00
95-149	Acoustic Filter Choke	.30
MS-200	Push-Pull input transformer.....	3.50
MS-201	Power filter choke.....	3.25

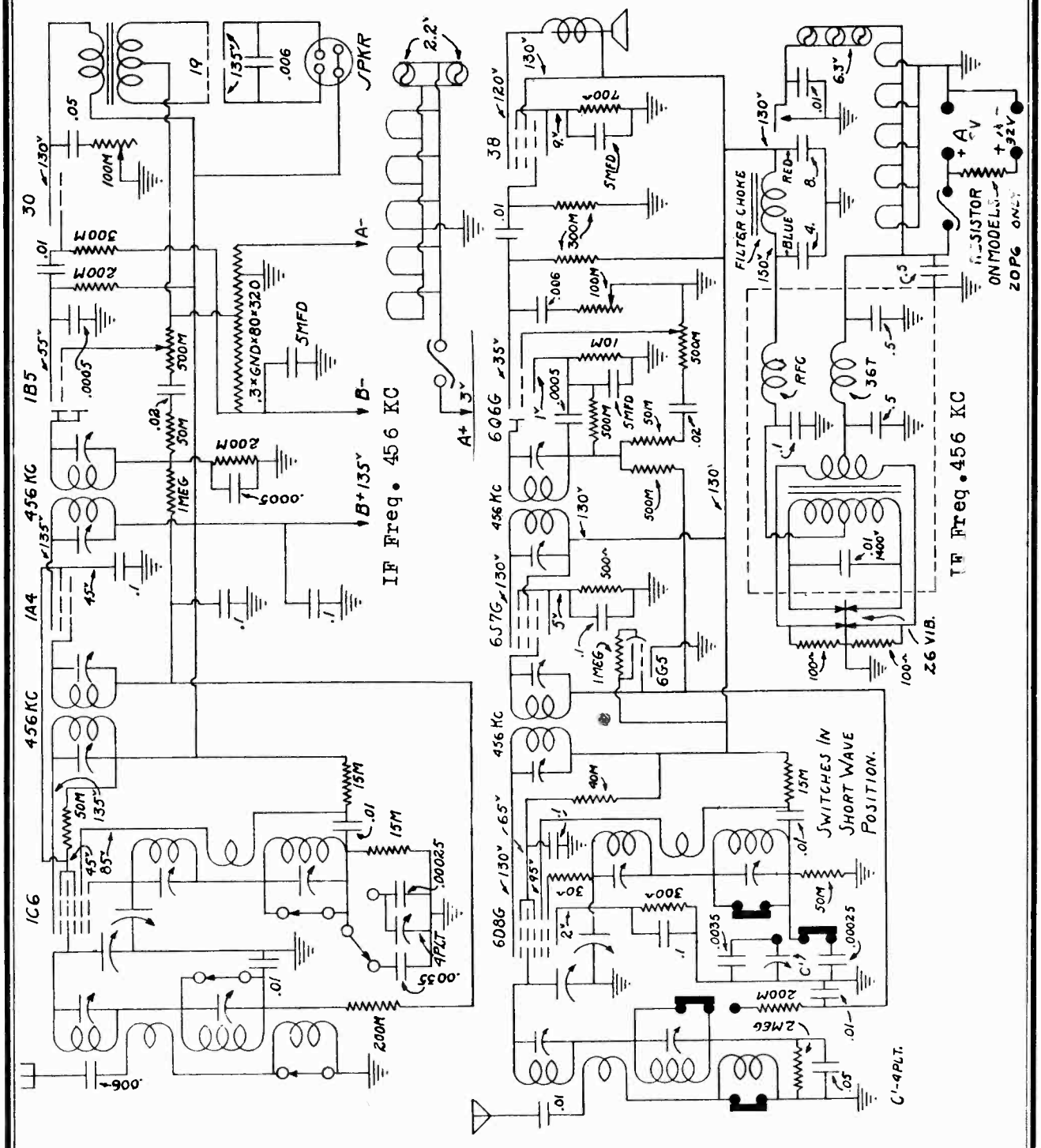
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PARTS LIST - MODELS 530,531,532,533,603,
612,617,620,623
(Chassis 2038)

