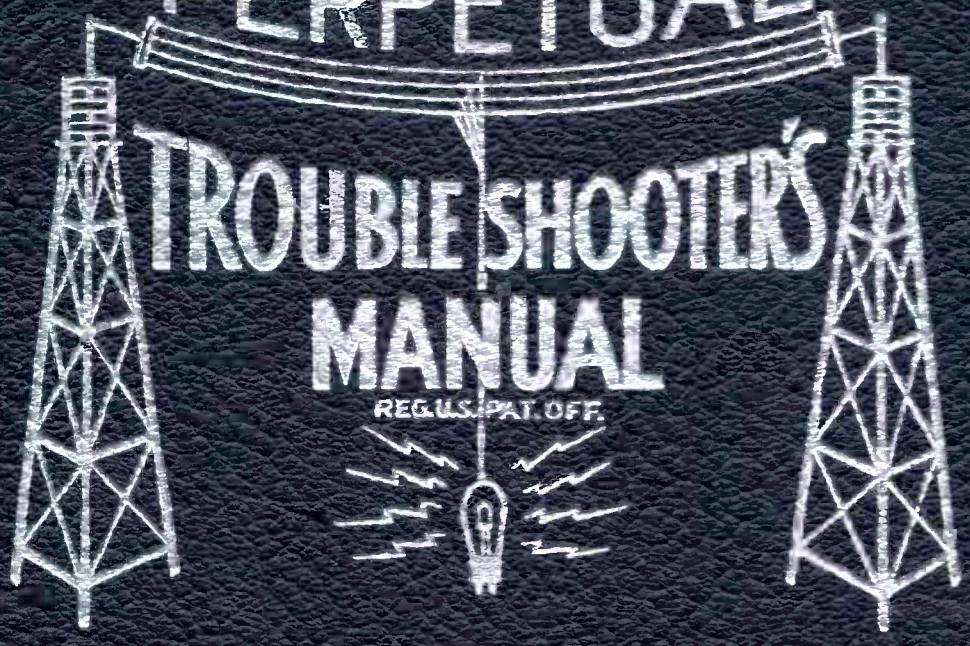
VOLUME IX

PERPETUAL TROUBLE SHOOTER'S MANUAL

REG. U.S. PAT. OFF.

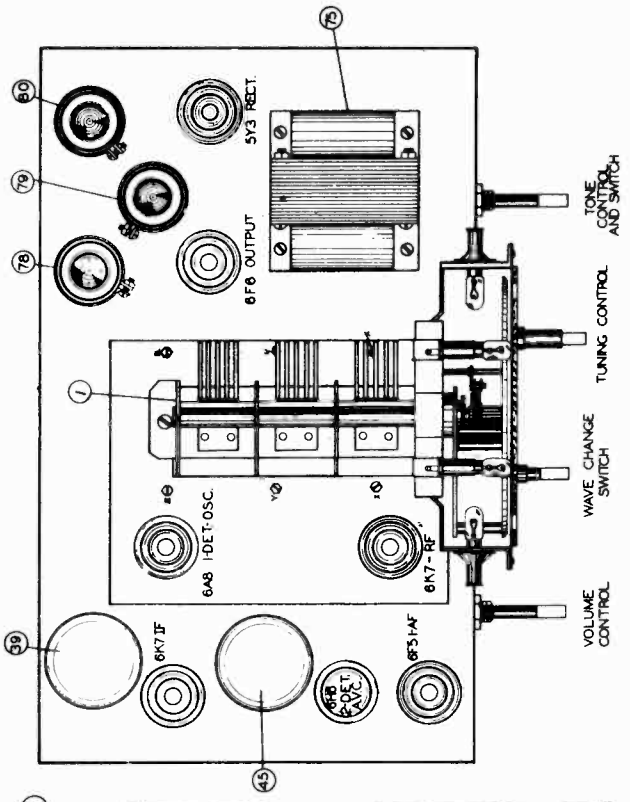


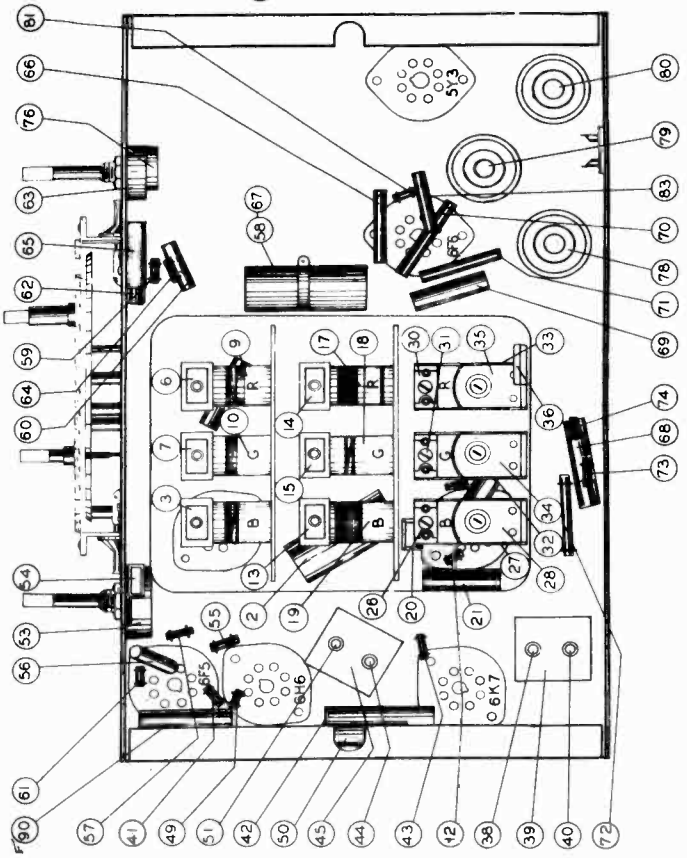
JOHN F. RIDER

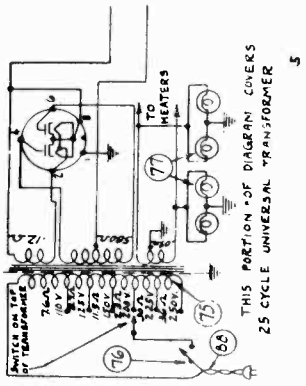
Socket, Trimmers
Chassis

UNITED AMERICAN BOSCH CORP.

MODELS 660T, 660C
Final Schematic

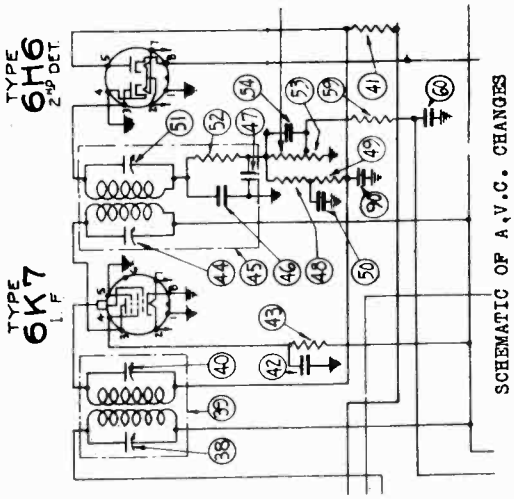






THE FINAL SCHEMATIC IS THE SAME AS THE PRELIMINARY GIVEN ON PAGE 7-35,36, WITH THE EXCEPTION OF CHANGES IN A PORTION OF THE A.V.C. CIRCUITS, SHOWN IN THE ACCOMPANYING FIGURE. DATA AND SCHEMATIC IS ALSO GIVEN FOR THE 25 CYCLE UNIVERSAL TRANSFORMER.
THE FOLLOWING CHANGES IN PART VALUES AND NUMBERS HAVE BEEN MADE:

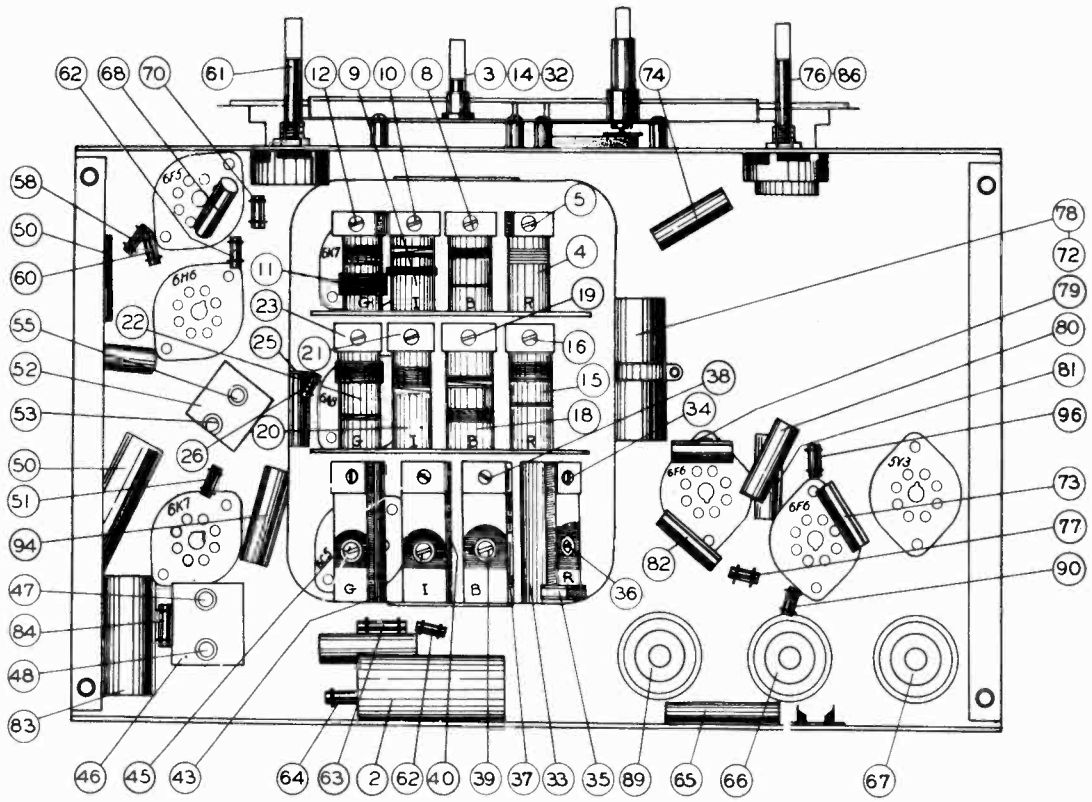
Dia #	Part #	Description and Value of Part
2	CW 2-60	.5 MFD, 200 Volt Condenser
37	SW9664	Switch and Bracket assembly- Oscillator section.
72	Sa101404	16,000 ohm, 1 watt resistor
81	RE95101	37 ohm, 1/4 watt resistor
82	TR 9658	Output transformer
88	9612	Line cable assembly
90	CW 2-05	.05 MFD, 200 Volt condenser

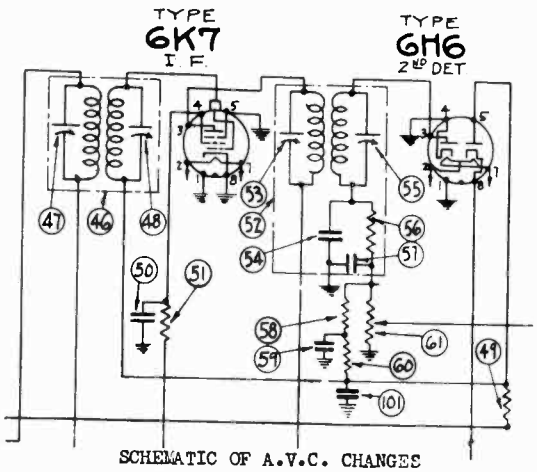


SCHEMATIC OF A.V.C. CHANGES

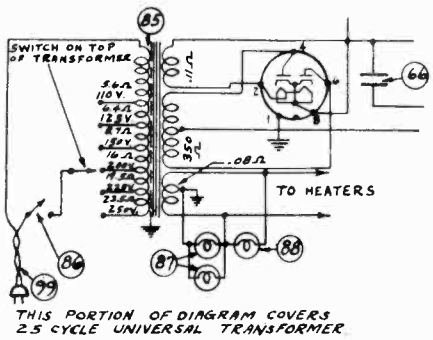
MODELS 670S,670C
Final Schematic
Chassis

UNITED AMERICAN BOSCH CORP.





SCHEMATIC OF A.V.C. CHANGES



THE FINAL SCHEMATIC OF THE MODELS 670S and 670C IS THE SAME AS THE PRELIMINARY SCHEMATIC GIVEN ON PAGE 7-39,40, WITH THE EXCEPTION OF CHANGES IN THE A.V.C. CIRCUITS WHICH ARE SHOWN IN THE ACCOMPANYING FIGURE. OTHER FIGURES GIVE THE NEW PARTS LAYOUT, AND SCHEMATIC AND DATA OF THE 25 CYCLE POWER TRANSFORMER. CHANGES IN PARTS AND THEIR VALUES ARE :

Dia #	Part #	Description and Value of Parts
2	CW 2-100	1 MFD, 200 Volt Condenser
50	CW 2-25	.25 MFD, 200 Volt Condenser
62	SA105268	1500 Ohm, 1/4 watt resistor
70	RE9584	.1 Megohm, 1/4 watt resistor
76	VR9537	.1 Megohm tone control,5000 Ohm min.
88	LP9510	Tuning indicator lamp, 6.3 V.,.25 Amp.
90	RE95101	37 Ohm, 1/4 Watt resistor
92	TR9577	Output transformer
99	CB9512	Line cable assembly
101	CW 2-05	.05 MFD, 200 Volt condenser

UNITED AMERICAN BOSCH CORP Final Schematic Data Circuit Data, Specs. Alignment, Notes

MODEL 680

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes . 4 #6K7, 1 #6A8, 1 #6C5, 2 #6H6, 1 #6F5, 2 #6L6, 1 #5Z3, 1 #5Y3
Power Supply Characteristics ..... 105 to 125 volts, 50 to 60 cycle A.C.
Power Consumption ..... 180 Watts
Maximum Output ..... 30 Watts
Maximum Undistorted Output ..... 20 Watts
Tuning Ranges ..... (Green Band - 150 to 390 KC. (White Band - 525 to 1800 KC. (Blue Band - 1750 to 6000 KC. (Red Band - - 5800 to 18500 KC.
Line-Up Frequencies ..... I.F. 465 KC., 350 KC., 165 KC., 1400 KC., 600 KC., 5000 KC., 2000 KC., 17000 KC., 6500 KC.

GENERAL DESCRIPTION

The Model 680 is a thirteen-tube, four-band, high fidelity superheterodyne, employing all-metal tubes, with the exception of the rectifiers. This model is built in two units, namely, the receiver proper and the class A.-B.1 amplifier, both of which are provided with an independent power supply. Among the refinements and features incorporated are high fidelity, bass and treble control, delay and a triple automatic volume control system. The second A.V.C. operates in the usual manner and controls the first I.F. amplifier tube. The third A.V.C., which controls the second I.F. amplifier tube, is designed to give proper tuning meter indications under all conditions. The FIRST A.V.C. controls the R.F. and first detector and does not start to function until a comparatively strong signal is received, thus the highest possible sensitivity is maintained at low signal level. Due to the fact that the first A.V.C. voltage is essentially flat ± 30 KC. from resonance, greater first A.V.C. voltage is supplied if the receiver is used in the presence of a strong off-side signal, thereby preventing cross-talk, R.F. and modulation overload on the desired signal. The delay system, which prevents between-station noise, automatically becomes inactive when a signal is received.

A type 6K7 tube is used as an R.F. amplifier, a type 6A8 as a first detector, a type 6C5 as an oscillator, two 6K7's as I.F. amplifiers, a type 6H6 as a second detector and second and third A.V.C., a type 6K7 as a first A.V.C. amplifier, a type 6F5 as an audio amplifier, two type 6L6's in the output stage, a type 5Y3 as a rectifier in the main chassis and a type 5Z3 as a rectifier in the power amplifier chassis

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF CENTROMATIC UNIT

If a component part located underneath the switch and coil assemblies of the "CentrOmatic" unit has to be replaced or a section of the unit has to be removed for inspection, each section can easily be removed separately. To do this, proceed with care as follows:

1. Remove the two screws which fasten the mounting plate of the wave-change switch shaft to the chassis frame. Pull switch shaft straight out.
2. Unsolder the stator and rotor leads from the gang condenser.
3. The fastening screws for the switch sections are located on top of the "CentrOmatic" unit and are indicated by X, Y and Z in Figure #1. Remove the corresponding screws.
4. Each individual section can then be pulled out straight.

NOTE: On the R.F. section, the plate lead from the 6K7 socket will have to be unsoldered from the switch terminal before the section can be removed.

On the oscillator section, the plate lead to the 6C5 socket and the plate supply lead will have to be unsoldered from the switch terminal before the section can be removed.

5. After repairs have been made, resolder the plate leads mentioned above and replace the section, being careful to observe that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "CentrOmatic" unit. This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
6. Replace the section fastening screws.
7. Resolder the stator and rotor leads on gang condenser.
8. Replace the switch shaft and the mounting fastening screws. When inserting the switch shaft, be careful that all the switch discs are in the same position, otherwise the switch shaft will not slide in. NEVER force the shaft into the switch discs. If shaft does not slide in freely, examine the position of the slot in each switch disc.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver, it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver 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.

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.

It is recommended that no attempt be made to align this receiver unless it is definitely known that it is necessary and then only if high grade equipment is available, preferably a cathode ray oscillograph.

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control at maximum, the tone control on bass, the wave-change switch on broadcast, the dial indicator at approximately 600 KC., and the HIGH FIDELITY CONTROL AT MINIMUM (COUNTER-CLOCKWISE).
2. Connect output meter across voice coil of speaker.
3. Set test oscillator at 465 KC., and connect to the grid of the second I.F. tube (6K7) through a .5 mfd. blocking condenser.
4. Adjust trimmer #74 for maximum output.
5. Connect the test oscillator (through same blocking condenser) to the grid of the first I.F. tube (6K7), and adjust trimmers #61 and #62 for maximum output, reducing the oscillator output as required.
6. Connect the test oscillator (through same blocking condenser) to the grid of the first detector and adjust trimmers #51 and #52 for maximum output.
7. Adjust trimmer #81 which controls the tuning meter circuit, for a sharp dip in the output. This dip in the output will occur simultaneously with the tuning meter deflection. This adjustment should be made very accurately to a minimum reading.

ADJUSTMENT OF GREEN BAND

1. Set wave-change switch to Green Band position.
2. Set test oscillator and dial indicator to 350 KC.
3. Apply test signal to antenna terminal of the chassis through a .0002 mfd. series condenser and adjust #35, #21, and #6 for maximum output.
4. Set test oscillator and dial indicator to 165 KC., and adjust #36 for maximum output, at the same time rocking the variable tuning condenser.
5. Return to 350 KC. setting with both test oscillator and dial indicator, and repeat adjustment of #35, #21 and #6 for accuracy.

ADJUSTMENT OF BROADCAST BAND

1. Set wave-change switch to the White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1400 KC., and adjust #38, #24 and #8 for maximum output.
3. Set test oscillator and dial indicator to 600 KC., and adjust #39 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 1400 KC. setting and make readjustment of #38, #24 and #8.

ADJUSTMENT OF BLUE BAND

NOTE: In adjusting the Blue and Red Bands, 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 wave-change switch to Blue Band position.
2. Set test oscillator and dial indicator to 5000 KC., and adjust #42, #26 and #10 for maximum output.
3. Set test oscillator and dial indicator to 2000 KC., and adjust #43 for maximum output, at the same time rocking the variable tuning condenser.

ADJUSTMENT OF RED BAND

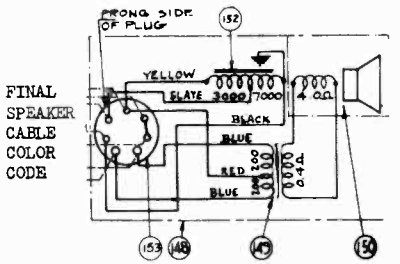
1. Set wave-change switch to Red Band position.
2. Set test oscillator and dial indicator to 17000 KC., and adjust #45, #29 and #13 for maximum output.
3. Set test oscillator and dial indicator to 6500 KC., and adjust #47 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 17000 KC. setting and make readjustment of #45, #29 and #13.

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 condenser 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.

WARNING: On the first A.V.C. transformer, Diagram #119, are two trimmer condensers which should, under no conditions, be adjusted excepting when the entire transformer has been replaced. The first production lot of this model was shipped with these two trimmers accessible, but on all future shipments these will be covered with a strip of fish paper.

The adjustment of this transformer is very critical, requiring the use of a very sensitive micro-ammeter and after the adjustments have been made at the factory, no further adjustment will be necessary.

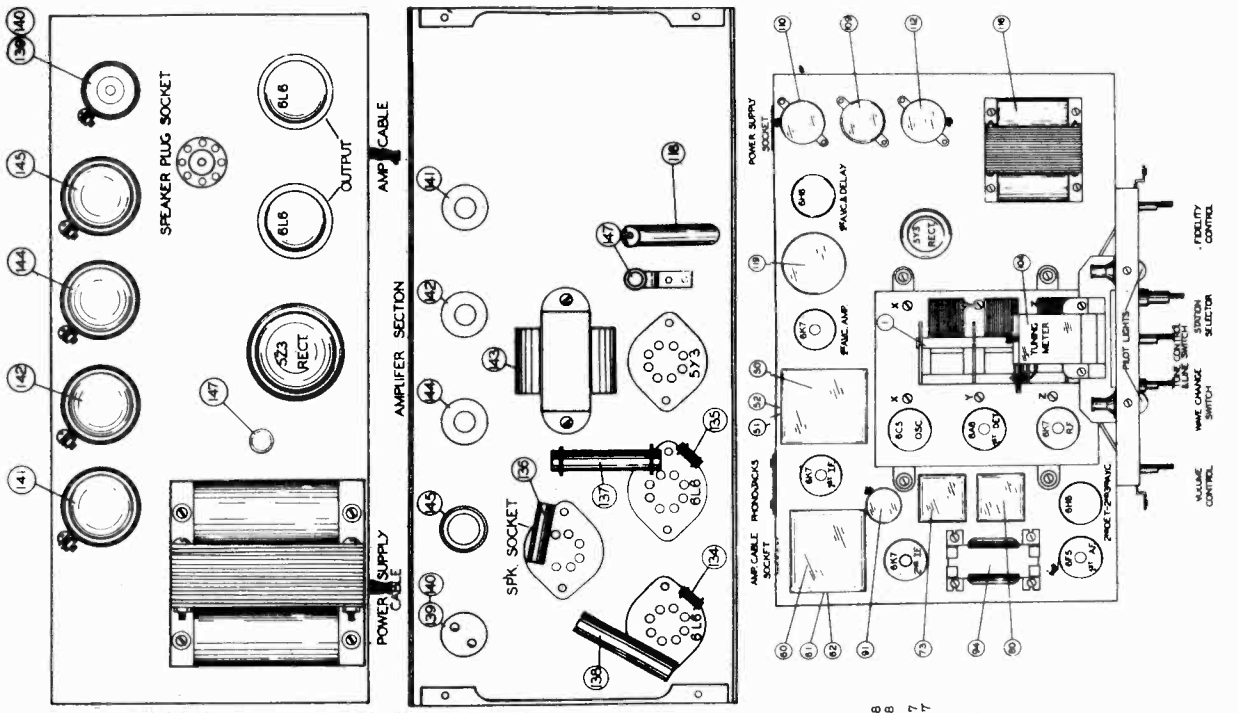
Should it become necessary to replace this A.V.C. transformer, communicate with the Radio Service Department of the United American Bosch Corporation, Springfield, Massachusetts.

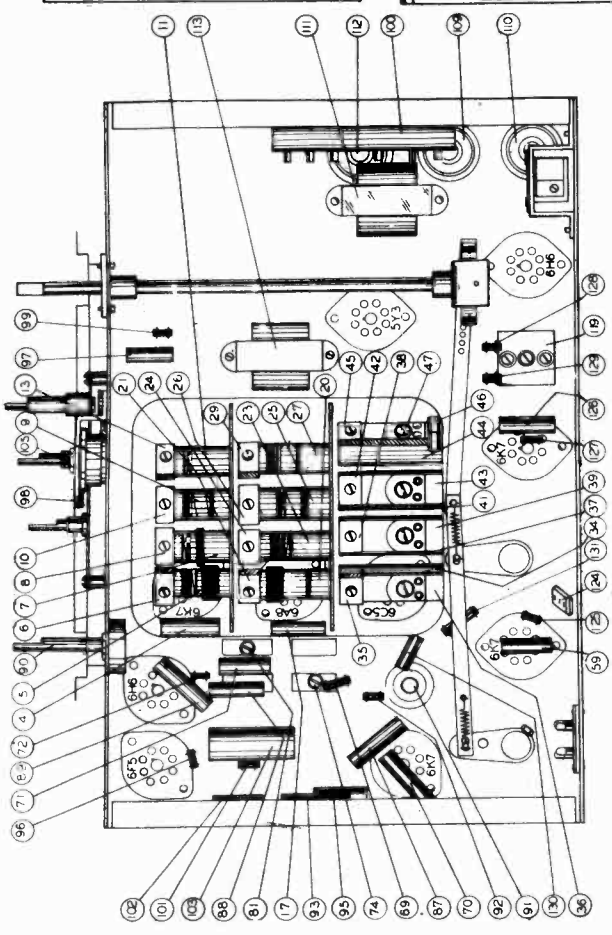


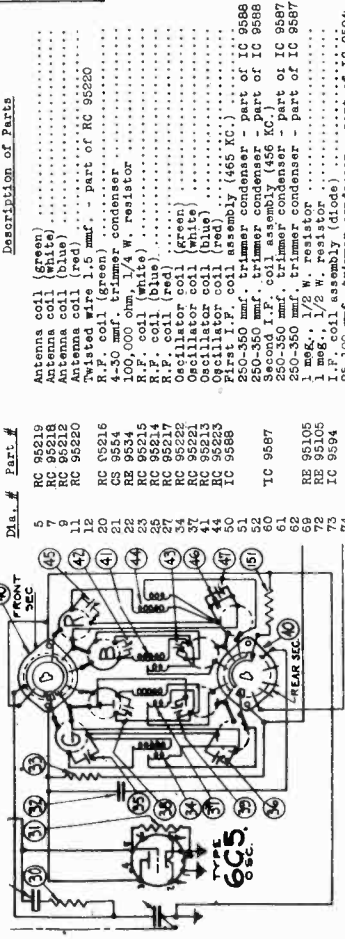
MODEL 680
Final Schematic

UNITED AMERICAN BOSCH CORP.

Socket, Trimmers
Chassis, Parts





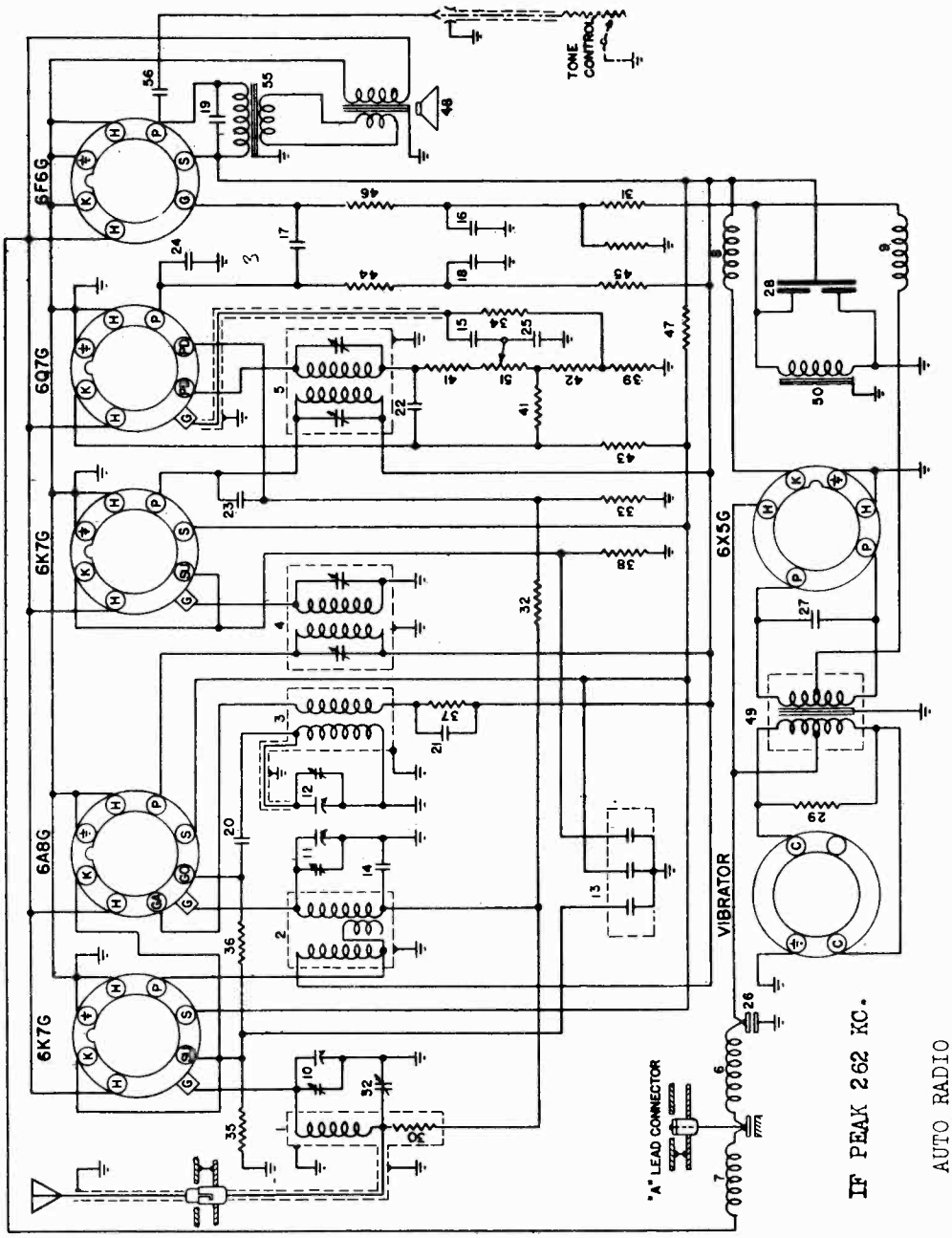


Dia. #	Part #	Description of Parts
5	RC 95219	Antenna coil (green)
7	RC 95218	Antenna coil (white)
9	RC 95212	Antenna coil (blue)
11	RC 95220	Antenna coil (red)
12		Twisted wire 1.5 mmf. - part of RC 95220
20	RC 95216	R.F. coil (green)
21	CS 9554	4-30 mmf. trimmer condenser
22	RE 9534	100,000 ohm, 1/4 W. resistor
23	RC 95215	R.F. coil (white)
25	RC 95214	R.F. coil (blue)
27	RC 95217	R.F. coil (red)
34	RC 95222	Oscillator coil (green)
37	RC 95221	Oscillator coil (white)
41	RC 95213	Oscillator coil (blue)
44	RC 95223	Oscillator coil (red)
50	IC 9588	First I.F. coil assembly (465 KC.)
51		250-350 mmf. trimmer condenser - part of IC 9588
52		250-350 mmf. trimmer condenser - part of IC 9588
60	TC 9587	Second I.F. coil assembly (456 KC.)
61		250-350 mmf. trimmer condenser - part of IC 9587
62		250-350 mmf. trimmer condenser - part of IC 9587
69	RE 95105	1 meg., 1/2 W. resistor
72	RE 95105	1 meg., 1/2 W. resistor
73	IC 9594	I.F. coil assembly (diode)
74		25-100 mmf. trimmer condenser - part of IC 9594
80	IC 9592	Tuning selector coil assembly (diode)
81		25-100 mmf. trimmer condenser - part of IC 9592
96	SA 105272	10,000 ohm, 1/4 W. resistor
98	RE 95136	20,000 ohm, 1/2 W. resistor
115	LP 9516	Tuning indicator lamp
118	RE 95137	300 ohm, 15 W. resistor
119	IC 9593	First A.V.C. transformer assembly
120		80-200 mmf. trimmer condenser - part of IC 9593
121		80-200 mmf. trimmer condenser - part of IC 9593
125	RE 95105	1 meg., 1/2 W. resistor
151	RE 95155	10,000 ohm, 2/5 W. resistor
147	LP 9545	Pilot lamp
149	SR 9548	Fuse assembly .5 amp.
150	TR 9594	Output transformer
150	DM 9517	Diaphragm and voice coil assembly
151	SA 105257	150 ohm, 1/4 W. resistor
152	CL 9564	Field coil
153	PG 9567	Speaker plug

FINAL SCHEMATIC IS THE SAME AS THE PRELIMINARY SCHEMATIC ON PAGE 7-43,44 , WITH THE EXCEPTION OF A CORRECTION IN THE OSCILLATOR CIRCUIT, THE CONNECTION OF A 150 OHM RESISTANCE (151) BETWEEN THE FRONT AND REAR SECTIONS OF THE OSCILLATOR WAVE CHANGE SWITCH AS SHOWN IN THE SCHEMATIC SECTION ; THERE IS ALSO DIFFERENT COLOR CODING ON THE SPEAKER CABLE AS SHOWN IN THE SCHEMATIC ON THE ALIGNMENT-PAGE. THE FOLLOWING PARTS CHANGES WERE ALSO MADE IN THE FINAL DATA :

UNITED MOTORS SERVICE

MODEL R 640 Delco
Schematic, Voltage
Alignment



AUTO RADIO

Delco Model R-640

Date: 2-3-37

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	SU	GA	GO	K
6K7G	R-F Amp.	6	230	55	4.0	-	-	4.0
6A8G	Osc. Mod.	6	230	55	-	120	0	4.0
6K7G	I-F Amp.	6	230	55	2.7	-	-	2.7
6Q7G	Det. Aud.	6	125	-	-	-	-	11.0
6F6G	Output	6	220	230	-	-	-	0
6X5G	Rectifier	6	-	-	-	-	-	230

All readings taken from tube socket contacts to ground with 1000 ohm per volt voltmeter.

Aligning I-F Stages at 262 K.C.

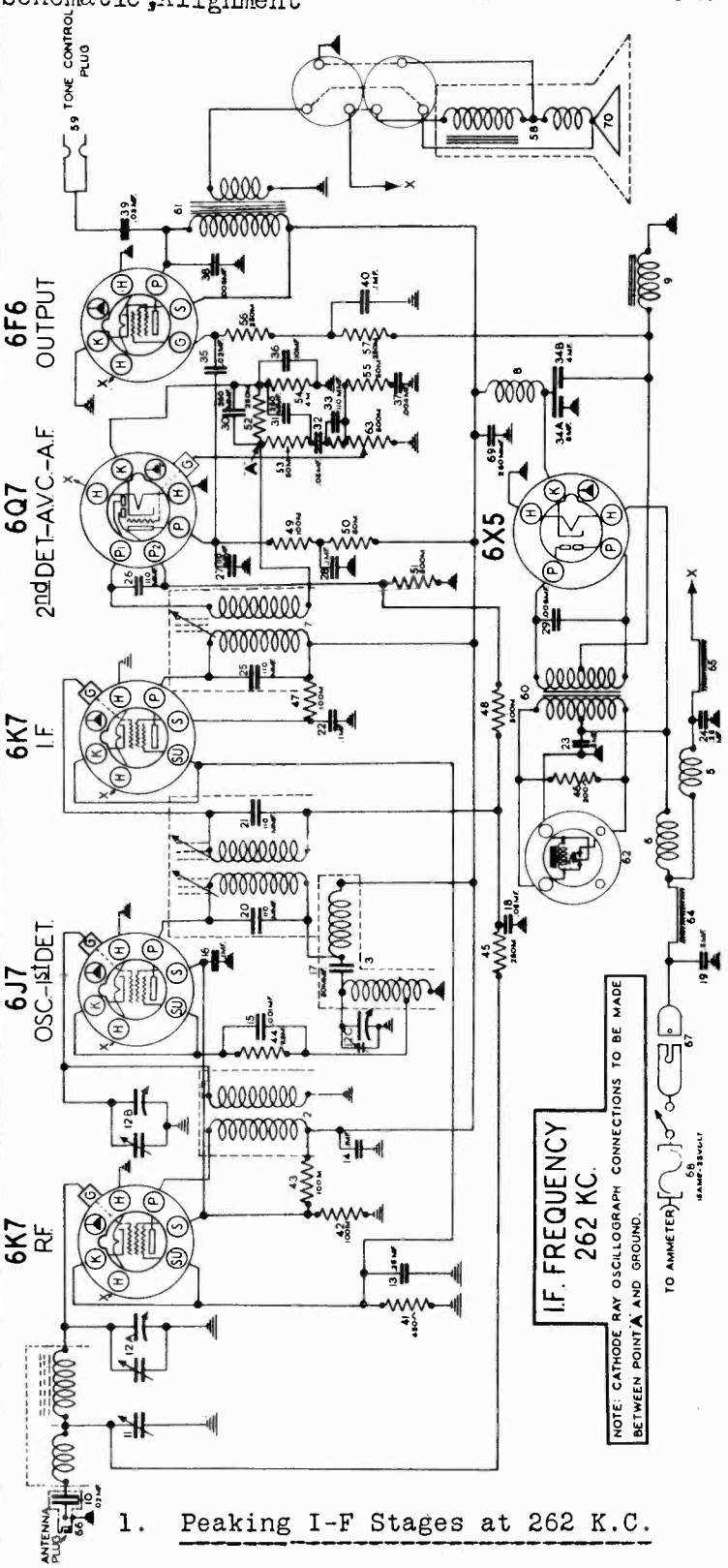
Set signal generator to 262 K.C. and connect signal lead to grid cap of 6A8G tube, through a .1 mfd. condenser. Adjust trimmers on both I-F coils located on under side of chassis sub-panel. Repeat adjustments until maximum output is obtained, using a weak signal.

Aligning R-F Stages

Set signal generator to 1530 K.C. and connect signal lead to antenna terminal of receiver through a .0002 mfd. mica condenser. Adjust oscillator trimmer on middle section of condenser gang. Set signal generator at 1400 K.C. and turn condenser gang until this signal is tuned in. Adjust the other two sections of condenser gang. Set signal generator to 600 K.C. and turn condenser plates until this signal is tuned in. Adjust antenna compensating condenser (located near antenna connector) while rocking the condenser gang plates back and forth until maximum output is obtained. Repeat adjustments made at 1400 K.C.

MODEL R-642 Delco
Schematic, Alignment

UNITED MOTORS SERVICE



AUTO RADIO

Delco Model R-642

Date: 6-2-37

R.F. ALIGNMENT ON NEXT PAGE

CIRCUIT ALIGNMENT

1. Peaking I-F Stages at 262 K.C.

(a) Connect the signal lead of the signal generator to the grid cap of the 6J7 tube, through a .1 mfd. condenser. Do not remove grid clip from tube. Connect the ground lead of the signal generator to the receiver case.

(b) Connect output meter from tone control jack to receiver case.

(c) Turn condenser gang plates to approximately 1000 K.C. and volume control on full.

(d) Adjust screws "A" and "C", located on the top of each I-F transformer, for maximum output. (See Parts Layout.)

(e) Adjust screw "B" (third I-F adjustment) on bottom of chassis, accessible through hole provided in bottom cover of receiver. DO NOT REMOVE BOTTOM COVER OF RECEIVER FOR THIS ADJUSTMENT.

(f) Repeat (d) and (e) until no further increase in output can be obtained.

Note: In order not to actuate the A.V.C. circuit, always use the lowest output from the signal generator, which will give a readable indication on the output meter.

UNITED MOTORS SERVICE

MODEL R-642 Delco
Socket, Trimmers
Chassis, Alignment

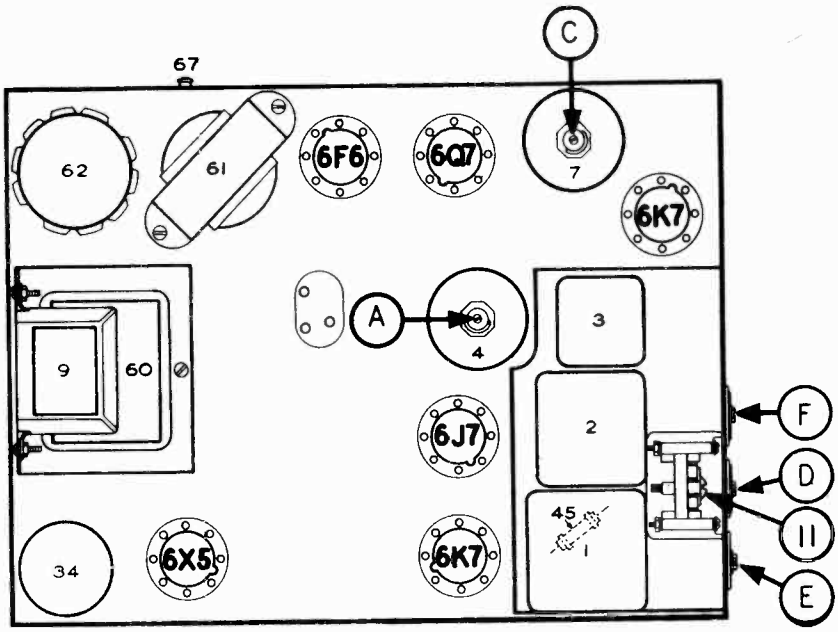


FIG. 3--PARTS LAYOUT--Top View

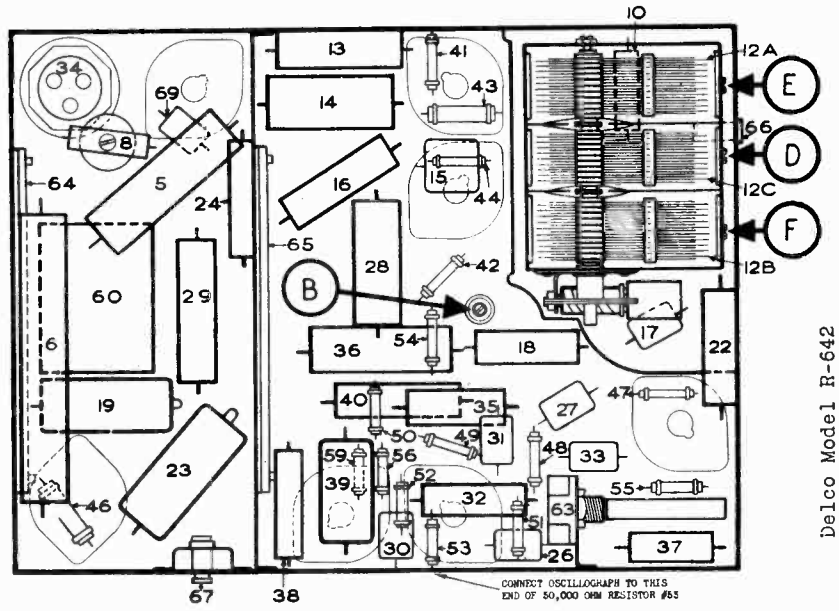


FIG. 4--PARTS LAYOUT--Bottom View

Delco Model R-642

Date: 6-2-37

4. Aligning at 600 Kilocycles

(a) Set signal generator to 600 kilocycles and turn condenser plates until signal is tuned in.

(b) Remove small button plug on control side of receiver. Adjust Delco Syncro-Tuning condenser (Illus. #11), while rocking tuning condenser plates back and forth slightly until maximum output is obtained.

(c) Repeat adjustments of trimmers "E" and "F" at 1400 kilocycles as covered in paragraphs (b) and (c) under "Aligning at 1400 Kilocycles".

3. Aligning at 1400 Kilocycles

(a) Connect generator signal lead to antenna connection of receiver THROUGH A .0002 MFD. MICA CONDENSER.

(b) Set signal generator carefully to 1400 kilocycles and turn condenser plates until this signal is tuned in with maximum output

(c) Adjust trimmers "E" and "F" for maximum output. Do not disturb the adjustment of trimmer "D" set at 1530 K.C.

I.F. ALIGNMENT ON PRECEDING PAGE

2. Aligning at 1530 Kilocycles

(a) Leave signal lead of signal generator connected to grid cap of 6J7 tube. Turn condenser gang plates all the way out of mesh and against high frequency stop.

(b) Set signal generator to exactly 1530 kilocycles and remove small plate on side of chassis covering trimmer screws.

(c) Adjust trimmer "D" on condenser gang carefully until generator signal is tuned in with maximum output.

MODEL R-640 Delco
Parts List
MODEL R-642 Delco
Voltage, Parts

UNITED MOTORS SERVICE

Illus. No.	Part No.	Part Name	Description
			Delco Model R-642
			Date: 6-2-37
1	1212042	Coil assy.	Antenna
2	1212041	Coil assy.	R-F
3	1212043	Coil assy.	Oscillator
4	1212032	Coil assy.	1st I-F
7	1212033	Coil assy.	2nd I-F
8	1212062	Choke	R-F "B"
9	1212046	Choke	"B" filter (iron core)
10	1212045	Condenser	Tubular .02 mfd. 200 V.
11	1212039	Condenser	Ant. compensating
12	1212035	Condenser	3 gang tuning
13	1212030	Condenser	Low loss .25 mfd. 150 V.
14	1207908	Condenser	Tubular .1 mfd. 400 V.
15	1207904	Condenser	Molded .001 mfd.
16	1207908	Condenser	Tubular .1 mfd. 400 V.
17	1207625	Condenser	Molded .0005 mfd.
18	1211442	Condenser	Low loss .05 mfd. 150 V.
19	1212029	Condenser	Tubular .5 mfd. 150 V.
20,21	1212059	Condenser	Molded .00011 mfd.
22	1207908	Condenser	Tubular .1 mfd. 400 V.
23	1212029	Condenser	Low loss .5 mfd. 150 V.
24	1212028	Condenser	Low loss .25 mfd. 150 V.
25	1212059	Condenser	Molded .00011 mfd.
26	**1210275	Condenser	Molded .0001 mfd.
27	**1209055	Condenser	Molded .00025 mfd.
28	1207908	Condenser	Tubular .1 mfd. 400 V.
29	1212040	Condenser	Buffer .008 mfd. 1700 V.
30,31	1209055	Condenser	Molded .00025 mfd.
32	1211440	Condenser	Tubular .05 mfd. 200 V.
33	**1210275	Condenser	Molded .0001 mfd.
34	1212038	Condenser	Electrolytic 8-4 mfd.
35	1212099	Condenser	Tubular .02 mfd. 600 V.
36	1212044	Conbenser	Electrolytic 10 mfd. 25 V.
37	1212098	Condenser	Tubular .004 mfd. 800 V.
38	1211439	Condenser	Tubular .006 mfd. 600 V.
39	1212064	Condenser	Molded .03 mfd.
40	1207908	Condenser	Tubular .1 mfd. 400 V.
41	1212063	Resistor	Insulated 450 ohms ½ watt
42	1209883	Resistor	Insulated 100,000 ohms ½ watt
43	1209445	Resistor	Carbon 100,000 ohms ½ watt
44	1212061	Resistor	Insulated 9,500 ohms ½ watt
44	*1210834	Resistor	Insulated 10,000 ohms ½ watt
45	1210117	Resistor	Insulated 250,000 ohms ½ watt
46	1211006	Resistor	Insulated 200 ohms ½ watt
47	1209883	Resistor	Insulated 100,000 ohms ½ watt
48	1210470	Resistor	Insulated 500,000 ohms ½ watt
49	1209883	Resistor	Insulated 100,000 ohms ½ watt
50	1210116	Resistor	Insulated 50,000 ohms ½ watt
51	1210470	Resistor	Insulated 500,000 ohms ½ watt
52	1210117	Resistor	Insulated 250,000 ohms ½ watt
53	1210116	Resistor	Insulated 50,000 ohms ½ watt
54	1211050	Resistor	Insulated 4,000 ohms ½ watt
55	1210116	Resistor	Insulated 50,000 ohms ½ watt
56,57	1210117	Resistor	Insulated 250,000 ohms ½ watt
58	1211976	Speaker	8" dynamic
60	1212037	Transformer	Power
61	1212034	Transformer	Output
62	5050673	Vitrator	Plug-in
63	1212036	Control	Volume res. 500,000 ohms
64,65	1212048	Condenser	Interference "A" line

MISCELLANEOUS PARTS

	1212058	Socket	Tube--octal base
	7230072	Socket	Vibrator
	1212052	Coupling	Condenser gang
	1211609	Clip	Chassis cover grounding
	1212054	Shield	Tube grid
	1212079	Clip	Vibrator retaining
	1212080	Plate	Trimmer condenser cover
	1212087	Ring	Vibrator grounding
	1212086	Case	Power transformer
	1212051	Connector	"A" lead (on chassis)
	1212053	Socket	Speaker
	1212082	Plug	Speaker (incl. cord)
	1212049	Gasket	Speaker (cardboard)
	1212057	Grille	Speaker front
	7231115	Socket	Tone control
	7230146	Clip	Tube grid

* Used on late production.
** Replacement part.

TUBE SOCKET VOLTAGES--(Bottom View of Chassis)

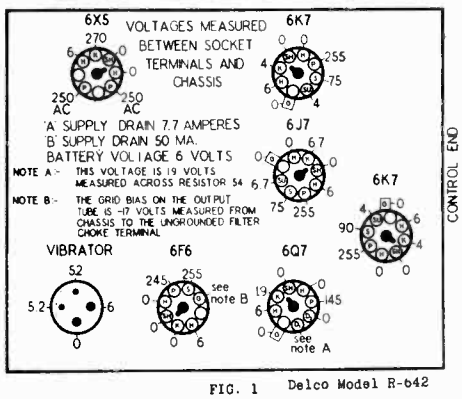


FIG. 1 Delco Model R-642

All voltage measurements made with a voltmeter having a resistance of 1000 ohms per volt.

R-640 PARTS LIST Date: 2-3-37

Illus. No.	Part No.	Part Name	Description
1	1211268	Coil assy.	Antenna
2	7231152	Coil assy.	R-F
3	7231040	Coil assy.	Oscillator
4	7230280	Coil assy.	1st I-F
5	7230281	Coil assy.	2nd I-F
6	7231151	Choke	"A' filter
7	1209897	Choke	Motor noise
8	7231386	Choke	6X5G tube filament
9	7231387	Choke	R-F "B" filter
10,11,12	7231211	Condenser	2 gang tuning
13	7231174	Condenser	1--.1 mfd. 2--.05 mfd.
14,15	1209307	Condenser	Tubular .02 mfd 200 V.
16	1207908	Condenser	Tubular .1 mfd. 400 V.
17	1209309	Condenser	Tubular .01 mfd. 400 V.
18	1209306	Condenser	Tubular .1 mfd. 400 V.
19	7231212	Condenser	Tubular .005 mfd. 600 V.
20,21	1209055	Condenser	Molded .00025 mfd.
22	7231177	Condenser	Molded .0004 mfd.
23	1207625	Condenser	Molded .00005 mfd.
24	1210275	Condenser	Molded .0001 mfd.
25	7231178	Condenser	Molded .0002 mfd.
26	7231150	Condenser	Tubular .5 mfd. 100 V.
27	7231149	Condenser	Tubular .005 mfd. 1000 V.
28	7230164	Condenser	Elect. dual 6 mfd.
29	1211006	Resistor	Insulated 200 ohms 1/4 watt
30,31	1209884	Resistor	Insulated 300,000 ohms 1/4 watt
32,33,34	1209885	Resistor	Insulated 1 megohm 1/4 watt
35	1211220	Resistor	Insulated 300 ohms 1/4 watt
36	1210881	Resistor	Insulated 60,000 ohms 1/4 watt
37	1211095	Resistor	Insulated 20,000 ohms 1/2 watt
38,39	1211041	Resistor	Insulated 1,500 ohms 1/4 watt
40	1210882	Resistor	Insulated 20,000 ohms 1/4 watt
41	*1211003	Resistor	Insulated 150 ohms 1/2 watt
42	*7231171	Resistor	Insulated 120 ohms 1/4 watt
43	1211077	Resistor	Insulated 7,500 ohms 1 watt
44,45	1210116	Resistor	Insulated 50,000 ohms 1/4 watt
46	1210470	Resistor	Insulated 500,000 ohms 1/4 watt
47	7231172	Resistor	Candohm 15,000 ohms 3 watt
48	7231214	Speaker	Dynamic
49	7231165	Transformer	Vibrator
50	7231159	Choke	"B" filter
51	7231170	Control	Volume
52	7231156	Condenser	Antenna compensating
55	7231513	Transformer	Output
56	7231223	Condenser	Tubular .03 mfd. 600 V.

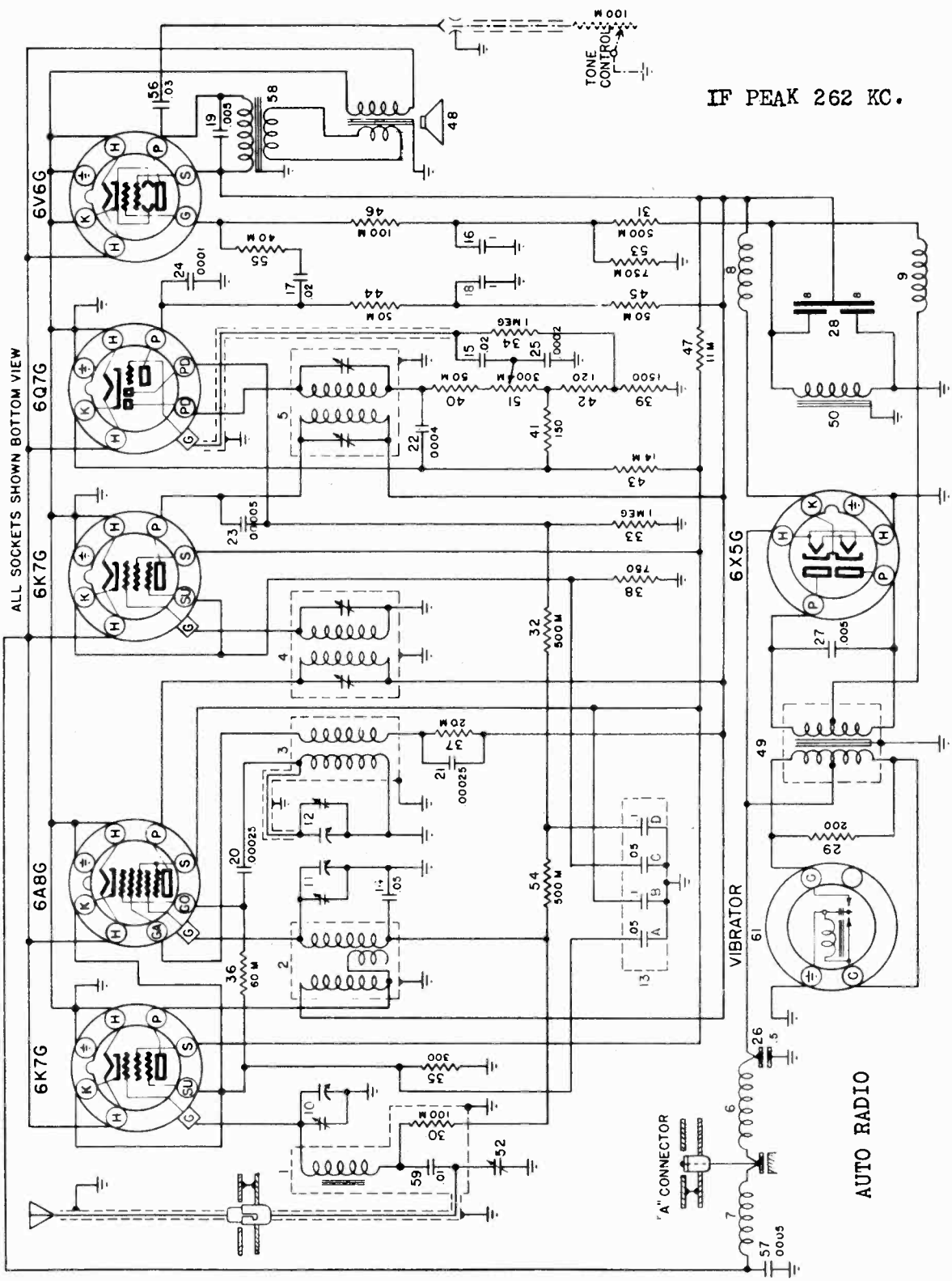
MISCELLANEOUS

7231111	Grille	Case front
1211609	Clip	Cover grounding
72312R3	Socket	Tube (unmarked)
7231115	Socket	Tone control lead

* Use resistors listed for replacement on first production

UNITED MOTORS SERVICE

MODEL R-641 Delco
Schematic



Delco Model R-641

Date: 7-1-37

The Delco Model R-641 is a six tube, single unit auto radio, with variable tone control, non-synchronous vibrator and type 6V6G "Beam" Power Tube.

OSCILLOGRAPH CONNECTIONS

In making tests with the Cathode Ray Oscillograph, connect to black lead of 2nd I-F coil (Illus. #5) and to chassis ground.

MODEL R-641 Delco
Socket, Trimmers
Chassis, Alignment
Voltage

UNITED MOTORS SERVICE

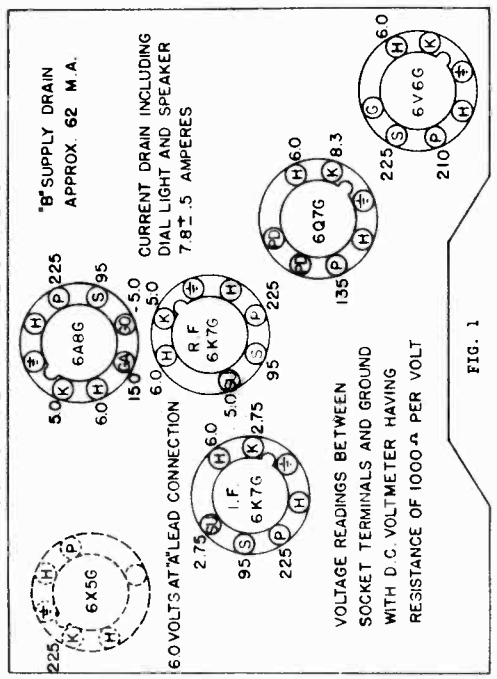


FIG. 1
(Bottom View of Chassis)

In order to prevent the A.V.C. circuit from affecting the alignment adjustments, the lowest Signal Generator output should be used, which will give a readable indication on the output meter.

All voltage measurements made with a voltmeter having a resistance of 1000 ohms per volt.

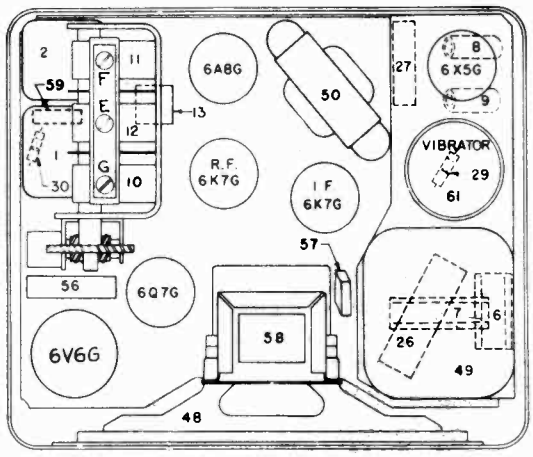


FIG. 3--PARTS LAYOUT--Top View

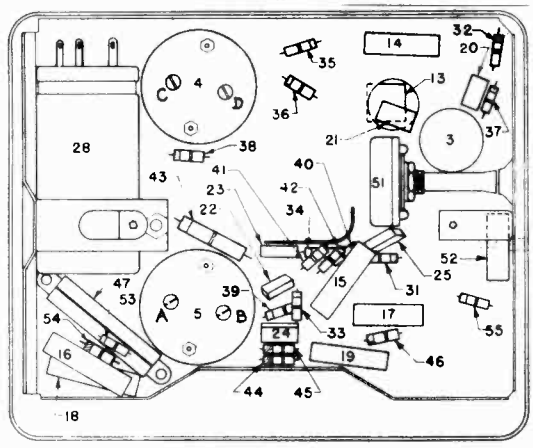


FIG. 4--PARTS LAYOUT--Bottom View

Delco Model R-641

Date: 7-1-37

Checking I-F Band Spread

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustment of the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Complete information concerning this check with the Oscillograph, is given in the Oscillograph Manual, included with each instrument.

1. Peaking I-F Stages at 262 Kilocycles

   (a) Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6A8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.

   (b) Connect output meter from plate of 6V6G tube to ground.

   (c) Set Signal Generator to exactly 262 kilocycles and turn volume control on full.

   (d) Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within narrow limits there is no appreciable change in output.

   (e) Adjust trimmers A-B-C-D on the top of the I-F coils (Illus. 4 & 5) carefully for maximum output.

   (f) Repeat adjustments of I-F trimmers A-B-C-D with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Aligning at 1530 Kilocycles

   (a) Leave Signal Generator leads connected the same as for I-F adjustments.

   (b) Turn tuning condenser plates all the way out and against high frequency stop.

   (c) Set Signal Generator to exactly 1530 kilocycles and adjust oscillator trimmer "E" on middle section of condenser gang carefully for maximum output.

3. Aligning at 1400 Kilocycles

   (a) Remove signal lead of Signal Generator from grid cap of 6A8G tube and connect to antenna terminal of receiver through a .0002 mfd. mica condenser.

   (b) Set the Signal Generator to 1400 kilocycles and tune the receiver to this signal.

   (c) Adjust the parallel trimmers "F" and "G" of the condenser gang carefully for maximum output. Do not disturb the 1530 kilocycle adjustment of the middle section of the condenser gang.

4. Aligning at 600 Kilocycles

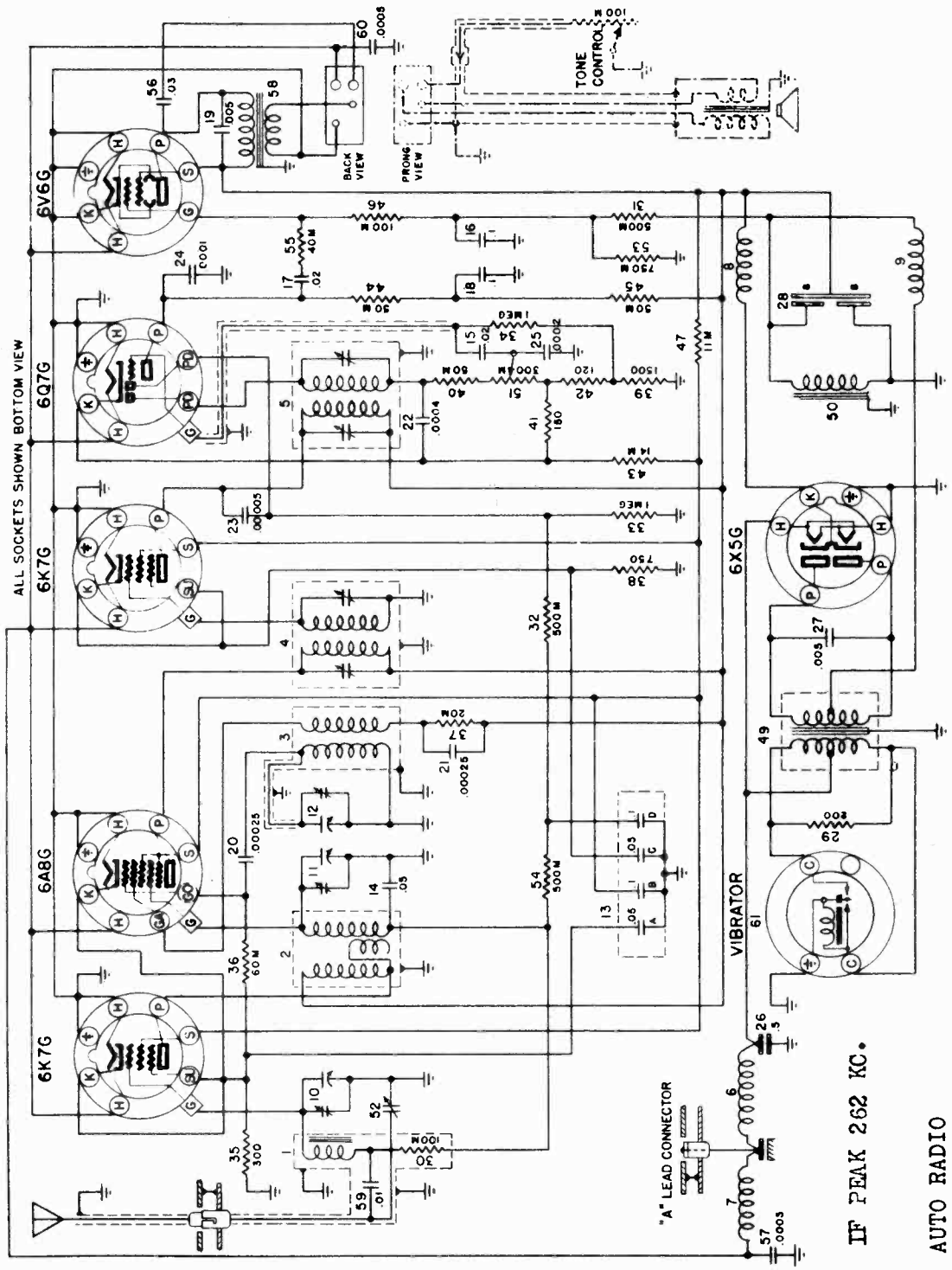
   (a) Set Signal Generator to approximately 600 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.

   (b) Adjust Delco Syncro-Tuning condenser (Illus. 52) located on side of chassis near antenna connector, rocking gang condenser plates back and forth through the signal until maximum output is obtained. (It will be necessary to readjust this condenser to the car antenna upon installation of the set.)

   (c) Repeat adjustments made under--"Aligning at 1400 K.C.".

UNITED MOTORS SERVICE

MODEL R-643 Delco
Schematic



Delco Model R-643 The Delco Model R-643 is a six tube, external speaker auto radio, with variable tone control, non-synchronous vibrator and type 6V6G "Beam" Power Tube.

Date: 6-25-37

OSCILLOGRAPH CONNECTIONS

In making tests with the Cathode Ray Oscillograph, connect to black lead of 2nd I-F coil (Illus. #5) and to chassis ground.

MODEL R-643 Delco
Socket, Trimmers
Chassis, Voltage
Alignment

UNITED MOTORS SERVICE

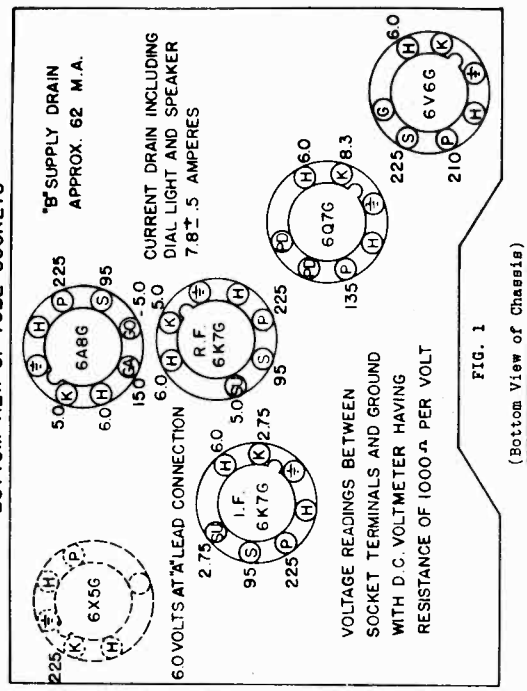


FIG. 1
(Bottom View of Chassis)

In order to prevent the A.V.C. circuit from affecting the alignment adjustments, the lowest Signal Generator output should be used, which will give a readable indication on the output meter.

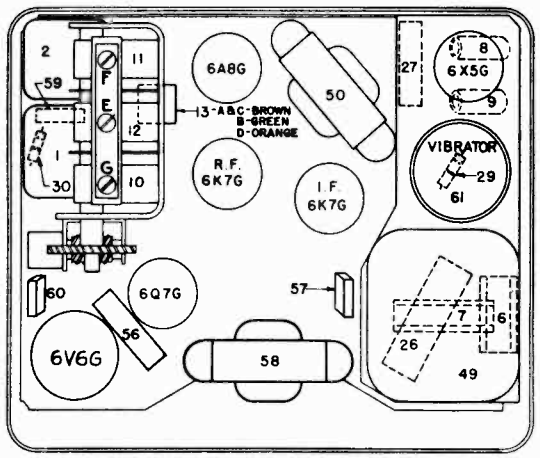


FIG. 3--PARTS LAYOUT--Top View

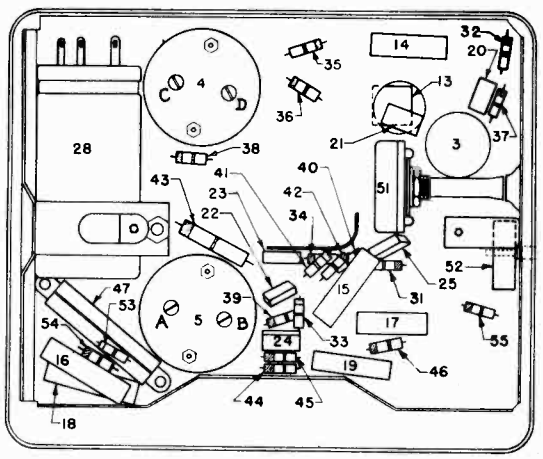


FIG. 4--PARTS LAYOUT--Bottom View

All voltage measurements made with a voltmeter having a resistance of 1000 ohms per volt.

Delco Model R-643

Checking I-F Band Spread — Date: 6-25-37

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustment of the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Complete information concerning this check with the Oscillograph, is given in the Oscillograph Manual, included with each instrument.

1. Peaking I-F Stages at 262 Kilocycles

   (a) Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6A8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.

   (b) Connect output meter from plate of 6V6G tube to ground.

   (c) Set Signal Generator to exactly 262 kilocycles and turn volume control on full.

   (d) Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within narrow limits there is no appreciable change in output.

   (e) Adjust trimmers A-B-C-D on the top of the I-F coils (Illus. 4 & 5) carefully for maximum output.

   (f) Repeat adjustments of I-F trimmers A-B-C-D with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Aligning at 1530 Kilocycles

   (a) Leave Signal Generator leads connected the same as for I-F adjustments.

   (b) Turn tuning condenser plates all the way out and against high frequency stop.

   (c) Set Signal Generator to exactly 1530 kilocycles and adjust oscillator trimmer "E" on middle section of condenser gang carefully for maximum output.

3. Aligning at 1400 Kilocycles

   (a) Remove signal lead of Signal Generator from grid cap of 6A8G tube and connect to antenna terminal of receiver through a .0002 mfd. mica condenser.

   (b) Set the Signal Generator to 1400 Kilocycles and tune the receiver to this signal.

   (c) Adjust the parallel trimmers "F" and "G" of the condenser gang carefully for maximum output. Do not disturb the 1530 kilocycle adjustment of the middle section of the condenser gang.

4. Aligning at 600 Kilocycles

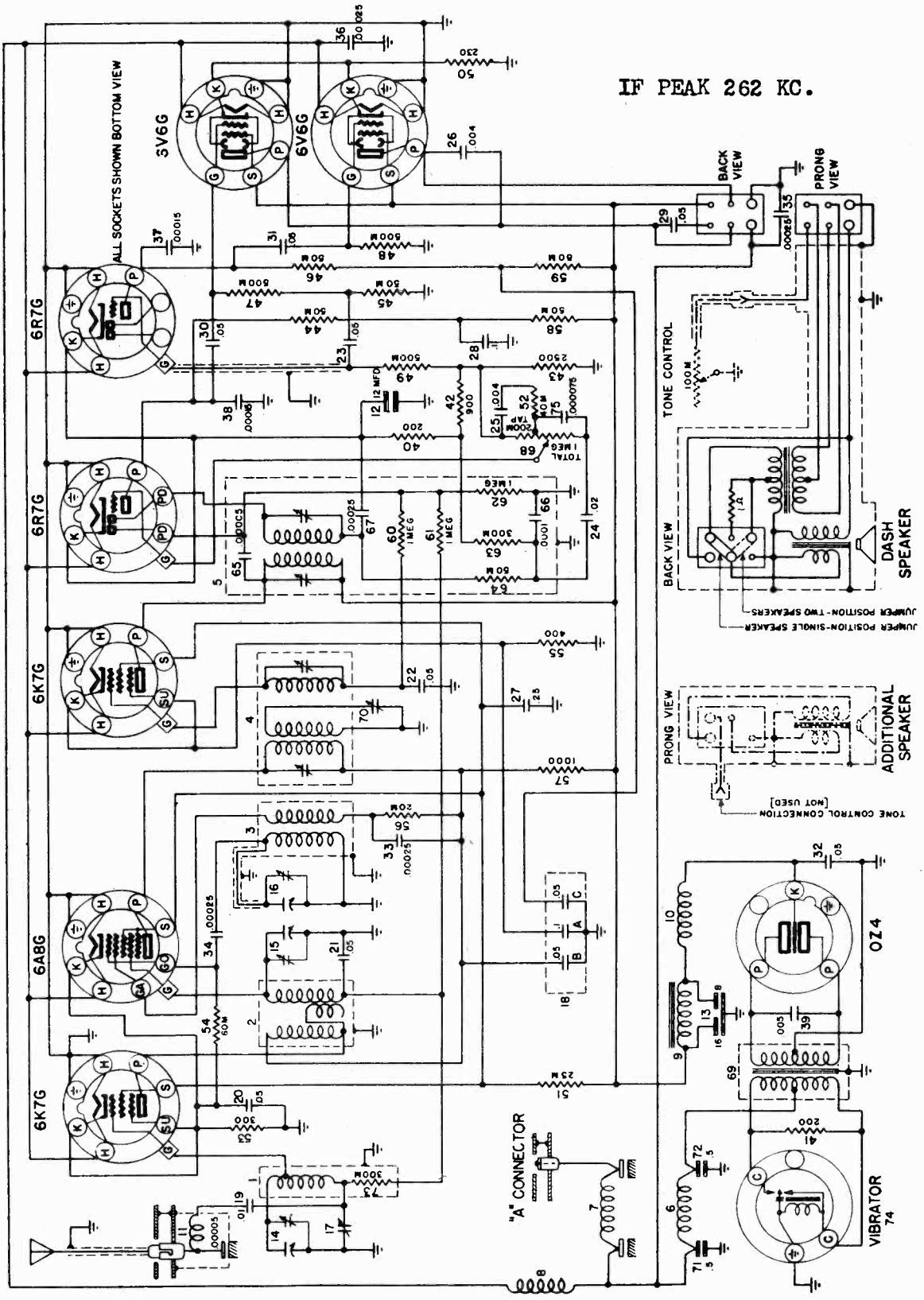
   (a) Set Signal Generator to approximately 600 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.

   (b) Adjust Delco Syncro-Tuning condenser (Illus. 52) located on side of chassis near antenna connector, rocking gang condenser plates back and forth through the signal until maximum output is obtained. (It will be necessary to readjust this condenser to the car antenna upon installation of the set.)

   (c) Repeat adjustments made under--"Aligning at 1400 KC.

UNITED MOTORS SERVICE

MODEL R-644 Delco
Schematic



AUTO RADIO

An extra socket is provided on the dash speaker for plugging in an additional speaker for two speaker operation.

Delco Model R-644

Date: 6-11-37

The Delco Model R-644 is an 8 tube, dash speaker auto radio, with bass compensation, octal base tubes and tone control. Two of the new 6V6G "Beam" power tubes are used in the output stage.

MODEL R-644 Delco
Socket, Trimmers
Chassis, Voltage
Alignment

UNITED MOTORS SERVICE

FIG. 3--PARTS LAYOUT--Top View

FIG. 4--PARTS LAYOUT--Bottom View

In order to prevent the A.V.C. circuit from affecting the alignment adjustments, the lowest Signal Generator output should be used, which will give a readable indication on the output meter for all adjustments.

Date: 6-11-37

Delco Model R-644

Checking I-F Band Spread

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustments to the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Complete information concerning this check with the Oscillograph, is given in the Oscillograph Manual, included with each instrument. In connecting the Oscillograph to the R-644, connect to white lead from bottom of 2nd I-F Coil (Illus. #5) and to chassis frame.

1. Peaking I-F Stages at 262 Kilocycles

(a) Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6A8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect output meter across plates of 6V6G output tubes. (If an A.C. meter is available having a full scale range of 4 volts or less, it can be connected directly across the voice coil connection on the speaker socket provided on the dash speaker for an additional speaker.)

(c) Set Signal Generator to exactly 262 kilocycles and turn volume control on full.

(d) Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within narrow limits there is no appreciable change in output.

(e) Adjust trimmers A-B-C-D on the top of the I-F coils (Illus. 4 & 5) carefully for maximum output.

(f) Adjust I-F trimmer "E" located on chassis sub-panel carefully for maximum output.

(g) Repeat adjustments of I-F trimmers A-B-C-D-E with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Aligning at 1530 Kilocycles

(a) Leave Signal Generator leads connected the same as for I-F adjustments.

(b) Turn tuning condenser plates all the way out and against high frequency stop.

(c) Set Signal Generator to exactly 1530 kilocycles and adjust oscillator trimmer on middle section of condenser gang carefully for maximum output.

3. Aligning at 1400 Kilocycles

(a) Remove signal lead of Signal Generator from grid cap of 6A8G tube and connect to antenna terminal of receiver through a .0002 mfd. mica condenser.

(b) Set the Signal Generator to 1400 kilocycles and tune the receiver to this signal.

(c) Adjust the parallel trimmers on the top and bottom sections of the condenser gang carefully for maximum output. Do not disturb the 1530 kilocycle adjustment of the middle section of the condenser gang.

4. Aligning at 600 Kilocycles

(a) Set Signal Generator to approximately 600 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.

(b) Adjust Delco Syncro-Tuning condenser (Illus. #17) located on side of chassis near antenna connector, rocking gang condenser plates back and forth through the signal until maximum output is obtained. (It will be necessary to readjust this condenser to the car antenna upon installation of the set.) (c) Repeat adjustments "Aligning at 1400 K.C.".

UNITED MOTORS SERVICE

MODEL R-1115 Delco
Below Ser.100,000
Socket, Voltage
Schematic

*NOTE: On early production run, condenser #17 was returned to ground

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	SU	G1	G2	K
6A7	Osc.-Mod.	6.3	250	90	-	0	165	3.2
6D6	I-F Amp.	6.3	250	90	3.2	-	-	3.2
76	Det.	6.3	70	-	-	-	-	6.0
41	Output	6.3	240	250	-	-	-	16.0
80	Rectifier	5.0	*	-	-	-	-	-

Readings taken from tube socket contacts to chassis ground (except filament with a 1000 ohm per volt D.C. meter, using a line voltage of 115 volts

*A.C. Voltage--330

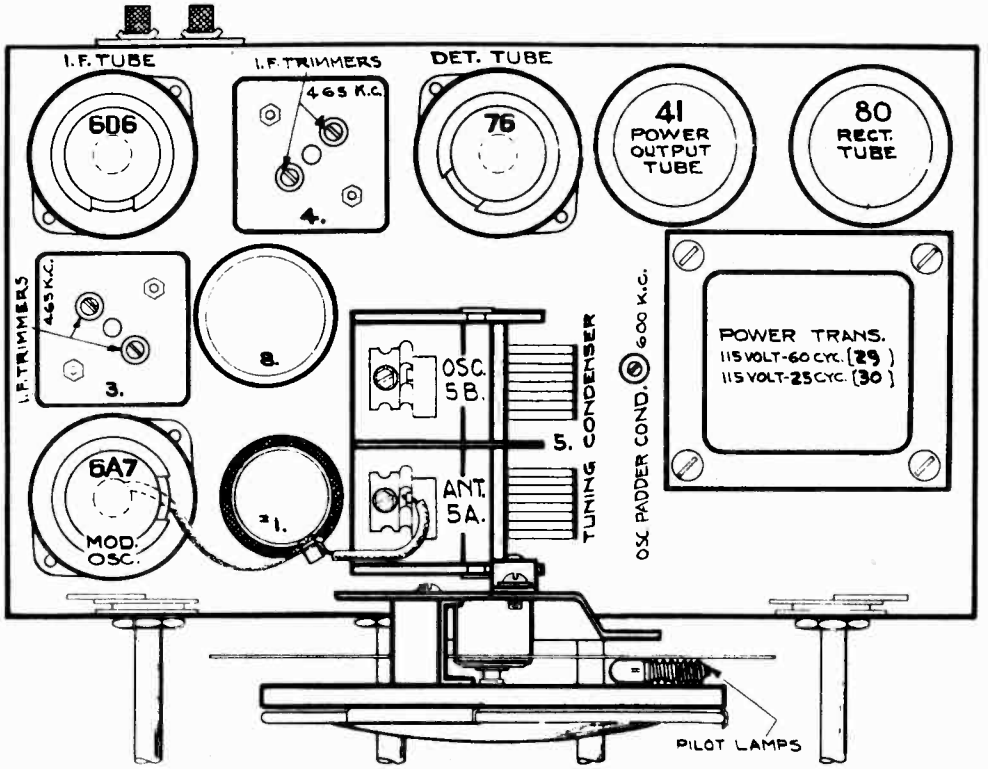
I.F.-465 K.C.

Delco Model R-1115

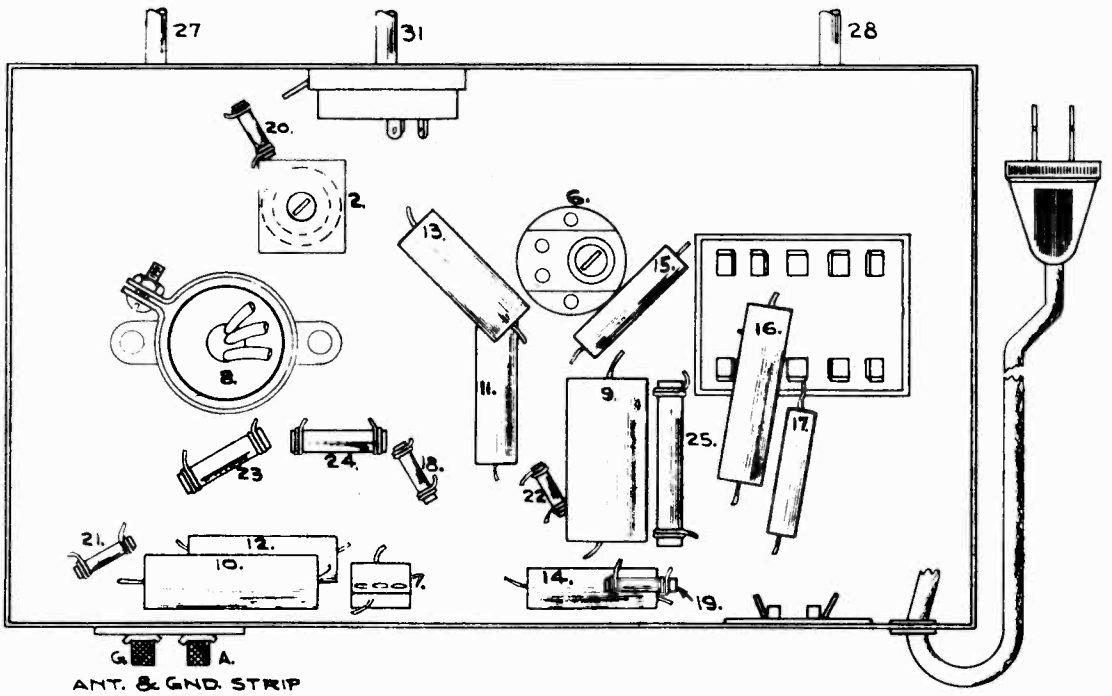
Date: 9-3-36

MODEL R-1115 Delco
Below Ser.100,000
Socket,Trimmers
Chassis,Alignment

UNITED MOTORS SERVICE



PARTS LAYOUT--Top View



-PARTS LAYOUT--Bottom View

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

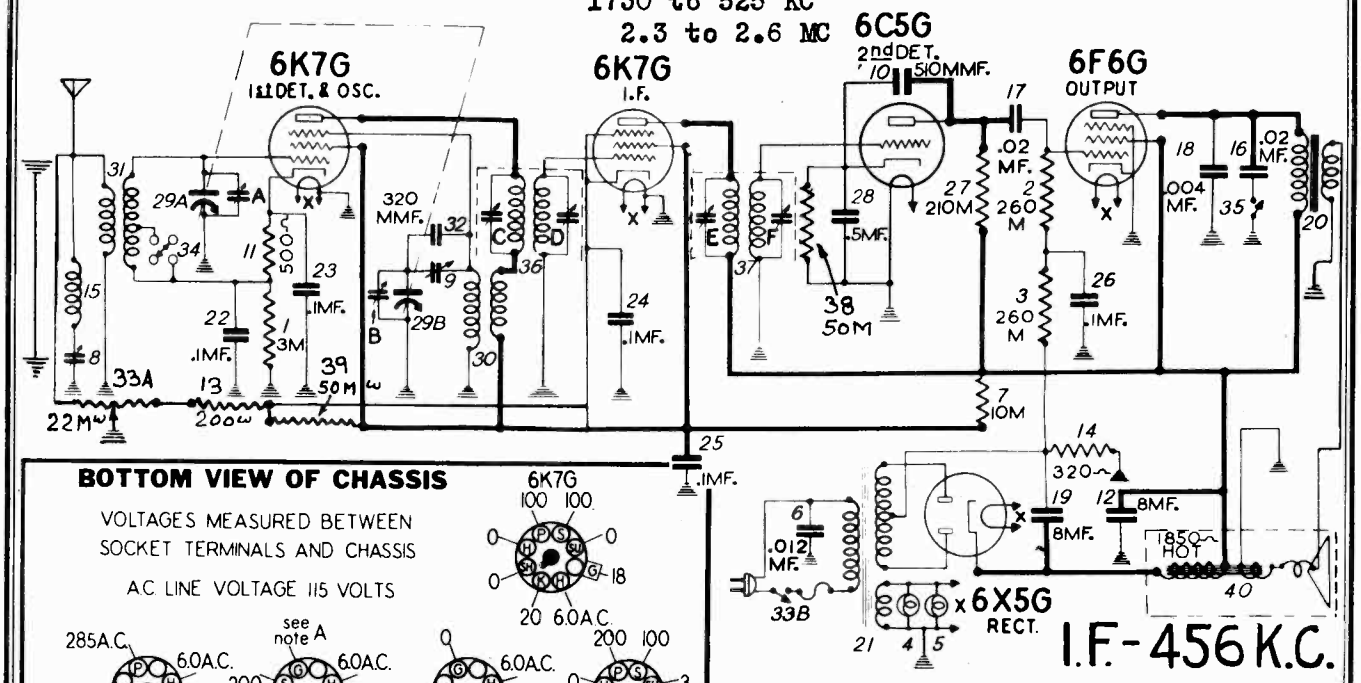
ALIGNMENT

Connect gen. to 6A7 tube thru .02 mf cond. Gen. at 465 kc, peak 2nd IF trimmers on unit desig. 4, and then 1st IF trimmers on unit #3. Gen. at 1720 kc, peak osc. gang cond. trimmer desig. #5B. Gen. and dial at 1400 kc, peak ant. gang cond. trimmer desig. 5A. Gen. and dial at 600 kc, rock var. cond. and peak osc. padder. No adj. necessary on the 2.3 to 2.5 MC Police Band.

UNITED MOTORS SERVICE

MODEL R-1115 Delco
Above Ser.100,000
Schematic, Socket
Trimmers, Chassis
Voltage, Alignment

FREQUENCY RANGES -
1730 to 525 KC
2.3 to 2.6 MC



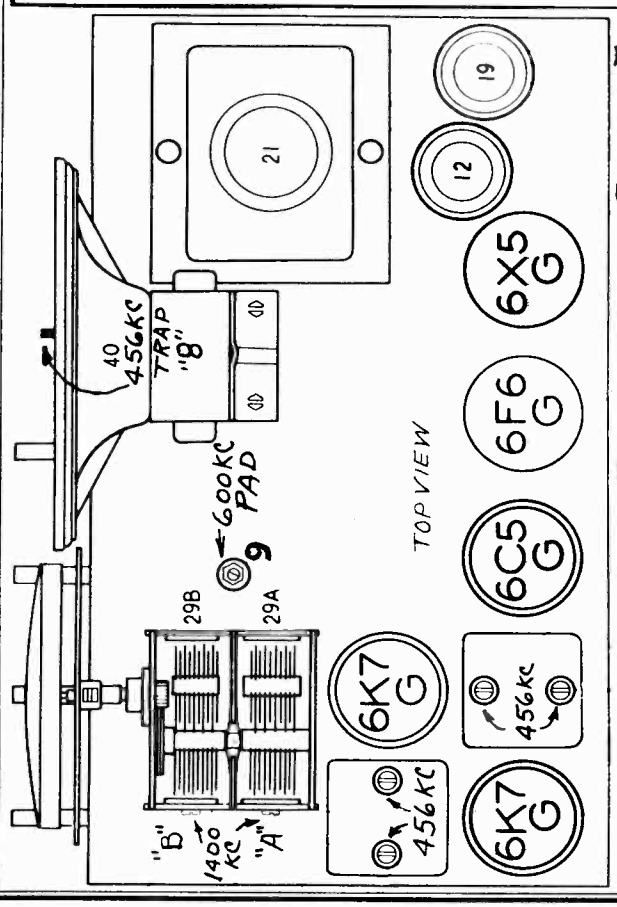
BOTTOM VIEW OF CHASSIS

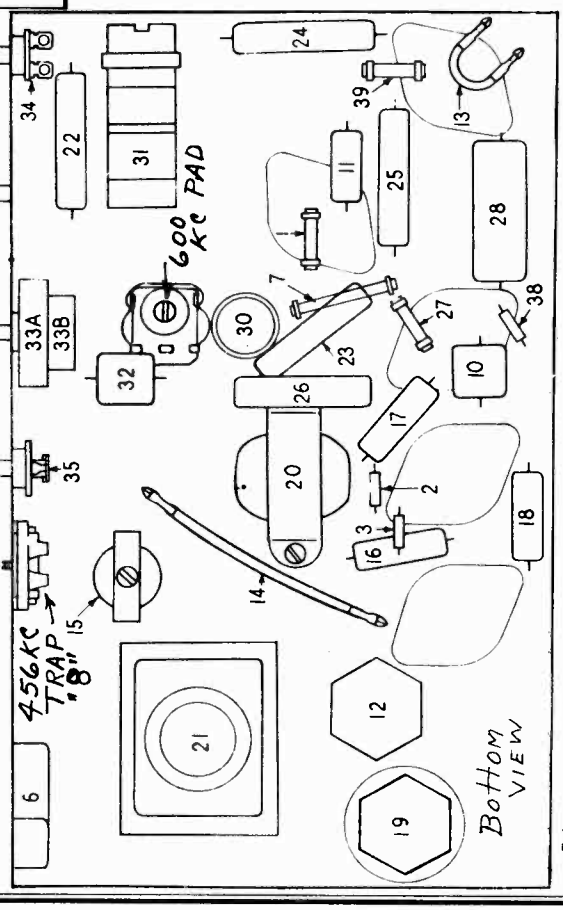
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

A.C. LINE VOLTAGE 115 VOLTS

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII
NO ADJUSTMENTS REQUIRED ON THE SHORTWAVE BAND

MODEL R-1115
1-18-37.

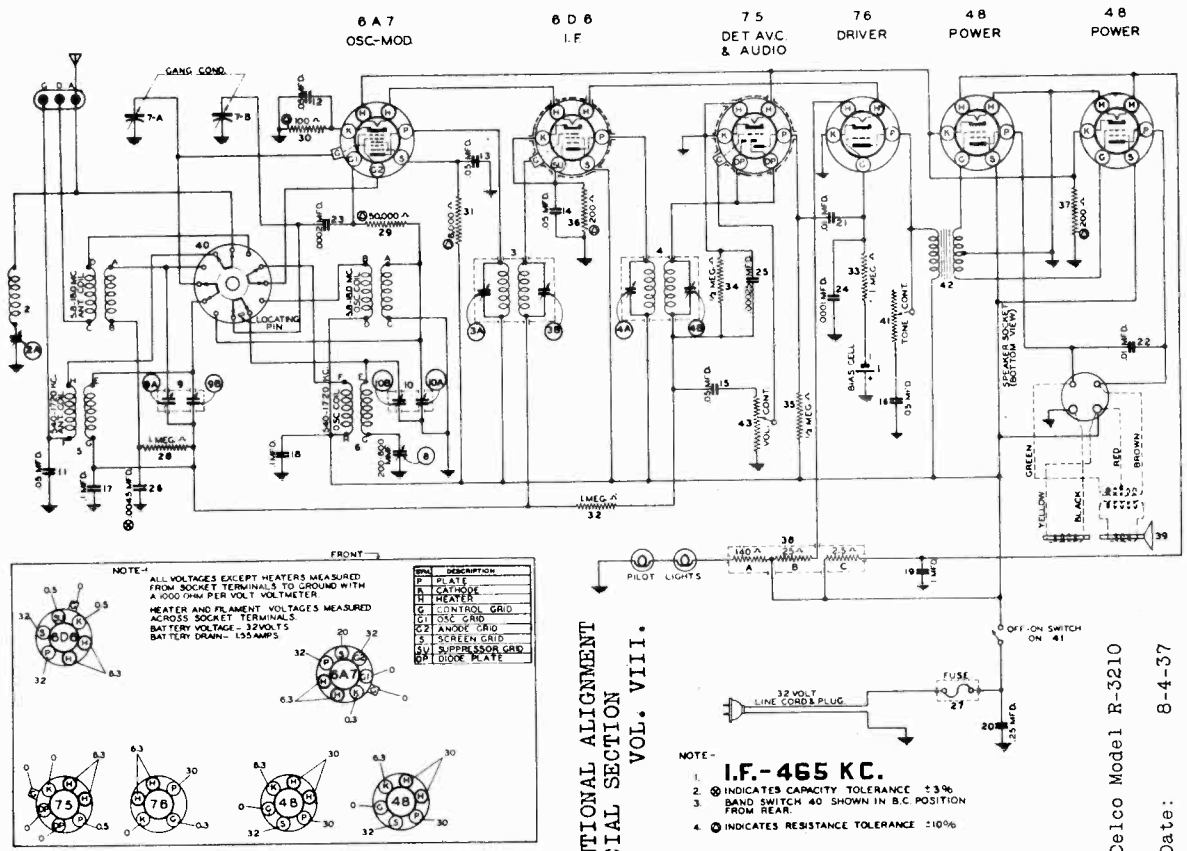




Align I-F trimmers at 456 KC. BROADCAST - Dial and Generator at 1400 KC, peak trimmers "B" & "A". Dial and generator at 600 KC, pad trimmer No. 9, while rocking gang condenser. Adjust wave trap at 456 KC peak.

MODEL R-3210 Delco
Schematic, Socket, Trimmers
Chassis, Voltage, Alignment

UNITED MOTORS SERVICE



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOL. VIII.

Delco Model R-3210 Date: 8-4-37

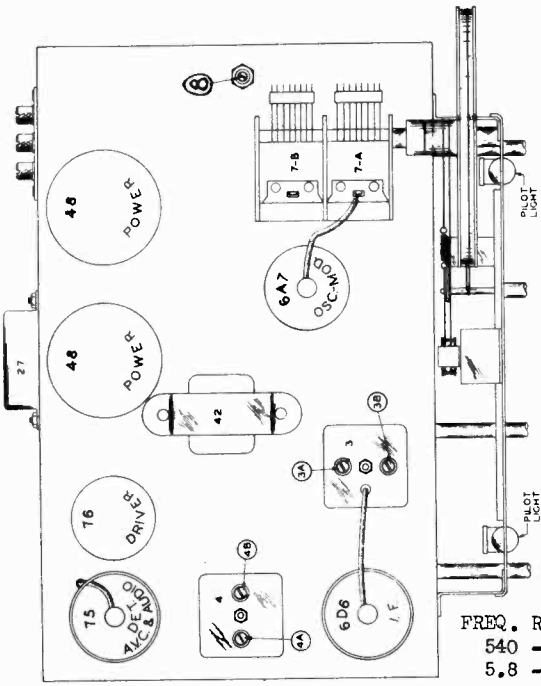


FIG. 2--PARTS LAYOUT--Top View

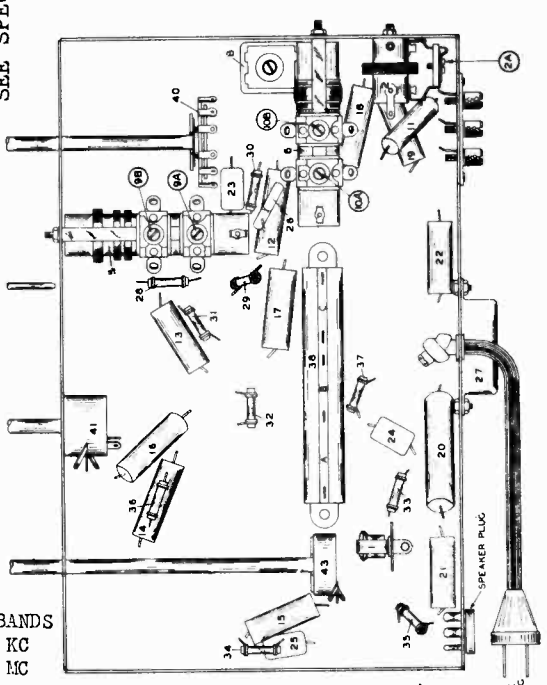


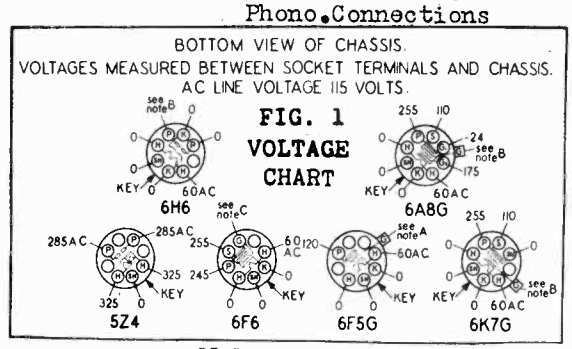
FIG. 3--PARTS LAYOUT--Bottom View

FREQ. RANGE BANDS
540 - 1720 KC
5.8 - 18.0 MC

Adjust IF Trimmers 4A, 4B, 3A, 3B, at 465 KC (Do not remove control-grid clip from 6A7) Adjust wave trap "2A" at 465 KC. Adjust BC Osc Trimmer, 10B, at 1720KC & BC Ant. Trimmer 9B, at 1400 KC. Adjust BC Osc. Series Padder "8" at 600 KC (while rocking variable condenser). Adjust S W Osc. Trimmer "10A" at 18MC and Ant. Trimmer "9A" at 15 MC (while rocking variable condenser). Dummy Antenna, IF- .02 Mfd., Wave Trap, RF, & SW. - .00025.

UNITED MOTORS SERVICE

MODELS R1116,R1117 Delco
Schematic,Socket,Chassis
Trimmers,Voltage,Transf.
Phono.Connections



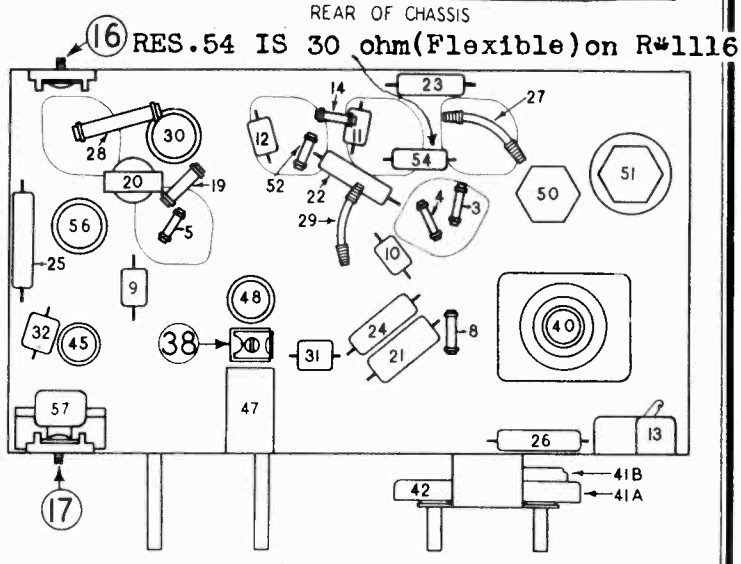
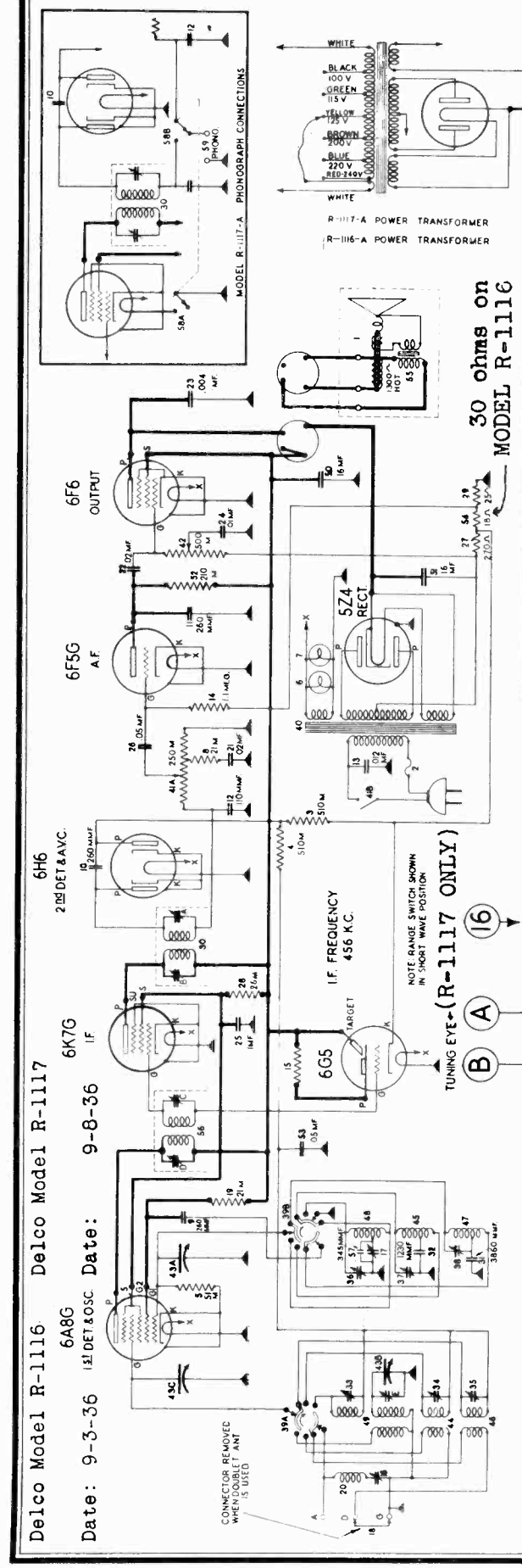


FIG. 3--PARTS LAYOUT--Bottom View



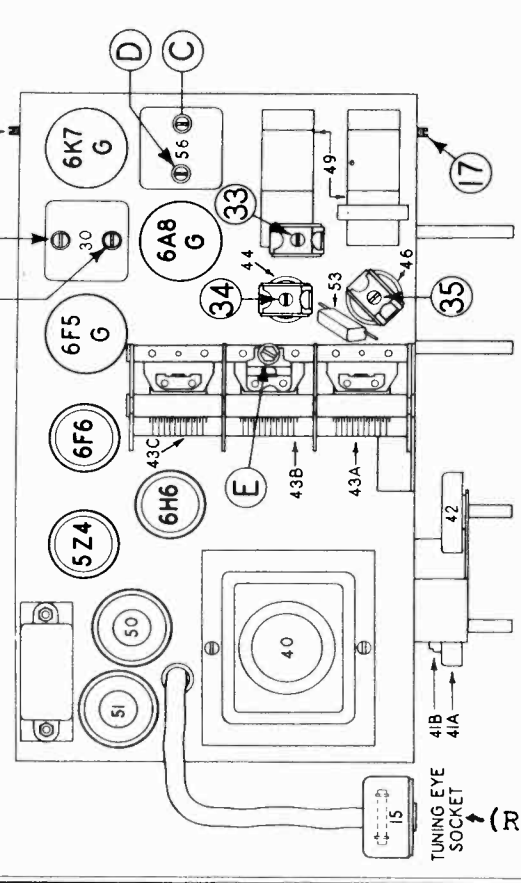


FIG. 2--PARTS LAYOUT--Top View

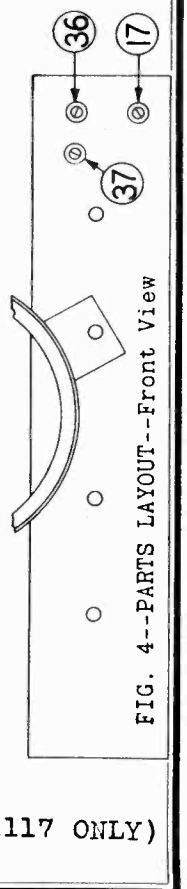


FIG. 4--PARTS LAYOUT--Front View

MODELS R1116,R1117 Delco
Alignment,Notes

UNITED MOTORS SERVICE

The receiver should be aligned in a location free from local interference (interference caused by motors, flashers, automobile ignition, etc.) as high frequency disturbances will cause difficulties in adjusting the short wave circuits.

DIAL SETTING CHECK: Turn the tuning knob until the rotor plates of the condenser gang are fully meshed. The dial pointer should be on the white horizontal line below 530 K.C. on the dial. This check should be made before attempting any trimmer adjustments.

1. Peaking I-F Stages at 456 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8G tube through a .1 or .25 mfd. condenser. DO NOT REMOVE THE GRID CLIP FROM THE TUBE.

(b) Connect the ground lead of the test oscillator to the receiver chassis.

(c) Place the test oscillator in operation at 456 K.C.

(d) Change the band switch to the broadcast position (fully clockwise).

(e) Set the receiver dial pointer to any position where it has no tuning effect on the I-F signal from the oscillator.

(f) Turn the receiver volume control to the maximum position.

(g) Adjust the four I-F trimmers A, B, C & D on the two I-F coils Illus. 30 and 56 (Fig. 2) carefully for maximum output in the following sequence--A-B-C-D. Then repeat the four trimmer adjustments. During alignment, maintain as low a signal output from the test oscillator as is consistent with obtaining at least half scale indication on the output meter.