22-112	.1 mfd 300 volt...(Filter).....	.25
*22-115	.1 " 200 " ...(Eight Used, See Below).....	.35
22-117	.5 " 300 " ...(Filter).....	.50
22-127	.000025 600 " ...(A.V.C. Grid).....	.35
22-137	.05 mfd 400 " ...(Oscillator Plate).....	.25
22-142	.4 " 300 " ...(Filter 25 Cycle Only).....	.40
22-147	.0005" 600 " ...(2nd Detector Plate).....	.20
22-161	Padder.....	.45
22-165	Three Gang Variable.....	3.50
22-167	8. mfd 500 volt...(Filter).....	1.50
22-169	8. " 50 " ...(2nd Det. Cathode, Driver Cathode & 1st Audio Cathode).....	.55
22-170	.1 " 400 " ...(1st Det. Plate, Tone Control).....	.25
22-175	.002 " 600 " ...(1st Audio Plate).....	.25
22-177	.2 " 400 " ...(2nd Det. Plate, 1st Audio Grid, 1st Audio Plate).....	.25
63-121	100M ohm 1 watt...(2nd Detector Plate).....	.25
63-137	250M " ½ " ...(Driver Grid).....	.25
63-140	1 meg" ½ " ...(A.V.C. Grid & Cathode).....	.25
63-169	400 " ½ " ...(A.V.C. & 4.A.V.C. Plate).....	.25
63-231	Volume Control & Switch Assembly.....	1.40
63-232	Tone Control.....	.75
63-236	500 ohm ...(Wide Metal) (Power Tube Bias).....	.25
63-237	1500 " ...(Narrow Metal) (Driver Tube Bias).....	.25
63-239	24M " 1 watt...(Osc. & 1st Audio Plate).....	.25
63-240	1900 " ½ " ...(R.F. 1st Det. & I.F. Grids).....	.25
63-242	2500 " ½ " ...(A.V.C. Cathode).....	.25
63-243	18M " 1 " ...(A.V.C. Cathode).....	.25
63-244	500 " ¼ " ...(Acoustic Filter).....	.25
63-245	1500 " ¼ " ...(1st Detector Cathode).....	.25
63-246	150 " ¼ " ...(R.F. Cathode).....	.25
63-247	8M " ¼ " ...(1st Audio Cathode).....	.25
63-248	50M " 1 " ...(2nd Det. Plate & Cathode).....	.25
63-249	Sensitivity & Quiet Control.....	.75
*22-115	R.F. 1st Detector, I.F. Grid Returns, A.V.C. Plate, A.V.C. Cathode, 1st Detector Cathode, R.F. Cathode, and Acoustic Filter.	
20-33	Antenna Coil.....	$ .75
20-34	Oscillator Coil.....	.85
20-35	Detector Coil.....	1.00
95-133	1st I.F. Transformer with Grid Lead.....	1.25
95-139	2nd I.F. Transformer without Grid Lead.....	1.25
46-61	Large Knobs.....	.20
46-62	Small Knobs.....	.10
49-52	Dynamic Speaker (With Transformer).....	8.25
49-53	Dynamic Speaker (Without Transformer).....	7.00
52-34	Speaker Multicord.....	.45
57-343	Escutcheon Plate.....	.50
78-56	Type 59 Socket.....	.15
78-57	Type 56 Socket.....	.15
78-58	Type 58 Socket.....	.15
78-59	Type 57 Socket.....	.15
78-60	Type 80 Socket.....	.15
93-167	Upper Cushion Washer for Chassis Mounting.....	.01
93-168	Lower Cushion Washer for Chassis Mounting.....	.01
95-142	115 volt 25 cycle Power Transformer.....	7.25
95-143	115 volt 60 cycle Power Transformer.....	5.25
95-149	Acoustic Filter Choke.....	.30
106-129	Small Tube Shield.....	.10
MS-200	Push Pull Input Transformer.....	3.50
MS-201	Power Filter Choke.....	3.25
122-5	Shadowgraph Meter.....	2.00

ZEPHYR RADIO CO.

MODELS 20A6,21A6,22A6
MODELS 20B6,21B6,22B6
20P6,21P6,22P6
Schematics,Voltage



Models 20A6,21A6,22A6
460.001 AND UP

500.001 AND UP Rwm.
Models 20B6,21B6,22B6
Models 20P6,21P6,22P6
Zephyr Radio Co.,Detroit,Michigan

MODELS 20X7,21X7,22X7
MODEL 25Y11
Schematics,Voltage

ZEPHYR RADIO CO.