2. Aligning at 1500 Kilocyles (Broadcast Band)

(a) Connect the signal lead of the test oscillator to the antenna terminal on the chassis through a 400 or 500 ohm carbon resistor. Leave test oscillator ground lead connected to the receiver chassis.

(b) Place test oscillator in operation at 1500 K.C.

(c) Turn dial pointer to 1500 K.C. setting.

(d) Adjust the Broadcast Band oscillator parallel condenser, Illus. 36 (Fig. 4) to maximum output.

(e) Adjust the Broadcast Band detector parallel trimmer, Illus. 33 (Fig. 2) to maximum output.

(f) Adjust the Broadcast Band antenna parallel trimmer, Illus. "E" (Fig. 2) to maximum output.

3. Aligning at 600 Kilocycles (Broadcast Band)

(a) Place test oscillator in operation at 600 K.C.

(b) Tune in the 600 K.C. test oscillator with the receiver dial for maximum output. (This point does not have to be exactly at the 600 K.C. dial setting.)

(c) Adjust the Broadcast Band oscillator tracking condenser, Illus. 17 (Fig. 2) while rocking the tuning condenser plates back and forth through resonance until no further increase in output can be obtained.

(d) Repeat operations under paragraph #2 "Aligning at 1500 Kilocycles" for accurate adjustments.

4. Adjusting the Wave Trap

(a) Place test oscillator in operation at 456 K.C. but leave it connected to the antenna terminal through a carbon resistor.

(b) Set the receiver dial pointer to any position where it has no tuning effect on the 456 K.C. signal.

(c) Adjust the wave trap trimmer, Illus. 16 (Fig. 2) for MINIMUM output, increasing the oscillator output as necessary to obtain a clearly defined point of minimum output.

5. Aligning at 5 Megacycles (5000 K.C. Police Band)

(a) Place test oscillator in operation at 5 megacycles.

(b) Turn dial pointer to 5 megacycles and turn band change switch to the Police Band (center position).

(c) Adjust the Police Band oscillator parallel trimmer, Illus. 37 (Fig. 4) for maximum output. If there are two peaks, the proper one is with the trimmer screw farthest out (less capacity).

(d) Adjust the Police Band antenna parallel trimmer, Illus. 34 (Fig. 2) to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the receiver dial. If this causes the output to go down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dail until maximum output meter deflection is secured.

Aligning at 16 Megacycles (16000 KC Foreign Band)

(a) Place the test oscillator in operation at 16 megacycles.

(b) Turn dial pointer to 16 megacycles and turn band change switch to the Foreign Band (fully counter-clockwise).

(c) Adjust the Foreign Band orcillator parallel trimmer, Illus. 38 (Fig. 3) to maximum output. Check to see if it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 megacycles. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 M.C. and adjust the trimmer, Illus. 38, to the proper peak with the trimmer screw farther out (less capacity).

(d) Adjust the Foreign Band antenna trimmer, Illus. 35 (Fig. 2) to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured.

(e) Check the adjustment by tuning the receiver to the image at about 15.1 M.C. The image should be much weaker than the 16 M.C. signal. If the image is equal to or stronger than the 16 M.C. signal, trimmer Illus. 35 is not at the proper peak. Turn the trimmer in a turn or so, then readjust as above.

NOTES ON TUBE SOCKET VOLTAGES

A bottom view of the receiver chassis is shown in Fig. 1 (Circuit Diagram) on which the voltages at each of the tube socket contacts are indicated. These readings were made with a D.C. voltmeter having a resistance of 1000 ohms per volt.

NOTE A: The grid bias for the 6F5G is--1.5 volts measured across resistor 29.

NOTE B: The grid bias for the 6A8G, 6K7G, and the anode voltage of the A.V.C. section of the 6H6 is--3.5 volts measured across resistors 29 and 54.

NOTE C: The grid bias for the 6F6 output tube is--19.5 volts measured across resistors 29, 54 and 27.

NOTE D: Target voltage for the 6G5 tuning eye is 255 volts.-DELCO MODEL R-1117

FREQ.-RANGE BANDS	
AMER.-BROADCAST (YELLOW)	525-1780 KC.
POLICE & AMATEUR (GREEN)	1750-5600 KC
FOR.SHORT-WAVE (RED)	5.5 - 18 MC

Delco Model R-1116

Date: 9-3-36

Delco Model R-1117

Date: 9-8-36

UNITED MOTORS SERVICE

MODEL R1118 Delco
Schematic, Chassis
Voltage, Changes

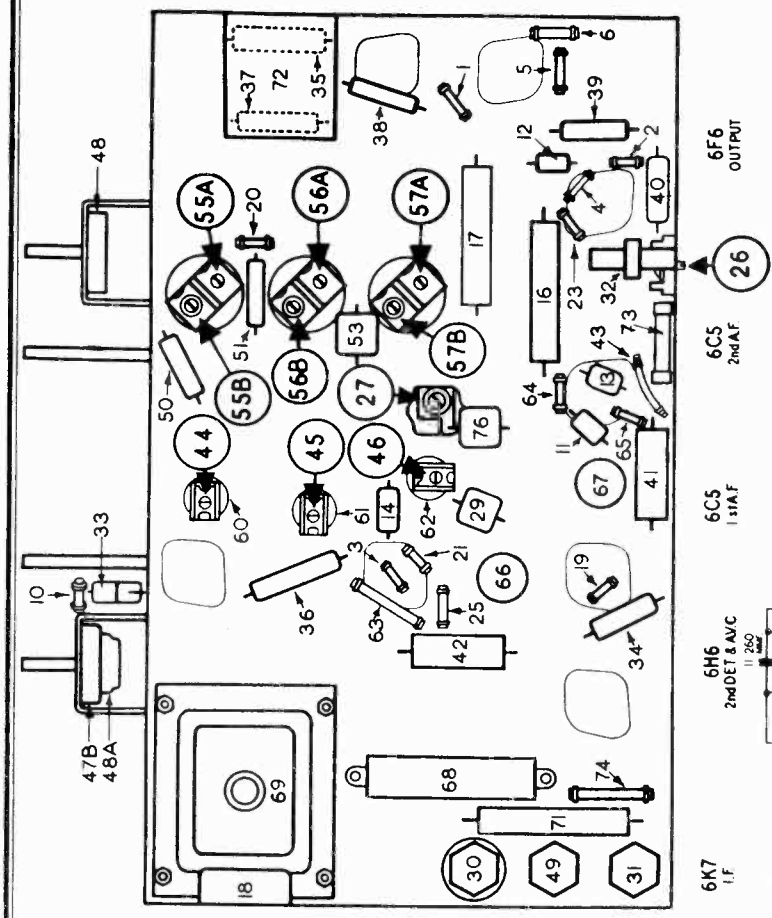
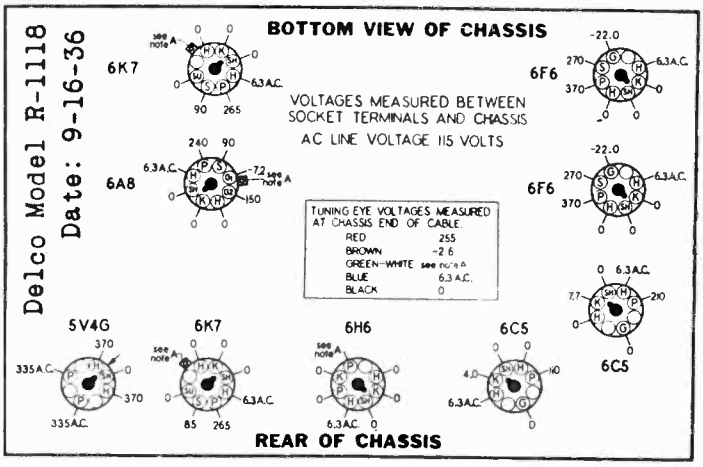
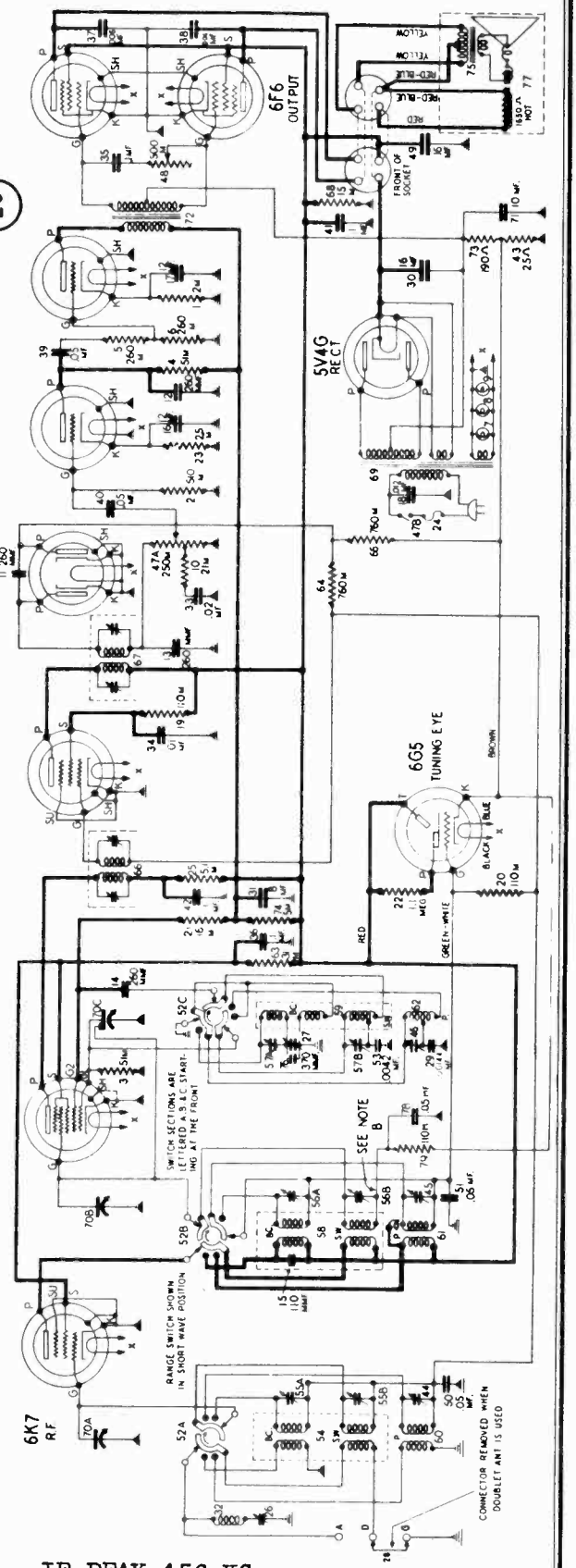


FIG. 3--PARTS LAYOUT-Bottom View

Note A: 2.6 volts measures across resistor #43.

Note B: On sets below serial #415,215, the lead indicated by "Note B" was bypassed directly to ground through the .05 mfd. condenser Illus. #51, and condenser #78 and resistor #79 were not used.





IF PEAK 456 KC

MODEL R1118 Delco
Socket, Trimmers
Alignment, Notes

UNITED MOTORS SERVICE

The receiver should be aligned in a location free from local interference (interference caused by motors, flashers, automobile ignition, etc.) as high frequency disturbances will cause difficulties in adjusting the short wave circuits.

DIAL SETTING CHECK: Turn the tuning knob until the rotor plates of the condenser gang are fully meshed. The slow moving dial pointer should then coincide with the low frequency end of the dial scale. This check should be made before attempting any trimmer adjustments.

1. Peaking I-F Stages at 456 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8 tube through a .1 or .25 mfd. condenser. DO NOT REMOVE THE GRID CLIP FROM THE TUBE.

(b) Connect the ground lead of the test oscillator to the receiver chassis.

(c) Place the test oscillator in operation at 456 KC.

(d) Change the band switch to the broadcast position (fully clockwise)

(e) Set the receiver dial pointer to any position where it has no tuning effect on the I-F signal from the oscillator.

(f) Turn the receiver volume control to the maximum position.

(g) Adjust the four I-F trimmers A, B, C and D on the two I-F coils, Illus. #66 and #67 (Fig. 2) carefully for maximum output in the following sequence--A-B-C-D. Then repeat the four trimmer adjustments. During alignment, maintain as low a signal output from the test oscillator as is consistent with obtaining at least half scale indication on the output meter.

2. Adjusting the Wave Trap

(a) Leave test oscillator in operation at 456 KC, but connect the oscillator output to the "A" and "G" terminals of the receiver with a 400 or 500 ohm carbon resistor in series with the "A" terminal and the oscillator signal lead.

(b) Set the receiver dial pointer to any position where it has no tuning effect on the 456 KC signal.

(c) Adjust the wave trap trimmer, Illus. #26 (Fig. 3) for MINIMUM output, increasing the oscillator output as necessary to obtain a clearly defined point of minimum output. If some particular station with a frequency near 456 KC causes code interference, it may be desirable to adjust the wavetrap on the actual frequency of the interfering station.

3. Aligning at 1500 Kilocycles (Broadcast Band)

(a) Leave the signal lead of the test oscillator connected to the antenna terminal on the chassis through a 400 or 500 ohm carbon resistor. Leave test oscillator ground lead connected to the receiver chassis.

(b) Place test oscillator in operation at 1500 KC.

(c) Turn receiver dial pointer to 1500 KC setting.

(d) Adjust the Broadcast Band oscillator parallel trimmer, Illus. #57A (Fig. 3) to maximum output.

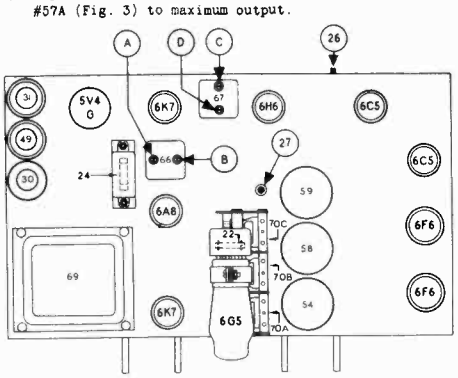


FIG. 2--PARTS LAYOUT--Top View

(e) Adjust the Broadcast Band detector parallel trimmer, Illus. #56A (Fig. 3) to maximum output.

(f) Adjust the Broadcast Band antenna parallel trimmer, Illus. #55A (Fig. 3) to maximum output.

4. Aligning at 600 Kilocycles (Broadcast Band)

(a) Place test oscillator in operation at 600 KC.

(b) Tune in the 600 KC test oscillator signal with the receiver dial for maximum output. (This point does not have to be exactly at the 600 KC dial setting.)

(c) Adjust the Broadcast Band oscillator tracking condenser, Illus. #27 (Fig. 3) while rocking the tuning condenser plates back and forth through resonance until no further increase in output can be obtained.

(d) Repeat operations under paragraph #3 "Aligning at 1500 Kilocycles" for accurate adjustment.

5. Aligning at 5 Megacycles (5000 KC--Police Band)

(a) Place test oscillator in operation at 5 megacycles.

(b) Turn dial pointer to 5 megacycles and turn band change switch to the Police Band (center position).

(c) Adjust the Police Band oscillator parallel trimmer, Illus. #46 (Fig. 3) for maximum output. If there are two peaks, the proper one is with the trimmer screw farthest out, (less capacity).

(d) Adjust the Police Band antenna parallel trimmer, Illus. #44 (Fig. 3) to maximum output.

(e) Adjust the Police Band detector trimmer, Illus. #45 (Fig. 3) to maximum output.

(f) Then try to increase the output by detuning the detector trimmer, Illus. #45, slightly and retuning the receiver dial. If this causes the output to go down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured.

6. Aligning at 16 Megacycles (16,000 KC--Foreign Band)

(a) Be sure that the "D" terminal is connected to the "G" terminal on the antenna terminal strip.

(b) Place the test oscillator in operation at 16 megacycles.

(c) Turn dial pointer to 16 megacycles and turn band change switch to the Foreign Band (fully counter-clockwise).

(d) Adjust the Foreign Band oscillator parallel trimmer, Illus. #57B (Fig. 3) to maximum output. Check to see if it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 megacycles. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC and adjust the trimmer, Illus. #57B, to the proper peak with the trimmer screw farther out (less capacity).

(e) Adjust the Foreign Band antenna trimmer, Illus. #55B (Fig. 3) to maximum output.

(f) Adjust the Foreign Band detector trimmer, Illus. #56B (Fig. 3) to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured.

(g) Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC signal. If the image is equal to or stronger than the 16 MC signal, trimmer Illus. #56B is not at the proper peak. Turn the trimmer IN a turn or so, then readjust as above.

GENERAL: The Delco Model R-1118 is a ten tube, three band, all wave receiver with A.V.C., continuously variable tone control and automatic bass compensation. The receiver is equipped with a band spread dial and a "Robot Eye" tuning indicator. The complete tube complement is as follows: two type 6K7, R-F and I-F Amplifiers; one type 6A8, Detector-Oscillator; one type 6H6, 2nd Detector and A.V.C.; two type 6C5, 1st and 2nd A-F Amplifiers; two type 6F6 in the Output Stage; one type 5V4G Rectifier and one type 6G5 Tuning Indicator.

The frequency ranges on the three bands covered are: American Broadcast Band (yellow) 527 to 1750 KC; Police and Amateur Band (green) 1720 to 5600 KC; and the Foreign Short Wave Band (red) 5.5 to 18 MC.

UNITED MOTORS SERVICE

MODEL R1119 Delco
Schematic, Voltage

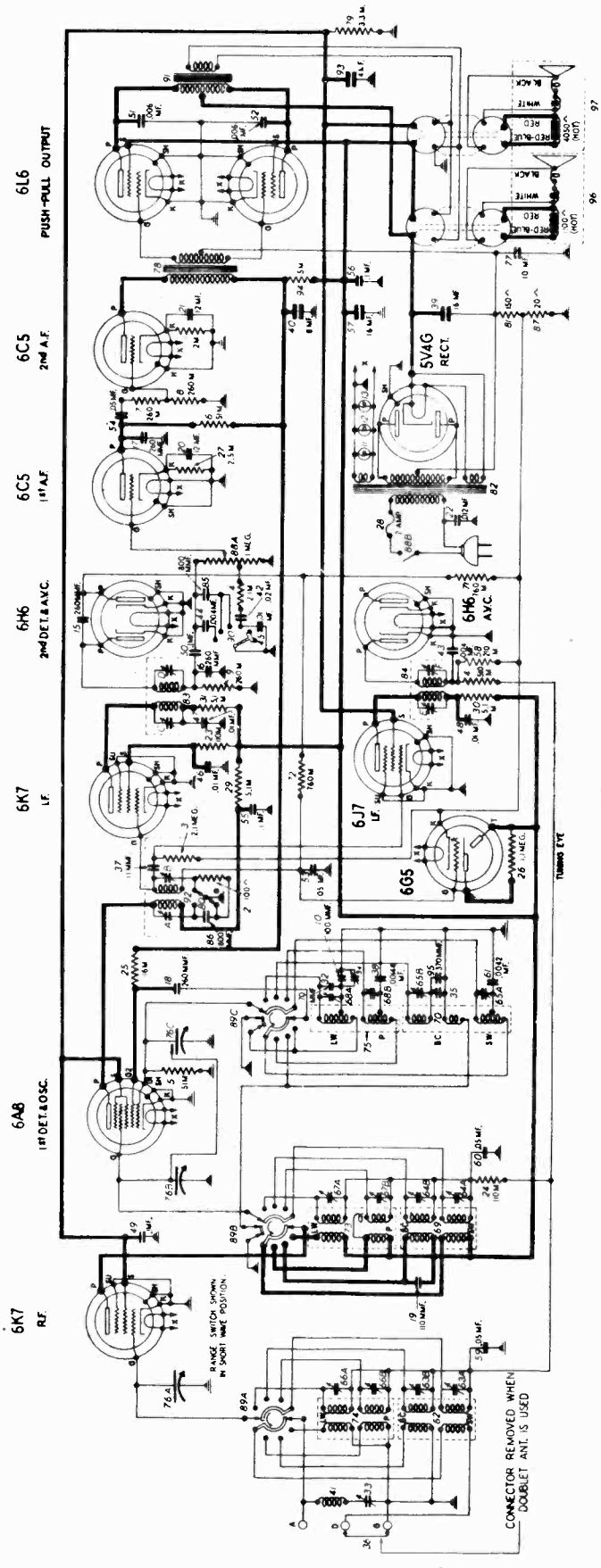


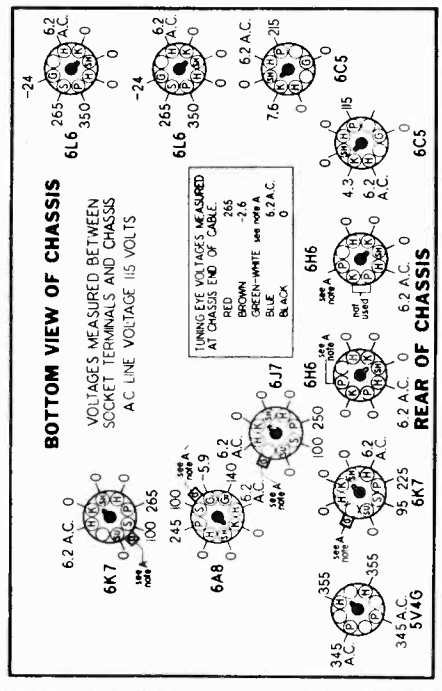
FIG. 1-- DELCO MODEL R-1119 CIRCUIT DIAGRAM & VOLTAGE CHART

IF PEAK 456 KC

Delco Model R-1119

Date: 1-15-37

Note A: 2.6 volts measures across resistor #87.



The frequency ranges on the four bands covered are: Long Wave band, 140 to 400 K.C., American Broadcast band, 527 to 1750 K.C., Police and Amateur band, 1720 to 5600 K.C., and Foreign Short Wave band, 5.5 to 18.0 M.C.

MODEL R1119 Delco
Socket, Trimmers
Chassis, Alignment

UNITED MOTORS SERVICE

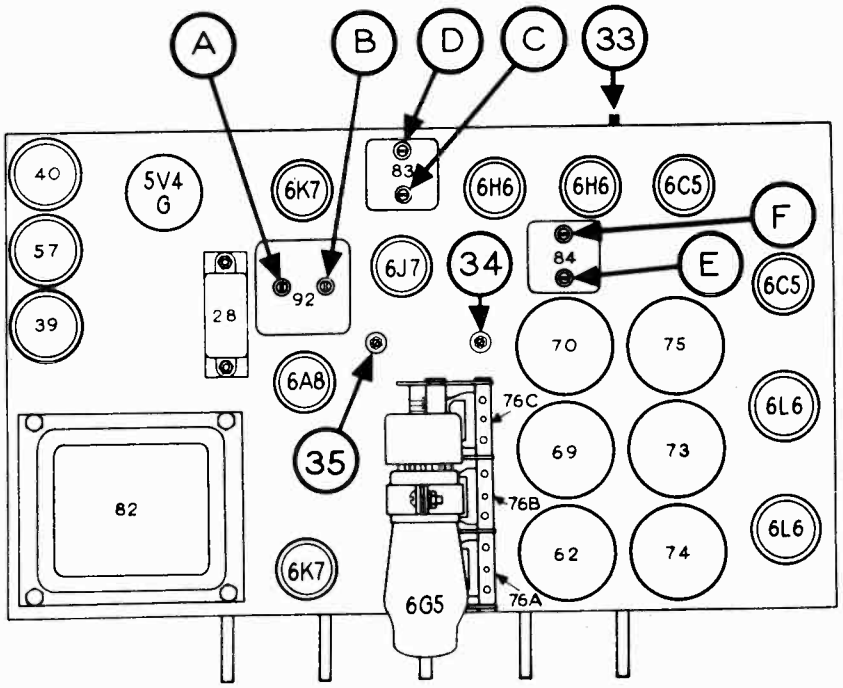


FIG. 2--PARTS LAYOUT--Top View

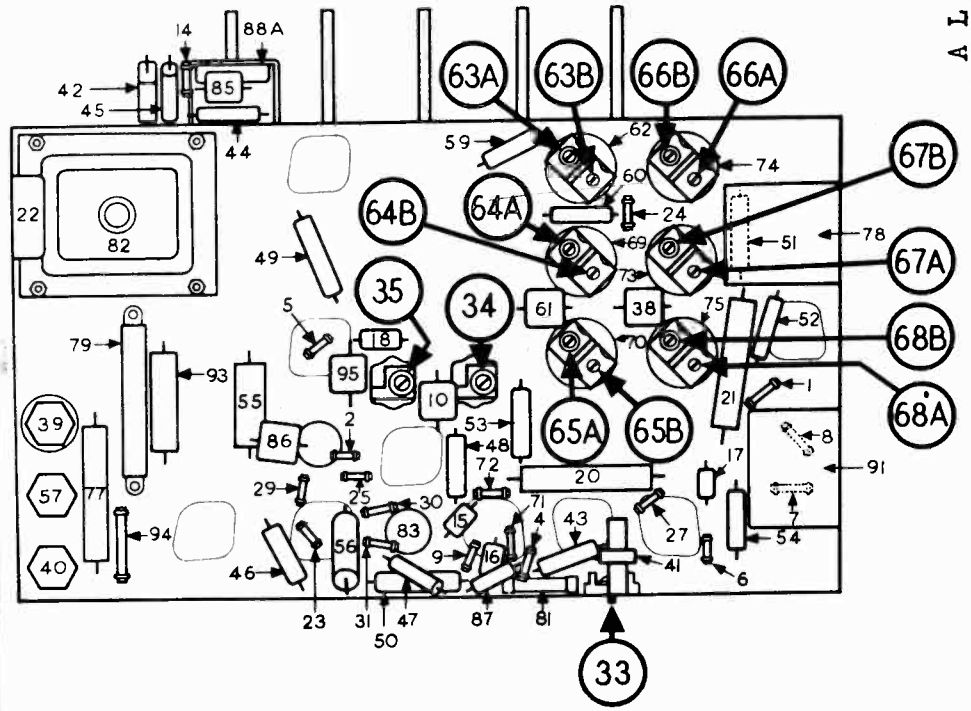


FIG. 3--PARTS LAYOUT--Bottom View

CONVENTIONAL ALIGNMENT.SEE
SPECIAL SECTION VOLUME VIII

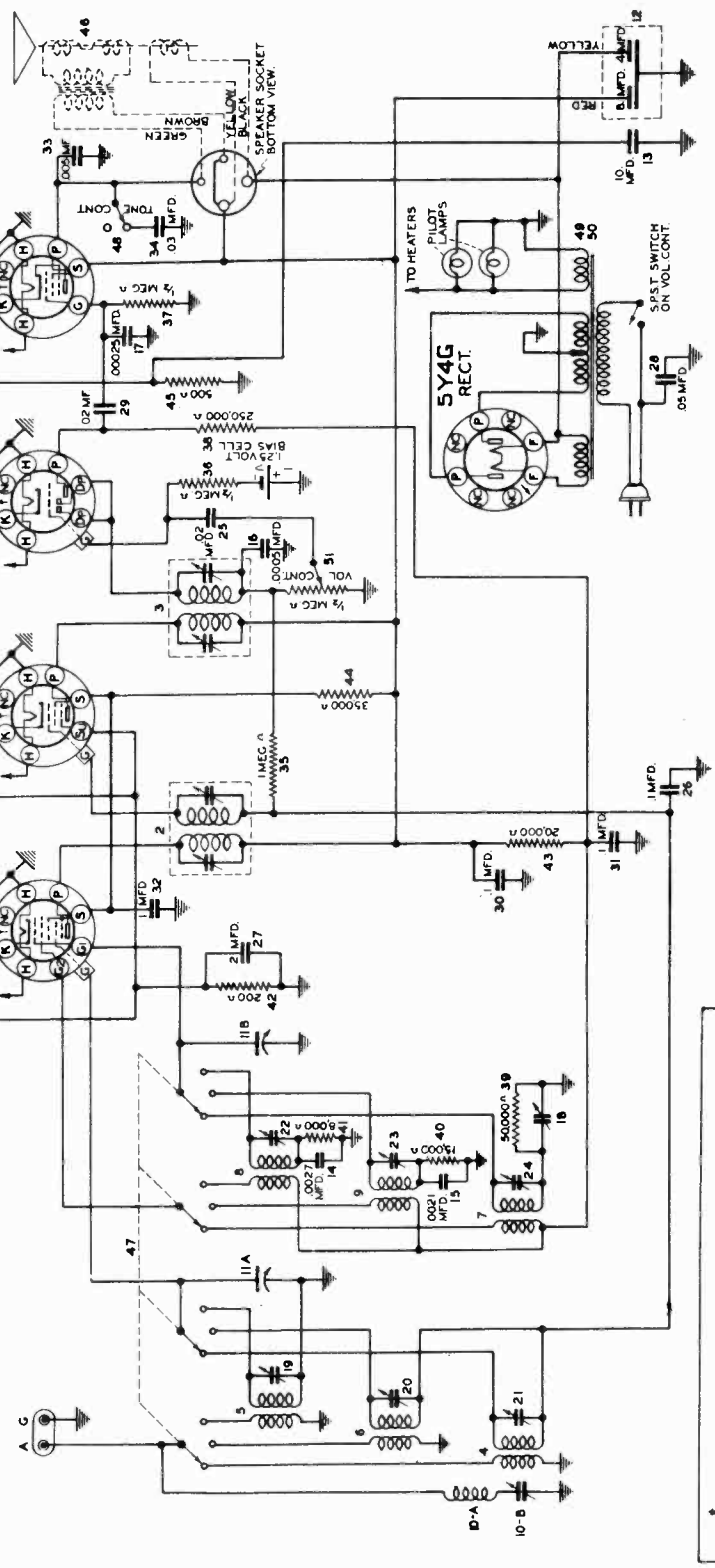
ALIGNMENT

CONVENTIONAL ALIGNMENT (see special section)

Gen. at 456 kc, peak IF trimmers A,B,C & D. Gen. at 1500 kc, peak osc. trimmer 65B, det. trim. 64B, and ant. trimmer 63B. Gen. at 600 kc, peak osc. padder 35. Repeat B.C. alignment.
Gen. at 1500 kc, fed to ant., adjust AVC trimmers E & F to minimum o.p. - repeat IF adj. at 456 kc.
Adjust wave trap trimmer 33 for minimum o.p. at 456 kc. POLICE BAND- Gen. & dial at 5MC, peak trimmer 68B, Ant. trim. 66B, and Det. trimmer 67B. FOREIGN BAND - Gen. & dial at 16 MC, peak trimmer 65A, Ant. trim. 63A and Det. trim. 64A. Image at 15.1 MC should be weaker than at 16MC if trim. 64A is peaked correctly. Weather BAND 350kc.- Gen. & dial at 350 kc, peak LW osc. trim.68A, Ant. trim. 66A & Det. trim. 67A. WEATHER BAND 175kc - Gen. & dial at 175 kc, rock var. cond. & peak osc. padder 34. Repeat 350 kc. alignment.

MODEL R1120 Delco
Schematic, Voltage

UNITED MOTORS SERVICE



I.F.-465 K.C.

Delco Model R-1120

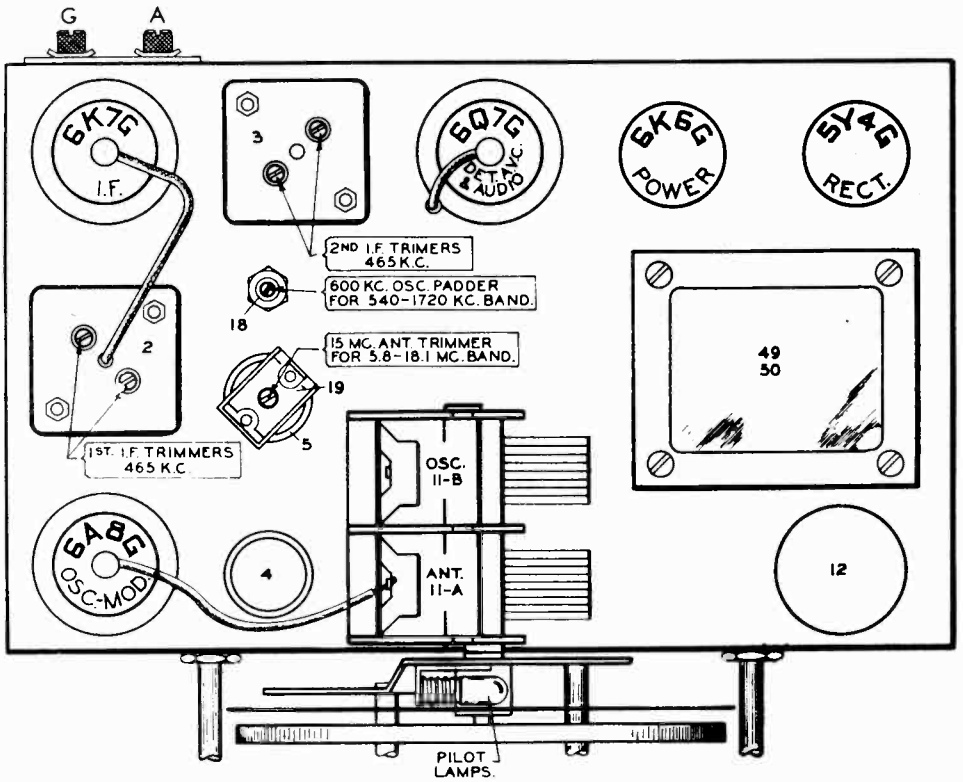
Date: 1-5-37

GENERAL: The Delco Model R-1120 is a five tube, three band, table model, 110 volt 60 cycle A.C. radio with A.V.C. and tone control.

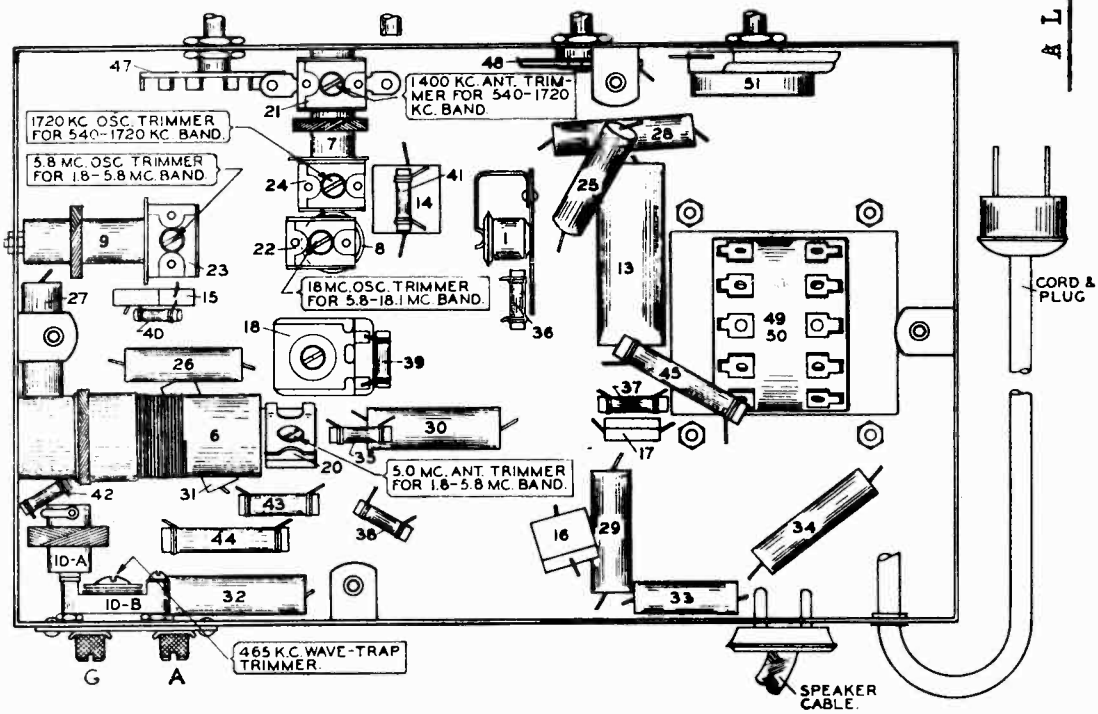
The frequency ranges on the three bands covered are: American Broadcast Band 1720 to 540 kilocycles, Police-Amateur Band 1.8 to 5.8 megacycles and the Foreign Short Wave Band 5.8 to 18.1 megacycles.

MODEL R1120 Delco
Socket, Trimmers
Chassis, Alignment

UNITED MOTORS SERVICE



-PARTS LAYOUT--Top View



-PARTS LAYOUT--Bottom View

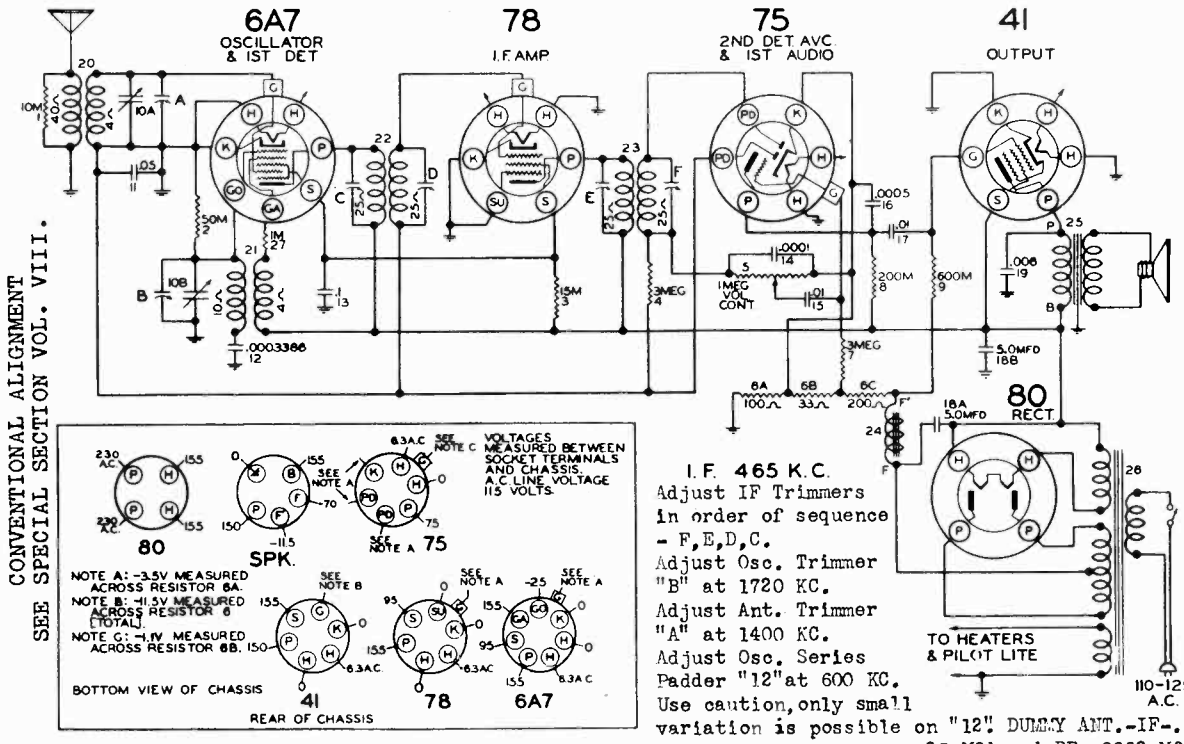
ALIGNMENT

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

Gen. at 465 kc, peak 2nd IF trimmers desig. #3, and then peak 1st IF trimmers desig. #2.
Gen. at 465 kc, peak wave trap trimmer 10B. BROADCAST ALIGNMENT- Gen. at 1720 kc, peak trimmer 24.
Gen. and dial at 1400 kc, peak trimmer 21. Gen. and dial at 600 kc, rock var. cond. and peak osc.padder 18.
POLICE-AMATEUR- Gen. and dial at 5.8 MC, peak osc. trimmer 23. Gen. and dial at 5MC, peak ant. trim. 20.
FOREIGN SHORT WAVE- Gen. and dial at 18 MC, peak osc. trimmer 22. Gen. at 18 MC and dial at 17 MC,
check for fundamental peak. Gen. and dial at 15 MC, rock var. cond. and peak ant. trimmer 19.

UNITED MOTORS SERVICE

MODEL R1125 Delco
Schematic, Socket
Trimmers, Chassis
Voltage, Alignment



I. F. 465 K.C.
Adjust IF Trimmers in order of sequence - F, E, D, C.
Adjust Osc. Trimmer "B" at 1720 KC.
Adjust Ant. Trimmer "A" at 1400 KC.
Adjust Osc. Series Padder "12" at 600 KC.
Use caution, only small variation is possible on "12" DUMMY ANT.-IF-.1 or .25 Mfd, and RF-.0002 Mfd.

The frequency range of the Model R-1125 is from 535 to 1720 K.C.

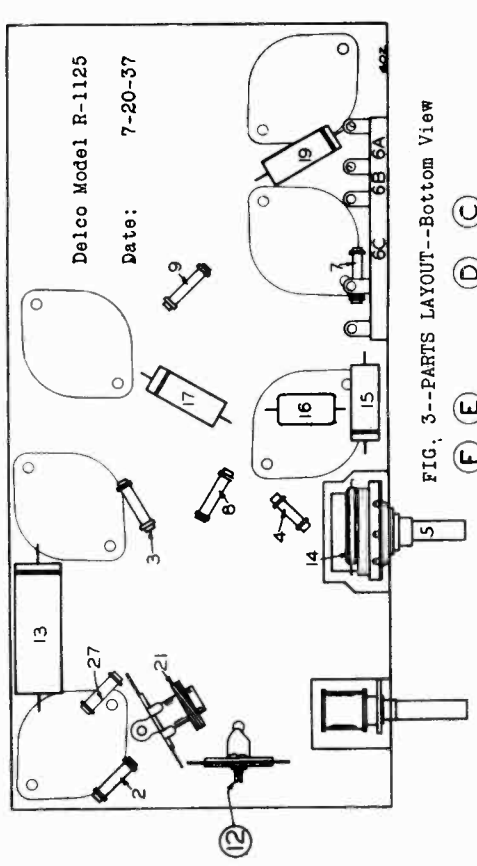


FIG. 3--PARTS LAYOUT--Bottom View

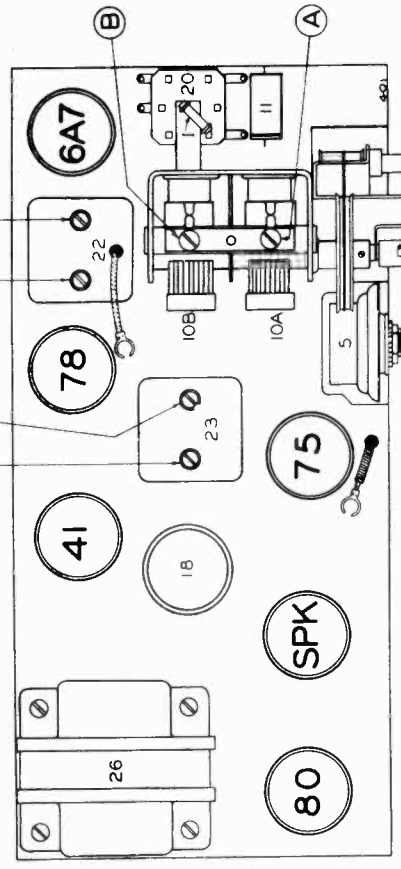


FIG. 2--PARTS LAYOUT--Top View

TUBE SOCKET VOLTAGES

These readings were made with a D.C. voltmeter having a resistance of 1000 ohms per volt.

A. The grid bias for the 6A7, 78 tubes and the anode voltage of the A.V.C. section of the 75 is 3.5 volts measured across resistor 6A.

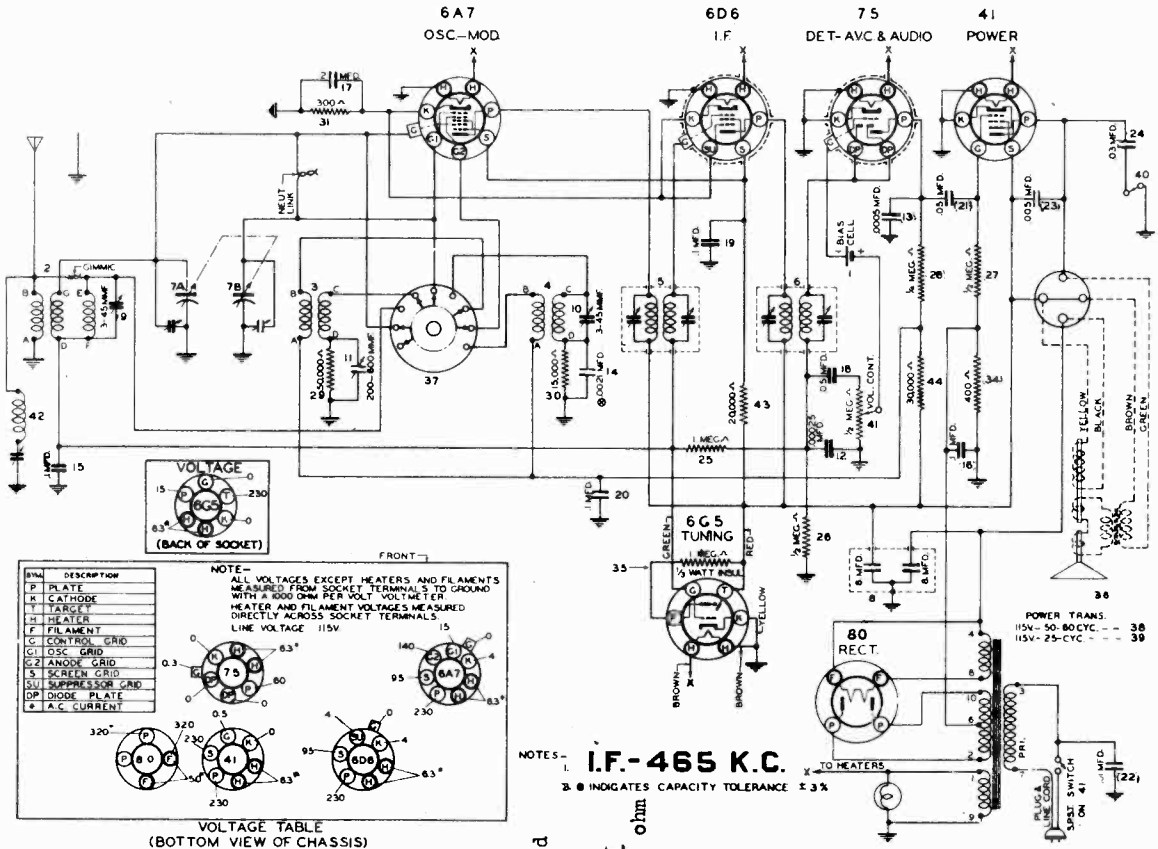
B. The grid bias for the 41 output tube is measured across resistor 6A, B, C, total.

C. The grid bias for the 75 tube is 1.1 volts measured across resistor 6B

MODEL R1126 Delco
Schematic, Socket

UNITED MOTORS SERVICE

Trimmers, Voltage
Chassis, Alignment



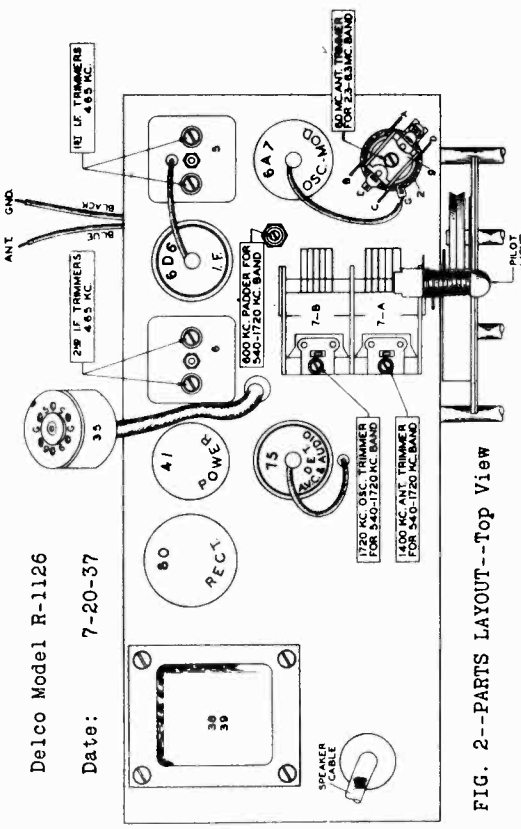


FIG. 2--PARTS LAYOUT--Top View

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

DUMMY IF WAVE TRAP & RF SW
ANT. .02Mfd. .0002 Mfd. 400 ohm

Do not remove control grid clip lead from 6A7 when aligning IF.

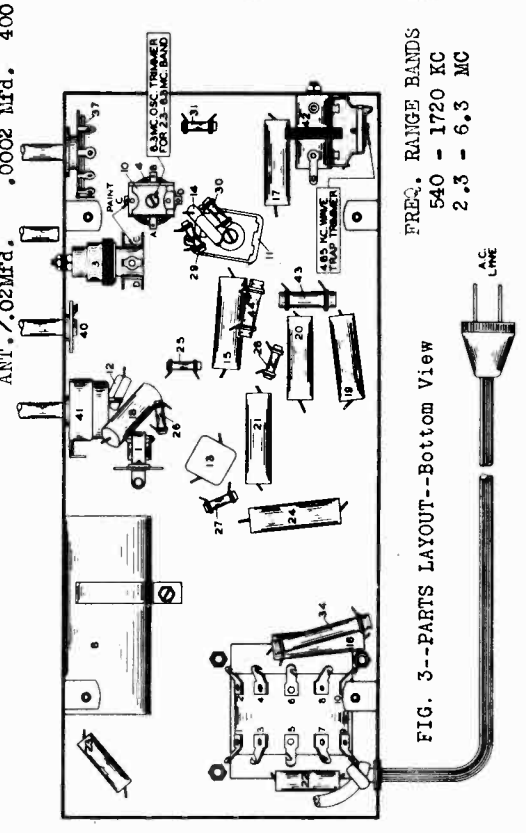
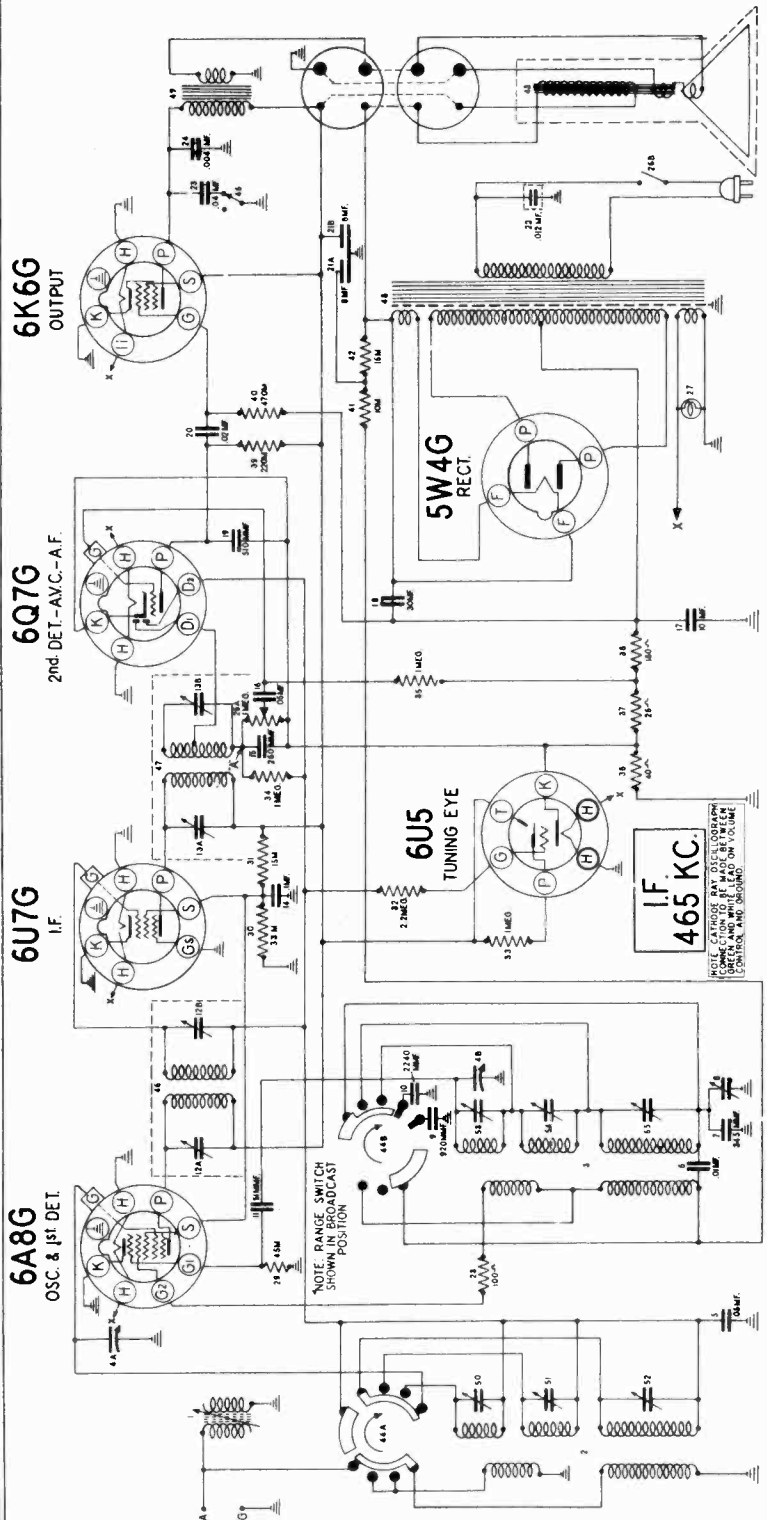


FIG. 3--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL R1127 Delco
Schematic, Trimmers



--TRIMMER LOCATIONS--

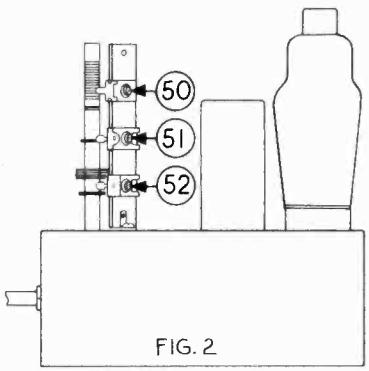


FIG. 2

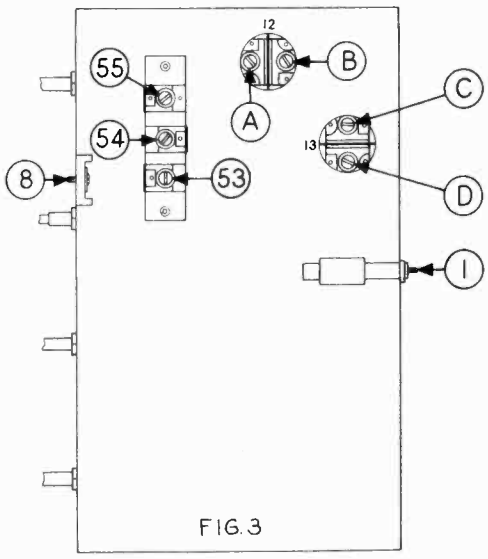


FIG. 3

Delco Model R-1127

Date: 8-2-37

The Delco Model R-1127 is a six tube, three band, receiver with A.V.C., tone control and "Robot" tuning eye. The complete tube complement is as follows: 6A8G Detector-Oscillator, 6U7G I.F. Amplifier, 6Q7G 2nd Detector, A.V.C. and 1st Audio Amplifier, 6K6G Output, 5W4G Rectifier and a 6U5 tuning eye.

The frequency range on the three bands covered are: American Broadcast Band 540 to 1720 K.C., Police and Amateur Band 1700 to 5600 K.C., and the Foreign Short Wave Band 5.5 to 18.0 M.C.

MODEL R1127 Delco
Voltage Alignment

UNITED MOTORS SERVICE

TUBE SOCKET VOLTAGES

Tube	H	P	S	G2	G	K
6A8G	6	230	100	170	A	0
6U7G	6	230	100		A	0
6Q7G	6	105	"		B	-2.3
6K6G	6	220	230		C	0
5W4G	6	*	"		"	"
6U5	6	14	"	-	A	-2.3

Voltage measurements (except heaters) made with 1000 ohm per volt D.C. voltmeter from tube socket contacts to ground.

* A.C. voltage--290 volts.....Target voltage tuning eye.....230 volts.

Note A: The bias on the control grids of the 6A8G, 6U7G and 6U5 tubes is -2.3 volts measured across resistor 36.

Note B: The bias on the control grid of the 6Q7G is -4 volts measured across resistors 36 and 37.

Note C: The bias on the control grid of the 6K6G is -14 volts measured across resistors 36, 37 and 38.

Delco Model R-1127 Date: 8-2-37

DIAL SETTING CHECK: Turn the tuning knob until the rotor plates of the condenser gang are fully meshed. The dial pointer should now be on the black horizontal line below 530 K.C. on the dial. This check should be made before attempting any trimmer adjustments.

1. Peaking I-F Stages at 465 K.C.

(a) Connect the signal lead of the signal generator to the grid cap of the 6A8G tube through a .1 or .25 mfd. condenser. DO NOT REMOVE THE GRID CLIP FROM THE TUBE.

(b) Connect the ground lead of the signal generator to the receiver chassis.

(c) Place the signal generator in operation at 465 K.C.

(d) Turn the range switch to the broadcast position (fully clockwise).

(e) Set the receiver dial pointer to about the 1000 K.C. point BETWEEN STATIONS.

(f) Turn the receiver volume control to the maximum position.

(g) Adjust the four I-F trimmers, A, B, C and D on the two I-F coils, (Fig. 3), carefully for maximum output in the following sequence A-B-C-D. Then repeat the four trimmer adjustments.

2. Adjusting the Wave Trap

(a) Connect the signal generator to the antenna terminal through a 400 or 500 ohm carbon resistor.

(b) Adjust the signal generator to 465 K.C.

(c) Turn the volume control on full.

(d) Set the dial pointer to about 1000 K.C. BETWEEN STATIONS.

(e) Adjust the wave trap trimmer, Illus. #1, (Fig. 3), for MINIMUM output, increasing the oscillator output as necessary to obtain a clearly defined point of minimum output.

3. Aligning at 16 M.C. (16,000 K.C. Foreign Wave Band)

(a) Turn the range switch to the Foreign Band position (extreme counter-clockwise).

(b) Set the dial pointer to 16 megacycles.

(c) Apply a 16 M.C. Signal to the A and G terminals of the receiver through a 400 or 500 ohm carbon resistor.

(d) Adjust the Foreign Band oscillator parallel trimmer, Illus. #53, (Fig. 3), to maximum output. Check to see if it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 M.C. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 M.C. and readjust the trimmer, Illus. #53, (Fig. 3), the proper peak is the one with the trimmer screw farthest out (least capacity).

(e) Adjust the Foreign Band antenna trimmer, Illus. #50, (Fig. 2), to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured.

(f) Check the adjustment by tuning the receiver to the image at about 15.1 M.C. The image should be much weaker than the 16 M.C. signal. If the image is equal to or stronger than the 16 M.C. signal, the trimmer, Illus. #50, is not at the proper peak. Turn the trimmer in a turn or so, then readjust as above.

4. Aligning at 5 M.C. (5,000 K.C. Police Band)

(a) Place the signal generator in operation at 5 M.C. and apply the signal to the A and G terminals of the receiver through a 400 or 500 ohm carbon resistor.

(b) Turn the dial pointer to 5 megacycles and the band change switch to the Police Band (center) position.

(c) Adjust the Police Band oscillator parallel trimmer, Illus. #54, (Fig. 3), for maximum output. If there are two peaks, the proper one is with the trimmer screw farthest out (least capacity).

(d) Adjust the Police Band antenna parallel trimmer, Illus. #51, (Fig. 2), to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the receiver dial. If this causes the output to go down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured.

5. Aligning at 1500 K.C. (Broadcast Band)

(a) Place the signal generator in operation at 1500 K.C. and apply a 1500 K.C. signal to the A and G terminal of the receiver through a 400 or 500 ohm carbon resistor.

(b) Turn the range switch to the Broadcast position (fully clockwise) and set the dial pointer to 1500 K.C.

(c) Adjust the Broadcast Band oscillator parallel trimmer, Illus. #55, (Fig. 3), to maximum output.

(d) Adjust the Broadcast Band antenna parallel trimmer, Illus. #52, (Fig. 2), to maximum output.

6. Aligning at 600 K.C. (Broadcast Band)

(a) Leave the signal generator connected as above but readjust to 600 K.C.

(b) Tune in the 600 K.C. Signal generator signal with the receiver dial for maximum output. (This point does not have to be exactly at the 600 K.C. dial setting.)

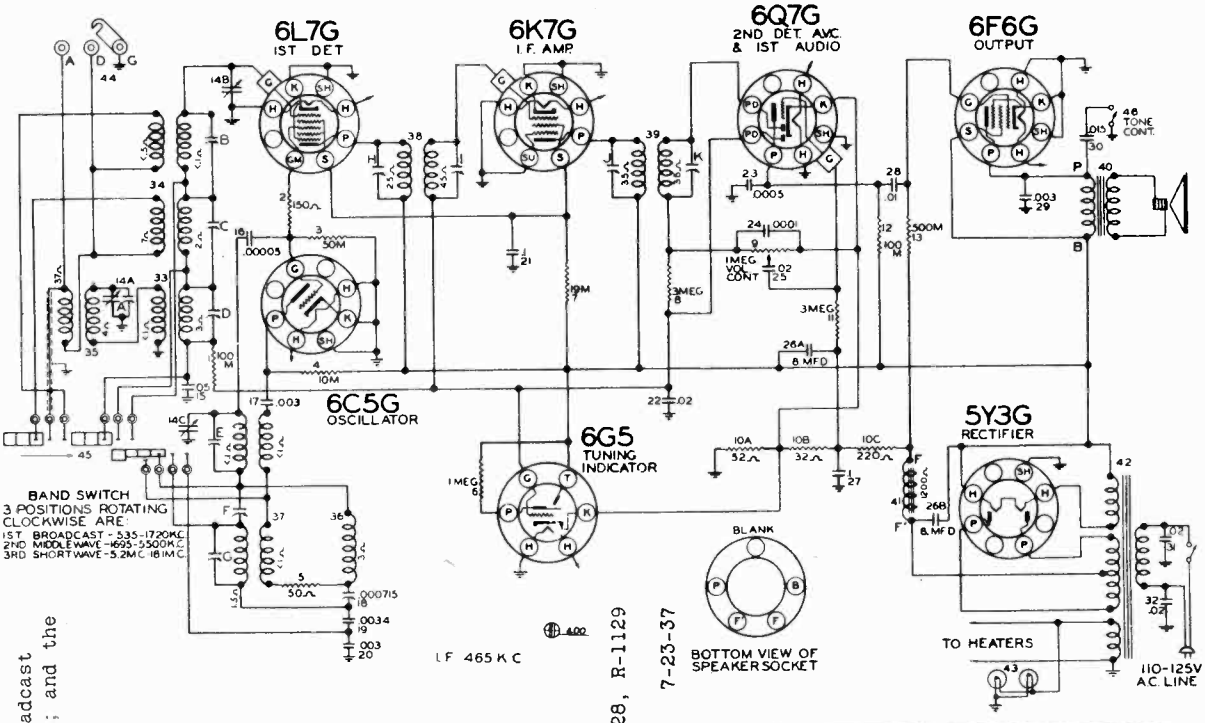
(c) Adjust the Broadcast Band oscillator tracking condenser, Illus. #8, (Fig. 3), while rocking the tuning condenser plates back and forth through resonance until no further increase in output can be obtained.

(d) Repeat operations under paragraph 5, "Aligning at 1500 Kilocycles" for accurate adjustments.

MODELS R1128,R1129 Delco

UNITED MOTORS SERVICE

Schematic,Socket Trimmers,Chassis



Models R-1128, R-1129 Date: 7-23-37

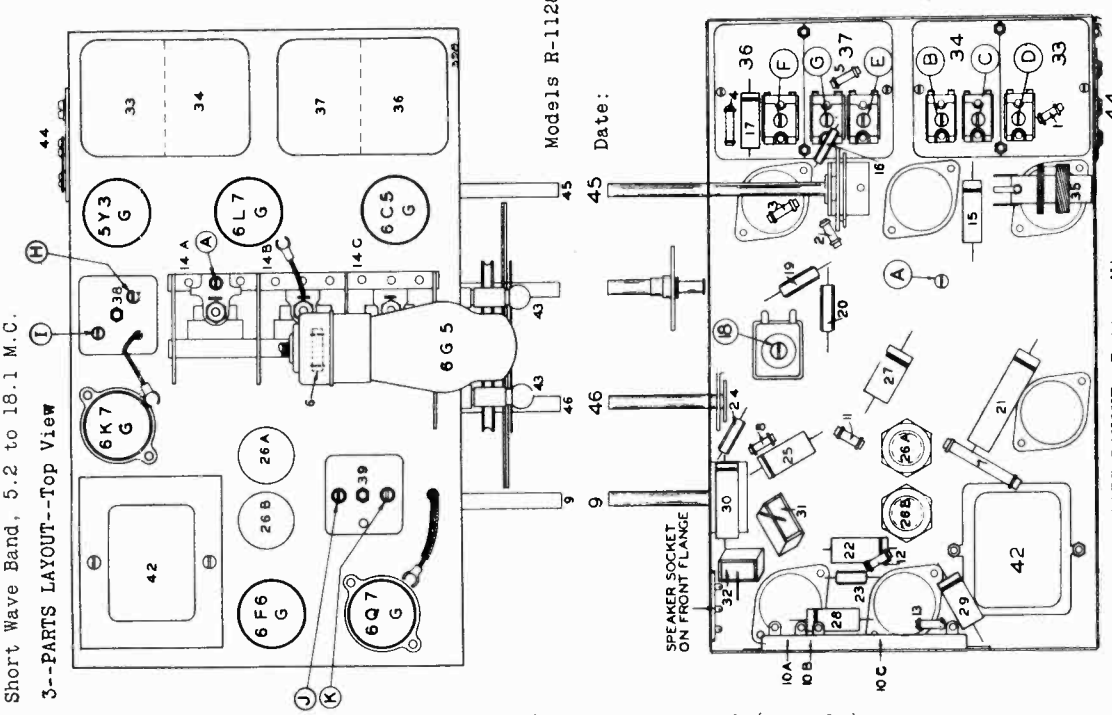


FIG. 3--PARTS LAYOUT--Top View

FIG. 4--PARTS LAYOUT--Bottom View

The frequency ranges on the three bands covered are: American Broadcast Band, 535 to 1720 K.C.; Police and Amateur Band, 1695 to 5500 K.C.; and the Foreign Short Wave Band, 5.2 to 18.1 M.C.

The Delco Models R-1128 (Table) and R-1129 (Console) are seven tube, three band receivers with A.V.C., tone control and Robot Eye tuning indicators. Both of these models employ the same chassis and use octal base glass type tubes.

MODELS R1128,R1129 Delco
Voltage,Alignment

UNITED MOTORS SERVICE

The receiver should be aligned in a location free from local interference (interference caused by motors, flashers, automobile ignition, etc.), as high frequency disturbances will cause difficulties in adjusting the short wave circuits.

DIAL SETTING CHECK: Turn the tuning knob until the rotor plates of the condenser gang are fully meshed. The dial pointer should be on the horizontal line below 550 K.C. on the dial. This check should be made before attempting any trimmer adjustments.

1. Peaking I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the Signal Generator to the receiver chassis.

(b) Connect the signal lead of the Signal Generator to the grid cap of the 6L7G tube through a .1 mfd. condenser. DO NOT REMOVE THE GRID CLIP FROM THE TUBE.

(c) Place the Signal Generator in operation at 465 K.C.

(d) Change the band switch to the broadcast position (fully counter-clockwise).

(e) Set the receiver dial pointer to any position where it has no tuning effect on the I-F signal from the Signal Generator.

(f) Turn the receiver volume control to the maximum position.

(g) Adjust the four I-F trimmers, H, I, J, K on coils Illus. 38 and 39 (Fig. 3) carefully for maximum output in the following sequence: K, J, I, H. Then repeat the four trimmer adjustments. During alignment, maintain as low a signal output from the signal generator as is consistent with obtaining at least half scale indication on the output meter.

2. Aligning at 1720 and 1550 Kilocycles (Broadcast Band)

(a) Connect the signal lead of the Signal Generator to the antenna terminal on the chassis through a .0002 mica condenser. Leave signal generator ground lead connected to the receiver chassis.

(b) Place Signal Generator in operation at 1720 K.C.

(c) Turn dial pointer to 1720 K.C. setting (gang condenser open).

(d) Adjust the oscillator trimmer condenser "F", Illus. 36 (Fig. 4) to maximum output.

(e) Place Signal Generator in operation at 1550 K.C.

(f) Turn dial pointer until 1550 K.C. signal is tuned in with maximum output.

(g) Adjust the detector parallel trimmer condenser "D", Illus. 33 (Fig. 4) to maximum output.

(h) Adjust the pre-selector parallel trimmer condenser "A", Illus. 14A (Fig. 3) to maximum output.

3. Aligning at 600 Kilocycles (Broadcast Band)

(a) Place Signal Generator in operation at 600 K.C.

(b) Tune in the 600 K.C. signal with the receiver dial for maximum output.

(c) Adjust the oscillator tracking condenser, Illus. 18 (Fig. 4) while rocking the tuning condenser plates back and forth through resonance until no further increase in output can be obtained.

(d) Repeat operations under paragraph #2 "Aligning at 1720 and 1550 Kilocycles" for accurate adjustments.

4. Aligning at 17 Megacycles (Foreign Band)

(a) Place the Signal Generator in operation at 17 megacycles.

(b) Turn dial pointer to 17 megacycles and turn band change switch to the Foreign Band (fully clockwise).

(c) Adjust the oscillator parallel trimmer condenser "E", Illus. 37 (Fig. 4) to maximum output.

(d) Adjust the antenna trimmer condenser "B", Illus. 34, (Fig. 4) to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured.

(e) Check the adjustment by tuning the receiver to the image at about 16.1 M.C. The image should be much weaker than the 17 M.C. signal. If the image is equal to or stronger than the 17 M.C. signal, trimmer "E", Illus. 37, is not at the proper peak. Turn the trimmer out a turn or so, then readjust as above.

5. Aligning at 5 Megacycles (5000 K.C. Police Band)

(a) Place Signal Generator in operation at 5 megacycles.

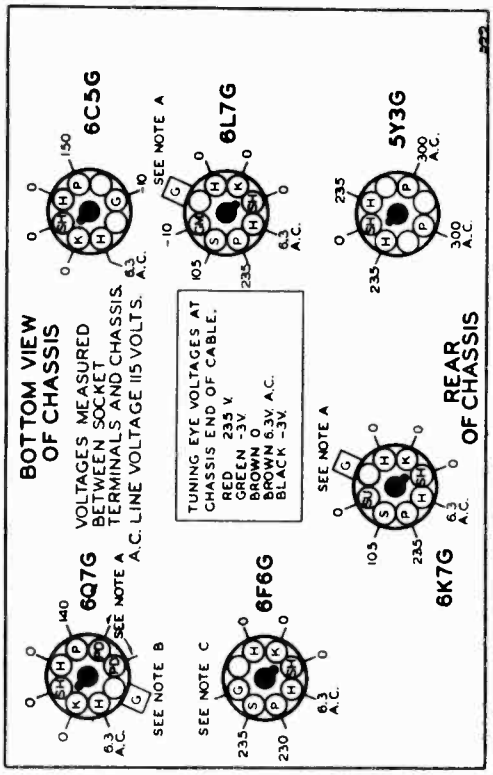
(b) Turn dial pointer to 5 megacycles and turn band change switch to the Police Band (center position).

(c) Adjust the oscillator parallel trimmer condenser "G", Illus. 37 (Fig. 4) for maximum output. If there are two peaks, the proper one is with the trimmer screw farthest out (less capacity).

(d) Adjust the antenna trimmer condenser "C", Illus. 34 (Fig. 4) to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the receiver dial. if this causes the output to go down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured.

Models R-1128, R-1129

Date: 7-23-37

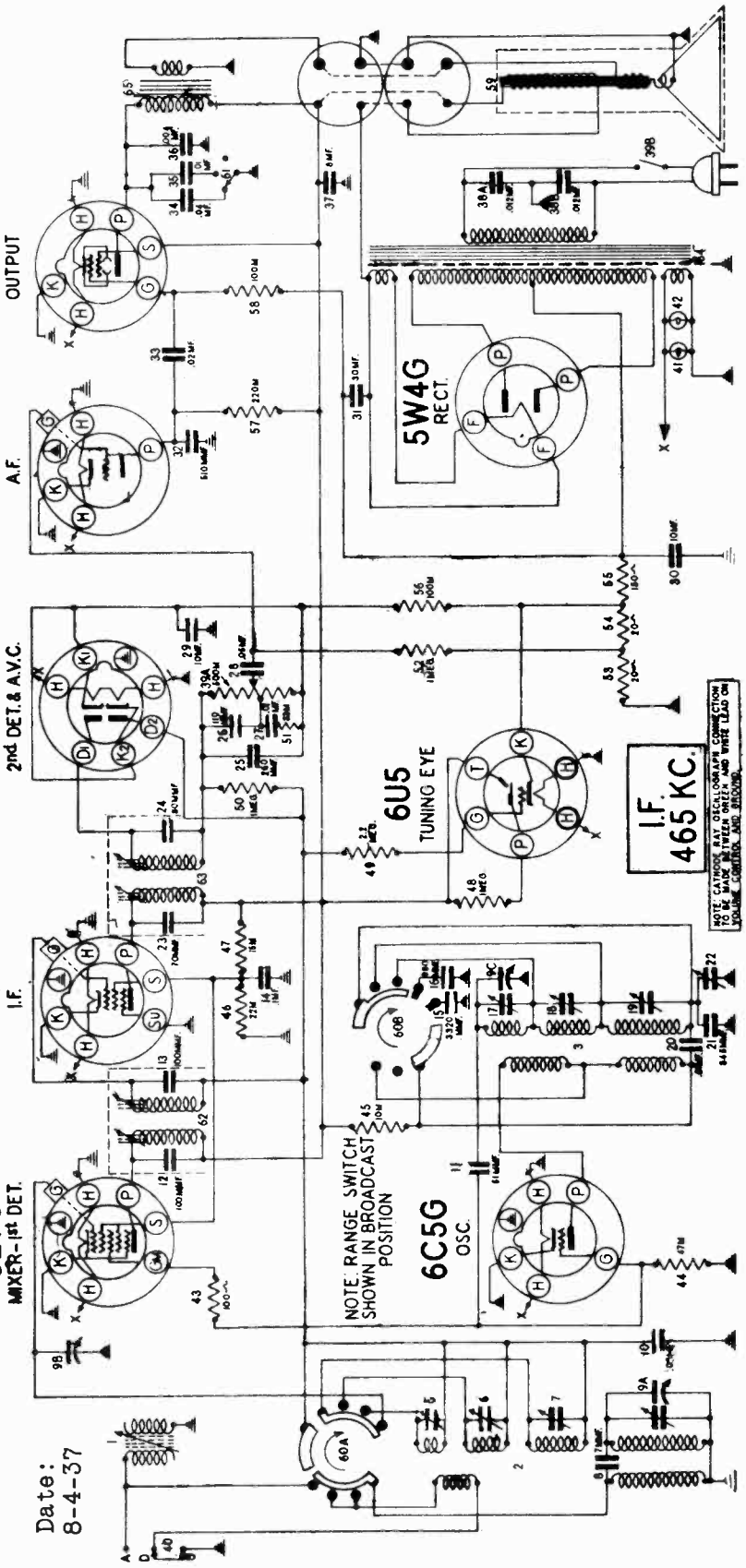


NOTE A: -3V. MEASURED ACROSS RESISTOR 10A
B: -1.8V. " " " 10B
C: -17 V. " " " 10 (TOTAL)

Voltage measurements made with a D.C. voltmeter having a resistance of 1000 ohms per volt. A.C. line voltage--115 volts.

UNITED MOTORS SERVICE

MODEL R1130 Delco
Schematic, Voltage



Delco Model R-1130

Date: 8-4-37

* A.C.....Tuning Eye Target Voltage.....230 volts.

TUBE SOCKET VOLTAGES

Tube	H	S	P	G3	K	G	
6L7G	6	90	230	-13	0	A	Voltage measurements (except heaters) made with 1000 ohm per volt D.C. voltmeter from tube socket contacts to ground.
6C5G	6	-	165		0	-14	Note A: The bias on the control grids of the 6L7G, 6K7 and 6U5 tubes is -2.5 volts measured across resistors 53 and 54.
6K7	6	90	230		0	A	
6H6	6	-	-		-2.5	-	Note B: The bias on the control grid of the 6F5 tube is -1.2 volts measured across resistor 53.
6F5	6	-	110		0	B	
6V6G	6	230	225		0	C	Note C: The bias on the control grid of the 6V6G tube is -14 volts measured across resistors 53, 54 and 55.
5W4G	6		*285		-	-	
6U5	6		12		-2.5	A	

The frequency ranges on the three bands covered are: American Broadcast Band 540 to 1720 K.C., Police and Amateur Band 1.7 to 5.6 M.C., and the Foreign Short Wave Band 5.5 to 18 M.C.

MODEL R1130 Delco
Trimmers, Alignment

UNITED MOTORS SERVICE

Delco Model R-1130

Date: 8-4-37

The receiver should be aligned in a location free from local interference (interference caused by motors, flashers, automobile ignition, etc.) as high frequency disturbances will make it difficult to adjust the short wave circuits.

DIAL SETTING CHECK: Turn the tuning knob until the rotor plates of the condenser gang are fully meshed. The dial pointer should be on the 510 K.C. line on the dial. This check should be made before attempting any trimmer adjustments. Alignment of the chassis MUST be in the following order:

1. Peaking I-F Stages at 465 K.C.

(a) Connect the signal lead of the signal generator to the grid cap of the 6L7G tube through a .1 or .25 mfd. condenser. DO NOT REMOVE THE GRID CLIP FROM THE TUBE.

(b) Connect the ground lead of the signal generator to the receiver chassis.

(c) Place the signal generator in operation at 465 K.C.

(d) Set the receiver band switch to the broadcast position (fully clockwise).

(e) Set the dial pointer at about the 1000 K.C. BETWEEN STATIONS.

(f) Turn the volume control full on (to extreme clockwise position).

(g) Adjust the four I-F trimmers, A, B, C and D on the two I-F coils Illus. #62 and 63, carefully for maximum output in the following sequence--A-B-C-D. Then repeat the four trimmer adjustments.

2. Adjusting the Wave Trap

(a) Place the signal generator in operation at 465 K.C. and connect it to the receiver "A" terminal with a 400 or 500 ohm carbon resistor in series. (Leave the "G" and "G" terminals connected together during the complete alignment.) Connect the ground lead of the signal generator to the "G" terminal.

(b) With the volume control full on and the range switch in the broadcast position, tune the set to about 1000 K.C., BETWEEN STATIONS.

(c) Adjust the wave trap trimmer, Illus. #1, (Fig. 2), for MINIMUM output, increasing the signal generator output as necessary to obtain a clearly defined point of minimum output.

3. Aligning at 16 M.C. (16,000 K.C. Foreign Band)

(a) Place the signal generator in operation at 16 M.C. leaving it connected to the "A" terminal of the set through a 400 or 500 ohm carbon resistor, and with the ground lead connected to the "G" terminal as above.

(b) With the volume control full on, turn the range switch to the Foreign Band position (fully counter-clockwise) and tune the receiver dial pointer to 16 M.C.

(c) Adjust the Foreign Band oscillator parallel trimmer, Illus. #17, (Fig. 3), to maximum output. Check to see if it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 M.C. A repeat signal should be heard at this point. If none is present, even with greatly increased signal generator output, retune the receiver to 16 M.C. and adjust the trimmer, Illus. #17, to the proper peak with the trimmer screw farther out (least capacity).

(d) Adjust the Foreign Band antenna trimmer, Illus. #5, (Fig. 2), to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured.

(e) Check the adjustment by tuning the receiver to the image at about 15.1 M.C. The image should be much weaker than the 16 M.C. signal. If the image is equal to or stronger than the 16 M.C. signal, the trimmer, Illus. #5, is not at the proper peak. Turn the trimmer in a turn or so, then readjust as above.

4. Aligning at 5 M.C. (5,000 K.C. Police Band)

(a) Place the signal generator in operation at 5 M.C. leaving it connected to the "A" terminal of the set through a 400 or 500 ohm carbon resistor.

(b) With the volume control full on turn the range switch to the Police and Amateur Band position (center position), and tune the receiver dial pointer to 5 M.C.

(c) Adjust the oscillator parallel trimmer, Illus. #18, (Fig. 3), to maximum output. If there are two peaks, the proper one is with the trimmer screw farthest out (least capacity).

(d) Adjust the antenna parallel trimmer, Illus. #6, (Fig. 2), to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the receiver dial. If this causes the output to go down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured.

5. Aligning at 1500 K.C. (Broadcast Band)

(a) Place the signal generator in operation at 1500 K.C. leaving it connected to the "A" terminal of the set through a 400 or 500 ohm carbon resistor.

(b) With the volume control full on turn the range switch to the Broadcast position (fully clockwise) and tune the receiver dial pointer to 1500 K.C.

(c) Adjust the oscillator parallel condenser, Illus. #19, (Fig. 3), to maximum output.

(d) Adjust the preselector trimmer, Illus. E, (Fig. 2), to maximum output.

(e) Adjust the antenna parallel trimmer, Illus. #7, (Fig. 2) to maximum output.

6. Aligning at 600 K.C. (Broadcast Band)

(a) Place the signal generator in operation at 600 kilocycles leaving it connected to the "A" terminal of the receiver through a 400 or 500 ohm carbon resistor.

(b) With the volume control full on and the range switch in the Broadcast Band position, tune the receiver to the 600 K.C. signal generator signal for maximum output. (This point does not have to be exactly at the 600 K.C. dial setting.)

(c) Adjust the oscillator tracking condenser, Illus. #22, (Fig. 2), while rocking the tuning condenser plates back and forth through resonance until no further increase in output can be obtained.

(d) Repeat operations under paragraph 5, "Aligning at 1500 Kilocycles" for accurate adjustments.

FIG. 2--TRIMMER LOCATION

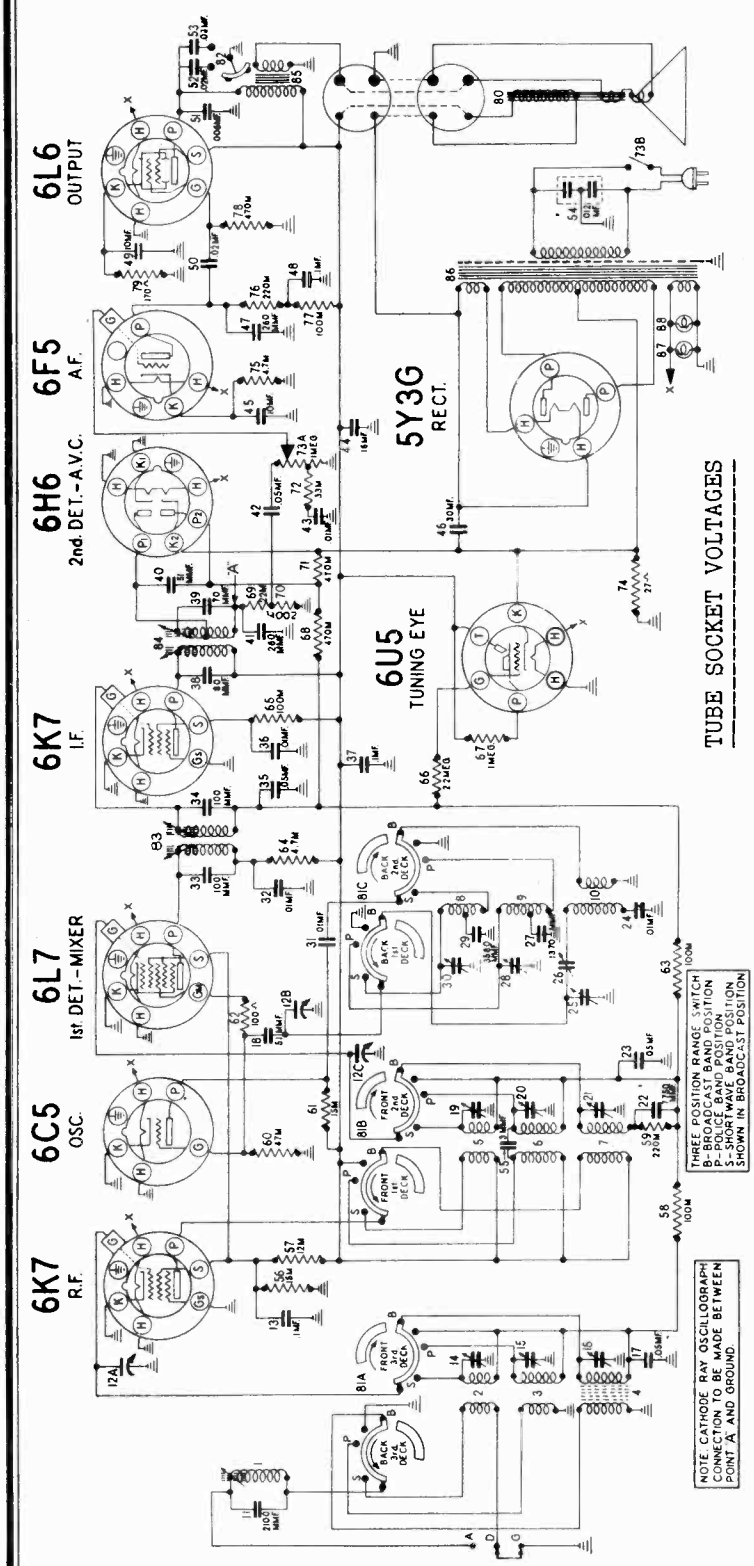
Top View

FIG. 3--TRIMMER LOCATION

Bottom View

UNITED MOTORS SERVICE

MODEL R1131 Delco
Schematic, Voltage



TUBE SOCKET VOLTAGES

Tube	Function	**H	P	S	GM	G	K
6K7	R-F Amp.	6	260	100	-	*	0
6C5	Oscillator	6	165	-	-	-1.6	0
6L7	Modulator	6	250	100	-1.3	*	0
6K7	I-F Amp.	6	260	100	-	*	0
6H6	Det.-A.V.C.	6	-	-	-		-2.8
6F5	A-F Amp.	6	100	-	-	0	1.4
6L6	Output	6	240	260	-	0	12
5Y3G	Rectifier	6	**340	-	-	-	-
6U5	Tuning Eye	6	14	-	-	*	-2.8

FREQUENCY RANGE BANDS

BROADCAST 525 - 1670 KC

POLICE 1.6 - 5.6 MC

FOREIGN 5.5 - 18.1 MC

* Bias on control grids 6L7, 6K7 (R-F), 6K7 (I-F) and 6U5 tubes is 2.8 volts measured across resistor #74.

** AC voltage. Tuning eye target voltage.....260 volts.

Voltage measurements made with a 100 ohm per volt DC voltmeter from tube socket contacts to ground. Plate voltage reading on 6F5 tube should be made on highest voltage scale.

Delco Model R-1131

Date: 9-14-37

The Delco Model R-1131 is a nine tube, three band, all wave receiver with A.V.C., "Robot" tuning eye, automatic bass compensation, tone control and permeability tuned--iron core I-F transformers. Seven of the tubes in this receiver are of the metal type, and two are of the glass type. The tube complement is as follows: 6K7 R-F Amplifier, 6L7 Modulator, 6C5 Oscillator, 6K7 I-F Amplifier, 6H6 2nd Detector and A.V.C., 6F5 Audio Amplifier, 6L6 Audio Output, 5Y3G Rectifier and a type 6U5 Tuning Eye.

MODEL R1131 Delco
Trimmers, Alignment

UNITED MOTORS SERVICE

The receiver should be aligned in a location free from local interference (interference caused by motors, flashers, automobile ignition, etc.) as high frequency disturbances will make it difficult to adjust the short wave circuits.

DIAL SETTING CHECK: Turn the tuning knob until the rotor plates of the condenser gang are fully meshed. The dial pointer should be set on the 500 KC line on the dial, by loosening the clip at the point where the pointer slide is attached to the drive cord, and moving the pointer to the correct position. This check should be made before attempting any trimmer adjustments.

Alignment of the chassis MUST be in the following order:

1st Intermediate Frequency	4th Broadcast Band (600 KC)
2nd Wave Trap	5th Police and Amateur Band
3rd Broadcast Band (1500 KC)	6th Short Wave Band

1. Peaking I-F Stages at 465 Kilocycles

(a) Connect the signal lead of the signal generator to the grid cap of the 6L7 tube through a .1 or .25 mfd. condenser. DO NOT REMOVE THE GRID CLIP FROM THE TUBE.

(b) Connect the ground lead of the signal generator to the receiver chassis.

(c) Place the signal generator in operation at 465 KC.

(d) Set the receiver band switch to the broadcast position (counter clockwise).

(e) Set the dial pointer at any point where it does not affect the signal.

(f) Turn the volume control full on (to extreme clockwise position).

(g) Adjust the four I-F trimmers A, B, C and D on the two I-F coils, Illus. 83 and 84, Fig. 2, carefully for maximum output in the following sequence--A, B, C and D. Then repeat the four trimmer adjustments. During alignment, maintain as low a signal output from the signal generator as is consistent with obtaining at least half scale indication on the output meter.

2. Adjusting the Wave Trap

(a) Place the signal generator in operation at 465 KC and connect it to the receiver A terminal with a 400 or 500 ohm carbon resistor in series. (Leave the D and G terminals connected together during the complete alignment.) Connect the ground lead of the signal generator to the G terminal.

(b) With the volume control full on and the range switch in the broadcast position, tune the set to about 1000 KC, BETWEEN STATIONS.

(c) Adjust the wave trap trimmer, Illus. E, Fig. 3, for MINIMUM output, increasing the signal generator output as necessary to obtain a clearly defined point of minimum output.

3. Aligning at 1500 Kiocycles (Broadcast Band)

(a) Place the signal generator in operation at 1500 kilocycles leaving it connected to the A terminal of the set through a 400 or 500 ohm resistor.

(b) With the volume control full on turn the range switch to the broadcast position (counter clockwise) and tune the receiver dial pointer to 1500 KC.

(c) Adjust the oscillator trimmer condenser, Illus. 25, Fig. 3, to maximum output.

(d) Adjust the antenna trimmer, Illus. 16, Fig. 3, to maximum output.

(e) Adjust the detector trimmer, Illus. 21, Fig. 3, to maximum output.

4. Aligning at 600 Kilocycles (Broadcast Band)

(a) Place the signal generator in operation at 600 kilocycles leaving it connected to the A terminal of the receiver through a 400 or 500 ohm carbon resistor.

(b) With the volume control full on and the range switch in the Broadcast Band position, tune the receiver to the 600 KC signal generator signal for maximum output. (This point does not have to be exactly at the 600 KC dial setting.)

(c) Adjust the oscillator tracking condenser, Illus. 26, Fig. 3, while rocking the tuning condenser plates back and forth through resonance until no further increase in output can be obtained.

(d) Repeat operations under "Aligning at 1500 Kilocycles" for accurate adjustments.

5. Aligning at 5 Megacycles (5000 KC Police Band)

(a) Place the signal generator in operation at 5 megacycles leaving it connected to the A terminal of the set through a 400 or 500 ohm carbon resistor.

(b) With the volume control full on turn the range switch to the Police and Amateur Band position (center position), and tune the receiver dial pointer to 5 megacycles.

(c) Adjust the oscillator parallel trimmer, Illus. 28, Fig. 3, to maximum output. If there are two peaks, the proper one is with the trimmer screw farthest out (least capacity).

(d) Adjust the antenna parallel trimmer, Illus. 15, Fig. 3, to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the receiver dial. If this causes output to go down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured.

(e) Adjust the detector parallel trimmer, Illus. 20, Fig. 3, to maximum output. Try to increase output by rocking the dial through resonance and retuning the trimmer until maximum output is obtained.

6. Aligning at 16 Megacycles (16,000 KC Foreign Band)

(a) Place the signal generator in operation at 16 megacycles leaving it connected to the A terminal of the set through a 400 or 500 carbon resistor, and with the ground lead connected to the G terminal as above.

(b) With the volume control full on, turn the range switch to the foreign band position (fully clockwise) and tune the receiver dial pointer to 16 megacycles.

(c) Adjust the oscillator parallel trimmer, Illus. 30, Fig. 3, to maximum output. Check to see if it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 megacycles. A repeat signal should be heard at this point. If none is present even with greatly increased signal generator output, retune the receiver to 16 MC and adjust the trimmer, Illus. 30, to the proper peak with the trimmer screw farther out.

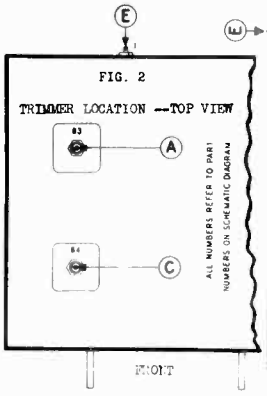
(d) Adjust the antenna trimmer, Illus. 14, Fig. 3, to maximum output. Then try to increase output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured.

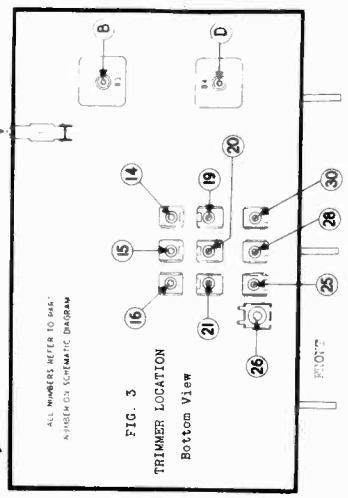
Check the adjustment by tuning the receiver to the image at about 15.1 MC; the image should be much weaker than the 16 MC signal. If the image is equal to or stronger than the 16 MC signal, trimmer No. 14 is not at the proper peak. Turn the trimmer in a turn or so, then readjust as above.

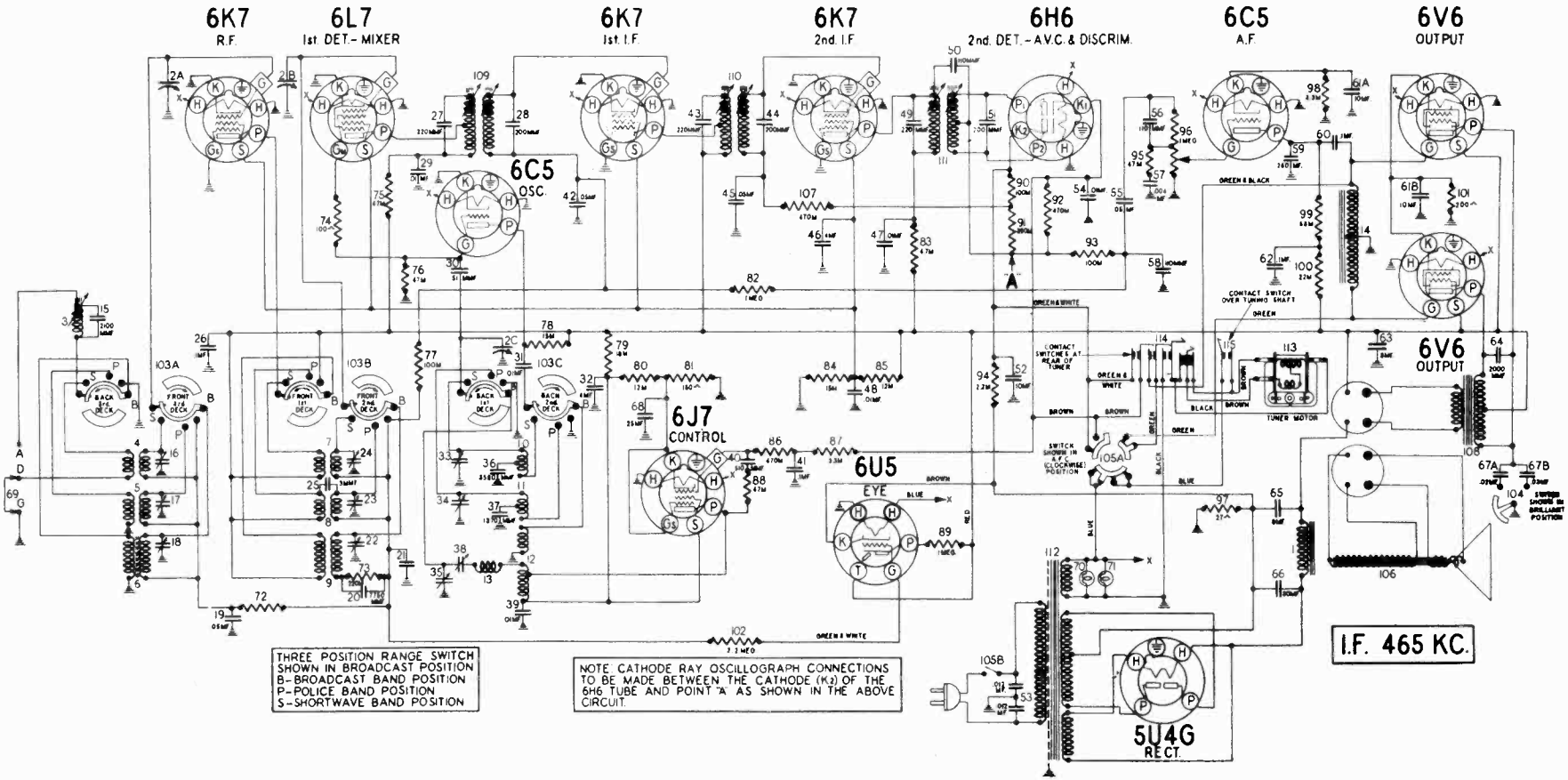
(e) Adjust the parallel trimmer, Illus. 19, Fig. 3, to maximum output. Then try to increase output by detuning trimmer slightly and retuning the dial until a maximum output meter deflection is obtained. Check adjustment by tuning in image as described in the last paragraph under (d).

Delco Model R-1131

Date: 9-14-37







The Delco Model R-1132 is a twelve tube, three band, all wave receiver with the entirely new and different "Delcomatic Tuner". Other features which this receiver embodies are A.V.C., "Robot" tuning eye, A.F.C., automatic bass compensation, tone control and permeability tuned--iron core I-F transformers. Ten of the tubes in this receiver are of the metal type, and two are of the glass type. The tube complement is as follows: One type 6K7 R-F amplifier, one type 6L7 modulator, one type 6C5 oscillator, one type 6K7 1st I-F amplifier, one type 6K7 2nd I-F amplifier, one type 6H6 second detector, A.V.C., and discriminator, one type 6C5 1st audio, two type 6V6 audio output, one type 5U4G rectifier, and one type 6U5 tuning eye.

FIG. 5-- CIRCUIT DIAGRAM

DELCO MODEL R-1132

Date: 10-1-37

UNITED MOTORS SERVICE

MODEL R1132 Delco
Voltage, Trimmers

UNITED MOTORS SERVICE

Dial Drive Data
Alignment Notes

INSTALLING THE DIAL DRIVE CORD

Before starting to thread the dial drive cord, see that the gang condenser is fully meshed, (plates fully closed). Insert one end of the cord through the upper eyelet on Drum "A" and knot it on the inside of the drum. Thread the cable over pulley "B" to the lower side of pulley "C", returning over pulley "C" to the upper side of pulley "D", thence to the rear of pulley "E". Lead the cord under pulley "E" and up to the front of drum "A". Wind two complete turns around drum "A", thread the cord through the lower eyelet on the drum and tie the end to the tension spring. Adjust the length of the cord so that the tension will be maintained on the cord when the spring is fastened to the small clip on the inside of the drum. Set the dial pointer to the last division on the left of the broadcast band scale, and clip the cord to the pointer slider.

INSTALLING THE BAND INDICATOR CORD

Before starting to thread the band indicator cord, tie a knot loosely in one end of the cord so that the tension spring may be connected to it. Tie a full knot about 3 inches from the knotted end of the cord. Place the range switch in the short wave position.

To thread the cord, take the end which has not been knotted, and wind one complete turn around drum "F", winding the turn from front to back. The cord should pass under the small metal pin which spans the drum. Loop the cord around the pin and wind one more complete turn around the drum. Run the knotted end of cord under pulley "H" to the lower side of pulley "I" and make one complete turn around "I". Insert the knot which has been tied 3 inches from the end of the cord into the slot in the pulley "I", and adjust the position of the dial scale so that the end of the pointer comes opposite the horizontal line across the dial scale, when the cord between the pulley "I" and "H" is fairly taut. Run the free end of the cord under pulley "G" and tie it to the tension spring. Adjust the lengths so that the tension will be maintained when the free end of the spring is connected to the knot at the other end of the cord. If the scale is not in exact alignment with the pointer, loosen the set screw which holds pulley "I" to the range switch shaft and adjust for correct position.

CIRCUIT ALIGNMENT

Individual coils and trimmer condensers are provided for each band, so that each circuit can be adjusted to give maximum efficiency on every tuning range. If realignment is found necessary, the circuits can be properly adjusted only with the use of a calibrated signal generator and an output meter.

The receiver should be aligned in a location free from local interference (interference caused by motors, flashers, automobile ignition, etc.) as high frequency disturbances will make it difficult to adjust the short wave circuits.

DIAL AND CAM SETTING CHECK: Turn the tuning knob until the rotor plates of the condenser gang are fully meshed. If the condenser will not close completely, proceed to loosen the set screws on the brass dial drive gear at the left side of the receiver and also the set screw on the flexible coupler on the gang condenser shaft. Then press the gang condenser plates closed and set the dial pointer to the 500 K.C. line on the dial scale by turning the cord drive drum on the left side of the mechanism. This check should be made before attempting any trimmer adjustments.

Alignment of the chassis MUST be in the following manner:

1st - Intermediate frequency
2nd - Wave trap
3rd - Broadcast band (1500 K.C.)
4th - Broadcast band (600 K.C.)
5th - A.F.C. alignment
6th - Police and amateur band
7th - Short wave band

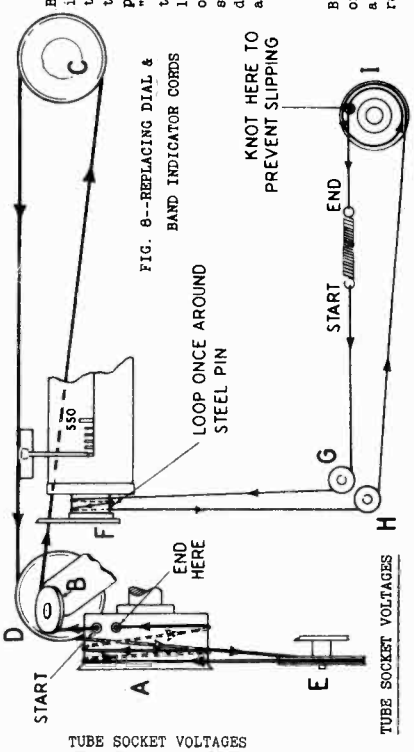


FIG. 8--REPLACING DIAL & BAND INDICATOR CORDS

TUBE SOCKET VOLTAGES

NOTE: Before proceeding with any voltage measurements the "A.F.C." switch must be in the manual position, volume control on full and tuning condenser in full mesh.

Tube	Function	P	S	GM	SU	G	K
6K7	R-F Amp.	290	100	--	0	A	0
6L7	Det.-Mixer	268	100	-.5	0	A	0
6C5	Oscillator	165	--	--		-5.0	0
6K7	1st I-F	290	100	--	0	A	0
6K7	2nd I-F	260	100	--	0	A	0
6J7	Control	112	112	--	1.5	--	1.5
6H6	Det. A.V.C.	0	--	--	--	--	0
6C5	A-F Amp.	116	--	--	--	0	5.5
6V6	Output	280	290	--	--	0	17
6V6	Output	280	290	--	--	0	17
5V4G	Rectifier	*330	--	--	--	--	--
6V5	Tuning Eye	16	--	--	--	-3.5	-3.5

* A.C.

TUBE SOCKET VOLTAGES

All measurements made with 1000 ohm per volt D.C. voltmeter from tube socket contacts to ground, except filaments. All filament voltages 6.3 volts measured with A.C. voltmeter across filaments.

Rectifier tube output voltage measured from filament contacts to ground... 355 volts D.C.

Tuning eye target voltage...290 volts.

NOTE "A": The grid bias for the 6L7 Modulator, 6K7 R-F, 6K7 1st I-F and 6K7 2nd I-F tubes is -3.5 volts, measured across resistor #97.

Delco Model R-1132

Date: 10-1-37

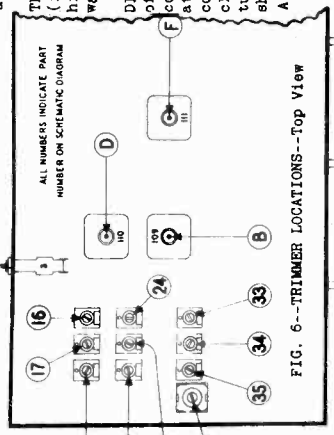


FIG. 6--TRIMMER LOCATIONS--Top View

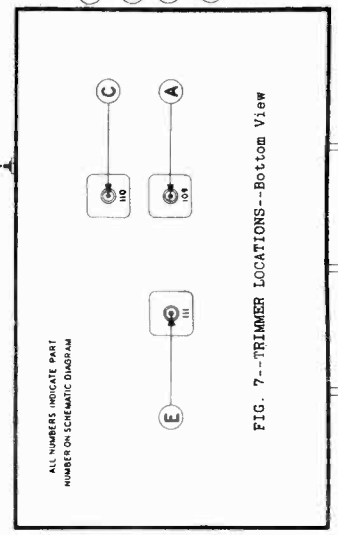


FIG. 7--TRIMMER LOCATIONS--Bottom View

UNITED MOTORS SERVICE

MODEL R1132 Delco Alignment

1. Peaking I-F Stages at 465 Kilocycles Delco Model R-1132 Date: 10-1-37

(a) Connect the signal lead of the signal generator to the grid cap of the 6L7 tube through a .1 or .25 mfd. condenser. DO NOT REMOVE THE GRID CLIP FROM THE TUBE.

(b) Connect the ground lead of the signal generator to the receiver chassis and leave it connected throughout the entire alignment procedure.

(c) Place the signal generator in operation at 465 K.C.

(d) Set the receiver band switch to the broadcast position (counter clockwise).

(e) Set the A.F.C. switch to the MANUAL TUNING POSITION (center position).

(f) Set the dial pointer at any point where it does not affect the signal.

(g) Turn the volume control full on (to extreme clockwise position).

(h) Adjust the six trimmers A, B, C, D, E and F on the three I-F coils, Illus. 109, 110 and 111 (Figs. 6 & 7), carefully for maximum output in the sequence given. Then repeat the six trimmer adjustments. During alignment, maintain as low a signal output from the signal generator as is consistent with obtaining at least half scale indication on the output meter.

2. Adjusting the Wave Trap

(a) Place the signal generator in operation at 465 K.C. and connect it to the receiver A terminal with a .0002 mfd. mica condenser in series. (Leave the D and G terminals connected together during the complete alignment.)

(b) With the volume control full on, the range switch in the broad cast position, and the A.F.C. switch in the manual (center) position tune the set to about 1000 K.C. BETWEEN STATIONS.

(c) Adjust the wave trap trimmer, Illus. G, (Fig. 6,) for MINIMUM output, increasing the signal generator output as necessary to obtain a clearly defined point of minimum output.

3. Aligning at 1500 Kilocycles (Broadcast Band)

(a) Place the signal generator in operation at 1500 kilocycles leaving it connected to the A terminal of the set through the .0002 mfd. mica condenser.

(b) With the volume control full on turn the range switch to the broadcast position (counter-clockwise) and tune the receiver dial pointer to 1500 K.C. BE SURE THAT A.F.C. SWITCH IS IN THE MANUAL (CENTER) POSITION.

(c) Adjust the oscillator parallel trimmer condenser, Illus. 35, (Fig. 6) to maximum output.

(d) Adjust the antenna parallel trimmer, Illus. 18, (Fig 6) to maximum output.

(e) Adjust the detector parallel trimmer, Illus. 22, (Fig. 6) to maximum output.

4. Aligning at 600 Kilocycles (Broadcast Band)

(a) Place the signal generator in operation at 600 kilocycles leaving it connected to the A terminal of the receiver through a .0002 mfd. mica condenser.

(b) With the volume control full on, the range switch in the broadcast position, and the A.F.C. switch in the manual (center) position, tune the receiver to the 600 K.C. signal for maximum output. (This point does not have to be exactly at the 600 K.C. dial setting.)

(c) Adjust the oscillator tracking condenser, Illus. 38, (Fig. 6) while "rocking" the tuning condenser plates back and forth through resonance until no further increase in output can be obtained.

(d) Repeat operations under "Aligning at 1500 Kilocycles" for accurate adjustments.

5. Automatic Frequency Control Alignment (A.F.C.)

(a) Place the signal generator in operation at 465 K.C. and couple it loosely to the 6L7 grid (connect the oscillator signal lead to the insulation on the grid lead of the 6L7). Switch off the modulation of the signal generator.

(b) Leave the A.F.C. switch in the manual (non A.F.C. or center) position.

(c) Connect the antenna A post to an outside aerial.

(d) Tune in a strong local station in the region of 1000 K.C. or lower (avoid stations around 930 K.C. which might beat with the second harmonic of the signal generator).

(e) Tune the receiver to zero beat (UNTIL AUDIO WHISTLE VANISHES COMPLETELY). (Tuning to either side of zero beat will cause the whistle to be heard.)

(f) NOW TURN THE A.F.C. SWITCH INTO THE A.F.C. POSITION (MAXIMUM CLOCKWISE POSITION).

(g) If the A.F.C. system is out of alignment, the beat note or whistle will again appear. If the beat note is heard adjust the discriminator trimmer, Illus. F, (Fig. 6), until zero beat is again obtained.

(h) If the above procedure has been followed correctly, opening or closing the A.F.C. switch will have no effect on zero beat.

5A. Alternate Method of A.F.C. Alignment

(Two Signal Generators Necessary)

(a) Connect one of the signal generators to the antenna A terminal and place it in operation at 1000 K.C. The 1000 K.C. signal should be unmodulated and its output should be rather high.

(b) Now proceed to connect the other generator as described in the previous method and place it in operation at 465 K.C. (unmodulated).

(c) The remaining procedure is the same as in e, f, g and h of the previous method of A.F.C. alignment.

NOTE: This method is preferable to the first as both signals being unmodulated, the zero beat setting is more easily distinguished.

6. Aligning at 5 Megacycles (5000 K.C. Police Band)

(a) Place the signal generator in operation at 5 megacycles leaving it connected to the A terminal of the set through .0002 mfd. mica condenser.

(b) With the volume control full on turn the range switch to the Police and Amateur Band position (center position). Then tune the receiver dial pointer to 5 megacycles.

(c) Adjust the oscillator parallel trimmer, Illus. 34, (Fig. 6), to maximum output. If there are two peaks, the proper one is with the trimmer screw farthest out. (Least capacity.)

(d) Adjust the antenna parallel trimmer, Illus. 17, (Fig. 6), to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the receiver dial. If this causes the output to go down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured.

(e) Adjust the detector parallel trimmer, Illus. 23, (Fig. 6), to maximum output. Try to increase output by rocking the dial through resonance and retuning the trimmer until maximum output is obtained

7. Aligning at 16 Megacycles (16,000 K.C. Foreign Band)

(a) Place the signal generator in operation at 16 megacycles leaving it connected to the A terminal of the set through a .0002 mfd. mica condenser.

(b) With the volume control full on, tune the range switch to the Foreign Band position (fully clockwise), and tune the receiver dial pointer to 16 megacycles.

(c) Adjust the oscillator parallel trimmer, Illus. 33, (Fig. 6), to maximum output. Check to see if it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 megacycles. A repeat signal should be heard at this point. If none is present even with greatly increased signal generator output, retune the receiver to 16 M.C. and adjust the trimmer, Illus. 33, to the proper peak with the trimmer screw farther out.

(d) Adjust both the antenna trimmer, Illus. 16, (Fig. 6), and the detector parallel trimmer, Illus. 24, (Fig. 6), to maximum output. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is obtained.

Check the adjustment by tuning the receiver to the image at about 15.1 M.C., the image should be much weaker than the 16 M.C. signal: If the image is equal to or stronger than the 16 M.C. signal, trimmers #16 and #24 are not at the proper peak. Turn the trimmer in a turn or so, then readjust as above.

MODEL R1132 Delco "Delcomatic" Tuner Adjustments, Notes

UNITED MOTORS SERVICE

OPERATION OF DELCOMATIC TUNER

The "Delcomatic Tuner" is a mechanical device which has for its prime purpose the accurate, noiseless and speedy tuning of a station, by the mere push of a button. This function is performed in the following manner:

As the push button on the keyboard is depressed, a pawl arm at the rear of the tuner comes forward and rests against a circular cam. It will be noted that these cams have two different heights (that is, a high and a low side). The purpose of the two different levels will be self-evident as this explanation progresses.

Projecting from the rear of the unit is a set of switches which are motivated by a Bakelite cam arm. This arm is in turn operated by the movement of the pawls. Therefore, it is readily seen that the position of the pawl arm will control the setting of the electrical contacts of the switches in question.

Also located directly above the tuning shaft will be found an auxiliary pair of contacts known as the power contacts.

Before any button is depressed or with the tuner in the manual tuning position, all contact switches are in the position shown in Figure 1.

Now as a button is depressed, the power contacts will automatically be closed and the pawl arm will come forward to rest either upon the high or the low side of the cam, depending upon its position. This will move the Bakelite switch arm to the position shown in Figures 2 or 3. (See Note below.) In either of these positions, the reversing contact will be closed (this contact governs the direction of travel of the tuner in order that the pointer may travel directly to the station). Also, with the Bakelite arm in this position, the starting contacts will close, supplying power to start the motor.

The mute contacts will be closed in order that no noise or signal may come through the speaker until the station is properly tuned in.

Lastly, the A.F.C. contacts are also closed, at the same time, and this serves to remove A.F.C. until the station is tuned in, thus eliminating the possibility of "grasping" the wrong station before the tuner comes to rest.
Now the motor proceeds to drive the mechanism to the proper position for the desired station and as it comes to rest, the following events will occur.

First, the pawl arm will fall into a notch in the circular cam. This in turn causes the Bakelite cam arm to set the rear contact switches in a new position. The starting contacts are now open and the motor power supply is off; also, the mechanism is at rest.

NOTE: IN CHECKING THESE POSITIONS BE SURE TO TURN THE POWER OFF.

The A.F.C. and mute contacts are both open, thus allowing the signal to come through the receiver and also allowing the A.F.C. to function, which in turn puts the finishing touches on a perfectly tuned-in program. This position of the switch showing the station tuned in is shown in Figure 4.

Thus we have completed one entire cycle from push button to the completely tuned program, utilizing the Delcomatic Tuner.

There remain, however, two mechanical features which may be of interest to the service man. One of these is a small star gear on the tuning shaft. When changing from automatic tuning to manual tuning, the button is released by merely turning the tuning knob. This is accomplished by the star gear in question, which pushes the kick-out bar, thus releasing the button.

The second feature mentioned is the friction drive of the tuning mechanism. The rubber ring on the end of the motor shaft engages a metal drive disc on the tuning shaft which serves to drive the mechanism when in the manual tuning position.

Should slippage between these parts occur, due to wear, it is possible to increase the contact pressure by loosening the set screw of the drive disc on the motor shaft. When this is done, then push the rubber wheel to a closer contact and retighten the set screw.

NOTE: DO NOT ATTEMPT TO OPERATE DELCOMATIC TUNER ON ANY VOLTAGE LOWER THAN 105 VOLTS A.C.

SERVICING DELCOMATIC TUNER

1. Be sure the principle of operation, both electrically and mechanically is understood before attempting to service the Delcomatic Tuner.

2. Do not attempt to operate Delcomatic Tuner on any voltage lower than 105 volts A.C.

3. In case of trouble, first check switch contact positions with A.C. power off, against Figures 1 to 4 to see that they correspond to those illustrated. If switch contact springs do not correspond to those illustrated, adjust complete switch assembly by loosening the two screws in the switch support bracket and moving entire switch assembly so that their respective contact positions line up with those as illustrated. Tighten screws in support bracket firmly after proper switch adjustment has been made. If satisfactory operation of switch cannot be obtained by this adjustment, certain of the switch contact springs may be out of adjustment. In this case, if adjustment is required to more than one spring (except reversing contacts) or if a spring is badly out of adjustment, complete replacement of the switch assembly should be made.

4. A clutch is provided on the main cam assembly shaft to absorb the shock from the motor when the pawls drop down into the cam slots. Clutch action is obtained by the pressure of a small horseshoe shaped spring against the #1212590 Driven Gear and Bushing. If this clutch slips it will be necessary to remove any oil or grease with carbon tetrachloride, which may have entered the clutch. If, after cleaning any oil or grease from between the gear and spring, the clutch continues to slip, it will then be necessary to replace the spring, Part #1212616.

5. If motor runs slow and line voltage is over 105 volts, check all mechanical parts to see that they turn freely with power off.

6. If motor does not operate, check to see that switch on front of chassis is in A.F.C. position. Also, when button is depressed, the motor power contacts above tuning shaft and starting contacts on switch behind tuner should be checked to see that they are closed. One set of reversing contacts, depending on whether pawl is on high or low side of cam, should also be closed.

7. It should be noted that when Delcomatic Tuner is in the process of tuning a station, that the "mute" contacts short the control grids of the 6V6 output tubes together. Also, that the "A.F.C." contacts are closed, causing the A.F.C. circuit to be inoperative until station pawl drops in cam slot.

Delco Model R-1132 Date: 10-1-37

"SETTING UP" THE DELCOMATIC TUNER

1. Remove the knob on tuning control shaft which is the control in the upper right hand corner of the receiver panel. This knob may be removed by simply pulling it away from the panel. As this knob is removed another knob on the same shaft, partly hidden behind the panel face, will appear.

2. Grasp this knob and pull it out as far as it will go and at the same time "rocking" it so that the gears in the mechanism at the rear will mesh properly.

3. The knob should now be rotated to the right (clockwise) as far as it will go. BE SURE THAT THE KNOB IS TURNED ALL THE WAY UNTIL IT REACHES A DEFINITE STOP.

4. Push any button which you wish to set to a particular station. Be sure the button is pushed all the way in.

5. Grasp the small tuning control knob again and tune the receiver to the desired station. TUNE CAREFULLY MAKING USE OF THE "ROBOT EYE" TO BE SURE THAT YOU ARE CORRECTLY TUNED TO THE STATION IN QUESTION.

6. Push in the next button you wish to set. You will notice that as the second button is pushed in the first one will be released. Now tune in the next station that you wish to set up, again making use of the "robot eye" to be sure that you are correctly tuned to the station.

7. Repeat above operations until all buttons have been set to stations.

8. In order to release the last button, which now remains depressed, grasp the knob on the tuning control shaft and push it back into the cabinet as far as it will go and then pull it out again. Do not forget to "rock" the control when pulling it out in order that its gears may mesh properly.

9. Turn the knob to the LEFT until you reach a definite stop. A firm pressure must be applied, otherwise you will not lock all of the internal controls.

10. Push the small tuning knob back into the cabinet again and put on the large knob that was originally pulled off of this shaft at the start of operations.

11. The "automatic tuner" is now ready for operation and will tune to any station that you have previously selected by merely pushing the button for which that station was set. Labels bearing the names of all stations are supplied with the receiver for use in labeling the push bottons. To label the push buttons you must first remove the cap of the push button. The cap should be pulled off by pulling on the top end which has a small hump that holds the cap on. Then remove the white cardboard tab and insert the label for the station to which the button was set. In replacing the cap start at the bottom and press on the top.

12. YOU DO NOT NEED TO ADJUST THE DELCOMATIC TUNER AGAIN UNLESS YOU DESIRE TO SET ANY ONE OF THE BUTTONS TO A DIFFERENT STATION.

13. If you should desire to again tune manually, merely turn the A.F.C. control knob (lower center knob) to the center or standard position. This will release the automatic tuning mechanism completely.

14. WHEN USING DELCOMATIC TUNING THE A.F.C. CONTROL KNOB MUST BE TURNED TO THE EXTREME RIGHT HAND POSITION.

15. It is not advisable to set up the "automatic tuner" for operation on the Short Wave or Police band. However, the "tuner" may be set up for stations on the police band but extremely accurate tuning such as is obtained on the broadcast band cannot be expected. In this case the automatic tuner will only serve to give the approximate location of the station.

UNITED MOTORS SERVICE

MODEL R1132 Delco "Delcomatic" Tuner Switch Data

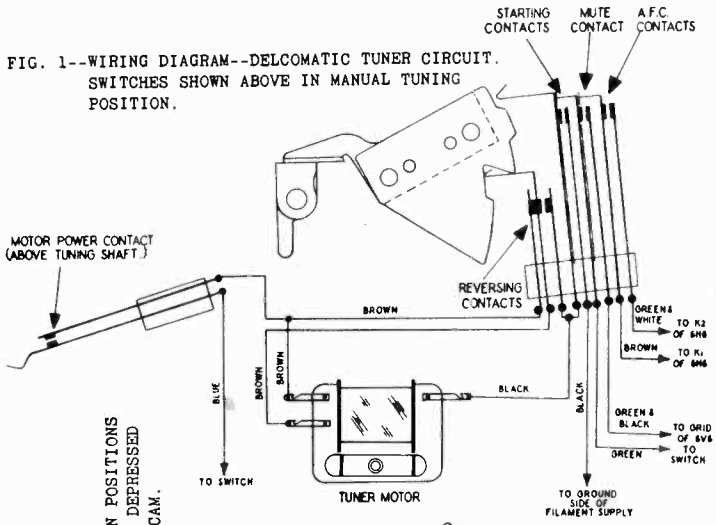


FIG. 1--WIRING DIAGRAM--DELCOMATIC TUNER CIRCUIT. SWITCHES SHOWN ABOVE IN MANUAL TUNING POSITION.

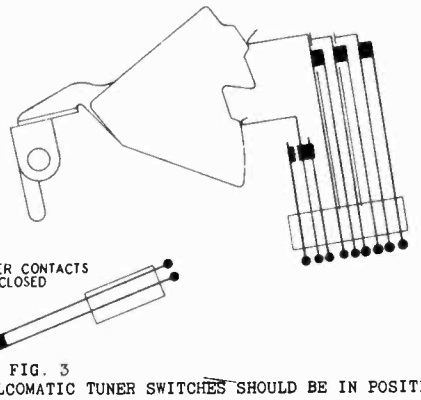
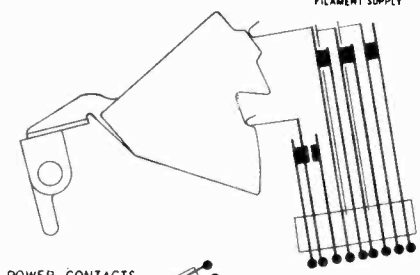
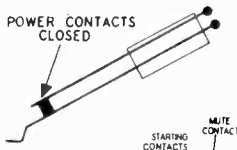


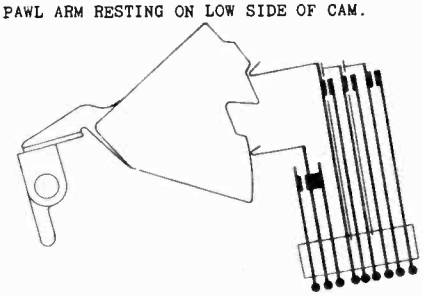
FIG. 3
DELCOMATIC TUNER SWITCHES SHOULD BE IN POSITIONS AS ILLUSTRATED WHEN STATION BUTTON IS DEPRESSED AND PAWL ARM RESTING ON LOW SIDE OF CAM.

FOR SETS BELOW SERIAL #929200

FIG. 2--DELCOMATIC TUNER SWITCHES SHOULD BE IN POSITIONS AS ILLUSTRATED WHEN STATION BUTTON IS DEPRESSED AND PAWL ARM RESTING ON HIGH SIDE OF CAM.







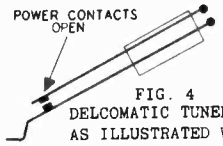


FIG. 4
DELCOMATIC TUNER SWITCHES SHOULD BE IN POSITIONS AS ILLUSTRATED WHEN STATION IS TUNED IN AND MECHANISM IS AT REST.

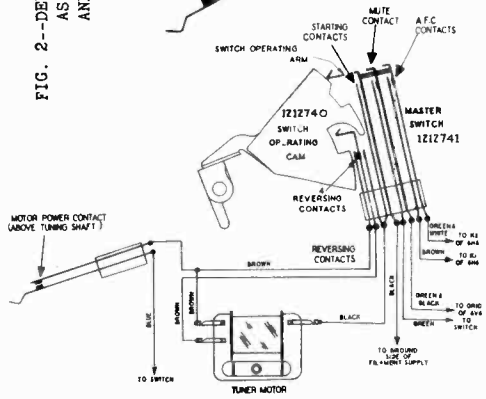
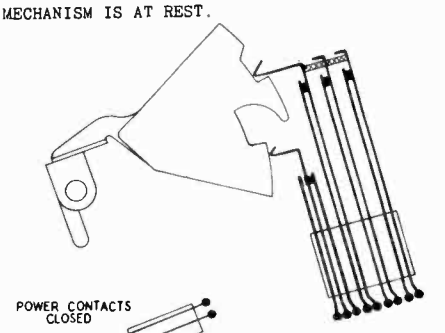
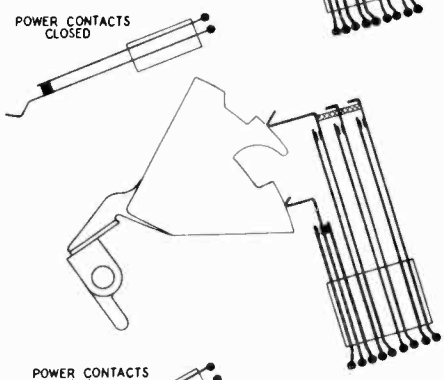


FIG.A1--WIRING DIAGRAM--DELCOMATIC TUNER CIRCUIT. SWITCHES SHOWN ABOVE IN MANUAL TUNING POSITION.





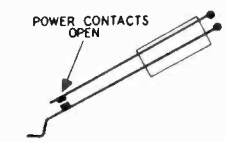


FIG.A3--DELCOMATIC TUNER SWITCHES SHOULD BE IN POSITIONS AS ILLUSTRATED WHEN STATION BUTTON IS DEPRESSED AND PAWL ARM RESTING ON LOW SIDE OF CAM.

Delco Model R-1132
Date: 10-1-37

DELCOMATIC TUNER SWITCH POSITIONS--SETS ABOVE SERIAL #929200

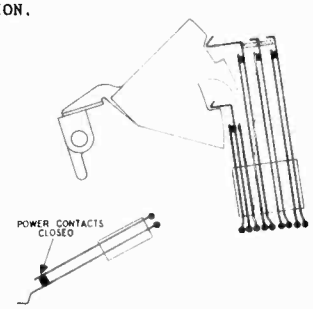


FIG.A2--DELCOMATIC TUNER SWITCHES SHOULD BE IN POSITIONS AS ILLUSTRATED WHEN STATION BUTTON IS DEPRESSED AND PAWL ARM RESTING ON HIGH SIDE OF CAM.

FIG.A4--DELCOMATIC TUNER SWITCHES SHOULD BE IN POSITIONS AS ILLUSTRATED WHEN STATION IS TUNED IN AND MECHANISM IS AT REST.

MODEL R1132 Delco
"Delcomatic" Tuner
Assembly Views

UNITED MOTORS SERVICE

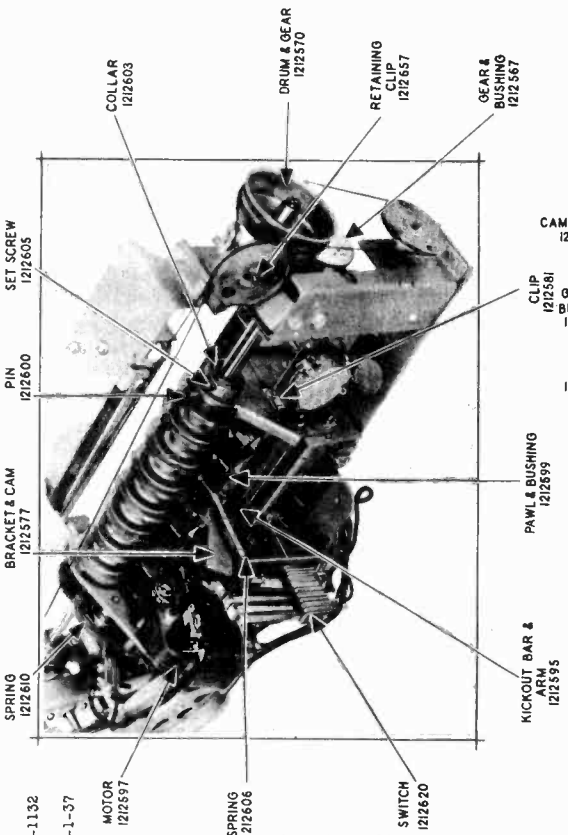


FIG. 9---DELCOMATIC TUNER PARTS

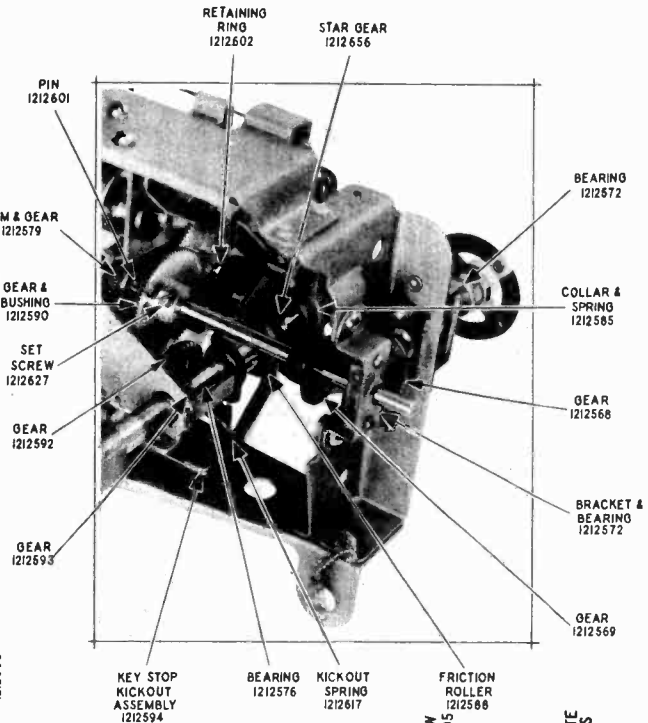


FIG. 10---DELCOMATIC TUNER PARTS

Delco Model R-1132
Date: 10-1-37

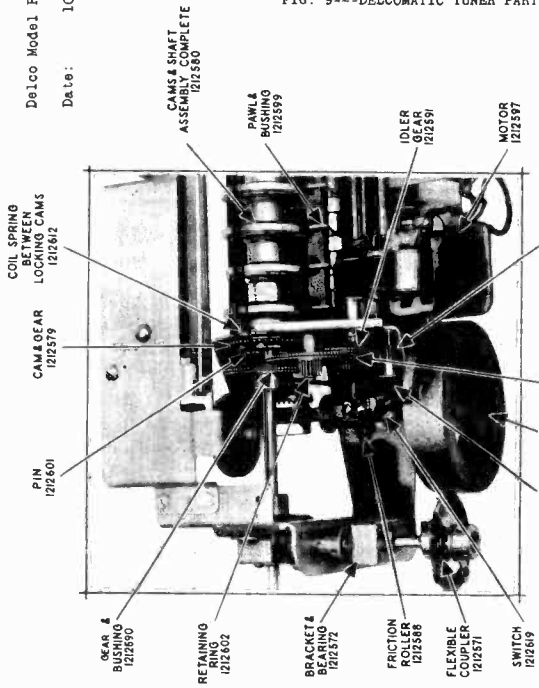


FIG. 12---DELCOMATIC TUNER PARTS

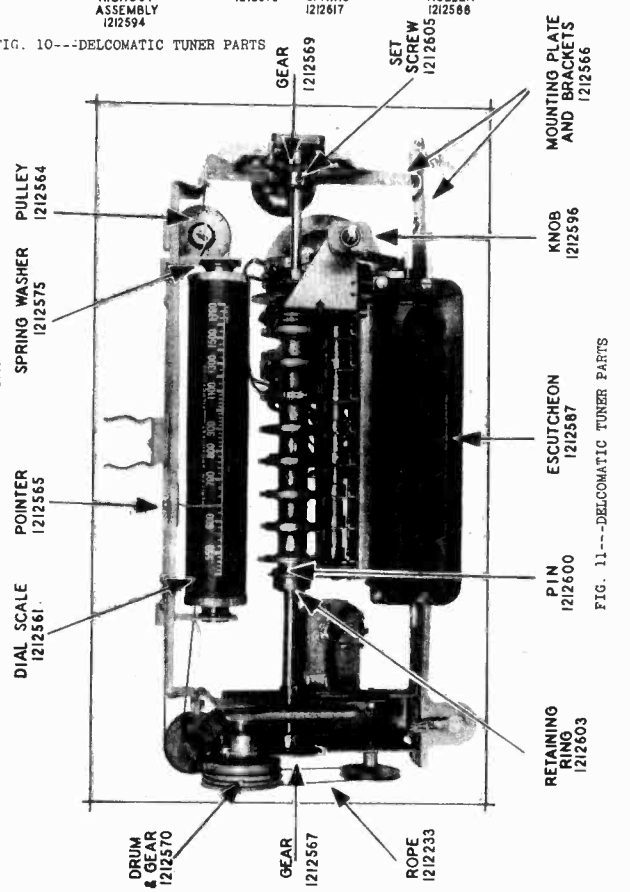
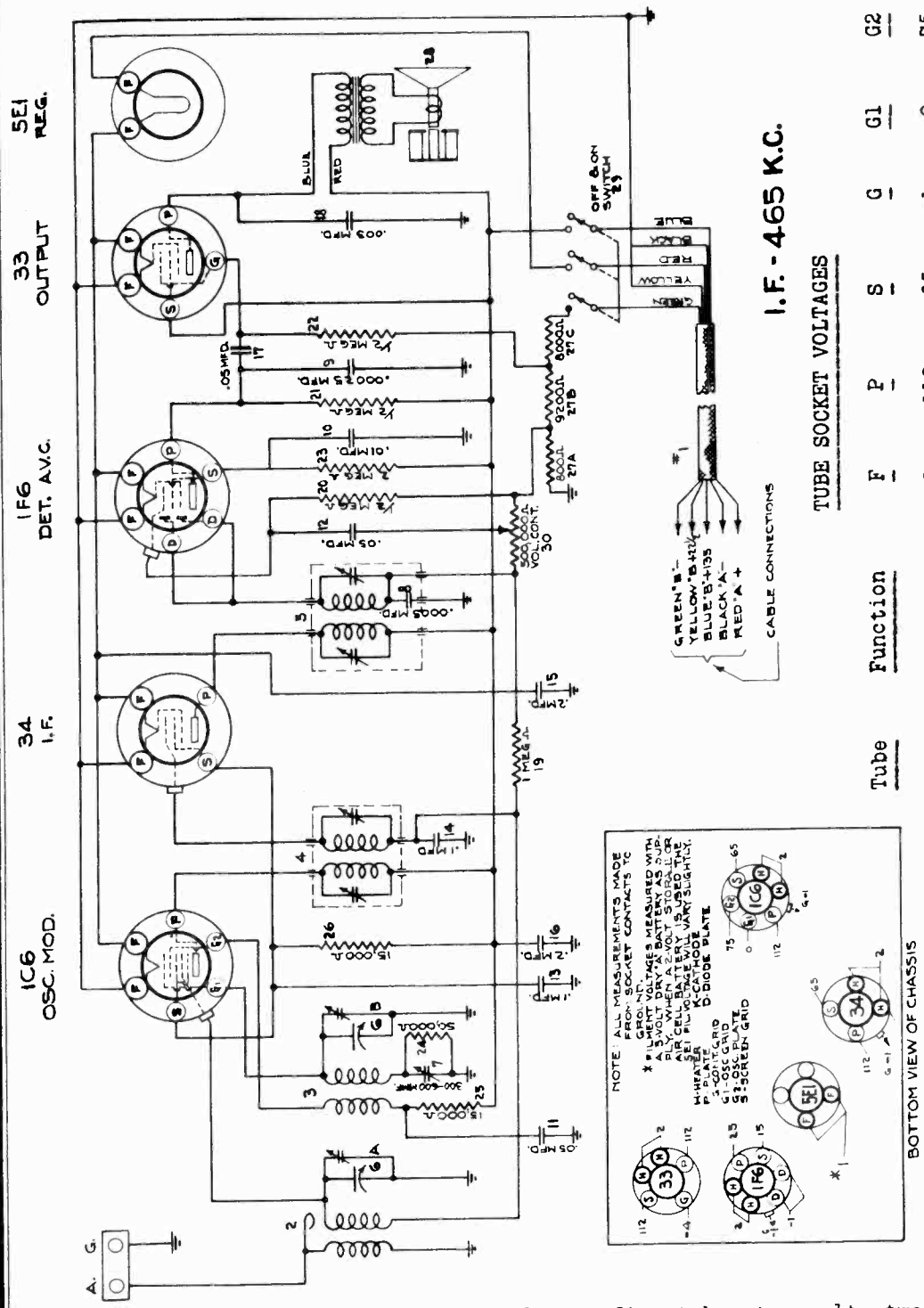


FIG. 11---DELCOMATIC TUNER PARTS

UNITED MOTORS SERVICE

MODEL R2050 Delco
Schematic, Voltage
Socket, Notes



TUBE SOCKET VOLTAGES

Tube	Function	F	P	S	G	G1	G2
1C6	Osc-Mod.	2	112	65	-1	0	75
34	I-F	2	112	65	-1	-	-
1F6	Det.1st A-F	2	25	15	-1	-	-
33	Output	2	112	112	-4	-	-
5E1	Regulator	1	-	-	-	-	-

Readings taken on 3 volt battery from tube socket contacts to ground, with a 1000 ohm per volt meter. 5E1 voltage Regulator filament voltage will vary depending on input voltage to receiver.

Delco Model R-2050

Date: 9-3-36

The Delco Model R-2050 is a five tube, two volt, two band, battery operated receiver with A.V.C. and a voltage regulator. The tubes use are: 1C6 Oscillator-Modulator, 34 I-F Amplifier, 1F6 Diode Detector--A.V.C. and 1st A-F Amplifier, 33 Power Output and a 5E1 Voltage Regulator.

The band coverage of the R-2050 receiver is from 540 to 1720 kilocycles.

The receiver is designed to be operated from 3-45 volt "B" batteries and either a 3 volt dry "A" battery, a 2 volt wet storage battery, or an "Aircell" battery.

1. Peaking I-F Stages at 465 Kilocycles

(A) Connect the ground lead of the test oscillator to the chassis frame. Connect the other lead to the grid cap of the 1C6 tube through a .02 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

(B) Set the test oscillator to exactly 465 kilocycles.

(C) Turn the volume control of the receiver on full.

(D) Peak each of the trimmers on the second I-F coil, Illus. #5 on Fig. 1

(E) Peak each of the trimmers on the first I-F coil, Illus. #4 on Fig. 1

(F) In order to assure accurate settings of the I-F trimmers the above adjustments should be repeated using the lowest test oscillator output that will give a reasonable output scale deflection.

2. Aligning R-F Circuits

(A) Remove the test oscillator lead from the grid of the 1C6 tube and connect it to the receiver "Ant." terminal through a .00025 mfd. series condenser.

(B) Check to see that the tuning dial has not slipped on the condenser gang shaft by turning the rotor plates of the gang condenser until they are completely out of mesh, at which point the dial pointer should be at the high frequency end of the dial calibration.

(C) Set the test oscillator frequency and receiver dial to exactly 1720 kilocycles.

(D) Adjust the trimmer mounted on top of the "Osc." section of the gang condenser, Illus. #6B on Fig. 1, to bring in the 1720 kilocycle test oscillator signal to maximum output.

(E) Set the test oscillator frequency and the receiver dial to exactly 1400 kilocycles.

(F) Adjust trimmer on top of the "Ant." section of the gang condenser. Illus. #6A on Fig. 1, for maximum output.

(G) Set receiver dial at approximately 600 kilocycles, leave the test oscillator connected to the antenna and ground terminals of the receiver.

(H) Set test oscillator frequency to 600 kilocycles.

(I) Adjust the 600 kilocycle oscillator padder condenser accessible through the hole in the top of the chassis adjacent to the gang condenser, while rocking the tuning condenser back and forth for maximum 600 kilocycle signal response.

Connect the set cable wires exactly as indicated on the cable markers. Remove the tubes from their sockets when hooking up batteries and recheck all connections before placing the tubes back in their sockets. The battery connections are as follows:

BATTERY CONNECTIONS

Connection	Lead Color
B -	Green
B + 22½ V.	Yellow
B + 135 V.	Blue
A -	Black
A +	Red

The 5E1 Voltage Regulator is used to maintain the filament voltage on the remaining tubes at the correct value of approximately 2 volts in order to adapt the receiver to operation on a 3 volt dry "A" battery and to take care of the normal charge to discharge battery voltage variations.

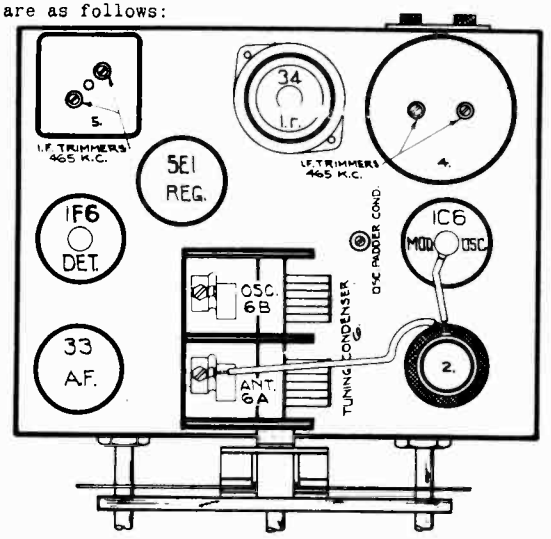


FIG. 2--PARTS LAYOUT--Top View

Delco Model R-2050

Date: 9-3-36

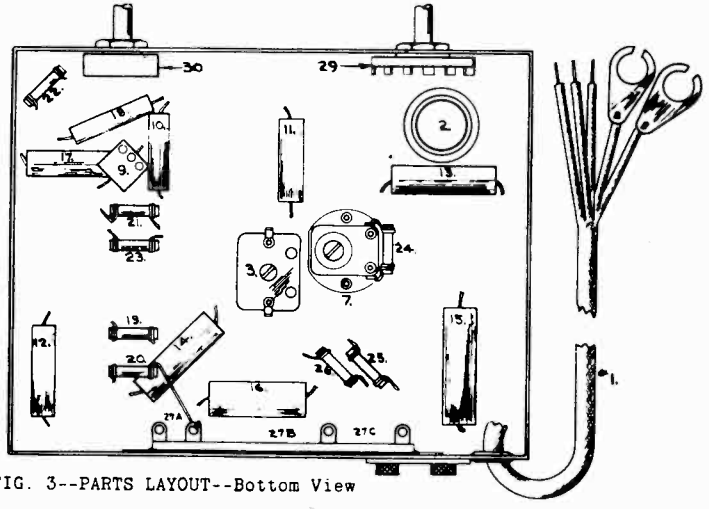


FIG. 3--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL R2055 Delco
Schematic, Voltage
Change, Batt. Notes

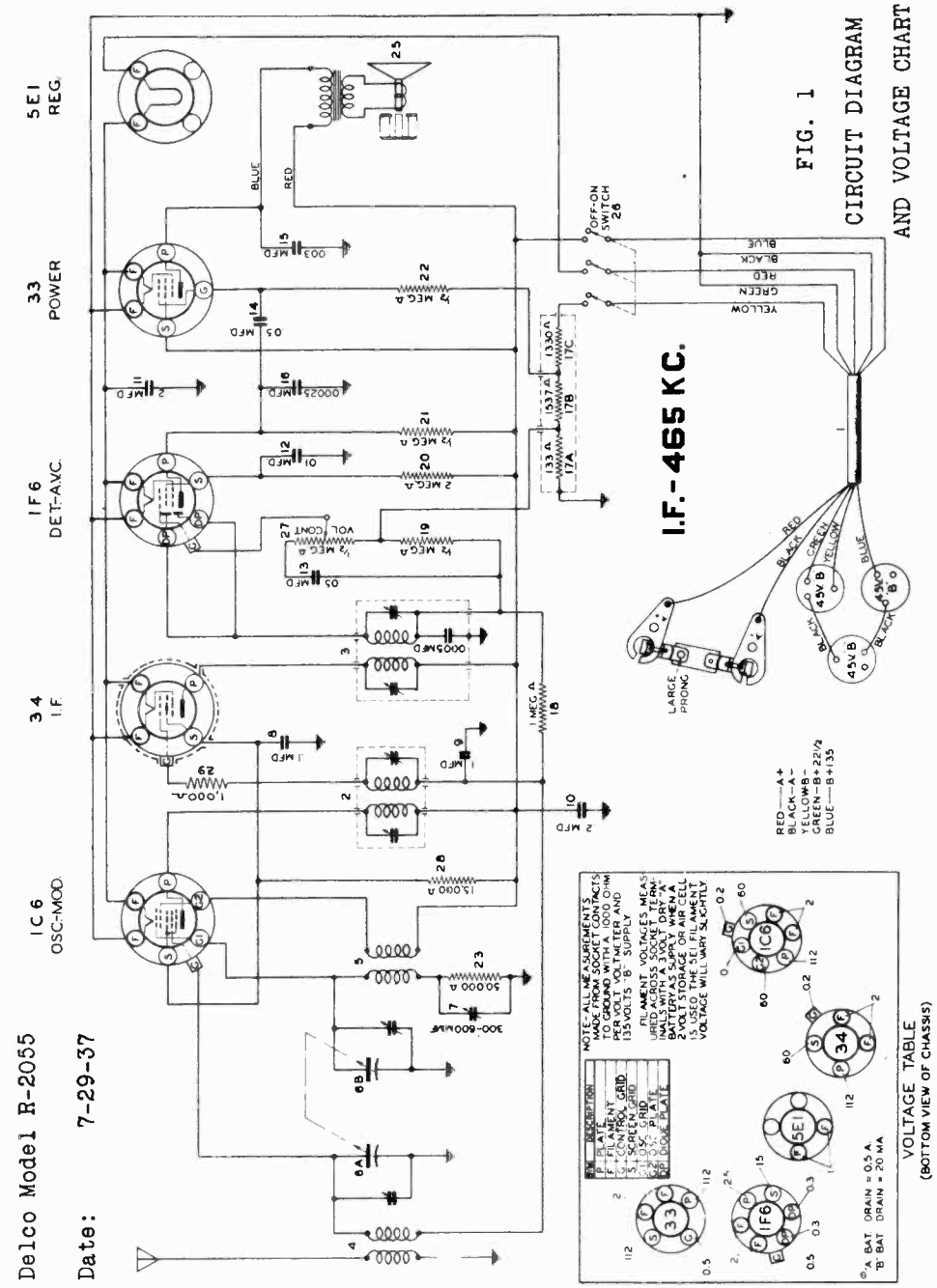


FIG. 1 CIRCUIT DIAGRAM AND VOLTAGE CHART

CIRCUIT CHANGE

Part #1210432 I-F Coil Assembly (Illus. #2) used on the first production of R-2050 sets, was replaced by Part #1212305 I-F Coil Assembly in order to correct a tendency of the I-F stages to oscillate. All service replacements of #1210432 I-F Coils should be made with the new coil #1212305. This coil has a 1000 ohm resistor mounted on the shield can, connected in series with the 34 tube grid.

BATTERY CONNECTIONS

PLUG-IN TYPE CONNECTORS ARE ATTACHED TO ENDS OF SET BATTERY CABLE LEADS--INSERT THESE PLUGS INTO THE PROPER TERMINAL ON TOP OF BATTERIES AND ALL BATTERY CONNECTIONS WILL BE CORRECTLY MADE. IF BATTERIES USED HAVE SCREW TYPE OR FAHNESTOCK TERMINALS REMOVE PLUGS FROM CABLE AND CONNECT WIRES IN ACCORDANCE WITH COLOR CODE.

Connect the set cable wires exactly as indicated on the cable markers. Remove the tubes from their sockets when hooking up batteries and recheck all connections before placing the tubes back in their sockets. The battery connections are as follows:

Lead Color	Connection
Green	B+ 22½
Yellow	B-
Blue	B+ 135
Black	A-
Red	A+

1. Peaking I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect the signal lead to the grid cap of the 1C6 tube through a .1 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.
(b) Set the signal generator to exactly 465 kilocycles.
(c) Turn the volume control of the receiver on full.
(d) Peak each of the trimmers on the 2nd I-F coil, Illus. #3 on Fig. 2.
(e) Peak each of the trimmers on the 1st I-F coil, Illus. #2 on Fig. 2.
(f) In order to assure accurate settings of the I-F trimmers, the above adjustments should be repeated using the lowest signal generator output that will give a reasonable output scale deflection.

2. Aligning R-F Circuits

(a) Remove the signal generator lead from the grid of the 1C6 tube and connect it to the receiver "Ant." terminal through a .00025 mfd. series condenser.
(b) Check to see that the tuning dial has not slipped on the condenser gang shaft by turning the rotor plates of the gang condenser until they are completely out of mesh, at which point the dial pointer should be at the high frequency end of the dial calibration.
(c) Set the signal generator frequency and receiver dial to exactly 1720 kilocycles.
(d) Adjust the trimmer mounted on the "Osc." section of the gang condenser, Illus. #6B, Fig. 2, to bring in the 1720 kilocycle signal generator signal to maximum output.
(e) Set the signal generator frequency and the receiver dial to exactly 1400 kilocycles.
(f) Adjust trimmer on the "Ant." section of the gang condenser, Illus. #6A on Fig. 2, for maximum output.
(g) Set receiver dial at approximately 600 kilocycles, leave the signal generator connected to the antenna and ground terminals of the receiver.
(h) Set signal generator frequency to 600 kilocycles.
(i) Adjust the 600 kilocycle oscillator padder condenser, Illus. #7, Fig. 3 accessible through the hole in the top of the chassis adjacent to the gang condenser, while rocking the tuning condenser back and forth for maximum 600 kilocycle signal response.

The Delco Model R-2055 is a five tube, two volt, single band, battery operated receiver with A.V.C. and a voltage regulator. The tubes used are: 1C6 Oscillator-Modulator, 34 I-F Amplifier, 1F6 Diode Detector--A.V.C. and 1st A-F Amplifier, 33 Power Output and a 5E1 Voltage Regulator.

The band coverage of the R-2050 receiver is from 540 to 1720 kilocycles. The receiver is designed to be operated from 3-45 volt "B" batteries and either a 3 volt dry "A" battery, 2 volt wet storage battery, or an "Aircell" battery.

VOLTAGE REGULATOR

The 5E1 Voltage Regulator is used to maintain the filament voltage on the receiver tubes at the correct value of approximately 2 volts in order to adapt the receiver to operation on a 3 volt dry "A" battery and to take care of the normal charge to discharge battery voltage variations.

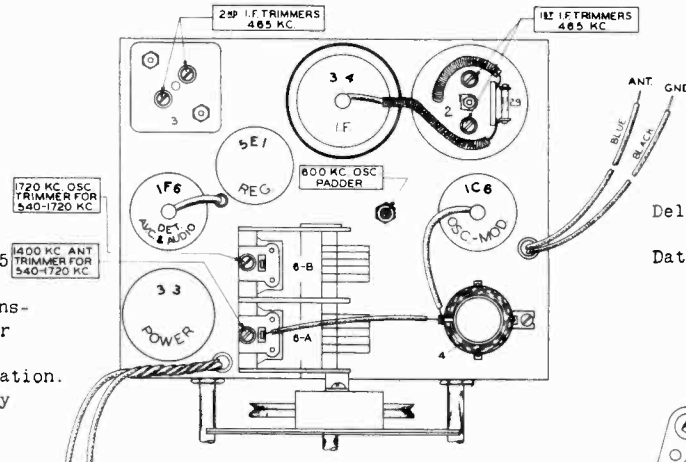


FIG. 2--PARTS LAYOUT--Top View

Delco Model R-2055

Date: 7-29-37

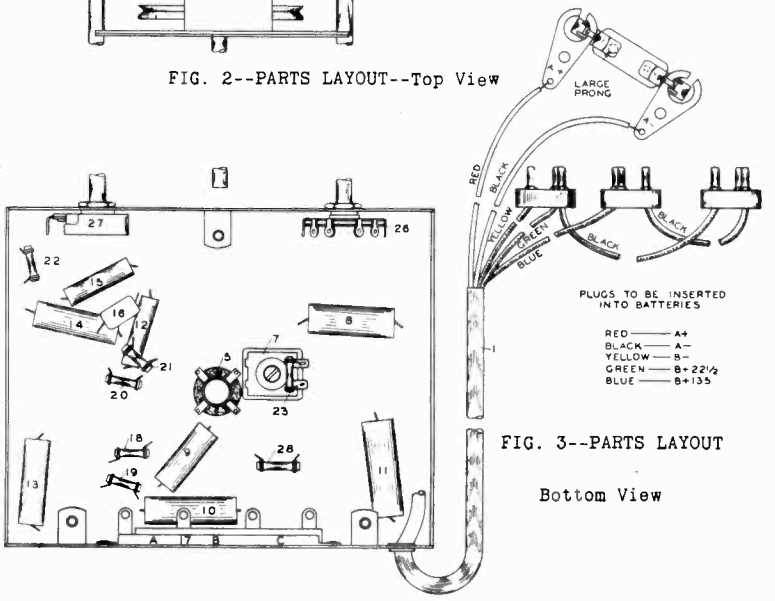


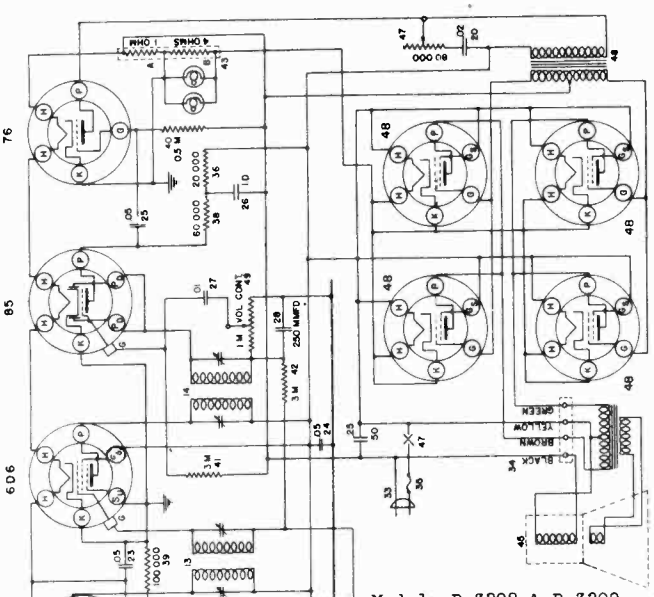
FIG. 3--PARTS LAYOUT

Bottom View

Trimmers, Chassis
Voltage, Notes

UNITED MOTORS SERVICE

MODELS R3208, R3209 Delco
Schematic, Socket



Models R-3208 & R-3209

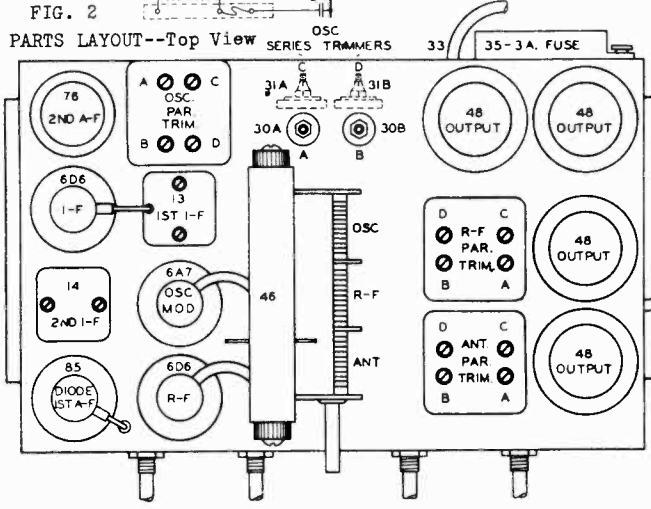
Date: 8-5-36

NOTE: In the Circuit Diagram and Parts Layout drawing Figure 2, the tuning ranges of the receiver are designated by letters as follows:

Red Band	"A" (5.9 - 15.3 M.C.)
Green Band	"B" (1590-4500 K.C.)
Yellow Band	"C" (540-1600 K.C.)
Blue Band	"D" (148-400 K.C.)

IF PEAK 450 KC

FIG. 2
PARTS LAYOUT--Top View



*TUBE SOCKET VOLTAGES

Tube	Function	H	P	Ga	Su	G	Go	Ga	K
6D6	R-F Amplifier	6.4	30.5	30.5	0	0	-	-	0
6A7	Osc-Mod	6.4	30.5	17.6	-	0	**	30.5	0
6D6	I-F Amplifier	6.4	30.5	30.5	0	0	-	-	0
85	Det. & 1st A-F	6.4	9.0	-	-	0	-	-	0
76	A-F Amplifier	6.4	30.0	-	-	0	-	-	0
48	(4) Output	25.2	30.0	30.5	-	1.6	-	-	5.2

Current drain 2.0 amperes at 32 volts.

**Oscillator grid (Go) voltage varies from - 1 at the low frequency end of the dial to - 3 at the high frequency end of the dial.

* Readings taken on 32 volt power supply with 1000 ohms per volt voltmeter from tube socket contacts (except filaments) to chassis.

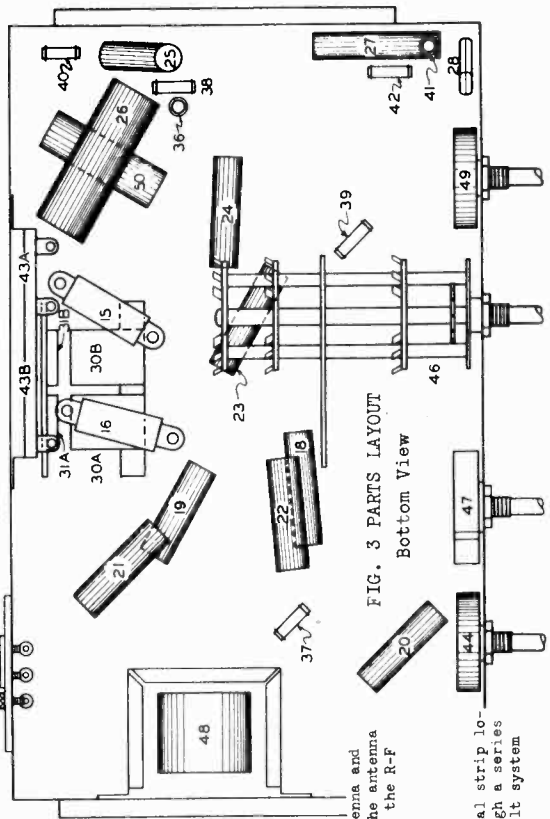


FIG. 3 PARTS LAYOUT
Bottom View

SENSITIVITY CONTROL

The sensitivity control is a potentiometer connected across the terminals on the antenna and ground terminal strip on the rear of the chassis. The movable arm is connected to the antenna coil. It is used to vary the strength of the signal in order to prevent overloading the R-F amplifier in view of the low plate voltage used.

GROUND CIRCUIT

DO NOT ground the chassis except through the use of the "GND" terminal on the terminal strip located on the rear of the chassis. This terminal connects to the chassis frame through a series condenser in order to prevent a short circuit when operating the receiver on a 32 volt system with the positive side grounded.

Models R-3208 & R-3209 Date: 8-5-36

1. Peaking I-F Stages at 450 Kilocycles

(a) Connect the antenna of the signal generator to the control grid connection on top of the 6A7 tube through a .02 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

(b) Connect the ground terminal of the signal generator to the ground terminal of the receiver.

(c) Set the signal generator to exactly 450 kilocycles.

(d) Rotate the receiver tuning condenser until the rotor plates are completely out of mesh.

(e) Turn the band selector switch to the Red Band. (First position on left)

(f) Adjust the line voltage to 32 volts.

(g) Turn the volume control and sensitivity control knobs all the way to the right.

(h) With the signal generator set to the lowest usable output level, adjust the I-F trimmer condensers for maximum signal output.

NOTE: The I-F trimmers are located on top of the I-F coils, Fig. 2, and may be adjusted with an insulated screw driver. Always make the adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency.

2. Aligning R-F Circuits Blue Band (148-400 K.C.)

(a) Turn the band selector switch to the first position on the right. (Blue Band)

(b) Rotate the receiver tuning condenser until the rotor plates are completely IN MESH and adjust the dial pointer, if necessary, so that it is exactly horizontal.

(c) Connect the antenna terminal of the signal generator to terminal on the rear of the receiver through a .00025 mfd. mica series condenser.

(d) Set the signal generator to 400 kilocycles.

(e) Rotate the station selector until the rotor plates are completely OUT OF MESH.

(f) Adjust the Blue Band "Osc." parallel trimmer (Fig. 2), for maximum output.

NOTE: If electrical interference causes an excessive reading on the output meter, making alignment difficult, it can be reduced by connecting a 5 to 10 mfd. paper condenser between the ground terminal of the receiver and the chassis frame.

(g) Adjust the Blue Band "R-F" parallel trimmer, (Fig. 2), for maximum output.

(h) Adjust the Blue Band "Ant" parallel trimmer, (Fig. 2), for maximum output.

(i) Repeat operations (f), (g) and (h) until no further improvement in output can be obtained.

(j) Set the signal generator to 150 kilocycles.

(k) Tune in the 150 kilocycle signal with the station selector in the region of 15 on the dial (Blue Band), for maximum reading on the output meter.

(l) Adjust the Blue Band oscillator series trimmer, (Illus. #31B, Fig. 2) while rocking the condenser gang plates back and forth slightly, until no further increase in output can be obtained.

(m) Repeat operations (f), (g) and (h) for more accurate adjustments.

3. Aligning R-F Circuits - Yellow Band (540-1600 K.C.)

(a) Turn the band selector switch to the second position from the right. (Yellow Band)

(b) Set the signal generator to 1400 kilocycles.

(c) Rotate the station selector until the pointer points to 140. (Yellow Band)

(d) Adjust the Yellow Band "Osc." parallel trimmer, (Fig. 2), for maximum signal output.

(e) Adjust the Yellow Band "R-F" parallel trimmer, (Fig. 2), for maximum signal output.

(f) Adjust the Yellow Band "Ant" parallel trimmer, (Fig. 2), for maximum signal output.

(g) Repeat operations (d), (e) and (f).

(h) Set the signal generator to 600 kilocycles.

(i) Tune in the 600 kilocycle signal with the station selector in the region of 60 on the dial (Yellow Band), for maximum reading on the output meter.

(j) Adjust the Yellow Band oscillator series trimmer, (Illus. #31A, Fig. 2) while rocking the condenser gang plates back and forth slightly, until no further increase in output can be obtained.

(k) Repeat operations (d), (e) and (f) for more accurate adjustments.

4. Aligning R-F Circuits - Green Band (1590-4500 K.C.)

(a) Turn the band selector switch to the second position from the left. (Green Band)

(b) Set the signal generator to 4000 kilocycles.

(c) Rotate the station selector until the pointer points to 4.0. (Green Band)

(d) Adjust the Green Band "Osc." parallel trimmer, (Fig. 2), for maximum signal output.

(e) Adjust the Green Band "R-F" parallel trimmer, (Fig. 2), for maximum signal output.

(f) Adjust the Green Band "Ant." parallel trimmer, (Fig. 2), for maximum signal output.

(g) Repeat operations (d), (e) and (f).

(h) Set the signal generator to 1700 kilocycles.

(i) Tune in the 1700 kilocycle signal with the station selector in the region of 1.7 on the dial (Green Band), for maximum reading on the output meter.

(j) Adjust the Green Band oscillator series trimmer (Illus. #30B, Fig. 2) while rocking the condenser gang plates back and forth slightly, until no further increase in output can be obtained.

(k) Repeat operations (d), (e) and (f) for more accurate adjustments.

5. Aligning R-F Circuits - Red Band (5,900-15,300 K.C.)

(a) Replace the .00025 series condenser in the output lead from the signal generator with a 400 ohm, carbon resistor.

(b) Turn the band selector switch to the first position on the left. (Red Band)

(c) Set the signal generator to 15 megacycles. (15,000 K.C.)

(d) Rotate the station selector until the pointer points to 15. (Red Band)

(e) Adjust the Red Band "Osc." parallel trimmer, (Fig. 2), for maximum signal output.

(f) Adjust the Red Band "R-F" parallel trimmer, (Fig. 2), for maximum signal output.

(g) Adjust the Red Band "Ant." parallel trimmer, (Fig. 2), for maximum signal output.

(h) Repeat operations (e), (f) and (g).

(i) Set the signal generator to 6 megacycles. (6000 K.C.)

(j) Tune in the 6 megacycle signal with the station selector in the region of 6.0 on the dial (Red Band) for maximum reading on the output meter.

(k) Adjust the Red Band oscillator series trimmer (Illus. #30A, Fig. 2) while rocking the condenser gang plates back and forth slightly, until no further increase in output can be obtained.

(l) Repeat operations (e), (f) and (g) for more accurate adjustments.

GENERAL: The Delco Models R-3208 (table model) and R-3209 (console model) employ the same chassis which is a nine tube, 32 volt, four band receiver. The tubes used are 6D6 R-F amplifier, 6A7 Oscillator-Modulator, 6D6 I-F Amplifier, 85 Detector and A-F Amplifier and four type 48 output tubes in push-pull parallel.

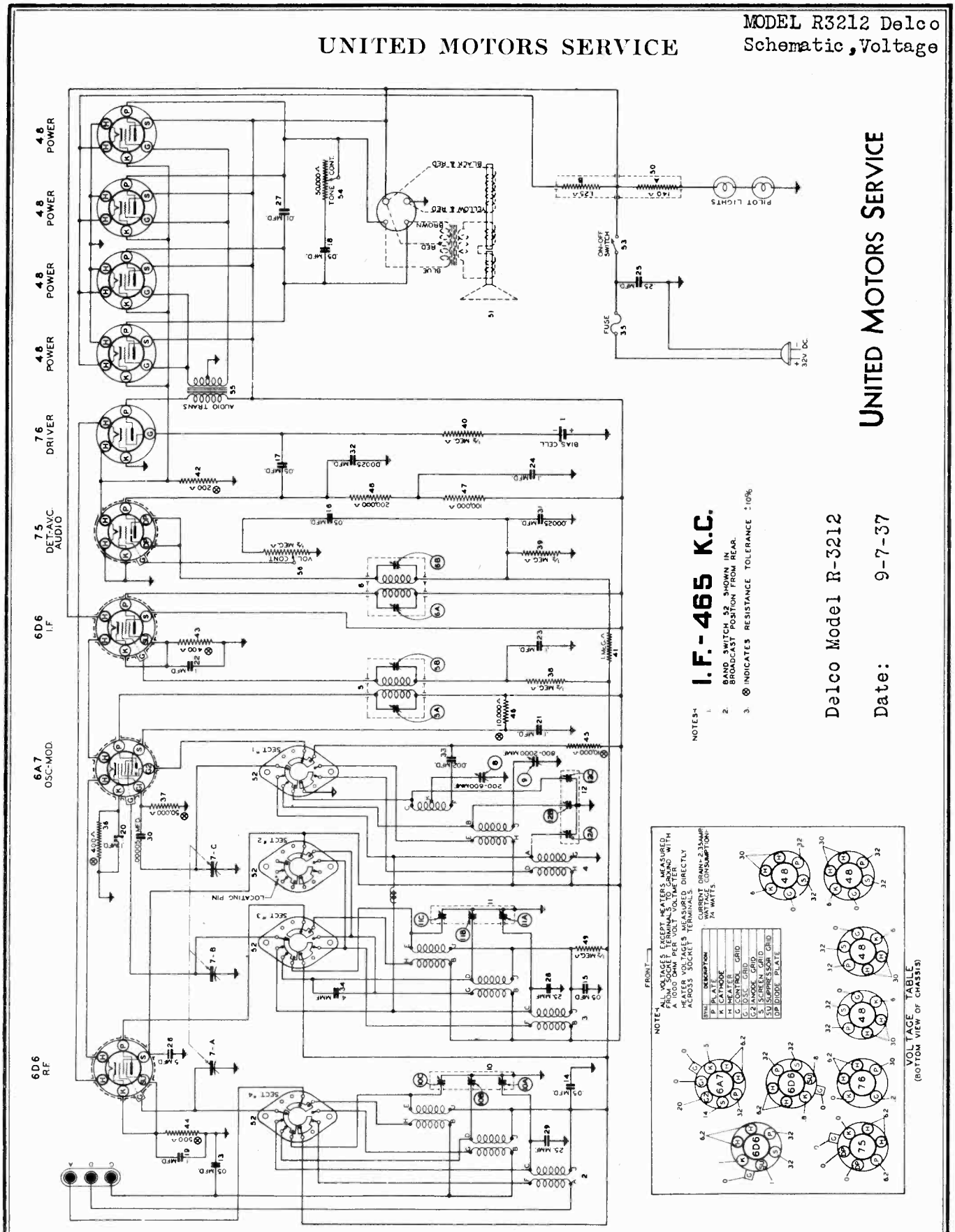


FIG. 1--DELCO MODEL R-3212 CIRCUIT DIAGRAM & VOLTAGE CHART

MODEL R3212 Delco
Socket,Trimmers
Chassis,Notes

UNITED MOTORS SERVICE

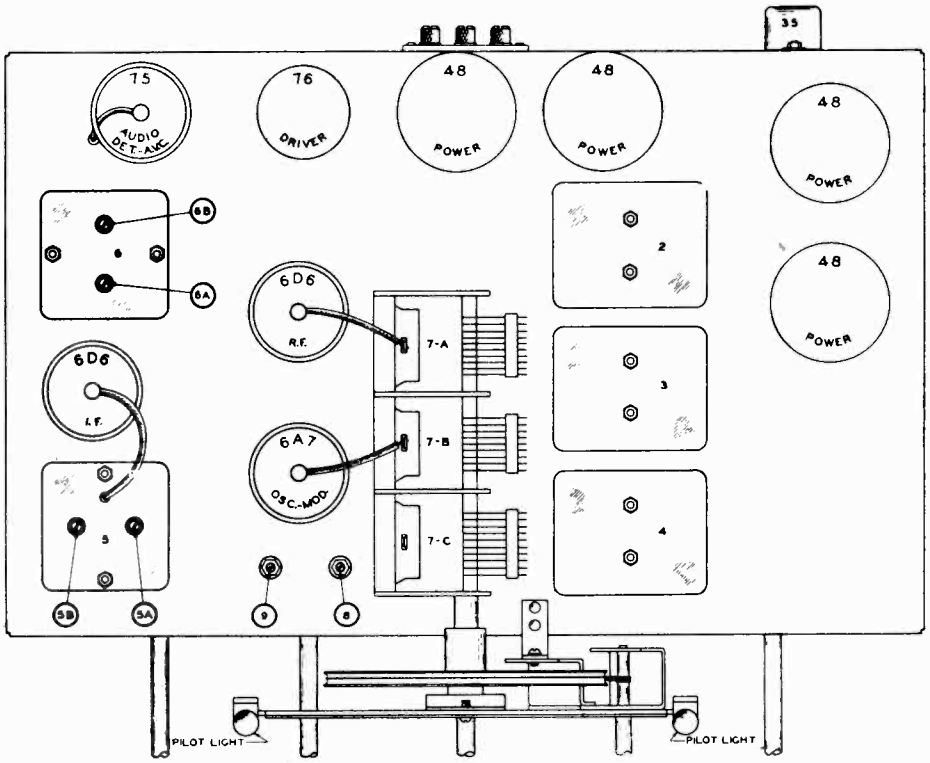


FIG. 2--PARTS LAYOUT--Top View

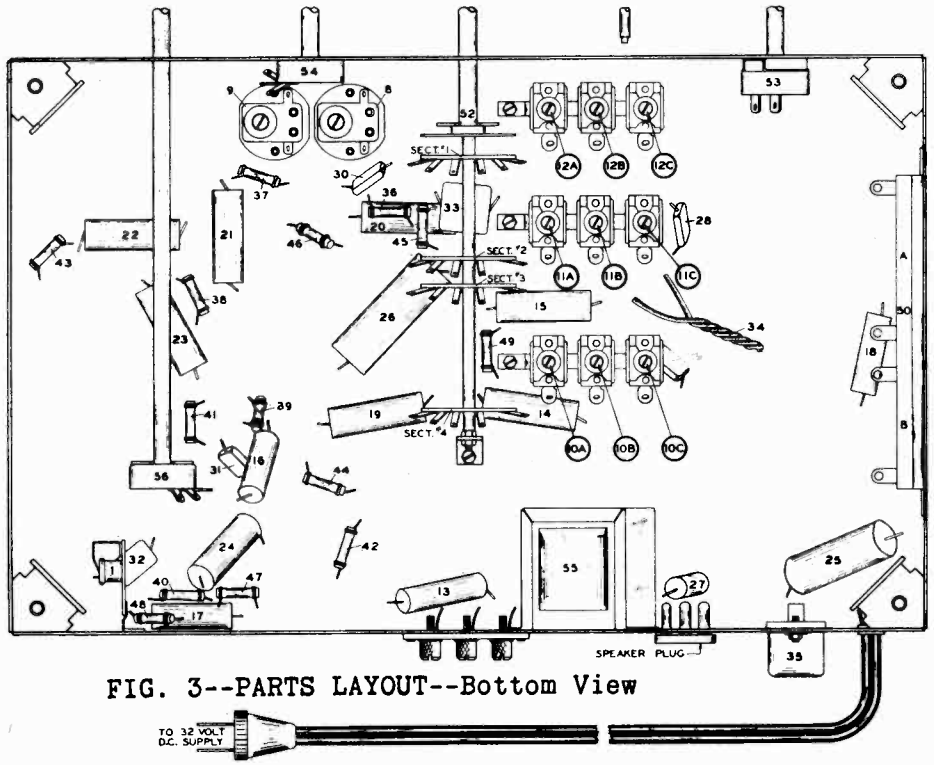


FIG. 3--PARTS LAYOUT--Bottom View

The Delco Model R-3212 is a nine tube, three band 32 volt operated superheterodyne receiver with AVC, tone control and an electro-dynamic speaker. The tubes used are: 6A7 Oscillator-Modulator, 6D6 R.F. Amplifier, 6D6 I.F. Amplifier, 75 Detector AVC and 1st Audio, 76 Driver, and four type 48 Output Tubes in push-pull parallel.

The frequency ranges on the bands covered are: American Broadcast Band 540-1720 kilocycles, Police and Amateur Band 2230 to 7500 kilocycles, and the Foreign Short Wave Band 7.15-18.5 megacycles.

Delco Model R-3212

Date: 9-7-37

TUBE SOCKET VOLTAGES

A bottom view of the chassis is shown in Fig. 1 (Circuit Diagram) on which the voltages to ground at each of the tube socket contacts are indicated.

UNITED MOTORS SERVICE

MODEL R3212 Delco
Alignment

Peaking I.F. Stages at 172 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.

(b) Set the test oscillator on 172 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak each of the I.F. trimmers on the 2nd I.F. coil, Illus. #9 on Fig. 2.

(e) Then peak each of the trimmers on the 1st I.F. coil, Illus. #8 on Fig. 2.

NOTE:
In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

Peaking Gang Condenser at 1530 K.C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. (Do not use the .5 mfd. condenser that was required in aligning the I.F. stages.)

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the trimmer for the oscillator section of the gang condenser (middle section) CAREFULLY for maximum output. Then adjust the trimmers for the "R.F." and "ANT." sections of the gang condenser also for maximum output.

Tracking Oscillator at 540 K.C.

(a) Turn the condenser plates until they are COMPLETELY IN MESH.

(b) Set test oscillator at 540 kilocycles. (Leave test oscillator leads connected to antenna and ground of receiver.)

(c) Adjust the oscillator tracking condenser (Illus. #24 on Fig. 3) located on the bottom of the chassis until the 540 K.C. signal is tuned in with maximum output.

Peaking Gang Condenser at 1400 K.C.

(a) Set the test oscillator at 1400 kilocycles.

(b) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output.

(c) Readjust the parallel trimmers for the "R.F." and "ANT." sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT DISTURB the setting of the "OSC." section of the gang condenser as this is adjusted at 1530 K.C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

Adjusting Receiver to Car Antenna

NOTE: An antenna compensating condenser is provided in the antenna circuit of this receiver that must be adjusted to the particular car antenna the receiver is to be used on. The test oscillator cannot be used for this adjustment due to the fact that capacity of its output circuit will not match the wide range of antenna capacities being used. Therefore, it is necessary that the adjustment be made after the receiver is installed on the car and is done in the following manner:

(a) Tune the receiver to a weak broadcast station on the low frequency end of the dial 550 to 700 K.C.

(b) Adjust the antenna compensating condenser for maximum response from the broadcast station. This condenser is shown as Illus. #23 on Fig. 3 and is located immediately to the rear of the speaker plug on the side of the receiver.

PART NO. 1209525 FILTER ASSEMBLY

Part No. 1209525 Filter Assembly is part of the "B" supply filter circuit and choke, R.F. filter choke along with an .06 mfd. 600 volt condenser sealed in a separate container. In case any of the parts used in this assembly are found to be defective it will be necessary to replace the complete filter assembly. The power transformer is mounted on top of the container for the filter assembly and both of these units are covered by the transformer can which may be removed by taking out the self-tapping screws which hold the can to its lower lid on the base of the receiver.

CIRCUIT CHANGES

On the part #1210009 Condenser Block, it will be found on some receivers that the sections having a black lead (18C) and blue lead (18G) are not used. In using the service replacement stock of part #1210009 Condenser Blocks, simply cut off either or both of the blue or black leads close to the block if they are not found on the defective block removed from the receiver. A number of receivers used a small tubular .01 mfd. condenser in place of the .01 section (18G) on this Condenser Block. If this condenser becomes defective--replace with a part #1210080 condenser.

CHASSIS PARTS

Part No.	Part Name	Description	Illus No.
1210022	Case	Chassis--less covers	
1209574	Case	Power transformer	
1207683	Clip	Grid connector	
1210011	Cloth	Speaker grille--incl. ring	
1210008	Coil	Antenna	5
1209528	Coil	R.F.	6
1209529	Coil	Oscillator	7
1210013	Coil assy.	1st I.F.	8
*1210015	Coil assy.	2nd I.F. (incl. 38, 41, 43)	9
**1210017	Coil assy.	2nd I.F. (incl. 38, 41, 43, 48)	9
1209571	Coil	Tube filament choke	10
1209572	Coil	Vibrator "A" choke	11
1209530	Condenser	3 gang tuning	15
1209531	Condenser	Electrolytic block	16
	Sec. A	16 mfd.	
	Sec. B	8 mfd.	
	Sec. C	8 mfd.	
1209532	Condenser	By-pass block	17
	Sec. A	.5 mfd., 160 volt	
	Sec. B	.5 mfd., 160 volt	
1210009	Condenser***	Filter block	18
	Sec. A	.4 mfd., 160 volt	
	Sec. B	.05 mfd., 200 volt	
	Sec. C	.05 mfd., 160 volt	
	Sec. D	.05 mfd., 400 volt	
	Sec. E	.02 mfd., 160 volt	
	Sec. F	.04 mfd., 200 volt	
	Sec. G	.01 mfd., 400 volt	
1209055	Condenser	Molded .00025 mfd.	19
1209055	Condenser	Molded .00025 mfd.	20
1209055	Condenser	Molded .00025 mfd.	21
1207625	Condenser	Molded .00005 mfd.	22
1209535	Condenser	Antenna compensating	23
1209536	Condenser	Oscillator tracking	24
1210010	Condenser	Tubular .02 mfd., 200 volt	25
1207908	Condenser	Tubular .1 mfd., 160 volt	26
1207908	Condenser	Tubular .1 mfd., 160 volt	27
1209538	Condenser	Molded .00095 mfd.	29
1209556	Condenser	Molded .0005 mfd.	30
*1209525	Filter assy.	"B" power	33
	Sec. A	.06 mfd. condenser	
	Sec. B	R.F. choke	
	Sec. C	Audio choke	
1204136	Resistor	Carbon 200,000 ohms 1/3 watt	35
1204136	Resistor	Carbon 200,000 ohms 1/3 watt	36
1207943	Resistor	Carbon 75,000 ohms 1/3 watt	37
1204138	Resistor	Carbon 500,000 ohms 1/3 watt	38
1204140	Resistor	Carbon 50,000 ohms 1/3 watt	39
1207905	Resistor	Carbon 150,000 ohms 1/3 watt	40
1207905	Resistor	Carbon 150,000 ohms 1/3 watt	41
1207905	Resistor	Carbon 150,000 ohms 1/3 watt	42
1208232	Resistor	Carbon 1 megohm 1/3 watt	43
1208959	Resistor	Carbon 30,000 ohms 1 watt	44
1209405	Resistor	Carbon 20,000 ohms 1/3 watt	45
1209542	Resistor	Candohm strip	46
	Sec. A	Res. 110 ohms	
	Sec. B	Res. 800 ohms	
	Sec. C	Res. 550 ohms	
	Sec. D	Res. 440 ohms	
1209650	Resistor	Carbon 400 ohms 1/3 watt	47
1209491	Resistor	Carbon 25,000 ohms 1 watt	49
1208756	Resistor	Carbon 250,000 ohms 1/3 watt	50
1208806	Ring	Tube shield	
1209583	Shield	Antenna coil	
1209584	Shield	R.F. coil	
1209594	Shield	Vibrator socket	
1210012	Shield	I.F. coils	
1209066	Shield	Tube	
1209548	Sleeve	Volume control shaft	
1209070	Socket	6F7 tube	
1209069	Socket	6A7 tube	
1209068	Socket	6B7 tube	
1209067	Socket	42 tube	
1210025	Speaker	Unit only--dynamic	54
1209592	Spring	Vibrator grounding	
1209921	Spring	Vibrator retaining	
1209560	Term. assy.	On power trans.	
1209562	Term. assy.	On R.F. coil	
1210014	Terminal	In 2nd I.F. coil	
1209570	Transformer	Vibrator power	55
1210019	Transformer	Output--on speaker	56
5039661	Vibrator	Plug-in synchronous	57
1209540	Volume control	Res. 1.5 megohms	58

* Used only on sets BELOW serial #0383500.
** Used only on sets ABOVE serial #0383500.
*** See "CIRCUIT CHANGES".

MODEL R6011 Delco
Socket, Trimmers
Chassis, Changes

UNITED MOTORS SERVICE

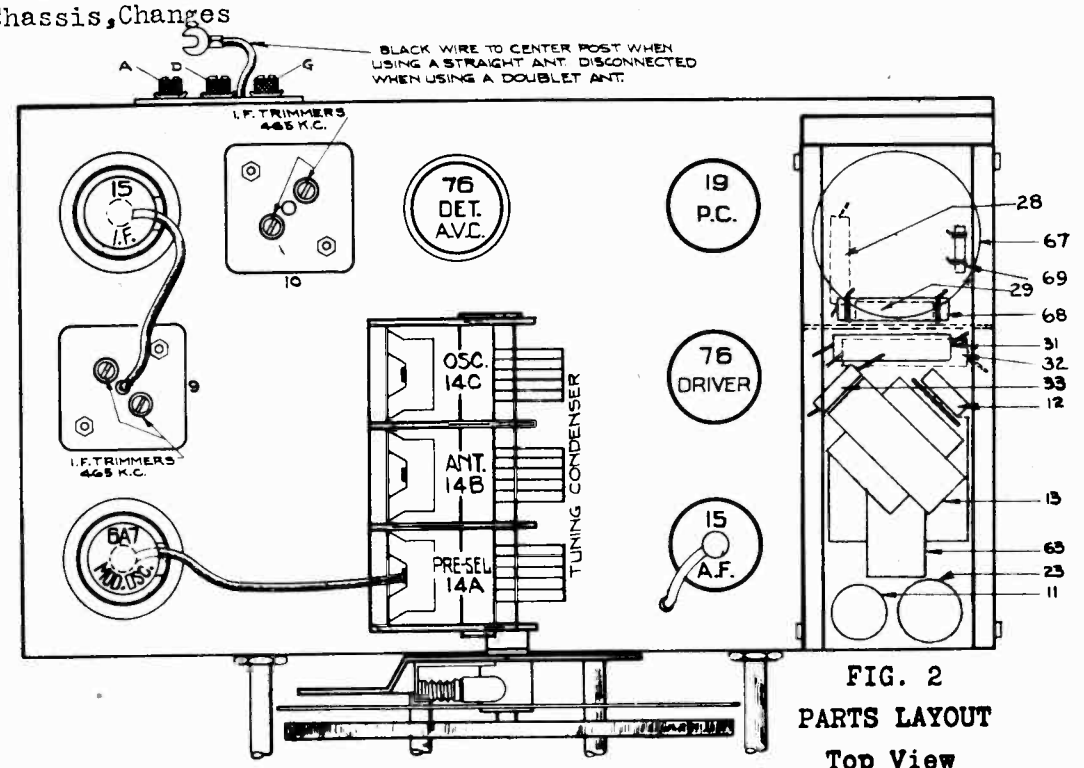


FIG. 2
PARTS LAYOUT
Top View

Delco Model R-6011 Date: 9-8-36

All R-6011 receivers incorporating the above changes can be identified by the letter "A" stamped on the rear of their chassis. The Circuit Diagram for these receivers is shown in Fig. 1A.

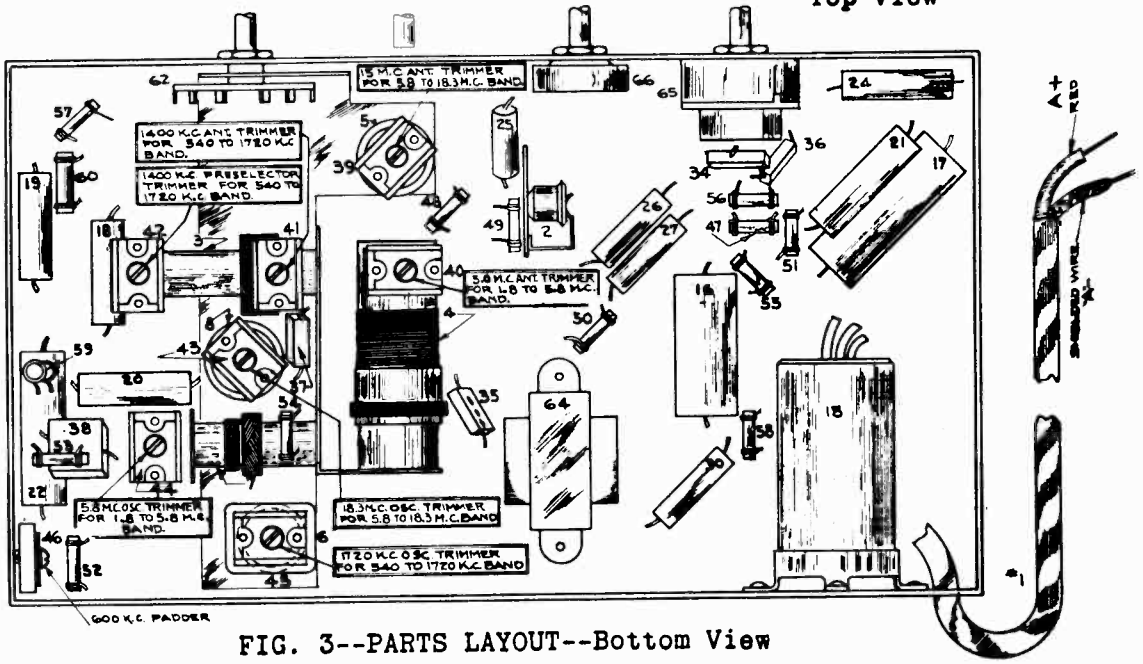


FIG. 3--PARTS LAYOUT--Bottom View

The following changes have been made in the Circuit Diagram of the R-6011 receiver as shown in Fig. 1.

CIRCUIT CHANGES

1. The .01 mfd. 1200-volt condenser, Illus. 32, connected across secondary of vibrator transformer was removed.

2. A 5000 ohm 1-watt resistor was added to the chassis and connected in series with condenser .01 mfd. Illus. #31.

3. A 150 ohm 1/3-watt resistor was added to the chassis and connected in the primary circuit of the vibrator transformer.

UNITED MOTORS SERVICE

MODEL R6011 Delco
Schematic, Voltage
Change, Notes

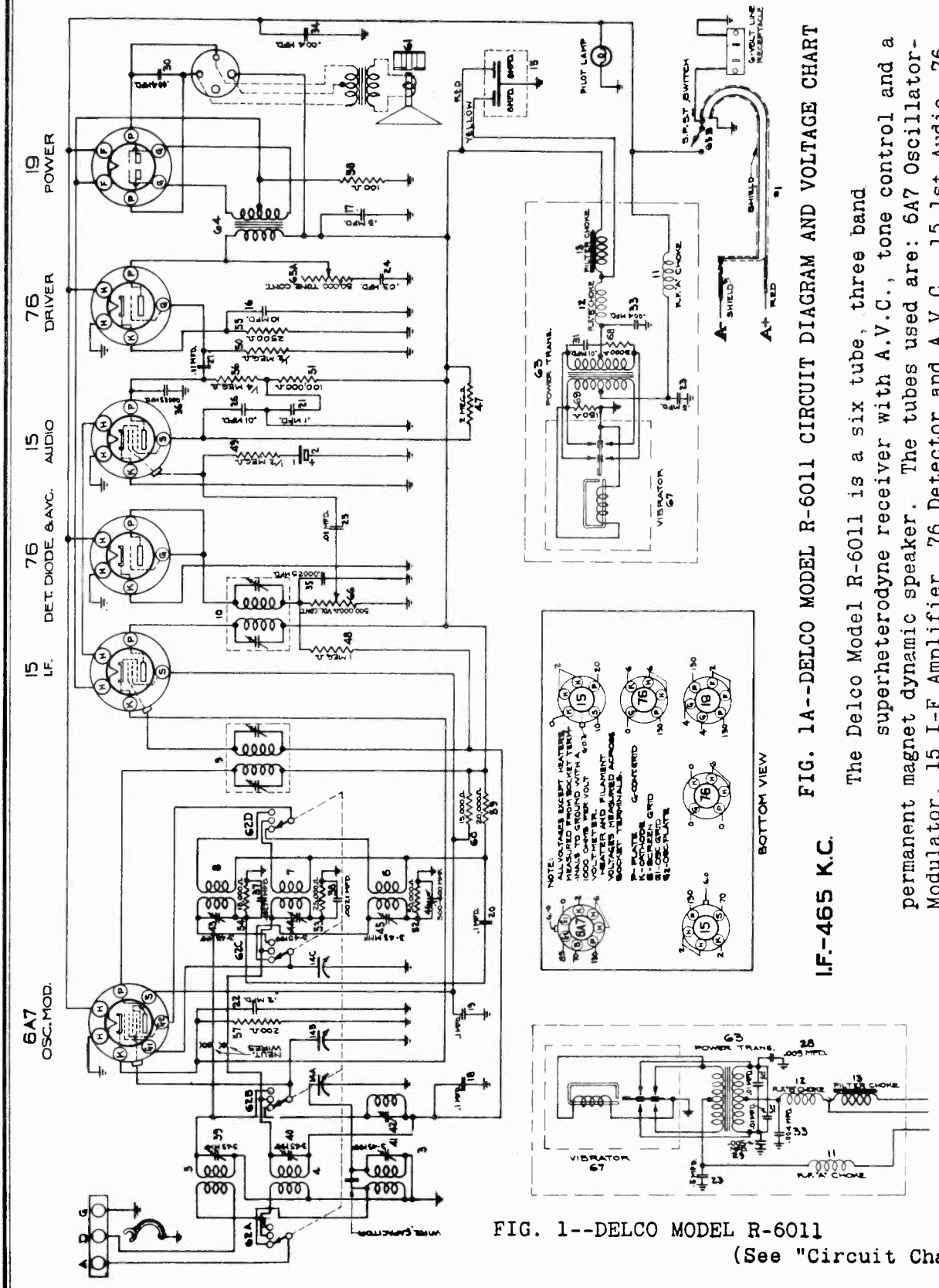


FIG. 1A--DELCO MODEL R-6011 CIRCUIT DIAGRAM AND VOLTAGE CHART

The Delco Model R-6011 is a six tube, three band superheterodyne receiver with A.V.C., tone control and a permanent magnet dynamic speaker. The tubes used are: 6A7 Oscillator-Modulator, 15 I-F Amplifier, 76 Detector and A.V.C., 15 1st Audio, 76 Driver and a Type 19 Output tube.

Delco Model R-6011 Date: 9-8-36 This receiver is designed to be operated from a six volt storage battery.

FIG. 1--DELCO MODEL R-6011

(See "Circuit Changes")

The frequency ranges on the bands covered are: American Broadcast Band (Yellow) 540 to 1720 kilocycles, Police and Amateur Band (Green) 1800 to 5800 kilocycles, and the Foreign Short Wave (Red) 5.8 to 18.3 megacycles.

Delco Model R-6011
Date: 9-8-36

1. Peaking I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect the other lead to the grid cap of the 6A7 tube through a .1 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

(b) Set the test oscillator to exactly 465 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak each of the trimmers on the 2nd I-F coil, Illus. #10 on Fig. 1.

(e) Peak each of the trimmers on the 1st I-F coil, Illus. #9 on Fig. 1.

(f) In order to assure accurate settings of the I-F trimmers the above adjustments should be repeated using the lowest test oscillator output that will give a reasonable output meter scale defection.

2. Aligning R.F. Circuits--Foreign Band (5.8-18.3 Megacycles)

(a) Remove the test oscillator lead from the grid of the 6A7 tube and connect it to the receiver antenna terminal through a 400 ohm carbon resistor.

(b) Check to see that the tuning dial has not slipped on the condenser gang shaft by turning the rotor plates of the gang condenser until they are completely out of mesh, at which point the dial pointer should be at the high frequency end of the dial calibration.

(c) Set the test oscillator frequency and receiver dial to exactly 18.3 megacycles.

(d) Adjust the 18.3 megacycle oscillator trimmer, Illus. #43 on Fig. 2, to bring in the 18.3 megacycle test oscillator signal with maximum output. NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.3 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.3 megacycles always check to see if the proper peak has been used. To do this leave test oscillator frequency at 18.3 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.3 megacycles Then vary the receiver dial slightly to the right and left of 17.3 megacycles, and if the fundamental peak was used in aligning at 18.3 megacycles the test oscillator signal will be heard at approximatey 17.3 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.3 megacycle oscillator trimmer must be properly readjusted.

(f) Set the test oscillator frequency and the receiver dial to exactly 15 megacycles.

(g) Adjust 15 megacycle antenna trimmer, Illus. #39 on Fig. 2, to maximum output.

3. Aligning R.F. Circuits--Police-Amateur Band (1.8-5.8 Megacycles)

(a) Set test oscillator frequency and receiver dial to exactly 5.8 megacycles.

(b) Adjust 5.8 megacycle oscillator trimmer, Illus. #44 on Fig. 2, to bring in 5.8 megacycle test oscillator signal with maximum output.

(c) Set test oscillator frequency and receiver dial to exactly 5 megacycles.

(d) Adjust 5 megacycle antenna trimmer, Illus. #40 on Fig. 2, for maximum output.

4. Aligning R.F. Circuits--American Broadcast Band (1720-540 Kilocycles)

(a) Set test oscillator frequency and receiver dial to exactly 1720 kilocycles. Replace 400 ohm series resistor with a .00025 mfd. condenser.

(b) Adjust 1720 kilocycle oscillator trimmer, Illus. #45 on Fig. 2, to bring in 1720 kilocycle test oscillator signal to maximum output.

(c) Set test oscillator frequency and receiver dial to exactly 1400 kilocycles.

(d) Adjust 1400 kilocycle antenna and preselector trimmers, Illus. #41 and #42 on Fig. 2, for maximum output.

(e) Set receiver dial and test oscillator frequency to approximately 600 kilocycles, leaving the test oscillator connected to antenna and ground terminals of the receiver.

(f) Adjust 600 kilocycle oscillator padder condenser, Illus. #46 on Fig. 2, rocking tuning condenser back and forth for maximum 600 kilocycle signal response.

NOTE: A bottom view of the chassis is shown in Fig. 1 & 1A (Circuit Diagram) on which the voltages to ground at each of the tube socket contacts are indicated.

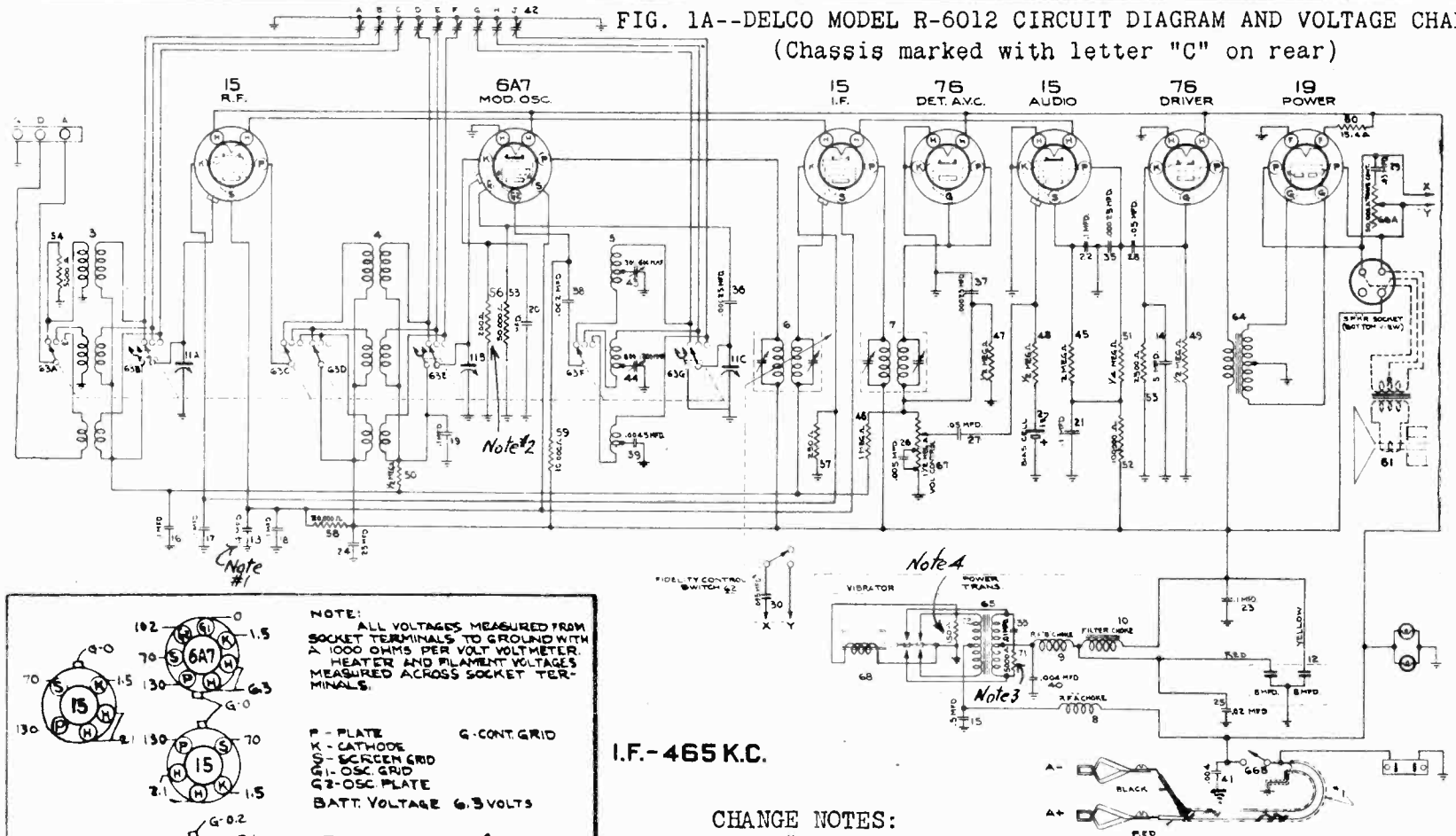
TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	G1	G2	G	K
6A7	Osc.-Mod.	6	130	60	0	75	0	2
15	I-F Amp.	2	130	60	--	--	0	2
76	Det.-A.U.C.	6	0	--	--	--	0	0
15	1st Audio	2	25	15	--	--	0	0
76	Driver	6	130	--	--	--	0	6
19	Output	2	130	--	--	--	4	--

Readings taken on a 6-volt battery from tube socket contacts to ground, with a 1000-ohm per volt D.C. meter.

Ampere drain--2.3 amps.

FIG. 1A--DELCO MODEL R-6012 CIRCUIT DIAGRAM AND VOLTAGE CHART
(Chassis marked with letter "C" on rear)



BOTTOM VIEW OF CHASSIS.

CHANGE NOTES:

Note #1. Condenser 13 was 2 mf.
Note #2. Resistor 56 was 400 ohms.
Note #3. Resistor 71 (5000 ohms) was added.
Note #4. Resistor 72 (150 ohms) was added.

In early models, a .005-mf. condenser was connected between each end of the vibrator transformer secondary and ground. Both these condensers were removed in later models.

In early models, a .01 mf condenser was connected across the secondary of the vibrator transformer. This was removed in later models.

The receivers in which these changes have been made can be identified by the letter "A" stamped on the rear of the chassis.

Delco Model R-6012

Date: 12-2-36

MODEL R6012 Delco
Socket,Trimmers
Chassis,Notes

UNITED MOTORS SERVICE

The Delco Model R-6012 is a seven tube, three band, six volt battery operated superheterodyne receiver with A.V.C., tone control and a permanent magnet dynamic speaker. The tubes used are: 15 R-F Amplifier, 6A7 Oscillator-Modulator, 15 I-F Amplifier, 76 Detector--A.V.C. 15 1st Audio, 76 Driver and a type 19 Output tube.

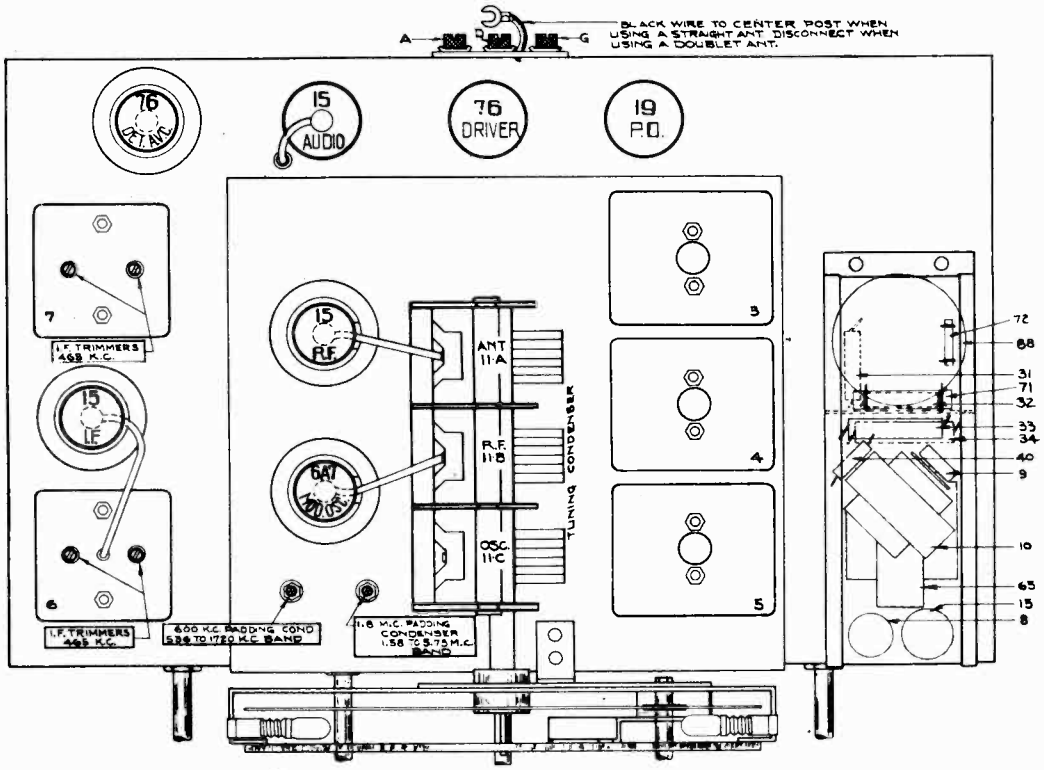


FIG. 2--PARTS LAYOUT--Top View

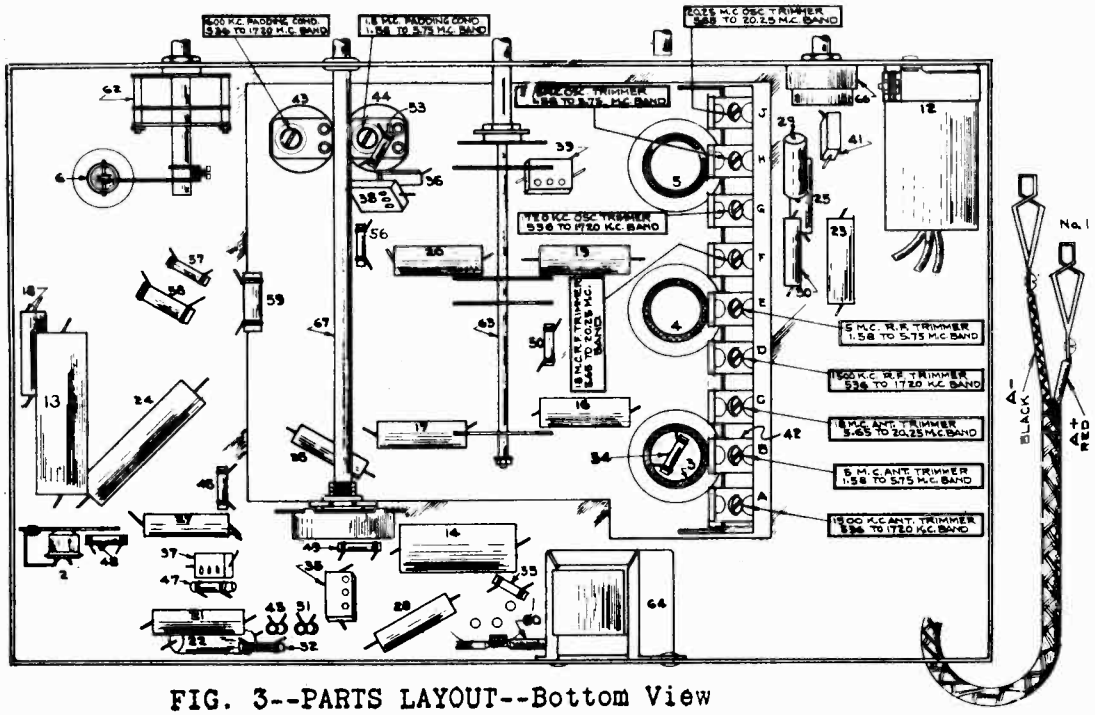


FIG. 3--PARTS LAYOUT--Bottom View

Delco Model R-6012

The frequency ranges on the bands covered are: American Broadcast Band (Yellow) 540 to 1720 kilocycles, Police & Amateur Band (Green) 1720 to 5800 kilocycles, and the Foreign Short Wave Band (Red) 5.8 to 20 megacycles.

Date: 9-23-36

This receiver is designed to be operated from a six volt storage battery.

UNITED MOTORS SERVICE

MODEL R6012 Delco
Voltage, Alignment

CIRCUIT ALIGNMENT

All of the adjustable condensers are very accurately adjusted at the factory and should need no further adjustment unless tampered with or in the replacement of a defective coil. If realignment is found necessary the set can be properly adjusted only by using a calibrated test oscillator or signal generator, and an output meter.

TUBE SOCKET VOLTAGES (See Chart on Fig. 1)

Tube	Function	H	P	S	G1	G2	G	K
15	R-F Amp.	2.1	130	70	--	--	0	1.5
6A7	Osc.-Mod.	6.3	130	70	0	102	0	1.5
15	I-F Amp.	2.1	130	70	--	--	0	1.5
76	Det.-A.V.C.	6.3	0	--	--	--	0	0
15	1st Audio	2.1	19	11	--	--	-.2	0
76	Driver	6.3	125	--	--	--	0	6
19	Power	2.1	127	--	--	--	0	--

Readings taken from tube socket contacts to chassis ground (except filaments) with a 1000 ohm per volt D.C. meter.

Ampere drain--2.7 amps.

1. Peaking I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect the other lead to the grid cap of the 6A7 tube through a .02 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

(b) Set test oscillator to exactly 465 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak each of the trimmers on the 2nd I-F coil, Illus. #7 on Fig. 2.

(e) Peak each of the trimmers on the 1st I-F coil, Illus. #6 on Fig. 2.

(f) In order to assure accurate settings of the I-F trimmers, the above adjustments should be repeated using the lowest test oscillator output that will give a reasonable output meter scale deflection.

2. Aligning R-F Circuits--"Foreign" Band (5.65-20.25 Megacycles)

(a) Remove the test oscillator lead from the grid of the 6A7 tube and connect it to the receiver antenna terminal through a 400 ohm resistor.

(b) Check to see that the tuning dial has not slipped on the condenser gang shaft by turning the rotor plates of the gang condenser until they are completely out of mesh, at which point the dial pointer should be at the high frequency end of the dial calibration.

(c) Set the test oscillator frequency and receiver dial to exactly 20.25 megacycles.

(d) Adjust the 20.25 megacycle oscillator, Illus. #42J on Fig. 3, to bring in the 20.25 megacycle test oscillator signal to maximum output. NOTE: When adjusting this trimmer, two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 20.25 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 20.25 megacycles, check to see if the proper peak has been used. To do this, leave the test oscillator frequency at 20.25 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 19.25 megacycles. Then vary the receiver dial slightly to the right and left of 19.25 megacycles, and if the fundamental peak was used in aligning at 20.25 megacycles, the test oscillator signal will be heard at approximately 19.25 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 19.25 megacycle oscillator trimmer must be properly readjusted.

(f) Set the test oscillator frequency and the receiver dial to exactly 18 megacycles.

(g) Adjust 18 megacycle antenna and R-F trimmers, Illus. #42C & 42F on Fig. 3, for maximum output.

3. Aligning R-F Circuits--"Police-Amateur" Band (1.58-5.75 Megacycles)

(a) Set test oscillator frequency and receiver dial to exactly 5.25 megacycles.

(b) Adjust 5.75 megacycle oscillator trimmer, Illus. #42H on Fig. 3. to bring in 5.75 megacycle test oscillator signal to maximum output.

(c) Set test oscillator frequency and receiver dial to exactly 5 megacycles.

(d) Adjust 5 megacycle antenna R-F trimmers, Illus. #42B & 42E on Fig. 3, for maximum output.

4. Aligning R-F Circuits--"American" Broadcast Band (1720-536 Kilocycles)

(a) Set test oscillator frequency and receiver dial to exactly 1720 kilocycles. Replace 400 ohm series resistor with .00025 condenser

(b) Adjust 1720 kilocycle oscillator trimmer, Illus. #42G on Fig. 3, to bring in 1720 kilocycle test oscillator signal to maximum output

(c) Set test oscillator frequency and receiver dial to exactly 1500 kilocycles.

(d) Adjust 1500 kilocycle antenna and R-F trimmers, Illus. #42A and #42D on Fig. 3, for maximum output.

(e) Set receiver dial and test oscillator frequency to approximately 600 kilocycles, leaving the test oscillator connected to antenna and ground terminals of the receiver.

(f) Adjust 600 kilocycle oscillator padder condenser, Illus. #43 on Fig. 3, rocking tuning condenser back and forth for maximum 600 kilocycle signal response.

SERVICE HINT--Vibrator Hash

In cases where a slight amount of vibrator hash or interference is noticeable on the R-6012, the reversing of the red and yellow leads on the dual 8 mfd. electrolytic condenser (Illus. #12) will usually eliminate the trouble. A letter "B" is stamped on the rear of all R-6012 chassis in which this change has been made in receiver production.

Delco Model R-6012

Date: 9-23-36

MODEL 983506 Pontiac
MODEL 983507 Pontiac
Socket,Trimmers
Chassis

UNITED MOTORS SERVICE

FOR OTHER DATA
SEE INDEX

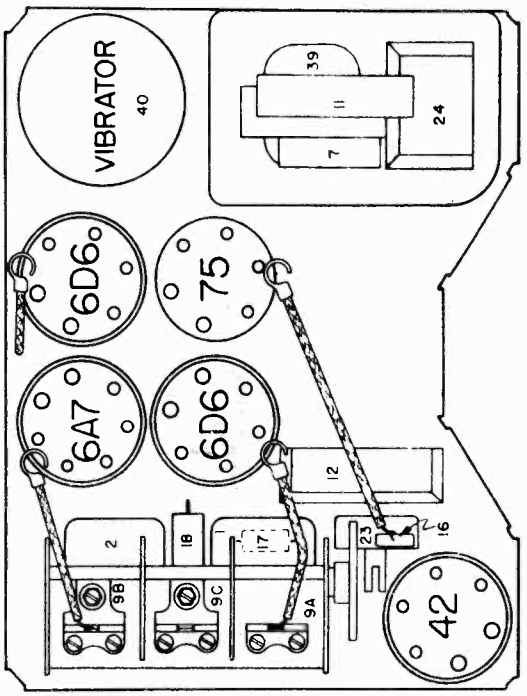


FIG. 2--PARTS LAYOUT--TOP VIEW

PONTIAC 983507

Date: 3-9-38

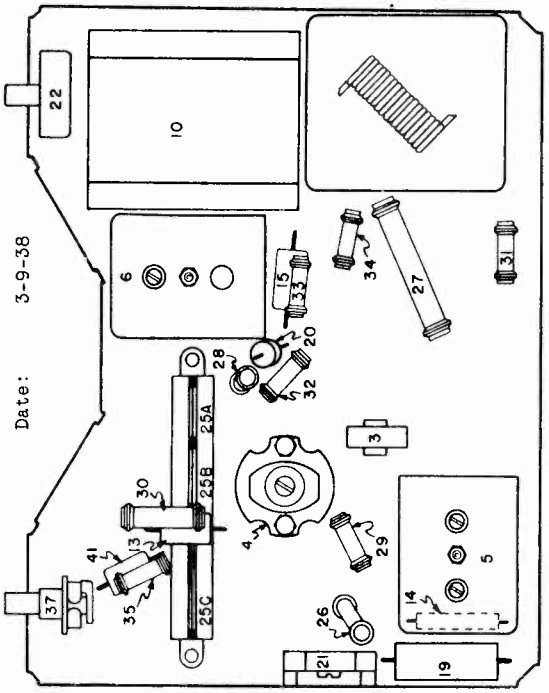


FIG 3--PARTS LAYOUT--BOTTOM VIEW

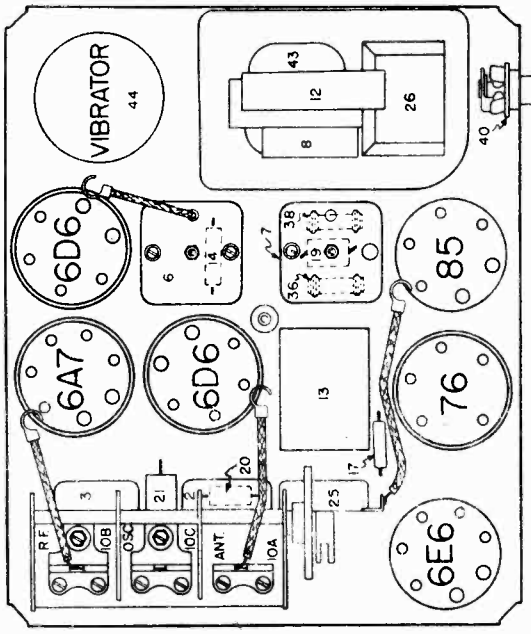


FIG. 2--PARTS LAYOUT--Top View

PONTIAC 983506 Date: 3-10-38

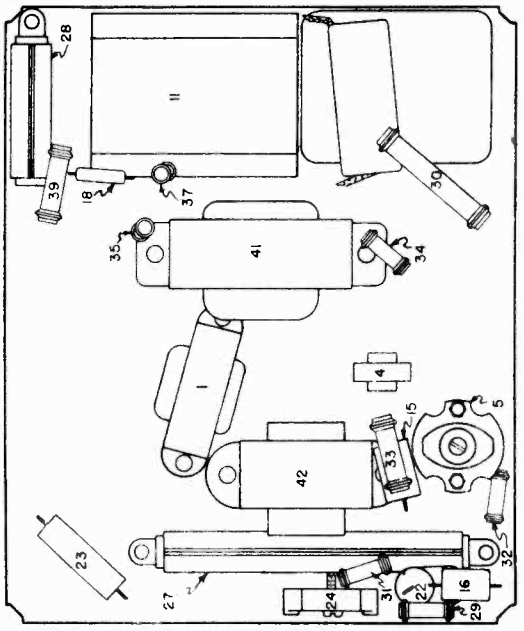
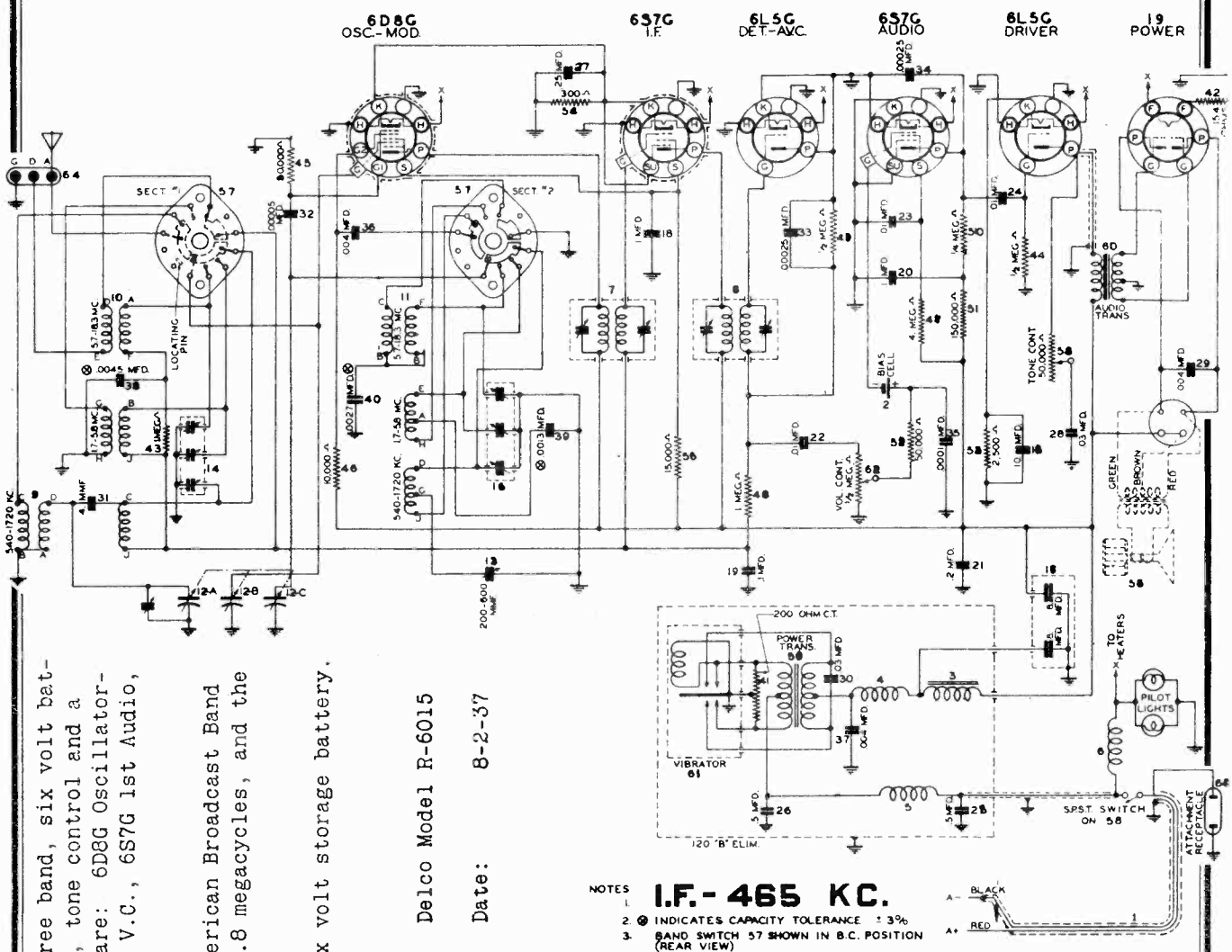


FIG. 3--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL R6015 Delco
Schematic, Chassis
Notes



Delco Model R-6015

Date: 8-2-37

NOTES
1. **I.F.- 465 KC.**
2. ⊗ INDICATES CAPACITY TOLERANCE ± 3%
3. BAND SWITCH 57 SHOWN IN B.C. POSITION (REAR VIEW)

The Delco Model R-6015 is a six tube, three band, six volt battery operated superheterodyne receiver with A.V.C., tone control and a permanent magnet dynamic speaker. The tubes used are: 6D8G Oscillator-Modulator, 6S7G I-F Amplifier, 6L5G Detector and A V.C., 6S7G 1st Audio, 6L5G Driver and a type 19 output tube.

The frequency ranges on the bands covered are: American Broadcast Band 540-1720 kilocycles, Police and Amateur band 1.7-5.8 megacycles, and the Foreign Short Wave band 5.7-18.3 megacycles.

This receiver is designed to be operated from a six volt storage battery.

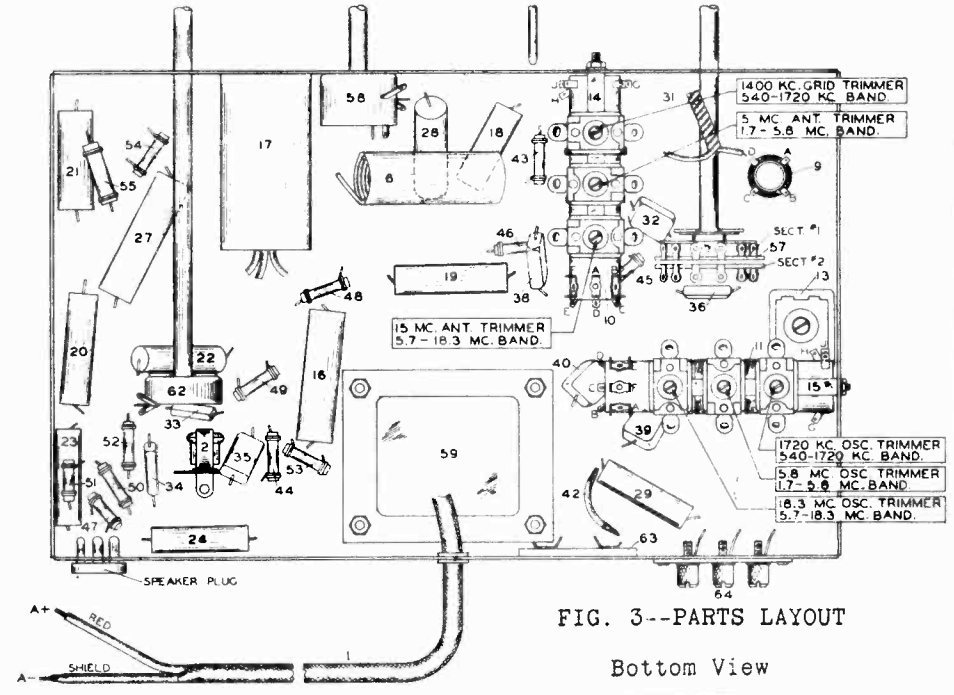


FIG. 3--PARTS LAYOUT

Bottom View

MODEL R6015 Delco
Socket, Trimmers
Voltage, Alignment

UNITED MOTORS SERVICE

1. Peaking I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame. Connect the other lead to the grid cap of the 6D8G tube through a .02 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

(b) Set the signal generator to exactly 465 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak each of the trimmers on the 2nd I-F coil, Illus. #8 (Fig. 2).

(e) Peak each of the trimmers on the 1st I-F coil, Illus. #7 (Fig. 2).

(f) In order to assure accurate settings of the I-F trimmers the above adjustments should be repeated using the lowest signal generator output that will give a reasonable output meter scale deflection.

2. Aligning R-F Circuits--Foreign Band 5.7-18.3 Megacycles

(a) Remove the signal generator lead from the grid of the 6D8G tube and connect it to the receiver antenna terminal through a 400 ohm carbon resistor.

(b) Check to see that the tuning dial has not slipped on the condenser gang shaft by turning the rotor plates of the gang condenser until they are completely in mesh, at which point the dial pointer should be at the low frequency end of the dial calibration.

(c) Set the signal generator frequency and receiver dial to exactly 18.3 megacycles.

(d) Adjust the 18.3 megacycle oscillator trimmer, Illus. #11 (Fig. 3) to bring in the 18.3 megacycle signal with maximum output. NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.3 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.3 megacycles always check to see if the proper peak has been used. To do this leave signal generator frequency at 18.3 megacycles, increase the output of the signal generator and tune the receiver dial to approximately 17.3 megacycles. Then vary the receiver dial slightly to the right and left of 17.3 megacycles, and if the fundamental peak was used in aligning at 18.3 megacycles the test signal will be heard at approximately 17.3 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.3 megacycle oscillator trimmer must be properly readjusted.

(e) Set the signal generator frequency and the receiver dial to exactly 15 megacycles.

(f) Ajust 15 megacycle antenna trimmer, Illus. #10 (Fig. 3) to maximum output.

3. Aligning R-F Circuits--Police-Amateur Band (1.7-5.8 Megacycles)

(a) Set signal generator frequency and receiver dial to exactly 5.8 megacycles.

(b) Adjust 5.8 megacycle oscillator trimmer, Illus. #11 (Fig. 3) to bring in 5.8 megacycle signal generator signal with maximum output.

(c) Set signal generator frequency and receiver dial to exactly 5 megacycles.

(d) Adjust 5 megacycle antenna trimmer, Illus. #10 (Fig. 3) for maximum output.

4. Aligning R-F Circuits--American Broadcast Band 1720-540 Kilocycles

(a) Replace 400 ohm series resistor with a .00025 mfd. condenser.

(b) Set signal generator frequency and receiver dial to exactly 1720 kilocycles.

(c) Adjust 1720 kilocycle oscillator trimmer, Illus. #11 (Fig. 3) to bring in 1720 kilocycle signal generator signal to maximum output.

(d) Set signal generator frequency and receiver dial to exactly 1400 kilocycles.

(e) Adjust 1400 kilocycle antenna trimmer, Illus. #12A (Fig. 2), for maximum output.

(f) Adjust 1400 kilocycle preselector trimmer, Illus. #10 (Fig. 3), for maximum output.

(g) Set receiver dial and signal generator frequency to approximately 600 kilocycles, leaving the signal generator connected to antenna and ground terminals of the receiver.

(h) Adjust 600 kilocycle oscillator padder condenser, Illus. #13 (Fig. 3), while rocking tuning condenser back and forth for maximum 600 kilocycle signal response.

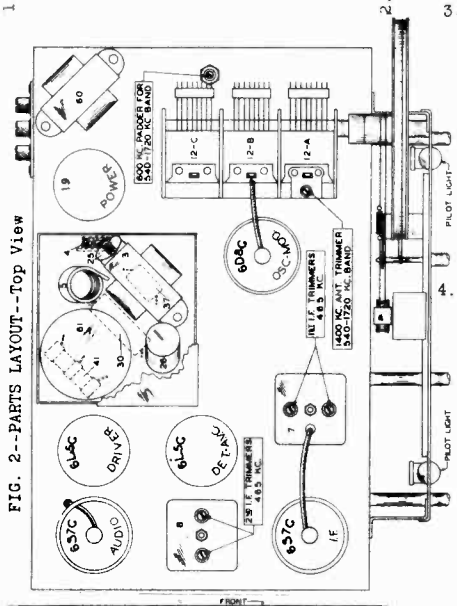
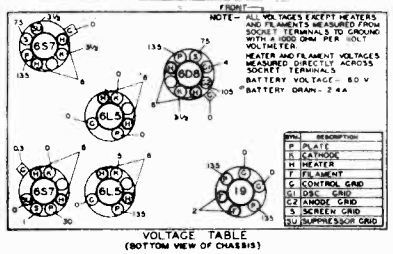


FIG. 2--PARTS LAYOUT--Top View



VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

Delco Model R-6015 Date: 8-2-37

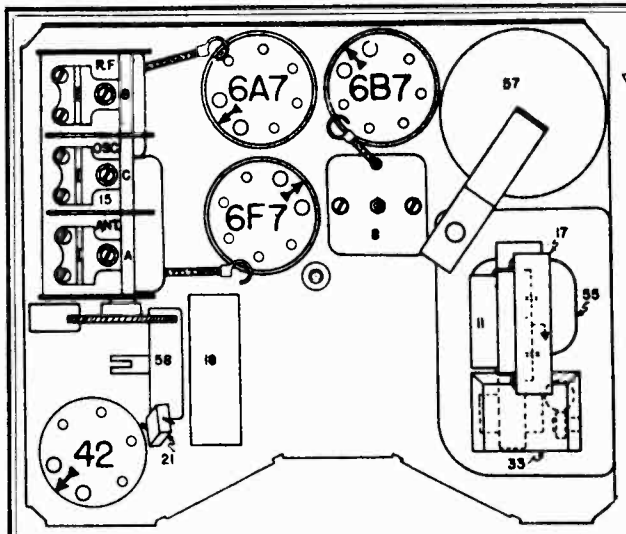


FIG. 2 PARTS LAYOUT--Top View
(BELOW Serial No. 0383500)

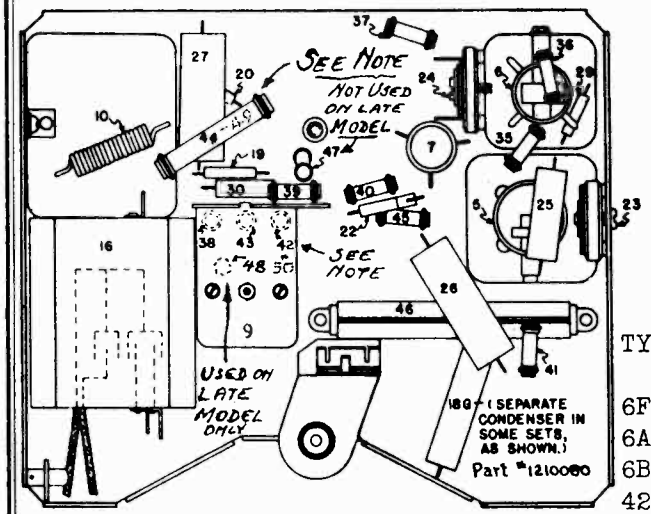
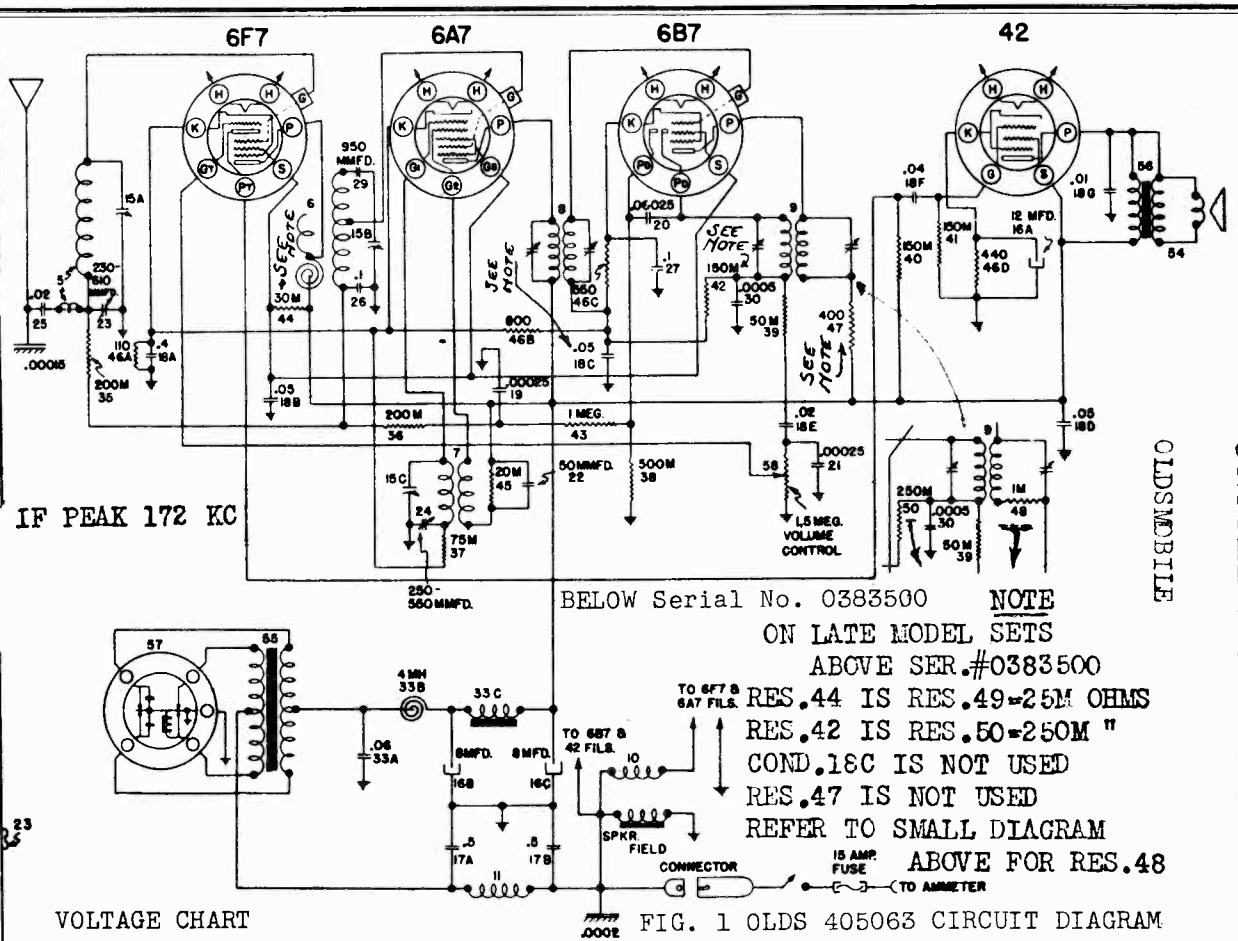


FIG. 3 PARTS LAYOUT--Bottom View
(BELOW Serial No. 0383500)



NOTE
ON LATE MODEL SETS
ABOVE SER.#0383500
RES.44 IS RES.49-25M OHMS
RES.42 IS RES.50-250M "
COND.18C IS NOT USED
RES.47 IS NOT USED
REFER TO SMALL DIAGRAM
ABOVE FOR RES.48

FIG. 1 OLDS 405063 CIRCUIT DIAGRAM

VOLTAGE CHART

TYPE	FUNCTION	H	P	PT	S	G1	G2	GS	GT	K
6F7	R.F. 1st Aud.	6	225	60	*90	-	-	-	0	2.1
6A7	Det. Osc.	6	225	--	-	0	150	90	-	2.1
6B7	I.F. 2nd Det. A.V.C.	6	225	--	*90	-	-	-	-	8.0
42	Output	6	215	--	225	-	-	-	-	15.0

*98 volts on sets above Serial No. 0383500.

Ampere drain of set at 6 volts is 5.8 amperes. Milliampere drain from "B" supply is approximately 55 M.A.

The audio output of the detector circuit is coupled to the triode portion of the 6F7 tube for audio frequency amplification. The pentode section of this same tube is used as a radio frequency amplifier.

All readings were taken to the chassis frame with a 1000 ohm per volt meter.

Date: 11-1-36

1. Peaking I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame. Connect the other lead to the grid cap of the 6A7 tube through a .1 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

(b) Set the signal generator to exactly 465 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak each of the trimmers on the 2nd I-F coil, Illus. #6A and 6B (Fig. 2).

(e) Peak each of the trimmers on the 1st I-F coil, Illus. #5A and 5B (Fig. 2).

(f) In order to assure accurate settings on the I-F trimmers the above adjustments should be repeated using the lowest signal generator output that will give a reasonable output meter scale deflection.

2. Aligning Circuits--Foreign Band 7.15-18.5 Megacycles

(a) Remove the signal generator lead from the grid of the 6A7 tube and connect it to the receiver antenna terminal through a 400 ohm carbon resistor.

(b) Check to see that the tuning dial has not slipped on the condenser gang shaft by turning the rotor plates of the gang condenser until they are completely in mesh, at which point the dial pointer should point to the last line at the low frequency end of the dial calibration.

(c) Turn band selector switch for operation on 18.5-7.15 megacycle band and set signal generator frequency and receiver dial to exactly 18.5 megacycles.

(d) Adjust the 18.5 megacycle oscillator trimmer, Illus. #12A (Fig. 3) for maximum 18.5 megacycle signal generator signal output. NOTE: When adjusting this trimmer two peaks may be noticed, in which case CARE MUST BE TAKEN THAT THE PROPER PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.5 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the second peak which is the proper one to use is tuned in.

(e) Set the signal generator frequency and the receiver dial to exactly 15 megacycles.

(f) Adjust 5 megacycle antenna trimmer, Illus. #10A (Fig. 3) for maximum output.

(g) Adjust 15 megacycle R-F trimmer, Illus. #11A (Fig. 3) for maximum output.

3. Aligning Circuits--Police-Amateur Band 2230-7500 Kilocycles

(a) Turn band selector switch for operation on 2230-7500 kilocycle band, set signal generator frequency and receiver dial to exactly 7.5 megacycles.

(b) Adjust 7.5 megacycle oscillator trimmer, Illus. #12B (Fig. 3) for maximum 7.5 megacycle signal output.

(c) Set signal generator frequency and receiver dial to exactly 6 megacycles.

(d) Adjust 6 megacycle antenna trimmer, Illus. #10B (Fig. 3) for maximum sensitivity.

(c) Adjust 6 megacycle R-F trimmer, Illus. #11B (Fig. 3) for maximum sensitivity.

(f) Set signal generator and receiver dial to approximately 2.5 megacycles--then while rocking gang condenser back and forth adjust 2.5 megacycle oscillator padder condenser, Illus. #9 (Fig. 2) for maximum sensitivity.

4. Aligning Circuits--American Broadcast Band 1720-540 K.C. Band

(a) Turn band selector for operation on 1720 to 540 kilocycle band, set signal generator frequency and receiver dial to exactly 1702 kilocycles. Replace 400 ohm series resistor in signal lead connected to antenna terminal with a .00025 mfd. condenser.

(b) Adjust 1720 kilocycle oscillator trimmer, Illus. #12C (Fig. 3) for maximum 1720 kilocycle signal generator signal output.

(c) Set signal generator frequency and receiver dial to exactly 1400 kilocycles.

(d) Adjust 1400 kilocycle antenna and R-F trimmers, Illus. #10C and 11C (Fig. 3) for maximum output.

(e) Set receiver dial and test oscillator frequency to approximately 600 kilocycles.

(f) Adjust 600 kilocycle oscillator padder condenser, Illus. #8 (Fig. 2) while rocking tuning condenser back and forth for maximum 600 kilocycle signal response.

All of the adjustable condensers are very accurately adjusted at the factory and should need no further adjustment unless tampered with in the field or a defective coil has been replaced. If realignment is found necessary, the set can be properly adjusted only by using a calibrated test signal oscillator or signal generator and an output meter.

Schematic, Socket, Chassis Trimmers, Voltage

UNITED MOTORS SERVICE

MODELS 544290, 544291
Serials with prefix "A"

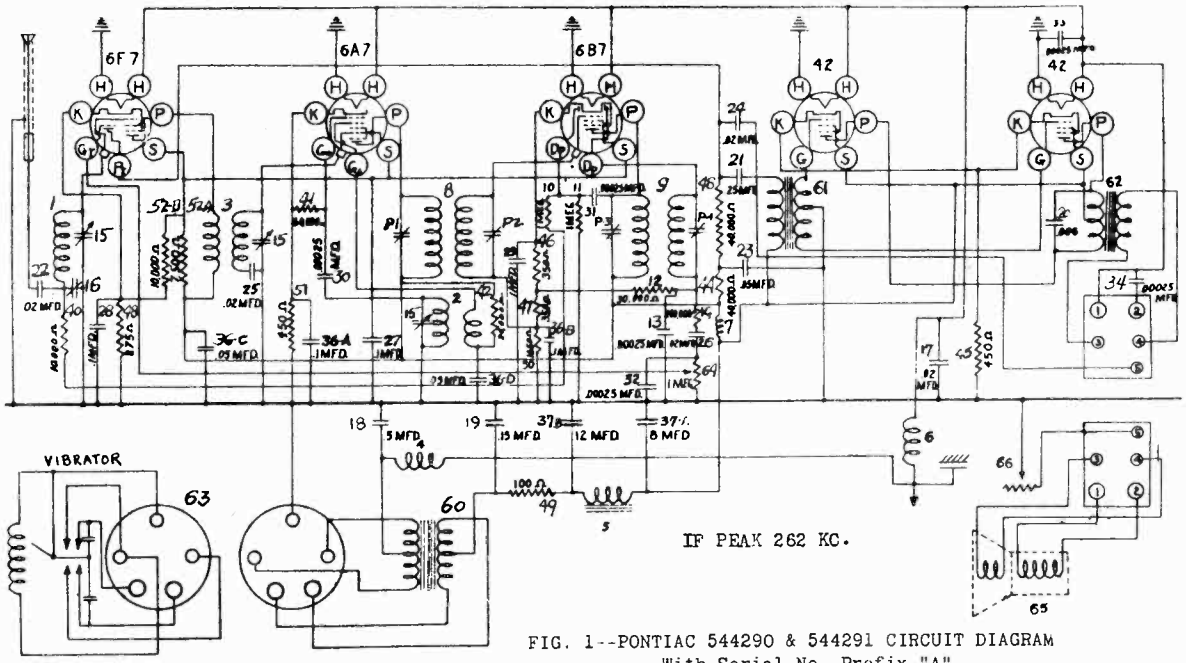


FIG. 1--PONTIAC 544290 & 544291 CIRCUIT DIAGRAM
With Serial No. Prefix "A".

Date: 2-25-38

TUBE SOCKET VOLTAGES

Type	Function	H	P	S	Pt	Gt	Ga	Go	K
6F7	R-F-1st A-F	6	230	110	110	0	-	-	7.0
6A7	Det.-Osc.	6	230	110	-	-	140	-	5.0
6B7	I-F Det.-AVC	6	230	100	-	-	-	-	13.0
42	Output	6	225	230	-	-	-	-	18.0
42	Output	6	225	230	-	-	-	-	18.0

Note: Data for Models 544290 and 544291, having serial numbers with the prefix "A" is given on this page.

For data for Models 544290 and 544291, having serial numbers with the prefix "O", see index for Model 405057 Olds, etc

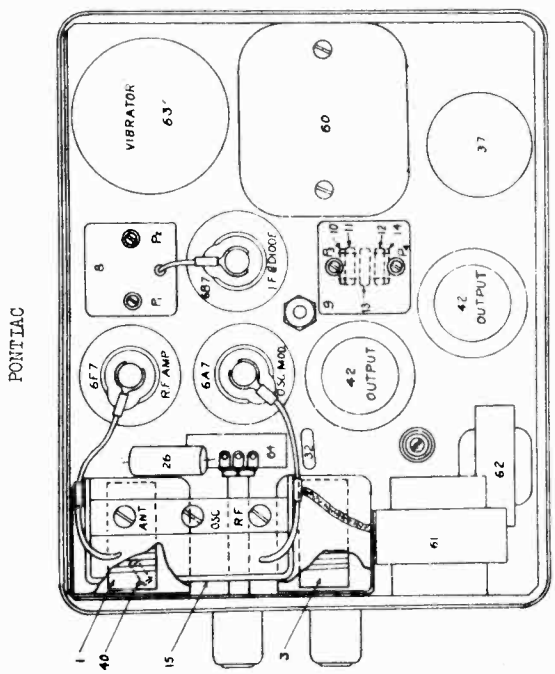


FIGURE 2--PARTS LAYOUT--Top View

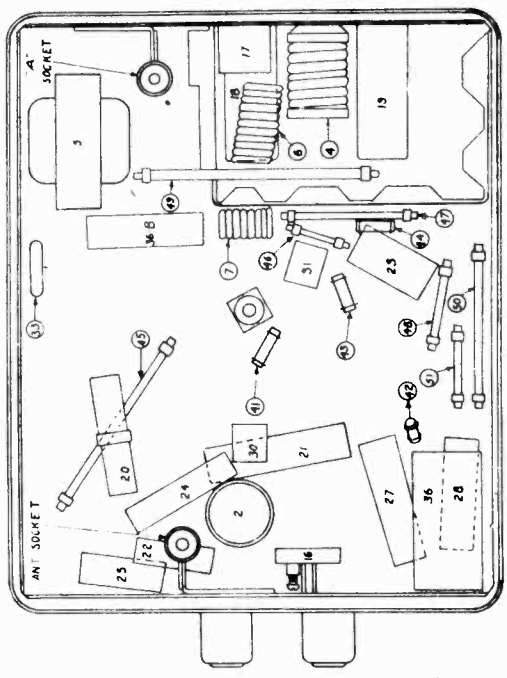


FIGURE 3--PARTS LAYOUT--Bottom View

MODELS 544290, 544291
Serials with prefix "A" UNITED MOTORS SERVICE
Alignment, Parts, Data

CIRCUIT ALIGNMENT

If realignment is found necessary, the circuits can be adjusted only with the chassis in its case, using a calibrated test oscillator or signal generator and an output meter.

1. Aligning I-F Stages at 262 Kilocycles

(a) Connect the signal lead of the signal generator to the grid cap of the 6A7 tube through a .5 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect the ground lead of the signal generator to the chassis frame.

(c) Connect the output meter to the plate prongs of the 42 type tubes.

(d) Set the signal generator to 262 kilocycles.

(e) Adjust the 2nd I-F trimmers (Illus. 9, Fig. 2) and then the 1st I-F trimmers (Illus. 8, Fig. 2) for maximum output. This operation should be repeated until no further increase in output is obtained.

2. Aligning at 1530 Kilocycles

(a) Disconnect the signal lead of the signal generator from the grid of the 6A7 tube and connect to the antenna terminal of the receiver.

(b) Turn the rotor plates of the gang condenser completely out of mesh and against the high frequency stop.

(c) Set the signal generator to 1530 kilocycles.

(d) Adjust the trimmer for the oscillator section of the gang condenser (middle section) CAREFULLY for maximum output. Then adjust the trimmer for the"R-F" and "ANT" sections of the gang condenser also for maximum output.

3. Aligning at 1400 Kilocycles

(a) Set the signal generator to 1400 kilocycles.

(b) Turn the condenser rotor plates until this signal is tuned in with maximum output.

(c) Readjust only the parallel trimmers for the "R-F" and ANT. sections of the gang condenser (Fig. 2) for maximum output.

4. Aligning at 600 Kilocycles

(a) Set the signal generator to 600 kilocycles.

(b) Turn the condenser rotor plates until this signal is tuned in with maximum output.

(c) Adjust the antenna compensating condenser (Illus. 16, Fig. 3) for maximum output.

(d) Retune the condenser plates for maximum output.

Repeat these operations alternately until no further improvement in output can be noted.

5. Realigning at 1400 Kilocycles

(a) Set the signal generator again to 1400 kilocycles.

(b) Turn the condenser rotor plates until this signal is tuned in with maximum output.

(c) Readjust the trimmer for the "ANT" section of the gang condenser CAREFULLY for maximum output.

6. Adjusting Receiver to Car Antenna

(a) Tune the receiver to a weak broadcast station on the low frequency end of the dial, 550 to 700 K.C.

(b) Adjust the antenna compensating condenser (Illus. 16, Fig. 3) for maximum response from the broadcast station.

REPLACEMENT PARTS

CHASSIS ELECTRICAL PARTS

Illus. No.	Part No.	Part Name	Description
1	1209343	Coil	Antenna
2	1209345	Coil	Oscillator
3	1209344	Coil	R-F
4	1209895	Coil	Vibrator "A" choke
5	1209291	Coil	"B" filter choke (audio)
7	1210079	Coil	"B" filter choke (R-F)
8	1209326	Coil assy.	1st I-F
9	1209287	Coil assy.	2nd I-F
10-11	1209885	Resistor	Insulated 1 megohm 1/2 watt
12	1209884	Resistor	Insulated 300,000 ohms 1/2 watt
13	1209796	Condenser	Molded .00025 mfd.
14	1209883	Resistor	Insulated 100,000 ohms 1/2 watt
15	1209346	Condenser	3 gang tuning
16	1209633	Condenser	Ant. compensating
17	1212099	Condenser	Tubular .02 mfd. 600 V.
18	1209299	Condenser	Metal case .5 mfd. 160 V.
19	1209300	Condenser	Metal case .15 mfd. 400 V.
20	7230593	Condenser	Tubular .006 mfd. 800 V.
21	7231594	Condenser	Tubular .25 mfd. 400 V.
22	1209310	Condenser	Tubular .02 mfd. 200 V.
23	1209308	Condenser	Tubular .05 mfd. 400 V.
24	1212099	Condenser	Tubular .02 mfd. 600 V.
25-26	1209307	Condenser	Tubular .02 mfd. 200 V.
27-28-29	1207908	Condenser	Tubular .1 mfd. 400 V.
30-31-32	1209796	Condenser	Molded .00025 mfd.
33-34	1209796	Condenser	Molded .00025 mfd.
36	1209289	Condenser	By-pass block
		Sec. A	.1 mfd. 200 V.
		Sec. B	.1 mfd. 200 V.
		Sec. C	.05 mfd. 400 V.
		Sec. D	.05 mfd. 400 V.
37	1209819	Condenser	Electrolytic block
		Sec. A	8 mfd. 350 V.
		Sec. B	12 mfd. 350 V.
40	1209883	Resistor	Insulated 100,000 ohms 1/2 watt
41	1208320	Resistor	Insulated 60,000 ohms 1/2 watt
42	1209405	Resistor	Insulated 20,000 ohms 1/2 watt
43-44	1208296	Resistor	Insulated 40,000 ohms 1/2 watt
45	1210078	Resistor	Flex. 450 ohms 3 watts
46-47	1208802	Resistor	Flex. 350 ohms 1/2 watt
48	1208125	Resistor	Flex. 275 ohms 1/2 watt
49	1209359	Resistor	Flex. 100 ohms 3 watts
50	1208956	Resistor	Flex. 1650 ohms 1/2 watt
51	1208110	Resistor	Flex. 450 ohms 1/2 watt
52	1209795	Resistor	Voltage divider
		Sec. A	7500 ohms
		Sec. B	10,000 ohms
60	1209282	Transformer	Power
61	1209815	Transformer	Input
62	1209293	Transformer	Input
63	5039661	Vibrator	Synchronous
64	1209296	Control	Volume--1 megohm

Pontiac 544290-1

Date: 2-25-38

Note: Data for Models 544290 and 544291, having serial numbers with the prefix "A" is given on this page.

For data for Models 544290 and 544291, having serial numbers with the prefix "O" see index for Model 405057 Olds, etc.

The Model 544290 is equipped with a"header" speaker while the Model 544291 makes use of the "dash" speaker.

HEADER SPEAKER PARTS

1210149	Speaker assy.	Complete
601745	Cable assy.	Speaker--5 prong
1209841	Cloth assy.	Grille--incl. ring
1209169	Plug	Speaker plug
1209840	Screen	Speaker grille (metal)
1209263	Speaker	Unit only
1209844	Spring	Tone control knob
1209628	Control	Tone 300,000 ohms

DASH SPEAKER PARTS

1210151	Speaker assy.	Complete
1209657	Cable	Speaker--5 prong
1209169	Plug	Speaker cable--5 prong
1210135	Speaker	8" dynamic

MISCELLANEOUS PARTS

1209334	Bolt	Cover stud			
1209335	Bracket	Volume control			
1209337	Case	Transformer			
1209342	Clamp	Elect. cond. mtg.			
1209350	Cover	Transformer bottom			
1209351	Cover	Transformer top	1209186	Screw	Chassis to case mtg.
1209352	Cover	Partition bottom	1209185	Screw	Vib. shield plate mtg.
1209354	Plug	Ant. comp. cond. cover	140881	Screw (set)	Headless cup point (#10-32 x 5/16")
1208806	Ring	Tube shield	1209744	Nut	Cover stud--bolt mtg.
1208282	Ring	Osc. coil retaining	115109	Washer	Cover stud--bolt mtg.
1208275	Shield	Osc. coil			
1208807	Shield	Tube (half)			
1208808	Shield	Tube (half with slot)			
1209658	Socket	Speaker connecting			
1209065	Socket	Vibrator			
1209735	Screw	Chassis bottom cover ret.			

UNITED MOTORS SERVICE

MODEL 600565
Chevrolet
Schematic

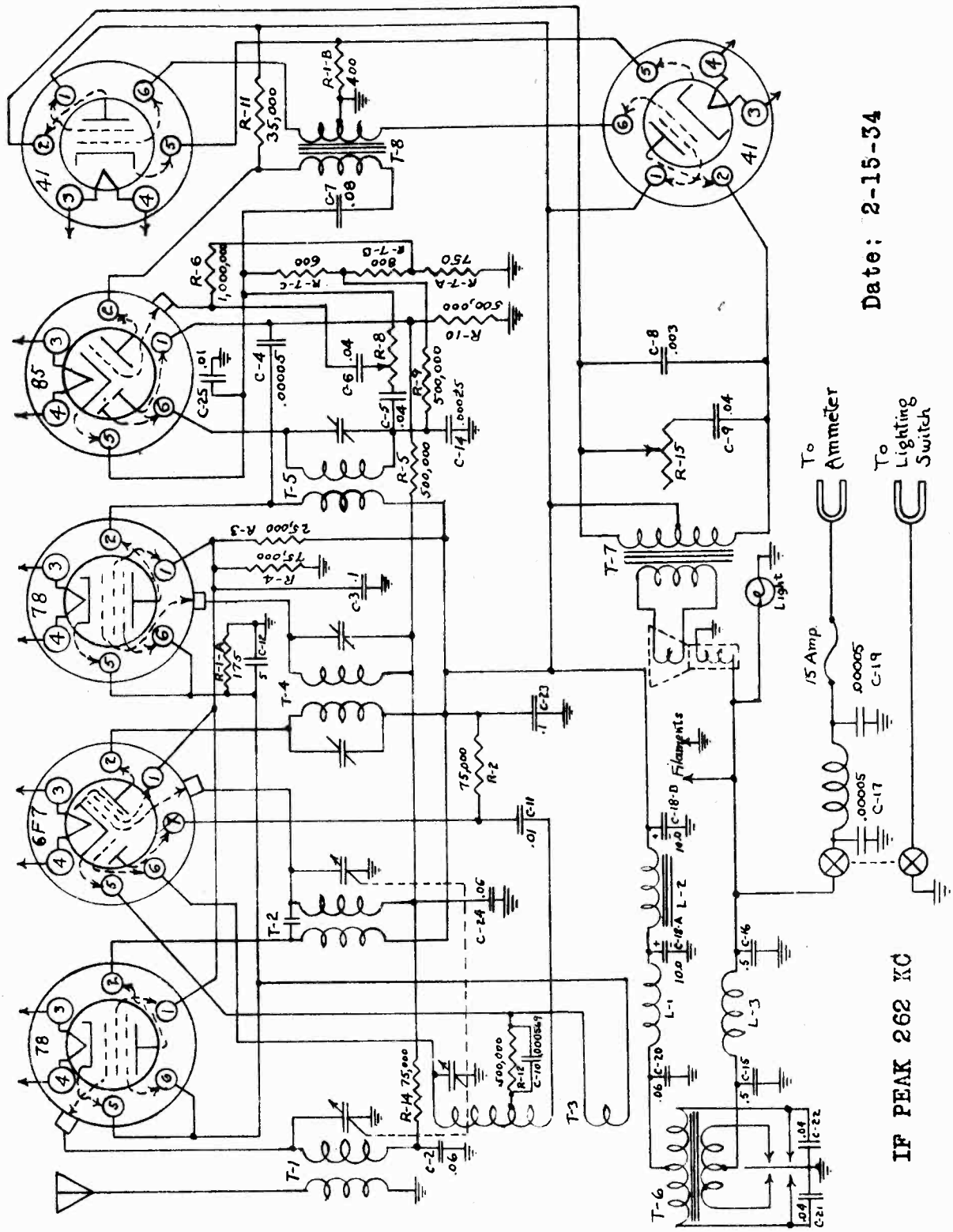


Fig. 2 CHEV. *600565 CIRCUIT DIAGRAM

VOLTAGE CHART

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Cond.	#7 Triode Plate
78	85	210	6.0	0	3.2	3.2	
6F7	85	210	0	6.0	3.2	0	90
78	85	210	6.0	0	3.2	3.2	
85	0	85	0	6.0	8.0	0	
41	210	205	6.0	0	16	0	
41	210	205	6.0	0	16	0	

Peaking I.F. Stages at 262 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the 41 output tubes. Make sure that the output meter is protected with a series condenser internally; if not, connect a 1/10 mfd. condenser in series with one of the output meter leads. The Dayrad #875 Universal Test Meter and Series #51 Volt-Ohmeter have this protective condenser included in them.

(a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassis ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available.

(f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

(a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208073) should be used. This block may be used also in peaking all of the U.M.S., B-O-P, and Chevrolet radios that use the "tubeless rectifier."

(c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.

(d) Open the condenser plates until they stop solidly against the beveled edge of the block as shown in Fig. 1.

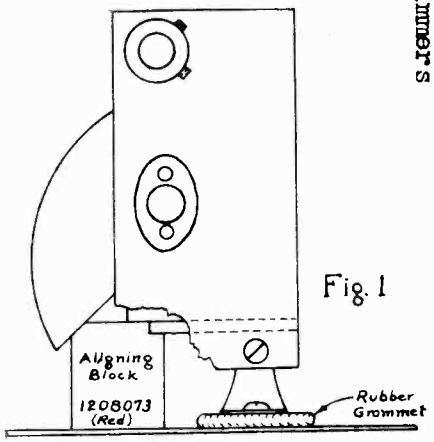


Fig. 1

(e) Peak the parallel trimmers on top of the condenser gang, the oscillator section first at 1400 K.C. for maximum deflection on the output meter.

(f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

NOTE: Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to determine the 1400 K.C. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be re-set.

GENERAL: The model 600565 auto radio is a powerful, two unit type, six tube superheterodyne radio receiver with airplane dial.

VIBRATOR NOISE

Examination of the mechanical construction of the transformer vibrator assembly will show that the bottom plate of the vibrator case is riveted to the chassis. The transformer-vibrator assembly is fastened to the bottom plate with two Parker Kalon screws through each end of the lid. For complete elimination of vibrator noise it is necessary that the bottom plate of the vibrator assembly make a good contact with the vibrator case at all points. Placing screws on all four sides of the bottom plate would make the servicing of the vibrator rather difficult, consequently screws were placed in the ends only. The press fit of the bottom plate must be depended upon to eliminate the vibrator noise.

Do not change a vibrator that is noisy electrically before checking the grounding of the vibrator assembly to its bottom plate. Use a pair of pliers to bend the longest sides of the bottom plate inward just enough to insure a pressure contact with the vibrator assembly at all points.

UNITED MOTORS SERVICE

MODEL 601177 Early Chevrolet
Below Ser.1748809
Schematic, Voltage

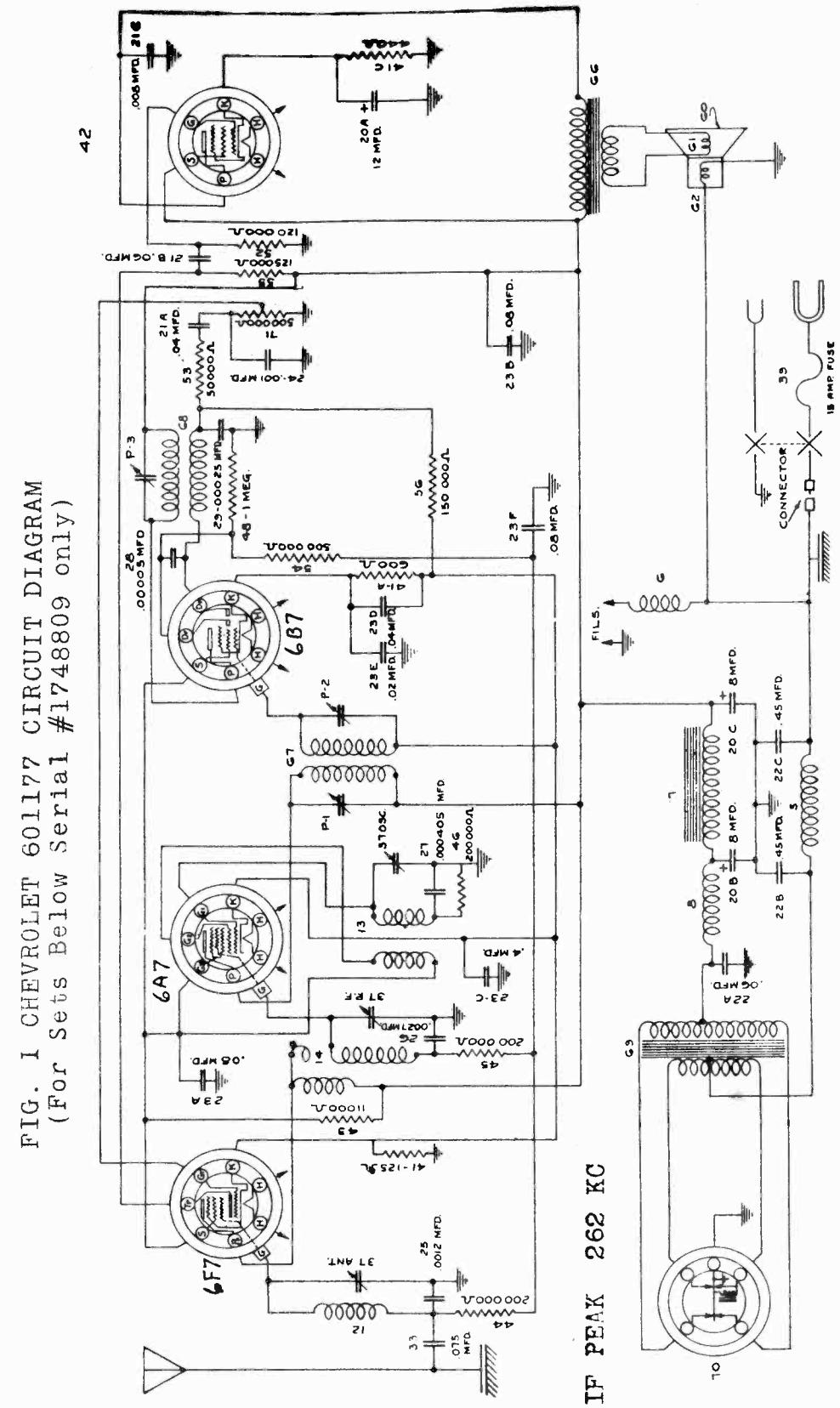


FIG. 1 CHEVROLET 601177 CIRCUIT DIAGRAM
(For Sets Below Serial #1748809 only)

VOLTAGE CHART

TYPE	FUNCTION	H	Pp	S	Tp	Gt	G	G1	G2	G3,5	K
6F7	R.F.	6	250	135	80	0	0	-	-	-	6.2
6A7	Det-Osc.	6	250	-	-	-	0	0	120	135	6.2
6B7	2nd Det-AVC	6	250	135	-	-	**0	-	-	-	8.5
42	Output	6	240	250	-	-	0	-	-	-	16.0

** 6.2 Volts for sets below serial No. 1748809

MODEL 601177 Late
Chevrolet
Above Ser.1748809
Schematic, Voltage

UNITED MOTORS SERVICE

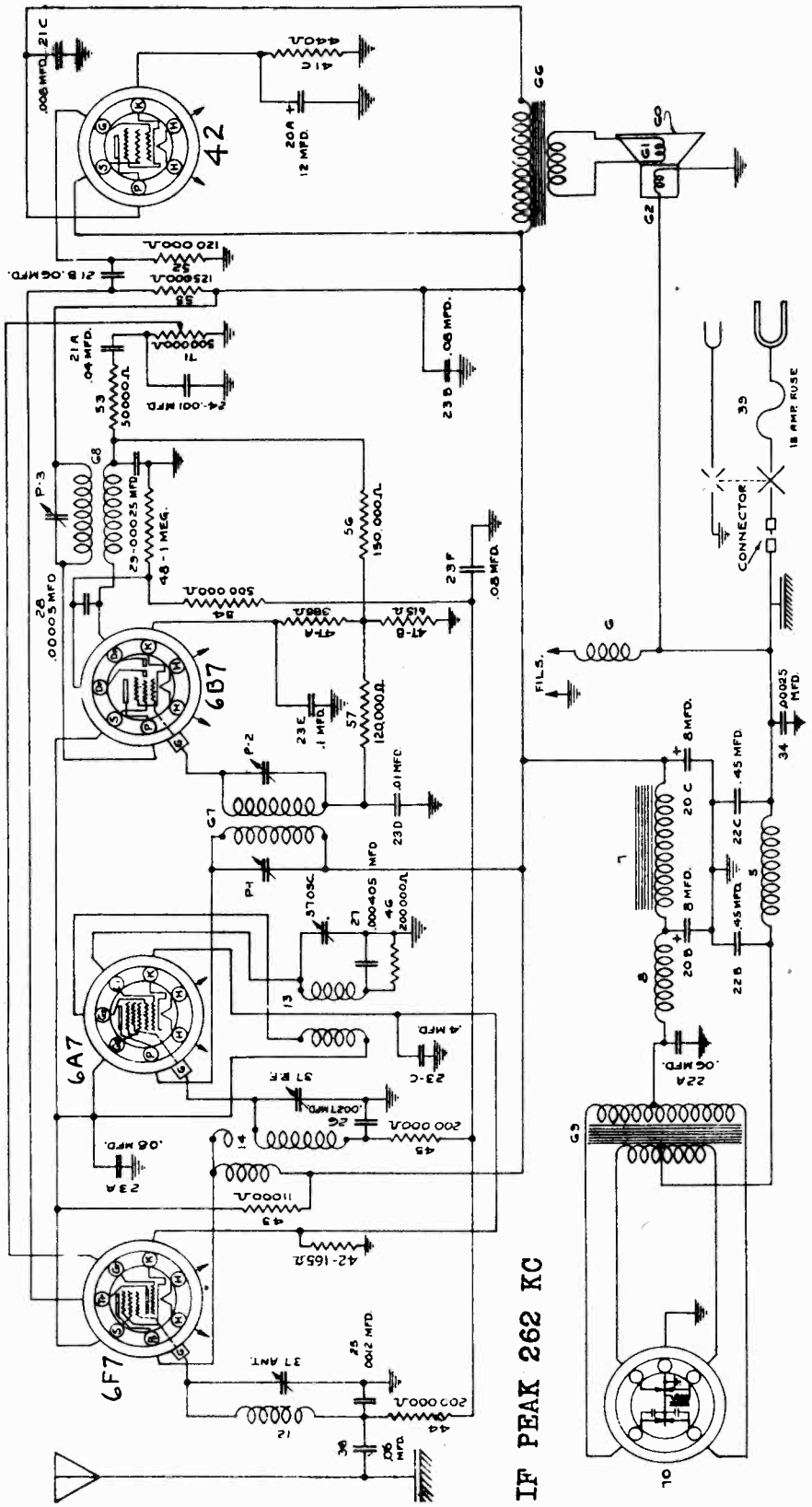


FIG. 1A CHEVROLET 601177 CIRCUIT DIAGRAM
(For Sets above Serial #1748809 only)

GENERAL: The Models 601177 is a four tube, single unit, superheterodyne auto radio. It is designed specifically for Chevrolet automobiles and equipped with a remote control and a plug-in vibrator of the full wave, self rectifying type.

VOLTAGE DATA OF LATE MODEL CHEVROLET 601177
SAME AS GIVEN FOR EARLY MODEL

Socket, Trimmers, Chassis Changes

UNITED MOTORS SERVICE

MODEL 601177, Early, Late Chevrolet

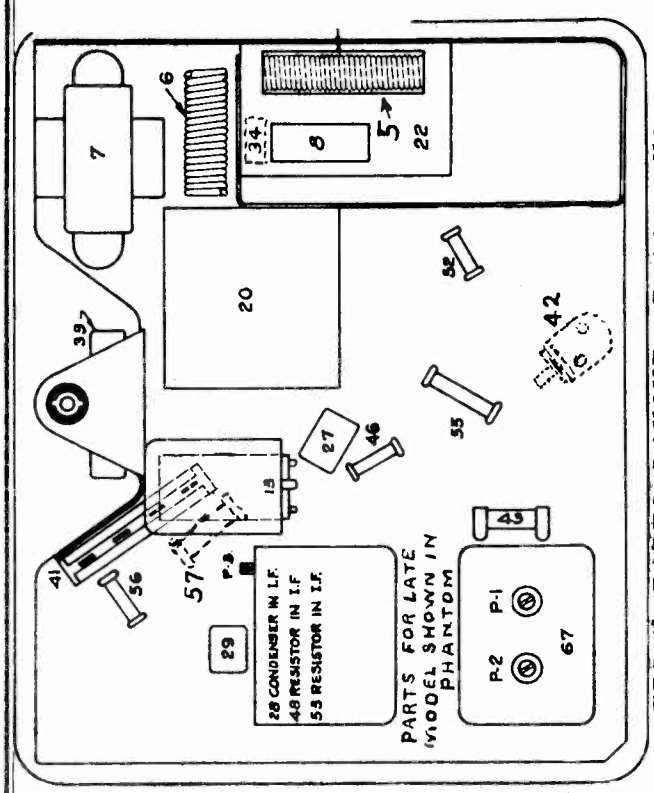


FIG. 2 PARTS LAYOUT--Bottom View

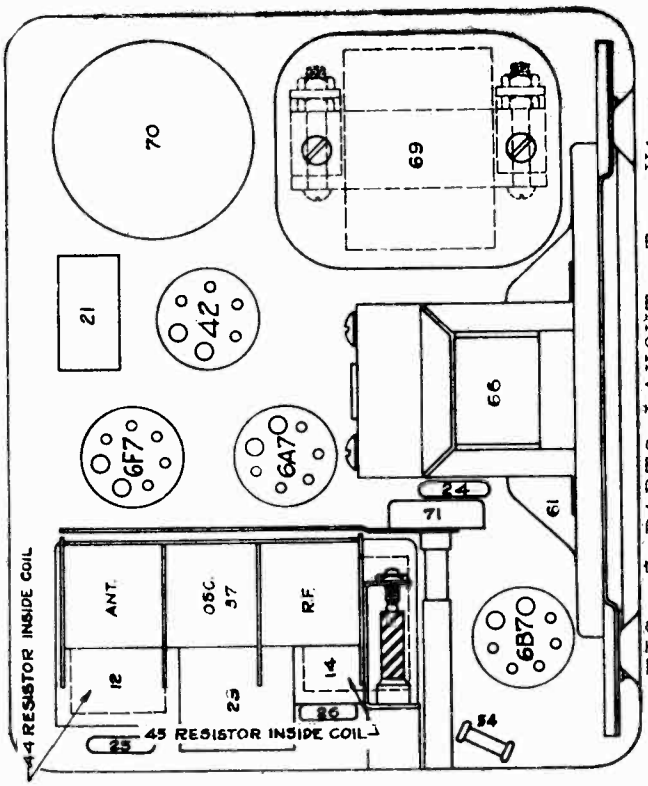


FIG. 3 PARTS LAYOUT--Top View

CIRCUIT CHANGES

Several changes were made in the receiver circuit starting at serial #1748809. It will be necessary to use Figures 1, 2 and 3 for receivers below serial #1748809 and to use Figures 1A, 2A and 3A for receivers above serial #1748809. PARTS SHOWN IN PHANTOM.
It will be noted on some receivers that the .008 mfd. section (Illus. 21C) of the part #1209048 Condenser Block has its lead cut off close to the block and a .008 mfd. tubular condenser connected from the plate of the 42 tube in its place. This change was made because it was found necessary to change the voltage rating of the .008 mfd. section of the condenser block after production started and a .008 mfd. tubular condenser was simply used until a new block could be manufactured. The tubular condenser used is part #1209212 and is located alongside of the power filter choke. All of the service replacement stock of #1209048 condenser blocks have a .008 mfd. section of a higher voltage rating and in installing these blocks in a receiver where the tubular condenser was used it will be necessary to either remove the tubular condenser or clip the lead off of the .008 section of the block.

The capacity of two sections of the part #1209050 Condenser Block (Illus. 23A to F) were changed at serial #1748809 along with several other circuit changes. The "D" section which was originally .04 mfd. was changed to .01 mfd. and the "E" section which was originally .01 mfd. was changed to .1 mfd. All of the service replacement stock of the part #1209050 Condenser Blocks are of the new type incorporating the above changes and should be used in the service replacement of all part #1209050 condenser blocks used below serial #1748809.

MODEL 601177, Early, Late
Chevrolet
Alignment

UNITED MOTORS SERVICE

Peaking I.F. Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a 1 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The 1 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.

(b) Set the test oscillator on 262 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak the I.F. trimmer P-3 for the 2nd I.F. coil shown on Figure 2.

(e) Then peak trimmers P-2 and P-1 of the first I.F. coil also shown on Figure 2.

(f) In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

Peaking Gang Condenser at 1530 and 1400 K.C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. Do not use the 1 mfd. condenser that was required in aligning the I.F. stages.

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the oscillator section (middle section) of the gang condenser CAREFULLY for maximum output. Then adjust the trimmers for the "R.F." and "ANT" sections of the gang condenser.

(e) Set the test oscillator on 1400 kilocycles.

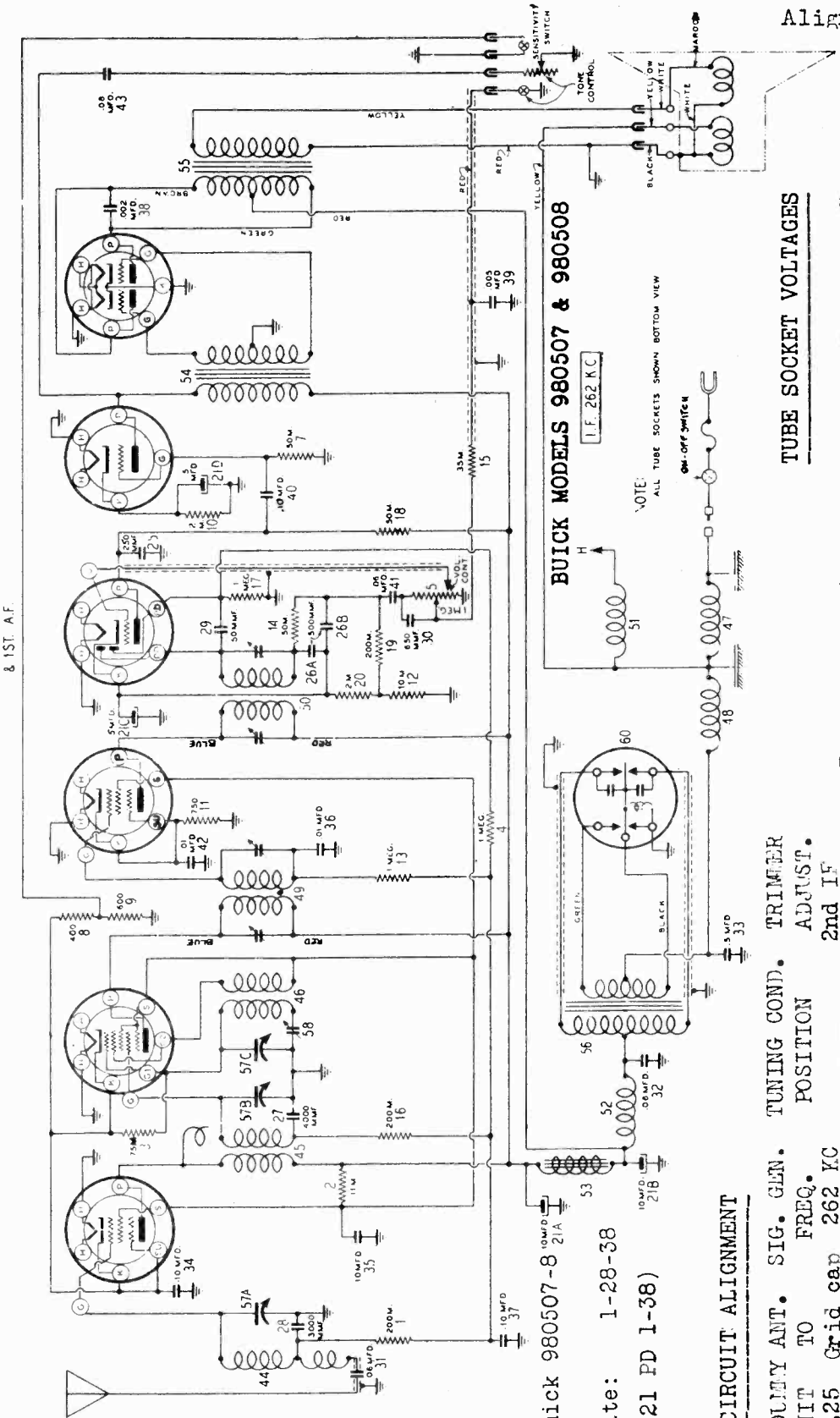
(f) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output. (No calibration blocks should be used as the oscillator circuit is adjusted at 1530 K.C. on this set.)

(g) Readjust the parallel trimmers for the "R.F." and "ANT" sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT disturb the oscillator trimmer (middle section) as this is adjusted at 1530 K.C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

CAUTION: Always use the lowest possible test oscillator output that will give a reasonable deflection of the output meter pointer, in order to prevent the A.V.C. from leveling out the output as the adjustments are made.

UNITED MOTORS SERVICE

MODELS 980507,980508
Buick
Schematic, Voltage
Alignment
MODEL 980509
Alignment



Buick 980507-8
Date: 1-28-38
(221 PD 1-38)

TUBE SOCKET VOLTAGES

Type	Function	H	P	S G2	K
6D6	R-F	6	240	115 -	7
6A7	Det-Osc.	6	240	115 115	7
6D6	I-F	6	240	115 -	5
85	Det. A.V.C.	6	175	- -	12
76	A-F Driver	6	225	- -	13
6A6	Output	6	250	- -	0

CIRCUIT ALIGNMENT

DUMMY ANT. UNIT	SIG. GEN. TO	TUNING COND. POSITION	TRIMMER ADJUST.
.25	Grid cap 6A7	262 KC	2nd IF
.0002	Ant. Post	1560KC	Min. Cap.
"	"	1400 KC	Tune to Signal
"	"	600 KC	"

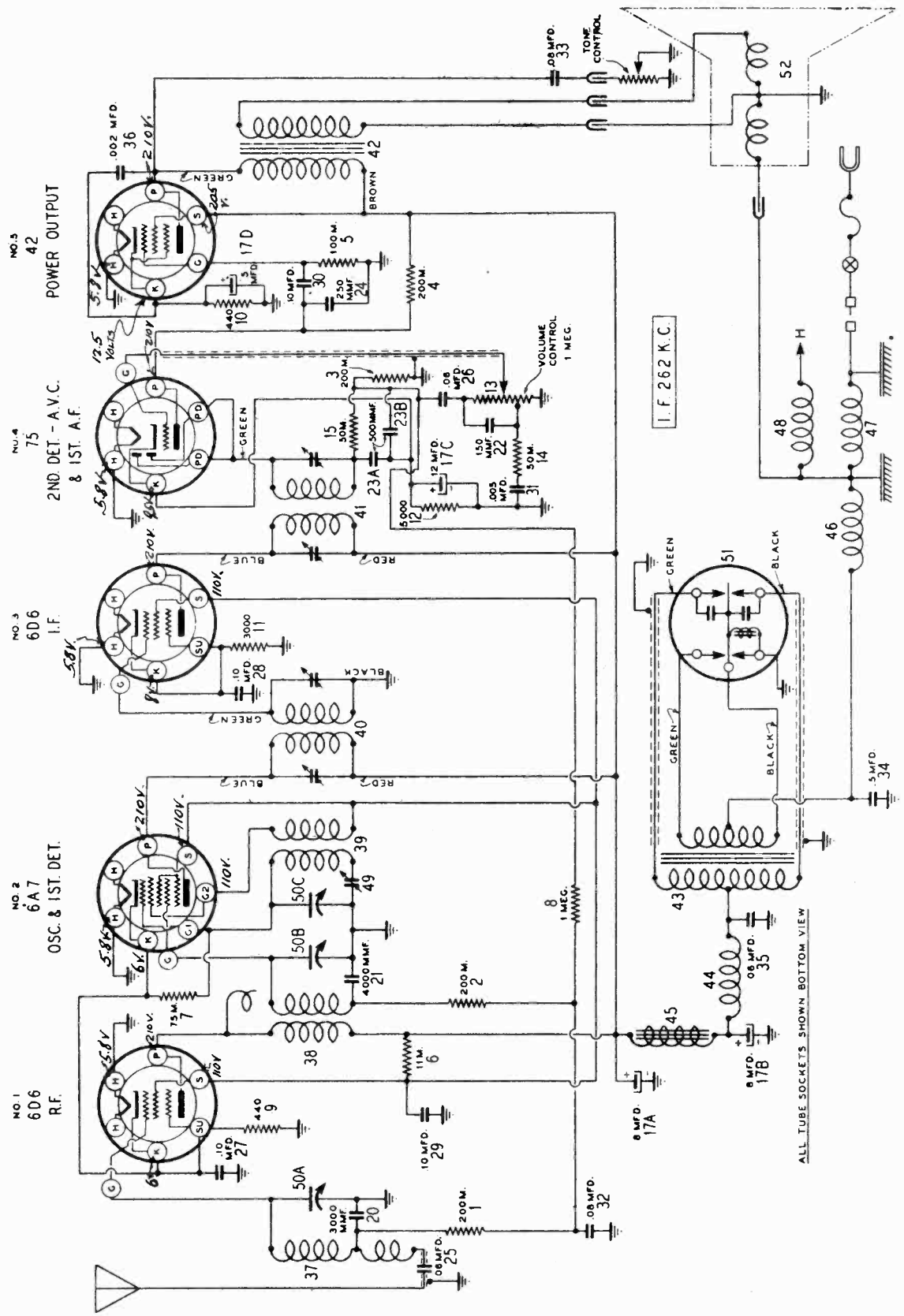
1st IF
Osc. Parallel
Ant. Parallel and R.F.
Osc. Tracking Condenser.

REPEAT ENTIRE PROCEDURE.

MODEL 980509 Buick
Schematic, Voltage

UNITED MOTORS SERVICE

This receiver was designed specifically for 1936 Buicks



BUICK MODEL 980509 CIRCUIT DIAGRAM

(222 PD 1-38)

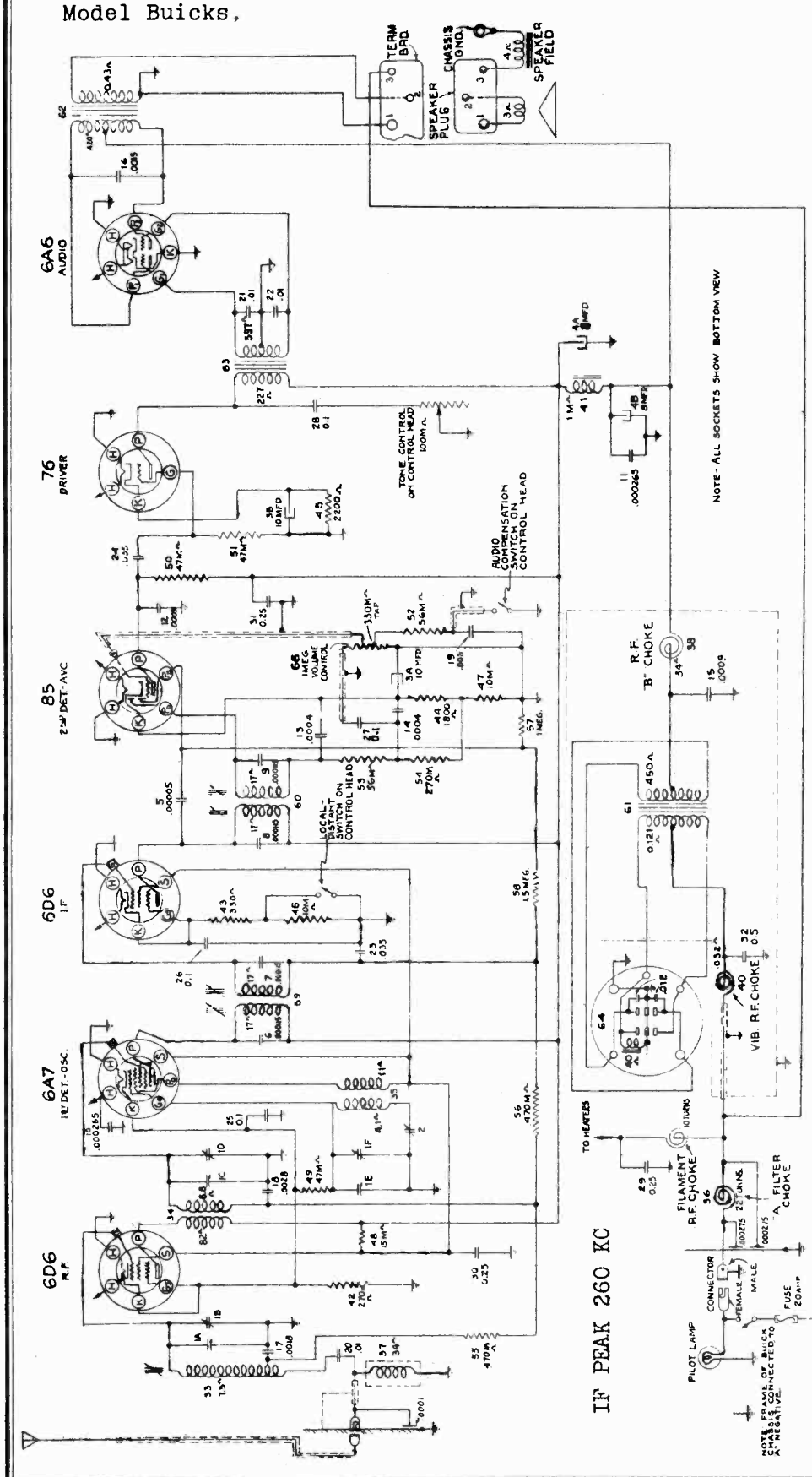
Date: 1-28-38

FOR ALIGNMENT SEE MODEL 980508

UNITED MOTORS SERVICE

MODELS 980525,980529
Buick
Schematic, Voltage

This receiver is designed specifically for 1936 Model Buicks.



IF PEAK 260 KC

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	GS	PO	K
6D6	R-F Amp.	6	235	90	4	-	4
6A7	Det.-Osc.	6	235	90	-	90	4
6D6	I-F Amp.	6	235	-	2.6	-	2.6
85	Det.-1st A-F	6	150	-	-	-	14
76	Driver	6	230	-	-	-	11
6A6	Output	6	260	-	-	-	0

BUICK MODEL 980525 and MODEL 980529

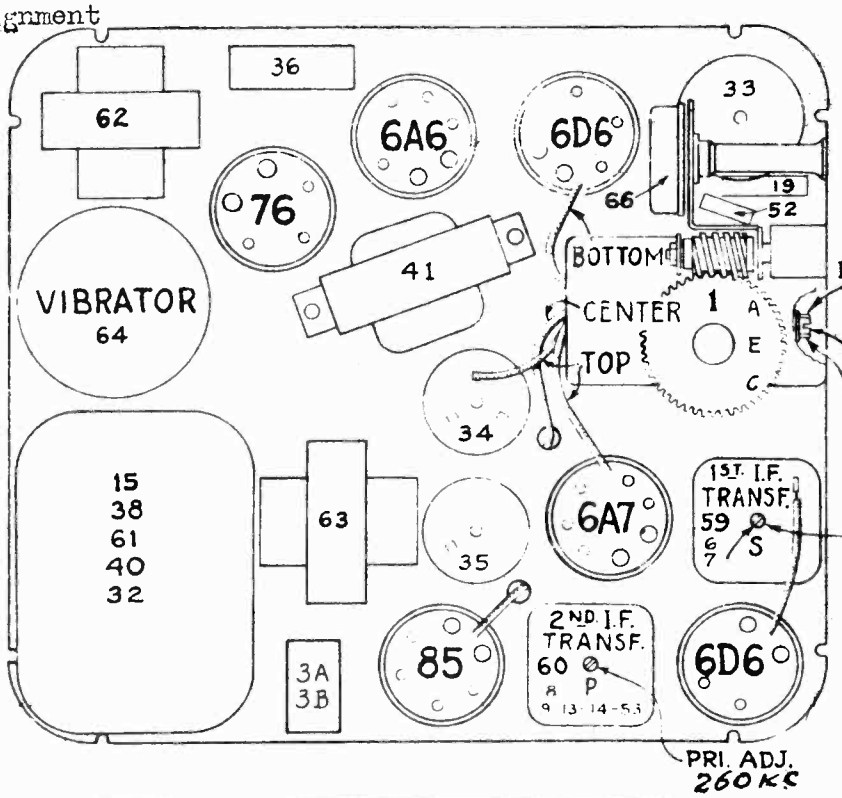
NOTE: Model 980525 is equipped with an 8" Dynamic Speaker. Model 980529 is equipped with a five and one half inch Header Speaker.

(391 PD 2-38) Date: 2-14-38

MODELS 980525, 980529
Buick
Socket, Trimmers, Chassis
Alignment

UNITED MOTORS SERVICE

MODEL 980526
Alignment

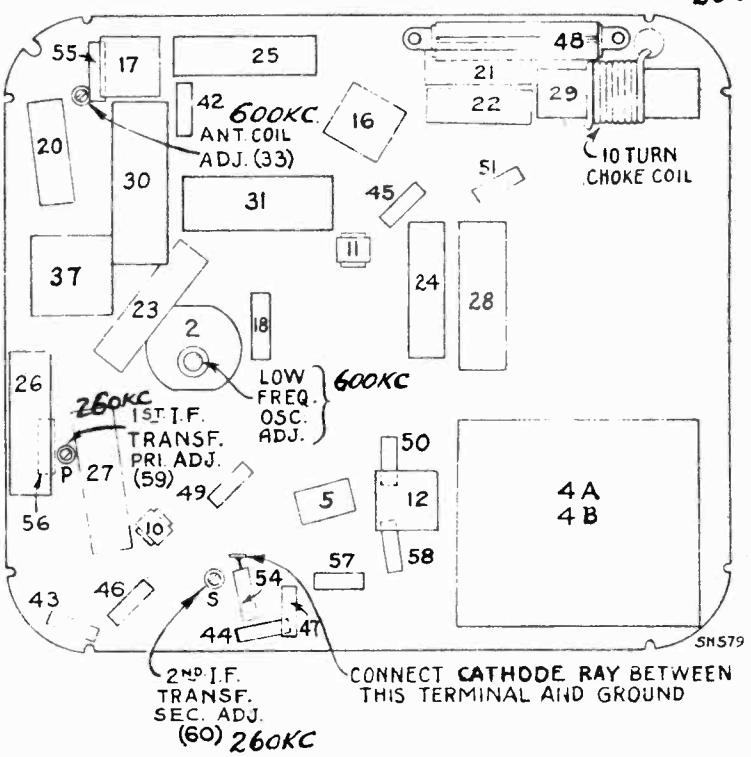


PARTS LAYOUT--Top View

BUICK MODEL 980525 AUTO RADIO

ALIGNMENT PROCEDURE

DUMMY ANT. UNIT TO	SIG. GEN FREQ.	TUNING COND. POSITION	TRIMMER TO ADJUST
.25 mfd. cap.	6A7 grid 260 KC	---	2nd IF
" "	" "	---	1st IF
" "	6D6 grid 1560 KC	Min. Cap.	Osc Parallel (OSC 1 F)
.0002 mfd. cap.	Ant. Post 600 KC	Tune to signal	Ant. Coil.
" "	" " 1400 KC	"	Parallel (ANT. 1B, R.F. 1D.)



PARTS LAYOUT -Bottom View

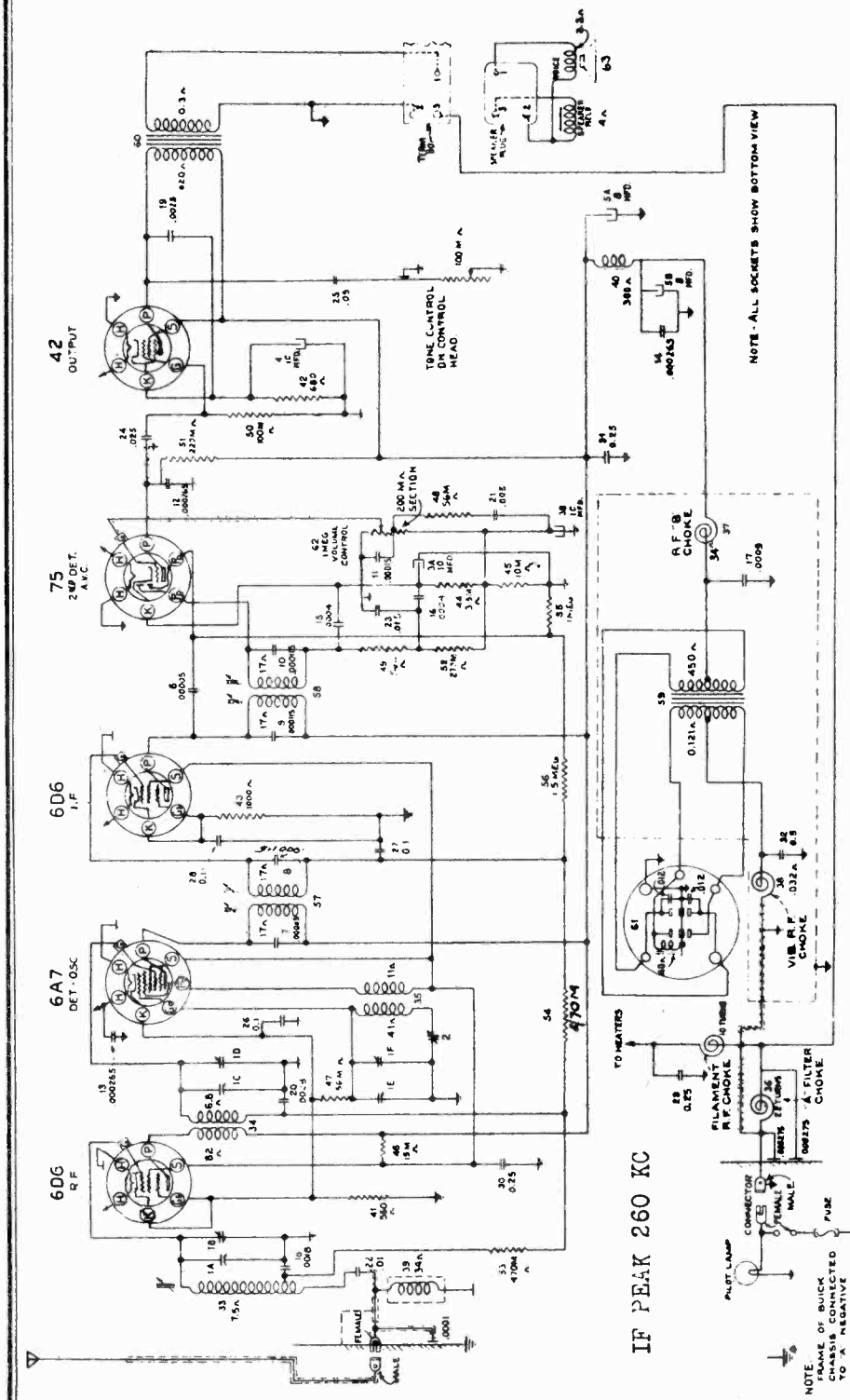
Checking I-F Band Spread

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustments to the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve.

MODEL 980526 Buick
Schematic, Voltage

UNITED MOTORS SERVICE

GENERAL: The Buick Model 980526 is a five tube, single unit, superheterodyne auto radio, designed specifically for 1936 Buicks, and is equipped with an instrument panel tuning control and tone control.



IF PEAK 260 KC

TUBE SOCKET VOLTAGES

BUICK MODEL 980526	Tube	Function	H	P	S	GS	PO	K
	6D6	R-F Amp.	6	260	95	7.4	-	7.4
FOR ALIGNMENT PROCEDURE	6A7	Det.-Osc.	6	260	95	-	95	7.4
SEE MODEL 980525	6D6	I-F Amp.	6	260	95	5.4	-	5.4
	75	2nd Det.	6	110	-	-	-	3.6
(402 PD 2-38)	42	Output	6	250	260	-	-	2.

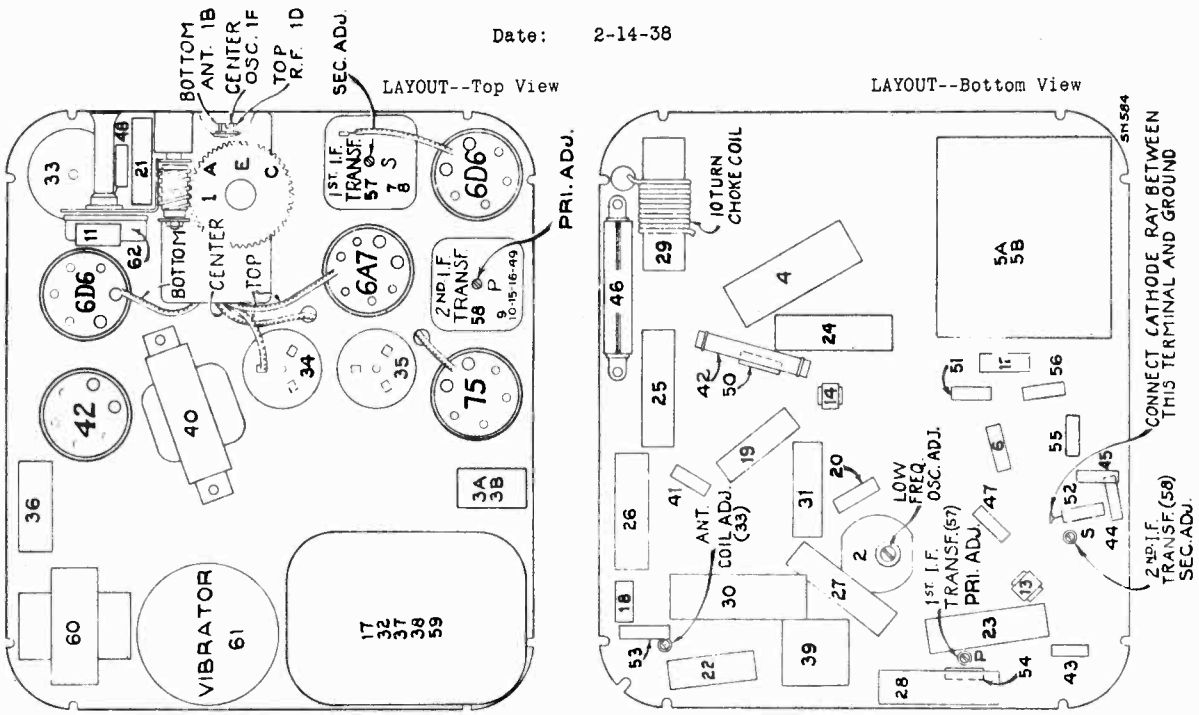
Date: 2-14-38

MODEL 980526 Buick
MODEL 980534-5 Buick
Socket, Trimmers
Chassis

UNITED MOTORS SERVICE

Buick 980526

Date: 2-14-38



Buick 980534-5

Date: 2-28-38

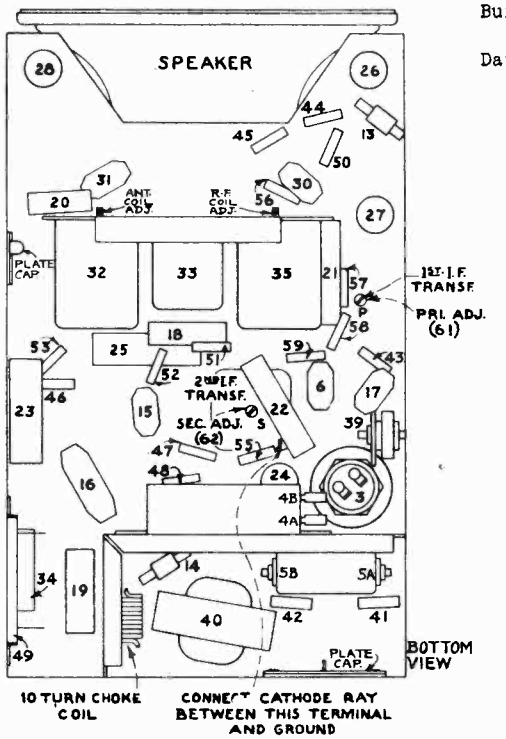


FIG. 3--PARTS LAYOUT--Bottom View

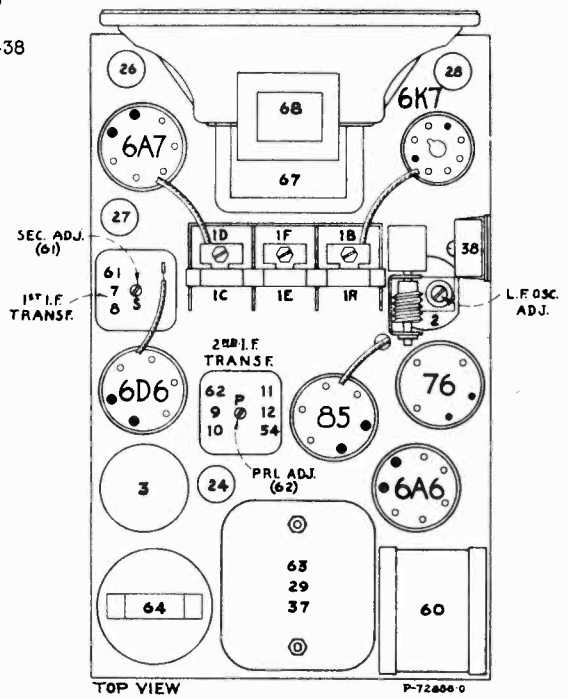


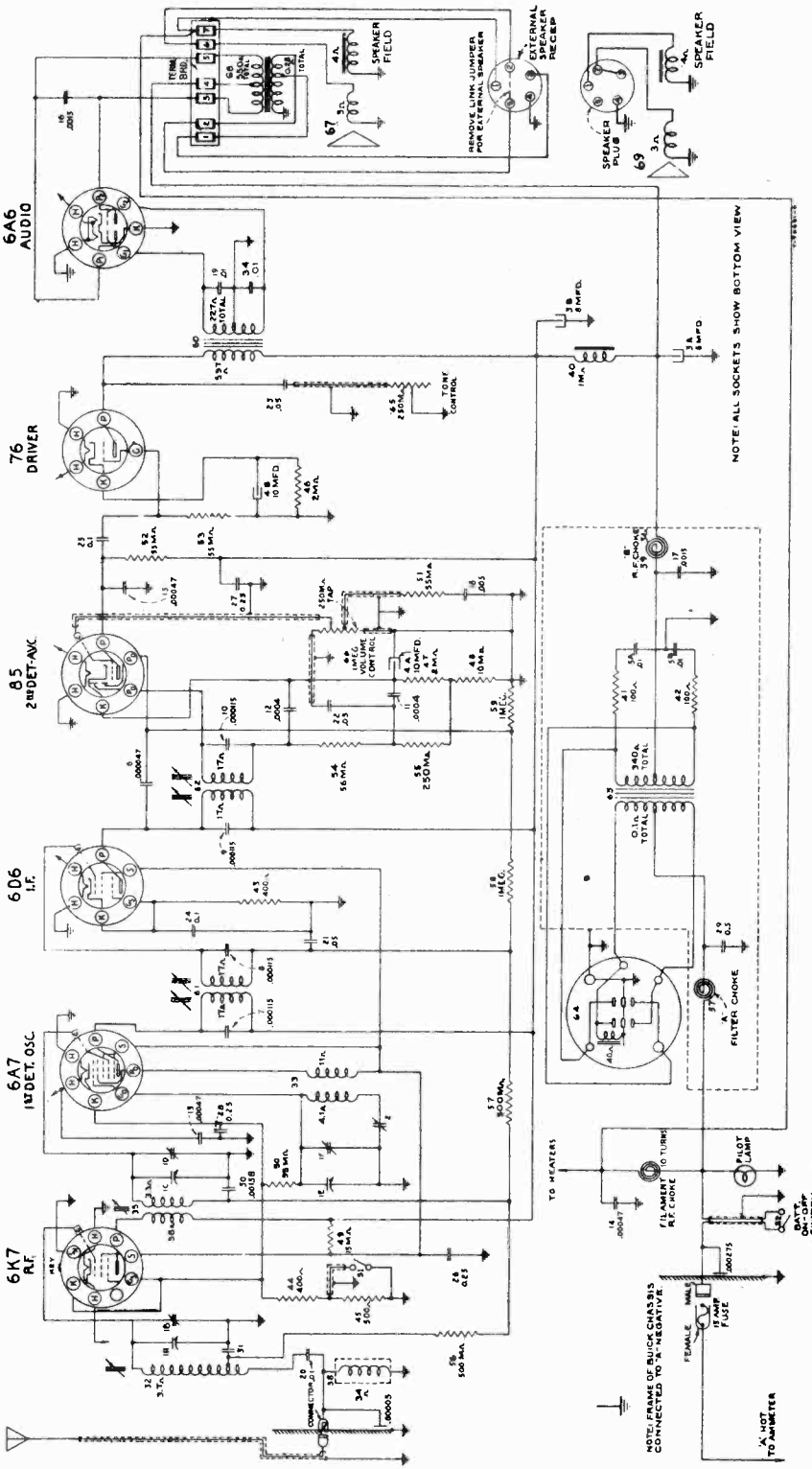
FIG. 2--PARTS LAYOUT--Top View

UNITED MOTORS SERVICE

MODELS 980534,980535
Buick
Schematic,Voltage

buick

These receivers are designed specifically for the 1937 Model Buicks Model 980535 is identical to Model 980534 except that an additional speaker is supplied.



TUBE SOCKET VOLTAGES

IF PEAK 260 KC

	Type	Function	H	P	S	G	Gs	K	Go	Po
BUICK MODELS 980534-5	6K7	R-F Amp.	6.0	235	90	0	5.1	5.1	-	-
	6A7	Det.-Osc.	6.0	235	90	0	-	5.1	1.7	89
	6D6	I-F Amp.	6.0	235	90	0	3.3	3.3	-	-
	85	Det.-Aud.	6.0	145	-	0	-	15.0	-	-
	76	Driver	6.0	230	-	0	-	11.0	-	-
Buick 980534-5	6A6	Output	6.0	260	-	0	-	0	-	-

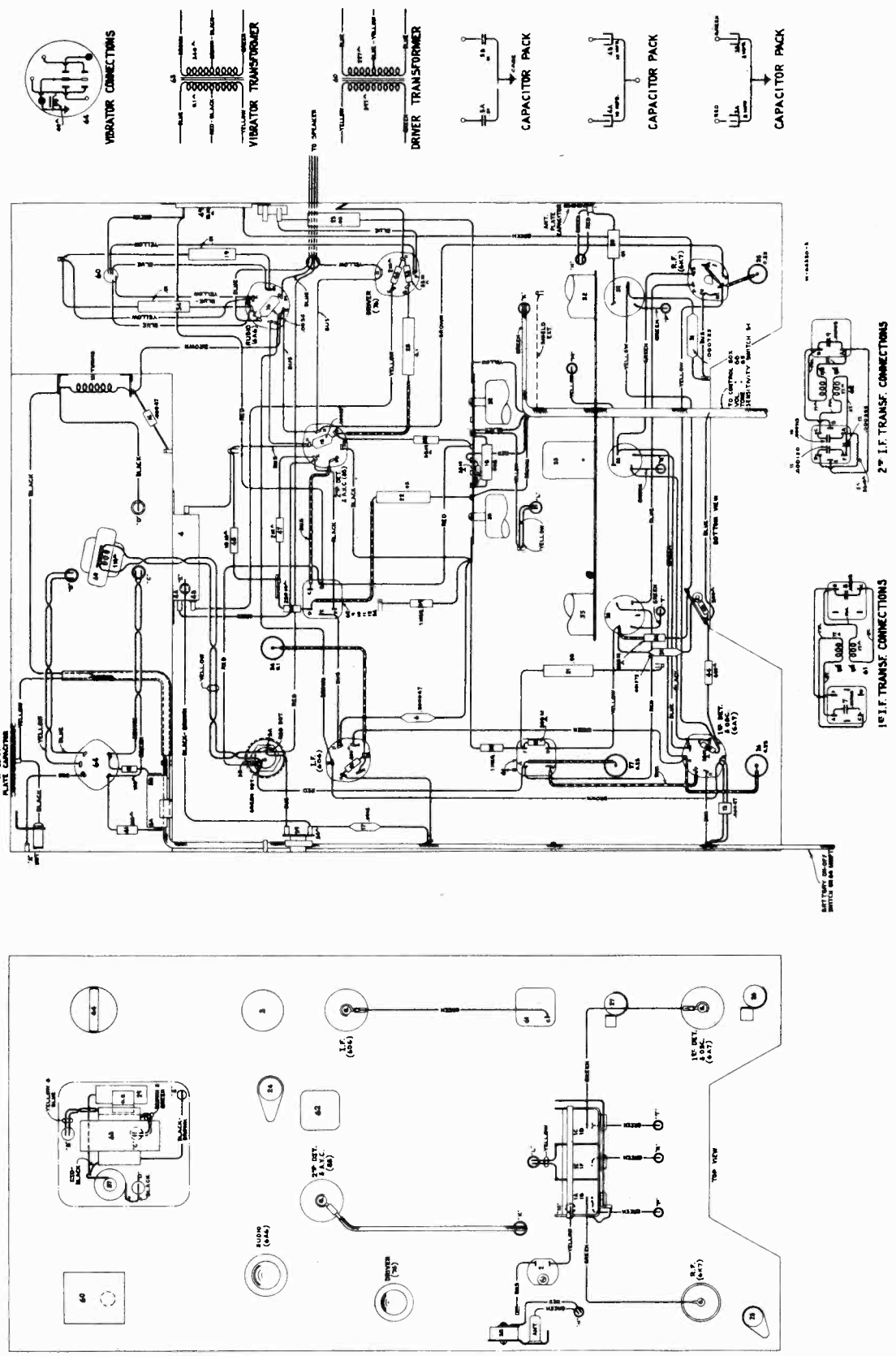
Readings taken on 6.3 volt battery using a 1000 ohm per volt meter from tube socket contacts to ground.

Date: 2-28-38

MODELS 980534,980535
Buick
Chassis Wiring

UNITED MOTORS SERVICE

Models 980534 and 980535



CIRCUIT ALIGNMENT

NOTE: BEFORE STARTING ALIGNMENT PROCEDURE, SEE THAT EITHER A JUMPER IS INSTALLED IN THE DUAL SPEAKER PLUG SOCKET (SEE CIRCUIT DIAGRAM) OR THE DUAL SPEAKER ITSELF IS CONNECTED. FAILURE TO DO THIS WILL RESULT IN AN OPEN CIRCUIT IN THE VOICE COIL.

1. Aligning I-F Stages at 260 Kilocycles

(a) Remove the top and bottom covers from the receiver case and place the receiver so that all adjustments are accessible. Connect the signal output of the signal generator to the control gid cap of the 6A7 tube through a .25 mfd. condenser (without disconnecting the grid lead) and connect the ground of the signal generator to the receiver chassis. Connect the Output Meter across the two plates of the 6A6 power tube for output indication. Tune the signal generator accurately to 260 KC. Adjust the four screws of the two I-F transformers, one on top and one on bottom of each transformer (Illus. #61 and 62, Figs. 2 & 3) for maximum output. Repeat these adjustments a second time for greater accuracy.

Checking I-F Band Spread

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustments to the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Complete information concerning this check with the Oscillograph, is given in the Oscillograph Manual, included with each instrument.

2. R-F Stage Alignment

The antenna and R-F coils used in these receivers contain adjustable iron cores, which require very careful adjustment at the factory. These adjustments are sealed and no further attempts to adjust them in service should be made unless they show evidence of being disturbed or tampered with. In any event where realignment is deemed necessary, the capacity adjustments should be made first in an effort to obtain normal sensitivity.

Two separate procedures are given for aligning the R-F circuits of these receivers and the procedure to be used will depend on whether the sealed iron core adjustments have been disturbed. The first procedure contains only capacity adjustments, while the second procedure contains both capacity and inductance adjustments.

The service replacement iron core antenna and R-F coils are pre-set at the factory and in most instances will require no further adjustment.

Properly align the tuning dial pointer to the gang tuning condenser by turning the receiver tuning control clockwise until all stops are reached at the high-frequency end of the dial, then rotate the tuning control counter-clockwise until all stops are reached at the low-frequency end of the dial.

IN THE FOLLOWING PARAGRAPHS WHEN ALIGNMENT IS MADE AT 600 K.C. THE DIAL POINTER ON THE CONTROL HEAD SHOULD BE SET TO THE CENTER OF THE "0" IN "60" WHEN LOOKING STRAIGHT INTO THE DIAL.

3. Aligning R-F Stages--Capacity Adjustments

(a) Connect the signal generator to the control grid cap of the 6A7 detector-oscillator tube through a .25 mfd. condenser. Adjust the signal generator to 1560 KC. Set the receiver tuning control to its mimimum capacity (full open) position. Adjust the oscillator parallel trimmer (Illus. 1-F, Fig. 2) for maximum output.

(b) Connect the signal generator to the antenna connection on the receiver through a .0005 mica condenser and adjust to 1400 KC. Tune the receiver to this signal and adjust the R-F and antenna trimmers (Illus. 1-D and 1-B, Fig. 2) on gang condenser for maximum output.

(c) Adjust signal generator to 600 KC and tune receiver to 600 KC. Adjust the oscillator series condenser (Illus. #2, Fig. 2) while rocking the gang tuning condenser back and forth through the signal, for maximum output.

(d) Adjust signal generator to 1400 KC and tune receiver to this signal. Readjust the oscillator, R-F, and antenna trimmers (Illus. #1-F, 1-D and 1-B, Fig. 2) for maximum output.

4. Aligning R-F Stages--Capacity and Inductance Adjustments

This procedure covers all R-F adjustments and should not be resorted to, unless the adjustments outlined in section "3" fail to restore normal sensitivity.

(a) Connect the signal generator to the control grid cap of the 6A7 tube through a .25 mfd. condenser. Adjust the signal generator to 1560 KC. Set the receiver tuning control to its minimum capacity (full open) position. Adjust the oscillator parallel trimmer (Illus. #1-F, Fig. 2) for maximum output.

(b) Adjust the signal generator to 600 KC and set the receiver dial to 600 KC. Adjust the oscillator series condenser (Illus. #2, Fig. 2) for maximum output.

(c) Adjust the signal generator to 1560 KC and set the receiver tuning to its minimum capacity (full open) position. Adjust the oscillator parallel trimmer (Illus. #1-F, Fig. 2) for maximum output.

(d) Connect signal generator to the antenna connector of the receiver through a .0005 mfd. mica condenser. Adjust the signal generator to 600 KC and tune the receiver to this signal. Adjust the magnetite core screws of the R-F and antenna coils (Illus. #35 and #32, Fig. 3) for maximum output.

(e) Adjust signal generator to 1400 KC and tune receiver to this signal. Adjust the oscillator, R-F and antenna trimmers (Illus. #1-F, 1-D and 1-B, Fig. 2) for maximum output.

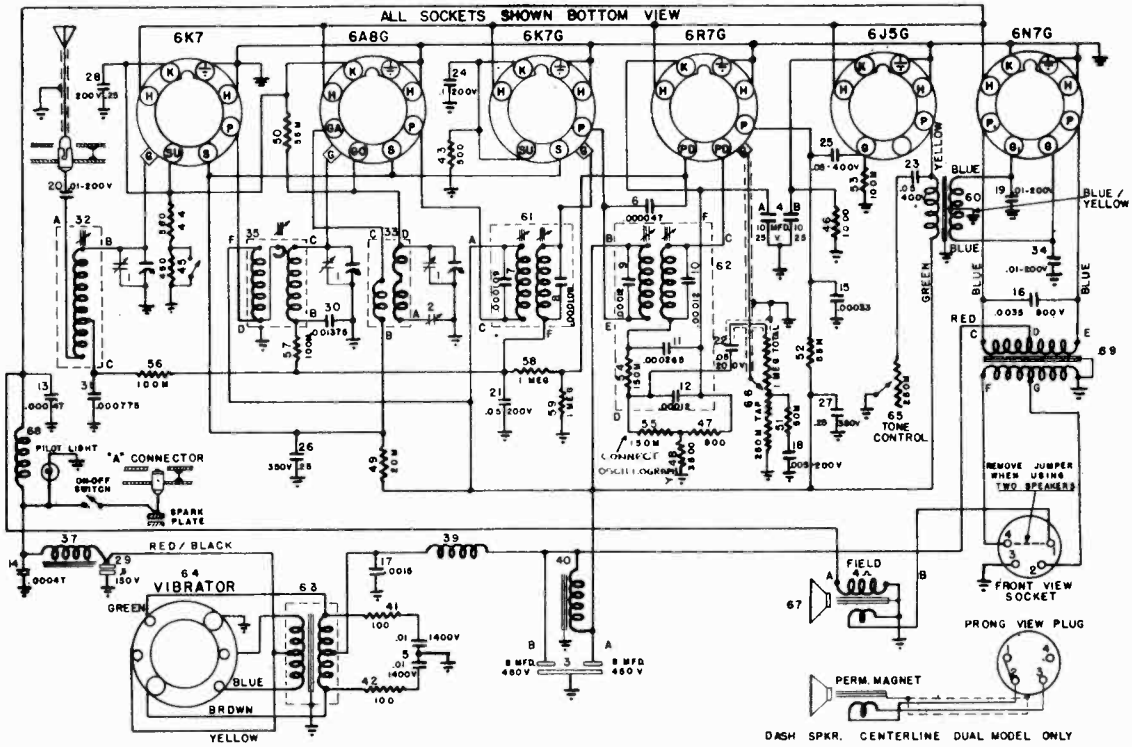
(f) Adjust signal generator to 600 KC and tune the receiver to this signal. Adjust the R-F and antenna magnetite core screws (Illus. #35 and #32, Fig. 3) for maximum output.

(g) Adjust signal generator to 600 KC and tune receiver to 600 KC. Adjust the oscillator series condenser (Illus. #2, Fig. 2) while rocking the gang tuning condenser back and forth through the signal, for maximum output.

(h) Adjust signal generator to 1400 KC and tune receiver to this signal. Readjust the oscillator, R-F, and antenna trimmers (Illus. #1-F, 1-D and 1-B, Fig. 2) for maximum output.

MODEL 1304873(980566)
Buick
Schematic,Voltage
Socket,Trimmers,Chassis

UNITED MOTORS SERVICE



1-F 262 KC

FIG. 2--BUICK MODEL 1304873 (980566)

BUICK MODEL
1304873
(980566)

Date 11-4-37.

TUBE SOCKET VOLTAGES

TUBE	H	P	S	Su	G2	K	Go	Ga
6K7	5.9	218	83	6.0	--	6.0	--	--
6AG8	5.9	218	83	--	--	6.0	10	80
6K7G	5.9	218	83	2.7	--	2.7	--	--
6R7G	5.9	145	--	--	--	6.0	--	--
6J5G	5.9	215	--	--	--	7.2	--	--
6N7G	5.9	255(P1&P2)						

Readings between socket terminals & gnd. with D.C. voltmeter,1000 ohms/volt. current drain 7.1 amps. with dial light& Speaker "B" supply drain approx 60 MA. Sensitivity switch closed 6 v. at "A" connector.

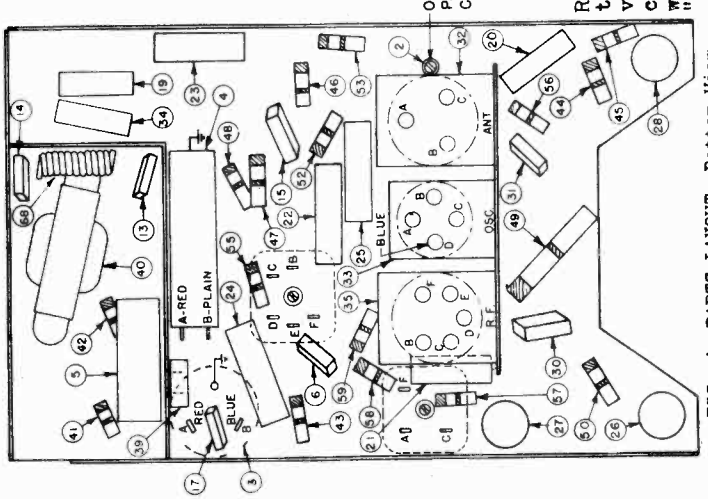


FIG. 4--PARTS LAYOUT--Bottom View

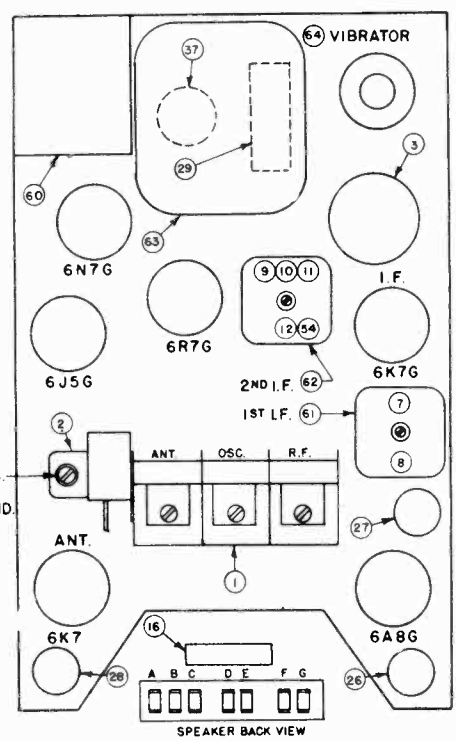
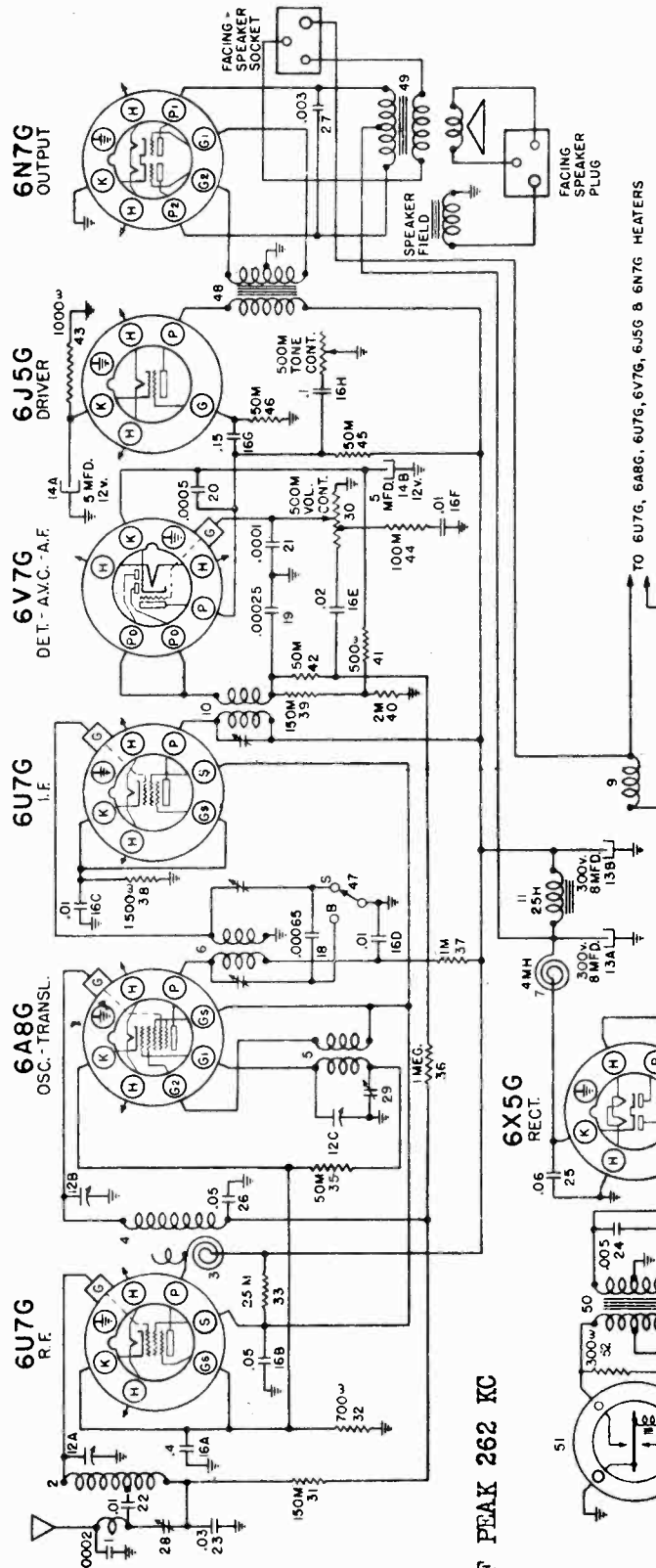


FIG. 3--PARTS LAYOUT--Top View

UNITED MOTORS SERVICE

MODEL 983526 Pontiac
Schematic, Voltage



TUBE SOCKET VOLTAGE

TYPE	FUNCTION	H	P	S	G₁	G₂	K
6U7G	R.F.	5.75	230	60	8.5		8.5
6A8G	OSC.-TRANS.	5.75	230		60	60	8.5
6U7G	I.F.	5.75	230	60	3.6		3.6
6V7G	DET.-1ST A.F.	5.75	90				6.0
6J5G	DRIVER	5.75	230				7.5
6N7G	OUTPUT	5.8	P₁ 230 P₂ 230				
6X5G	RECT.	5.75	A.C.				240

NOTE: ABOVE READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY - 6 VOLTS. CURRENT DRAIN 7.5 AMPERES. "B" SUPPLY DRAIN APPROXIMATELY 52 MA.

IF PEAK 262 KC

Date: 2-28-38

FIG. 1--PONTIAC MODEL 983526 CIRCUIT DIAGRAM

GENERAL: The Pontiac Model 983526 is a seven tube, "dash" speaker receiver with a "Local-Distance" switch and tone control. The receiver was designed for operation in 1937 Pontiacs and is equipped with an instrument panel tuning control having a tone control in addition to the tuning and volume controls.

MODEL 983526 Pontiac
Socket, Trimmers
Chassis, Alignment

UNITED MOTORS SERVICE

CIRCUIT ALIGNMENT

Pontiac Model 983526

Aligning I-F Stages at 262 Kilocycles

IMPORTANT: The "Local-Distance" switch on the tuning control used with this receiver is used to control the alignment of the first I-F coil windings. It is important, therefore, in peaking the I-F stages, that the "Local-Distance" switch be placed in the "Distance" position.

Connect the signal lead of the signal generator to the grid cap of the 6A8G Translator Tube through a .1 mfd. condenser, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the chassis frame.

Turn "Local-Distance" switch on set to "DISTANCE" position. (If the receiver is aligned with the switch in the "Local" position, the "Local-Distance" switch will operate backwards.)

Connect the output meter across the plate prongs of the 6N7G tube.

Set the signal generator to exactly 262 kilocycles.

Adjust the trimmers on the I-F coils (Illus. 6 & 10, Fig. 3) for maximum output. These adjustments should be repeated several times.

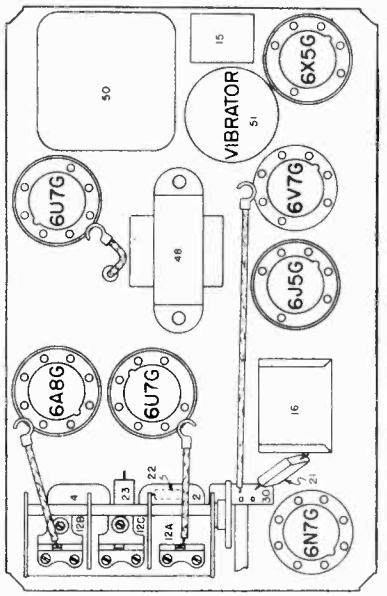


FIG. 2--PARTS LAYOUT--Top View

Aligning at 1530 Kilocycles

Leave the signal generator leads connected the same for aligning the I-F circuits. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop. Set the signal generator to 1530 kilocycles. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 12C, Fig. 2) for maximum output. (It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the entire high frequency end of the dial.)

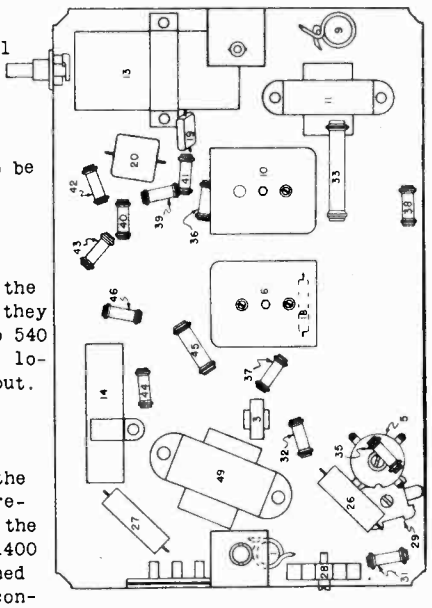


FIG. 3--PARTS LAYOUT--Bottom View

Aligning at 540 Kilocycles

Leave signal generator leads connected the same as before. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop. Set the signal generator to 540 K.C. Adjust the oscillator padding condenser (Illus. 29, Fig. 3) located on the under-side of the receiver sub-panel to maximum output.

Aligning at 1400 Kilocycles

Remove the signal lead of the signal generator from the grid of the 6A8G Translator tube and connect to the antenna terminal of the receiver THROUGH A .0002 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. Set the signal generator to 1400 K.C. Turn the condenser rotor plates until this frequency is tuned in with maximum output. Adjust the R-F parallel trimmer on the condenser gang (Illus. 12B, Fig. 2) and the antenna compensating condenser (Illus. 28, Fig. 3) located on the side of the receiver case for maximum output.

Aligning at 600 Kilocycles

Set the signal generator on 600 K.C. Turn the condenser rotor plates until the signal from the signal generator is tuned in with maximum output. Maintain a low output signal from the signal generator and readjust the oscillator tracking condenser (Illus. 29, Fig. 3) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

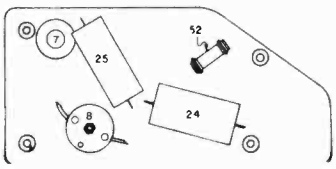


FIG. 4--PARTS LAYOUT--Vibrator Filter

Date: 2-28-38

UNITED MOTORS SERVICE

MODEL 983527 Pontiac
Schematic, Voltage
Socket, Trimmers
Chassis

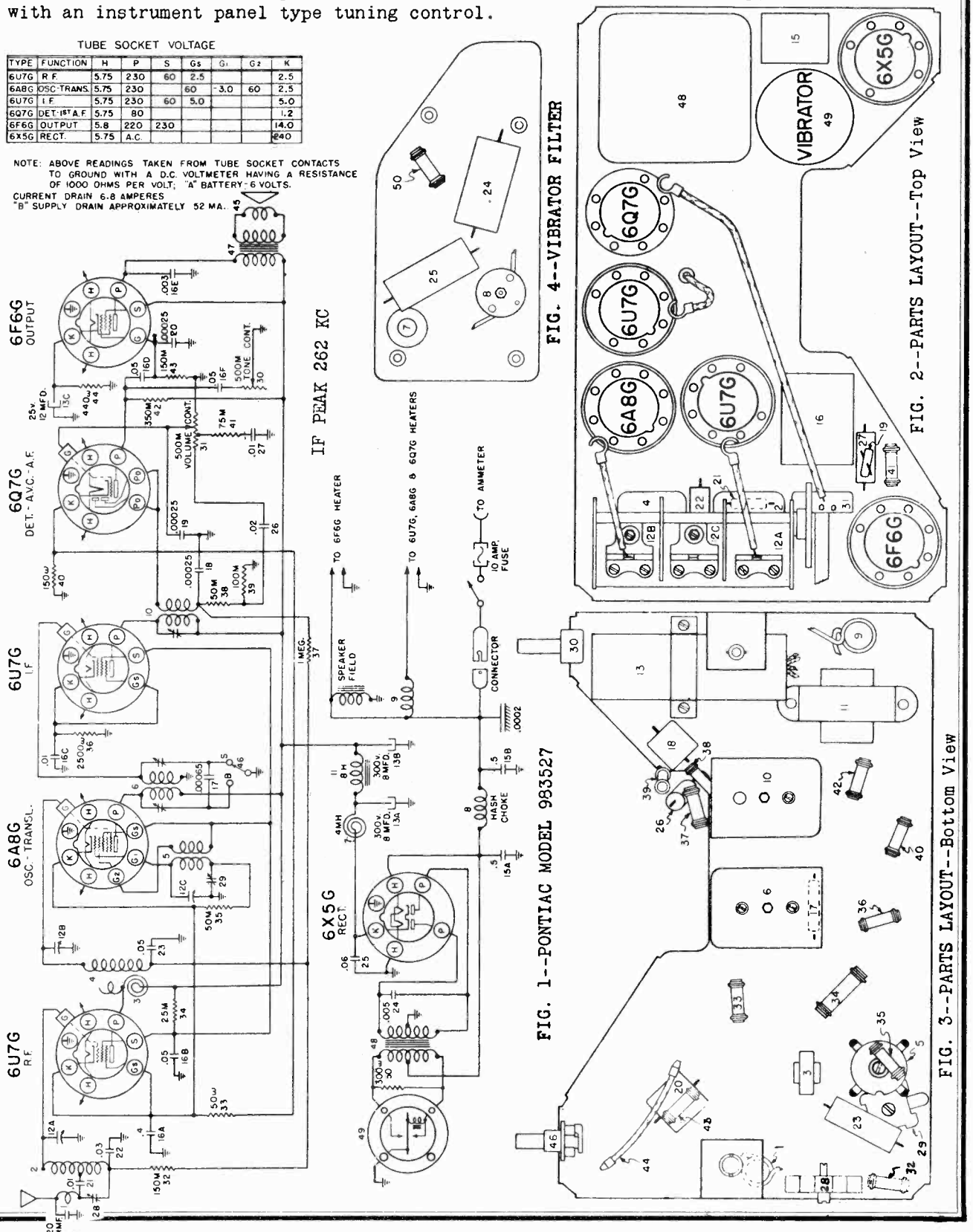
Date:
3-7-38

GENERAL: The Pontiac Model 983527 is a six tube single unit receiver with a "Local-Distance" switch, tone control and 8" Dynamic Speaker. This receiver was designed for operation in 1937 Model Pontiacs and is equipped with an instrument panel type tuning control.

TUBE SOCKET VOLTAGE

TYPE	FUNCTION	H	P	S	G$_2$	G$_1$	G$_2$	K
6U7G	R.F.	5.75	230	60	2.5			2.5
6A8G	OSC-TRANS.	5.75	230		60	-3.0	60	2.5
6U7G	I.F.	5.75	230	60	5.0			5.0
6Q7G	DET-1ST A.F.	5.75	80					1.2
6F6G	OUTPUT	5.8	220	230				14.0
6X5G	RECT.	5.75	A.C.					240

NOTE: ABOVE READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY-6 VOLTS.
CURRENT DRAIN 6.8 AMPERES
"B" SUPPLY DRAIN APPROXIMATELY 52 MA.



MODEL 983527 Pontiac
Alignment

UNITED MOTORS SERVICE

Pontiac 983527

2.Aligning at 1530 Kilocycles

(a) Leave the signal generator leads connected the same as for aligning the I-F circuits.

(b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

(c) Set the signal generator to 1530 kilocycles.

(d) Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 12C, Fig. 2) for maximum output. It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the entire high frequency end of the dial.

3.Aligning at 540 Kilocycles

(a) Leave signal generator leads connected the same as before.

(b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

(c) Set the signal generator to 540 K.C.

(d) Adjust the oscillator tracking condenser (Illus. 29, Fig. 3) located on the under-side of the receiver sub-panel to maximum output.

4.Aligning at 1400 Kilocycles

(a) Remove the signal lead of the signal generator from the grid of 6A8G tube and connect to the antenna terminal of the receiver THROUGH A .0002 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used.

(b) Set the signal generator to 1400 K.C.

(c) Turn the condenser rotor plates until this frequency is tuned in with maximum output.

(d) Adjust the R-F parallel trimmer on the condenser gang (Illus. 12B, Fig. 2) and the antenna compensating condenser, (Illus. 28, Fig. 3) located on the side of the receiver case for maximum output.

5.Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C.; however, it is necessary in most cases to repeak this condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

(a) Set the signal generator on 600 K.C.

(b) Turn the condenser rotor plates until the signal from the signal generator is tuned in with maximum output.

(c) Maintain a low output signal from the signal generator and readjust the oscillator tracking condenser (Illus. 29, Fig. 3) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

1.Aligning I-F Stages at 262 Kilocycles

(a) Connect the signal lead of the signal generator to the grid cap of the 6A8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the chassis frame.

(b) Connect the output meter from the plate of the 6F6G tube to ground.

(c) Place Local-Distance switch in "Distance" position.

(d) Set the signal generator at exactly 262KC.

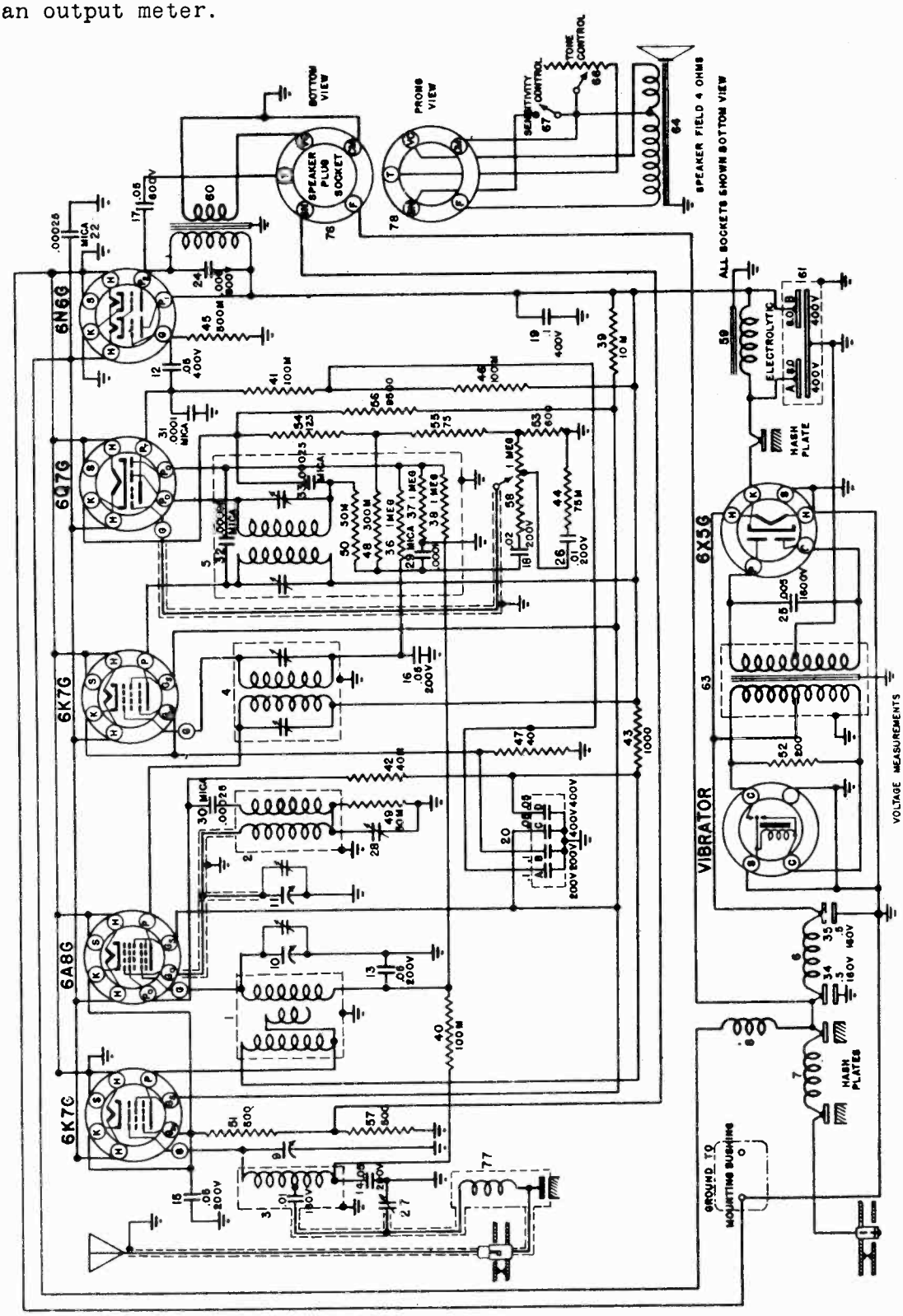
(e) Adjust trimmers on the IF coils (6 and 10 FIG. 3) carefully for maximum output.

Repeat adjustments several times.

MODEL 983534 Pontiac
Schematic

UNITED MOTORS SERVICE

If realignment is found necessary, the circuits can be properly adjusted only with the use of a calibrated test oscillator, or signal generator, and an output meter.



Pontiac 983534

Date: 3-7-38

GENERAL: The Pontiac Model 983534 is a six tube single unit auto radio, with tone and sensitivity controls and bass compensation. A non-synchronous vibrator and a tube type rectifier is used in the power supply in a full wave circuit.

MODEL 983534 Pontiac
Socket, Trimmers
Chassis, Voltage
Alignment

UNITED MOTORS SERVICE

CIRCUIT ALIGNMENT

Pontiac 983534

1. Aligning I-F Stages at 262 Kilocycles

   (a) Connect the signal lead of the signal generator to the grid cap of the 6A8G translator tube, through a .1 mfd. condenser, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the chassis frame.

   (b) Connect the output meter from the plate of the 6N6G to ground. (Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D.C. voltages.)

   (c) Set the signal generator to exactly 262 K.C.

   (d) Turn receiver volume control on full and tuning condenser plates out of mesh. Adjust the trimmers on the I-F coils (Illus. 4 and 5, Fig. 2) for maximum output. These adjustments should be repeated several times and during alignment the signal generator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1560 Kilocycles

   (a) Leave the signal generator leads connected the same as for aligning the I-F circuits.

   (b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

   (c) Set the signal generator to 1560 kilocycles.

   (d) Adjust the parallel trimmer for the oscillator section (middle) of the condenser gang (Illus. 11, Fig. 2) for maximum output. (It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the entire high frequency end of the dial.)

3. Aligning at 1400 Kilocycles

   (a) Remove the signal lead of the signal generator from the grid of the translator (6A8G) tube and connect to the antenna terminal of the receiver THROUGH A .0002 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that this mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly.)

   (b) Set the signal generator to 1400 K.C.

   (c) Turn the condenser rotor plates until the frequency is tuned in with maximum output.

   (d) Adjust the R-F parallel trimmer on the condenser gang (top section) and the antenna compensating condenser, (Illus. 27, Fig. 3) for maximum output.

4. Aligning at 600 Kilocycles

   (a) Set the signal generator on 600 K.C.

   (b) Turn the condenser rotor plates until the signal from the signal generator is tuned in with maximum output.

   (c) Maintain a low output signal from the signal generator and readjust the oscillator tracking condenser (Illus. 28, Fig. 3) while rocking the variable condenser gang tuning shaft back and forth through the signal.

   (d) This operation should be continued until no further increase in output can be obtained.

5. Realigning at 1400 Kilocycles

   (a) Recheck alignment of R-F section of condenser gang and antenna compensating condenser (Illus. 27, Fig. 3) as given in paragraph 3.

   (b) It will be necessary to readjust the antenna compensating condenser upon installation in a car.

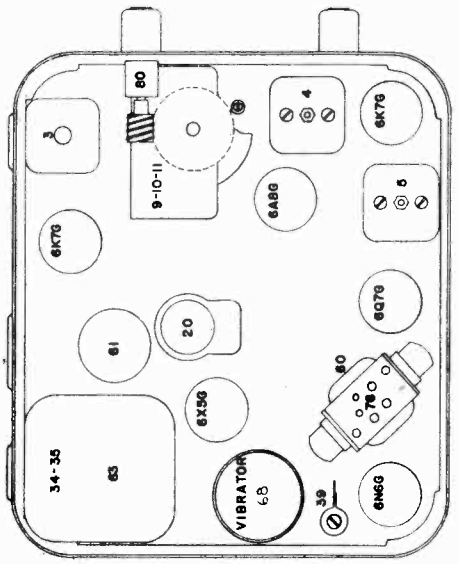


FIG. 2--PARTS LAYOUT--Top View

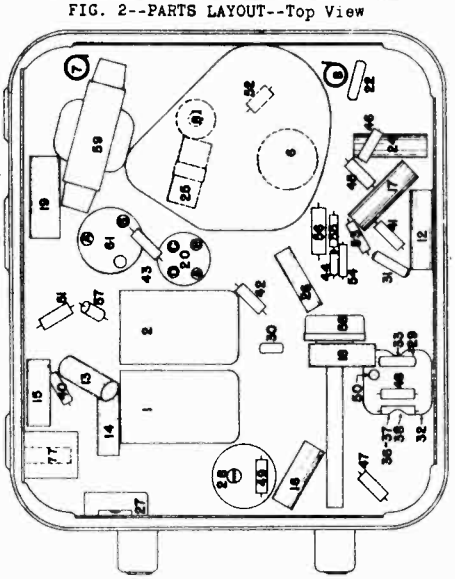


FIG. 3--PARTS LAYOUT--Bottom View

PONTIAC MODEL 983534 AUTO RADIO

TUBE SOCKET VOLTAGES

Type	Function	H	P	Gs	Su	Po	Pl	K
6K7G	R-F Amp.	6.0	235	90	4.0	-	-	4.0
6A8G	Osc.-Mod.	6.0	245	90	-	120	-	4.0
6K7G	I-F Amp.	6.0	245	90	2.5	-	-	2.5
6Q7G	Det.-Aud.	6.0	130	-	-	-	-	7.5
6N6G	Output	6.0	225	-	-	-	245	-
6X5G	Rectifier	6.0	-	-	-	-	-	255

Readings taken from tube socket contacts to ground with a 1000 ohm per volt voltmeter and sensitivity control in the "Distance" position.

Date: 3-7-38

UNITED MOTORS SERVICE

MODEL 983569 Pontiac
Schematic, Vibrator
Condenser Data

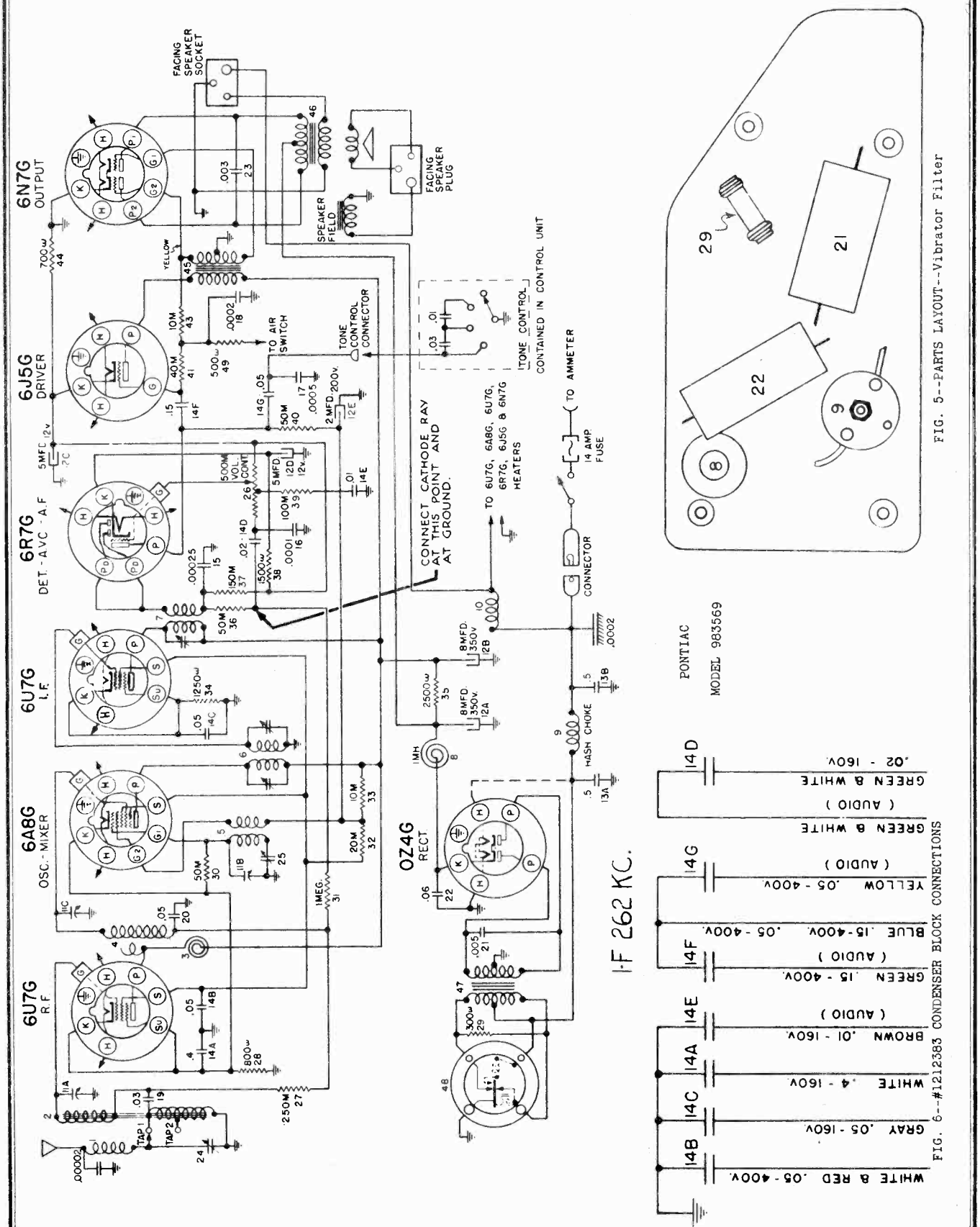
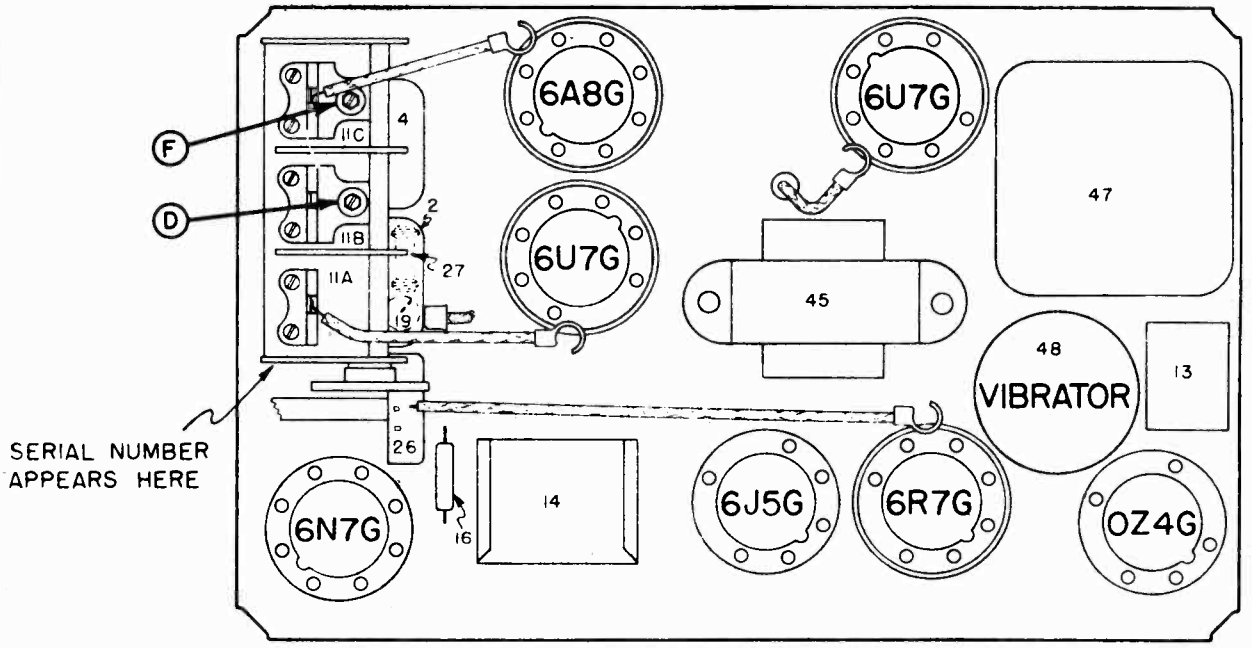


FIG. 5--PARTS LAYOUT--Vibrator Filter

FIG. 6--#1212383 CONDENSER BLOCK CONNECTIONS

MODEL 983569 Pontiac
Socket,Trimmers
Chassis

UNITED MOTORS SERVICE



Pontiac 983569

FIG. 3--PARTS LAYOUT--Top View

Date: 10-11-37

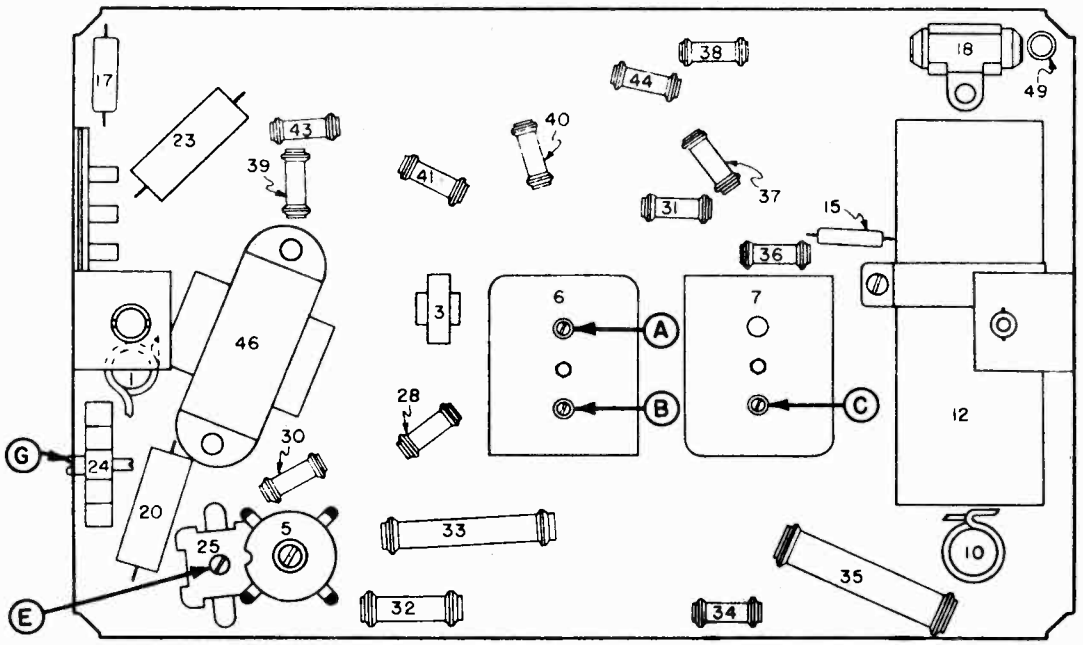


FIG. 4--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL 985252 Chevrolet
Schematic, Socket
Trimmers, Chassis

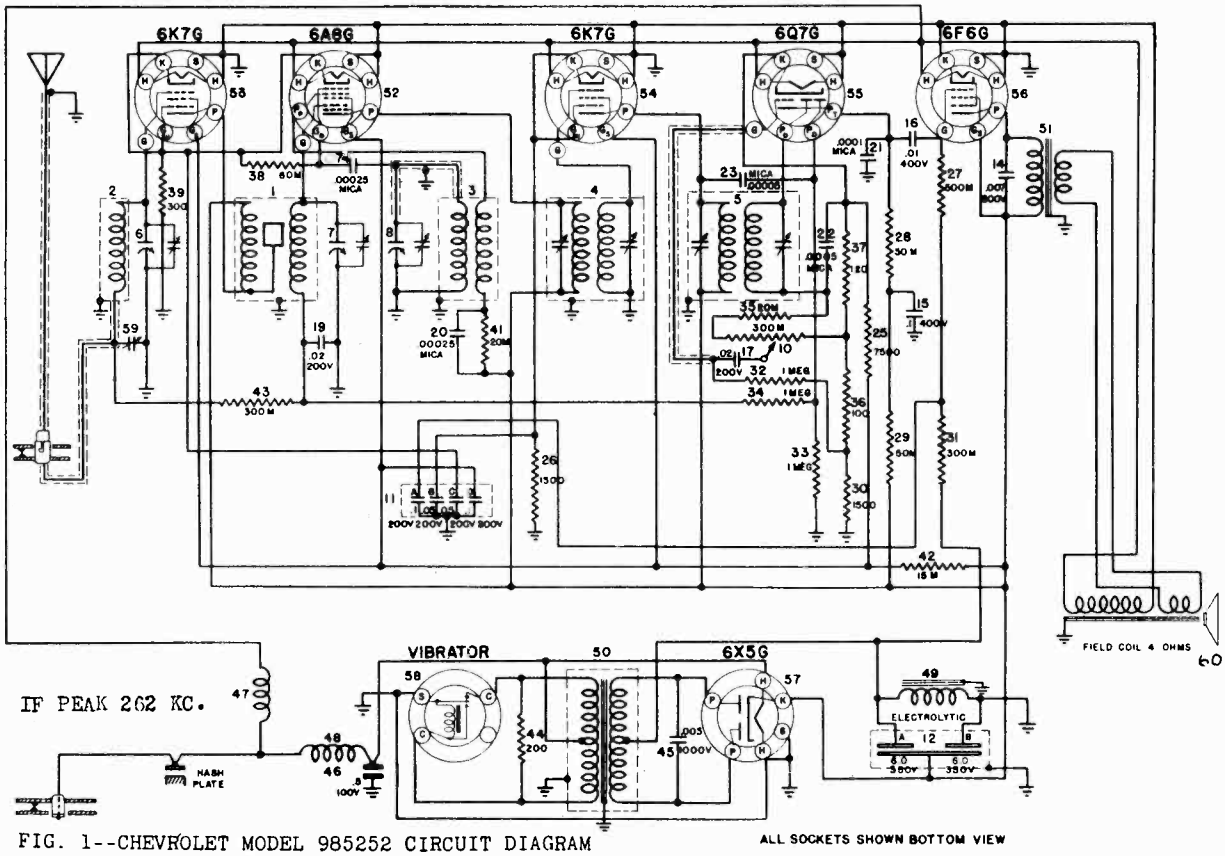


FIG. 1--CHEVROLET MODEL 985252 CIRCUIT DIAGRAM

GENERAL: The Chevrolet Model 985252 is a six tube, single unit auto radio with an under panel mounting tuning control. All of the receiver tubes are octal base types and a separate rectifier tube (6X5G) is employed in the power supply.

Date: 12-2-36

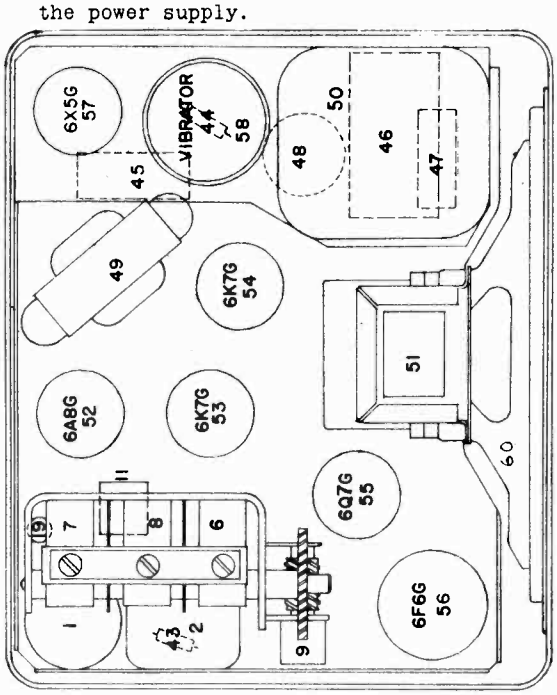


FIG. 2--PARTS LAYOUT--Top View

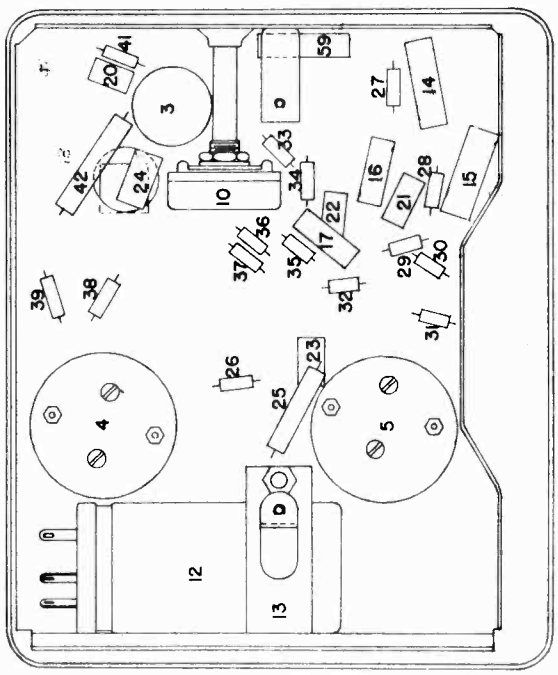


FIG. 3--PARTS LAYOUT--Bottom View

MODEL 985252 Chevrolet
Alignment, Voltage

UNITED MOTORS SERVICE

CIRCUIT ALIGNMENT

If realignment is found to be necessary, the circuits can be adjusted only with the use of a calibrated test oscillator or signal generator, and an output meter.

Peaking I-F Stages at 262 Kilocycles (1)

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8G Oscillator Tube through a .1 mfd. condenser, leaving the tube's grid clip in place. Connect the ground lead of the test oscillator to the chassis frame.

(b) Connect the output meter from the plate prong of the 6F6G to ground. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D.C. voltages.

(c) Set the test oscillator to exactly 262 K.C.

(d) Adjust the trimmers on the I-F coils (Illus. 4 & 5) for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

Aligning at 1560 Kilocycles (2)

(a) Leave the test oscillator leads connected the same as for aligning the I-F stages.

(b) Turn the rotor plates of the condenser gang all the way out and against the high frequency stop.

(c) Set the test oscillator to exactly 1560 K.C.

(d) Adjust the parallel trimmer for the oscillator section (middle) of the condenser gang (Illus. #8) for maximum output.

NOTE: It is very important that this frequency be set accurately as a slight mis-setting will cause the set to be out of track over the entire high frequency end of the dial.

Aligning at 1400 Kilocycles (3)

(a) Remove the signal lead of the test oscillator from the grid of the 6A8G Oscillator Tube and connect to the Antenna terminal of the receiver through a .0002 mfd. mica condenser.

(b) Set the test oscillator to 1400 K.C.

(c) Turn the condenser rotor plates until this frequency (1400 K.C.) is tuned in with maximum output.

(d) Adjust the R-F and Antenna parallel trimmer on the condenser gang (Illus. 6 & 7) for maximum output.

TUBE SOCKET VOLTAGES

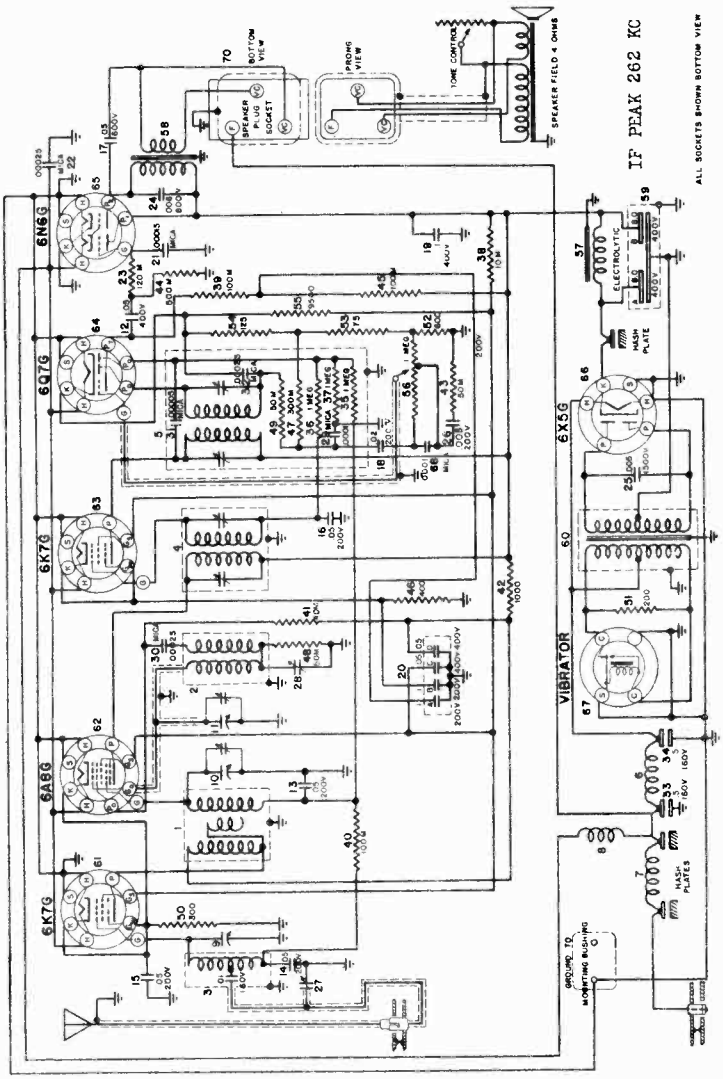
Reading taken from tube socket contacts to ground, with a 1000 ohm per volt voltmeter.

Tube	Function	H	P	S	G	GO	PO	K
6K7	R-F	6.0	205	70	0	--	--	3.0
6A8G	Mod.-Osc.	6.0	205	70	0	8.0	135	3.0
6K7G	I-F	6.0	215	70	0	--	--	4.0
6Q7G	Det. A-F	6.0	140	--	0	--	--	14.5
6F6G	Output	6.0	205	215	16.5	--	--	--

Chevrolet 985252 Date: 12-2-36

UNITED MOTORS SERVICE

MODEL 985253 Chevrolet
Schematic, Voltage
Socket, Trimmer, Chassis



GENERAL: The Chevrolet Model 985253 is a six tube auto radio with a header type speaker, bass compensation, octal base tubes, and a tube type rectifier in the power supply.

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	GO	PO	K
6K7G	R-F Amp.	6.0	240	100	-		4.3
6A8G	Mod.-Osc.	6.0	250	100	-15	125	4.3
6K7G	I-F	6.0	250	100	-		3.3
6Q7G	Det.-Audio	6.0	135	-	-		8.3
6N6G	Output	6.0	237	250	-		0

Readings taken with a D.C. voltmeter having a resistance of 1000 ohms per volt.

Chevrolet 985253

Date: 12-7-36

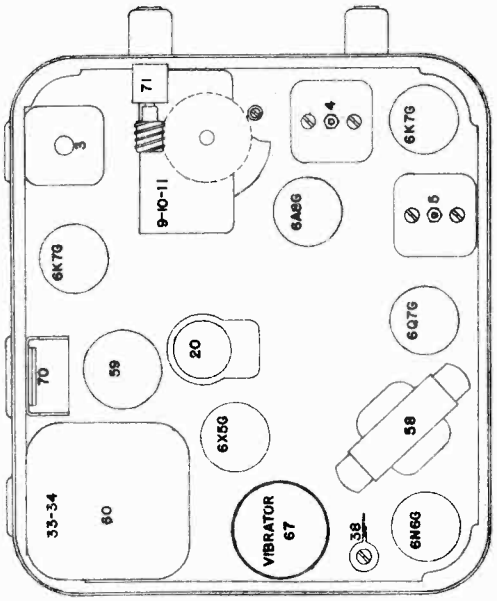


FIG. 2--PARTS LAYOUT--Top View

FIG. 3--PARTS LAYOUT--Bottom View

MODEL 985253 Chevrolet
Alignment

UNITED MOTORS SERVICE

CHEVROLET MODEL 985253 CIRCUIT ALIGNMENT Date: 12-7-36

1. Peaking I-F Stages at 262 K.C.

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8G Modulator-Oscillator tube, through a .1 mfd. condenser. Connect the ground lead of the test oscillator to the chassis frame.

(b) Set the Test Oscillator at 262 K.C.

(c) Turn volume control on full and tuning condenser plates completely out of mesh.

(d) Adjust trimmers on the I-F coils (Illus. 4 and 5) for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1560 Kilocycles

Leave the test oscillator leads connected the same as for aligning the I-F Stages. Make sure the rotor plates of the condenser are turned all the way out and against the high frequency stop. Set the test oscillator to exactly 1560 K.C. Adjust the parallel trimmer for the oscillator section (middle) of the condenser gang (Illus. #11) for maximum output.

3. Aligning at 1400 Kilocycles

Remove the signal lead of the test oscillator from the grid of the 6A8G Tube and connect to the antenna terminal of the receiver THROUGH A .0002 MFD. MICA CONDENSER. Set the test oscillator to 1400 K.C. Turn the condenser plates until this frequency is tuned in with maximum output. Adjust the R-F parallel trimmers on the condenser gang (Top section) for maximum output. Adjust the antenna compensating condenser (Illus. #27) for maximum output.

4. Aligning at 600 Kilocycles

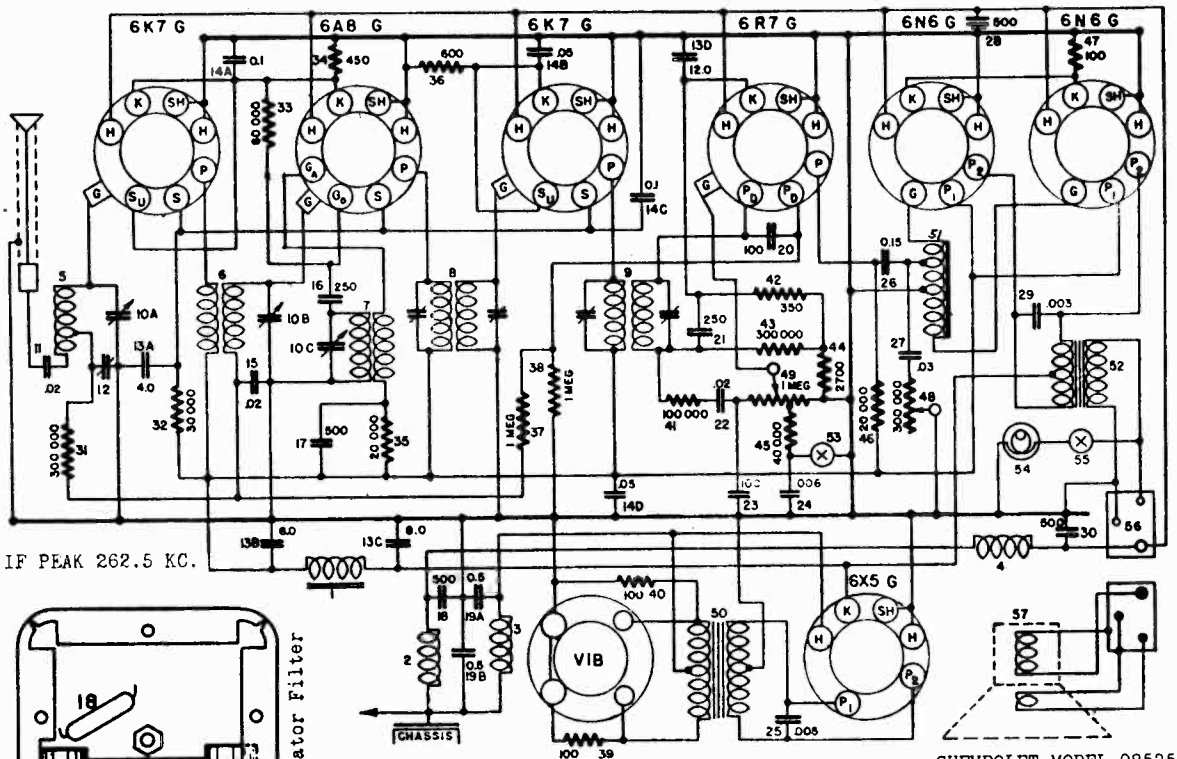
Set the test oscillator on 600 K.C. and turn the condenser plates until this signal is tuned in with maximum output (at approximately 600 K.C. position of plates). Maintain a low test oscillator signal and adjust the oscillator tracking condenser (Illus. #28) while rocking the condenser gang plates back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

5. Realigning at 1400 Kilocycles

Recheck alignment of the R-F section of the condenser gang and antenna compensating (Illus. #27) at 1400 K.C. as given in paragraph #3.

UNITED MOTORS SERVICE

MODEL 985255 Chevrolet
Schematic, Voltage
Socket, Trimmers, Chassis



CHEVROLET MODEL 985255

Date: 12-24-36

TUBE SOCKET VOLTAGES

Tube	Function	H	P	P2	S	Su	Ga	Go	K
6K7G	R-F Amp.	6.0	235	-	100	5.5	-	-	5.5
6A8G	Osc.-Mod.	6.0	235	-	100	-	135	18	5.5
6K7G	I-F Amp.	6.0	235	-	100	3.6	-	-	3.6
6R7G	Det.-A-F	6.0	170	-	-	-	-	-	7.5
*6N6G	Output	6.0	240	235	-	-	-	-	5.0
6X5G	Rectifier	6.0	-	-	-	-	-	-	

Readings taken with a D.C. voltmeter having a resistance of 1000 ohms per volt.

* Same for both 6N6G tubes.

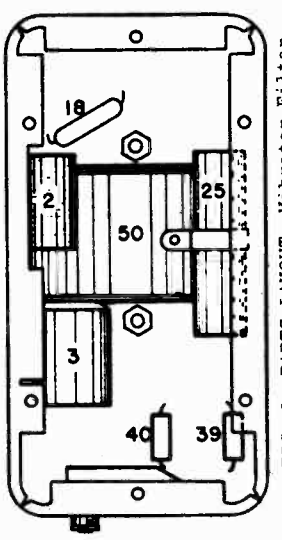


FIG. 1--PARTS LAYOUT--Vibrator Filter

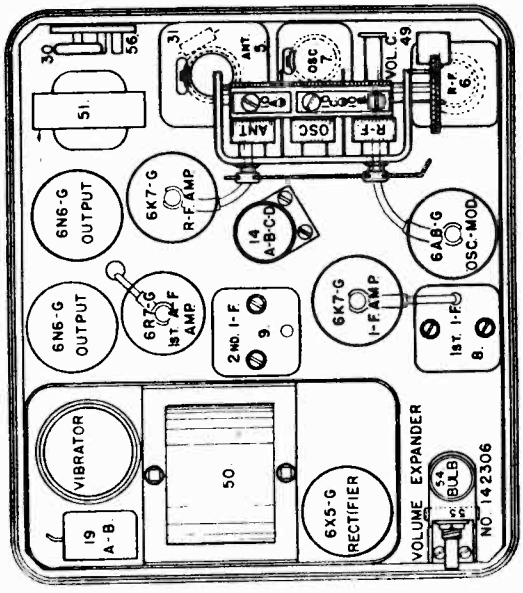


FIG. 3--PARTS LAYOUT--Top View

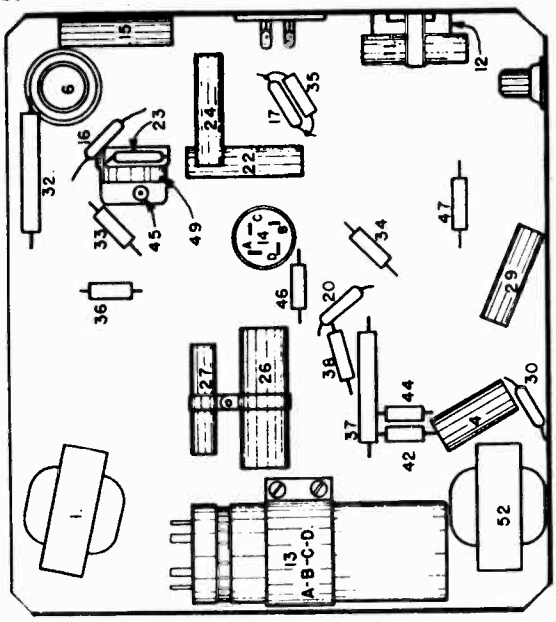


FIG. 4--PARTS LAYOUT--Bottom View

MODEL 985255 Chevrolet
Alignment, Note

UNITED MOTORS SERVICE

CIRCUIT ALIGNMENT

Aligning I-F Stages at 262.5 Kilocycles

Chevrolet 985255

(a) Connect the signal lead of the test oscillator to the grid cap of the 6K7G I-F Amplifier tube, through a .1 mfd. condenser, leaving the tube's grid clip in place. Connect the ground lead of the test oscillator to the chassis frame.

(b) Connect the output meter from the plate (P2) of one of the 6N6G Output tubes to the plate (P2) of the other 6N6G Output tube.

(c) Set the test oscillator carefully to 262.5 K.C.

(d) Turn the "Volume Expander" switch on the receiver to the "Off" position. Turn the volume control on full and turn the condenser gang plates so that they are completely in mesh. Leave the "Fidelity Control" Cable disconnected from the chassis.

Aligning I-F Stages at 262.5 Kilocycles--Cont'd.

(e) Adjust both trimmers located on the 2nd I-F coil (Illus. #9) for maximum output.

(f) Connect the signal lead of the test oscillator to the grid cap of the 6A8G Oscillator-Modulator tube, leaving the tube's grid clip in place.

(g) Adjust both trimmers located on the 1st I-F coil (Illus. #8) for maximum output.

NOTE: DO NOT READJUST THE TRIMMERS ON THE 2ND I-F COIL, ILLUS. #9.

Aligning at 1550 Kilocycles

Leave the test oscillator signal lead connected to the grid cap of the 6A8G tube. Turn the condenser rotor plates all the way out and against the high frequency stop. Set the test oscillator to exactly 1550 K.C. Adjust the parallel trimmer for the oscillator section (middle) of the condenser gang (Illus. #10C) carefully for maximum output.

Aligning at 1400 Kilocycles

Remove the signal lead of the test oscillator from the grid of the 6A8G tube and connect to the antenna terminal of the receiver THROUGH a .0002 MFD. MICA CONDENSER. Set the test oscillator to 1400 K.C. Turn the condenser plates until this frequency is tuned in with maximum output. Adjust the "R-F" and "ANT." sections of the condenser gang (Illus. #10) carefully for maximum output.

Adjusting Antenna Compensating Condenser

Leave the test oscillator leads connected the same as before. Set the test oscillator to 600 kilocycles. Tune in the 600 K.C. signal with the station selector for maximum output. Adjust the antenna compensating condenser (Illus. #12) while rocking the tuning condenser setting back and forth through the signal, until no further improvement in output can be obtained. Recheck the alignment of the "ANT" section of the condenser gang as given in paragraph #3.

Automatic Volume Expansion: A new feature in automotive radio design is automatic volume expansion, made possible by the use of an "expander tube" connected across the voice coil of the speaker. The resistance of this tube varies with current, so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music.

GENERAL: The Chevrolet Model 985255 is a seven tube, dash speaker auto radio with an instrument panel tuning control, volume expander, "Music-Speech" and Audio Fidelity controls.

Date: 12-24-36

UNITED MOTORS SERVICE

MODEL 985283 Chevrolet
Schematic

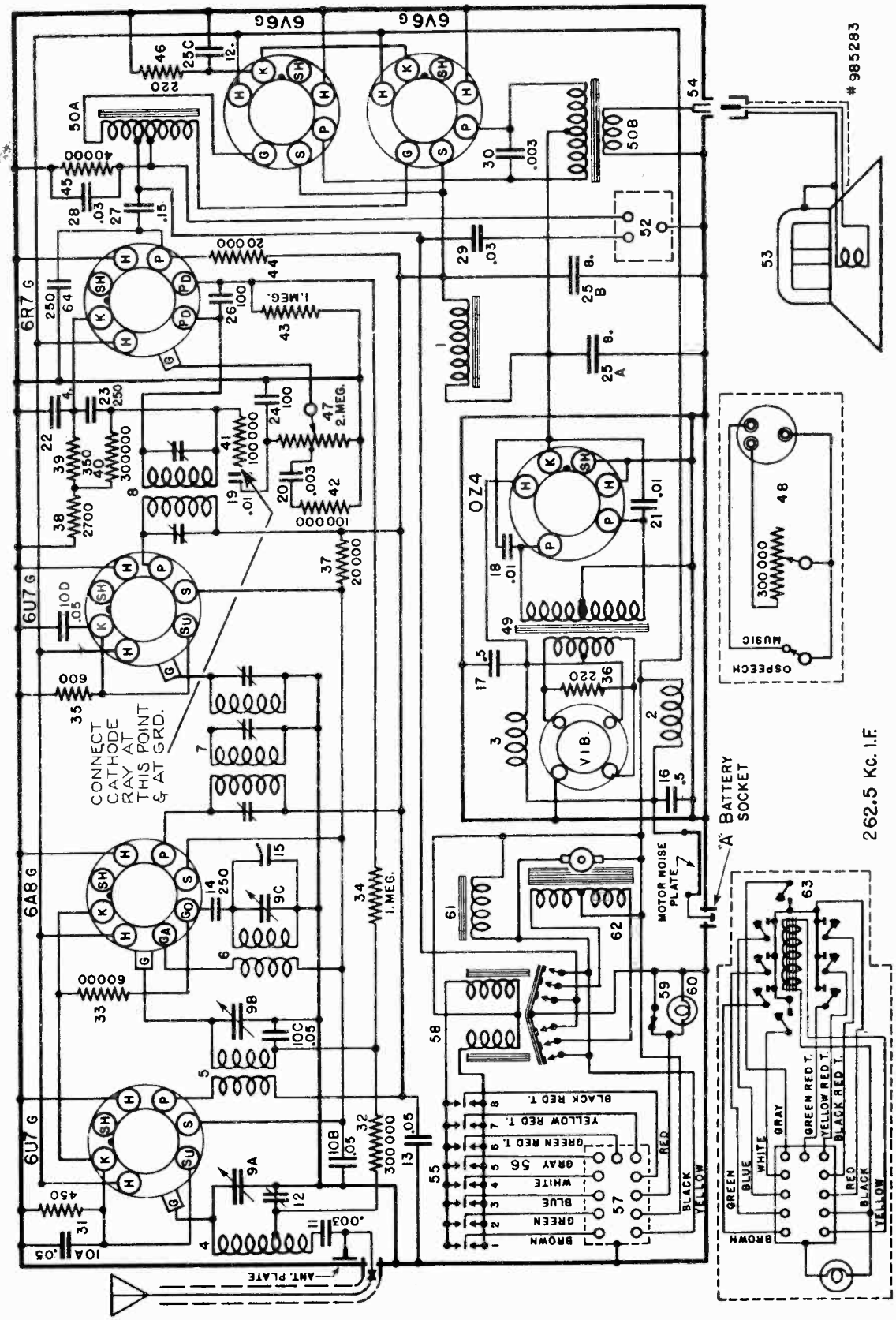


FIG. 3--CHEVROLET MODEL 985283 CIRCUIT DIAGRAM

MODEL 985283 Chevrolet
Socket, Trimmers, Chassis
Voltage, Tuner Assembly

UNITED MOTORS SERVICE

Chevrolet 985283 Date: 12-13-37

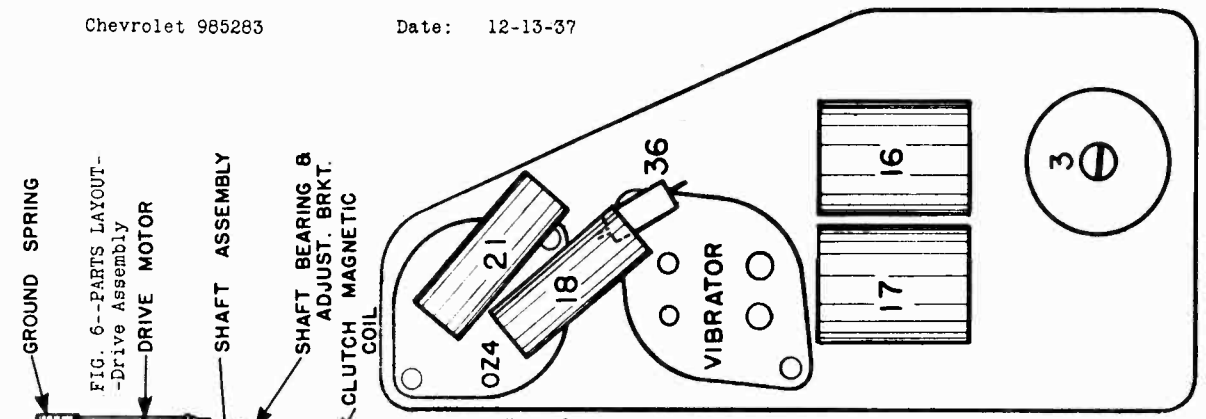


FIG. 6--PARTS LAYOUT--Drive Assembly

FIG. 2--PARTS LAYOUT--Vibrator Filter

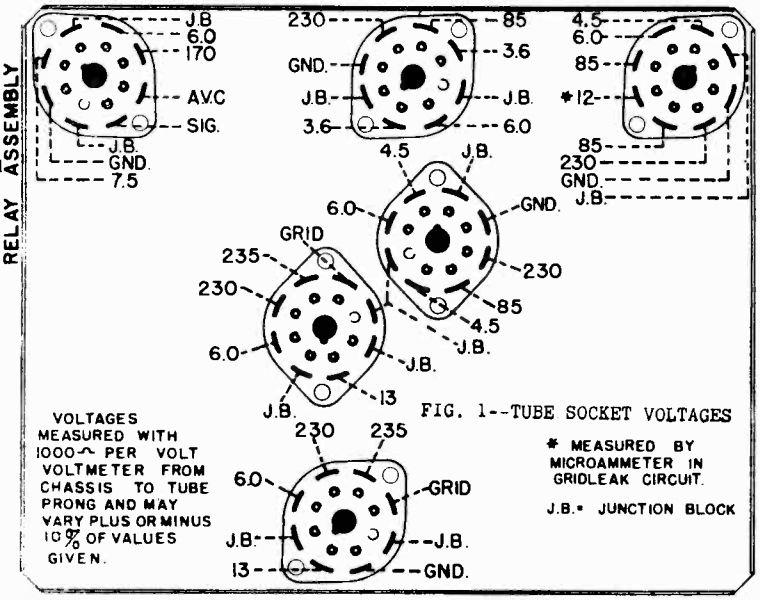


FIG. 1--TUBE SOCKET VOLTAGES

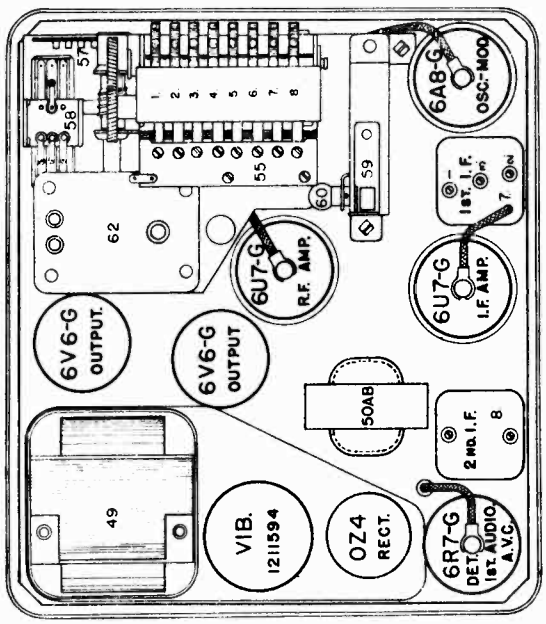


FIG. 4--PARTS LAYOUT--Top View

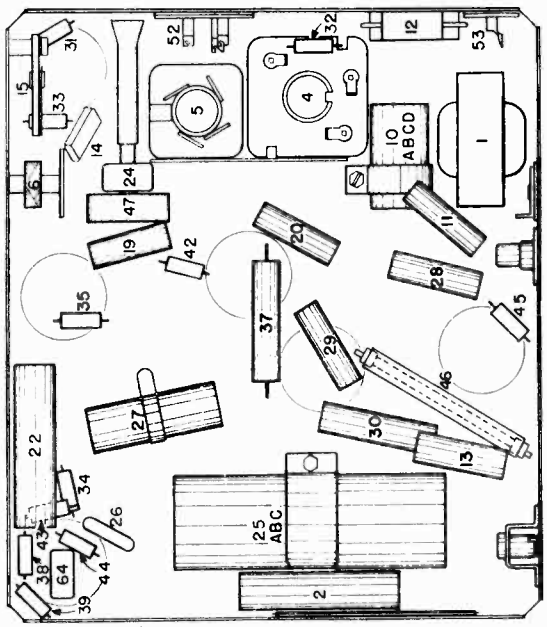


FIG. 5--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL 985284 Chevrolet
Schematic, Socket, Chassis
Trimmers, Voltage

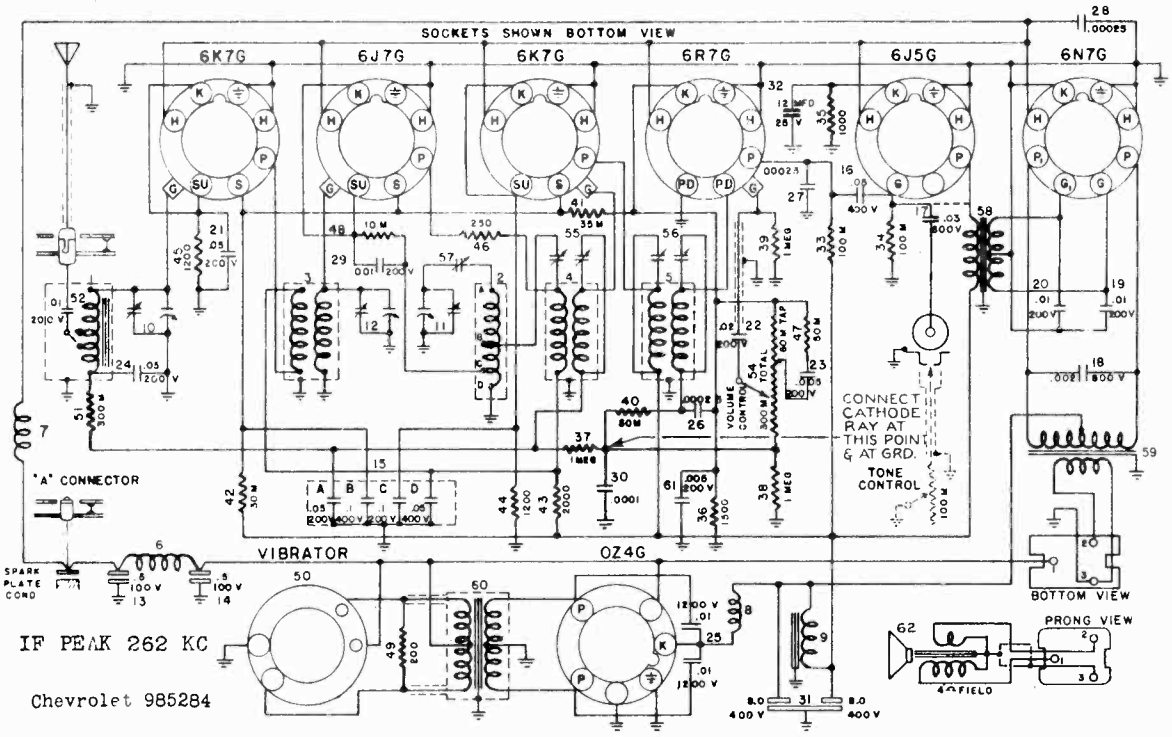


FIG. 2--CHEVROLET MODEL 985284 CIRCUIT DIAGRAM

TUBE SOCKET VOLTAGES

TUBE	H	P	S	Su	K	Pl	G	
6K7G (RF)	6.0	222	89	11.8	11.8	--	---	VOLTAGE READINGS BETWEEN SOCKET TER-
6J7G	6.0	222	89	4.5	4.5	--	---	MINALS & GROUND WITH A D.C. VOLTMETER
6K7G (IF)	6.0	238	89	7.5	7.5	--	---	HAVING A RESISTANCE OF 1000 OHMS/VOLT
6R7G	6.0	118	--	---	5.8	--	---	CURRENT DRAIN 6 AMPS. WITHOUT DIAL LIGHT
6J5G	6.0	230	--	---	7.6	--	---	OR SPEAKER .CURRENT DRAIN 7.7 AMPS. WITH
6N7G	6.0	250	--	---	---	250	---	DIAL LIGHT AND SPEAKER "B" SUPPLY DRAIN
OZ4G	---	---	--	---	---	---	260 APPROX. 58 M.A.	

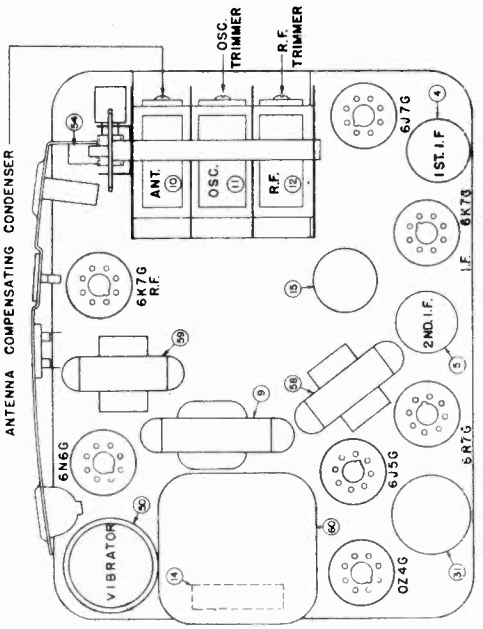


FIG. 3--PARTS LAYOUT--Top View

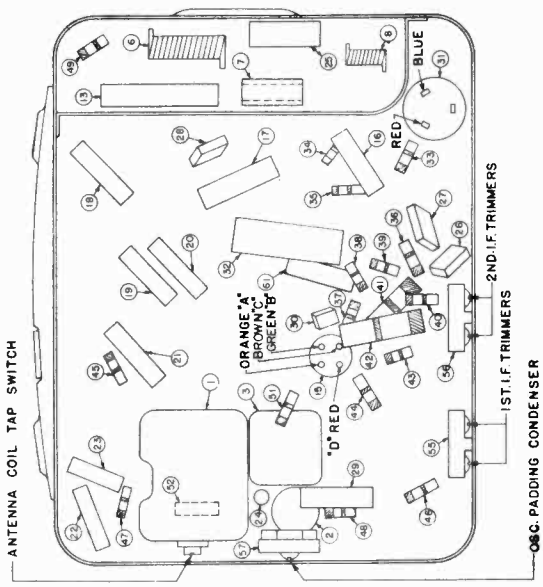


FIG. 4--PARTS LAYOUT--Bottom View

MODEL 985285 Chevrolet
Schematic, Socket, Chassis
Trimmers, Condenser

UNITED MOTORS SERVICE

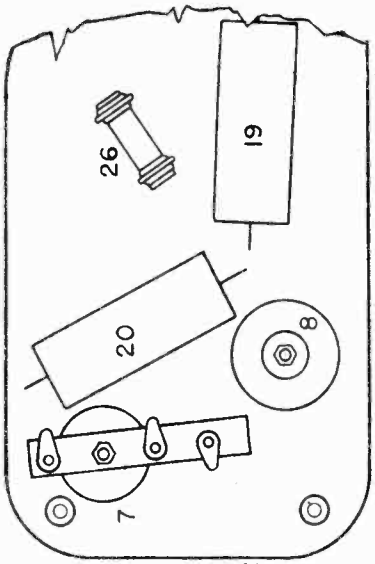
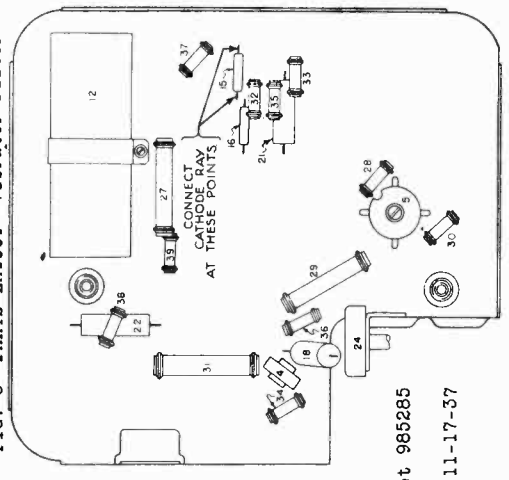


FIG. 6--PARTS LAYOUT--Vibrator Filter



Chevrolet 985285

Date: 11-17-37

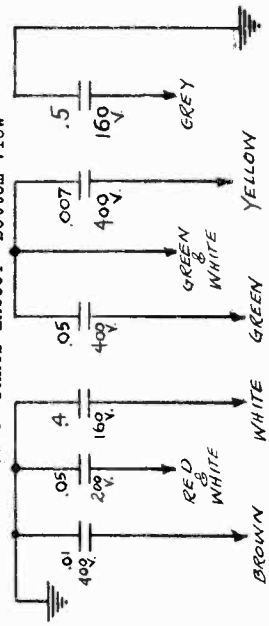


FIG. 4--PARTS LAYOUT--Bottom View

FIG. 7--#1212544 CONDENSER BLOCK CONNECTIONS

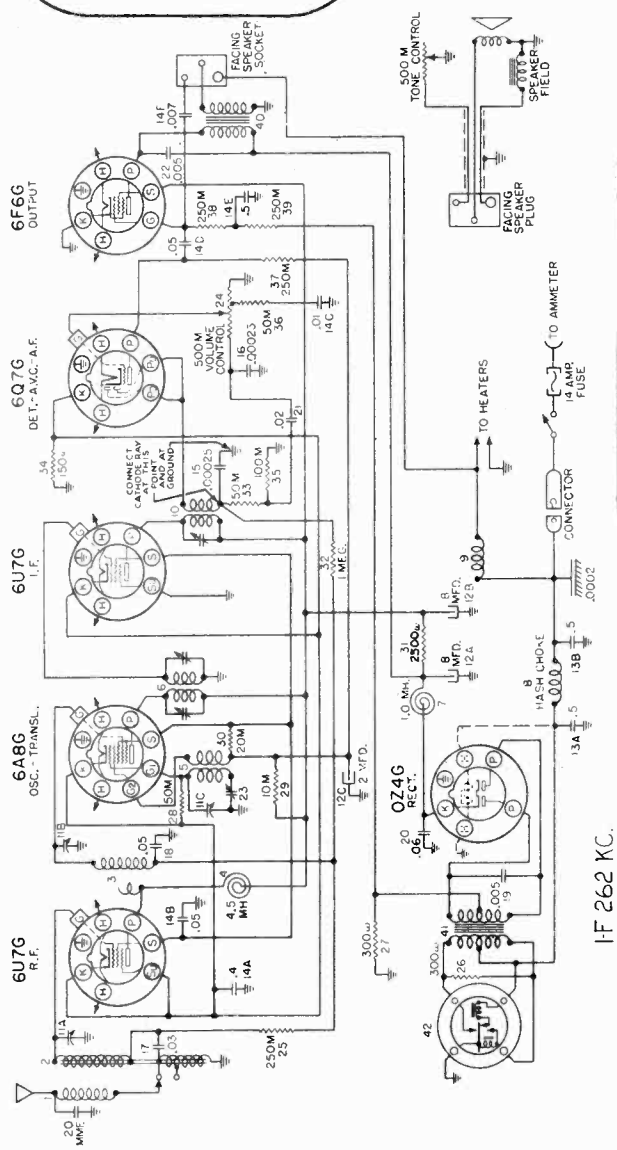


FIG. 5--PARTS LAYOUT--Side View

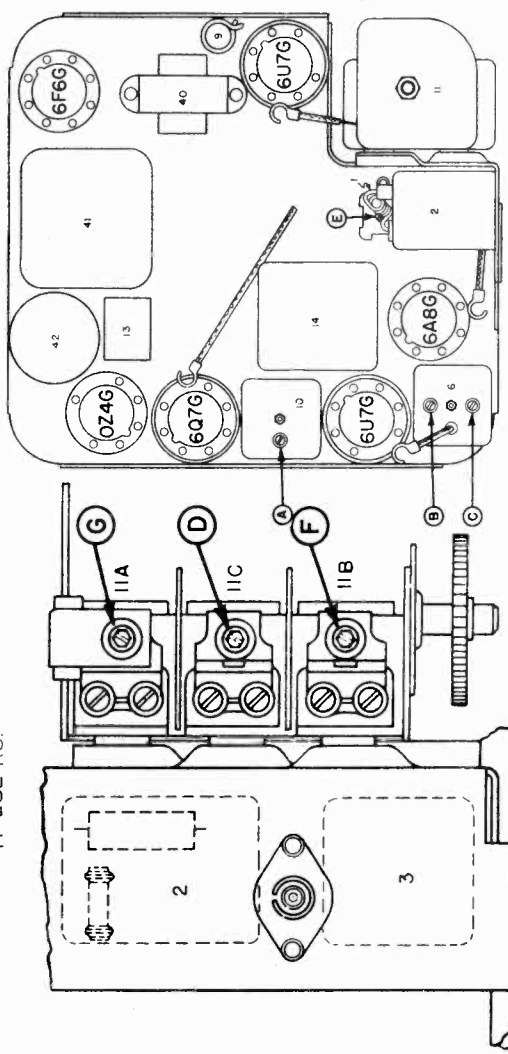


FIG. 3--PARTS LAYOUT--Top View

UNITED MOTORS SERVICE

MODEL 7232553(983570)
Pontiac
Schematic, Voltage
Trimmers

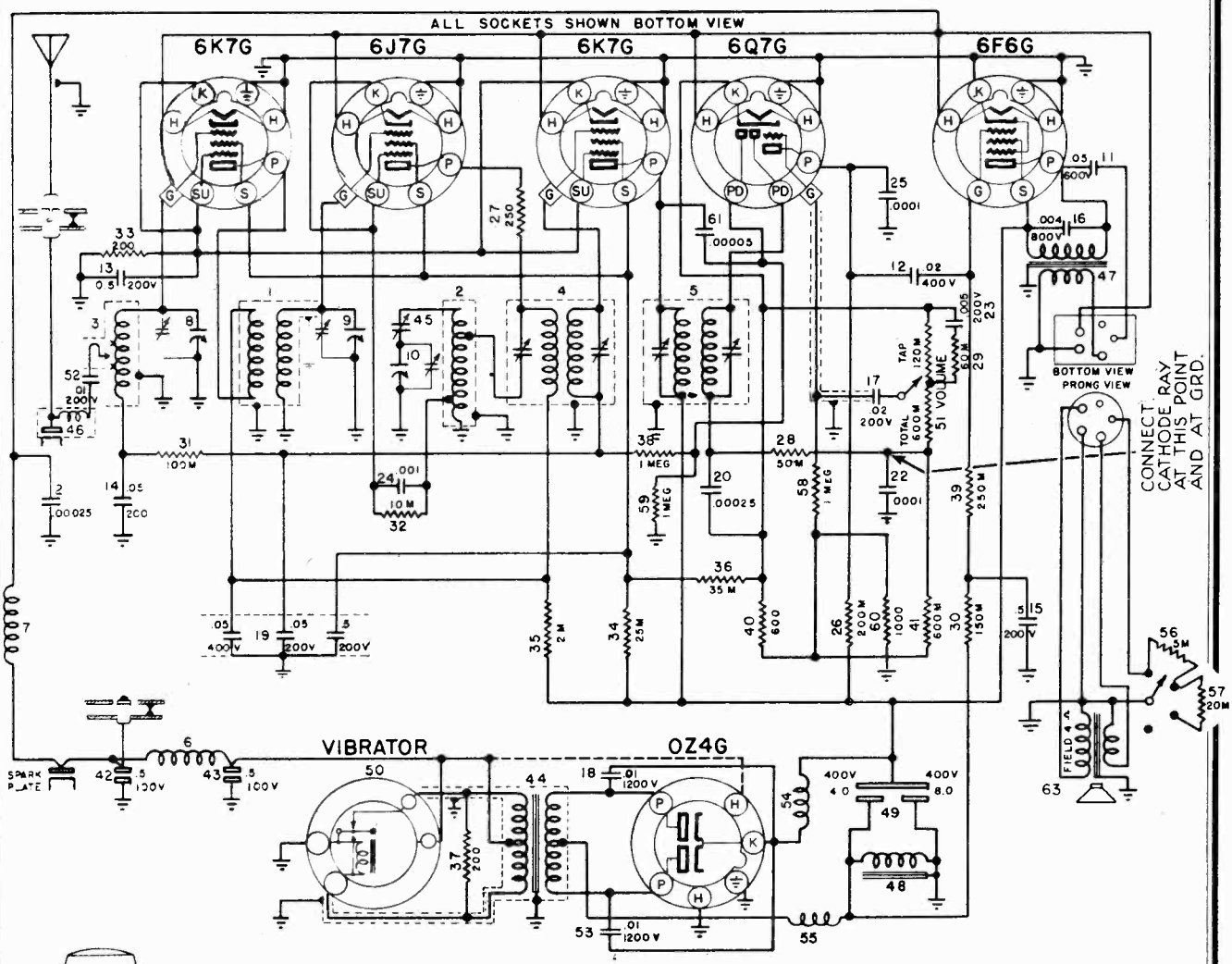


FIG. 2--PONTIAC MODEL 7232553 (983570) CIRCUIT DIAGRAM

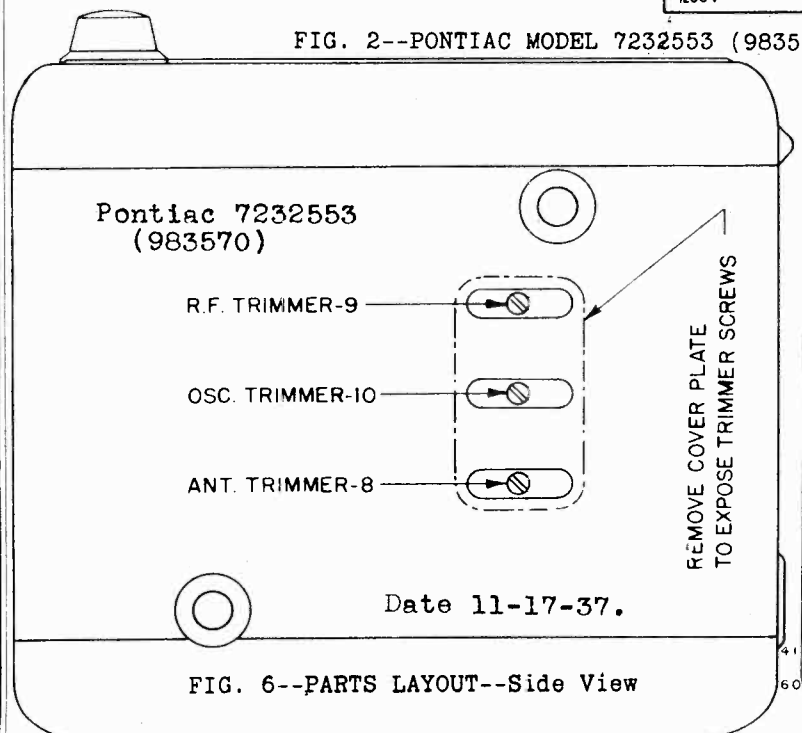
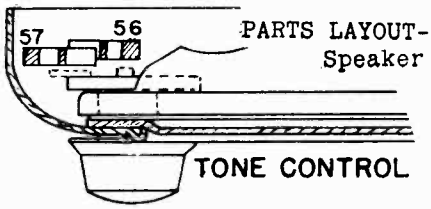


FIG. 6--PARTS LAYOUT--Side View



BOTTOM VIEW OF TUBE SOCKETS

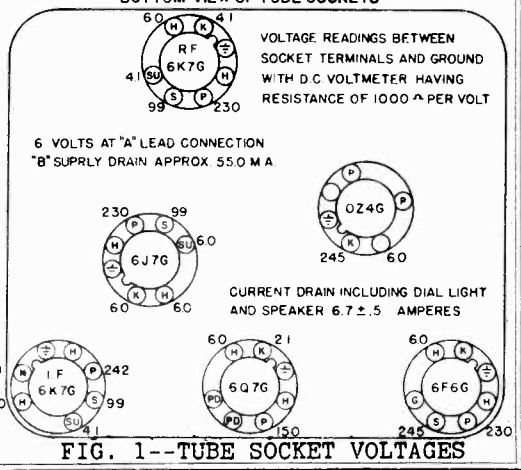


FIG. 1--TUBE SOCKET VOLTAGES

MODEL 7232553(983570)
Pontiac
Socket, Trimmers
Chassis

UNITED MOTORS SERVICE

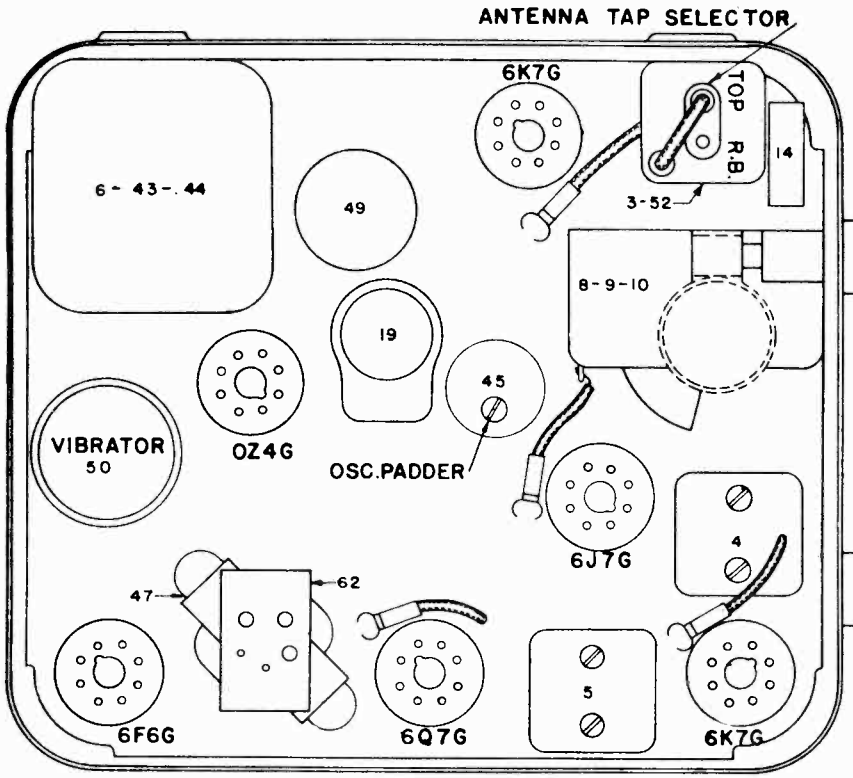


FIG. 3--PARTS LAYOUT--Top View

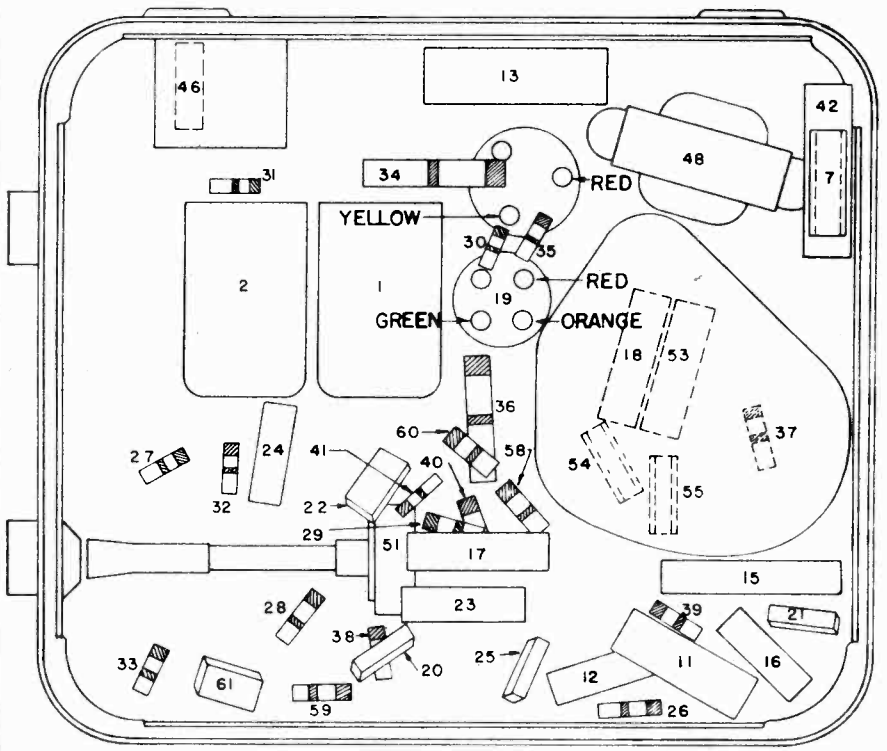
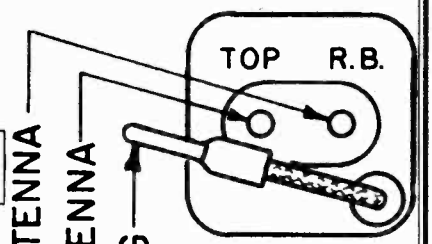


FIG. 4--PARTS LAYOUT--Bottom View



PLUG HERE WHEN USING RUNNING BOARD TYPE ANTENNA
PLUG HERE WHEN USING TURRET TOP ANTENNA
ANTENNA COIL TAP SELECTOR PLUG

TOP VIEW OF
ANTENNA COIL SHIELD

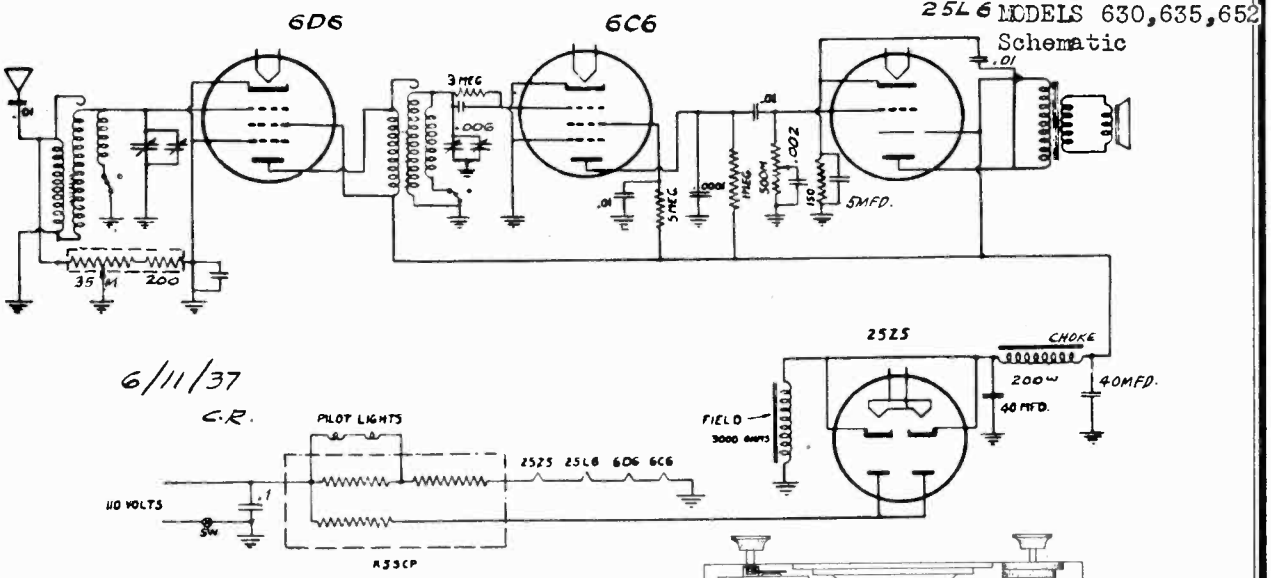
FIG. 5--ANTENNA COIL--Selector Tap

PONTIAC MODEL
7232553
(983570)

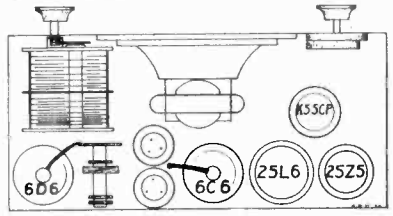
Date 11-17-37.

THE WALGREEN CO.

MODEL 255
Schematic, Socket
Notes, Parts
25L6 MODELS 630, 635, 652
Schematic



MODEL 255



VIEW SHOWING POSITION OF TUBES

Ground

Caution: Under no circumstance should a ground connection be used, or the far end of the aerial connected to radiators, water pipes, etc.

Current Supply

Any outlet used for household purposes and having a voltage of at least 105 volts and no more than 125 volts can be used. This current can be either direct or alternating current. If in doubt about the line voltage, consult your local power company. They will be pleased to furnish the necessary information. Do not attempt to operate receiver on a current of more than 125 volts. Should the line voltage be more than 125 volts, a special line voltage reducer is available at your neighborhood Walgreen Drug Store.

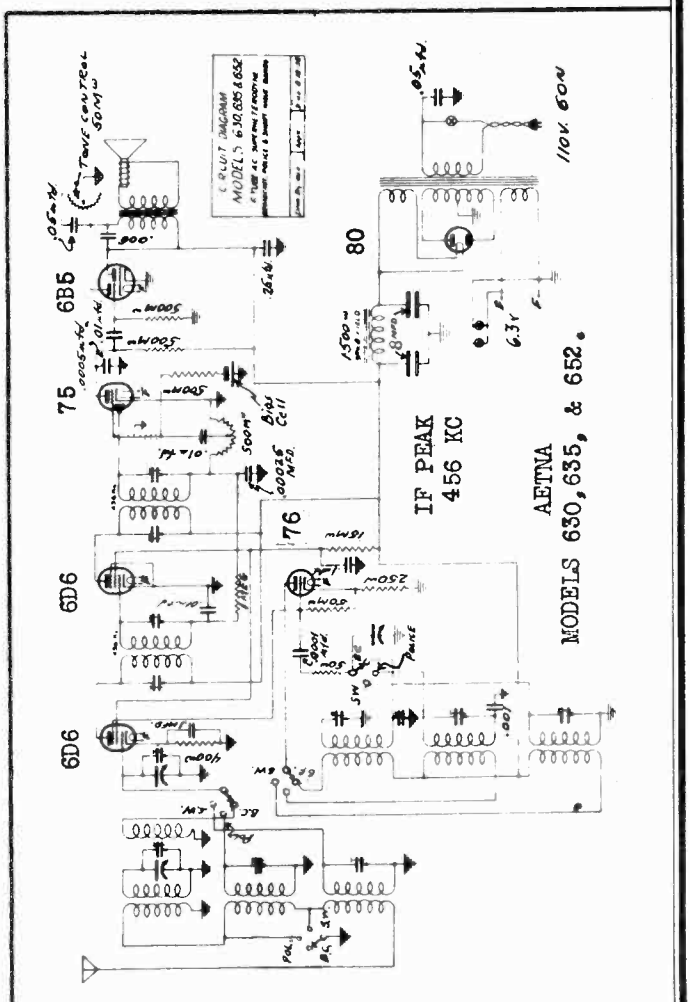
Aerial

The aerial can be either indoors or outside and in most instances should be no less than 20 feet in length or more than 40 feet. The aerial is to be connected to the short green wire protruding from the rear of the cabinet. When an indoor aerial is used it may be concealed under the base board or tacked to the top of the picture moulding around the room.
Should the receiver be operated in localities where there are no local broadcast stations, a longer outside aerial will be necessary for satisfactory reception. In highly congested metropolitan districts, where most of the apartments are in tall steel reinforced concrete buildings, it will be necessary to have an outside aerial to obtain satisfactory performance. The use of so called aerial eliminator's is not advised.

PARTS

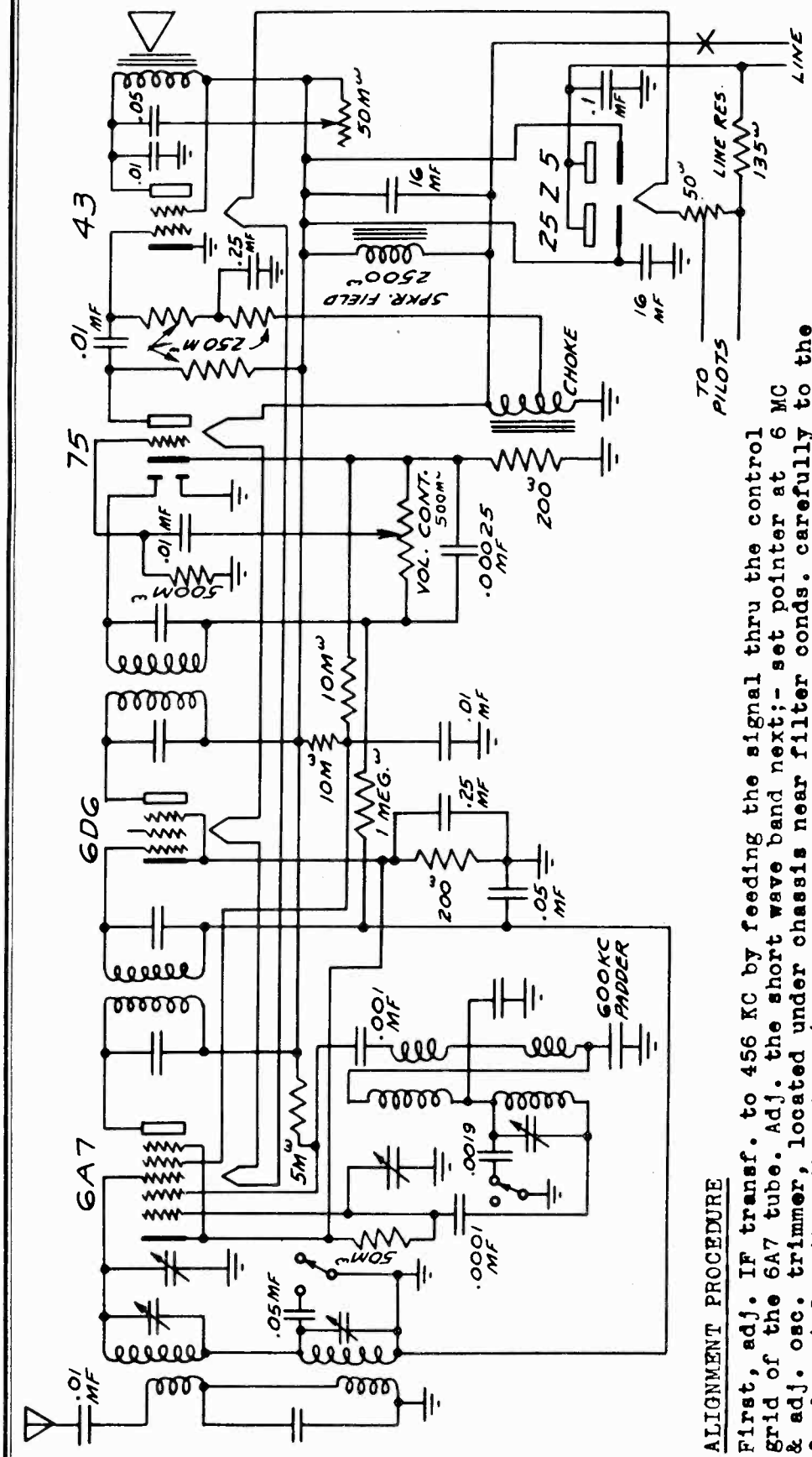
Part No.	Description	Price List
5835	Speaker	$4.50
138	Transformer—Output	1.25
577	Cone and Voice Coil Assembly	1.25
151	Field Coil	1.25
	Variable Condenser	
1633	Type A—with Gear Outside	3.00
1631	Type B—with Gear Inside	3.00
	Shaft and Pinion	
461	For Type A Variable Condenser	.60
462	For Type B Variable Condenser	.75
463	Rotor Gear For Type A Only	.50
2864	Antenna Coil	1.25
2865	Interstage Coil	1.25
2525	Filter Condenser	1.20
2426	Volume Control with Switch	1.25
4040	Dial Assembly Complete	2.50
4039	Dial Scale	.50
4112	Dial Ribbon	.40
464	Dial Pulley For Ribbon (Left)	.40
465	Dial Pulley For Ribbon (Right)	.40
4041	Dial Frame	.75
458	Dial Pulley For Variable Shaft	.40
459	Dial Gable	.15
478	Dial Window (Clear)	.25
1822	Pilot Light Socket	.25
148	Filter Choke	.75
3721	Band Switch	.50
259	Tone Control	.75
3911	Knobs	.25
	Grille Cloth	.10

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE



MODEL 700
Schematic
Alignment

THE WALGREEN CO.



ALIGNMENT PROCEDURE

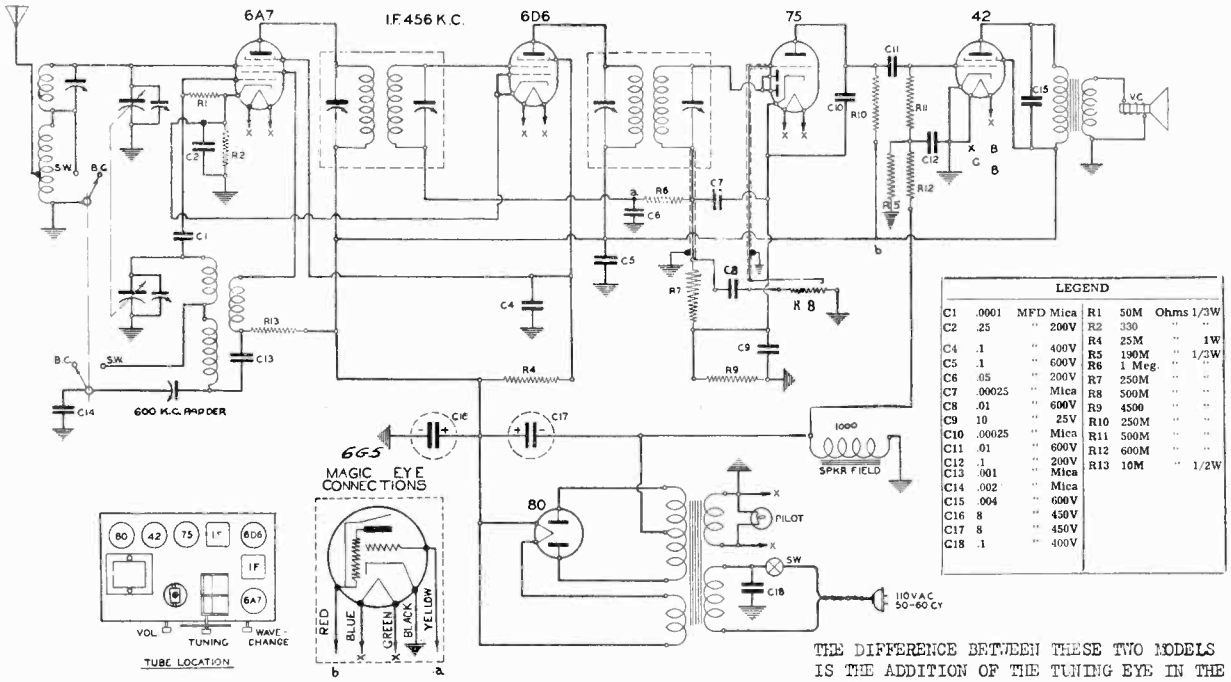
First, adj. IF transf. to 456 KC by feeding the signal thru the control grid of the 6A7 tube. Adj. the short wave band next;- set pointer at 6 MC & adj. osc. trimmer, located under chassis near filter conds. carefully to the fundamental rather than image(fund. is second peak as you adj. from max. cap.); then adj. the short wave ant. trimmer, located on top of chassis near var. cond., for max. signal; next dial across short wave band checking it at 2.5 and 4 MC to see that it does not stop oscillating. If this should occur, try changing 6A7 tubes to find one that will oscillate at 2.2 MC. If you experience any difficulty in finding a satisfactory tube, it may be necessary to use separate bias on 6A7(200 ohm res. and .1/4 mfd cond.) in order to use the tubes available.

Now, set band switch to broadcast position and adj. padder at about 600 Kc for max. gain, rocking the var. cond. with each adj. of the padder - then with gang all the way open, adj. B.C. osc. trimmer located under chassis near outer edge, to 1717 KC and set B.C. ant. trimmer located on top of chassis near outer edge, for maximum gain.

This set is designed to operate on 105-125 volts AC-DC DO NOT CONNECT A GROUND TO THIS SET.

WARWICK MFG. CO.

MODEL 5 Tube A-C Superhet.
MODEL 6 Tube A-C Superhet.
Schematic, Socket, Trimmers
Alignment

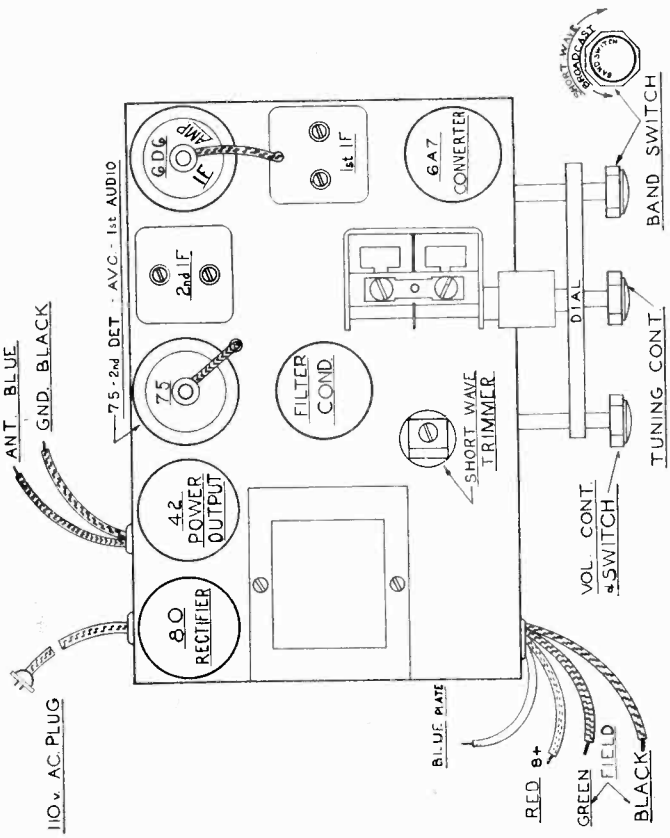


LEGEND							
C1	.0001	MFD Mica		R1	50M	Ohms	1/3W
C2	.25	" 200V		R2	330	"	"
C4	.1	" 400V		R4	25M	"	1W
C5	.1	" 600V		R5	190M	"	1/3W
C6	.05	" 200V		R6	1 Meg.	"	"
C7	.00025	" Mica		R7	250M	"	"
C8	.01	" 600V		R8	500M	"	"
C9	.10	" 25V		R9	4500	"	"
C10	.00025	" Mica		R10	250M	"	"
C11	.01	" 600V		R11	500M	"	"
C12	.1	" 200V		R12	600M	"	"
C13	.001	" Mica		R13	10M	"	1/2W
C14	.002	" Mica					
C15	.004	" 600V					
C16	8	" 450V					
C17	8	" 450V					
C18	.1	" 400V					

THE DIFFERENCE BETWEEN THESE TWO MODELS IS THE ADDITION OF THE TUNING EYE IN THE 6 TUBE MODEL.

6 Tube A. C. Superheterodyne with Cathode Ray Magic Eye

A good ground connection to a water pipe or other metallic conductor entering into the ground for some distance is ESSENTIAL.



The frequency range covered by this receiver is as follows: Broadcast band 540 KC to 1709 KC. Short-wave band 2.1 megacycles to 6.4 megacycles. These ranges are selected by turning the range switch knob. Turning this knob to the left switches to the broadcast band; to the right switches to the short wave band.

I. F. Alignment:

Connect a test oscillator or signal generator through a .1 mfd. condenser to the grid of the 6A7 tube and set the oscillator to 456 KC. Use an output meter connected to the speaker if possible, to obtain the most accurate adjustments. Peak each I.F. stage to maximum response, reducing the output of the oscillator as far as possible for final adjustments.

R. F. Alignment:

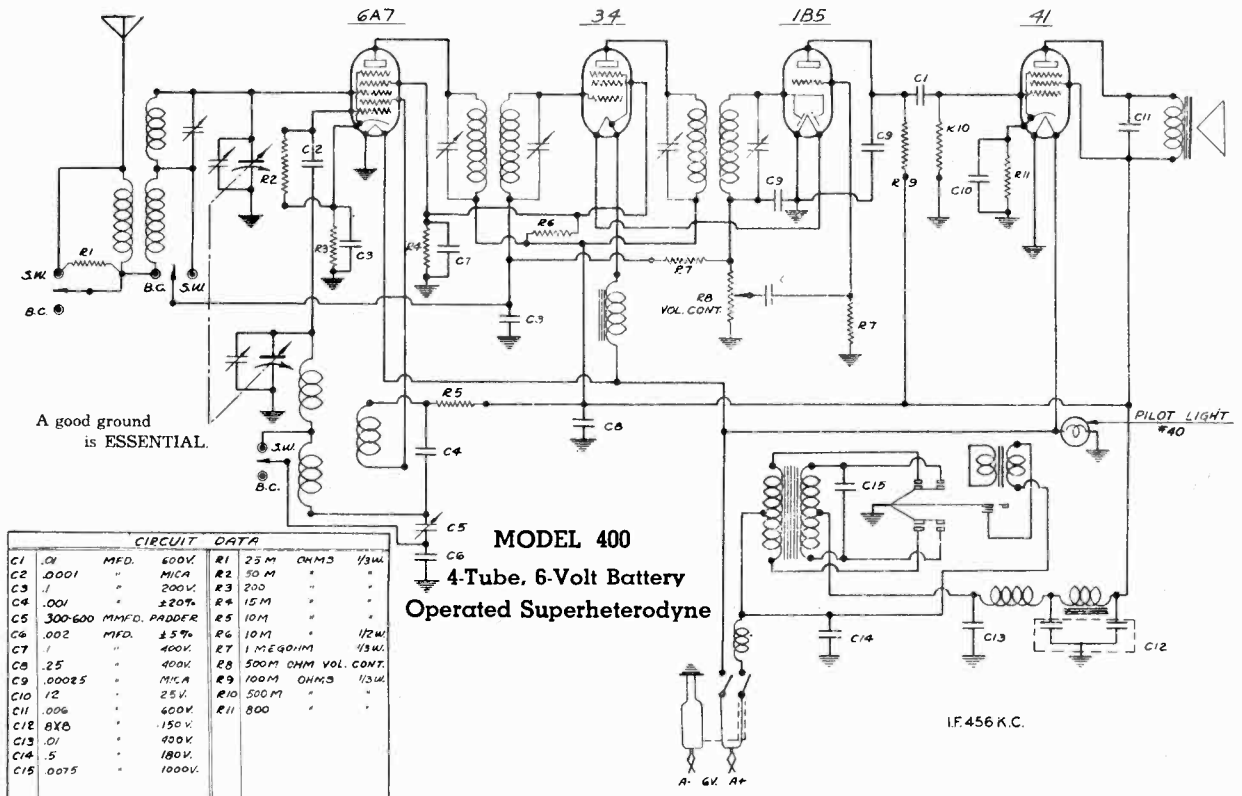
With the test oscillator set to 1720 KC and connected to the antenna wire of the receiver through a .00025 mfd condenser, switch the receiver to the broadcast band and set the pointer at the end of travel on the right (at the 1700 KC end). Adjust the rear trimmer on the top of the variable condenser, for maximum gain. Then set the test oscillator at 1400 KC and tune in this signal on the receiver as though tuning a station. If an adjustment at this point is necessary on your set, you will have a trimmer condenser to adjust on top of the variable condenser at the front; this is adjusted for maximum gain.

Now adjust the test oscillator to 600 KC and tune in this signal. Adjust the padder condenser (which is adjusted through the right hand end of the chassis) in the following manner: turn the dial slowly and repeatedly back and forth across the signal while adjusting the padder. Adjust for maximum gain.

Now switch the receiver to short wave. With the test oscillator set at 6 megacycles, tune in this signal on the receiver. Then adjust the short wave trimmer (which is located on top of the coil above the chassis) for maximum gain.

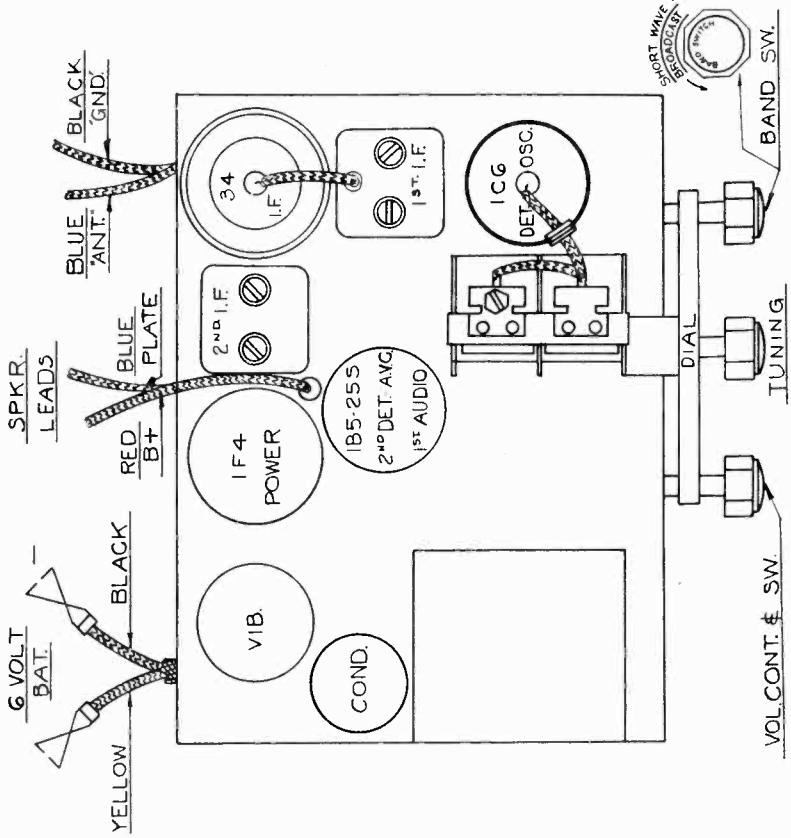
MODEL 400
Schematic, Socket
Trimmers, Alignment

WARWICK MFG. CO.



MODEL 400
4-Tube, 6-Volt Battery Operated Superheterodyne

CIRCUIT DATA							
C1	.01	MFD.	600V.	R1	25 M	OHMS	1/3W.
C2	.0001	"	MICA	R2	50 M	"	"
C3	.1	"	200V.	R3	200	"	"
C4	.001	"	±20%	R4	15 M	"	"
C5	300-600	MMFD.	PADDER	R5	10M	"	"
C6	.002	MFD.	±5%	R6	10M	"	1/2W.
C7	.1	"	400V.	R7	1 MEGOHM		1/3W.
C8	.25	"	400V.	R8	500M OHM	VOL. CONT.	
C9	.00025	"	MICA	R9	100M	OHMS	1/3W.
C10	.12	"	25V.	R10	500M	"	"
C11	.006	"	600V.	R11	800	"	"
C12	8X8	"	150V.				
C13	.01	"	400V.				
C14	.5	"	180V.				
C15	.0075	"	1000V.				



WARNING: IF WINDCHARGER IS USED DO NOT OPERATE SET WITH CHARGER CONNECTED

Warning: Place Storage Battery in such a position that clips on Battery Cable may be fastened directly to Battery Terminals. Do not add any additional wire length to cables as this will make the set hum.

I. F. Alignment:

Connect the oscillator through a 1 condenser to the grid of the 6A7 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.

R. F. Alignment:

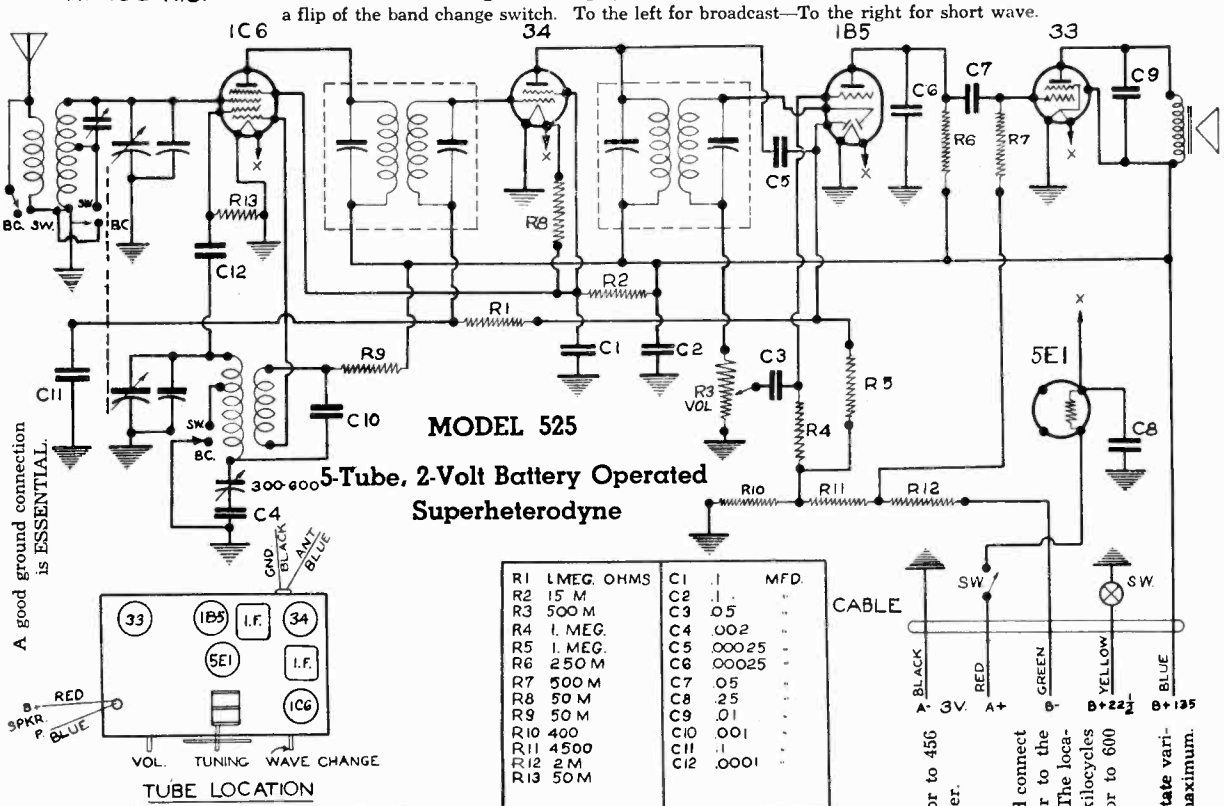
With the wave change switch in the broadcast position, set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. The location of oscillator trimmer is on rear section of variable condenser. Reset the test oscillator to 1400 kilocycles and adjust antenna trimmer located corner front section of variable condenser. Now set oscillator to 600 kilocycles and adjust padder located on side of chassis. Check alignment at 1000 kilocycles.

For aligning police band, set test oscillator to 6 megacycles. Turn band switch to short wave. Rotate variable condenser until signal is heard. Peak antenna trimmer (across antenna coil under chassis) to maximum. Rock variable condenser slightly backward and forward until maximum peak is reached.

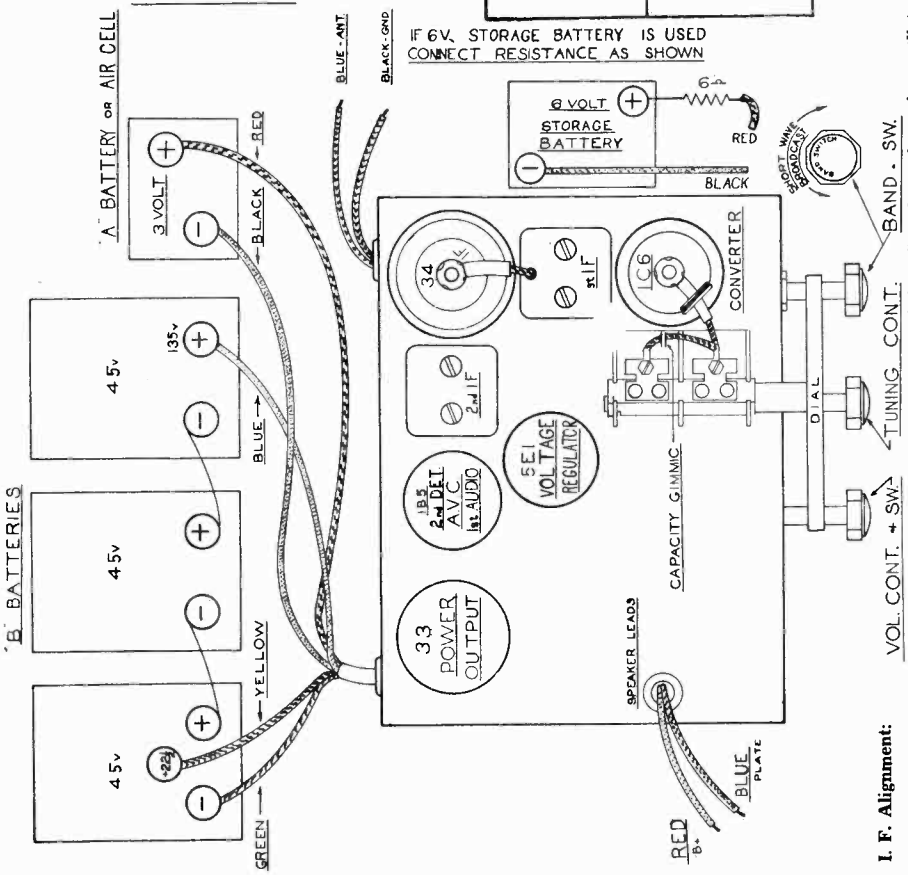
MODEL 525
Schematic, Socket
Trimmers, Alignment

WARWICK MFG. CO.

The frequency range covered by this receiver is as follows: Broadcast band 537 KC to 1730 KC. The short wave band covers a range of 2.2 megacycles to 6.4 megacycles and either of these bands are selected at will by a flip of the band change switch. To the left for broadcast—To the right for short wave.



R1	1 MEG. OHMS	C1	.1 MFD.
R2	15 M	C2	.1
R3	500 M	C3	.05
R4	1. MEG.	C4	.002
R5	1. MEG.	C5	.00025
R6	250 M	C6	.00025
R7	500 M	C7	.05
R8	50 M	C8	.25
R9	50 M	C9	.01
R10	400	C10	.001
R11	4500	C11	.1
R12	2 M	C12	.0001
R13	50 M		



I. F. Alignment:

Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.

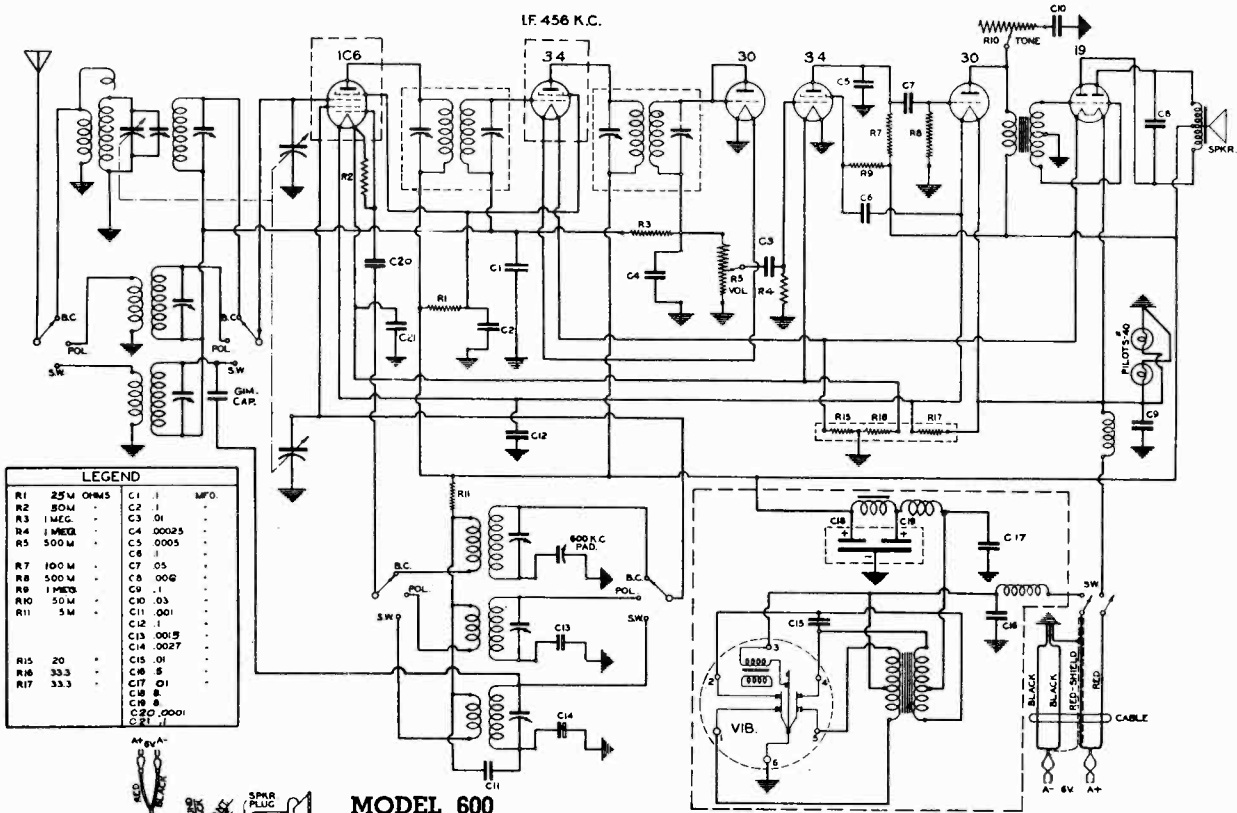
R. F. Alignment:

With the wave change switch in the broadcast position, set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. The location of oscillator trimmer is on rear section of variable condenser. Reset the test oscillator to 1400 kilocycles and adjust antenna trimmer located corner front section of variable condenser. Now set oscillator to 600 kilocycles and adjust padder located on side of chassis. Check alignment at 1000 kilocycles.

For aligning police band, set test oscillator to 6 megacycles. Turn band switch to short wave. Rotate variable condenser until signal is heard. Peak antenna trimmer (across antenna coil under chassis) to maximum. Rock variable condenser slightly backward and forward until maximum peak is reached.

MODEL 600
Schematic, Socket
Trimmers, Alignment

WARWICK MFG. CO.

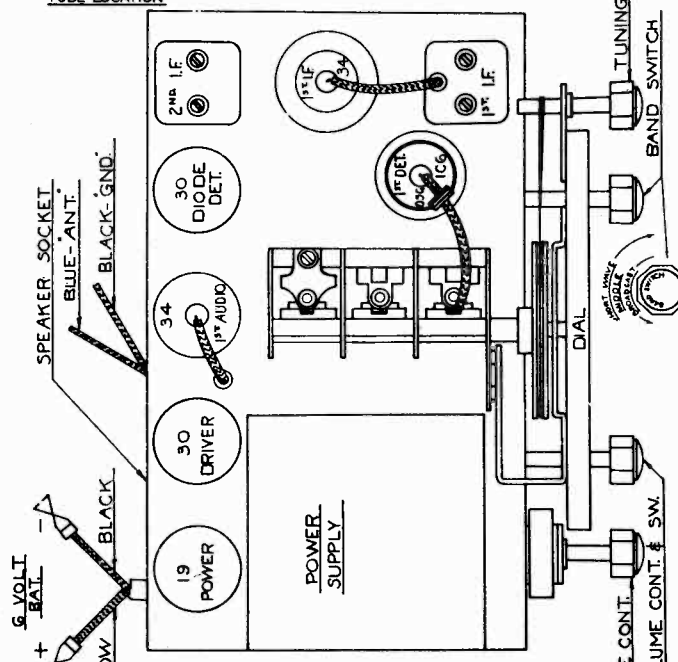


MODEL 600

6-Tube, 6-Volt Superheterodyne Battery Receiver

BANDS	SWITCH
537 to 1730 KC	LEFT
1.8 to 5.7 MC	CENTER
5.7 to 18.3 MC	RIGHT

TUBE LOCATION



A good ground connection to a water pipe or other metallic conductor entering into the ground for some distance is ESSENTIAL.

WARNING: IF WINDCHARGER IS USED DO NOT OPERATE SET WITH CHARGER CONNECTED.

Warning: Place Storage Battery in such a position that clips on Battery Cable may be fastened directly to Battery Terminals. Do not add any additional wire length to cables as this will make the set hum.

I. F. Alignment:

Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.

R. F. Alignment:

With the wave change switch in the broadcast position, set oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, second position from the front. Reset the test oscillator to 1400 kilocycles and adjust antenna trimmer located on top of rear section of variable condenser. Peak detector trimmer located across proselector coil under chassis. Now set oscillator to 600 kilocycles and adjust padder located on top of the chassis. Check alignment at 1000 kilocycles.

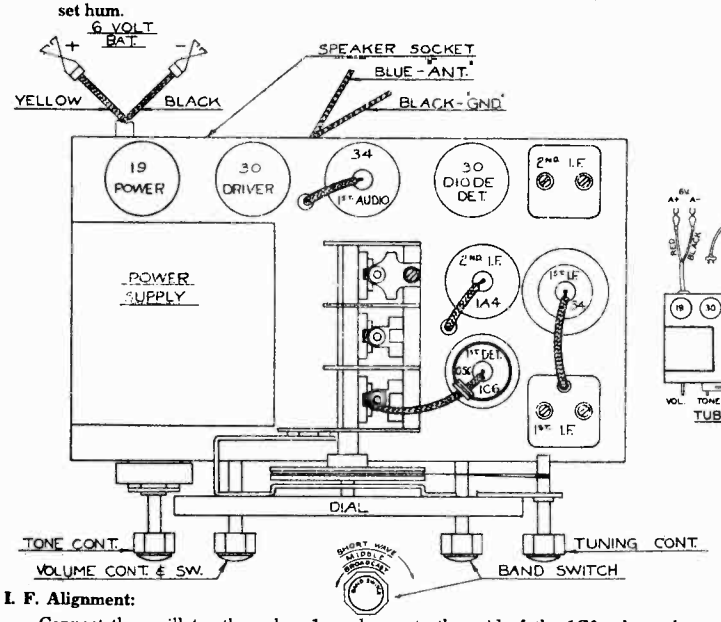
For aligning the police band, set test oscillator to 5 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right sid eof the chassis, first position from the front. Now adjust antenna trimmer located on the front of the chassis, left position, to resonance.

The short wave band is aligned by setting the condenser to 18 megacycles and adjust the oscillator trimmer located on the right side of the chassis, first position from the front to resonance with an 18 megacycle signal from the test oscillator. Turn dial to 16 M. C. and adjust antenna trimmer through right hand hole in front of chassis, rocking variable condenser slightly back and forth to get maximum peak.

A good ground connection to a water pipe or other metallic conductor entering into the ground for some distance is ESSENTIAL.

WARNING: IF WINDCHARGER IS USED DO NOT OPERATE SET WITH CHARGER CONNECTED.

Warning: Place Storage Battery in such a position that clips on Battery Cable may be fastened directly to Battery Terminals. Do not add any additional wire length to cables as this will make the set hum.



I. F. Alignment:

Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.

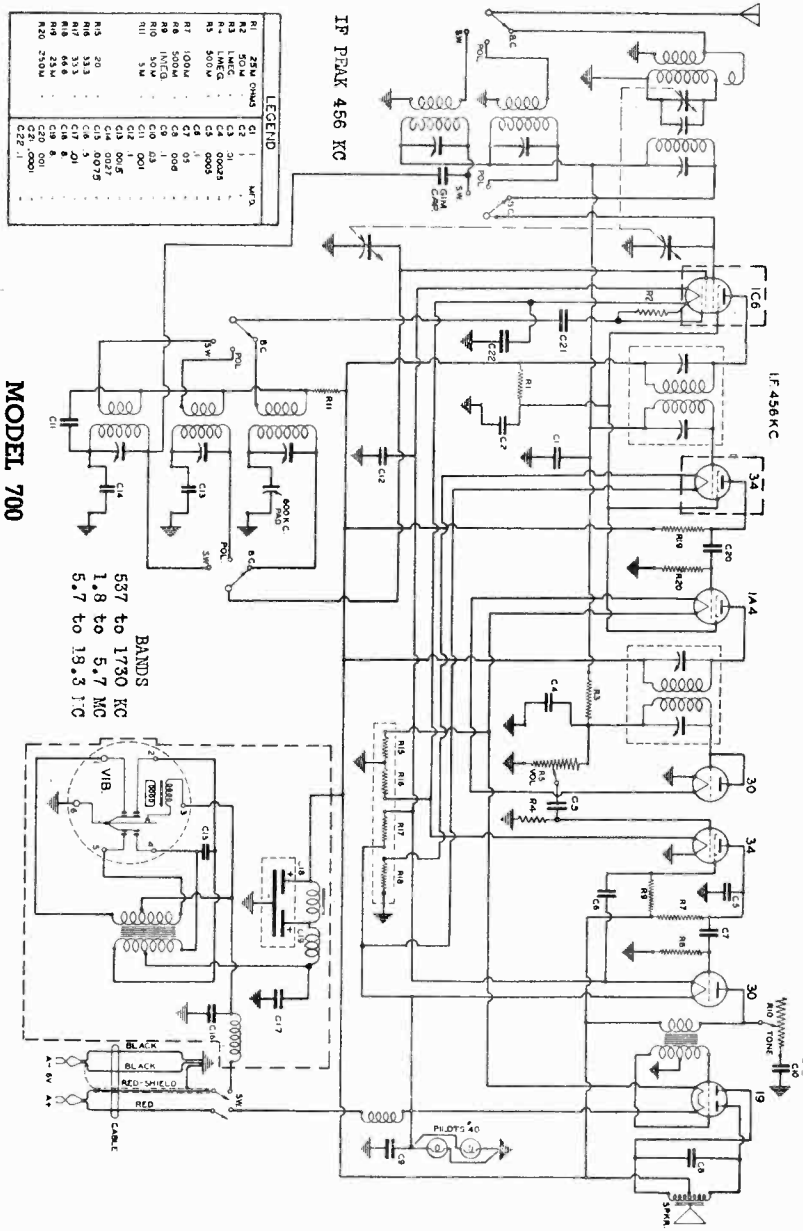
R. F. Alignment:

With the wave change switch in the broadcast position. set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, second position from the front. Reset the test oscillator to 1400 kilocycles and adjust the antenna trimmer located on rear section of variable condenser. Adjust 1st detector trimmer under the chassis across preselector. Now set oscillator to 600 kilocycles and adjust padder located on side of chassis. Check alignment at 1000 kilocycles.

For aligning the police band, set test oscillator to 5 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right side of the chassis, first position from the front. Now adjust antenna trimmer located on the front of the chassis, left position, to resonance.

The short wave band is aligned by setting the condenser to 18 megacycles and adjust the oscillator trimmer located on the right side of the chassis, third position from the front to resonance with an 18 megacycle signal from the test oscillator. Turn dial to 16 M. C. Set test oscillator to 16 M. C. and adjust antenna trimmer through right hand hole in front of chassis, rocking variable condenser slightly back and forth to get maximum peak.

MODEL 700
7-Tube, 6-Volt Battery Operated Superheterodyne



WARWICK MFG. CO.

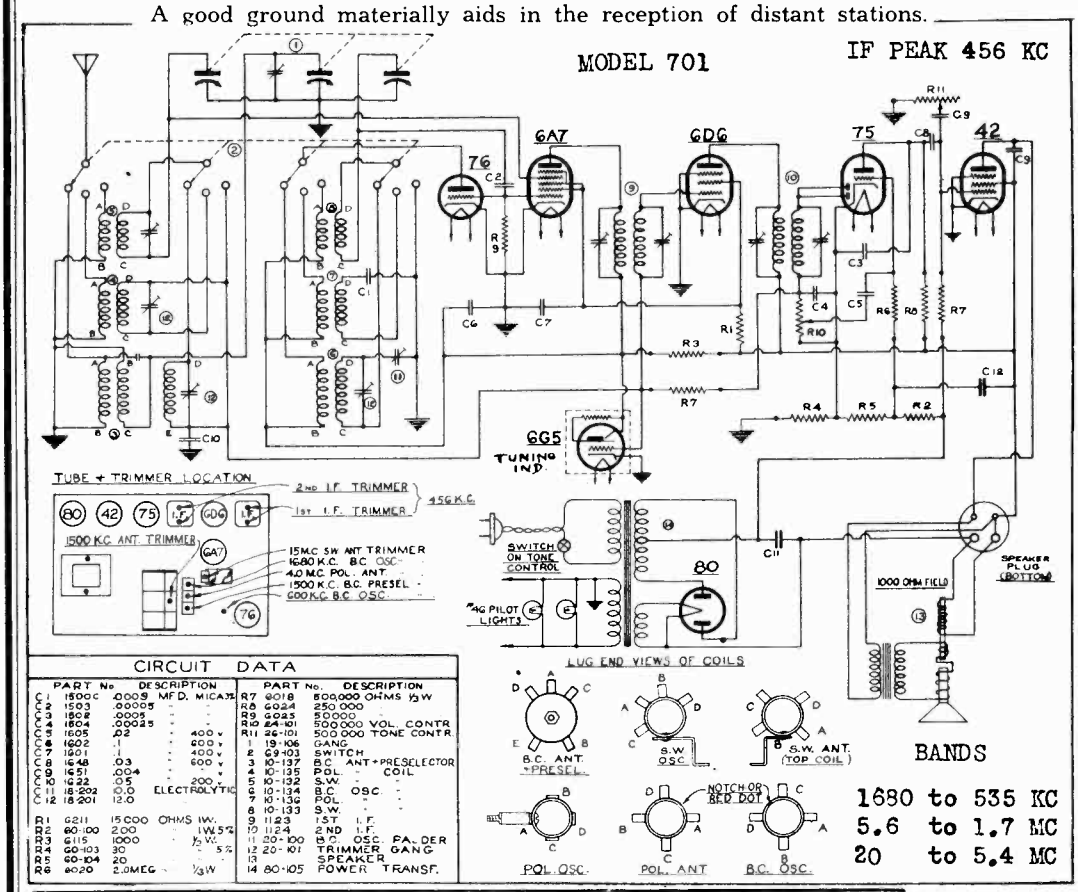
MODEL 700
Schematic, Socket
Trimmers, Alignment

MODEL 701
Schematic, Socket

WARWICK MFG. CO.

Voltage, Trimmers
Alignment, Parts

A good ground materially aids in the reception of distant stations.

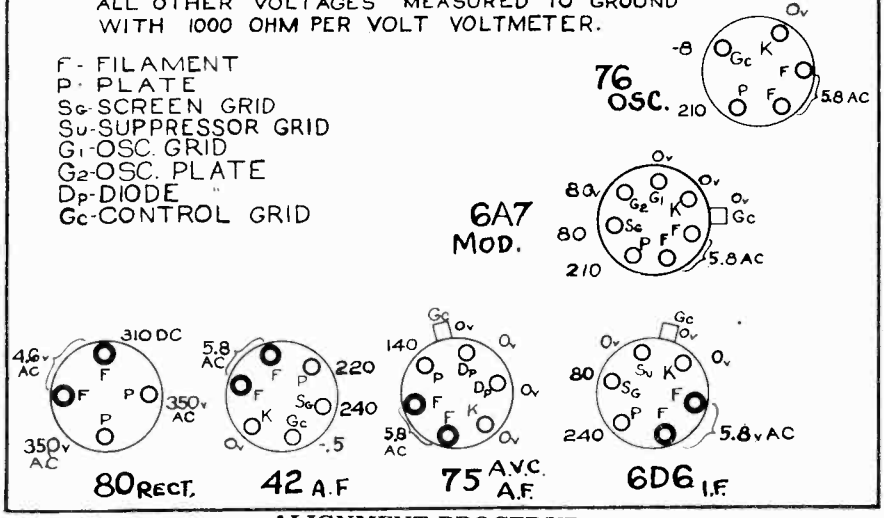


CIRCUIT DATA

PART No.	DESCRIPTION	PART No.	DESCRIPTION
C1	15-002 .0009 MF D. MICAS	R7	60-18 500,000 OHMS 1/2 W
C2	15-03 .00005 " "	R8	60-24 250,000 " "
C3	15-02 .0005 " "	R9	60-25 500,000 " "
C4	15-04 .00025 " "	R10	64-101 500,000 VOL. CONTR.
C5	16-05 .02 " 400 V	R11	26-101 500,000 TONE CONTR.
C6	16-02 .1 " 600 V	1	19-106 GANG
C7	16-01 .1 " 400 V	2	69-103 SWITCH
C8	16-48 .03 " 600 V	3	10-137 B.C. ANT.+PRESELECTOR COIL
C9	16-51 .004 " "	4	10-135 POL. " "
C10	16-22 .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	62-11 15,000 OHMS 1W.	9	11-23 1ST I.F.
R2	60-100 2.00 " 1W. 5%	10	11-24 2ND I.F.
R3	61-15 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	60-20 2.0 MEG " 1/3 W	14	80-105 POWER TRANSF.

FILAMENT VOLTAGES MEASURED ACROSS SOCKET.
ALL OTHER VOLTAGES MEASURED TO GROUND
WITH 1000 OHM PER VOLT VOLTMETER.

F - FILAMENT
P - PLATE
Sg - SCREEN GRID
Su - SUPPRESSOR GRID
G1 - OSC. GRID
G2 - OSC. PLATE
Dp - DIODE
Gc - CONTROL GRID



ALIGNMENT PROCEDURE

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

1. Connect the signal generator to the grid cap of the 6A7 tube through a 1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

2. Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer and the 1500 K.C. broadcast preselector trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

3. The police band is aligned by feeding 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

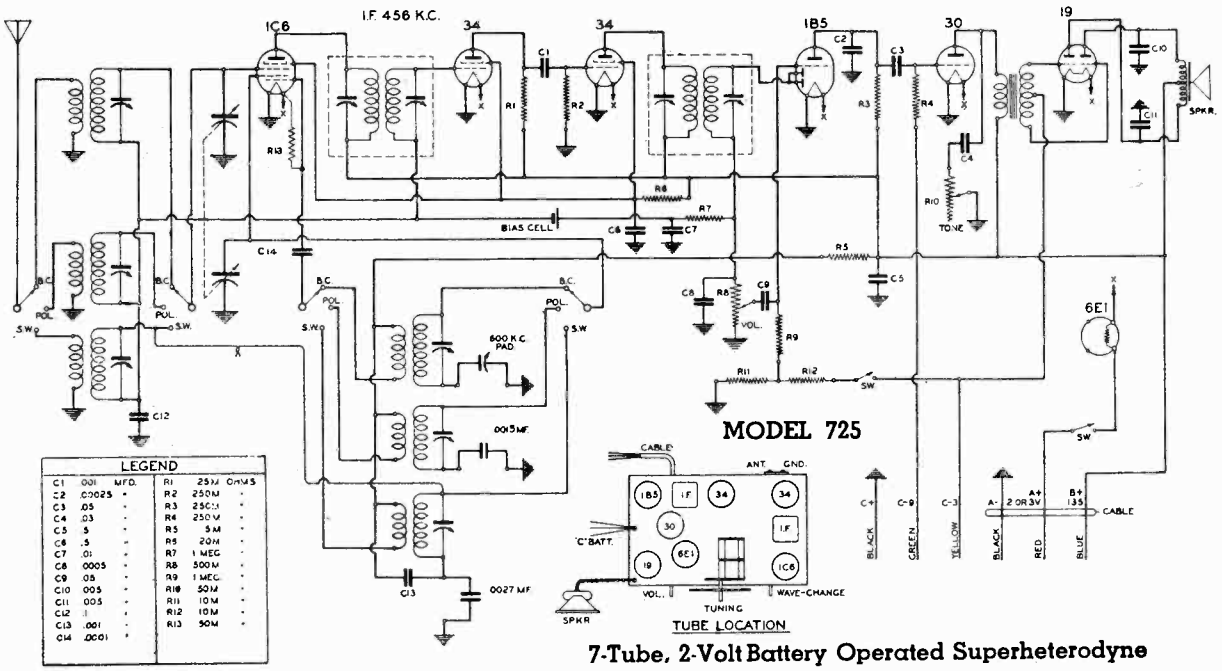
4. The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

WARWICK MFG. CO.

MODEL 725
Schematic, Socket
Trimmers, Alignment

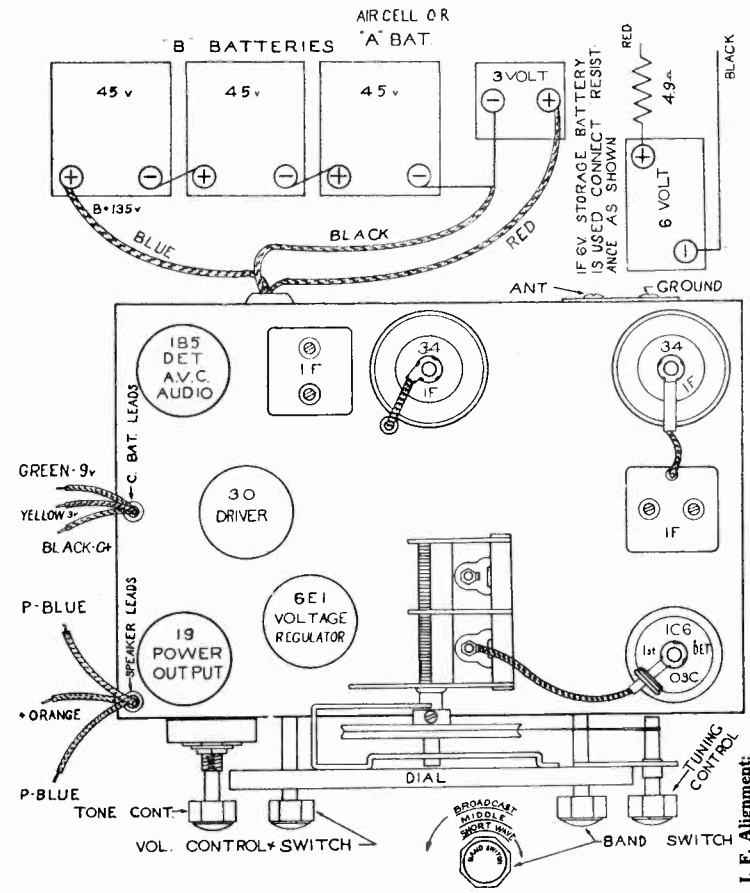
A good ground connection to a water pipe or other metallic conductor entering into the ground for some distance is ESSENTIAL.

IF PEAK 456 KC



LEGEND					
C1	.001	MFD.	R1	25M	OHMS
C2	.00025	"	R2	250M	"
C3	.05	"	R3	250M	"
C4	.03	"	R4	250M	"
C5	.5	"	R5	.5M	"
C6	.5	"	R6	20M	"
C7	.01	"	R7	1 MEG	"
C8	.0005	"	R8	500M	"
C9	.05	"	R9	1 MEG.	"
C10	.005	"	R10	.5M	"
C11	.005	"	R11	10M	"
C12		"	R12	10M	"
C13	.001	"	R13	50M	"
C14	.0001	"			

7-Tube, 2-Volt Battery Operated Superheterodyne



I. F. Alignment:
Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.

R. F. Alignment:
With the wave change switch in the broadcast position, set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, second position from the front. Reset the test oscillator to 1400 kilocycles and adjust antenna trimmer located under the chassis. Now set oscillator to 600 kilocycles and adjust padder located on top of the chassis. Check alignment at 1000 kilocycles.

For aligning the police band, set test oscillator to 5 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right side of the chassis, first position from the front. Now adjust antenna trimmer located on the front of the chassis, left position, to resonance.

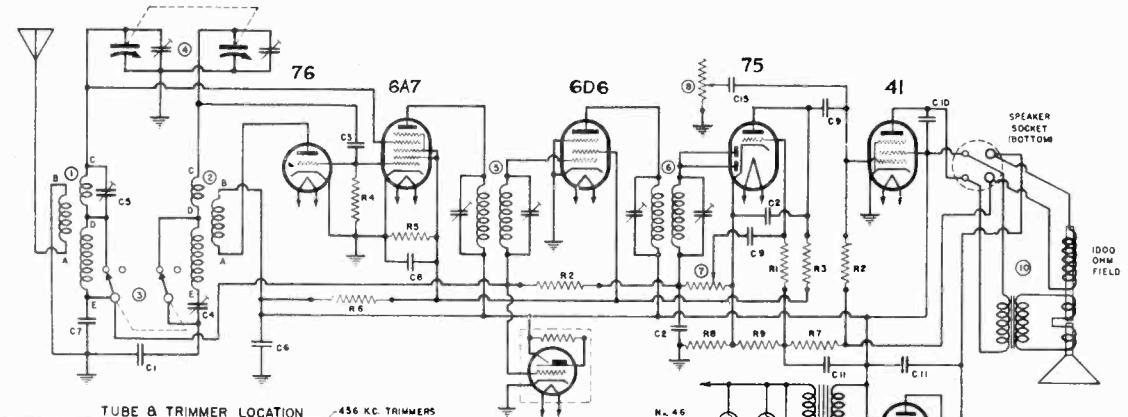
The short wave band is aligned by setting the condenser to 18 megacycles and adjust the oscillator trimmer located on the right side of the chassis, third position from the front to resonance with an 18 megacycle signal from the test oscillator. Turn dial to 16 M. C. Set test oscillator to 16 M. C. and adjust antenna trimmer through right hand hole in front of chassis, rocking variable condenser slightly back and forth to get maximum peak.

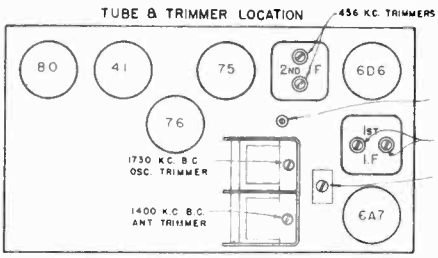
MODEL 741
Schematic, Socket

WARWICK MFG. CO.

Trimmers, Voltage
Alignment, Parts

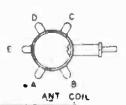
The tubes used are a 76 as oscillator, a 6A7 as modulator, a 6D6 as I. F. amplifier, a 75 as A. V. C. and audio rectifier and audio voltage amplifier, a 41 as power audio amplifier, an 80 as a power rectifier and a 6G5 as tuning indicator.

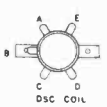




BANDS
1730 to 535 KC
6.4 to 2.1 MC

IF PEAK
456 KC





MODEL 741

CIRCUIT DATA

	PART NO.	DESCRIPTION
C1	15-101	.00148 MFD. MICA 5%
C2	1504	.00025
C3	1501	.0001
C4	20-100	B.C. OSC. PADDING COND.
C5	2504	S.W. ANTENNA TRIMMER
C6	1602	.1 MFD. 600V
C7	1600	.1 200V
C8	1607	.05 400V
C9	1603	.01 400V
C10	1651	.004 600V

	PART NO.	DESCRIPTION
R1	6020	2 MEGOHM 1/3 W
R2	6018	.5
R3	6026	100,000 OHMS
R4	6028	40,000
R5	6117	25,000 1/2 W
R6	6210	10,000 1 W
R7	60-100	200 OHMS 1W WIRE WOUND
R8	60-101	50 1/2W
R9	60-104	20
C11	18-200	DUAL 8 MFD. 450V ELC'T'C

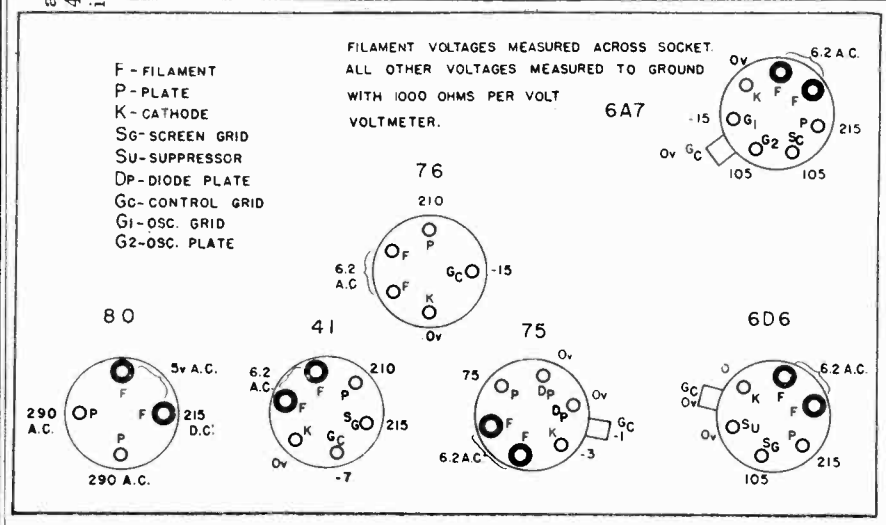
	PART NO.	DESCRIPTION
1	10-143	B.C. & S.W. ANTENNA COIL
2	10-144	OSCILLATOR
3	6922	WAVE SWITCH
4	19-107	2 GANG VARIABLE COND.
5	1123	FIRST I.F. TRANSFORMER
6	1124	SECOND I.F.
7	24-101	VOLUME CONTROL
8	26-101	TONE CONTROL & SWITCH
9	80-106	POWER TRANSFORMER
10		SPEAKER

CIRCUIT DIAGRAM	
DRAWN BY	DATE 5-18-37

A good ground materially aids in the reception of distant stations.

F - FILAMENT
P - PLATE
K - CATHODE
Sg - SCREEN GRID
Su - SUPPRESSOR
Dp - DIODE PLATE
Gc - CONTROL GRID
G1 - OSC. GRID
G2 - OSC. PLATE

FILAMENT VOLTAGES MEASURED ACROSS SOCKET.
ALL OTHER VOLTAGES MEASURED TO GROUND WITH 1000 OHMS PER VOLT VOLTMETER.



ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

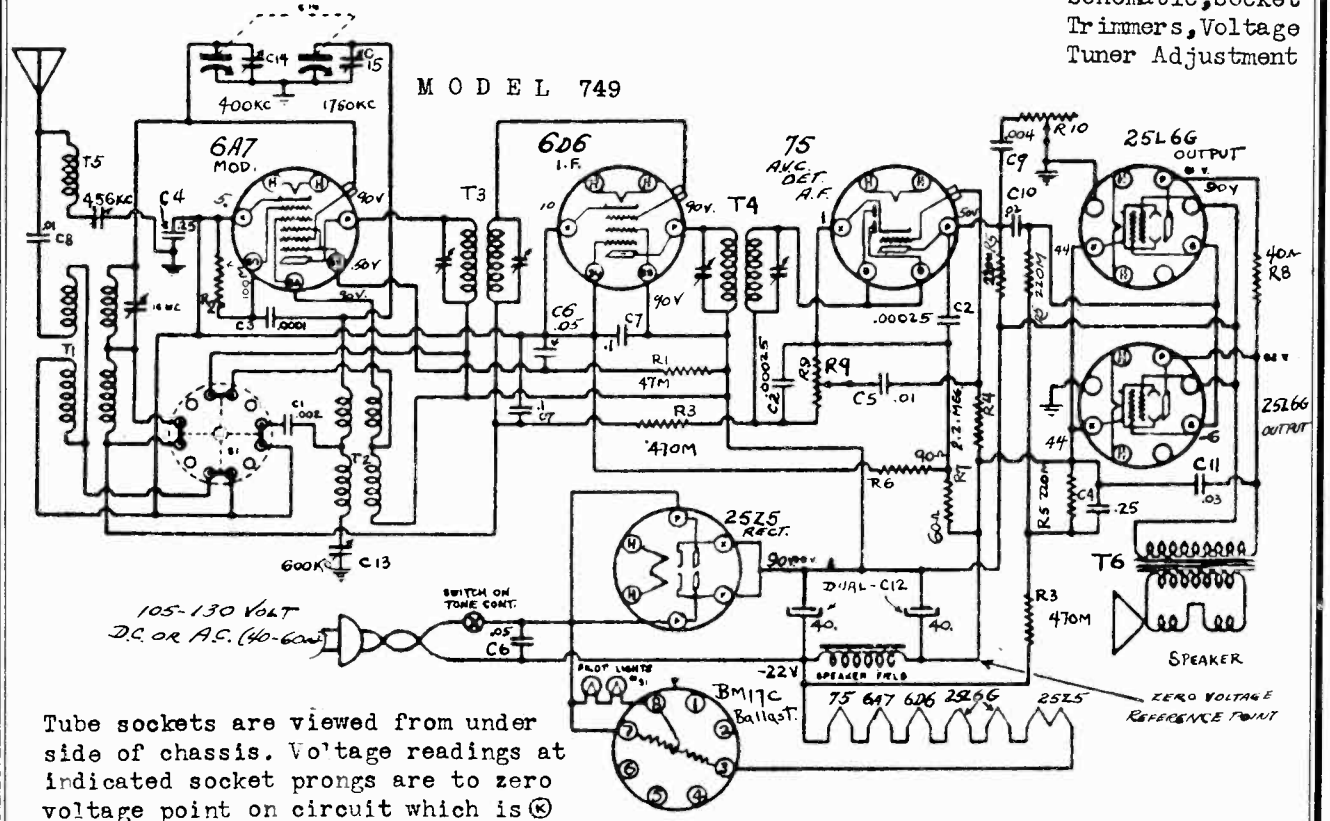
Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1730 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1730 K.C. broadcast oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. broadcast antenna trimmer to maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

The short wave band is aligned while feeding a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Turn the wave switch to short wave position and tune in the 6.0 M.C. signal. Adjust the 6.0 M.C. short wave trimmer to maximum output.

WARWICK MFG. CO.

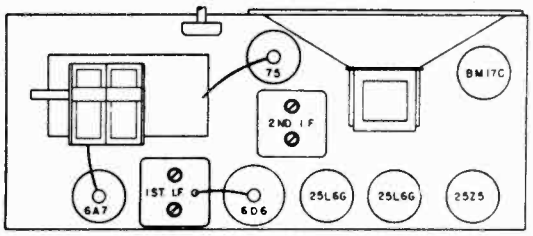
MODEL 749
Schematic, Socket
Trimmers, Voltage
Tuner Adjustment



Tube sockets are viewed from under side of chassis. Voltage readings at indicated socket prongs are to zero voltage point on circuit which is Ⓚ on 25L6G tube. Voltages must be measured with no signal. Alignment is to be made at the frequencies shown on the trimmer condensers.

Figures at cathodes are cathode currents in milliamperes. Capacity values are in microfarads.

Wave trap adjustment at 456 KC. Input is made to provide maximum reduction of signal. Where no voltage reading is shown at socket prongs, it indicates zero voltage or very low reading.



LOCATION OF PARTS ON TOP OF CHASSIS

IF PEAK 456 KC

SETTING PUSH-BUTTONS

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your six selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner, push in the Station Selector Knob and turn it to the frequency of the station desired.

MODEL 751
Schematic, Socket

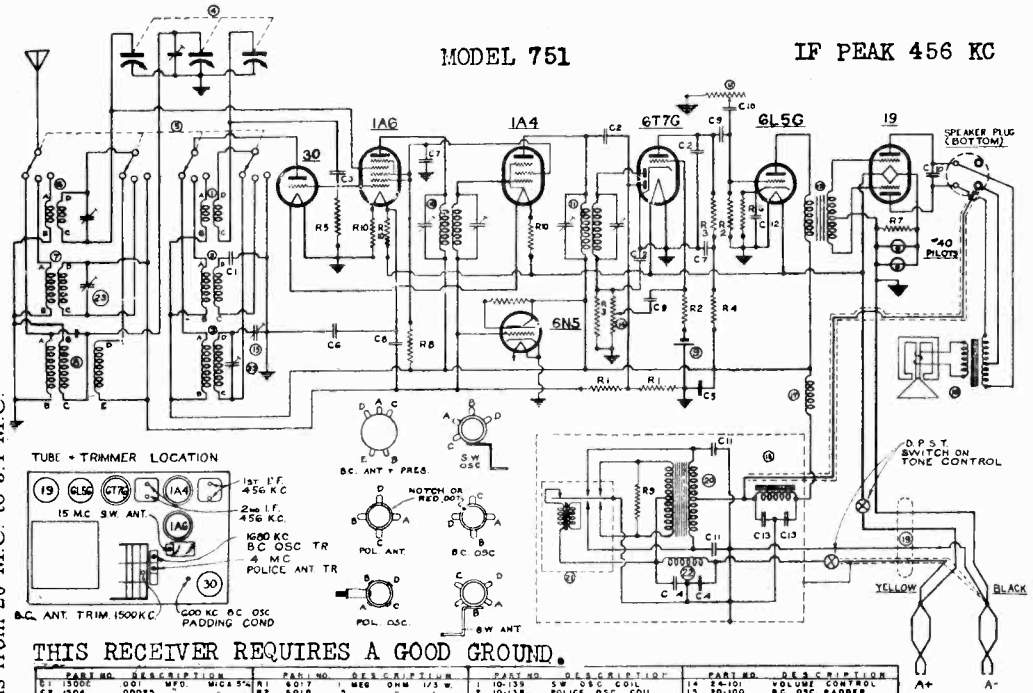
WARWICK MFG. CO.

Trimmers, Voltage
Alignment, Parts

This receiver is a 7 tube, 6 volt storage battery operated superheterodyne.

The tubes used are a 30 as oscillator, a 1A6 as modulator, a 1A4 as I.F. amplifier, a 6T7G as A. V. C. and audio rectifier and audio voltage amplifier, a 6L5G as audio driver, a 19 as power audio amplifier, and a 6N5 as tuning indicator.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 20 M.C. to 5.4 M.C.



THIS RECEIVER REQUIRES A GOOD GROUND.

PART NO.	DESCRIPTION
C1	1500C .001 MFD. MICA 5%
C2	1504 .00025 " "
C3	1510 .00025 " "
C4	1535 .01 " 150V.
C5	1616 .25 " 400V.
C6	1614 .25 " 200V.
C7	1601 .1 " 400V.
C8	1600 .1 " 200V.
C9	1603 .01 " 400V.
C10	1611 .008 " 600V.
C11	1604 .01 " 600V.
C12	16-100 10 M.F.D. 25V. ELECTROLYTIC
C13	1645 8 " 150V. "

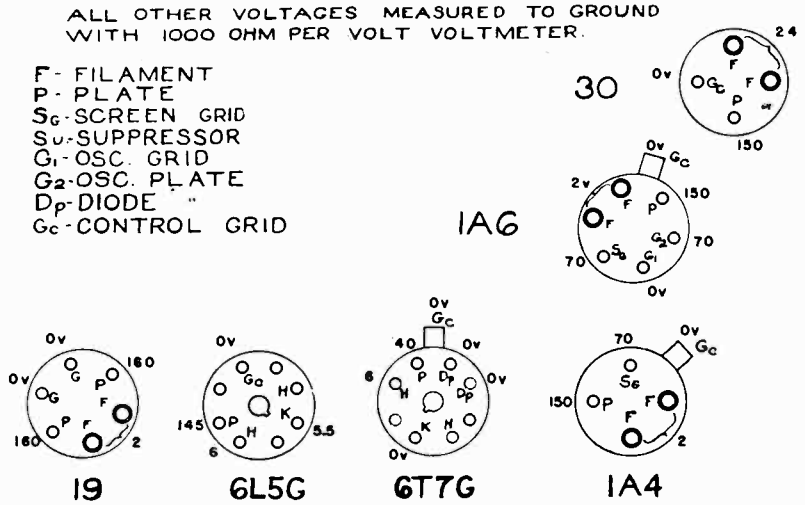
PART NO.	DESCRIPTION
R1	6017 1 MEG OHM 1/2 W.
R2	6016 .5 " " "
R3	6024 25 " " "
R4	6026 100,000 " "
R5	6025 50,000 " "
R6	6008 1500 " "
R7	6007 800 " "
R8	6117 25,000 " 1/2 W.
R9	6101 100 " "
R10	60-102 33 1/3 " WIRE WOUND

PART NO.	DESCRIPTION
1	10-139 SW. OSC. COIL
2	10-138 POLICE OSC. COIL
3	10-136 B.C. OSC. COIL
4	19-108 2 GANG CONDENSER
5	88-103 WAVE SWITCH
6	10-132 S.W. ANT. COIL
7	10-135 POLICE ANT. COIL
8	10-137 B.C. ANT. & PRESEL. C'L
9	4800 BIAS CELL
10	1133 1ST. I.F. TRANSFORMER
11	1134 2ND. I.F. TRANSFORMER
12	26-102 TONE CONTROL
13	8010 PUSH-PULL AUDIO TRANS.

PART NO.	DESCRIPTION
14	54-101 VOLUME CONTROL
15	30-100 B.C. OSC. PADDER
16	SPEAKER
17	3303 R.F. "B" CHOKE
18	3307 FILTER
19	23-103 BATTERY CABLE
20	8041 POWER TRANSFORMER
21	3407 VIBRATOR
22	3313 R.F.C. CHOKE
23	20-102 TRIMMER STRIP

FILAMENT VOLTAGES MEASURED ACROSS SOCKET.
ALL OTHER VOLTAGES MEASURED TO GROUND
WITH 1000 OHM PER VOLT VOLTMETER.

F - FILAMENT
P - PLATE
S_G - SCREEN GRID
S_U - SUPPRESSOR
G_1 - OSC. GRID
G_2 - OSC. PLATE
D_P - DIODE
G_C - CONTROL GRID



ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total resistance approximately 10,000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the IA6 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 455 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding 4.0 M.C. signal to the receiver antenna post through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

MODEL Phantom Light Dial Adjustments

WELLS-GARDNER & CO.

MODEL 17-Button Telephone Dial

This Supplements Series A1, A2, A3, A4, A5, and A7 Service Manuals and covers Dials and Drives used with these Chassis.

NOS. 9, 10, & 11 — 17 BUTTON TELEPHONE DIAL

NOS. 3 & 7 — PHANTOM LIGHT DIAL

APRIL, 1937

Identification of Dial and Chassis

The following description will identify the different dials:

No. 9 Dial—17 Button Telephone Dial—Station call letters in black push buttons.

No. 11 Dial—Same as No. 9 Dial except push buttons are brown.

No. 10 Dial—17 Button Telephone Dial—Station call letters are rectangular in shape and are mounted in rectangular openings in escutcheon ring. Equipped with visible tone and volume indicators.

No. 3 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by series of circles.

No. 7 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by slanting lines.

The following description will identify the chassis used with the above dials:

7 tube—Series A4
8 tube—Series A1
9 tube—Series A5
9 Tube—Series A7 (Export)
11 Tube—Series A2
13 Tube—Series A3

Telephone Dial Assembly

The telephone dial assembly provides a means of pre-setting a number of broadcasting stations and tuning in these stations at any time by depressing a button and rotating the dial to a stop position.

The apparatus is mounted on an assembly attached at the front of the chassis. An examination of this assembly will clearly show the method of operation.

Silencer Circuit—A silencer circuit is provided which results in silent tuning between stations when using the telephone dial buttons.

When a telephone dial button is depressed, a circuit is established between the ungrounded end of the volume control and the chassis ground. Referring to Fig. 1 it will be noted that contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), spring and pulley ring stud. Since the pulley ring is at ground potential, this grounds the audio voltage and no signal will be heard until the button is released to break the contact.

It should be noted that the contact ring is part of the pulley ring assembly, but is insulated from it.

In the case of powerful local stations a slight amount of signal may be heard when the button is depressed.

Telephone Dial Adjustments

Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article on "Silencer Circuit" in this manual, no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning in a signal with one of these buttons, it can be corrected as follows:

If Noise Occurs on All Buttons—This is probably due to a poor contact between the flat contact spring and the contact ring—See Fig. 1. Clean the flat contact spring and contact ring to insure a good electrical connection. Ordinary cleaning fluid may be used and will be effective in most cases in cleaning the surface without affecting the plating. If the contact is still not satisfactory, a piece of fine emery cloth may be used.

If Noise Occurs on One Button Only—This is due to a poor contact between the pulley ring stud, spring, contact washer, and contact ring—See Fig. 1. Clean all of these items of the particular button, in the same manner as mentioned previously, so as to provide a good electrical connection.

Telephone Dial Drive Cord Slipping

If the telephone dial drive cord slips on the tuning shaft pulley, this may be remedied by adjusting the drive cord tension pulley. Loosen the tension pulley bracket screw and adjust pulley assembly until the desired tension is obtained.

Position of Stop Pin

When the telephone dial assembly is on the chassis, the gang condenser rotor should not completely open or close. The travel of the rotor in this respect is controlled by the gang stop pin on the pulley ring—See Fig. 4. This is necessary to protect the gang condenser in case the telephone dial is swung rapidly to either of the extreme positions. When the gang stop pin is properly set, it will serve as the stop at both extreme positions. If the rotor is seen to open completely or close completely, the stop pin should be pulled back and re-set to overcome this condition.

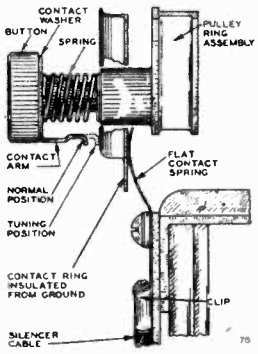


Fig. 1—Silencer Assembly

Greasing and Oiling

After a period of time, put some light grease on the pulley ring shaft and on the teeth of the pulley ring. Use light oil on the drive shaft assembly bearing, care being taken not to get any on the drive cord.

Telephone Dial Replacements

Replacing Complete Dial and Condenser Assembly

Remove the grid lead clip from tube grid cap.

Remove silencer cable from the contact spring assembly. Unsolder dial lamp lead from terminal of tube socket.

Unsolder the three stator section connections of the gang condenser. Unsolder the three braided shield leads which ground the gang condenser frame to the chassis, taking care not to loosen the connections of any other units which are grounded at these common points.

At the back of the gang condenser is a stud which secures the assembly to an "L" bracket which is secured to the chassis.

Through this stud is a cotter pin. Remove only the cotter pin, metal washer, and rubber washer.

Viewing the assembly from the back, on the left is a brass bolt which holds the dial support bracket to the chassis—remove this bolt from underneath the chassis.

Grasp the dial support brace and move entire assembly toward the front of the chassis. When the support casting rubber cushions slip clear of the slot in front of chassis, lift entire assembly clear of chassis.

To replace this assembly, reverse the procedure as given above.

Replacing Pulley and Button Ring Assembly Only

Remove drive cord.

From underneath the chassis, unsolder the dial lamp lead from prong of the tube socket. Pull this lead through and out to the front of the assembly.

Remove the four escutcheon screws which hold the escutcheon ring and glass crystal in place. The dial scale pointer is removed by unhooking it from the center stud. Unscrew and remove center stud, washers, and dial scale. Slide pulley ring assembly off the center shaft.

On the No. 10 dial, two strips of celluloid between the escutcheon ring and the glass crystal will have to be removed.

To replace the pulley ring assembly, proceed as follows: Lay the assembly face down and adjust the stop pin. The stop pin (Fig. 2) is directly in back of the wide spacer on the dial button ring. Pull this pin back and adjust it to the center position —See Fig. 2.

Rotate tuning condenser rotor counter-clockwise (from front) as far as possible—See. Fig. 2.

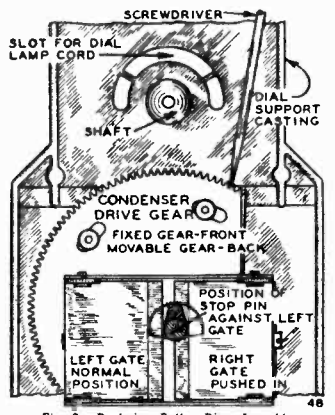


Fig. 2—Replacing Pulley Ring Assembly

Place the pulley ring assembly on the shaft with the knot of the dial lamp lead at the top—do not engage the gears.

Pull the dial lamp lead through the slot in the pulley ring gear and through the long slot in the dial support casting. Then place this lead through the clip under the dial support brace and out through the opening in the back of this brace.

With the gears still disengaged, rotate the pulley ring clockwise (from front) ½ revolution until the stop pin passes over the right gate and comes to rest against the left gate—See Fig. 2.

With the condenser rotor fully closed, push the pulley ring on the shaft until the pulley ring gear engages the *fixed gear only* (front) of the condenser drive gear assembly. Hold the pulley ring assembly and with a fine blade screw driver, move the movable (back) gear clockwise one tooth relative to the fixed gear—See Fig. 2. Then push the pulley ring all of the way on, engaging the movable gear.

Now lay the chassis on its back. Replace in the order given the large washer with rectangular hole, dial scale, washers, center stud, dial pointer, glass crystal, and escutcheon. Resolder the lamp lead.

For the No. 10 dial, before putting the escutcheon on, lay the two celluloid strips on the glass crystal with the inside flange facing away from the glass. Then lay the escutcheon on top of the celluloid strips. The section not cut out for station call letters should be at the wide spacer in the button spacer ring. Center the small holes in the celluloid discs in the station call letter openings and then tighten the escutcheon screws.

The stop pin must now be adjusted, as explained in article "Position of Stop Pin," until the condenser does not open or close fully. Injury to the condenser will result if allowed to open or close fully.

Replace the drive cord as explained in the article "Replacing Drive Cord."

Replacing Gates

After a great amount of use, one or both of the stop gates may wear, making it necessary to replace the stop gate assembly. This is done by first removing the pulley ring assembly as explained in the article "Replacing Pulley and Button Ring Assembly."

The stop gate assembly is then removed by taking out the two screws at the bottom of the assembly.

MODEL 17-Button Telephone Dial

WELLS-GARDNER & CO.

MODEL Phantom Light Dial Replacement Data

Replacing Drive Cord

Remove the old drive cord and tension spring. Rotate telephone dial clockwise (from back of chassis) as far as it will go.

Viewing the pulley ring drum from above and to the back, place the knotted end of the drive cord in the slot provided for it, catching the knot in back of the rib as shown in Fig. 3.

Bring the cord down and around the right side

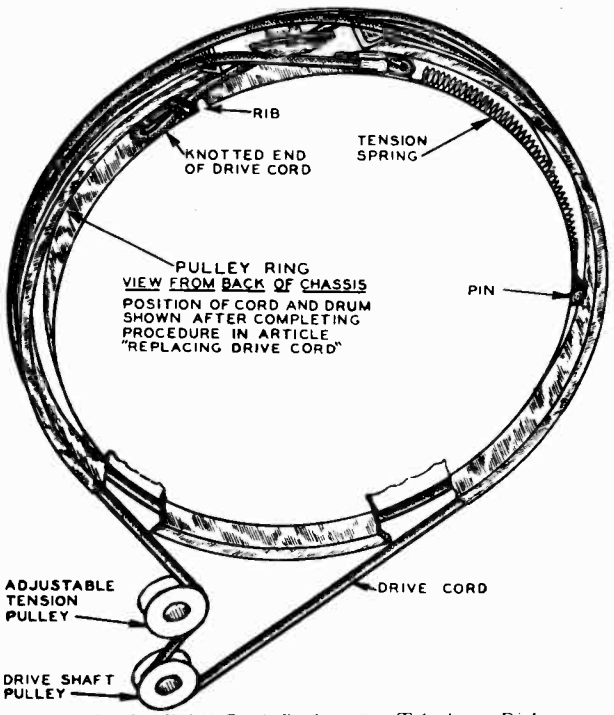


Fig. 3—Drive Cord Replacement-Telephone Dial

(from back) of the drum at front part of groove in pulley ring drum and under the drive shaft pulley making one-half turn on this pulley. Then bring the cord around the right side (from back) of the adjustable tension pulley and up to the upper left side of the pulley ring drum in front of the cord already on.

Hold the cord in the left hand and rotate the dial counter-clockwise with the right hand. Feed the cord on the drum in such a way that after passing the two openings at the top of the pulley ring drum, it passes to the back of the groove in the drum. After the pulley ring drum makes one complete revolution, place the cord through the left drum opening into the slot and secure the tension spring hook over the pin provided for it—See Fig. 3.

Replacing a Telephone Dial Button or Button Shaft

A telephone dial button or button shaft may be replaced without removing the chassis from the cabinet.

Rotate the dial until the button shaft to be replaced is in the position shown in Fig. 4. Using a wooden wedge block or any other wedge, hold this button shaft in place as shown. Remove the clear celluloid disc and the call letter disc with the point of a pin from the button of the shaft to be replaced (No. 10 dial—brown opaque celluloid disc only).

Remove the hairpin spring from the front of this shaft, spreading it with an ice pick or screwdriver. Take off the button, metal washer, molded bushing, and spring. Take out the wedge block, remove the button shaft to be replaced from the back of the dial assembly and put in the new one. Then put the wedge block back in place again as illustrated.

Lay the cabinet back down against a chair so that it will be about 30 degrees from the vertical position.

Assemble the spring, molded bushing, metal washer, and button in the order shown in Fig. 5. (Last three items may be in one unit). Push the button and spring assembly over the button shaft with the tab of the metal washer in the normal

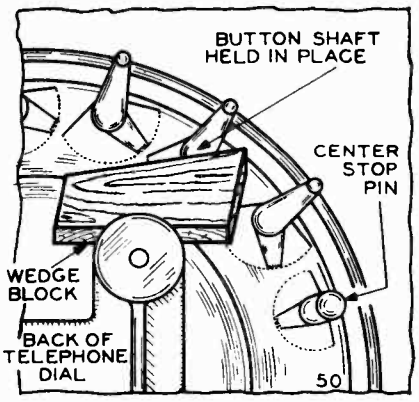
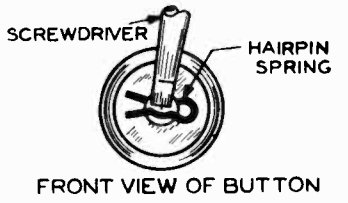


Fig. 4—Holding a Push Button Shaft in Place



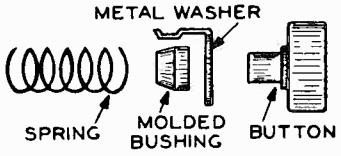


Fig. 5—Putting a Hair Spring on a Push Button Shaft

position—See illustration in instruction book. Hold the tab and rotate the button until the flat in the shank coincides with the flat on the shaft. Push the button all of the way on.

Put the hairpin spring in place, as shown in Fig. 5, with the upper part of the slot near the end of the button shaft and the lower part over the end of the shaft. Place the blade of a screwdriver at the center of the lower part of the spring and push down until the spring snaps into place in the slot on the shaft. Remove the wedge block.

MODEL Phantom
Light Dial
Data, Parts List

WELLS-GARDNER & CO.

MODEL 17-Button
Telephone Dial

Telephone Dial Replacement Parts

See article "Identification of Dial and Chassis" in this manual in order to determine the correct dial and chassis assembly number.

The parts in the 3 lists shown below apply to the A1, A2, A3, A5, and A7 chassis unless otherwise specified.

DESCRIPTION	No. 9 DIAL PARTS		No. 11 DIAL PARTS		No. 10 DIAL PARTS	
	PART NO.	LIST PRICE	PART NO.	LIST PRICE	PART NO.	LIST PRICE
Pulley, Button Ring and Gang Cond. Assy. complete with Buttons, Dial Scale, Pointer, and Glass Crystal (A1, A2, A5, and A7 Chassis)	11A103	$23.20	11A121	$23.40	11A114	$25.50
Pulley, Button Ring, and Gang Condenser Assembly, as above (A3 Chassis)	11A111	24.60	11A120	25.00	11A113	27.00
Support Casting for above	25X368	1.35	25X368	1.35	25X410	1.45
Brace for above Casting (over Tuning Cond.) (A1, A2, A5, and A7 Chassis)	25X371	.15	25X371	.15	25X371	.15
Brace as above (A3 Chassis)	25X367	.20	25X367	.20	25X367	.20
Hex. Brass Stud (Support Bracket Mounting)	20X152	.04	20X152	.04	20X152	.04
Rubber Grommet for above Stud	6X8	.10	6X8	.10	6X8	.10
"L" Bracket—Rear Gang Mounting (A1, A2, A5, and A7 Chassis)	25X362	.08	25X362	.08	25X362	.08
"L" Bracket—Rear Gang Mounting (A3 Chassis)	25X382	.10	25X282	.10	25X382	.10
Stud (Rear Gang Mounting)	20X150	.08	70X150	.08	20X150	.08
Rubber Washer for Gang Mounting on "L" Bracket	2X236 doz.	.16	2X236 doz.	.15	2X236 doz.	.15
Rubber Grommet for Gang Mounting on "L" Bracket	6X16 doz.	.30	6X16 doz.	.30	6X16 doz.	.30
Rubber Cushions for Support Bracket (Front)	8X43	.10	8X43	.10	8X43	.10
Drive Cord Tension Spring	28X114 doz.	.35	28X114 doz.	.35	28X114 doz.	.35
Drive Cord	10X23	.65	10X23	.65	10X23	.65
Cord Tension Adjustment Assembly complete	26A59	.20	26A59	.20	26A59	.20
Drive Shaft only (Tuning)	26X245	.10	26X245	.10	26X245	.10
Front Brass Bearing Race and Drive Pulley for Drive Shaft	29X74	.10	29X74	.10	29X74	.10
Rear Brass Bearing Race for Drive Shaft	29X73	.15	29X73	.15	29X73	.15
8 Ball Bearings in Retainer (Two sets used on above Shaft)	20X151	.10	20X151	.10	20X151	.10
Horseshoe Washer for Drive Shaft	19X67 doz.	.15	19X67 doz.	.15	19X67 doz.	.15
Gate Assembly complete	25A154	.45	25A154	.45	25A154	.45
Spring only for Gate Assembly	28X45 doz.	.10	28X45 doz.	.10	28X45 doz.	.10
Condenser Drive Gear Assembly complete	25A153	.60	25A153	.60	25A153	.60
Gear Spreader Spring for above	28X102 doz.	.20	28X102 doz.	.20	28X102 doz.	.20
Pulley and Button Ring complete (Less Dial Crystal, Dial Crystal Escutcheon, Dial Scale, Dial Scale Washers, Dial Pointer and Stud, and Dial Lamps and Sockets)	26A61	11.50	26A62	11.50	26A62	11.50
Pulley Ring Casting only	25A162	3.20	25A162	3.20	25A162	3.20
Button Spacer Ring only	24X273	1.70	24X285	1.70	24X285	1.70
Silencer Contact Ring	30X79	.30	30X79	.30	30X79	.30
Push Button Assembly complete (Including Hairpin Spring, Button Spring, Push Button, Button Bushing, Button Shaft, Metal Washer and Tab)	26A63	.40	26A64	.40	26A64	.40
Push Button only	10A105	.10	10A111	.10	10A111	.10
Metal Washer and Tab	19X66	.10	19X66	.10	19X66	.10
Bakelite Bushing for Push Button	10A104	.10	10A104	.10	10A104	.10
Shaft for Push Buttons	26X238	.15	26X238	.15	26X238	.15
Hairpin Springs for Push Button Assembly	28X111 doz.	.10	28X111 doz.	.10	28X111 doz.	.10
Springs for Push Buttons	28X109 doz.	.10	28X126 doz.	.10	28X126 doz.	.10
Stop Pin Shaft Assembly (Behind Wide Spacer)	26A60	.30	26A60	.30	26A60	.30
Stop Pin Shaft	26X244	.25	26X244	.25	26X244	.25
Spring for above Stop Pin	28X112 doz.	.10	28X112 doz.	.10	28X112 doz.	.10
Dial Scale (Specify Type of Dial, Name of Radio, and Series or Model Number)		.55		.55		1.20
Washer, Dial Spacer (Large with rectangular hole)	19X74 doz.	.10	19X74 doz.	.10	19X74 doz.	.10
Washer, Dial Clamp (Small with round hole)	19X73 doz.	.10	19X73 doz.	.10	19X73 doz.	.10
Dial Pointer	15X95	.20	15X95	.20	15X95	.20
Dial Pointer Cap	15X96	.10	15X104	.10	15X104	.10
Dial Pointer Stud	20X171	.10	20X171	.10	20X171	.10
Glass Crystal	17X21	.15	17X21	.15	17X21	.15
Glass Crystal Escutcheon	4X174	.45	4X194	.40	4X184	.40
Dial Lamp Socket	7A62 ea.	.10	7A62 ea.	.10	7A62 ea.	.10
Dial Lamp Socket Assembly (3 Sockets) Less Lamps	7A63	.50	7A63	.50	7A63	.50
Dial Lamp (No. 51 Bayonet Type)	7A32	.20	7A32	.20	7A32	.20
Celluloid Dial Light Diffusers	41X16	.10	41X16	.10	41X16	.10
Silencer Contact Spring Assembly	26A57	.10	26A57	.10	26A57	.10
Complete Set of Station Call Letter Discs with 25 Celluloid Discs	26A56	.35	26A56	.35	26A56	.35
Tone Indicator Assembly (Less Dial Light Socket and Dial Lights, Take up Cord and Collar)					26A65	.35
Celluloid Indicator and Arm (Tone or Volume)					26A67	.20
Indicator Mounting Bracket (Tone)					25X407	.10
Spring for Tone or Volume Indicator					28X133 doz.	.60
Brass Collar, Cord Take up (Tone or Volume)					29X20 doz.	.10
3" Tone and Volume Indicator Cord						
Volume Indicator Assembly (Less Dial Light Socket, Dial Light, Take up Cord and Collar)					26A66	.35
Indicator Mounting Bracket (Volume)					25X408	.10
Call Letter Holder, Celluloid					58X254	.25
Brown Opaque Discs for Telephone Dial Buttons					58X217 doz.	.10
Dial Lamp Socket Assembly (For Tone or Volume Indicator)					7A57	.10
Paper Light Diffuser—Circular 4½" Diameter					41X22	.10
Complete Set of Station Call Letter Cards					26A58	.40
Blank Sheet of Call Letter Cards (Used for Export Sets Only)					58X240	.15

Prices Subject to Change Without Notice.

Phantom Light Dial Replacement Parts

See article "Identification of Dial and Chassis" in this manual in order to determine the correct dial and chassis assembly number.

The No. 3 Dial is used on the Series A1, A4, and A5 chassis. The No. 7 Dial is used on the Series A1 and A4 chassis only. The following parts are common to both groups unless otherwise specified.

DESCRIPTION	No. 3 DIAL PARTS		No. 7 DIAL PARTS	
DIAL ASSEMBLY	PART NO.	LIST PRICE	PART NO.	LIST PRICE
Dial Assembly, Complete with Dial Glass, Dial Assembly Mounting Plate, Brace, Support Bracket, Celluloid Dial Background, Indicator Tension Spring, Indicator Cords, Indicator Cord Takeup Collars, Side Reflectors, Lamp Sockets and Lamps, Fibre Strips, and Fibre Light Shield	Specify Type of Dial, Name on Dial or Escutcheon, Model or Series of Radio	$10.85	Specify Type of Dial, Name on Dial or Escutcheon, Model or Series of Radio	$10.70
Dial Glass Only (Series A1-A5)	See Above	.95	See Above	.80
Dial Glass Only (Series A4)	See Above	.95	See Above	.70
Celluloid Background for Dial (Series A1-A5)	58X206	.45	9X41	.40
Celluloid Background for Dial (Series A4)	58X206	.45	9X42	.40
Dial Assembly Mounting Plate with Tone & Volume Indicators, and Indicator Pulleys	25X381	.90	25X411	1.00
Dial Assembly Brace (Attached to Gang Condenser)	25X383	.10	25X383	.10
Fibre Strip (At Back of Tone and Volume Indicator Lamps)	11X58	.10	11X58	.10
Tension Spring for Tone and Volume Indicators	28X88	.10	28X88	.10
8" Black Cord for Indicators	doz.	.20	doz.	.20
Brass Collars with Set Screws—to secure Indicator Cords to Shafts	29X20 ea.	.10	29X20 ea.	.10
Dial Lamp Reflector (Right From Front)	41X18	.10	41X18	.10
Dial Lamp Reflector (Left From Front)	41X17	.10	41X17	.10
Dial Lamp Sockets and Clips (For Edge Lighting of Dial and Tone & Volume Indicators)	7A62	.10	7A62	.10
Dial Lamp Socket Assembly (4 Sockets) Less Lamps	7A64	.60	7A64	.60
Dial Lamp (No. 51 Bayonet Type)	7A32	.20	7A32	.20
Phantom Light Assembly Complete with Lamps (Series A1-A5)	25A164	1.65	25A164	1.65
Phantom Light Assembly Complete with Lamps (Series A4)	25A207	1.30	25A207	1.30
Springs for Lamps of Above Assembly	28X86 ea.	.10	28X86 ea.	.10
Brass Collars for Lamps of Above Assembly	19X61	.10	19X61	.10
Bracket (To secure Phantom Light Assembly to Drum)	25X360	.10	25X360	.10
Fibre Strip (At bottom of Dial Glass)	11X59	.10	11X59	.10

Prices Subject to Change Without Notice.

Phantom Light Dial - Replacing Drive Cord

Remove the dial assembly as follows: Take out the screw which secures the dial frame brace to the back of the gang condenser. Take out the two screws which secure the brackets on the bottom of the dial frame to the chassis. Lay the dial assembly face down in front of the chassis—it is not necessary to remove the volume control and tone control indicator cords.

Remove the phantom light assembly from the drive drum by taking out the screw.

Take off the old cord and tension spring. Tie a knot with a small loop in it in one end of the new cord. Then tie the other end of this cord to the hook on the tension spring. The distance from the loop on one end to the tension spring is 17¾ inches.

From the front of the chassis, place the looped end of the cord through the drum hole located near the cord track opening, and hook it over the hook provided for it at the back of the drum.

Bring the cord up and around the right side of the drum, keeping the cord in the grooved track of the drum.

Bring the cord down to the right side of the drive shaft and wind it three and one-third times around this shaft progressing toward the back.

Then bring the cord up and around the left side of the drive drum. Hook the tension spring on the hook of the drive drum.

Replace the phantom light and the dial assembly.

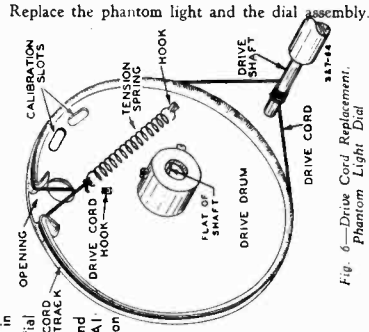


Fig. 6—Drive Cord Replacement, Phantom Light Dial

Phantom Light Dial Replacement Parts

See article "Identification of Dial and Chassis" in this manual in order to determine the correct dial and chassis assembly number.

The No. 3 Dial is used on the Series A1, A4, and A5 chassis. The No. 7 Dial is used on the Series A1 and A4 chassis only. The following parts are common to both groups unless otherwise specified.

DESCRIPTION	No. 3 DIAL PARTS		No. 7 DIAL PARTS	
DRIVE ASSEMBLY	PART NO.	LIST PRICE	PART NO.	LIST PRICE
Tuning Shaft Only	26X248	.15	26X248	.15
Tuning Drive Cord—20"	doz.	.45	doz.	.45
Tension Spring for Above Cord	28X27	.10	28X27	.10
Drive Drum & Hub	24X279	.40	24X279	.40
Rubber Cushion (Front) for Assembly Mounting	8X43	.10	8X43	.10
Rubber Cushion (Rear)—Gang Mounting	8X44	.10	8X44	.10
Rubber Cushion (Rear—under Chassis)—Gang Mounting	8X45	.10	.445	.10
Rear Mounting Foot for Gang Condenser	25X283	.10	25X283	.10
Support Bracket and Drive Shaft Bushing for Gang Condenser	25X380	.45	25X380	.45

Prices Subject to Change Without Notice.

MODELS 14,15,16
Electric Drive Dials
Service Notes

WELLS-GARDNER & CO.

This Supplements Series A1, A2, and A3 Service Manuals and covers the Electric Drive used with these Chassis.

ELECTRIC DRIVE PANEL ASSEMBLY

NOS. 14, 15, AND 16 DIALS

SEPT., 1937

Possible Troubles and Means of Correcting

The following list of possible troubles has been made up for your convenience in any servicing that may be required on the electric drive panel. Almost every condition that may be met with in the field is listed. A statement of the manner in which the difficulty may manifest itself and a brief statement of its cause and correction is made. In most cases, a reference is made to an illustration and a paragraph number in which the matter is discussed more fully. It may be necessary, occasionally, to read the entire article or a portion of it to fully understand the paragraph referred to. Undoubtedly very few of these manifestations will present themselves to the service man but it is our belief that any difficulty that may arise can be handled by the service man by referring to this manual.

A—If dial pointer reaches the end of the scale and stops.

1. The reversing switch does not operate properly—Adjust reversing switch and put on centering spring (early models).—Par. 185—Figs. 6 and 23.
2. Reversing switch or wiring defective—Replace switch or check wiring.—Par. 186, 193—Figs. 6 and 24.
3. (a) The stop lever does not go up into notch on setting disc far enough—Loosen set screws of setting disc corresponding to button which is depressed and adjust position of this disc relative to stop lever.—Par. 110—Figs. 10 and 15.
   (b) Stop lever spring may be too weak—Tighten spring.—Par. 110—Fig. 8.
4. Friction disc may slip in friction drive models or hub on gear No. 1 may slip on early gear drive models—Change friction drive panel to gear drive panel or replace faulty gear No. 1.—Par. 42, 62—Fig. 7.

B—After a tuning button has been depressed, the dial pointer goes back and forth without stopping.

1. Pawl on setting disc does not extend out far enough—Pinch into position.—Par. 102—Fig. 12.
2. Button may be set too close to the end of the dial pointer travel—Move drum in setting disc.—Par. 105, 106—Fig. 13.
3. Pawl stuck—See that pawl slides back freely.—Par. 104—Fig. 12.
4. Motor On-Off Switch may be stuck in On position—Adjust switch or release plunger.—Par. 135, 136—Figs. 8, 9, and 16.

C—If the dial pointer does not stop at the same point each time the tuning button is depressed. If this occurs on one button only.

1. Drum slipping in setting disc—Replace setting disc corresponding to that button.—Par. 93, 94—Figs. 10 and 11.
2. High spot on setting disc may move the stop lever sufficiently to break the switch contact—Adjust the motor on-off switch a slight amount or file down high spot on setting disc.—Par. 96—Fig. 9.
3. Set screws of setting disc loose—Tighten set screws.—Fig. 6.
4. Brake drum not perfectly round—Replace setting disc.—Par. 95—Figs. 10 and 11.
5. Motor On-Off switch does not open fast enough after station is reached due to stop lever being too low or high—Adjust height of stop lever or switch lever until proper On position is reached.—Par. 138—Figs. 6 and 9.
6. Tuning eye cable may be caught in setting disc—Remove cable from setting disc assembly.

If this occurs on all buttons.

1. Main drive cable loose—Tighten by means of turn-buckle.—Par. 147—Fig. 21.
2. Set screws in top pulley of main drive cable loose—Tighten these.—Par. 147—Fig. 6.
3. Spring clip on drive drum of tuning condenser may fit loosely on drive arm—Bend this clip to provide a tight grip.—Par. 61A—Fig. 7.
4. Silencer switch spring assembly may not have sufficient tension to push back the motor armature after the circuit is broken—Increase tension by bending the spring.—Par. 39—Figs. 4 and 5.
5. Faulty action of motor On-Off switch—Adjust switch and switch lever.—Par. 135, 136, 137, 138—Figs. 8, 9 and 16.

D—If, when a setting button is depressed, dial pointer does not move at all or does not move properly when tuning knob is turned.

1. The back of the setting button plunger does not engage the rocker arm—Line up the rocker arm with the back of the plunger by bending.—Par. 97, 98—Fig. 11.
2. The top of the rocker arm does not engage the operating lever which releases the drum of setting disc—Loosen the setting disc set screws and line up the disc with the rocker arm.—Par. 98—Fig. 11.
3. Clutch plate does not engage drive pulley—Bend clutch plate forward.—Par. 171—Fig. 6.
4. Setting button may not be pushed in sufficiently—Push button in further.—Fig. 11.

E—After a tuning button has been depressed, the manual tuning knob rotates while the motor is in operation.

1. Chassis may be too far forward in cabinet and prevent clutch release lever from returning to electric position—Move chassis back.—Par. 51, 172.
2. Electric-manual die cast lever arm does not turn freely on the clutch assembly bearing and does not return to electric position—Bend or file down bearing so that this lever turns freely.—Par. 172—Fig. 3.
3. Tuning knob put on shaft while lever is in manual position—Loosen this knob and put it on when lever is in electric position.—Par. 172, 176.
4. Clutch releasing spring broken or of insufficient tension—Put on new spring or increase tension of old spring.—Par. 172—Fig. 6.

F—Manual tuning knob turns with difficulty when tuning the radio manually.

1. Motor pinion jammed against gear No. 1—Pull motor away from gear.—Par. 44—Fig. 6.
2. Fibre gear No. 1 riding on washer of motor pinion—Change to new type pinion.—Par. 46—Fig. 6.
3. Motor pinion sticks on bearing—Change to new type pinion.—Par. 46—Fig. 6.
4. Clutch releasing spring does not turn freely—Bend this spring so that it rotates freely.—Par. 173—Fig. 6.

G—Jumpy action when tuning the radio manually.

1. Faulty friction drive in original issue panels—Change to gear drive panel.—Par. 42.
2. Silencer spring has not enough tension to disengage rotor from pinion—Readjust tension of silencer spring.—Par. 39—Figs. 4 and 5.

H—Excessive backlash when tuning the radio manually.

1. Loose set screws on drive drum on tuning condenser—Tighten these screws.—Par. 61A.
2. Compression springs in gears of train of gears missing or not set properly—Replace or reset springs in gears.—Par. 60—Fig. 7.
3. Take-up spring on gear No. 5 missing or anchorage point of this spring broken.—Par. 60—Fig. 7.
4. Spring clip on drive drum on tuning condenser fits loosely on drive arm—Tighten this clip.—Par. 22, 61A—Fig. 7.
5. Loose bearings on setting disc shaft—Tighten right hand bearing (from back of panel).—Par. 112—Fig. 6.

I—Drive belt slips when tuning the radio manually.

1. Excessive amount of oil on drive belt—Clean off oil.—Fig. 6.
2. Increase tension on drive belt by readjusting position of idler (early models only).—Fig. 6.
3. Main drive cable too tight—Loosen tension on main drive cable by means of turn-buckle.—Fig. 21.
4. (Early models only) Friction disc in motor binds—Change to gear drive panel.—Par. 42.
5. Motor pinion jammed against gear No. 1—Pull motor back from gear.—Par. 44—Fig. 3.
6. Motor pinion sticks on bearing—Put in new type pinion.—Par. 46—Fig. 6.
7. Gear train jammed—Free gears which are not working smoothly.—Par. 61—Fig. 7.

J—Electric-manual lever cannot be pushed to manual position.

Early Models Only

Bend yoke track away from clutch release lever until it engages yoke of clutch shaft properly.—Par. 174—Fig. 22.

Early and Late Models

1. One or more of the tuning button plungers has not returned to the normal position—Stretch tuning plunger spring.—Par. 111—Fig. 8.
2. Chassis too far forward in cabinet—Move chassis back.—Par. 51.
3. Locking plate screws loose—Turn down screws.—Par. 181—Fig. 3.

K—Electric-manual lever will not stay in the manual position.

The tip on the clutch release lever slot may be broken off or down too low—Return electric drive panel to factory for new clutch release lever.—Par. 175—Fig. 3.

L—Electric-manual lever cannot be pushed back into electric position from manual.

1. The tip on the clutch release lever slot may be too high—Cut or file off the end of this tip.—Par. 175—Fig. 3.
2. 4 washers which hold locking plate are tight—Loosen these washers.—Par. 180—Fig. 3.
3. Interlocking lever binds—Free lever.—Par. 175, 180—Fig. 3.
4. Clutch release lever binds—Free lever.—Par. 175—Fig. 3.

M—Electric-manual lever apparently has no effect on mechanism.

1. Pin of electric-manual lever casting is not in hole of clutch release lever—Remove manual tuning knob and place pin of electric-manual lever in hole of clutch release lever—Replace manual tuning knob—see instructions in Par. 176—Fig. 3.
2. Washer in front of clutch release lever loose from bearing—Return electric drive panel assembly to factory for replacement of this item.—Fig. 3.

N—Motor rotates but dial pointer does not move (early models only).

1. Friction disc in motor may slip—Change to gear drive panel.—Par. 42.
2. Fibre gear No. 1 may be slipping on its hub—Replace this gear.—Par. 62—Fig. 7.

O—Motor rotates when no button is depressed.

Plunger of motor On-Off switch sticks in On position—Release switch plunger.—Par. 135, 136—Figs. 8, 9, and 16.

P—After a tuning button has been depressed, the motor does not operate.

1. Motor On-Off switch out of adjustment—Readjust or replace switch.—Par. 135, 136, 137—Figs. 8, 9, and 16.
2. Motor pinion jammed against gear No. 1—Move motor away from gear.—Par. 44—Figs. 3 and 6.
3. Fibre gear No. 1 riding on washer of motor pinion Change to new type pinion.—Par. 46—Fig. 7.

4. (Early type drive cable) Cable slips—Turnbuckle take-up hitting top pulley or bottom idler—Return panel to factory for later type panel.—Par. 6.

Q—Excessive motor noise.

1. Chassis too far forward in cabinet and touching panel at some point—Move chassis back a slight amount by loosening wood support screws.—Par. 51.
2. Motor pinion chattering.
   (a) Silencer spring tension too great—Bend spring back to loosen tension.—Par. 40—Figs. 4 and 5.
   (b) Faulty pinion in motor—Replace pinion.
   (c) Pins on armature short or uneven so that they do not engage pinion properly—Replace motor.—Par. 49.
   (d) Motor bearing mounting clamps loose—Tighten these bearings or replace motor.—Par. 45.

R—After one tuning button has been depressed, pressing in another does not release the first nor permit the second to stay in.

Locking plate slightly distorted—Depress the first button again and then the second quickly.

This condition can be corrected by screwing in the locking plate screws in case they are out too far and by hitting the locking plate.—Par. 183—Fig. 3.

S—Tuning button does not push in easily or does not remain depressed.

1. Chassis may be too far forward in cabinet and prevent clutch release lever from returning to electric position—Move chassis back.—Par. 172.
2. Electric-manual die cast lever arm does not turn freely on the clutch assembly bearing and does not return to electric position—Bend or file down bearing so that clutch release lever turns freely. —Par. 172—Fig. 3.
3. (Applies only to buttons not pushing in easily) No grease on button shaft—Put some grease on shaft at point where it passes through locking plate. —Fig. 3.

T—Tuning button cannot be pushed all the way in.

1. Chassis too far back in cabinet—Move chassis forward but do not touch front panel.
2. Chassis too far forward in cabinet causing locking plate to contact cabinet—Move chassis back.—Par. 51.

U—If dial pointer does not move when tuning button is depressed.

(Early type friction drive only) Motor far enough away from gear No. 1 so that it does not engage friction disc—Move motor closer to friction disc. —Par. 6, 42.

V—Set dead.

1. Silencer switch shorted—Bend into proper position.—Par. 41—Figs. 4 and 5.
2. Armature tight in bearings and will not push back after switch is off—Free shaft in bearing or replace motor.—Par. 45—Fig. 5.

W—Signals can be heard with full volume between stations while tuning the radio electrically.

Silencer switch or silencer circuit open—Bend switch into position and check silencer circuit.—Par. 41—Figs. 4 and 5.

X—If creaking noise is heard on all buttons when tuning radio electrically.

Drive cable riding over itself on pulley B—Lay cable properly on this pulley.—Par. 158—Fig. 21.

Y—If setting disc stops in both directions of rotation.

Pawl spring may be missing or pawl stuck so that stop lever drops in notch in either direction of rotation.—Par. 104—Fig. 12.

Changes Since Early Models

(1) A number of changes in the electric drive assembly have been made in the course of production. The following listing summarizes these changes and identifies the chassis which have these changes.

Issue No. — Blank

(2) The issue number of the electric drive panel is stamped on the bracket over the motor switch—See Fig. 6. In the early models, no issue numbers were used.

(3) Early 7-tube sets may be identified by the fact that when the electric-manual lever is in the electric position, all four red mounting screws are located, as shown in Fig. 1.

(4) In case major trouble is experienced on the electric drive panel of these sets, it will be necessary to return the entire chassis or complete radio to the factory for reconditioning. Replacement panels cannot be satisfactorily mounted on these models.

(5) Early 9, 11, 13, and intermediate 7-tube sets may be identified by the fact that the two top red screws are in the position shown in Fig. 2. (This is also true of all subsequent models.)

(6) In case of major difficulty on the electric drive panel of these sets, which cannot be repaired locally, the panel can be removed from the chassis and returned to the factory for replacement.

(7) A number of changes were made during production of the early models which can be summarized as follows: A new type drive cable (Fig. 6) was used. A reversing switch centering spring (Fig. 23) was added. An improved type clutch release lever was used (Fig. 3). Nos. 2, 3, and 4 compound gears (Fig. 6) were changed to die castings. The reversing switch lever was modified and an improved rocker arm (Fig. 8) used which permitted greater movement of the setting button plunger. The mounting screw hole on the On-Off switch mounting was enlarged to facilitate adjustment. The clutch releasing spring (Par. 172) was added.

Issue No. 2

(8) All shipments made after August 23, 1937, incorporate the above changes and two additional major changes as follows: Originally a friction drive was used between the motor and the first gear of the train of gears. This friction drive was replaced with a gear drive (Fig. 6) starting with the No. 2 issue panels. A new method of stringing the main drive cable (Fig. 21) was also used in No. 2 panels. This new method is not applicable to the old drive cable.

(9) Almost any difficulty which may be encountered in these and subsequent issue number panels can be corrected in the field. The information contained in this manual will serve as a guide in making practically any repairs which may be required.

(10) In later No. 2 issue panels, a new reversing switch (Fig. 24) was used. A change was also made in the silencer spring, a heavier spring with silver contact being added.

Issue No. 3

(11) The guard was placed over the silencer spring assembly (Fig. 4) in panels with this issue number. A specially hardened motor pinion replaced the previous type. Rubber cushions were placed on the back of the cabinet panel to prevent the chassis from touching.

Issue No. 4

(12) A covering was placed over the reversing switch and an adjustment stud added to the base of the motor On-Off switch.

Replacing Electric Drive Panel on Chassis

(13) The electric drive panel assembly is the same for all chassis and may be removed from the chassis and replaced as explained below (the early 7-tube chassis as explained at the last part of this article, is an exception).

(14) Remove the chassis from the cabinet using extreme care not to damage the setting button shafts. Remove the electric tuning buttons by pushing down the lower end of the small hairpin spring at the back of the button and at the same time, pulling the button off the shaft. It is not necessary to remove the setting buttons.

(15) The screws in the wooden support behind the electric drive panel must be unscrewed and the support removed from the cabinet.

(16) Remove the speaker plug from the socket at the back of the chassis and also the tuning eye tube from its clamp bracket. Loosen the screw holding the bottom shield connection to the back of the chassis. Unscrew and remove the two "L" bolts (located under the chassis shelf) which are secured to the two rear chassis mounting feet.

(17) To remove the panel from the chassis, turn the electric-manual lever to the electric position. Unsolder the wire on the silencer switch on the front panel and also the motor connections under the chassis.

(18) Remove the dial pointer by pulling it off.

(19) Remove the dial scale bracket from the panel by taking out the two top screws and one bottom screw. Pull off dial lamp sockets and unhook clutch release lever tension spring.

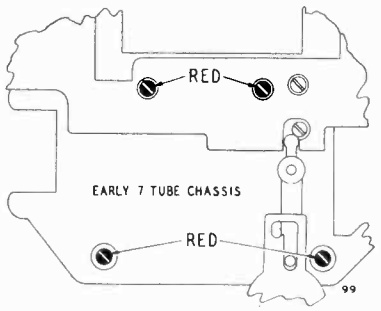


Fig. 1—Location of 4 Red Mounting Screws in Early Models

(20) Remove the four RED SCREWS shown in Figs. 1 and 2. DO NOT remove the screw on each side of the shaft extending through the center of the panel in the case of later models as shown in Fig. 2. *See special procedure at the last of this article for early 7-tube models.*

(21) The panel can then be pulled straight out from the chassis.

(22) To replace the assembly, reverse the above procedure. When mounting the panel, care must be taken that the drive arm (Fig. 6) on the drive gear and spring clip on gang condenser drive drum line up properly. To do this allow the front part of the chassis to project 2 or 3 inches over the edge of the table. Turn the gang condenser until the spring clip on the drive drum is at its lowest position. Spread this spring clip with a *small* screwdriver, bringing this screwdriver up from beneath the chassis. Care should be taken not to spread the spring clip too far. Turn the gears on the electric drive panel until the drive arm is at its lowest position. Gently push the drive arm into position in the spring clip on the drive drum. The screwdriver will drop to the floor.

(23) When installing a new replacement panel on a late model, the following points must be observed carefully:

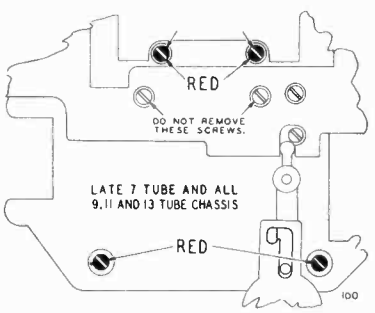


Fig. 2—Location of 4 Red Mounting Screws in Late Models

(24) MOUNTING SCREWS—Two screws with heads painted red are furnished with the new panel. These screws are longer than those used in the old panel and must be used in the TOP mounting holes only. The screws used on the old panel may be used in the two lower mounting holes of the new panel.

MODELS 14,15,16
Electric Drive Dials
Motor Connections
Motor-Silencer Spring
Data

WELLS-GARDNER & CO.

(25) MOTOR CONNECTIONS—The motor cable assembly in the new panel has only two lead wires extending from it, while the old motor cable assembly has three. The third lead on the old cable assembly was connected to a condenser which is not necessary when the new drive assembly is used.

(26) The two leads from this condenser (metal shell, tubular type) to the terminal strips should be disconnected. The condenser can be left in the chassis, or it may be removed.

(27) One cable lead is soldered to the terminal strip lug to which is connected one wire of the power cord and one power transformer primary lead. The other cable lead is soldered to the terminal strip lug to which is also connected the lead from the On-Off switch and the other power transformer primary lead.

(28) CAUTION—When the electric drive panel is removed from the chassis, lay it face down and not back down. The reason for this is that there is a possibility that the motor On-Off switch on the back of the unit will be damaged or thrown out of adjustment.

(29) In handling the electric drive panel, do not carry it by the switch lever (See Fig. 6) which actuates the motor On-Off switch. This bar may be bent and damaged by such handling.

A New Electric Drive Panel Cannot Be Mounted on the Early 7-Tube Models

(30) These models may be identified by the fact that when the chassis is removed from the cabinet and the electric-manual lever is in the electric position all four red mounting screws are located as shown in Fig. 1. On late models, the two top red screws are in the position shown in Fig. 2.

(31) If trouble serious enough to require replacement of the electric drive panel develops in the early model radio, it will be necessary to send the entire chassis or the complete radio to the factory to have this done. A replacement panel should not be ordered as it cannot be mounted on the early type 7-tube chassis.

(32) The following procedure for removing the panel from early models is given only in case minor repairs are necessary.
(33) Unsolder wires and remove mounting screws. Pull the panel away from the chassis about ½ inch, being careful not to damage the steel cable. Then tilt the upper part of the panel toward the chassis. Lower the panel about ½ inch and slide it to the left so the steel cable will pass under the bracket. After the cable clears this bracket, the panel may be removed.

Motor and Silencer Spring Assembly

(34) The electric motor supplies the mechanical power for tuning in a station when an electric tuning button is depressed. A reversible AC motor is used. It is mounted to the electric drive panel by means of two screws. Power is transmitted to the rotating mechanism by means of a pinion gear on the armature shaft which meshes with the first gear of a train of gears.
(35) At the front of the motor is an assembly shown in Fig. 3 and known as the silencer spring assembly. This assembly has a two-fold purpose. First, it establishes a contact *while the motor is operating* which completes a circuit to the chassis ground that silences the radio. This circuit is shown in the schematic circuit diagram of the chassis manuals. Its second function is to exert a slight amount of spring tension on the end of the armature shaft which extends from the motor.

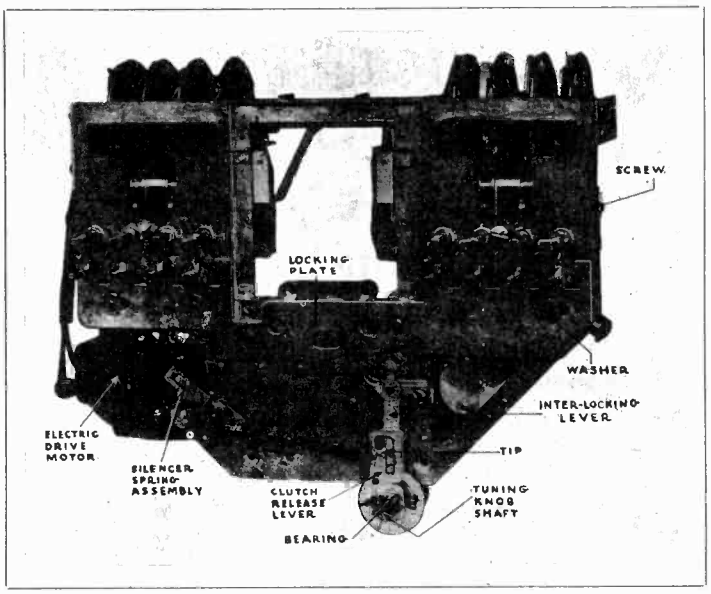


Fig. 3—Electric Drive Panel—Front View

(36) The small pinion gear inside of the motor rotates freely on the front motor bearing. This pinion is always in mesh with gear No. 1. There are two pins on the armature and two extensions on this pinion. The entire armature shaft assembly slides back and forth in its bearings.

(37) When the circuit through the motor is complete, magnetic action causes the armature shaft to slide toward the front of the panel. The force is strong enough to overcome the tendency of the silencer switch spring to prevent this movement.—Fig. 5.

(38) The pinion gear comes into close proximity with the armature and the two pins and two extensions mentioned above engage, causing this gear to rotate with the armature. The electric tuning mechanism turns as a result. When the circuit through the motor is broken, the magnetic pull on the armature is released and the silencer spring forces the armature toward the back of the panel, causing the pinion gear to disengage from the armature proper —Fig. 4.

(39) The tension of the silencer spring is of great importance. If the tension is insufficient it will not push back the armature shaft after the circuit is broken and the inertia of the motor will continue to exert a driving force on the train of gears. This will cause the tuning mechanism to go somewhat past the station after the setting disc has arrived at the stop position. The remedy is to tighten the spring by bending it.
(40) If the tension of the silencer spring is too great it will prevent the armature from moving forward when the circuit is completed and engaging the pinion gear. When this occurs the pinion will not turn at all or a chattering caused by the armature pins and pinion extensions will be heard. The remedy, of course, is to reduce the tension of the spring by bending.

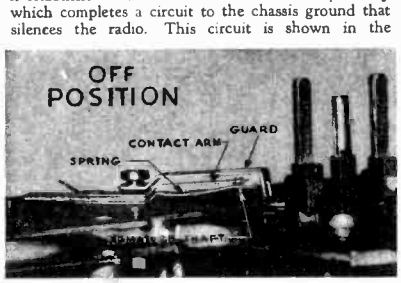


Fig. 4—Silencer Assembly—Off Position

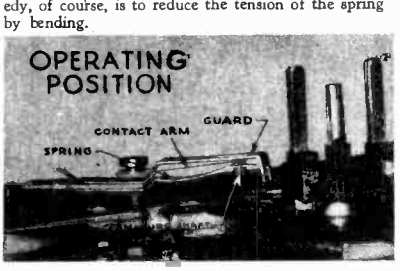


Fig. 5—Silencer Assembly—Operating Position

(41) The contact and the spring of this assembly must close while the armature is in its operating position—otherwise the radio will not be silent between stations. Be sure that the assembly is not so bent that the contact and spring are permanently in contact. This condition would, of course, short out all signals.
(42) The early electric drive panels, those with no issue number on the switch bracket, used a friction drive between the motor and the first gear. A friction disc was used instead of the large toothed gear of gear assembly No. 1 shown in Fig. 7. This friction disc engaged a friction drive pinion on the motor. No. 2 and later issue panels all use the gear drive.

(43) There are several conditions under which the motor will not operate. External electrical faults, mainly open circuits, are discussed in other articles. Open windings within the motor will, of course, prevent its operation.

(44) If the motor is jammed against compound gear assembly No. 1 (see Fig. 6) it will not operate. The remedy is to loosen the two motor mounting screws (Fig. 6) slightly. Then insert a screwdriver between the upper right side of the bakelite motor case and the die cast frame at point "B" (Fig. 3). Turn the screwdriver to move the motor away from the frame and tighten the mounting screws. Care should be taken not to crack the bakelite case. In some cases it will be necessary to replace the top 8-32 screw with a 6-32 screw and nut in order to get proper spacing between the motor and the first gear.

(45) Tight bearings or a bent shaft will prevent motor operation. The remedy for tight bearings is to disassemble the motor, free and oil the bearings. In the case of a bent shaft a new motor will usually be required. On occasion, the bearing clamps may become loose—tighten the bearings or replace the motor.

(46) Still another item which prevents motor operation is the pinion gear jammed against the bearing. The bearing has a fillet or slightly rounded corner. Gear No. 1 pressing against the washer of the pinion gear may jam this gear against the bearing. Or, the pinion itself may jam against the bearing. In either case it will not turn. The remedy is to replace the pinion with a new type pinion that is rounded out to take care of the bearing fillet. One of these may be obtained at the factory.

(47) Jamming and tightness at various points of the rotating mechanism such as gears, belts, shafts and pulleys will cause an excessive load and prevent motor operation.

WELLS-GARDNER & CO.

MODELS 14,15,16
Electric Drive Dials
Motor Notes,Part 2
Gear Train Data

(48) If the motor operates but does not drive the rotating mechanism, the following conditions may prevail: The early type friction drive disc may be slipping. The remedy is to replace the early friction electric drive panel with the gear type panel. In a few of the first sets incorporating the gear drive from the motor, the fibre gear of compound gear No. 1 (see Fig. 7) may slip on its hub. There is a spring washer which holds this gear to its hub and this washer may become too loose. The method of detecting this trouble and the correction of it are explained fully in the article "Train of Gears."

(49) Worn pins on the armature and worn projections on the pinion gear will prevent engaging of these two pieces. The silencer spring assembly may be too tight as explained above.

(50) If the motor runs only in one direction, check for a defective reversing switch or open wiring.

(51) If the electric drive panel or chassis comes in contact with the cabinet at any point, motor vibration will be transmitted to the cabinet and excessive noise will be heard while the motor is in operation. If the chassis is too far forward, it may touch at some point. There are 4 wood screws, 2 at each side of the wood support at the back of the electric drive panel. Unscrew these screws 2 or 3 turns or enough to pull the chassis back about 1/8 inch. This will prevent the electric panel from touching the cabinet. Do not pull the chassis too far back as this would prevent the buttons from being properly depressed.

Replacing Silencer Spring Assembly

(52) Unsolder the wire connected to the switch. Unscrew and remove the large brass screw at the center of the switch. All parts may now be removed from the front of the panel. Replace the assembly in the following order: Armature shaft spring, fibre strip, contact arm, fibre washer, guard, and brass screw. The guard is used on issue No. 3 or higher models only. Resolder the wire to the switch.

Replacing Motor

(53) Remove the drive panel from the chassis. It is not necessary to unsolder the silencer switch wire.

(54) Loosen the screws holding the cable clamps enough so that the cables to the reversing switch and the motor on-off switch can be removed. Unsolder the cable wires connected to the reversing switch, motor on-off switch and to the terminal strip under the chassis base. Save the varnished tubing and the wire connected between the motor on-off switch and the terminal strip under the chassis base. If the chassis is of the early type using the tubular condenser connected to the reversing switch, save this connecting wire also.

(55) Remove the two screws holding the motor to the support casting from the back of the panel. The motor and cable assembly can now be removed.

(56) To replace the motor, reverse the above procedure. The five leads from the motor are connected as shown in Fig. 24. Be sure to enclose these leads and the other lead from the motor on-off switch in the proper varnished tubing. If the chassis is of the early type using the tubular condenser connected to the reversing switch, run this lead wire through the proper varnished tubing.

(57) If, after the motor is replaced and all parts reassembled, the motor appears to be jammed as indicated by the manual tuning knob turning very hard with the electric-manual lever in the manual position, the following remedy should be tried.

(58) Loosen the two motor mounting screws slightly and move the motor away from gear No. 1 as explained in paragraph 44.

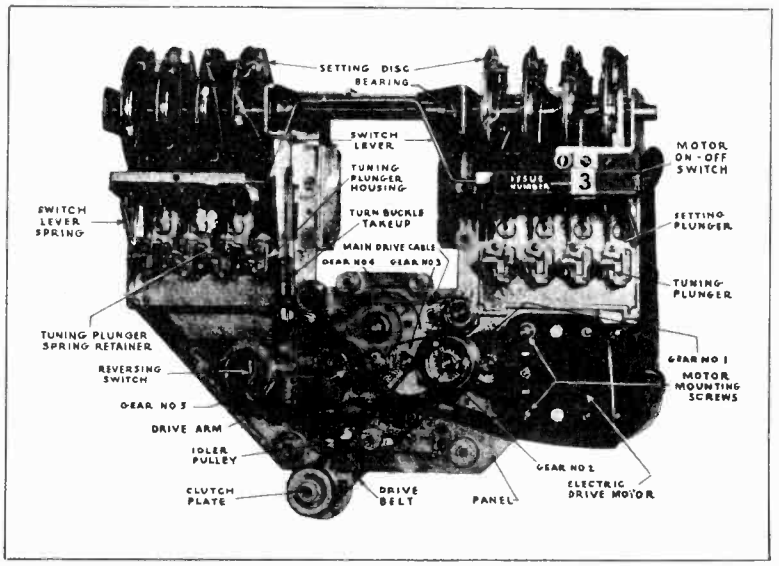


Fig. 6—Electric Drive Panel—Back View

Train of Gears

(59) The train of gears from the motor shown in Fig. 6 reduces the speed and increases the torque. It transmits power to gear No. 5, which drives the tuning condenser, and to gear No. 4, on the shaft of which is the setting disc cable pulley. Gear No. 2 is belt connected to the clutch assembly pulley—Fig. 6. The latter permits manual tuning of the radio and the manual setting of the buttons for electric operation.

(60) Gear assemblies Nos. 3 and 4 have compression springs between the fixed and movable gears of the assembly. Gear No. 5 has a takeup spring in front of it (from back of panel). All of these springs must be properly inserted to prevent backlash. The proper method of inserting the compression spring in gear assembly No. 3 is explained below.

(61) It is essential that the train of gears mesh properly and rotate freely. In case the gears are jammed, look for a foreign object caught between the gears or a compression spring partly out of the slot.

(61A) The drive arm on gear No. 5 should fit tightly in the spring clip on the tuning condenser drive drum. The drive drum is the drum secured by means of set screws at the front of the condenser shaft. Remove the panel and tighten the spring clip by bending, if it is loose. (See par. 22 for insertion of arm in clip.) If the set screws on the drive drum are loosc, there will be backlash in tuning. These set screws can be reached and tightened from the bottom of the chassis with a thin blade screwdriver. Rotate the tuning condenser until first one and then the other of the screws is at the bottom.

Replacement of Gear No. 1

(62) In a few of the first sets incorporating the gear drive from the motor, the fibre gear of compound gear No. 1 (See Fig. 7) may slip on its hub. There is a spring washer which holds this gear to its hub and this washer may become too loose. When this occurs, the large fibre gear will be seen to rotate while the hub and small metal pinion gear which engages with gear No. 2, remains stationary.

(63) In a case of this kind, compound gear No. 1 must be replaced. In the later type, the metal hub is rigidly secured to the fibre gear. Following is the replacement procedure:

(64) Remove electric panel assembly from chassis and lay it face down on the bench.

(65) Remove belt and idler pulley—See Fig. 7.

(66) Refer to turn-buckle take-up on steel drive cable—See Fig. 7. Observe position of hex nut on the stud of this turn-buckle, that is, see how many threads this nut is from the end of the stud.

(67) Loosen the main drive cable by loosening the hex nut on turn-buckle and backing off the round knurled nut about 5 half turns.

(68) Remove horseshoe washer from gear Nos. 1 and 2, spreading the horseshoe washers by means of long nose pliers and screwdriver.

(69) Take out the 2 motor mounting screws and lift the motor out of place—See Fig. 7.

(70) Lift up the main drive cable to clear the teeth at the top of gear No. 2—take care not to nick the cable.

(71) Remove gear Nos. 2 and 1.

(72) Put the new fibre tooth gear No. 1 on the shaft and replace horseshoe washer.

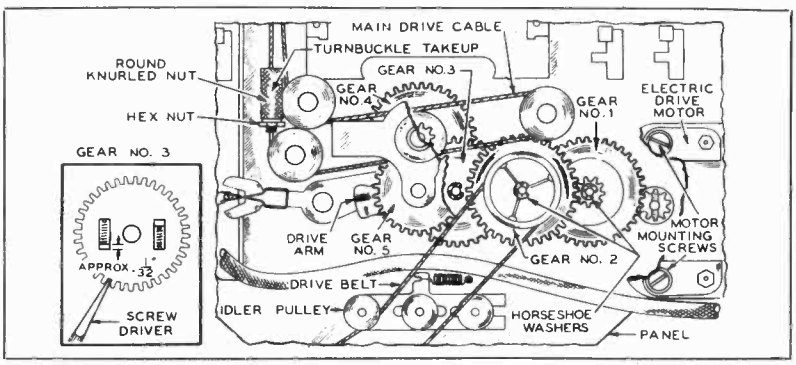


Fig. 7—Replacement of Gear No. 1

MODELS 14,15,16
Electric Drive Dials
Discs and Buttons
Adjustments,Part 1

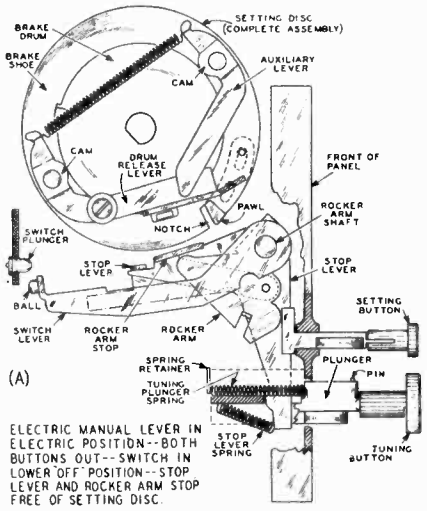


Fig. 8—Setting Disc—Off Position

(73) Now refer to gear assembly No. 3—See Fig. 7. The top gear of this assembly is movable and the bottom gear is fixed. Rotate the top gear one tooth clockwise relative to the bottom gear and hold the two in this position with a screwdriver as illustrated.

(74) Slide gear No. 2 on its shaft, pulling the main drive cable over the top of the teeth—again care must be taken not to nick the cable.

(75) Push gear No. 2 all the way on its shaft, engaging gear Nos. 1 and 3. Replace the horseshoe washers.

(76) Check for take-up on gear No. 3. Approximately 1/32 inch of the fixed gear (bottom) will show through slot in top gear—See Fig. 7.

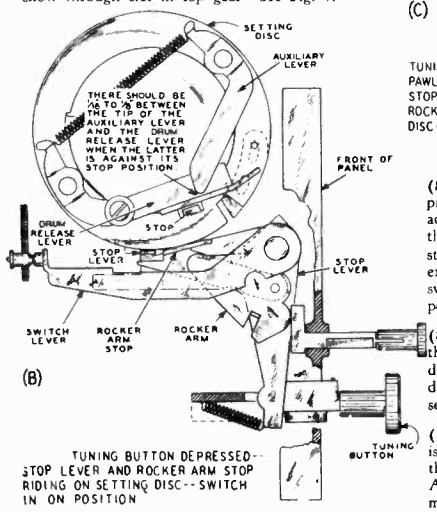


Fig. 9—Setting Disc—On Position. Stop Lever on Edge of Disc

(77) Reassemble motor to frame, pushing tension spring under motor shaft. Be sure to use the same screws to mount the motor to the frame that were taken off. Care must be taken that the pinion gear in the motor meshes properly with the teeth of fibre gear No. 1. If these two gears appear to be so close together that they bind, pull the motor away from gear No. 1 before tightening the mounting screws.

(78) Replace belt and idler pulley.

(79) Retighten turn-buckle on main drive cable bringing hex nut to its former position and round knurled nut down tight against hex nut washer.

(80) Reassemble electric drive panel to chassis.

Setting Discs, Tuning and Setting Buttons, and Associated Levers

(81) The setting discs, tuning and setting buttons, and the levers immediately below the discs, provide a stop position by means of which the electric circuit through the motor can be broken and a mechanical stop provided when a predetermined station has been tuned in.

(82) The essential movements are illustrated in Figs. 8, 9, 10, and 11. The actions of the reversing switch, motor switch, locking plate and clutch, tie in closely with this procedure but are more fully explained in separate articles under those names.

(83) Referring to Fig. 8, the electric-manual lever has been thrown to the electric position. Both the tuning and setting buttons are out. The stop lever and rocker arm stop are in line and free of the setting disc.

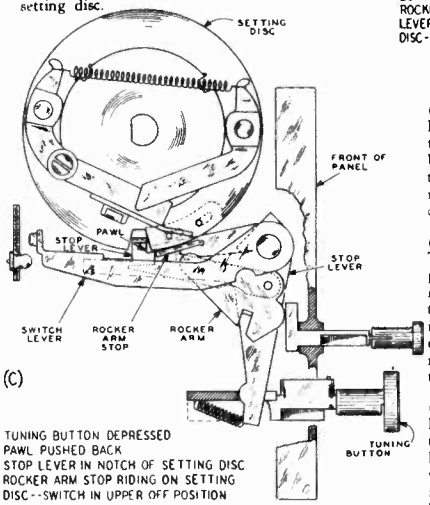


Fig. 10—Setting Disc—Stop Lever in Notch

(84) In Fig. 9, the tuning button has been depressed. The bottom part of the stop lever (portion adjacent to plungers) has been pulled over so that the top part of the stop lever and the rocker arm stop are riding on the edge of the setting disc. The extreme back portion of the stop lever has lifted the switch lever, bringing the motor switch to the On position.

(85) With the motor switch in the On position, the motor drives the train of gears and the setting discs rotate. Now refer to the pawl on the setting disc (Fig. 8), which partially covers the notch in the setting disc.

(86) The purpose of the pawl on the setting disc is to permit the stop lever to fall into the notch in the setting disc in only one direction of rotation. All stations are tuned in, therefore, with the rotating mechanism moving in one direction of rotation. All cable slack and play in gears is taken up in the same direction. If, when stations are set, the tuning knob is turned in this same direction as covered in the instructions, the stations will be tuned in very accurately by the electric tuning mechanism.

(87) Now refer again to the rotating setting disc. Let us say that the direction of rotation is such that the stop lever rides over the pawl and does not drop into the notch. Just before the tuning condenser has reached the end of its travel, the pin on the No. 4 gear assembly casting (Fig. 6) throws the reversing switch lever and the motor changes its direction of rotation. When the pawl reaches the stop lever, the latter will engage the tip of the pawl which extends just beyond the edge of the setting disc, causing the pawl to slide over, opening the notch in the setting disc. The stop lever falls into this notch.

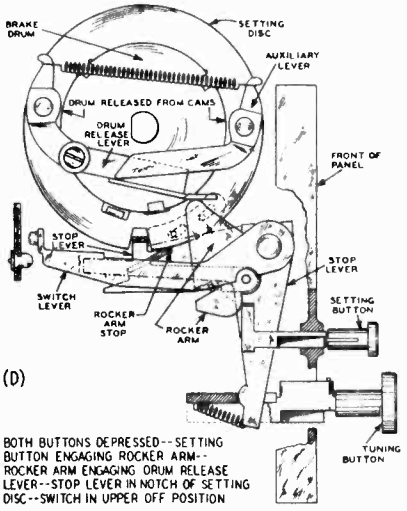


Fig. 11—Setting Disc—Setting Button Depressed

(88) Referring to Fig. 10, the entry of the stop lever into the notch on the setting disc has raised the switch lever until the motor switch is in the Upper Off position. The motor stops and the setting disc is held by the stop lever in the notch. The rocker arm stop still rides on the edge of the setting disc and is no longer lined up with the stop lever.

(89) In Fig. 11, the setting button is depressed. The rocker arm stop, moves toward the back and permits the rocker arm to lift the end of the drum release lever of the setting disc. As will be seen in the illustration, the drum release lever lifts the auxiliary lever and the cams of these two levers move off of the brake drum. This allows the drum to rotate inside of the brake shoes (Fig. 8) or outer portion of the setting disc.

(90) The rocker arm can engage the drum release lever only when the rocker arm stop can move toward the back, and this can be done only when the stop lever is in the notch of the setting disc. It is only when the stop lever is in the notch that the rocker arm can engage the drum release lever properly. That is why in all other positions of the stop lever the latter is lined up with the rocker arm stop and prevents the rocker arm from moving upward.

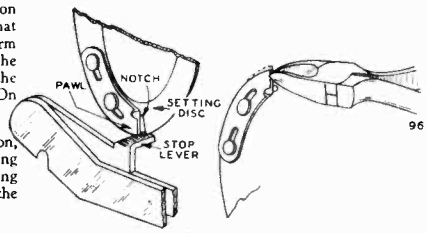


Fig. 12—Pinching Pawl of Setting Disc

(91) When the setting button was depressed, the plunger of this button working against the locking plate (Fig. 3) moved this plate over sufficiently to engage the clutch. Now when the manual tuning knob is turned, the setting discs, except the one which has its setting button depressed, will rotate. The brake drum of the setting disc which we are discussing and which has its setting button depressed, will also rotate, but the brake shoe, or outer portion, remains stationary (Fig. 11). When the station is tuned in, the setting button is released and this causes the cams of the drum release lever and auxiliary levers to bear down on the brake drum, holding this drum firmly in position.

(92) Throwing the electric-manual lever to the manual position will lower the switch lever to the Lower Off position—See Fig. 8. Pushing in another tuning button will release the tuning button we have discussed and bring the tuning button mechanism of the button which is depressed to the position shown in Fig. 9.

Adjustments, Part 2
Replacements

WELLS-GARDNER & CO.

MODELS 14,15,16
Electric Drive Dials
Discs and Buttons

Adjustments

(93) The cams must be tight against the brake drum of the setting disc (Fig. 8) otherwise this drum will slip and the dial pointer will not stop at the proper point. In Fig. 9 is shown the proper distance between the end of the auxiliary lever and the drum release lever bar when the latter is against its stop. If this spacing is not correct, the cams will not grip and release properly. A new setting disc will be required in this case.

(94) If the rivets which hold the drum release lever and the auxiliary lever are loose, the cams will not close down tightly on the brake drum. Tighten these rivets or replace the entire setting disc.

(95) A brake drum which is not perfectly round will not be gripped properly by the cams of the auxiliary and drum release lever. A new setting disc will also be required in this case.

(96) A high spot on the outer edge of the setting disc may cause the stop lever to move sufficiently to break the motor switch contact. File down the setting disc or adjust the motor switch if this occurs.

(97) If the rocker arm is bent, it may not engage the back of the setting button plunger as shown in Fig. 11.

(98) Bend the rocker arm to the proper position. The rocker arm may, instead of engaging the drum release lever, come between this lever and the brake drum of the setting disc. Correct this condition by bending the rocker arm and by shifting the position of the setting disc on the shaft.—See Par. 128.

(99) As explained above, when the setting disc rotates, the stop lever will pass over the pawl in one direction of rotation. In the other direction of rotation the stop lever will engage the tip end of the pawl, cause the pawl to slide over and permit the stop lever to fall into the notch of the setting disc.

(100) If the tip end of the pawl does not extend a sufficient amount beyond the outer edge of the setting disc, this action will not take place and the setting disc will rotate beyond the stop lever in either direction of rotation.

(101) Should this faulty condition exist on one of the setting discs, whenever the electric tuning button corresponding to this disc is depressed, the dial pointer will continue to move back and forth without stopping.

(102) This condition is easily corrected as follows: Using a pair of side cutters, grip the tip of the pawl as shown in Fig. 12 about 1/32 inch from the edge. Pinch firmly and push outward (away from the center of setting disc). Do this until the tip of the pawl is a little more than 1/64 inch beyond the outer edge of the setting disc.

(103) After this procedure has been followed, depress the setting button corresponding to this setting disc and see whether the stop lever edge engages the pawl properly.

(104) If the pawl spring is missing, the stop lever can drop into the notch of the setting disc in both directions of rotation. This same condition can take place if the pawl should stick in the open position. If the pawl should stick in the closed position, the setting disc will continue to rotate, first in one direction and then the other without stopping. The remedy is to free the pawl so that it slides back easily. Do this by loosening the rivet with a screwdriver.

(105) It is not advisable to set a station close to the end of the dial pointer travel, at the point where the reversing switch operates. If, when a setting button is depressed you should turn the tuning knob too far, a click will be heard near the end of the dial pointer travel. Then, whenever THIS electric tuning button is depressed, the dial pointer will continue to move back and forth without stopping.

(106) This condition is easily corrected as follows: Turn the electric-manual lever to the manual position. Then turn the tuning knob and observe the setting disc corresponding to the button on which the above condition takes place. Stop turning the knob when disc is in position shown in Fig. 13.

(107) Then with the flat end of a long pencil or thin piece of wood, carefully depress the drum release lever (Fig. 13) and rotate the setting disc about one inch in the direction shown by the arrow.

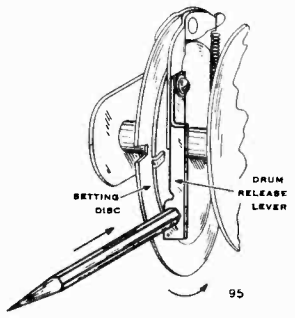


Fig. 13—Adjusting Position of Brake Drum

Do not use a metal rod or the pointed end of the pencil. The setting disc will turn readily after the drum release lever has been depressed.

(108) This will correct the condition, the stations may be set, and the radio operated in the usual manner.

(109) Of course, when tuning in a station manually, as explained in the instruction book, you can tune to the extreme end of the dial pointer travel without the above condition taking place.

(110) The stop lever may not enter far enough into the notch in the setting disc due to the setting disc being at the incorrect position on the shaft (See Par. 129) or the stop lever spring (Fig. 8) may be of insufficient tension to force this lever into the notch. In a case of this kind, the brake shoe (Fig. 8) stops while the brake drum continues to rotate with the motor. The motor has sufficient power through the gears to rotate the brake drum even though the cams (Fig. 8) have not been released. When the end of the dial scale is reached, the thump of the reversing switch is usually sufficient to force the stop lever into the notch sufficiently to throw the motor switch to the Off position. The remedy is to loosen the setting disc set screws and move the disc to the correct position—See Fig. 15—Par. 129. If the main drive cable has been stretched, take up the slack by means of the turn-buckle take-up (Fig. 21). If the stop lever spring (Fig. 8) was responsible for the above condition, tighten this spring.

(111) If the tuning plunger spring (Fig. 8) is weak, it will not return the tuning button to its normal position and it will not be possible to push the electric-manual lever to the manual position as the movement of the locking plate will be prevented. The remedy is to stretch the tuning plunger spring. This can be removed and replaced as explained in the article on replacement of the tuning button plunger.

(112) Backlash may be caused by loose bearings in the setting disc shaft. This may be corrected as follows: Loosen the set screw in the right bearing (from back of panel). Location of this bearing is shown in Fig. 6. Grasp the setting disc shaft at the center and pull toward the left. Push the bearing toward the right and tighten the set screw.

Replacing an Electric Tuning Button Plunger

(113) Remove electric drive panel from the chassis and mount it in a vertical position by means of clamps or a vise. Turn the clutch release lever to the electric position.

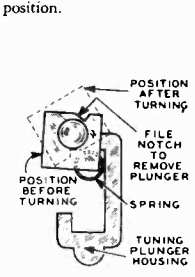


Fig. 14—Tuning Plunger Spring Retainer

(114) Remove the pin from the front of the button plunger—See Fig. 8—by pulling it out. If this cannot be done file the pin flush with the plunger. Unhook the stop lever spring from the back end of the button.

(115) File a V shaped notch in the rectangular spring retainer at the back of the tuning plunger housing—See Fig. 14. The location of the notch is illustrated. Then turn the spring retainer to the position shown in this illustration with the notch at the upper left corner of the housing. When this is done the spring in the housing will spring out. Then push the plunger out from the front of the panel.

(116) To replace the plunger push it into the housing from the back at the same time moving the clutch release lever slowly toward the manual position until the plunger slides all the way into place.

(117) Replace the spring in the plunger housing depressing it and at the same time moving the spring retainer into position to hold the spring in place. Hook the stop lever spring to the back of the plunger.

(118) Insert the smooth end of the new stop pin in the hole in the front of the shaft, forcing it in by squeezing with pliers. Caution—Leave about 1/16 inch of the pin extending above the surface of the plunger.

(119) Replace the electric drive panel on the chassis.

Replacing a Setting Button Plunger

(120) It is advisable to remove the electric drive panel from the chassis and mount it in a vertical position by means of clamps or a vise. Turn the clutch release lever to the manual position.

(121) Remove the switch lever as explained in the article "Replacing Switch Lever."

(122) Move the rocker arm shaft to the left or right, as necessary, to allow the stop lever and rocker arm above the setting button plunger to be taken off from the rocker arm shaft. After these are removed the setting button plunger may be pushed out from the front of the panel.

(123) Replace the new plunger from the back of the panel and reassemble rocker arm and stop lever to the rocker arm shaft.

(124) Reassemble the switch lever and replace the electric drive panel on the chassis.

Replacing a Setting Disc

(125) Turn the clutch release lever to the manual position.

(126) Remove the support bracket at either end of the setting disc shaft by taking out the two screws holding it in place. The bracket to be removed depends upon which side of the center of the panel the setting disc to be replaced is located.

(127) Unscrew the two set screws in the hub of the disc. If the disc to be replaced is any other than the end one, all discs from the end of the shaft to the one being replaced must also be removed.

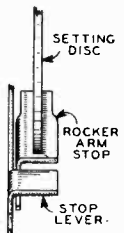


Fig. 15—Positioning Setting Disc

(128) When replacing the disc, it must be placed on the shaft with the hub toward the left (from back). The edge of the setting disc should be directly over the middle of the rocker arm stop—See Fig. 15.

(129) If the disc is set too far to the right (from the back) a condition may exist in which a station cannot be set because the rocker arm will not engage the drum release lever. If the disc is set too far to the left, the pawl will prevent the stop lever from falling far enough into the notch in the setting disc to operate the switch lever although the setting disc is stopped.

MODELS 14,15,16
Electric Drive Dials
Motor Switch,Drive Cable
Data

WELLS-GARDNER & CO.

Motor On-Off Switch and Switch Lever

(130) The function of the motor On-Off switch is to complete the electric circuit through the motor when an electric tuning button is depressed and to break the circuit at the proper instant when the station has been tuned in by the rotating mechanism.

(131) The essential parts of the switch, see Figs. 8 and 16, are an insulated base, two contacts, one fixed and the other on a movable reed, and a plunger. The latter, when pushed in, causes the movable reed to bend until the contact which is on it, touches the fixed contact. When the plunger is out the reed bends back and the two contacts separate.

(132) There are three positions of the switch known as the Upper Off, the On and the Lower Off position.

(133) These positions are illustrated in Figs. 8, 9, and 10. As will be seen in Fig. 9, the switch is in the On position when the ball on the switch lever moves against the rounded outside face of the plunger and forces it inward.

(134) The proper operation of the switch depends on the correct relative position of the switch plunger and the ball on the switch lever.

(135) The bakelite switch base should be parallel with the switch lever as shown in Fig. 16. If the switch base is further out the plunger may not be pushed in sufficiently to throw the switch to the On position and if the base is too close the ball may jam against the plunger instead of the two rounded surfaces of these items engaging properly. Bend the switch base in or out until proper interaction is obtained. (In issue No. 4 and later panels there is an adjustment screw for this purpose.)

(136) The plunger on the switch base and the ball on the switch arm must also be at the correct height relative to each other. The ball should line up with the plunger when one of the tuning buttons is depressed and the stop lever is riding on the edge of the setting disc—See Fig. 9. From this On position there should be an approximately equal throw of the switch lever to either the Upper or Lower Off positions—See Figs. 8 and 10.

(137) To adjust the height, loosen the two screws which hold the switch base in place. Grasp the bakelite switch base at the left side (from back of panel) and raise or lower it.

(138) In some cases bending of the switch lever at either side may also be required. The switch lever should rest on or be very close to all eight of the stop lever extensions when no tuning button is depressed. Push in each of the tuning buttons, one at a time and see if the ball on the switch lever lines up with the switch plunger in the On position (Fig. 9).

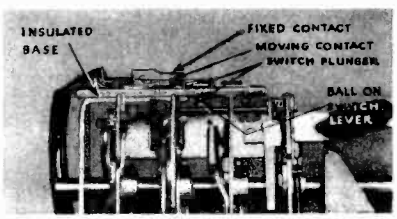


Fig. 16—Motor On-Off Switch—Top View

Replacing Motor On-Off Switch

(139) If the switch mechanism is broken or cannot be put in proper working order, a new one may be ordered. The old switch is removed by taking out the 2 screws which hold it in place and unsoldering the 2 switch leads.

Replacing Switch Lever

(140) The switch lever (Fig. 6) consists of three distinct sections—a center section, left section, and right section (from back of panel). Each section may be replaced separately.

(141) Turn the clutch release lever to the manual position. All the following operations are performed from the back of the panel.

(142) CENTER SECTION—To remove this section, take out the screws at each end and lift the section off. When replacing this section, the end with the cutout portion must be on the right side.

(143) LEFT SECTION—Unhook the switch lever spring from the left side of the lever. Remove the horseshoe washer from the left end of the rocker arm shaft. Push shaft toward right side far enough so that the horseshoe washer on the right end of the shaft is accessible. Remove this washer. Then lift the left end of the switch lever high enough so that the rocker arm shaft will slide under the lever when the shaft is pushed toward the left. Push the shaft toward the left far enough to allow the right end of the lever to slip off the shaft. To replace this section, reverse the above procedure.

(144) RIGHT SECTION—Unhook the switch lever spring from the right side of the lever. Remove the horseshoe washers from the ends of the rocker arm shaft. Push the shaft to the right enough to allow the left end of the lever to be lifted. Then push the shaft to the left enough to allow the right end of the lever to slip off the shaft. To replace this section, reverse the above procedure.

Replacement

(148) EARLY MODEL CABLE — Early electric drive panels, those without an issue number on the switch bracket, used a different drive cable than the one shown in Fig. 21. If the cable breaks on these models, do not attempt to restring the cable. Instead, the electric drive panel will have to be returned to the factory to have this done.

(149) LATER MODEL CABLE — These may be identified by the issue No. 2 or higher number stamped on the switch bracket. Should cable restringing be required in the case of the later type, this can readily be accomplished by ordering a new drive cable, if one is necessary, and putting it on in accordance with the following instructions:

(150) Remove electric drive panel from chassis.

(151) Remove the old drive cable. It will have to be unsoldered at pulleys B and E—See Fig. 21. Turn clutch release lever to manual position.

(152) From the front of the panel, turn manual tuning knob to the right (clockwise) as far as it will go. This will bring the drive arm on gear No. 5 to the left (from back of panel)—See Fig. 7.

(153) Now support the panel in such a manner that it is held firmly in an upright position, the back of the panel toward the operator. The bottom of the casting can be gripped at a number of points in a vise or clamp—care should be taken not to distort the casting.

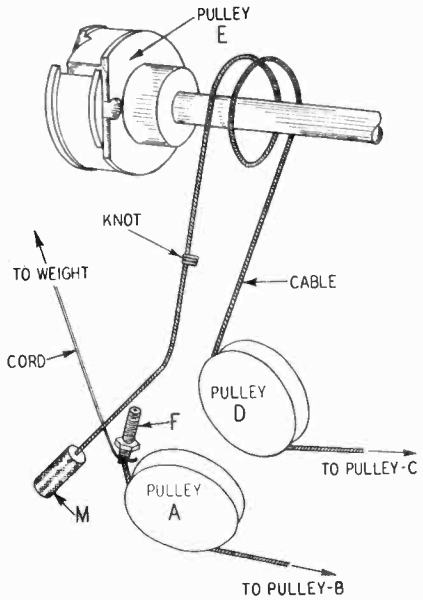


Fig. 18—Drive Cord Replacement—Step No. 2

(154) Referring to the new drive cable, it will be noted that one end has a screw fitting and the other end has a round knurled nut fitting. These two fittings together with the hex nut and lock washer comprise the turn-buckle take-up.

(155) With screw end F (Fig. 17) hanging down, place the cable into the vertical slot at the back of pulley B with the knot inside of the opening at point G.

(156) Then wind the screw end of the cable on pulley B in a clockwise direction one turn, passing over the portion of this cable which is in slot H.

Main Drive Cable

(145) The function of the main drive cable is to rotate the setting discs in conjunction with the train of gears and keep the rotation at a definite fixed position in relation to the rotational position of the drive gears. The cable is rigidly secured to a pulley on the shaft of gear No. 4 and passes over a series of other pulleys to a pulley on the setting disc shaft where it is also rigidly secured.

(146) It is important that this cable ride freely over all pulleys and with all slack taken out. The turn-buckle take-up, as shown in Fig. 21, is provided to take up slack.

(147) If the drive cable is loose the dial pointer will not stop at the same point each time a tuning button is depressed, because of the lack of fixed relation between the setting discs and the drive gears. Take up the slack by means of the turn-buckle. Loose set screws on the top pulley of this cable will also bring about this same condition. Tighten these screws.

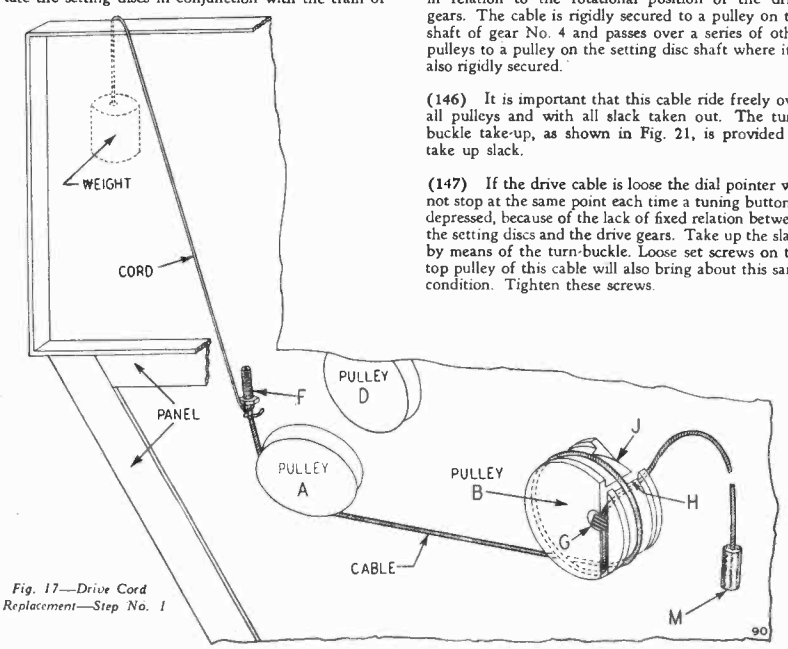


Fig. 17—Drive Cord Replacement—Step No. 1

Clutch Assembly and Electric Manual Lever Notes

WELLS-GARDNER & CO.

MODELS 14,15,16 Electric Drive Dials Cable Data, Part 2

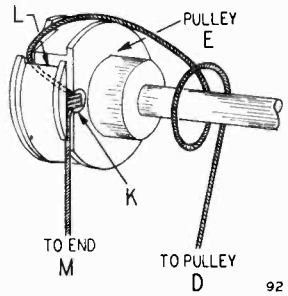


Fig. 19—Drive Cord Replacement—Step No. 3

(157) Bring the screw end of the cable over to pulley A and hold it in this position. This can be done by fastening a 10 inch stout cord to the end of cable F. Attach a weight to the other end of this cord and let the weight hang over the top of the panel as shown in Fig. 17. Instead of a stout cord, the round knurled nut and old cable can be secured to the screw end of the new cable.

(158) Now refer to the portion of the cable that is in the slot at point H pulley B. Using a small wooden prod, bend this cable and bring it back onto pulley B at groove J. CAUTION: Do not use a metal prod as this may damage the cable. It is important that the cable at groove J be kept close to the front flange of pulley B (flange nearest panel) while the portion of the cable which extends downward from point G be kept close to the back flange of this pulley so that the cable from pulley A will ride freely in the center of pulley B—as shown in Fig. 21.

(159) Then from groove J bring the cable in a counterclockwise direction ½ turn around pulley B, over to pulley C, ½ turn around pulley C, over to the bottom of pulley D, and then up to the shaft at the right of pulley E—Be sure the cable is well down in slot H, pulley B.

(160) Wind the cable LOOSELY one and one-half turns around this shaft, progressing toward the left as shown in Fig. 18.

(161) Rotate the setting discs until pulley E is approximately in the position shown in Fig. 19 Using a thin wooden prod, place cable in slot L with knot in hole at point K of pulley E. Rotate the setting discs a slight amount back and forth. This will provide clearance while getting the cable in the slot. Push the cable well down into slot L—See Fig. 19.

(162) Rotate the setting discs ¾ of a complete revolution in such a direction that the top of the discs move toward the front of the panel. Bring the round knurled nut under the loop of the cable as shown in Fig. 20.

(163) Place cable from pulley D on pulley E at left flange (from back of panel). Now holding cable from pulley D, rotate setting discs in such a direction that the top of the discs move away from the front of the panel. Rotate the discs approximately ¼ of a turn or until the slack in the cable from pulley D is all taken up. Pulley E and the cable will then be in the position shown in Fig. 21 and the knurled nut end M of the cable will be hanging down from pulley E and must be held in tension.

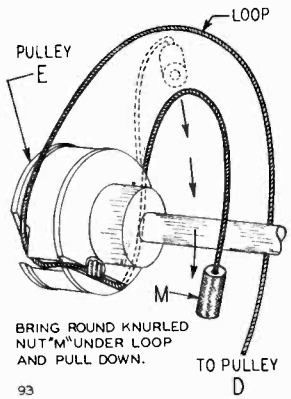


Fig. 20—Drive Cord Replacement—Step No. 4

(164) The next step is to connect the two portions of the turn-buckle together. Before doing this, see that the cable is on all of the pulleys as shown in Fig. 21. Tension should still be applied to both ends of the cable.

(165) Remove weight and cord (or round nut) from screw end F of the cable. Put the lock washer against the hex nut on this cable. Screw round knurled nut onto screw end of cable. While this is being done, the setting discs should be grasped by another person and rotated as far as they will go in such a direction that the top of the discs moves away from the front of the panel. The purpose of this is to take up all slack in the cable and to enable the two ends of the turn-buckle to be secured together.

(166) The cable must be firm and with all slack out. It should not be so tight, however, that the setting discs and pulleys do not turn freely. Tension of the cable is regulated by the position of the hex nut. The round knurled nut must be screwed tightly against the lock washer next to the hex nut.

(167) Solder knots at points G and K on pulleys B and E respectively. Reassemble the electric drive panel to chassis.

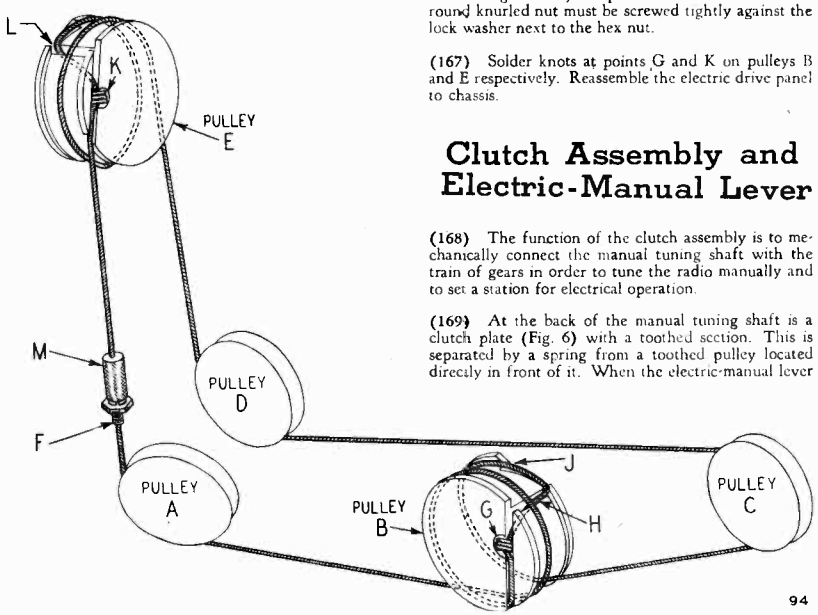


Fig. 21—Drive Cord Replacement—Complete Assembly

Clutch Assembly and Electric-Manual Lever

(168) The function of the clutch assembly is to mechanically connect the manual tuning shaft with the train of gears in order to tune the radio manually and to set a station for electrical operation.

(169) At the back of the manual tuning shaft is a clutch plate (Fig. 6) with a toothed section. This is separated by a spring from a toothed pulley located directly in front of it. When the electric-manual lever is in the electric position, the clutch plate is free of the pulley. When the lever is turned to the manual position, a yoke, or crosspiece, on the front of the manual tuning shaft is pulled forward on the yoke track of the clutch release lever (Fig. 3) pulling the tuning shaft forward. This causes the clutch plate to engage the toothed pulley. This pulley is belt-connected to gear No. 2 on the train of gears. As a result, the gears rotate when the manual tuning knob is turned. When the setting button is depressed, the plunger moves the locking plate over. This, in turn, moves the interlocking lever which throws the clutch release lever *toward* the manual position. The movement of the clutch release lever is sufficient to cause the clutch plate (Fig. 6) to engage the toothed pulley.

(170) To avoid misunderstanding in the following paragraphs, the electric-manual lever is the separate die-cast lever bearing the words "Electric-Manual" visible from the front of the cabinet panel, and the clutch release lever is the stamped lever shown in Fig. 3.

(171) If the clutch plate is bent too far back, it may not engage the pulley teeth properly when the lever is thrown to the manual position or when the setting button is depressed. Bend this plate forward at the toothed section until it meshes properly under the above conditions. Also, be sure the clutch plate releases properly when the electric manual lever is in the electric position.

(172) When the electric-manual lever is in the electric position, the tuning knob should not turn when a tuning button is depressed and the motor is operating, since the clutch plate should be disengaged from the pulley. If this knob rotates while the motor is operating, the chassis may be too far forward in the cabinet preventing the clutch release lever from returning to the electric position. Move the chassis back (Par. 51). The electric-manual die cast lever may not turn freely on the clutch bearing (Fig. 3) and may not return to the electric position. Bend the upper and lower portion of the bearing together with heavy pliers, or file the surface down until this lever turns easily. The tuning knob may have been put on the shaft while the electric-manual lever was in the manual position. Loosen this knob and put it on when the lever is in the electric position. The clutch releasing spring between the clutch plate (Fig. 6) and the toothed pulley may be broken or of insufficient tension to properly separate these two items. Put on a new spring or increase the tension of this spring.

(173) If the manual tuning knob turns very hard when tuning the radio manually, the clutch releasing

Fig. 22—Clutch Release Lever—Early Models

spring which is just in front of the clutch plate, may have become caught in some manner and not rotate freely on the shaft. Bend this spring so that it rotates freely on the shaft, or put on a new one.

(174) In Fig. 22 is shown a side view of the early type of clutch release lever. On occasion the yoke track was too close to the lever proper and when the electric-manual lever was pushed to the manual position, the yoke jammed against the end of the track instead of sliding up on it. The remedy for this is to bend the yoke track away from the lever $\frac{1}{32}$ or $\frac{1}{16}$ of an inch until proper action is obtained.

(175) The tip on the clutch release lever slot (Fig. 3) may be too high or too low. If too high, it will prevent the electric-manual lever from being pushed into the electric position. The remedy is to cut or file a slight amount off the top of this tip. If the tip is too low, the clutch release lever will not stay in the manual position. As a general rule, the electric drive panel will have to be returned to the factory to have this corrected. Binding of the clutch release lever and interlocking lever (Fig. 3) might also prevent the electric-manual lever from being thrown to the electric position. Free these levers so that they operate easily if this condition occurs.

MODELS 14,15,16
Electric Drive Dials
Electric Manual Lever
Notes,Part 2

WELLS-GARDNER & CO.

Locking Plate and
Reversing Switch,Notes

Replacing Electric-Manual Lever and Manual Tuning Knob

(176) Before removing the electric-manual lever turn it to the electric position. When replacing the lever, place it on the tuning shaft, line up the pin on the back of the lever with the hole in the clutch release lever and push the lever on the shaft. When replacing the tuning knob on the shaft, push it all the way on and tighten the set screw.

Replacing Clutch Releasing Spring or Clutch Plate

(177) Remove the electric drive panel from the chassis and lay it face down in front of the chassis. It is not necessary to unsolder the wire on the silencer assembly or the wires on the motor cable asembly to the chassis.

(178) Hold the front end of the tuning knob shaft with pliers and, at the same time, loosen the hex nut at the back end of the shaft. Remove the nut, lock washer, and clutch plate. Replace the clutch spring and, if necessary, the clutch plate, and reassemble, reversing the above procedure. Correct adjustment of the clutch plate is important and the instructions given in Par. 171 should be carefully followed.

Locking Plate

(179) The locking plate (Fig. 3) has three main functions. First, it holds the tuning button in, after the button has been depressed and releases any other tuning buttons which have previously been depressed. Second, it shifts the electric-manual lever, when the setting button is depressed, to engage the clutch. It does this by moving the interlocking lever which, in turn, shifts the clutch release lever. Third, when the electric-manual lever is turned to the manual position, the locking plate releases any buttons that are depressed and locks these buttons to keep them from being depressed.

(180) The locking plate must slide freely on the 4 studs and in back of the 4 washers (Fig. 3) which hold it in place. If the plate appears to bend at these washers, loosen them with a screwdriver and place a small amount of grease in back of the washer. The interlocking lever (Fig. 3) must also work freely and should be loosened until it turns easily.

(181) If the locking plate screws at the top of the locking plate are too loose, it may not be possible to push the electric-manual lever to the manual position. The reason for this is that the tip of the locking plate is so far out that it does not move into the slot on the tuning button plunger. The remedy, of course, is to tighten these screws.

(182) If a tuning button is depressed and pressing in another button does not release the first nor permit the second button to stay in, it is due to a slight distortion in the locking plate or to the fact that the locking plate screws are out too far.

(183) This condition can be overcome without removing the chassis from the cabinet by depressing the first button again and then depressing the second quickly. However, it may be permanently corrected as follows: The two locking plate screws (Fig. 3) may be out too far. Turn these screws down and see if this corrects the condition. If it does not, the plate is distorted. If the left hand group (from front) of buttons will not remain depressed and will not release the right hand group, tap the locking plate lightly with a hammer at point A, Fig. 3. If the right hand group of buttons will not remain depressed and will not release the left hand group, tap the locking plate at the bottom of the plate directly under point A. This will overcome the distortion on the plate and should correct this condition.

Reversing Switch

(184) The function of the reversing switch is to provide a means of reversing the direction of the motor rotation just before the gang condenser rotor reaches maximum open or closed position as the radio is being tuned electrically. This is accomplished by means of the pin on the No. 4 drive gear casting operating the reversing switch lever. This lever trips the reversing switch which changes one of the motor windings from one side of the line to the other causing a reversal of the direction of rotation of the motor. The electrical connections for this circuit are shown in Fig. 24.

(185) If the dial pointer reaches the end of the scale and stops, but the motor continues to operate, loosen the reversing switch mounting screws and adjust the position of the bracket up or down until the switch operates properly. If this procedure does not remedy the condition, put one of the centering springs on the reversing switch—one of these can be obtained from the factory. Later models are already equipped with this spring—See Fig. 23.

(186) If trouble develops in the reversing switch circuit, carefully check the wiring for loose or broken connections. Carefully check the switch to see that it is making proper contact in both positions. If it is not, it will have to be replaced. Early models used a switch which required a tubular condenser across the contact points. Do not operate this type switch without the condenser being connected to it as the contact points will be damaged. The switch used on later models and for replacement purposes does not use this condenser. If an old switch is replaced by one of the new type, disconnect the condenser from the circuit.

Replacing Reversing Switch

(187) Remove the electric drive panel from the chassis (See article on this procedure). It is not necessary to unsolder the silencer or motor connections.

(188) The location of the reversing switch is shown in Fig. 6. Unscrew and remove the two small bolts which hold the switch to the bracket. Unsolder the leads to the switch.

(189) To replace the switch, reverse the above procedure. The connections to the switch are shown in Fig. 24. If an early type switch requiring a condenser is replaced by a new type switch, the two leads from the metal shell tubular condenser should be disconnected and also the extra lead from the condenser to the switch.

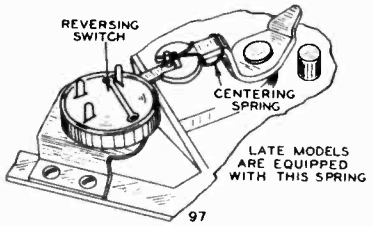


Fig. 23—Centering Switch on Reversing Switch Lever

(190) In Fig. 24 is shown the electrical wiring of the electric drive panel. Three distinct units, the motor, the on-off switch, and the reversing switch enter into the electrical operation. Since the operation of each of these units is discussed fully in the articles covering them, it will not be repeated here.

Electric Circuit of the Motor Drive

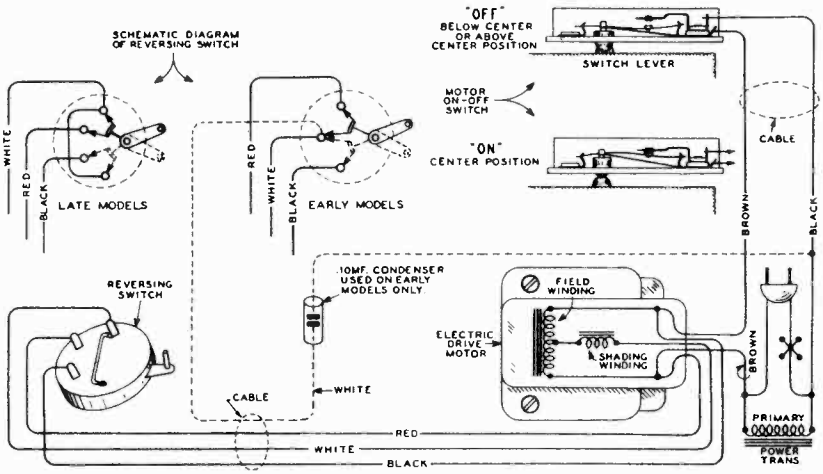


Fig. 24—Electric Drive Panel Wiring

(191) One other electric circuit which is associated with the electric drive panel is the silencer circuit. This circuit silences the radio while the motor is operating. The mechanical operation of the silencer circuit is discussed fully in the article "Motor and Silencer Spring Assembly."

(192) The silencer circuit is shown in the schematic circuit diagram of the service manuals of the various chassis using the electric drive.

(193) If there is reason to believe that one or more of the electrical connections are open, check for continuity using Fig. 24 as a guide. Following are the D.C. resistances of the motor windings:

Field—tap to black wire—13.6 ohms
Field—tap to red wire—16.3 ohms
Shading Winding —99.7 ohms

WELLS-GARDNER & CO.

MODELS 14,15,16
Electric Drive Dials
Parts List

CONTAINING 25 AND 40 CYCLE DATA AND PARTS LIST

SEPT., 1937

25 Cycle Electric Drive Panel

The 25 cycle electric drive panel assembly is identical to the 60 cycle assembly except that a 25 cycle motor and a different gear No. 1 (see Fig. 6 in electric drive notes) are used.

The pinion gears in the 25 and 60 cycle motors are not the same. If, therefore, one of these pinions is ordered, the type of motor must be specified. (Both 25 and 60 cycle motors are furnished with pinion included.)

40 Cycle Power Supply

An electric drive chassis equipped with a 117-234 volt 40 to 60 cycle power transformer can be used on a 60 cycle power supply only, unless changed as mentioned below. The electric drive panels of these sets are equipped with 60 cycle motors and these will function satisfactorily only at that frequency.

If one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 25 cycle model is used for this purpose.

Electric Drive Panel Replacement Parts

There is a number on the On-Off switch bracket which identifies the panel as to major part changes. Be sure to mention this issue number when ordering parts for the Electric Drive Panel.

For names of parts shown in the Electric Drive Panel list, refer to the illustrations in the Electric Drive NOTES, especially Figs. 3, 6, 7, 8, 9, 10 and 11.

Part No.	Description	List Price
25A217	60 Cycle Electric Drive Panel Complete—Includes Main Casting, Gears, Pulleys, Switches, Motor, Setting Discs, Tuning and Setting Button Plungers—less Gang Condenser, Condenser Support Bracket, Upper Triangular Support Bracket, Dial Scale and Bracket, Dial Pointer and Cap	$27.80
25A249	25 Cycle Electric Drive Panel Complete—Same as above except with 25 Cycle Motor and No. 1 Gear Assembly	29.20
57X8	Locking Plate	.60
28X139	Spring for Locking Plate Doz.	.30
37X93	Interlocking Lever	.10
37X95	Clutch Release Lever	.10
28X137	Spring used on above Lever Doz.	.35
26X259	Tuning Knob Shaft	.10
37X94	Yoke for Clutch Lever (Fits in Groove on above Shaft)	.10
19X88	Keyway Washer (Used on Clutch Bearing) Doz.	.15
24X294	Pulley for Manual Drive Belt (On Back of Tuning Shaft)	.30
20X212	Roller Bearing for Above Pulley Doz.	.15
57X10	Clutch Plate	.10
28X152	Clutch Release Spring (In front of Clutch Plate from Back of Panel) Doz.	.05
8X57	Manual Drive Belt	.35
26A74	Belt Tension Pulley and Bracket Assembly	.20
28X150	Spring for above Assembly Doz.	.20
24X316	Belt Idler Pulley only	.10
25A178	Setting Disc Assembly	.75
28X134	Tension Spring (Fastened to Auxiliary and Drum Release Levers) Doz.	.25
28X151	Tension Spring for Pawl of Setting Disc Doz.	.25
26X255	Setting Disc Shaft	.40
20X192	Ball Bearings in Retainer (For Setting Disc Shaft)	.10
20X207	Bearing Cone (Without Set Screw)—On Setting Disc Shaft	.15
20X195	Bearing Cone (With Set Screw)—On Setting Disc Shaft	.20
24X288	Pulley for Drive Cable (On Setting Disc Shaft)	.15
25X403	Support Bracket for Setting Disc Shaft (Left side from back)	.10
25X412	Support Bracket for Setting Disc Shaft and Motor On-Off Switch	.15
26A75	Adjusting and Support Rod for Motor On-Off Switch (Panel Issue No. 4 and Later)	.10
2A105	Motor On-Off Switch Assembly Complete	.95
37X85	Switch Lever (Right section from back)	.20
37X96	Switch Lever (Left section from back)	.20
25X413	Switch Lever (Center section)	.15
28X137	Switch Lever Spring Doz.	.35
37X82	Stop Lever	.10
28X148	Stop Lever Spring Doz.	.15
25A181	Rocker Arm and Rocker Arm Stop Assembly Complete with Spring	$0.20
28X131	Spring for Rocker Arm Stop Doz.	.10
26X256	Rocker Arm Shaft	.10
26X261	Setting Button Plunger	.10
10A121	Setting Button only	.10
26X254	Tuning Button Plunger with Stop Pin	.15
28X138	Tuning Plunger Spring Doz.	.10
10A120	Tuning Button only	.10
28X129	Hairpin Springs for Tuning Buttons Doz.	.10
10X26	Main Drive Cable Complete with Turnbuckle	.75
12X75	60 Cycle Motor Complete	4.55
24X296	Pinion Gear only (On Motor Armature Shaft)—60 Cycle	.10
12X82	25 Cycle Motor Complete	6.15
25A233	No. 1 Pinion and Gear Assembly (For 60 Cycle Operation)	.45
25A248	No. 1 Pinion and Gear Assembly (For 25 Cycle Operation)	.60
24X307	No. 2 Gear and Pulley	.20
25A184	No. 3 Gear Assembly	.35
25A221	No. 4 Gear Assembly	.55
28X141	Spreader Springs for Gears No. 3 and 4 Doz.	.05
26A73	Pulley Bracket Assembly complete with Gear No. 5, Pulleys and Roller Bearing Assembly	1.70
25A186	No. 5 Gear and Drive Arm Assembly only	.30
2A97	Reversing Switch	.35
37X98	Lever for Operating Reversing Switch	.10
28X158	Centering Spring (Used on Reversing Switch Lever)	.10
25X430	Bracket for Reversing Switch	.10
25A239	Silencer Spring Assembly complete with Shield	.20
26A79	Drive Drum for Gang Condenser	.50
25X401	Front Support Bracket for Gang Condenser	.65
8X43	Rubber Cushion (Used for Mounting above Bracket)	.10
20X152	Stud (Used with Rubber Grommet—6X8—for Mounting above Bracket to Chassis)	.10
6X8	Rubber Grommet (Used with above Stud) Doz.	.15
25X424	Triangular Support Bracket (Holds Electric Drive Panel to Gang Condenser Support Bracket)	.10
Specify Name & Model Number of Radio	Dial Scale Mounting Bracket Complete with Dial Scale (Less Pointer and Pointer Cap)	1.80
	Dial Scale only	1.35
25X417	Mounting Bracket only for Dial Scale	.35
15X111	Dial Pointer only	.20
15X104	Cap for Dial Pointer	.10
26X265	Stud for Mounting Pointer	.10
10A125	Electric-Manual Lever	.20
7A67	Dial Lamp Socket Assembly (2 Sockets) less Lamps	.30
	Dial Lamp only (No. 51 Bayonet Type)	.20
17X23	Glass Crystal	.10
28X25	Retaining Spring for Glass Crystal	.10
25X362	"L" Bracket (For Mounting Rear of Gang Condenser to Chassis)—Series A1 and A2	.10
25X382	"L" Bracket (For Mounting Rear of Gang Condenser to Chassis)—Series A3	.10
20X150	Stud (For Mounting above Bracket to Gang Condenser)	.10
6X18	Rubber Grommet (Used on above Stud) Doz.	.30
2X236	Rubber Washer—Flat (Used with above Grommet) Doz.	.15
26A56	Station Call Letter Discs and 25 Celluloid Discs	.35
25X405	Shipping Support Bracket (Top of Electric Drive Panel to Wood Brace)	.20
8X23	Rubber Cushion (Used with Shipping Support Bracket)	.10

Prices Subject to Change Without Notice. FORM 1589

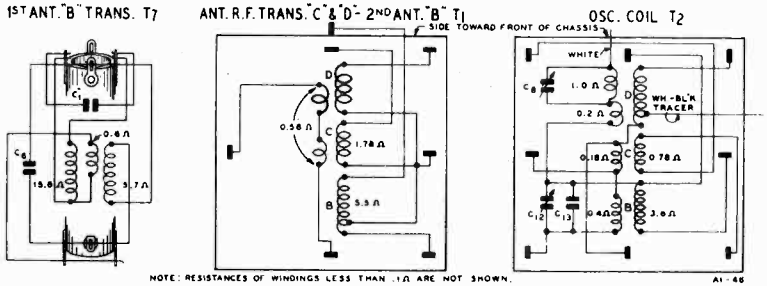


Fig. 7—Coil Terminal Arrangement and D.C. Resistance of Windings

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the side panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—See Fig. 2.

Early Models—A few of the early models did not have the circular knockout for the phonograph socket as mentioned above. If a phonograph installation is to be made in connection with one of these early models, write the factory for detailed instructions.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Notes issued for this chassis. (see index)

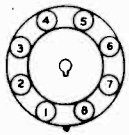


Fig. 5—Octal Tube Terminal Numbering (bottom of socket)

Twenty-five Cycle Models

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

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.

NOTE: METAL TUBES ARE IN THE SAME POSITIONS AS THE GLASS EQUIVALENTS SHOWN IN THE LAYOUT

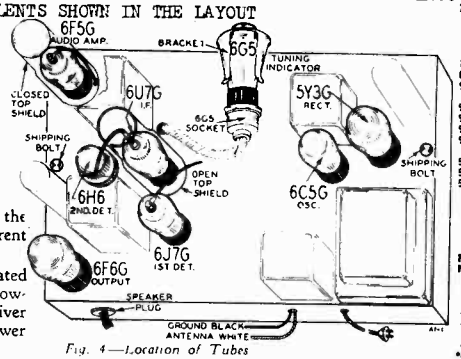


Fig. 4—Location of Tubes

Series A1 - 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.

With the exception of the parts otherwise indicated, the following parts are common to Series A1 chassis using either the Telephone Dial or the Phantom Light Dial.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A256	Tube Socket—Octal (7 Prong)	$0.15
3A261	Tube Socket—Octal (5 Prong)	.10
3A263	Tube Socket—Octal (8 Prong)	.15
3A262	Speaker Socket—(4 Prong)	.15
13X295	6G5 Tube Socket and Cable Assembly	.55
3A266	Phono Socket—Octal (4 Prong)	.10
3A252	Dual Keyway Socket—Octal (8 Prong)—Universal Power Transformer Connections	.15
6A214	Plug (4 Prong)—Used with above socket	.25

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

12A298	8" Dynamic Speaker compl. with Output Transformer (TS)	6.30
	Cone and Voice Coil Assy. for above Spkr.	2.75
	Output Transformer only (TS)	2.45
12A268	10" Dynamic Speaker compl. with Output Transformer (TS)	6.65
	Cone and Voice Coil Assy. for above Spkr.	3.50
	Output Transformer only (TS)	2.45
12A291	12" Dynamic Speaker compl. with Output Transformer (TS)	7.55
	Cone and Voice Coil Assy. for above Spkr.	4.60
	Output Transformer only (TS)	2.45

KNOBS

Specify name of knob & name & model of radio	Volume Control	.15
	Tone Control	.15
	Tuning Control	.15
	Band Switch	.20
	Selectivity Control	.25

GENERAL

32X51	Tube Shield Base	.10
32X32	Tube Shield—Open Top (Used only on models having glass tubes)	.15
32X50	Tube Shield—Closed Top (Used on glass & metal tube chassis)	.15
8X23	Rubber Cushions (Chassis Mounting)	.10
2X38	Felt Washers (Used behind Knobs) doz.	.10
13X80	Line Cord and Plug	.50
13X214	Antenna and Ground Lead Assembly	.30
2A87	Band Change Switch (1 section, 3 position)—Used on Phantom Light Dial Radios only	1.05
2A85	Dial Lamp Switch—Used with above Switch on Phantom Light Dial only	.30
2A77	Band Change Switch (1 section, 3 position)—Used on Telephone Dial Radios only	1.00
25X375	Chassis Mounting Foot	.10
30X44	Grid Clip Only doz.	.10
2A78	Selectivity Switch	.40
4A68	Terminal Strip (3 Lugs Insulated)	.10
25X378	Clamp Bracket for Tuning Eye Tube	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A774	T1	Antenna Transformer and Can Assembly "B" Range Secondary; C & D Range	$2.00
9A778	T7	1st Antenna Coil Assembly "B" Range	1.20
9A775	T2	Oscillator Coil and Can Assembly	3.35
9A776	T3	1st I.F. Transformer and Can Assembly	2.40
9A777	T4	2nd I.F. Transformer and Can Assembly	2.35
	T5	Output Transformer only (See "Speakers")	
53X144	T6	117 Volt, 60 Cycle, Standard Power Transformer	3.10
53X145	T6	117 Volt, 25 Cycle, Standard Power Transformer	5.20
53X146	T6	117-234 Volt, 40-60 Cycle, Universal Power Transformer	4.35

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C5	.05 mf.	180	$0.15
46X120	C17	.01 mf.	360	.15
46X187	C19	.02 mf.	180	.15
46X212	C20	.04 mf.	360	.15
46X105	C21	.1 mf.	360	.20
46X187	C26	.02 mf.	180	.15
46X202	C27	.02 mf.	360	.15
*46X98	C33	.1 mf.	180	.20
46X147	C34	.005 mf.	360	.15

CONDENSERS (Cont.)

TUBULAR (Cont.)

Part No.	Code	Capacitance	Voltage	List Price
46X98	C36	.1 mf.	180	$0.20
46X202	C37	.02 mf.	360	.15
46X98	C38	.1 mf.	180	.20
46X100	C39	.002 mf.	600	.15
46X108	C40	.05 mf.	600	.20

ELECTROLYTIC

44X36	C41	30 mf.	250	.75
44X31	C42	12 mf.	340	.80

MOLDED

47X69	C1	250 mmf.		.15
47X63	C6	10 mmf.		.15
47X49	C18	7 mmf.		.10
47X56	C32	50 mmf.		.10
47X65	C35	250 mmf.		.15
†47X56	C43	50 mmf.		.10

TRIMMER

17A73	C2	2-25	mmf.	Antenna Range—"D"	.35
	C3	2-25	mmf.	Antenna Range—"C"	
	C4	2-25	mmf.	2nd Antenna Range—"B"	
17A74	C7	2-25	mmf.	1st Antenna Range—"B"	.10
17A69	C8	40-100	mmf.	Oscillator 7000 KC	.40
	C12	40-120	mmf.	Oscillator 600 KC	
17A76	C9	2-25	mmf.	Oscillator Range "D"	.25
	C10	2-25	mmf.	Oscillator Range "C"	
17A75	C11	1300-1700	mmf.	Range "C"—Series Padding	.50
17A68	C14	1-12	mmf.	Oscillator Range "B"	.20
17A70	C23	15-50	mmf.	1st I.F. Trimmers	.40
	C24	15-50	mmf.		
	C29	15-50	mmf.	2nd I.F. Trimmers	.40
17A70	C30	15-50	mmf.		

MISCELLANEOUS

47X82	C13	330 mmf. Iron Clad	.30
47X81	C16	35 mmf. Iron Clad	.25
47X85	C22	60 mmf. Iron Clad	.30
47X85	C25	60 mmf. Iron Clad	.30
47X84	C28	75 mmf. Iron Clad	.35
47X87	C31	160 mmf. Iron Clad	.30
47X80	C15	13 mmf. Compensating Capacitor	.50
14A70		3 Section Gang Condenser less Gears and Dial Assy.	4.20

* Used only on Telephone Dial Models.
† Used only on Phantom Light Dial Models.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A95402	R1	4000 Ohm	0.2	$0.10
A94104	R2	100,000 Ohm	0.2	.15
A94104	R3	100,000 Ohm	0.2	.15
A94251	R4	250 Ohm	0.2	.15
C94203	R5	20,000 Ohm	1.0	.15
C94203	R6	20,000 Ohm	1.0	.15
B94203	R7	20,000 Ohm	0.5	.15
A94405	R8	4 Megohm	0.2	.15
A94126	R9	12 Megohm	0.2	.15
A95105	R10	1 Megohm	0.2	.10
A95503	R11	50,000 Ohm	0.2	.10
A95205	R12	2 Megohm	0.2	.10
*A95106	R13	10 Megohm	0.2	.10
A95504	R17	500,000 Ohm	0.2	.10
A95205	R18	2 Megohm	0.2	.10
A95503	R19	50,000 Ohm	0.2	.10
A95154	R20	150,000 Ohm	0.2	.10
A95254	R21	250,000 Ohm	0.2	.10
A95151	R23	150 Ohm	0.2	.10

WIRE WOUND

43X76	R15	26 Ohm	.25	.35
	R16	239 Ohm	2.0	

VARIABLE

36X235	R14	.5 Megohm Volume Control and On-Off Switch	.90
40X223	R22	.15 Megohm Tone Control	.65

* Used only on Telephone Dial Models.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.55
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.20
10A90	Knob Only of Phono Cable	.20

DIAL AND DRIVE ASSEMBLY

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE NOTES (see index)

Prices Subject to Change Without Notice.

MODEL A-1 Series
Schematic, Specs.
Sensitivity, Phono.

WELLS-GARDNER & CO.

Power Consumption - 67 Watts (At 117 volts 60 cycles)

Power Output - - - - 2.5 Watts Undistorted
4.5 Watts Maximum

Selectivity - 30 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - 456 KC.

Speakers - - - - - 8", 10" or 12" Dynamic

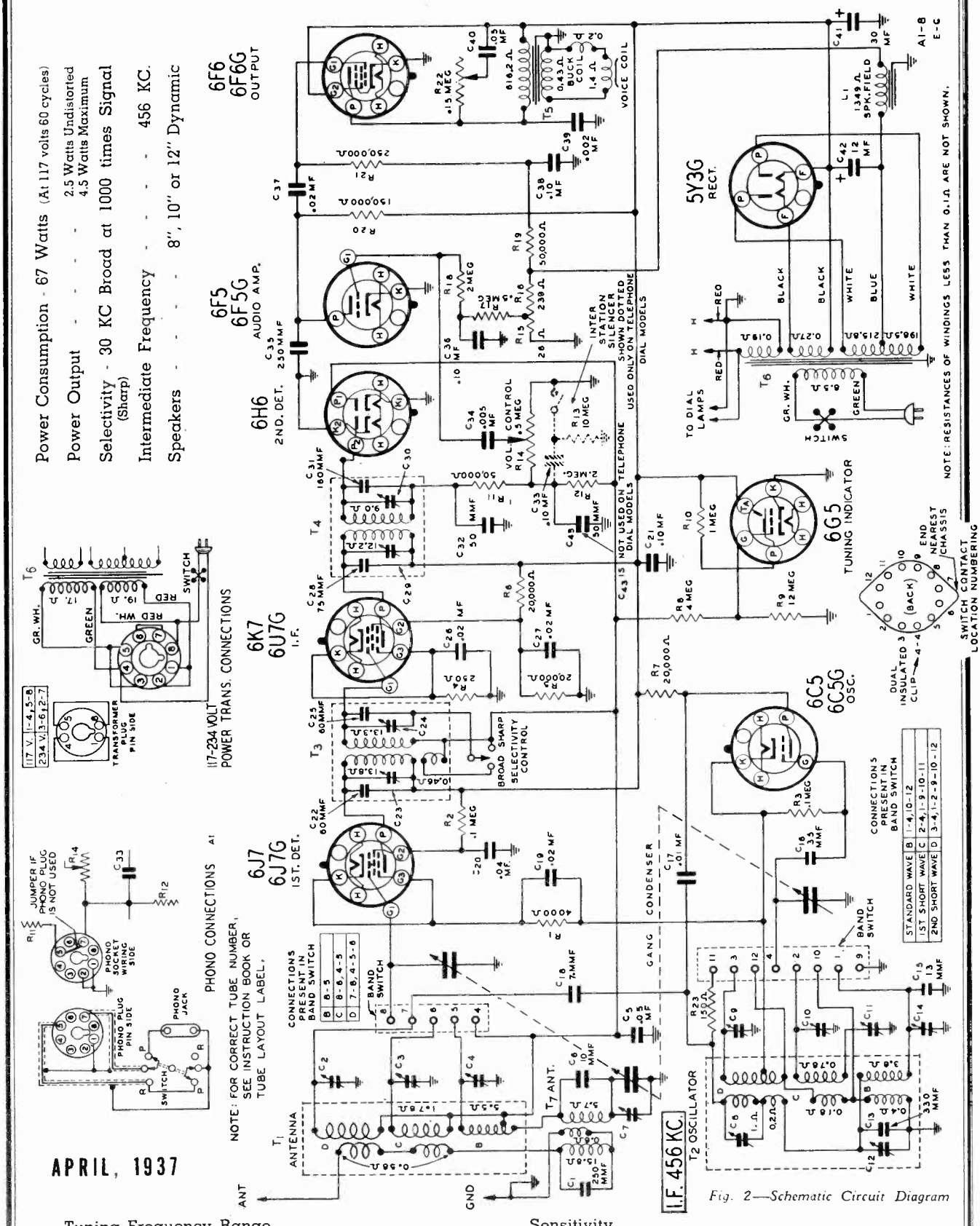


Fig. 2—Schematic Circuit Diagram

APRIL, 1937

Tuning Frequency Range		Sensitivity	
B Range	528 to 1830 KC.	B Range	8 Microvolts Average
C Range	1810 to 6350 KC.	C Range	13 Microvolts Average
D Range	6300 to 22000 KC.	D Range	9 Microvolts Average

MODEL A-1 Series
Alignment, Trimmers
Circuit Data, Voltage

WELLS-GARDNER & CO.

8 TUBE • 3 BAND • ALL WAVE SERIES A1

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C23) & (C24)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C7) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C12)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C10)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

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

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, 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 the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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 on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

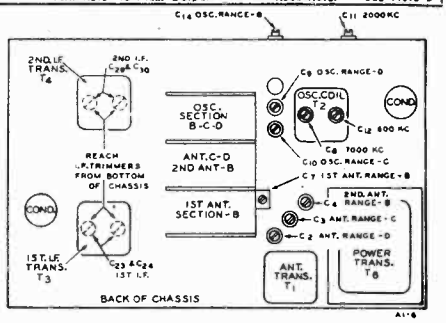


Fig. 3—Location of Trimmers

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T7 are the antenna coil assemblies and T2 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. When it is in the Range B position, a double tuned antenna R.F. stage is used while for the C and D Ranges, a single tuned secondary is used.

A type 6J7 tube functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

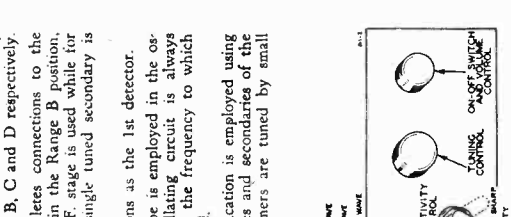


Fig. 1—Arrangement of Controls

Referring to Fig. 2, it will be noted that there is a coupling winding connected in series with the secondary of I.F. transformer T3. When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer 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.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the 1st detector and I.F. tubes.

A 6F5 triode tube functions as the first audio amplifier while the output stage uses a 6F6 output pentode tube. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6G5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

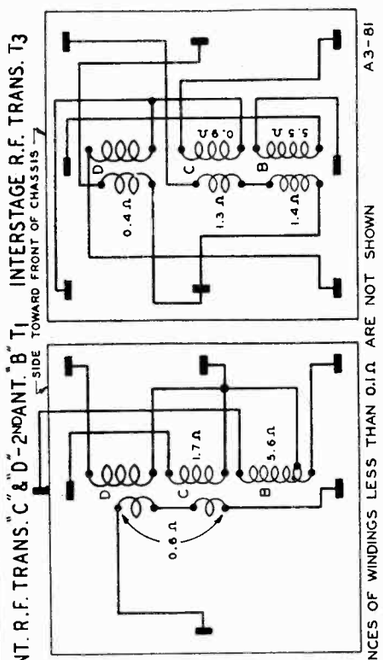
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG 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
6J7 6J7G	1st Det.	0	6.1(1)	220	100	7.9		6.1(1)	7.9
6C5 6C5G	Osc.	0	6.1(1)	140				6.1(1)	0
6K7 6U7G	I.F.	0	6.1(1)	220	100	2		6.1(1)	2
6H6	2nd Det.	0	6.1(1)		0			6.1(1)	0
6F5 6F5G	Audio Amp.	0	6.1(1)		75			6.1(1)	0(2)
6F6 6F6G	Power	0	6.1(1)	215	220			6.1(1)	0(3)
5Y3G	Rectifier	0	4.9(4)		610(5)		610(5)		4.9(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 220		Cathode to Ground 0		Across Heater 6.1 A. C.	

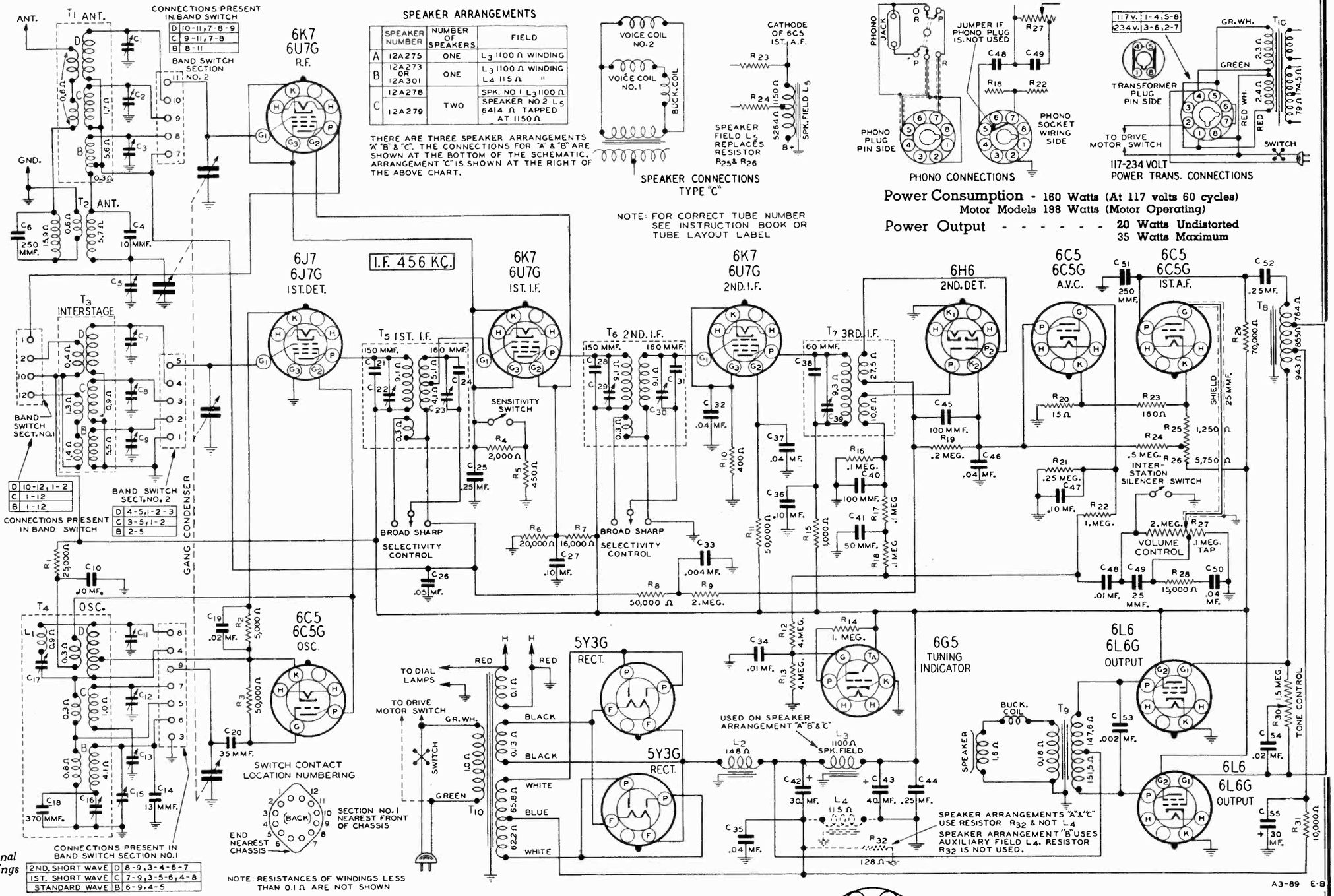
(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R15.
(3) Bias (14 volts) as read across resistors R15 and R16.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

WELLS-GARDNER & CO.

MODELS A3,A6 Series
Schematic, Coils, Phono. Speaker Conn., Specs. Sensitivity



NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1Ω ARE NOT SHOWN



SPEAKER ARRANGEMENTS

	SPEAKER NUMBER	NUMBER OF SPEAKERS	FIELD
A	12A275	ONE	L_3 1100Ω WINDING
B	12A273 OR 12A301	ONE	L_3 1100Ω WINDING L_4 11.5Ω "
C	12A278	TWO	SPK. NO 1 L_3 1100Ω
	12A279		SPEAKER NO 2 L_5 6414Ω TAPPED AT 1150Ω

THERE ARE THREE SPEAKER ARRANGEMENTS "A" "B" & "C". THE CONNECTIONS FOR "A" & "B" ARE SHOWN AT THE BOTTOM OF THE SCHEMATIC. ARRANGEMENT "C" IS SHOWN AT THE RIGHT OF THE ABOVE CHART.

SPEAKER CONNECTIONS TYPE "C"

NOTE: FOR CORRECT TUBE NUMBER SEE INSTRUCTION BOOK OR TUBE LAYOUT LABEL

PHONO CONNECTIONS

117-234 VOLT POWER TRANS. CONNECTIONS

Power Consumption - 160 Watts (At 117 volts 60 cycles)
Motor Models 198 Watts (Motor Operating)

Power Output - - - - - - - 20 Watts Undistorted
35 Watts Maximum

Fig. 7—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

Fig. 2—Schematic Circuit Diagram

Tuning Frequency Range

B Range ..... 528 to 1830 KC.
C Range ..... 1810 to 6350 KC.
D Range ..... 6300 to 22000 KC.

Sensitivity

B Range..... Less than 1 Microvolt Average
C Range..... Less than 1 Microvolt Average
D Range..... Less than 1 Microvolt Average

Selectivity (Sharp) - 22 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC.

Speakers - - - - One or Two 12" Dynamics

JUNE, 1937

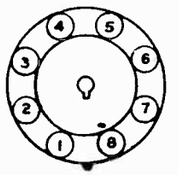


Fig. 6—Octal Tube Terminal Numbering (bottom of socket).

Series A6 Chassis

The Series A6 is identical to the Series A3 except for the speaker circuit. The Series A6 employs two speakers the connections for which are shown in the schematic circuit diagram, Fig. 2.

WELLS-GARDNER & CO.

MODELS A3,A6 Series
Voltage,Trimmers
Alignment,Notes

13 TUBE • 3 BAND • ALL WAVE A. C. POWER SUPPLY

ALIGNMENT PROCEDURE

Local-Distance Switch — Distance Position.
Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
3rd I.F.	Range B	.1 mf.	456 KC	Grid of 2nd I.F. Tube	3rd I.F. (C39)	Turn Rotor to Full Open	Adjust to Maximum Output
2nd I.F.	Range B	.1 mf.	456 KC	Grid of 1st I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C15)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st & 2nd Ant. Range B (C5) & (C3)—Int. Range B (C9)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C16)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Ant. Range C (C2) Int. Range C (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C13)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C1) Int. Range D (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C17)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

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

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

On the electric drive models, the pointer is held to the shaft by a friction clip arrangement. With the electric-manual lever in the manual position, hold the tuning knob and move the pointer to the 1500 KC mark on the dial.

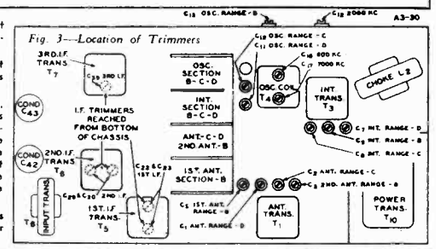
In sets using any other type of dial mechanism, it will be necessary to adjust the position of the indicator until it is at the 1500 KC mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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 on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

Fig. 3—Location of Trimmers



117-234 Volt Power Transformer

Some models are equipped with a 117-234 volt universal power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

Models without the electric drive, which are equipped with this transformer, may be used on a power supply of 40 to 60 cycles. If an electric drive motor is used, however, it is important that the set be operated on a 60 cycle power supply only. The reason for this is that the 60 cycle motor in the electric drive panel of this model will not operate satisfactorily at any frequency other than 60 cycle. Consequently, if one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 25 cycle model, is used for this purpose.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Twenty-Five Cycle Models

Twenty-five cycle receivers not equipped with an electric motor drive, differ from sixty cycle receivers only in the fact that a different power transformer is used. The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true—a sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

ELECTRIC DRIVE MODELS—In twenty-five cycle electric drive sets, in addition to the power transformer change mentioned above there is also a twenty-five cycle motor. Since these motors will not operate satisfactorily on a sixty cycle power supply, it follows that the twenty-five cycle electric drive sets cannot be used on sixty cycle power.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control Maximum — Antenna Shorted to Ground
Local-Distance Switch in Distance Position
Readings taken with 1000 Ohm-per-volt meter — Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG 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—6U7G	R.F.	0	6.1(1)	250	130	10.0(2)		6.1(1)	10.0(2)
6J7—6J7G	1st Det.	0	6.1(1)	250	115	0		6.1(1)	6.0
6C5—6C5G	Osc.	0	6.1(1)	115				6.1(1)	0
6K7—6U7G	1st I.F.	0	6.1(1)	250	130	10.0(2)		6.1(1)	10.0(2)
6K7—6U7G	2nd I.F.	0	6.1(1)	240	130	5.0		6.1(1)	5.0
6H6	2nd Det.	0	6.1(1)					6.1(1)	0
6C5—6C5G	A.V.C.	0	6.1(1)	5(3)				6.1(1)	.5
6C5—6C5G	1st A.F.	0	6.1(1)	145				6.1(1)	6.0
6L6—6L6G	Output	0	6.1(1)	330	250	21(4)		6.1(1)	0
5Y3G	Rectifier	0	4.7(5)		1100(6)		1100(6)		4.7(5)
6G5	Tuning Indicator	Plate to Ground 20(3)		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) Subject to variation.
(3) As read with a 1000 Ohm-per-volt meter (500 volt scale).
(4) Bias as read across L4 or R32, depending on speaker arrangement. See Schematic Diagram.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—See Fig. 2.

Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6G5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

MODELS A3,A6 Series
Circuit Data,Socket
Parts List

WELLS-GARDNER & CO.

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna R.F. transformer assemblies, T3 is the interstage R.F. transformer assembly, and T4 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C, and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2. When the switch is in the Range B position, a double tuned antenna R.F. stage is used while for the C and D Ranges a single tuned R.F. stage is used.

A 6K7 tube functions as an R.F. amplifier. The output of this tube is fed into a tuned R.F. stage. The out-put of the latter actuates the control grid of a 6J7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillator circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

Two stages of I.F. amplification are employed using 6K7 tubes. The primaries and secondaries of the 1st and 2nd I.F. transformers and the primary of the 3rd I.F. transformer are tuned by small trimmer condensers.

Referring to the 1st and 2nd I.F. transformers T5 and T6 in Fig. 2, it will be noted that there are coupling windings shown below the primaries.

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 the 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.

A type 6H6 twin diode functions as the 2nd detector and AVC tube. Referring to Fig. 2, the 3rd I.F. transformer has two secondary windings, each of which works into one of the 6H6 diodes.

Referring to the circuit associated with the audio winding (lower diode winding—Fig. 2) the audio component is developed across volume control resistor R27 and transmitted through the movable arm to the control grid of the 6C5 1st A.F. amplifier. The DC component of the voltage developed in this circuit is applied through resistor R22 to the control grid of the 6C5 AVC tube.

The AVC voltage developed in the circuit of the upper diode winding is applied through isolating resistors to the control grid circuits of the R.F. and 1st I.F. tubes. The cathode of the AVC diode is connected to the plate of the AVC tube. This tube under no-signal conditions operates at a very low voltage on the plate by virtue of the drop across plate resistor R24. When there is a signal voltage in the audio circuit, the DC component of this voltage, as mentioned above, is applied to the control grid of the AVC tube. This voltage makes the grid more negative and reduces the plate current. The reduction in plate current lessens the drop across the plate resistor and brings the plate to a higher positive potential. This positive potential is applied through resistor R19 to the AVC line, subtracting from the AVC voltage developed across R19. As a consequence of this cancellation, there is practically no AVC voltage applied to the controlled tubes until the AVC tube reaches cut-off after which the plate potential of this tube ceases to become more positive with increasing signal voltage and the AVC functions in the normal manner. The audio output increases rapidly with the input signal for low values of signal input, reaching maximum power output for an input signal of but a few microvolts. At this point the AVC commences to act and further signal input increase causes very little change in output signal level.

Across the volume control resistor R27 is a filter composed of condensers C49 and C50 and resistor R28. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output stage employs two type 6L6G power amplifier tubes in a stage of push-pull amplification. Two type 5Y3G rectifiers are used in the power unit.

The 6G5 tuning indicator tube is employed.

Two single speaker and one dual speaker arrangements are used with this chassis. Connections for each of the three types are shown in the schematic circuit diagram Fig. 2.

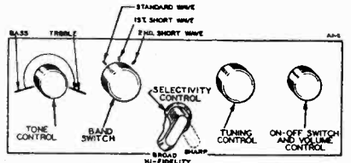


Fig. 1—Arrangement of Controls

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

- Replacement Parts

Series A3 also Series A6

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.

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A794	T1	Antenna Transformer and Can Assembly—B Range Secondary, C & D Range	$2.00
9A795	T2	Antenna Coil Assembly "B" Range	1.25
9A796	T3	R.F. Interstage Transformer and Can Assembly	2.20
9A797	T4	Oscillator Coil and Can Assembly	$3.60
9A798	T5	1st I.F. Transformer and Can Assembly	2.65
9A799	T6	2nd I.F. Transformer and Can Assembly	2.40
9A800	T7	3rd I.F. Transformer and Can Assembly	2.40
50X34	T8	Input Transformer	1.50
	T9	Output Transformer (See Speakers)	
53X152	T10	117-234 Volt, 40-60 Cycle, Universal Power Transformer	
53X165	T10	117 Volt, 60 Cycle, Power Transformer	8.70
53X166	T10	117 Volt, 25 Cycle, Power Transformer. (When replacing a 60 Cycle Transformer with a 25 Cycle Transformer, a 25 Cycle Motor must also be ordered for the Electric Drive Models.)	6.25 9.90
52X49	L2	Filter Choke	2.46

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X105	C10	.10 mf.	360	$0.20
46X187	C19	.02 mf.	180	.15
46X117	C25	.25 mf.	180	.25
46X180	C26	.05 mf.	180	.15
46X181	C27	.10 mf.	240	.15
46X211	C32	.04 mf.	180	.15
46X114	C33	.004 mf.	600	.15
46X124	C34	.01 mf.	180	.15
46X211	C35	.04 mf.	180	.15
46X217	C36	.10 mf.	360	.20
46X212	C37	.04 mf.	360	.15
46X121	C44	.25 mf.	360	.30
46X211	C46	.04 mf.	180	.15
46X98	C47	.10 mf.	180	.20
46X178	C48	.01 mf.	360	.15
46X200	C50	.04 mf.	180	.15
46X121	C52	.25 mf.	360	.30
46X216	C53	.002 mf.	1800	.15
46X202	C54	.02 mf.	360	.15

ELECTROLYTIC

44X21	C42	30 mf.	450 Wat	1.65
44X36	C43	40 mf.	290 Wat	1.00
45X224	C55	30 mf.	25 Dry	.65

MOLDED

47X63	C4	10 mmf.	.15
47X69	C4	250 mmf.	.15
47X57	C40	100 mmf.	.10
47X56	C41	50 mmf.	.10
47X67	C45	100 mmf.	.10
47X72	C49	25 mmf.	.10
47X65	C51	250 mmf.	.15

TRIMMER

17A77	C1	2-25 mmf.	Range "D" Antenna Trimmer	.45
	C2	2-25 mmf.	Range "C" Antenna Trimmer	
	C3	2-25 mmf.	Range "B" 2nd Antenna Trimmer	
	C5	2-25 mmf.	Range "B" 1st Antenna Trimmer	
17A73	C7	2-25 mmf.	Range "D" Interstage Trimmer	.35
	C8	2-25 mmf.	Range "C" Interstage Trimmer	
	C9	2-25 mmf.	Range "B" Interstage Trimmer	
17A76	C11	3-25 mmf.	Range "D" Oscillator Trimmer	.25
17A75	C12	2-25 mmf.	Range "C" Oscillator Trimmer	.70
	C13	1300-1700 mmf.	Range "C" Oscillator 7000 KC Adjustment	.50
17A68	C15	1-12 mmf.	Range "B" Oscillator Trimmer	.20
17A69	C16	40-120 mmf.	600 KC Trimmer	.40
	C17	40-100 mmf.	7000 KC Trimmer	
17A70	C22	15-55 mmf.	1st I. F. Trimmers	.40
	C23	15-55 mmf.		
17A70	C29	15-55 mmf.	2nd I. F. Trimmers	.40
	C30	15-55 mmf.		
17A71	C39	15-55 mmf.	3rd I. F. Trimmer	.25

Prices Subject to Change Without Notice.

Part No.	Code	Capacitance	Voltage	List Price
47X80	C14	13 mmf.	Compensating Capacitor	$0.50
47X89	C18	370 mmf.	Iron Clad	.30
47X81	C20	35 mmf.	Iron Clad	.25
47X83	C21	150 mmf.	Iron Clad	.35
47X84	C24	160 mmf.	Iron Clad	.35
47X83	C28	150 mmf.	Iron Clad	.35
47X84	C31	160 mmf.	Iron Clad	.35
47X85	C38	60 mmf.	Iron Clad	.30
14A71	4 Section Gang Condenser (Less Dial and Drive Assembly)			5.90

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

12A273	12" Dynamic Speaker complete with Output Transformer (T9)—(Series A3) ("B" Arrangement—Fig. 2)		13.10
	Cone and Voice Coil Assembly for above Speaker		6.40
	Output Transformer Only (T9)		3.40
12A301	12" Dynamic Speaker complete with Output Transformer (T9)—(Series A3) ("B" Arrangement—Fig. 2)		13.10
	Cone and Voice Coil Assembly for above Speaker		3.20
	Output Transformer Only (T9)		3.40
12A278	12" Dynamic Speaker complete with Output Transformer (T9)—(Series A6) ("C" Arrangement—Fig. 2)		10.20
	Cone and Voice Coil Assembly for above Speaker		2.80
	Output Transformer Only (T9)		3.05
12A279	12" Dynamic Speaker (T9)—No Output Transformer (Series A6) ("C" Arrangement—Fig. 2)		7.50
	Cone and Voice Coil Assembly for above Speaker		2.80

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
C94253	R1	25,000 Ohm	1.0	$0.15
A94502	R2	5,000 Ohm	0.2	.15
A94503	R3	50,000 Ohm	0.2	.15
A94202	R4	2,000 Ohm	0.2	.15
B94451	R5	450 Ohm	0.5	.15
D94203	R6	20,000 Ohm	2.0	.30
D94163	R7	16,000 Ohm	2.0	.30
A95503	R8	50,000 Ohm	0.2	.10
A95205	R9	2 Megohm	0.2	.10
A94401	R10	400 Ohm	0.2	.15
B94501	R11	50,000 Ohm	0.5	.15
A94405	R12	4 Megohm	0.2	.15
A94405	R13	4 Megohm	0.2	.15
A95105	R14	1 Megohm	0.2	.10
A95102	R15	1,000 Ohm	0.2	.10
A95104	R16	100,000 Ohm	0.2	.10
A95104	R17	100,000 Ohm	0.2	.10
A94104	R18	100,000 Ohm	0.2	.15
B94704	R19	200,000 Ohm	0.5	.15
B93150	R20	15 Ohm	0.5	.20
A93254	R21	250,000 Ohm	0.2	.20
A93105	R22	1 Megohm	0.2	.20
B93161	R23	160 Ohm	0.5	.20
A94504	R24	500,000 Ohm	0.2	.15
A94153	R28	15,000 Ohm	0.2	.15
B95703	R29	70,000 Ohm	0.5	.10
A95103	R31	10,000 Ohm	0.2	.10

WIRE WOUND

*43X68	R25	1,250 Ohm	2.0	.85
†43X81	R26	5,750 Ohm	8.0	
	R32	128 Ohm	4.0	.25

VARIABLE

36X228	R27	2 Megohm Volume Control and Switch	1.00
40X225	R30	1.5 Megohm Tone Control	.65

* Not used on Series A6—See Fig. 2—Type "C" Speaker Connections.
† Used only on Series A6—See Fig. 2—Type "C" Speaker Connections.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X304	Phono Cable Assembly Complete (Includes Plug, Double-Tip Phono Jack, Switch, and Knob)	$2.55
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for chassis not equipped with this socket	.10
6A218	Plug (8 Prong) only, of phono cable	.15
2A50	Phono Switch only, of phono cable	.70
3A12	Phono Jack only, of phono cable	.10
10A90	Knob only, of phono cable	.20

DIAL AND DRIVE ASSEMBLY

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE NOTES (see index)

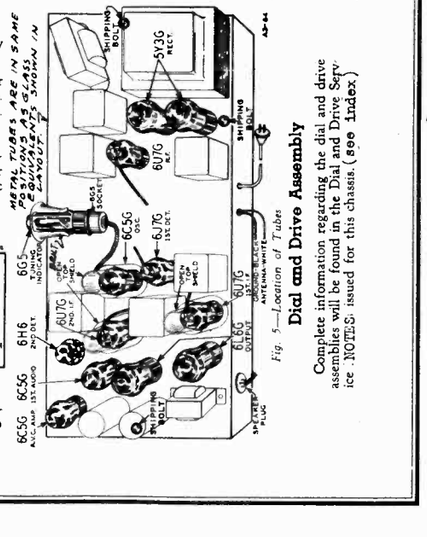


Fig. 5—Location of Tubes

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service NOTES issued for this chassis. (see index)

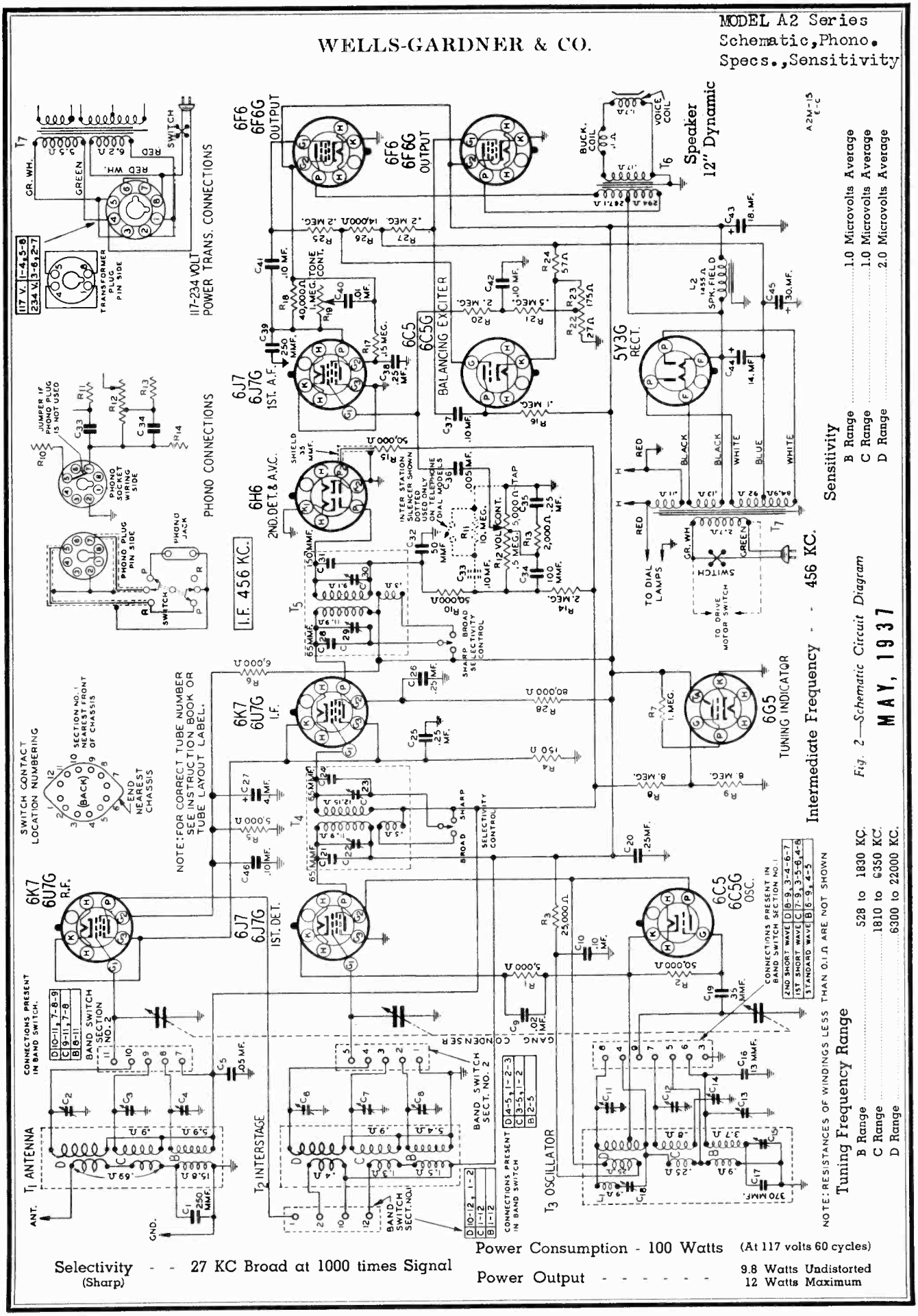


Fig. 2—Schematic Circuit Diagram

MAY, 1937

MODEL A2 Series
Trimmers, Alignment
Circuit Data, Coils

WELLS-GARDNER & CO.

SERIES A2

11 TUBE • 3 BAND • ALL WAVE

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C4) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C15)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3) Int. Range C (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C14)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C6)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C18)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

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

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, 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 the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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 on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

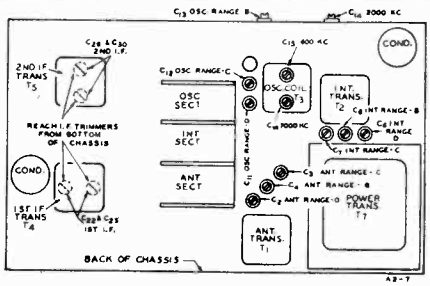


Fig. 3—Location of Trimmers

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R.F. and I.F. tubes.

Across the volume control resistor R12 is a filter composed of condensers C34 and C35 and resistor R13. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6J7 1st A. F. tube. The output of this tube is fed thru resistance coupling into the 6F6 output tube shown nearest to it in the schematic.

A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6C5 balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6F6 output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6G5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into a 6J7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

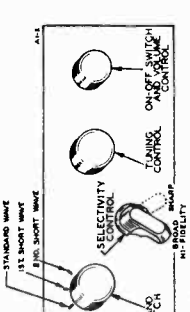


Fig. 1—Arrangement of Controls

Referring to the 1st and 2nd I.F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown below the primary of T4 and below the secondary of T5.

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.

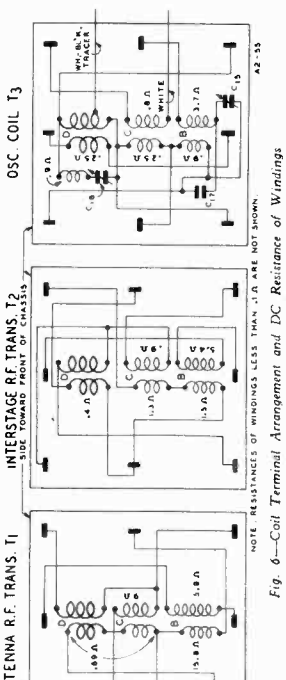


Fig. 6—Coil Terminal Arrangement and DC Resistance of Windings

WELLS-GARDNER & CO.

MODEL A2 Series
Socket, Voltage
Changes, Data
Parts List

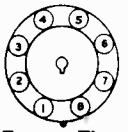


Fig. 7—Octal Tube Terminal Numbering (bottom of socket).

Twenty-Five Cycle Models

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

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.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic. AS GLASS EQUIVALENTS SHOWN IN LAYOUT

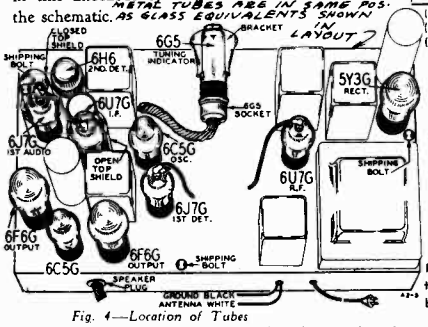


Fig. 4—Location of Tubes

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—see Fig. 2.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Notes issued for this chassis. (see index)

Changes in Later Models

Later models of this series have the following changes incorporated in them.

On the first models, the 2nd I.F. Coil was not expanded. In other words, the extra selectivity coupling winding was not incorporated in the early type coil. Models with the letter "C" or any later issue stamped on the chassis use the new type coil with the selectivity coupling winding. Because of the change in coil connections, the selectivity switch used on the late model is not interchangeable with that on the early model.

When ordering parts, therefore, it is important that the issue letter on the chassis be noted and the correct part number as shown in the parts list be specified.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG 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 6U7G	R.F.	0	6.1(1)	250	105	2.5		6.1(1)	2.5
6J7 6J7G	1st Det.	0	6.1(1)	250	125	0		6.1(1)	5.8
6C5 6C5G	Osc.	0	6.1(1)	125(2)				6.1(1)	0
6K7 6U7G	I.F.	0	6.1(1)	250	100	2.5		6.1(1)	2.5
6H6	2nd Det.—A.V.C.	0	6.1(1)					6.1(1)	0
6J7 6J7G	1st A.F.	0	6.1(1)	110	120	0(3)		6.1(1)	0(3)
6C5 6C5G	Balancing Exciter	0	6.1(1)	100				6.1(1)	18.5
6F6 6F6G	Output	0	6.1(1)	330	250			6.1(1)	0(4)
5Y3G	Rectifier	0	4.8(5)		730(6)		730(6)		4.8(5)
6G5	Tuning Indicator	Plate to Ground 20		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) Subject to variation.
(3) Bias (2.5 volts) as read across resistor R22.
(4) Bias (24 volts) as read across resistors R22, R23, & R24.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

The R.F. circuit of early models was slightly different from that used in later models. The screen grids of the R.F. and I.F. tubes now supplied by separate voltage sources were formerly connected together and supplied from a single source. On the latter models, resistor R 28 and condenser C 46 were not used.

Series A2 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
3A256	Tube Socket—Octal (7 Prong)	$0.15
3A263	Tube Socket—Octal (8 Prong)	.15
3A241	Tube Socket—Octal (5 Prong)	.10
3A262	Speaker Socket (6 Prong)	.15
13Z295	Tuning Eye Tube Socket and Cable Assembly	.55
3A266	Phono Socket—Octal (4 Prong)	.10
3A252	Dual Keyway Socket—Octal (8 Prong)—Universal Power Transformer Connections	.15
6A214	Plug (4 Prong)—Used with above Socket	.25

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

12A269	12" Dynamic Speaker, complete with Output Trans. (T6)	7.70
	Cone and Voice Coil Assembly for above speaker	4.60
	Output Transformer only (T6)	2.45

KNOBS

Specify Name of Knob & Name & Model of Radio	Volume Control Knob	.15
	Tone Control Knob	.15
	Tuning Control Knob	.15
	Band Switch Knob	.20
	Selectivity Control Knob	.25

GENERAL

25Z378	Clamp Bracket for Tuning Eye Tube	.10
32X50	Tube Shield—Closed Top (Used on glass and metal tube chassis)	.15
32E32	Tube Shield—Open Top (Used only on models having glass tubes)	.15
32X51	Tube Shield Base	.10
2X38	Felt Washers (Used Behind Knobs) ..... doz.	.10
8X23	Rubber Cushions (Chassis Mounting) ..... doz.	.10
30Z44	Grid Clip only	
2A78	Selectivity Switch (Early Type—Used when 2nd I.F. is not expanded)	.40
2A83	Selectivity Switch (Late Type—Used when 2nd I.F. is expanded)	.45
4A38	Terminal Strip (1 lug insulated, one lug used for mtg.)	.10
4A53	Terminal Strip (3 lugs insulated, mounting hole used)	.10
4A68	Terminal Strip (3 lugs insulated)	.10
13Z214	Antenna and Ground Lead Assembly	.50
13X80	Line Cord and Plug	1.65
2A79	Band Switch (2 section, 3 position)	

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A779	T1	Antenna Transformer and Can Assembly	$2.15
9A780	T2	R.F. Interstage Transformer and Can Assembly	2.30
9A781	T3	Oscillator Coil and Can Assembly	3.60
9A782	T4	1st I.F. Transformer and Can Assembly	2.40
9A783	T5	2nd I.F. Transformer and Can Assembly (Early Type—Without selectivity coupling winding)	2.25
9A857	T5	2nd I.F. Transformer and Can Assembly (Late Type—With selectivity coupling winding)	2.25
	T6	Output Transformer (See "Speakers")	
53Z148	T7	117 Volt, 60 Cycle, Standard Power Transformer	4.45
53Z149	T7	117 Volt, 25 Cycle, Standard Power Transformer	7.15
53Z150	T7	117-234 Volt, 40-60 Cycle, Universal Power Transformer	5.75

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C5	.05 mf.	180	$0.15
44X187	C9	.02 mf.	180	.15
46X105	C10	.10 mf.	360	.20
46X121	C20	.25 mf.	360	.30
46X117	C25	.25 mf.	180	.25
46X121	C26	.25 mf.	360	.30
46X98	C33	.10 mf.	180	.20
46X197	C35	.25 mf.	180	.25
46X147	C36	.005 mf.	360	.15
46X105	C37	.10 mf.	360	.20
46X121	C38	.25 mf.	360	.30
46X161	C40	.01 mf.	600	.15
46X105	C41	.10 mf.	360	.20
46X98	C42	.10 mf.	180	.20
46X181	C44	.10 mf.	240	.15

CONDENSERS (Cont.)

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
45X223	C27	4 mf.	150 Dry	$0.75
44X11	C43	18 mf.	290 Wet	1.10
44X30	C44	14 mf.	450 Wet	1.00
45X222	C45	30 mf.	25 Dry	.95

MOLDED

47X69	C1	250 mmf.	.15
47X81	C19	35 mmf.	.25
47X56	C32	50 mmf.	.10
47X57	C34	100 mmf.	.10
47X65	C39	250 mmf.	.15

TRIMMER

17A73	C2, C3, C4	2-25 mmf.	Range "D" Antenna Trimmer, Range "C" Antenna Trimmer, Range "B" Antenna Trimmer	.35
17A73	C6, C7, C8	2-25 mmf.	Range "D" Interstage Trimmer, Range "C" Interstage Trimmer, Range "B" Interstage Trimmer	.35
17A76	C11, C12	2-25 mmf.	Range "D" Oscillator Trimmer, Range "C" Oscillator Trimmer	.25
17A68	C13	1-12 mmf.	Range "B" Oscillator Trimmer	.20
17A75	C14	1300-1700 mmf.	2000 KC Adjustment	.50
17A69	C15, C18	40-120 mmf.	Oscillator 600 KC Adjustment, Oscillator 1400 KC Adjustment	.40
17A70	C22, C23	15-55 mmf.	1st I.F. Trimmer	.40
17A70	C29, C30	15-55 mmf.	2nd I.F. Trimmer	.40

MISCELLANEOUS

47X80	C16	13 mmf.	Compensating Capacitor .50
47X89	C17	370 mmf.	Iron Clad .30
47X91	C21	65 mmf.	Iron Clad .25
47X91	C24	65 mmf.	Iron Clad .25
47X91	C28	65 mmf.	Iron Clad .25
47X83	C31	150 mmf.	Iron Clad .35
14A70		3 Section Gang Condenser (less dial and drive assembly)	4.20

* Used on late models only.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94502	R1	5,000 Ohm	0.2	$0.15
A94503	R2	50,000 Ohm	0.2	.15
C94253	R3	25,000 Ohm	1.0	.15
A94151	R4	150 Ohm	0.2	.15
E94502	R5	5,000 Ohm	3.0	.30
G94602	R6	6,000 Ohm	6.0	.40
A95105	R7	1 Megohm	0.2	.10
A94805	R8	8 Megohm	0.2	.15
A94805	R9	8 Megohm	0.2	.15
A95503	R10	50,000 Ohm	0.2	.10
A95106	R11	10 Megohm	0.2	.10
A94202	R13	2,000 Ohm	0.2	.15
A95205	R14	2 Megohm	0.2	.10
A95503	R15	50,000 Ohm	0.2	.10
A94104	R16	100,000 Ohm	0.2	.15
A94154	R17	150,000 Ohm	0.2	.15
B94403	R18	40,000 Ohm	0.5	.15
A95205	R20	2 Megohm	0.2	.10
A95504	R21	500,000 Ohm	0.2	.10
B93570	R24	57 Ohm	0.5	.20
A93204	R25	200,000 Ohm	0.2	.20
AJ3143	R26	14,000 Ohm	0.2	.20
A95204	R27	200,000 Ohm	0.2	.10
*B94803	R28	80,000 Ohm	0.5	.15

WIRE WOUND

43X77	R22	27 Ohm	0.25	.35
	R23	175 Ohm	2.0	

VARIABLE

36X236	R12	500,000 Ohm	Volume Control and On-Off Switch	1.00
40X224	R19	1 Megohm	Tone Control	.65

* Used on late models only.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.85
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE NOTES. (see index)

Prices Subject to Change Without Notice.

MODEL A4 Series
Phono., Coils
Parts List

WELLS-GARDNER & CO.

Series A4 - 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
3A262	Speaker Socket (6 Prong)	$0.15
3A261	Tube Socket—Octal (5 Prong)	.10
3A256	Tube Socket—Octal (7 Prong)	.15
3A263	Tube Socket—Octal (8 Prong)	.15
3A266	Phono Socket—Octal (4 Prong)	.10
13X295	Tuning Eye Tube Socket and Cable Assembly	.55
3A252	Dual Keyway Socket (8 Prong)—Universal Transformer Connections	.15
6A214	Plug (4 Prong)—Used with above Socket	.25

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

12A277	8" Dynamic Speaker complete with Output Trans. (T6)	4.65
	Cone and Voice Coil Assembly for above Speaker	2.75
	Output Transformer only	2.00
12A288	8" Dynamic Speaker complete with Output Trans. (T6)	6.30
	Cone and Voice Coil Assembly for above Speaker	2.75
	Output Transformer only	2.45

KNOBS

Specify name of knob & name & model of radio

Selectivity Control	.25
Band Change Switch	.20
Tuning Control	.15
Volume Control	.15
Tone Control	.15

GENERAL

25X378	Clamp Bracket for Tuning Eye Tube	.10
8X23	Rubber Cushions (Chassis Mounting)	.10
2X38	Felt Washers (Used behind Knobs) doz.	.10
32X50	Tube Shield (Closed Top)	.15
25X375	Chassis Mounting Foot	.10
30X44	Grid Clip Only doz.	.10
2A91	Band Change Switch	.90
2A85	Dial Light Switch (Used with above Switch on Phantom Light Dials only)	.30
2A78	Selectivity Switch	.40
4A68	Terminal Strip (3 Lugs Insulated)	.10
4A18	Terminal Strip (2 Lugs Insulated)	.10
32X5	Tube Shield Base	.10
13X80	Line Cord and Plug Assembly	.50
13X214	Antenna and Ground Lead Assembly	.30

TRANSFORMERS AND COILS

			List Price
9A813	T1	Antenna Transformer and Can Assembly "B" Secondary—"D" Range	$1.65
9A812	T2	1st Antenna Coil Assembly "B" Range	1.30
9A814	T3	Oscillator Coil and Can Assembly	2.80
9A815	T4	1st I.F. Transformer and Can Assembly	1.80
9A816	T5	2nd I.F. Transformer and Can Assembly	1.50
	T6	Output Transformer (See "Speakers")	
53X144	T7	117 Volt, 60 Cycle Power Transformer	3.10
53X145	T7	117 Volt, 25 Cycle Power Transformer	5.20
53X146	T7	117-234 Volt, 40-60 Cycle Universal Power Transformer	4.35

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C6	.05 mf.	180	$0.15
46X120	C15	.01 mf.	360	.15
46X187	C16	.02 mf.	180	.15
46X212	C17	.004 mf.	360	.15
46X187	C22	.02 mf.	180	.15
46X202	C23	.02 mf.	360	.15
46X105	C30	.10 mf.	360	.20
46X147	C32	.005 mf.	360	.15
46X98	C34	.10 mf.	180	.20
46X202	C35	.02 mf.	360	.15
46X98	C36	.10 mf.	180	.20
46X100	C37	.002 mf.	600	.15
46X108	C38	.05 mf.	600	.20

ELECTROLYTIC

					List Price
44X35	C39	30 mf.	260	Wet	.75
44X31	C40	12 mf.	340	Wet	.80

Part No.	Code	Description	List Price
MOLDED			
47X69	C1	250 mmf.	.15
47X63	C5	10 mmf.	.15
47X49	C7	7 mmf.	.15
47X63	C13	10 mmf.	.15
47X53	C14	35 mmf.	.15
47X56	C28	50 mmf.	.15
47X56	C29	50 mmf.	.15
47X65	C33	250 mmf.	.15
TRIMMER			
17A74	C2	2-25 mmf. 1st Antenna Range "B"	.10
17A76	C3	2-25 mmf. Range "D" Antenna	.25
	C4	2-25 mmf. 2nd Antenna Range "B"	
17A35	C8	40-100 mmf. 6000 KC Trimmer	$0.45
	C9	250-550 mmf. 600 KC Trimmer	
17A76	C11	2-25 mmf. Range "D" Oscillator	.25
	C12	2-25 mmf. Range "B" Oscillator	
17A57	C19	50-120 mmf. 1st I.F. Trimmer	.35
	C20	50-120 mmf.	
17A34	C25	70-150 mmf. 2nd I.F. Trimmer	.40
	C26	150-250 mmf.	
MISCELLANEOUS			
14A70		3 Gang Condenser Less Dial and Drive Assembly	4.55

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A95402	R1	4,000 Ohm	0.2	$0.10
A94104	R2	100,000 Ohm	0.2	.15
A94104	R3	100,000 Ohm	0.2	.15
A94251	R4	250 Ohm	0.2	.15
C94203	R5	20,000 Ohm	1.0	.15
C94203	R6	20,000 Ohm	1.0	.15
894203	R7	20,000 Ohm	0.5	.15
A94405	R8	4 Megohm	0.2	.15
A94126	R9	12 Megohm	0.2	.15
A95105	R10	1 Megohm	0.2	.10
A95503	R11	50,000 Ohm	0.2	.10
A95205	R12	2 Megohm	0.2	.10
A95504	R17	500,000 Ohm	0.2	.10
A95205	R18	2 Megohm	0.2	.10
A95503	R19	50,000 Ohm	0.2	$0.10
A95154	R20	150,000 Ohm	0.2	.10
A95254	R21	250,000 Ohm	0.2	.10

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.55
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis Not Equipped with this Socket	.10
6A218	Plug (8 Prong) only of Phono Cable	.15
3A12	Phono Jack only of Phono Cable	.10
2A50	Phono Switch only of Phono Cable	.70
10A90	Knob only of Phono Cable	.20

DIAL AND DRIVE ASSEMBLY

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE Notes (see index)

Prices Subject to Change Without Notice.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Notes for this chassis. (see index)

Phonograph Connections

Phonograph connections are made as shown in Fig. 7. On the side panel of the chassis base is a round knockout 1⅛ inch in diameter. An octal base socket is mounted in this knockout opening and wired as illustrated.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph radio switch and double tip jack.

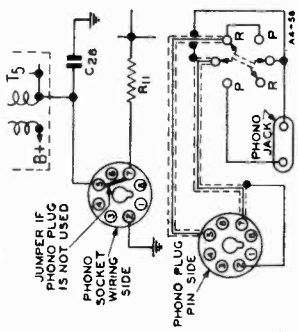


Fig. 7—Phonograph Connections

117-234 Volt Power Transformer

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Part No.	Code	Resistance	Wattage	
WIRE WOUND				
43X76	R15	26 Ohm	0.25	Armored Wire Wound
	R16	239 Ohm	2.0	
VARIABLE				
36X235	R14	.5 Megohm	Volume Control and Switch	
40X223	R22	.15 Megohm	Tone Control	

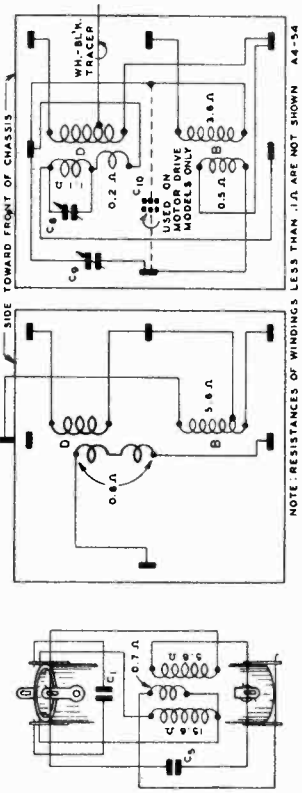


Fig. 4—Coil Terminal Arrangement and D.C. Resistance of Windings

SERIES A4
HOME RADIO
A. C. POWER SUPPLY
7 TUBE • 2 BAND
JULY, 1937

WELLS-GARDNER & CO.

MODEL A4 Series
Schematic, Specs.
Sensitivity

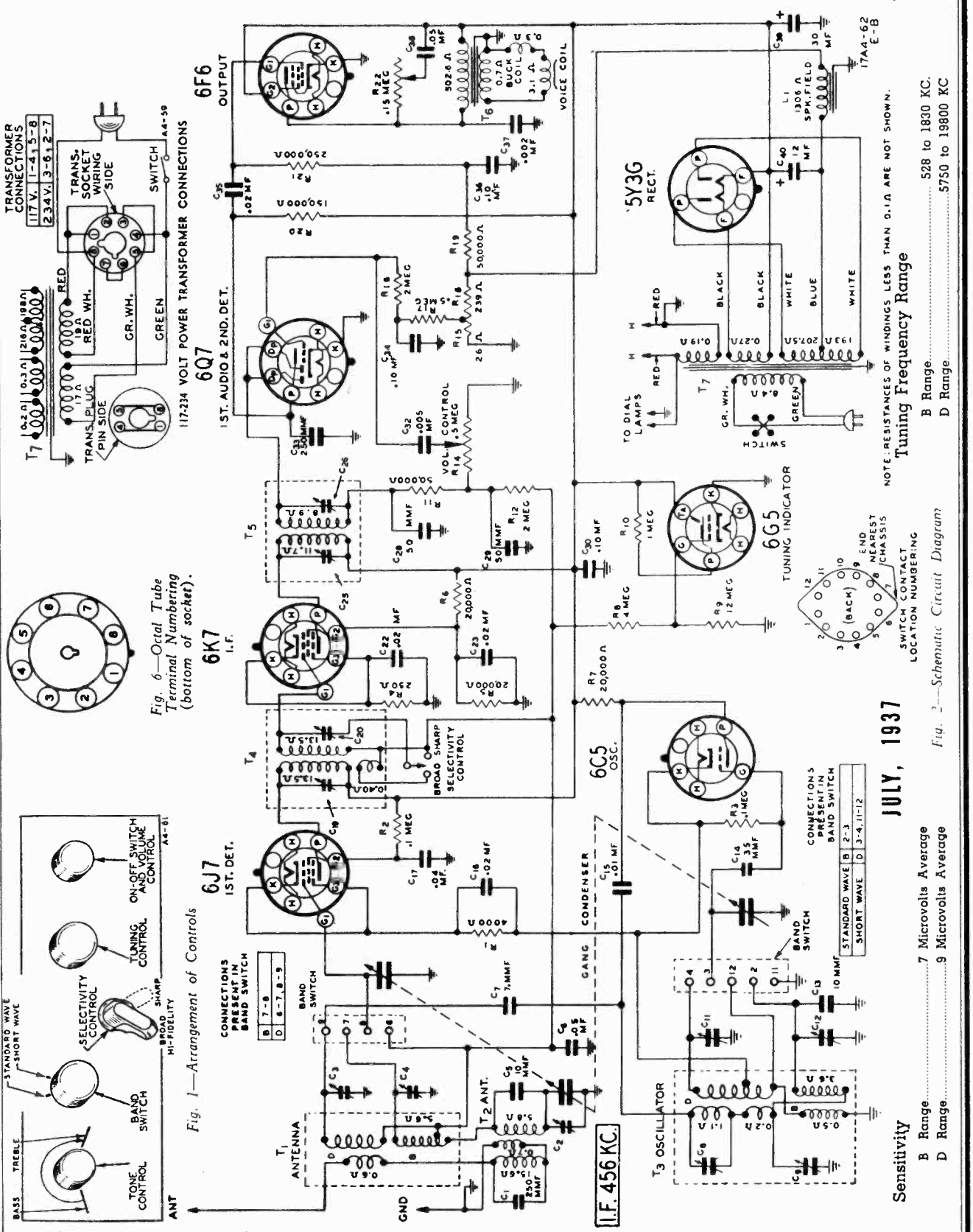


Fig. 1—Arrangement of Controls

Fig. 6—Octal Tube Terminal Numbering (bottom of socket).

Fig. 2—Schematic Circuit Diagram

Selectivity (Sharp) - - 28 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - - 456 KC.

Speaker - - - - - - - - - - - - 8" Dynamic

Power Consumption - - 67 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - - 2.5 Watts Undistorted
4.5 Watts Maximum

MODEL A4 Series
Trimmers, Alignment
Circuit Data, Socket

WELLS-GARDNER & CO.

SERIES A4

7 TUBE • 2 BAND

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
2nd I.F.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C25) & (C26)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C19) & (C20)	Turn Rotor to Full Open	Adjust to Maximum Output
Range B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C2) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C9)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
Range D							
19800 KC	Range D	400 ohm	19800 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
16000 KC	Range D	400 ohm	16000 KC	Antenna Lead	Ant. Range D (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
6000 KC	Range D	400 ohm	6000 KC	Antenna Lead	6000 KC (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B

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

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the moving beam of light indicator, 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 the beam is at the 1500 KC mark on the dial. Retighten the screw.

In sets using a pointer or any other type of dial mechanism, it will be necessary to adjust the position of the indicator until it is at the 1500 KC mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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 on the dial. It may be necessary to increase the input signal to hear the image.

Notice—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

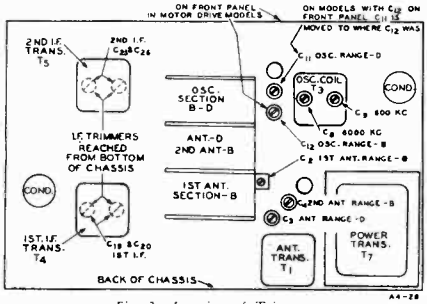


Fig. 3—Location of Trimmers

Circuit

This model is a two band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna coil assemblies and T3 is the oscillator coil assembly. The standard wave and short wave coils in each assembly are indicated by the letters B and D respectively.

The band switch completes connections to the coils in use. When it is in the Range B position, a double tuned antenna R.F. stage is used while for the D Range, a single tuned secondary is used.

A type 6J7 tube functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to Fig. 2, it will be noted that there is a coupling winding connected in series with the secondary of I.F. transformer T4. When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer 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.

A type 6Q7 duo-diode triode functions as the second detector and a one stage audio amplifier. AVC voltage is applied to the 1st detector and I.F. tubes.

Resistance coupling is used between the 1st audio stage and the output stage which employs a type 6F6 ouput pentode tube. A dynamic reproducer is used.

The power unit uses a 5Y3G full wave rectifier.

A 6G5 tuning indicator tube is employed.

Twenty-Five Cycle Models

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

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.

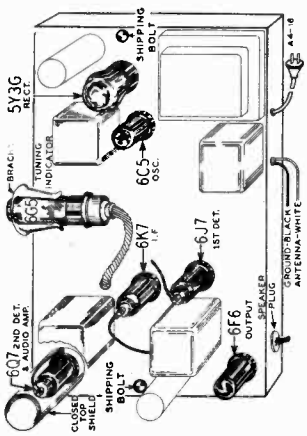


Fig. 5—Location of Tubes

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG 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
6J7	1st Det.	0	6.2(1)	230	145	9.5		6.2(1)	9.5
6K7	I.F.	0	6.2(1)	230	100	2.0		6.2(1)	2.0
6C5	Osc.	0	6.2(1)	140				6.2(1)	0
6Q7	1st Audio & 2nd Det.	0	6.2(1)	100				6.2(1)	0(2)
6F6	Power Amp.	0	6.2(1)	210	230			6.2(1)	0(3)
5Y3G	Rectifier	0	5.0(4)	Plate to Ground 230	630(5)	Target to Ground 230	Cathode to Ground 0	630(5)	5.0(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 230				Across Heater 6.2 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R15.
(3) Bias (14 volts) as read across resistors R15 and R16.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

MODEL A5 Series
Schematic, Specs.
Sensitivity, Phono.

WELLS-GARDNER & CO.

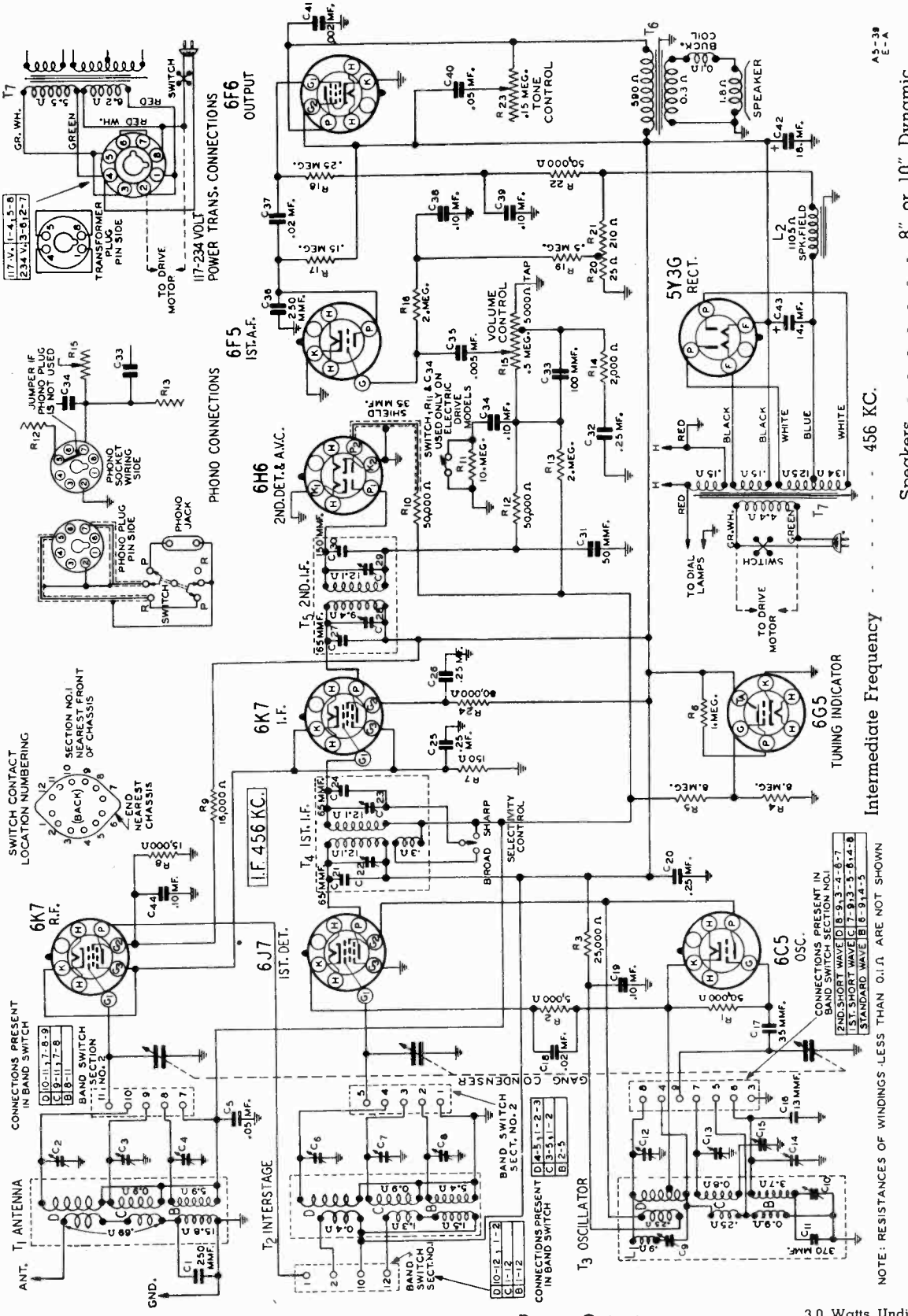


Fig. 2—*Schematic Circuit Diagram*

JULY, 1937

Intermediate Frequency - - - - - - - - - - 456 KC.

Speakers - - - - - - - - - - 8" or 10" Dynamic

Sensitivity

B Range	1.0 Microvolts Average
C Range	1.0 Microvolts Average
D Range	2.0 Microvolts Average

Tuning Frequency Range

B Range	528 to 1830 KC.
C Range	1810 to 6350 KC.
D Range	6300 to 22000 KC.

NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN

Power Output - - - - - - - 3.0 Watts Undistorted
5.0 Watts Maximum

Power Consumption - 75 Watts (At 117 volts 60 cycles)

Selectivity - 27 KC Broad at 1000 times Signal
(Sharp)

MODEL A5 Series
Trimmers, Alignment
Circuit Data, Voltage

WELLS-GARDNER & CO.

SERIES A5

9 TUBE • 3 BAND • ALL WAVE

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter: Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C28) & (C29)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C4) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C10)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3) Int. Range C (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C15)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C6)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C9)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

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

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, 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 the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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 on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

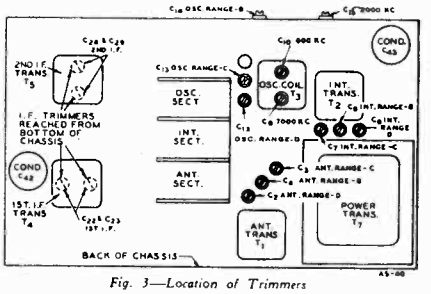


Fig. 3—Location of Trimmers

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into a 6J7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to Fig. 2, it will be noted that there is a coupling winding connected in series with the secondary of I.F. transformer T4. When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer 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.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R.F. and I.F. tubes.

Across the volume control resistor R15 is a filter composed of condensers C32 and C33 and resistor R14. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

A 6F5 triode tube functions as the first audio amplifier while the output stage uses a 6F6 output pentode tube. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

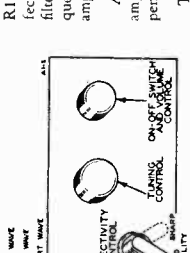


Fig. 1—Arrangement of Controls

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG 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	6.2(1)	245	118	2.5		6.2(1)	2.5
6J7	1st Det.	0	6.2(1)	245	114	0		6.2(1)	6.2
6C5	Osc.	0	6.2(1)	114				6.2(1)	0
6K7	I.F.	0	6.2(1)	245	118	2.5		6.2(1)	2.5
6H6	2nd Det.	0	6.2(1)		0			6.2(1)	0
6F5	1st A.F.	0	6.2(1)		155			6.2(1)	0(2)
6F6	Power	0	6.2(1)	230	245	16(3)		6.2(1)	0
5Y3G	Rectifier	0	5.0(4)		680(5)		680(5)		5.0(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 245		Cathode to Ground 0		Across Heater 6.2	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R20.
(3) Bias (16 volts) as read across resistors R20 and 21.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

WELLS-GARDNER & CO.

MODEL A5 Series
Socket,Coils,Data
Parts List

General Service Data

117-234 Volt Power Transformer

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

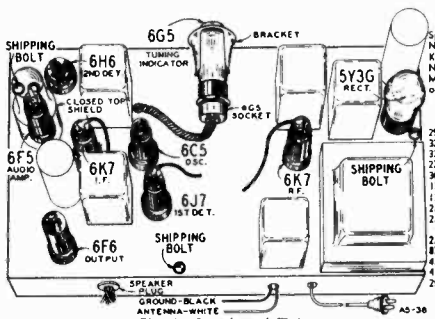


Fig. 4—Location of Tubes

Twenty-Five Cycle Models

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

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.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Notes issued for this chassis. (see index)

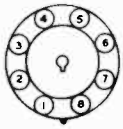


Fig. 5—Octal Tube Terminal Numbering (bottom of socket).

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—See Fig. 2.

Series A5 - Replacement Parts

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A263	Tube Socket—Octal (8 prong)	$0.15
3A256	Tube Socket—Octal (7 prong)	.15
3A261	Tube Socket—Octal (5 prong)	.10
3A242	Speaker Socket (6 prong)	.15
3A266	Phono Socket—Octal (4 prong)	.10
13X295	Tuning Eye Tube Socket and Cable Assembly	.55
3A252	Dual Keyway Socket—Octal (8 prong)—Universal Power Transformer Connections	.15
6A214	Plug (4 prong)—Used with above Socket	.25

SPEAKERS

12A285	8" Dynamic Speaker Complete with Output Transformer (T6)	5.65
	Cone and Voice Coil for above Speaker	2.75
	Output Transformer only	2.45
12A290	10" Dynamic Speaker Complete with Output Transformer (T6)	6.65
	Cone and Voice Coil for above Speaker	3.50
	Output Transformer only	2.45

KNOBS

Specify Name of Knob & Name & Model of Radio

Volume Control Knob	.15
Tone Control Knob	.15
Tuning Control Knob	.15
Band Switch Knob	.20
Selectivity Control Knob	.25

GENERAL

25X378	Clamp Bracket for Tuning Eye Tube	.10
32X50	Tube Shield (Closed Top)	.15
32X51	Tube Shield Base	.10
2X38	Felt Washer (Used behind knobs) Doz.	.10
30X44	Grid Clip Doz.	.10
13X214	Antenna and Ground Lead Assembly	.30
13X80	Line Cord and Plug Assembly	.50
2A95	Band Change Switch	1.65
2A96	Dial Lamp Switch—Used with above Switch on Phantom Light Dial only	.30
2A78	Selectivity Switch	.40
8X23	Rubber Cushions (Chassis mounting)	.10
4A68	Terminal Strip (3 lugs insulated)	.10
4A53	Terminal Strip (2 end lugs, mounting hole in center)	.10
25X375	Chassis Mounting Foot	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A876	T1	Antenna Transformer and Can Assembly	$2.15
9A877	T2	R. F. Interstage Transformer and Can Assembly	2.30
9A878	T3	Oscillator Coil and Can Assembly	3.60
9A879	T4	1st I. F. Transformer and Can Assembly	2.40
9A880	T5	2nd I. F. Transformer and Can Assembly	2.30
	T6	Output Transformer Only (See "Speakers")	
53X159	T7	117 Volt, 60 Cycle Power Transformer	3.60
53X160	T7	117 Volt, 25 Cycle Power Transformer	6.20
53X161	T7	117-234 Volt, 60 Cycle Universal Power Transformer	6.00

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C5	.05 mf.	180	$0.15
46X187	C18	.02 mf.	180	.15
46X105	C19	.10 mf.	360	.20
46X121	C20	.25 mf.	360	.30
46X117	C25	.25 mf.	180	.25
46X121	C26	.25 mf.	360	.30
46X197	C32	.25 mf.	180	.25
*46X98	C34	.10 mf.	180	.20
46X147	C35	.005 mf.	360	.15
46X202	C37	.02 mf.	360	.15
46X98	C38	.10 mf.	180	.20
46X98	C39	.10 mf.	180	.20
46X103	C40	.05 mf.	600	.20
46X102	C41	.002 mf.	600	.15
46X181	C44	.10 mf.	240	.15

ELECTROLYTIC

44X11	C42	18 mf.	290	Wet	1.10
44X10	C43	14 mf.	400	Wet	1.25

MOLDED

47X69	C1	250	mmf.	.15
47X56	C31	50	mmf.	.10
47X57	C33	100	mmf.	.10
47X65	C36	250	mmf.	.15

TRIMMER

Part No.	Code	Capacitance	Voltage		List Price
17A73	C2	2-25	mmf.	Range "D" Antenna	$0.35
	C3	2-25	mmf.	Range "C" Antenna	
	C4	2-25	mmf.	Range "B" Antenna	
17A73	C6	2-25	mmf.	Range "D" Interstage	.35
	C7	2-25	mmf.	Range "C" Interstage	
	C8	2-25	mmf.	Range "B" Interstage	
17A69	C9	60-100	mmf.	7000 KC	.40
	C10	60-100	mmf.	600 KC	
17A76	C12	2-25	mmf.	Range "D" Oscillator	.25
	C13	2-25	mmf.	Range "C" Oscillator	
17A68	C14	1-12	mmf.	Range "B" Oscillator	.20
17A75	C15	1300-1700	mmf.	2000 KC	.50
17A70	C22	15-55	mmf.	1st I. F. Trimmers	.40
	C23	15-55	mmf.		
17A70	C28	15-55	mmf.	2nd I. F. Trimmers	.40
	C29	15-55	mmf.		

MISCELLANEOUS

47X89	C11	270	mmf.	Iron Clad	.30
47X80	C16	13	mmf.	Compensating Capacitor	.50
47X81	C17	36	mmf.	Iron Clad	.25
47X91	C21	65	mmf.	Iron Clad	.25
47X91	C24	65	mmf.	Iron Clad	.25
47X91	C27	65	mmf.	Iron Clad	.25
47X83	C30	150	mmf.	Iron Clad	.35
14A70	3 Section Gang Condenser (Less Dial and Drive Assembly)				4.55

* Used on Telephone Dial models only—See Fig. 2.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94503	R1	50,000 Ohm	0.2	$0.15
A94602	R2	5,000 Ohm	0.2	.15
C94263	R3	25,000 Ohm	1.0	.15
A94805	R4	8 Megohm	0.2	.15
A94805	R5	8 Megohm	0.2	.15
A95105	R6	1 Megohm	0.2	.10
A94151	R7	150 Ohm	0.2	$0.15
C94153	R8	15,000 Ohm	1.0	.15
D94163	R9	16,000 Ohm	2.0	.30
A95503	R10	50,000 Ohm	0.2	.10
*A95106	R11	10 Megohm	0.2	.10
A95503	R12	50,000 Ohm	0.2	.10
A95205	R13	2 Megohm	0.2	.10
A94202	R14	2,000 Ohm	0.2	.15
A95205	R16	2 Megohm	0.2	.10
A95154	R17	150,000 Ohm	0.2	.10
A95254	R18	250,000 Ohm	0.2	.10
A95504	R19	500,000 Ohm	0.2	.10
A95503	R22	50,000 Ohm	0.2	.10
B94803	R24	80,000 Ohm	0.5	.15

WIRE WOUND

43X83	R20	25 Ohm	.25	.30
	R21	210 Ohm	2.0	

VARIABLE

36X236	R15	500,000 Ohm	Volume Control and On-Off Switch	1.00
40X223	R23	.15 Megohm	Tone Control	.65

* Used on Telephone Dial models only—See Fig. 2.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch and Knob)	$2.55
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

DIAL AND DRIVE ASSEMBLY

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE Notes (see index)

Prices Subject to Change Without Notice.

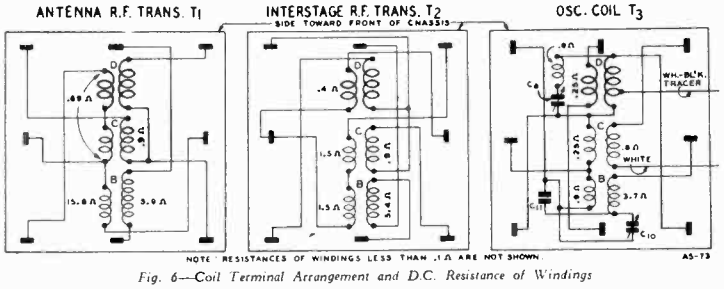


Fig. 6—Coil Terminal Arrangement and D.C. Resistance of Windings

Series C6 Replacement Parts

The following parts list covers two types of the Series C6 auto radio.

Type "A" has a rectangular dial scale with a sliding pointer.

Type "B" has a circular dial scale with a rotating pointer disc.

All parts shown are common to both types of radios except in the case of part numbers with the letter "A" or "B" in front of them. Part numbers with a letter in front of them are used only on the type radio indicated by the letter.

NOTICE—There is a chassis number label on the inside of the bottom chassis cover. This chassis number identifies the radio as to chassis, dial, and issue number. When ordering parts or writing, be sure to mention the chassis number.

Manufacturer — Wells-Gardner & Co., 2701 N. Kildare Avenue, Chicago, Illinois, U. S. A.

Prices Subject to Change Without Notice.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A263	Tube Socket—Octal (8 prong)	$0.15
3A271	Tube Socket—Octal (7 prong)	.10
3A267	Vibrator Socket (7 prong)	.15
3A274	Tube Socket—Octal (5 prong)	.10

SPEAKER

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

Part No.	Description	List Price
12A309	6" Dynamic Speakar complete with Output Transformer (T5)	$3.20
	Cone and Voice Coil Assembly for above Speaker	1.40
	Output Transformer only (T5)	1.25
(B) 14X226	Speaker Housing only	1.30
(A) 14X227	Speaker Housing only (Tan color)	1.30
(A) 14X229	Speaker Housing only (Brown color)	1.30
14X213	Grille Cloth	.10
14X204	Wire Screen	.15
13X331	Speaker Cable only	.40

GENERAL

19A32	Vibrator Unit	3.50
28X186	Spring Clamp for Vibrator	.10
(B) 34X256	Chassis Case only	1.25
(B) 34X257	Chassis Case Cover only	.45
(B) 34X258	Front Case Cover only (less Dial Scale and Retaining Plate)	.40
(B) 34X264	Chassis Case Back—Issue No. 2	.30
(A) 34X261	Chassis Case only (Tan color)	1.20
(A) 34X266	Chassis Case only (Brown color)	1.20
(A) 34X262	Chassis Case Cover only (Tan color)	.45
(A) 34X254	Chassis Case Cover only (Brown color)	.45
(A) 34X260	Front Case Cover only (Less Celluloid Crystal and Retaining Spring)—Tan color	.40
(A) 34X267	Front Case Cover only (Less Celluloid Crystal and Retaining Spring)—Brown color	.40
(A) 34X263	Chassis Case Back (Brown color)—Issue No. 2	.30
32X30	Tube Shield Base	.10
32X24	Tube Shield	.10
30X44	Grid Clip only Doz.	.10
(B) 10A151	Tone or Tuning Control Knob	.10
(A) 10A150	Tone or Tuning Control Knob	.10
4A30	Terminal Strip (Single Lug Insulated—Mtg. Lug Ext.)	.10
4A38	Terminal Strip (Single Lug Insulated—One Mtg. Foot)	.10
4A76	Terminal Strip for Antenna Connection (Marked HC and LC)	$0.10
4A77	Terminal Strip (3 Lugs Insulated—One Mtg. Foot)	.10
32X106	Shield for Power Transformer and Filter Assembly	.35

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
(B) 9A940	T1	Antenna Transformer and Can Assembly	$1.20
(A) 9A952	T1	Antenna Transformer and Can Assembly	1.20
9A941	T2	Oscillator Coil Assembly	.60
9A942	T3	1st I.F. Transformer Assembly	1.20
9A943	T4	2nd I.F. Transformer Assembly	1.00
42X102		1st and 2nd I.F. Can Assembly (Issue No. 1 Type using Spring Mounting Lugs)	.30
42X105		1st and 2nd I.F. Can Assembly (Issue No. 2 Type using Threaded Mounting Lugs)	.30
	T5	Output Transformer (See "Speaker").	
53X178	T6	Power Transformer	1.20

Part No.	Description	List Price
9A946	L1 Antenna Motor Noise Reactor	.20
9A945	L3 "A" Line Motor Noise Reactor	.20
9A960	L4 "B" Reactor (Issue No. 2)	.20
9A944	L5 Vibrator Reactor	.25
9A959	L6 "A" Line Reactor	.15

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C3	.05 mf.	180	$0.15
46X117	C6	.25 mf.	180	.25
46X211	C9	.04 mf.	180	.10
46X211	C12	.04 mf.	180	.10
46X124	C18	.01 mf.	180	.15
46X228	C22	.018 mf.	1200	.35
46X229	C23	.10 mf.	300	.15
46X226	C25	.25 mf.	180	.20
46X226	C26	.25 mf.	180	.20
46X124	C28	.01 mf.	180	.15
46X147	C30	.005 mf.	360	.15

ELECTROLYTIC

45X239	C17	10 mf.	25	Dry	.30
45X236	C29A	4 mf.	25	Dry	1.20
	C29B	21 mf.	200		
	C29C	14 mf.	250		

MOLDED

47X63	C1	10 mmf.	.15
47X44	C8	35 mmf.	.10
47X57	C15	100 mmf.	.10
47X57	C16	100 mmf.	.10
47X41	C20	2000 mmf. (Issue No. 1 only)	.20
47X65	C21	250 mmf.	.15
47X65	C27	250 mmf.	.15

TRIMMER

Part of Gang Condenser	C2	Antenna Trimmer	
	C5	Oscillator Trimmer	
17A57	C10	50-120 mmf. — 1st I.F.	.35
	C11	50-120 mmf. — 1st I.F.	
17A80	C13	50-120 mmf. — 2nd I.F.	.30
	C14	65-185 mmf. — 2nd I.F.	

MISCELLANEOUS

47X101	C4	13 mmf. Compensating Capacitor	.35
47X96	C7	200 mmf. Iron Clad	.10
47X96	C19	200 mmf. Iron Clad	.10
47X96	C24	200 mmf. Iron Clad	.10
(B) 14A90		2 Section Gang Condenser only—Less Push Button Tuning and Dial Assemblies	2.30
(A) 14A89		2 Section Gang Condenser only—Less Push Button Tuning and Dial Assemblies	2.35

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A84101	R1	100 Ohm	0.2	$0.15
A85503	R2	50,000 Ohm	0.2	.10
A85403	R3	40,000 Ohm	0.2	.10
A85303	R4	30,000 Ohm	0.2	.10
A85503	R5	50,000 Ohm	0.2	.10
A85205	R6	2 Megohm	0.2	.10
A85504	R7	500,000 Ohm	0.2	.10
A85103	R8	10,000 Ohm	0.2	.10
A95502	R9	5,000 Ohm	0.2	.10
A85504	R11	500,000 Ohm	0.2	.10
A84671	R12	670 Ohm	0.2	.15
A85105	R13	1 Megohm	0.2	.10
C94801	R14	800 Ohm	1.0	.15
A85201	R15	200 Ohm	0.2 (Issue No. 1 only)	.10

VARIABLE

(B) 36X248	R10	2 Megohm	Volume Control and On-Off Switch .75
(A) 36X247	R10	2 Megohm	Volume Control and On-Off Switch .75

MISCELLANEOUS ITEMS

16X26	1	9 Ampere Fuse	.10
21A6	1	Distributor Suppressor	.35
48X27	1	Generator Condenser	.45
21A5	1	Choke-Condenser Unit (Not shipped with radio)	1.50
21A7	1	Spark Plug Suppressor (Not shipped with radio)	.35

PUSH BUTTON TUNING AND DIAL AND DRIVE ASSEMBLY

(TYPE "B" RADIO)

Part No.		Description	List Price
20A40		Push Button Tuning Assembly Complete with Large Drive Pulley, Idler Pulley Bracket and 2 Idler Pulleys less Push Buttons, Dial Assembly, and Locking Knob	$3.00
10A148		Locking Knob only	.10
37X123		Rod for Turning Above Knob Doz.	.10
19X127		Flat Washer (2 used behind Locking Knob) Doz.	.10
25A268		Connecting Arm and Counter-Weight Assembly	.15
28X187		Tension Spring for Above Assembly Doz.	.20
28X68		Tension Spring for Drive Cord Doz.	.20
		30" Drive Cord Ea.	.05
25A300		Pointer Disc and Pulley Assembly	.45
28X129		Hairpin Spring used on Pointer Disc and Pulley Shaft Doz.	.10
26X287		Shaft for Tuning Knob	.10
19X67		Horseshoe Washer used on above Shaft Doz.	.10
7A57		Dial Lamp Socket	.10
		No. 51 Dial Lamp	.20
Specify Name and Chassis No. of Radio		Celluloid Dial Scale	.20
10A155		Push Button only Ea.	.10
26A101		1 Call Letter Sheet and 6 Celluloid Tabs	.10

(TYPE "A" RADIO)

Part No.	Description	List Price
20A41	Push Button Tuning Assembly with Connecting Arm less Push Buttons, Locking Knob and Dial Assembly	$2.90
10A148	Locking Knob only	.10
37X123	Rod For Turning Above Knob Doz.	.10
19X127	Flat Washer (2 used behind Locking Knob) Doz.	.10
25A273	Dial Bracket Assembly Complete with 4 Idler Pulleys and Studs	.65
26A102	Drive Drum and Counter-Weight Assembly	.20
20X250	Spring Clamp to hold Drive Drum to Gang Condenser Shaft Doz.	.20
28X187	Tension Spring for above Assembly Doz.	.20
28X174	Tension Spring for Drive Cord Doz.	.25
	30" Drive Cord Ea.	.05
26X290	Shaft For Tuning Knob	.15
19X67	Horseshoe Washer (used on Above Shaft) Doz.	.10
58X301	Celluloid Dial Scale	.15
41X28	Celluloid Light Diffuser (Mounted at front of Push Button Tuning Assembly)	.05
17X29	Celluloid Crystal	.15
15X125	Pointer for Dial	.10
28X193	Retaining Spring for Above Crystal Doz.	.60
7A57	Dial Lamp Socket	.10
	No. 51 Dial Lamp	.20
10A144	Push Button Only	.10
10A160	Push Button Guards (Bakelite)	.10
26A101	1 Call Letter Sheet and 6 Celluloid Tabs	.10

INSTALLATION ITEMS

CABLES

Part No.	Quantity	Description	List Price
13X332	1	60" Antenna Cable and Plug	$0.75
13X330	1	Battery Cable (Long Section with Fuse Receptacle)	.20
13X329	1	"A" Cable—Short Section Connected to Chassis (Part of Chassis Assembly)	.10

SPEAKER AND CHASSIS MOUNTING PARTS

20X59	1	Double End Hex Bolt for Mounting Speaker to Fire Wall	.10
	1	5/16"—18 Hex Nut for above Mounting Bolt Doz.	.25
	1	5/16" Spring Locknut for above Mounting Bolt Doz.	.10
19X18	1	Flat Washer for above Bolt Doz.	.15
2X282	1	Wood Spacer for Speaker (3" sq. X 1 3/16" thick)	.10
2X284	1	Wood Spacer for Speaker (3" sq. X 1⅜" thick)	.10
25X516	1	Mounting Strap for Chassis	.10
(A) 25X524	1	Front Stud Mounting Bracket (Used temporarily on some early models—part of chassis case on late models.)	.55
20X265	2	¼"—20 X ½" Square Head Bolts (Used to Mount Chassis to Instrument Panel) Doz.	.15
	3	⅛"—20 X 13/16" Wing Nuts (Used on above Bolts on No. 2 Issue radios and on front mounting studs on No. 1 Issue radios—Also to hold mounting strap to chassis) Doz.	.20
	3	⅛" Split Lockwashers (Used with above Wing Nuts) Doz.	.05
	1	¼"—20 X 1" Flat Head Bolt (Used to hold Mounting Strap to Fire Wall or Cowl) Doz.	.10
	1	¼"—20 Hex Nut (Used on above Flat Head Bolt) Doz.	.05
19X42	1	Flat Washer (Used on above Flat Head Bolt) Doz.	.05

Issue Number

The last number of the number on the chassis number label identifies the radio as to the issue number. In this model, this label will be found on the inside of the bottom chassis cover.

Issue No. 1

Mechanical Assembly—The 2 front mounting studs are attached to the top of the chassis case.

The I.F. coil cans have a spring clip by means of which they are secured to the chassis.

The back of the chassis case is not removable.

Electrical Assembly—See electrical changes under "Issue No. 2."

Issue No. 2

Mechanical Changes—The chassis case is supplied with a front mounting bracket and this bracket is secured to the instrument panel of the car by means of 2 separate bolts.

The I.F. cans use a threaded spade lug which extends through the chassis base and is secured in place with nuts and lock washers.

The back of the chassis case can be removed.

Electrical Changes—The following changes are all illustrated in the schematic—Fig. 1.

The 6H6 tube plate No. 1, which was connected originally to ground is removed from ground and connected as shown in the schematic.

Condenser C20 is removed.

The position of condenser C21 is changed as shown.

Resistor R15 (200 ohms) is removed and replaced by choke *1A*.

Two Models of C6 Radio

There are 2 models of Series C6 auto radio.

One model has a rectangular dial scale with a sliding pointer.

The other model has a circular dial scale with a rotating pointer disc.

The 2 models also differ in the capacities of the antennas which may be used. The values are shown in article "Antenna Capacity."

WELLS-GARDNER & CO.

MODEL C6 Series
Schematic, Coils
Specifications

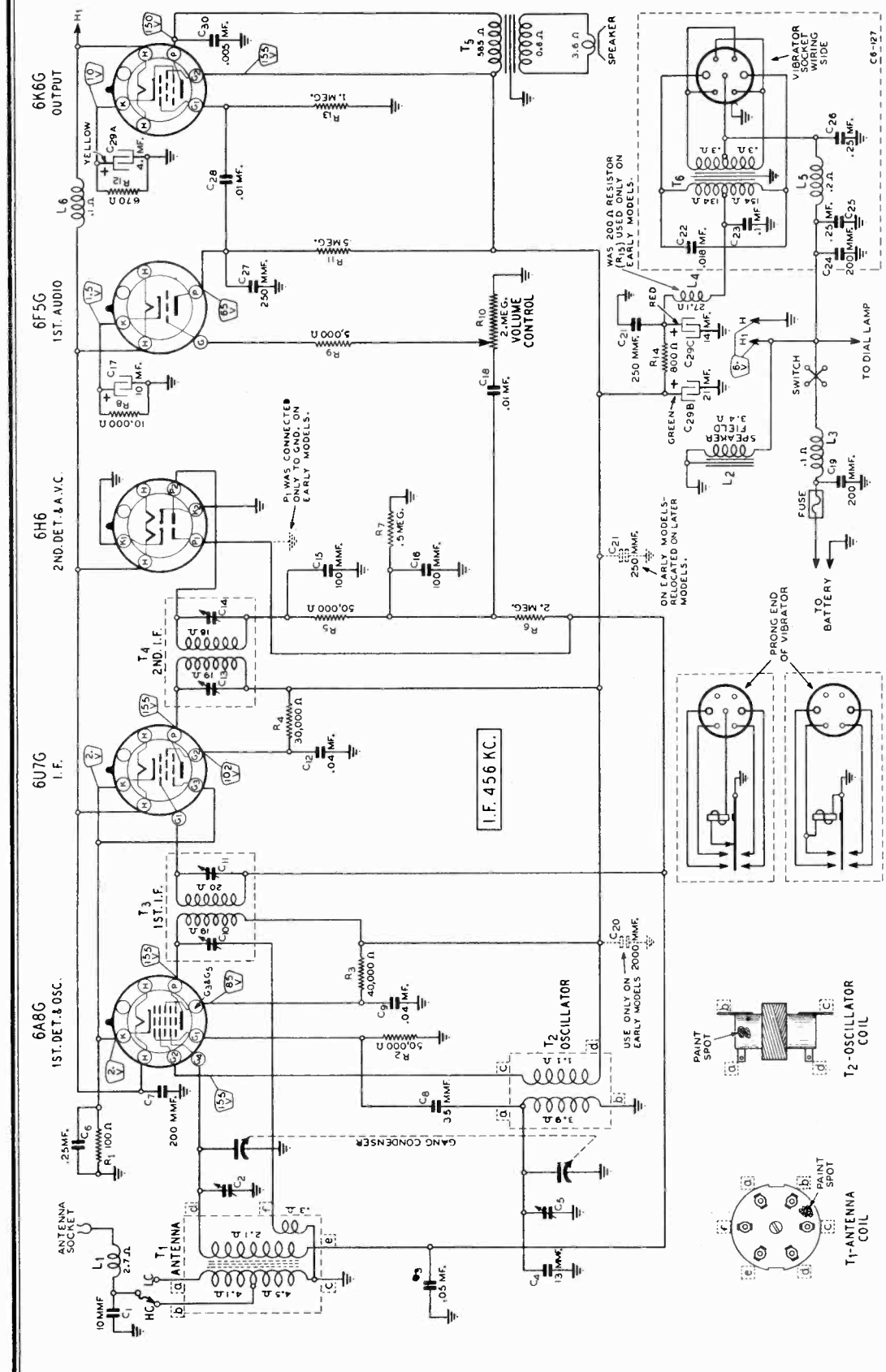


Fig. 1—Schematic Circuit Diagram

Power Consumption - -	5.5 Amperes at 6.3 Volts
Power Output - - - - -	.8 Watt Undistorted
Sensitivity - -	10 Microvolts at .5 Watt Output
Selectivity -	42.5 KC Broad at 1000 Times Signal
Tuning Frequency Range - - -	528 to 1550 KC
Intermediate Frequency - - - - - - -	456 KC
Speaker - - - - - - - - - - - -	6" Dynamic

APRIL, 1938

MODEL C6 Series
Socket, Circuit Data
Drive Cord Data
Alignment

WELLS-GARDNER & CO.

SERIES C6

5 TUBE

AUTO RADIO

Circuit

This model is a 5 tube automobile radio with a tuning range as shown in the specifications above. The signal is fed through an antenna transformer with tuned secondary into a 6A8G tube which functions as the 1st detector and oscillator. The end connection and tap connection on the primary of the antenna transformer permit the use of a high or low capacity car antenna.

The oscillating circuit is always resonant at 456 KC above the frequency to which the antenna circuit is tuned.

Resistance coupling is used between the 1st audio stage and the output stage, which employs a type 6K6G pentode output tube. A dynamic reproducer is used.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

Polarity in inserting the vibrator must be observed. It can be inserted in two ways, and the correct method depends on which terminal of the car storage battery is grounded.

One stage of I.F. amplification is employed using a 6U7G tube.

A type 6H6 tube functions as the 2nd detector and AVC tube. AVC voltage is applied to the control grid circuits of the 1st detector and I.F. tubes.

A 6F5G tube is used in the first audio stage.

Fig. 2—Replacing Drive Cord—Rotating Pointer Models

Drive Cord Replacement—Rotating Pointer Models

Tie a knot with a small loop at one end of the new drive cord. The free end of the drive cord is tied to the tension spring. The distance between knots should be 23⅛ inches.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2 (Shown with gang condenser half open). Bring the cord up through the slot in the drum rim and wind one-half turn to the rear (from front of chassis) around the drive drum. Pass cord around the pulley B as shown. Wind one turn clockwise (from front of chassis) around pointer disc pulley C. Loop cord through the notches on the outside rim of the pointer disc pulley as shown. Wind 2½ turns clockwise, progressing from a point midway between the bracket arms toward the chassis, on tuning control shaft D. Bring cord to the left under pointer disc pulley C and around pulley E as shown. Pass cord to top of drive drum A and wind one turn to the rear around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum rim. Place free end of spring over the hook on the condenser drive drum.

Setting Pointer Disc—Tune in an 800 KC signal. Hold the tuning shaft and turn the pointer disc until the pointer is at the correct position when the chassis front cover is put back in place.

Drive Cord Replacement—Sliding Pointer Models

Remove the celluloid dial scale. Open the clamps on the back of the dial pointer in order to remove the old drive cord.

It is not necessary to remove the dial and drive bracket assembly in order to replace the drive cord.

Tie a knot with a small loop at one end of the new drive cord. Slide a ½ inch length of fabric tubing on the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 28⅝ inches.

Turn the gang condenser to full open position.

Place the looped end of the drive drum A—See Fig. 3. Bring the cord up through the slot in the drum rim as shown. Wind 3½ turns on tuning control shaft C, progressing from a point midway between the two bracket arms toward the chassis. Bring cord under pulley D and around pulleys E and F as shown. See that the fabric tubing is now between pulleys E and F. Bring the drive cord to the rear around drive drum A and through the slot in the drum rim as shown.

Turn the gang condenser to full open position and place the free end of the tension spring over the hook on drive drum A.

If the antenna is connected at the LC terminal, the antenna cable has been cut as explained in the instructions. If cut in half (30-inch length), the capacity of the antenna cable is approximately 35 mmf. Connect the antenna wire, in this case, through a 25 mmf. condenser to the antenna post of the signal generator.

Fig. 3—Replacing Drive Cord—Sliding Pointer Models

Dial Pointer Adjustment—Mount the celluloid dial scale on the dial bracket. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the dial scale and tighten the clamps with long nose pliers.

Calibration—Sliding Pointer Models—The pointer assembly is clamped to the drive cord and it is seldom necessary to reset it to obtain proper dial calibration. If re-calibration is required, loosen the clamps with a screw driver, bringing the pointer assembly first down to one end of the dial scale and then down to the other end. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the scale and tighten the clamps with long nose pliers.

Alignment Procedure

Remove the bottom and front chassis covers. Directions for removing the bottom cover are in the instruction book.

To remove the front cover, first pull the knobs and buttons off the shafts. Remove the 2 screws at the top and the 2 screws at the sides of the front cover. Press in the sides of the chassis case to release the lugs at the sides of the front cover. Pull outward on the bottom of the front cover and then push the cover up until the lugs at the top are released.

Do not remove the back of the chassis case. This back can be taken off of the No. 2 and later issue sets.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 1st Detector. Connect the ground lead of the signal generator to the chassis. Set the volume control at maximum. Attenuate the signal from the signal generator to prevent the leveling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. These trimmers can be reached through the 4 holes in the back wall of the chassis case. It will be necessary to pull out the fiber insulating sheet a slight amount.

Insert the antenna cable plug in the antenna socket on the chassis.

Rotating Pointer Models—If the antenna is connected at the HC terminal and the entire 60-inch shielded cable (70 mmf.) is being used, connect the antenna wire at the other end through a 120 mmf. condenser to the antenna post of the signal generator.

If the antenna is connected at the LC terminal and the short shielded cable (19 mmf.) is being used, connect the antenna wire, in this case, through a 20 mmf. condenser to the antenna post of the signal generator. If the long cable has been cut to length and is being used, the total capacity of the cable and the series condenser should be 38 to 40 mmf.

Both Models—Set the signal generator for 1550 KC. Turn the rotor of the tuning condenser to the full open position. Adjust the trimmer of the oscillator section of the gang condenser until maximum output is obtained. See Fig. 4 for location of this trimmer.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the trimmer of the antenna section of the gang condenser for maximum output.

Calibration—Rotating Pointer Models—To obtain dial scale calibration, tune in an 800 KC signal. Hold the tuning shaft and turn the pointer disc until the pointer is at the correct position when the chassis front cover is put back in place.

Fig. 4—Location of Tubes

Inserting Vibrator Unit

IMPORTANT—The vibrator unit can be inserted in two ways. The proper method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the + mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (−) terminal of the car battery is grounded, line up the − mark on the top of the vibrator with the arrow on the chassis base.

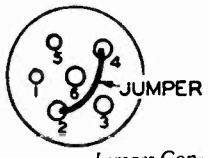
Antenna Capacity

Rotating Pointer Models—The antenna coil is designed for car antennas with a capacity of 190 mmf. for the HC connection and 60 mmf. for the LC connection. This capacity is the total capacity of the antenna and the shielded lead.

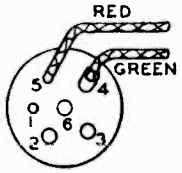
Complete information regarding car antenna installation will be found in the instruction book packed with the radio.

Sliding Pointer Models—The information for this type of radio is the same as above except that the HC capacity is 300 mmf. and the LC capacity is 38 mmf.

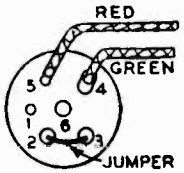
Roof Speaker and Dual Speaker Connections



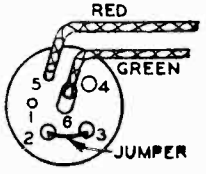
Jumper Connection for Chassis Speaker only



Single 5¼ Inch Roof Speaker



Dual 5¼ In. Roof & 6 In. Chassis Speakers

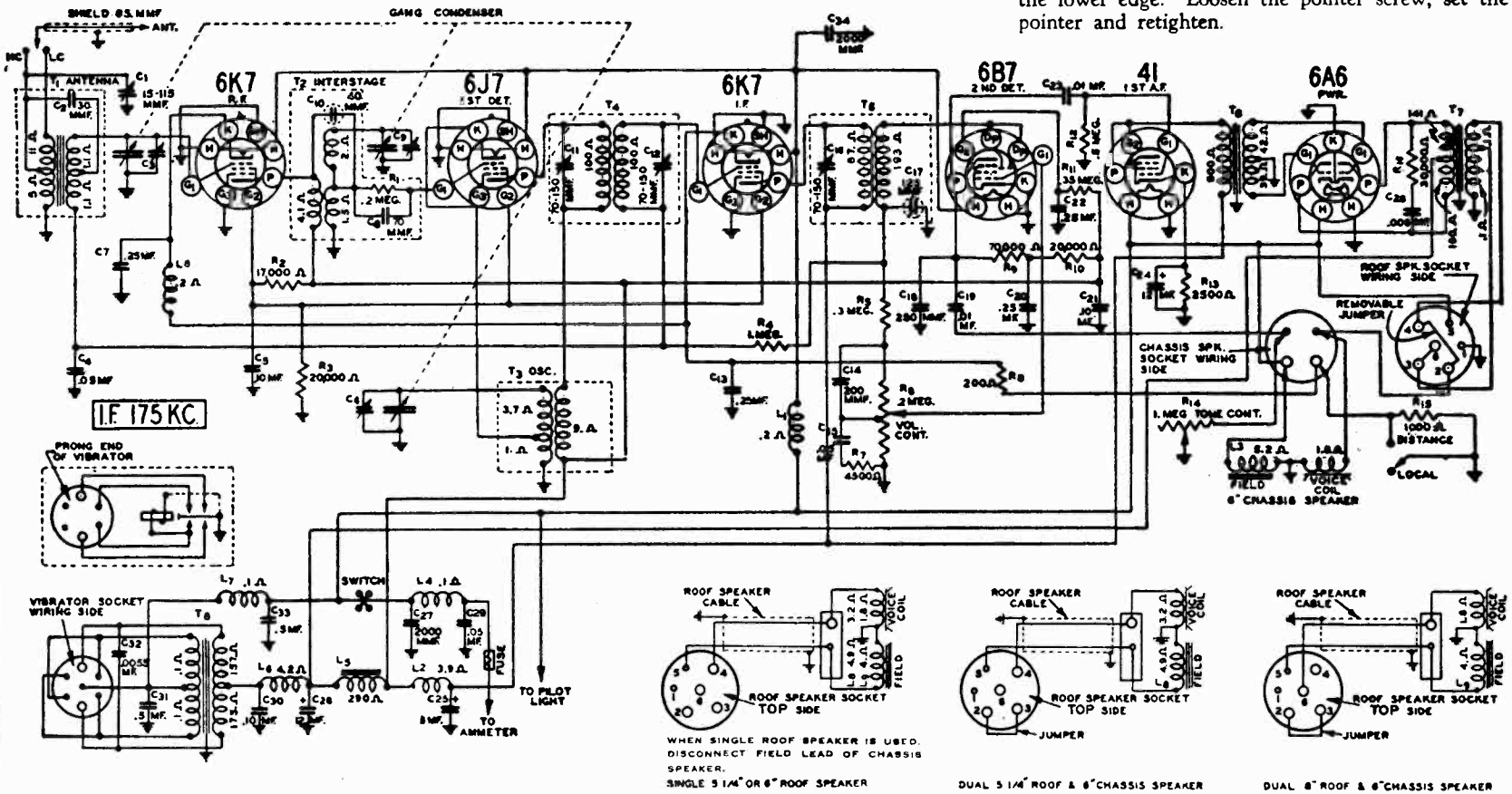


Dual 8 Inch Roof and 6 Inch Chassis Speakers.

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—see Fig. 10. Remove the pilot lamp assembly. 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. The knob must be held during this adjustment.

If the control head is inaccessible it may be calibrated by setting the pointer from the front. Remove the crystal by inserting a knife blade under the lower edge. Loosen the pointer screw, set the pointer and retighten.



WHEN SINGLE ROOF SPEAKER IS USED, DISCONNECT FIELD LEAD OF CHASSIS SPEAKER.

SINGLE 5 1/4" OR 6" ROOF SPEAKER

DUAL 5 1/4" ROOF & 6" CHASSIS SPEAKER

DUAL 8" ROOF & 6" CHASSIS SPEAKER

Inserting Vibrator Unit

Note that the vibrator unit can be inserted in two ways. The proper method of insertion will depend on which side of the car battery is grounded. Complete information is shown on the label on the vibrator.

Series 6J

CHANGES IN LATER MODELS

SERIES 6J June, 1937

Later models of the Series 6J have changes incorporated in them which are explained below. The models which have these changes may be identified by the issue letter which is a large letter stamped on top of the chassis base. The tube arrangement label on the chassis case cover also shows this issue letter.

When ordering parts, it is important that the issue letter be noted and the correct part number, as shown in the parts list, be specified.

The "D" issue Series 6J is different from the "B" and "C" The gang condenser used in the "D" issue radios does not have the cut plate oscillator section. A padding condenser (600 KC) was added in series with the oscillator section of this gang condenser and the oscillator coil. The padding condenser is a part of the 2nd I. F. trimmer unit and is mounted in the 2nd I. F. coil can.

The capacity (C17) shown within a dotted circle in the 2nd I.F. coil assembly on the schematic has been changed to an actual part as shown in the supplementary parts list.

The antenna, R.F. Interstage, oscillator, and 2nd I.F. coil assemblies have been changed and have been given new part numbers as shown in the supplementary parts list.

SUPPLEMENTARY REPLACEMENT PARTS

The PARTS of the Series 6J are used on the Series 6J "D" issue Radio with the following EXCEPTIONS: **PRICES ARE SUBJECT TO CHANGE**
THE FOLLOWING NEW PARTS ARE USED: **WITHOUT NOTICE**

No.	Code	Description	List Price
9A859	T1	Antenna Transformer and Can Assembly.....	$1.65
9A861	T2	R. F. Interstage Transformer and Can Assembly.....	1.75
9A862	T3	Oscillator Coil and Can Assembly.....	.95
9A858	T5	2nd I. F. Transformer and Can Assembly.....	2.35
47X57	C17	100 mmf. Molded Condenser.....	.10
17A79	(C16 (	30-100 mmf. 2nd I.F. Trimmer) 900-1300 mmf. Oscillator 600 KC Padder)	.45
14A77		3 Section Gang Condenser Complete with Drive Gears.....	5.05

THE FOLLOWING PARTS OF THE SERIES 6J ARE NOT USED ON THE SERIES 6J "D" ISSUE RADIO:

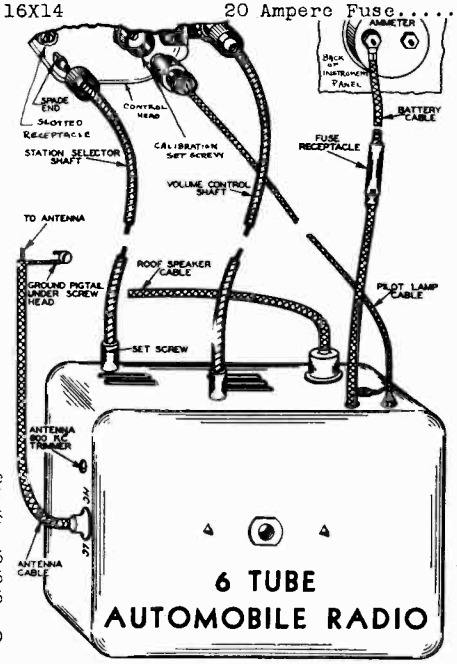
9A740) 9A771)	or T1	Antenna Transformer and Can Assembly.....	$1.65
9A741) 9A765)	or T2	R.F. Interstage Transformer and Can Assembly.....	1.70
9A742) 9A772)	or T3	Oscillator Coil and Can Assembly.....	.85
9A744	T5	2nd I.F. Coil and Can Assembly.....	1.60
17A65	C16	30-100 mmf. 2nd I.F. Trimmer.....	.20
14A65		3 Section Gang Condenser Complete with Drive Gears.....	5.85

The Following Changes apply to all Issues of the Series 6J:
THE FOLLOWING NEW PARTS ARE USED:

46X213	C29	.5 mf. 180 volt Tubular Condenser.....	$0.30
16X16		15 Ampere Fuse.....	.10

THE FOLLOWING PARTS ARE NOT USED:

46X207	C29	.5 mf. 180 volt Tubular Condenser.....	$0.30
16X14		20 Ampere Fuse.....	.10



General Installation View

Alignment Procedure

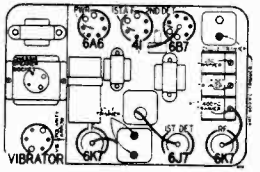
Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. Set the volume control at the maximum position and attenuate the signal from the signal generator to prevent the levelling off action of the AVC. Then adjust the three IF trimmers until maximum output is obtained

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. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

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 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Then set the signal generator for 600 KC and adjust the 600 KC antenna trimmer to maximum (see Fig. 10 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.



Location of Tubes and Vibrator

Adjusting Antenna 600 KC 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. 9 for location of this trimmer.

Antenna

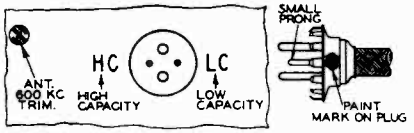


Fig. 9—Antenna Plug Insertion

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

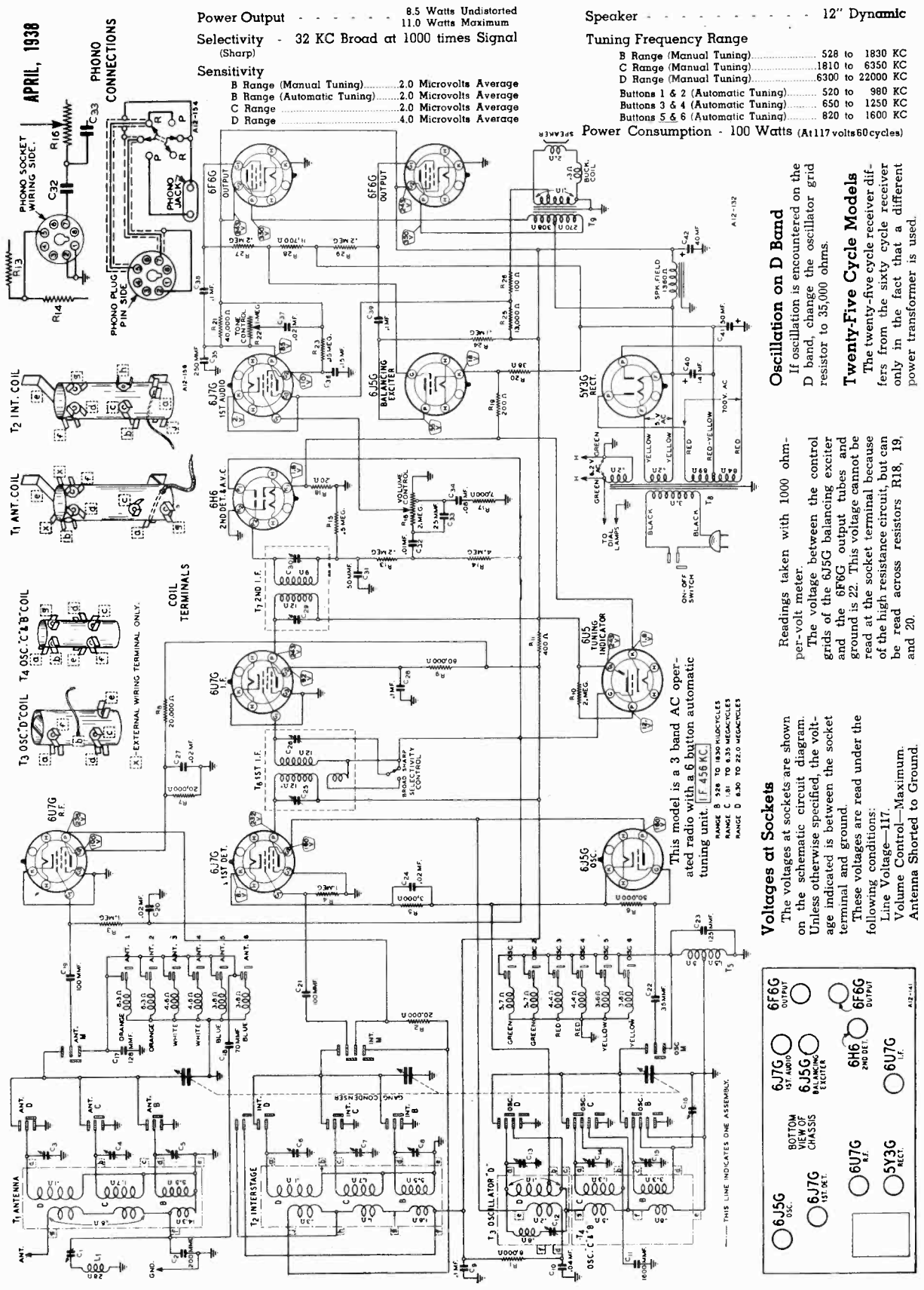
If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 9.

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

Specifications
Coils

WELLS-GARDNER & CO.

MODEL A12 Series
Schematic, Socket
Phono., Voltage



Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
Line Voltage—117.
Volume Control—Maximum.
Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.

The voltage between the control grids of the 6J5G balancing exciter and the 6F6G output tubes and ground is 22. This voltage cannot be read at the socket terminal because of the high resistance circuit, but can be read across resistors R18, 19, and 20.

Oscillation on D Band

If oscillation is encountered on the D band, change the oscillator grid resistor to 35,000 ohms.

Twenty-Five Cycle Models

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

MODEL A12 Series
Circuit Data
Alignment, Trimmers

WELLS-GARDNER & CO.

Circuit

Ten buttons are provided on the front panel. Three buttons actuate linear band switches for a broadcast and 2 short wave manual tuning ranges. Six buttons actuate switches which connect fixed tuned circuits for automatic tuning. Depressing any of the 9 band and automatic tuning buttons also turns on the radio. Depressing the 10th button will turn the radio to the off position.

The band switch has 4 arms as shown in Fig. 5, one each for the B, C, and D bands (broadcast, 1st and 2nd short wave, respectively) and one called the "Master" arm. The master arm switches from manual to automatic tuning and vice versa. This arm is actually over the other 3 arms rather than in back of them, as shown in the illustration. Depressing any of the B, C, or D band buttons actuates the arm for that band and also the master arm. The latter is in only when one of the 3 band switch buttons is depressed.

In manual tuning, an R. F. antenna transformer with tuned secondary is used before the 6U7G R.F. tube. The output of this tube is fed through another R. F. transformer with tuned secondary into the 6J7G 1st detector tube. A 6J5G tube functions as a separate oscillator. The antenna, interstage, and oscillator circuits are tuned by sections of the gang condenser.

In automatic tuning, the gang condenser is not used. A single tuned circuit is used before the R. F. tube while a stage of resistance coupling is employed between this tube and the 1st detector. The other automatic tuned circuit is the oscillator grid circuit. Tuning of the R. F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil.

The iron cores within the automatic tuning antenna and oscillator coil forms are secured to a brass rod. This rod is moved back and forth by a screw at the front of the radio.

Alignment between the oscillator and antenna automatic tuning coils is obtained by changing the antenna (rear) coil position while the iron core is held in place on the shaft.

In the schematic, the band switch and the automatic tuning switch are broken into sections each of which is given a name that is, to some extent, descriptive of its location in the circuit. Ant. D, for example, completes the antenna coil D band connections when the D range button is depressed. The location of the Ant. D connections on the band switch is shown in Fig. 5. All of the switches have only 2 positions. In the schematic, they are in the normal or button out position.

Now, to describe the connections for one manual tuning range: Let us assume that the B band button is depressed. The antenna transformer B band secondary is connected to the R. F. tube grid circuit through the Ant. B and Ant. M sections of the B band and master switch arms. The antenna transformer C and D band secondaries are short circuited.

The interstage transformer B band secondary is connected to the 1st detector tube grid circuit through the Int. B and Int. M sections of the switch arms mentioned above. The interstage transformer C band secondary is short circuited and the D band secondary is open circuited.

The oscillator B band grid coil is connected to the grid circuit of the oscillator tube through the Osc. B and Osc. M sections of the same switch arms as mentioned above. The oscillator B band cathode coil is connected to ground through the Osc. B section. The oscillator C and D band grid coils are short circuited.

The permeability tuning coils are open circuited.

In like manner, to describe the connections for one automatic tuning circuit, assume that button number 1 is depressed.

The antenna circuit is connected to the R. F. tube grid circuit through the Ant. M section of the master switch arm. The antenna circuit is also connected to the antenna No. 1 permeability coil through Ant. 1 switch. The antenna No. 1 coil is shunted by fixed condenser C17. The connections from the antenna and interstage transformer secondaries are open circuited.

The plate of the R. F. tube is connected in series with resistor R2 to the B+ line. It is also connected through coupling condenser C21 to the grid of the 1st detector. The latter is connected through grid leak R4 to ground.

The oscillator cathode circuit is connected through the tap on tracking coil T5 to ground. This tracking coil is connected through the Osc. M switch section to the control grid circuit of the oscillator tube. It is also connected to oscillator No. 1 coil through the Osc. 1 switch section. The tracking or oscillator grid coil is tuned by fixed condenser C23 and the inductance of oscillator coil No. 1.

One stage of I. F. amplification is employed using a 6U7G tube. An expander is used in the 1st I. F. transformer for high fidelity reception.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R. F. and I. F. tubes.

Across the volume control resistor R16 is a filter composed of condensers C33 and C34 and resistor R17. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6J7G 1st A. F. tube. The output of this tube is fed through resistance coupling into the 6F6G output tube immediately to the right of it in the schematic.

A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6J5G balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6F6G output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

Degeneration or negative feedback is used in the audio amplifier. A portion of the voltage developed across the secondary of the output transformer is fed back into the cathode circuit of the 1st audio tube. The voltage fed back is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

The power unit uses a 5Y3G full wave rectifier. A 6U5 tuning indicator tube is employed.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BUTTON DEPRESSED	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C29) & (C30)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C25) & (C26)
RANGE B					
1830 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C5) Int. Range B (C8)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C16) Rock Rotor—See Note B
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to 600 KC Adjust Sig. Gen.—See Note C	Wave Trap (C1) Adjust for MINIMUM Output
RANGE C					
6350 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C4) Int. Range C (C7)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
20,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Int. Range D (C6) Rock Rotor—See Note B
7000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	7000 KC (C12) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT				TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D
700 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
700 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
1100 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
1100 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

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

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

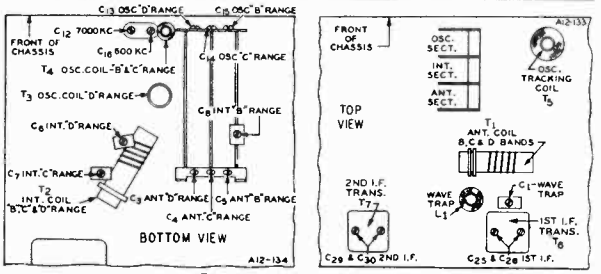


Fig. 1—Location of Trimmers

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 on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. steges.

SERIES A12

Drive Cord Replacement

LATE MODELS—Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾ inch length of fabric tubing on the cord. The free end of the drive cord should be tied to the tension spring in such a manner that there is a distance of 56⅜ inches between the knots.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2. Bring the cord up through the slot in the drum rim and pass to the right (from back of chassis) and around pulley B. Then bring the cord to the left and over pulley C. See that the fabric tubing is now between pulleys B and C. Continue cord down to control shaft D and wind 3½ turns counter-clockwise (from back of chassis) on shaft D. Bring cord up to and over pulley E. Bring cord down to top of drive drum A and wind one turn clockwise around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum. Place free end of spring over the hook on the condenser drive drum.

EARLY MODELS—The procedure is the same as for the late models with the following exceptions:

The distance between the knots on the drive cord should be 49¼ inches.

Leaving shaft D (Fig. 3), the drive cord is brought directly to the top of drive drum A and then continued as in late models.

Permeability Tuning and Band Switch Assemblies—Differences in Early Models

A few of the first models used a station button plunger 6$^{13}/_{32}$ inches long. These models may be identified by a red paint mark on the front bracket of the tuning unit at the upper right corner. On later models, this length was changed to 6$^{9}/_{16}$ inches. These models have an orange paint mark in place of the red mark. It is important, therefore, that the length be noted when ordering this part and the correct part number, as shown in the parts list, be specified.

The plungers are replaceable only on the permeability (6 button) tuning unit. In the case of the band switch unit, if any parts require replacing, the entire assembly must be ordered. Two of these assemblies are listed, one using the early short shaft and the other using the later long shaft. The short shaft (early unit) has no paint mark on it. The long shaft (late unit) has an orange paint mark on it.

A change was also made on the tuning rod assembly (Rod on which 2 iron cores are mounted). The rod used on early models was 3¾ inches long and the back end of the rod rested in a small cup in the end of the compression spring. The rod used on late models is 4¾ inches long, extends through the compression spring and projects beyond the rear bracket of the tuning assembly. Only the later type rod complete with the compression spring and a small washer is being furnished for replacement. This complete assembly is interchangeable with the early type.

ATTACHING DIAL POINTER—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.

Phonograph Connections

Phonograph connections are made in the schematic circuit diagram. On the back panel of the chassis base is a round knockout 1$^{9}/_{64}$ inches in diameter. An octal plug base socket is then mounted in this knockout opening. In the case of the jack. early models a 1$^{9}/_{64}$ inch hole must be drilled in the back panel. as shown A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phono-graph-radio switch and double tip

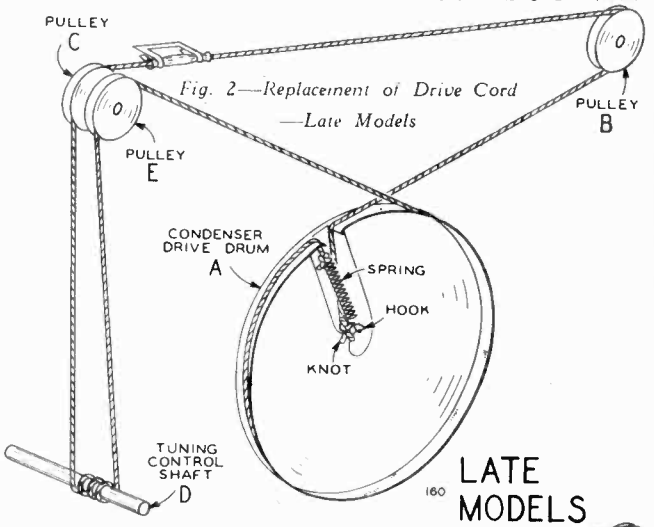


Fig. 2—Replacement of Drive Cord —Late Models

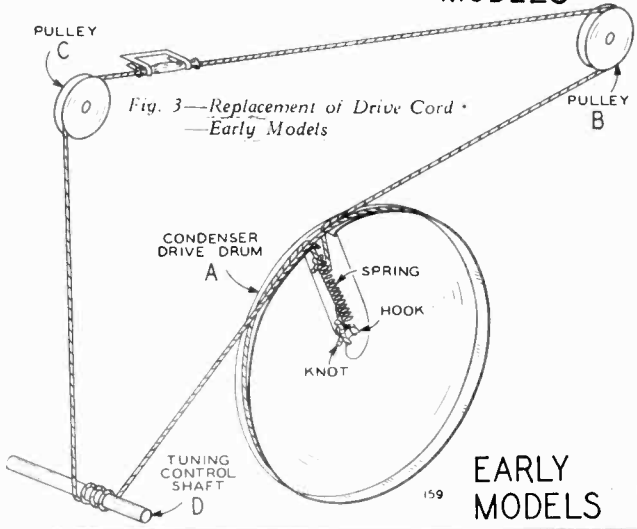


Fig. 3—Replacement of Drive Cord —Early Models

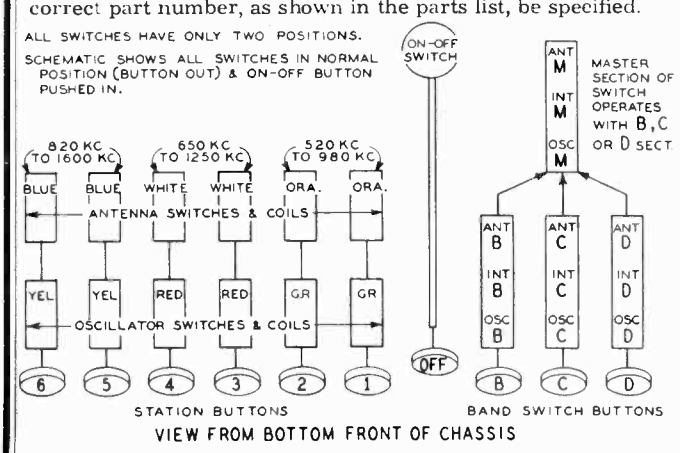


Fig. 5—Permeability Tuning Unit and Band Switch Arrangement.

Replacement Parts

NOTICE: There is a chassis number label on the chassis base. The chassis number identifies the radio as to chassis, dial, and issue number. When ordering parts or writing, be sure to mention the chassis number.

Manufacturer—Wells-Gardner & Co., 2701 N. Kildare Ave., Chicago, Ill., U. S. A.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A263	Tube Socket—Octal (8 Prong)	$0.15
3A256	Tube Socket—Octal (7 Prong)	.15
3A261	Tube Socket—Octal (5 Prong)	.10
3A269	Speaker Socket (5 Prong)	.10
13X334	Tuning Eye Tube Socket and Cable Assembly	.35

SPEAKER

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

12A307	12" Dynamic Speaker	5.75
	Cone and Voice Coil Assembly for above Speaker	2.80

KNOBS AND BUTTONS

Specify Name of Knob and Name and Model of Radio	Tone Control Knob	.15
	Volume Control Knob	.15
	Tuning Control Knob	.15
10A143	Station, Band Switch, and On-Off Buttons Ea.	.10

GENERAL

Part No.	Description	List Price
32X110	Tube Shield—for 6U7G I. F.	$0.10
32X115	Tube Shield—for 6U7G R. F.	.20
32X51	Tube Shield Base	.10
2X38	Felt Washers (Used behind knobs) Doz.	.10
8X69	Rubber Cushion (Chassis Mounting) Ea.	.10
30X44	Grid Clip only Doz.	.10
4A68	Terminal Strip (3 lugs insulated—1 mounting foot)	.10
4A52	Terminal Strip (4 lugs insulated—2 mounting feet)	.10
4A38	Terminal Strip (1 lug insulated—1 lug used for mounting)	.10
13X214	Antenna and Ground Lead Assembly	.30
13X80	Line Cord and Plug Assembly	.50
2A113	On-Off Switch	.25
37X118	Lever for operating above Switch	.10
28X27	Tension Spring for above Lever Doz.	.20

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A930	T1	Antenna Transformer Assembly	$1.55
9A931	T2	R.F. Interstage Transformer Assembly	1.35
9A938	T3	Oscillator Coil Assembly "D" Range	.75
9A932	T4	Oscillator Coil Assembly "B" and "C" Range	1.20
9A929	T5	Oscillator Tracking Coil	.45
9A933	T6	1st I.F. Transformer and Can Assembly	1.75
9A934	T7	2nd I.F. Transformer and Can Assembly	1.45
53X174	T8	117 Volt, 60 Cycle, Standard Power Transformer	3.90
53X175	T8	117 Volt, 25 Cycle, Standard Power Transformer	6.35
53X176	T8	117-234 Volt, 40-60 Cycle, Universal Power Transformer	5.00
51X61	T9	Output Transformer	1.40
9A939	L1	Wave Trap Coil	.30

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X105	C9	.10 mf.	360	$0.20
46X212	C10	.04 mf.	360	.15
46X187	C20	.02 mf.	180	.15
46X187	C24	.02 mf.	180	.15
46X223	C27	.02 mf.	240	.10
46X105	C28	.10 mf.	360	.20
46X120	C32	.01 mf.	360	.15
46X176	C34	.08 mf.	180	.15
46X227	C36	.15 mf.	360	.15
46X202	C37	.02 mf.	360	.15
46X109	C38	.10 mf.	360	.20
46X105	C39	.10 mf.	360	.20

ELECTROLYTIC

44X30	C40	14 mf.	450 Wet	1.00
45X238	C41	50 mf.	25 Dry	.55
44X36	C42	40 mf.	290 Wet	1.00

MOLDED

47X97	C2	200 mmf.	.10
47X90	C11	1600 mmf.	.20
47X98	C18	70 mmf.	.10
47X57	C19	100 mmf.	.10
47X57	C21	100 mmf.	.10
47X53	C22	35 mmf.	.10
47X56	C31	50 mmf.	.10
47X72	C33	25 mmf.	.10
47X65	C35	250 mmf.	.15

TRIMMER

Part No.	Code	Capacitance		List Price
17A64	C1	30-90 mmf.	Wave Trap	$0.25
17A88	C3	1-12 mmf.	Antenna Range "D"	.25
	C4	1-12 mmf.	Antenna Range "C"	
	C5	1-12 mmf.	Antenna Range "B"	
17A89	C6	1-12 mmf.	Interstage Range "D"	.10
17A89	C7	1-12 mmf.	Interstage Range "C"	.10
17A89	C8	1-12 mmf.	Interstage Range "B"	.10
17A88	C13	1-12 mmf.	Oscillator Range "D"	.25
	C14	1-12 mmf.	Oscillator Range "C"	
	C15	1-12 mmf.	Oscillator Range "B"	
17A87	C12	40-100 mmf.	7000 KC Range "B" Padder	.60
	C16	300-600 mmf.	600 KC Range "D" Padder	
17A85	C25	70-110 mmf.	1st I.F.	.30
	C26	70-110 mmf.		
17A86	C29	70-150 mmf.	2nd I.F.	.35
	C30	150-250 mmf.		

MISCELLANEOUS

47X100	C17	128 mmf.	Ceramic	.30
47X99	C23	125 mmf.	Ceramic	.30
14A88		3 Gang Condenser less Dial and Drive Assembly		3.45

DIAL AND DRIVE ASSEMBLY

Part No.	Description	List Price
26A96	Dial Mounting Plate only—Complete with 3 Idler Pulleys and Felt Dial Background less Tuning Knob Shaft, Volume and Tone Controls. (See Fig. 2 for method of replacing drive cord)	$1.25
25X520	Brace for above Mounting Plate (Top of Dial Mounting Plate to back of Chassis)	.10
521	Brace for Gang Condenser (Gang Mounting Bracket to side of Dial Mounting Plate)	.05
25A267	Tuning Eye Tube Clamp Assembly	.10
26X286	Tuning Knob Shaft only	.10
19X67	Horeshoe Washers for above Shaft Doz.	.10
24X350	Drive Drum for Condenser	.10
20X250	Spring Clamp to Hold Drive Drum to Shaft Doz.	.20
	60" Drive Cord (See Figs. 2 and 3) Ea.	.20
28X174	Tension Spring for Drive Cord Doz.	.25
	Dial Glass (Specify Name and Chassis Number of Radio)	.40
7X20	Felt Dial Background	.10
15X120	Pointer for Dial	.10
4X252	Dial Escutcheon and Celluloid Crystal Assembly	1.40
7A69	Dial Lamp Socket Assembly (2 Sockets with Wire)	.20
	Dial Lamp—No. 51	.20

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.70
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

PERMEABILITY TUNING AND BAND SWITCH ASSEMBLIES

Part No.	Description	List Price
2A109	Band Change Switch Assembly Complete with Trimmer Condensers less Push Buttons (Assembly with 4 push button shafts) Early, Short Shaft Type (No Paint Mark on Assembly)	$4.30
2A125	Same as above—Late, Long Shaft Type (Orange Paint Mark on Assembly)	4.30
25A265	Permeability Tuning Push Button Assembly Complete with 12 Coils less Push Buttons (Assembly with 6 push button shafts)	5.55
26A89	Front Bracket for Tuning Assembly—Includes 6 Setting Screws and Front Switch Contact Spring Strip	.75
20X249	Setting Screw Only—Part above Bracket Doz.	.20
26A90	Rear Bracket for Tuning Assembly—Includes Rear Switch Contact Spring Strip	.60
26A91	Station Button Plunger with 2 Switch Contacts mounted on Fiber Strips and 1 Rubber Bumper (Early Type—Length 6 3/32")	.10
26A92	Station Button Plunger with 2 Switch Contacts mounted on Fiber Strips and 1 Rubber Bumper (Late Type—Length 6 9/16")	.10
8X64	Rubber Bumper only for above Station Button Plunger and Band Switch Plunger Doz.	.10
28X182	Compression Spring for Station Button Plunger Doz.	.10
37X112	Locking Plate for Button Plungers (At Rear of Assembly—Length 7 1/4")	.10
28X183	Flat Pressure Spring for Locking Plate Doz.	.25
25X522	"L" Shaped Stop Bracket used behind above Spring (At back of Tuning Push Button Assembly) Doz.	.10
26A88	Fiber Blinder and Felt Pad (Used on Button Plungers and located behind Button Escutcheon) Doz.	.10
25X504	Adjustable Coil Support Bracket for Rear (Antenna) Coils	.10
28X184	Spring Clamps for holding front and rear coils in place Doz.	.10
26A93	Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16" Washer, and 1 Compression Spring (for Buttons Nos. 1 and 2—520-980 KC)	.30
26A94	Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16" Washer, and 1 Compression Spring (for Buttons Nos. 3 and 4—650-1250 KC)	.30
26A95	Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16" Washer, and 1 Compression Spring (for Buttons Nos. 5 and 6—820-1600 KC)	.30
9A925	Antenna Coil Assembly (Color—Orange; Range 520-980 KC; Buttons 1 and 2)	.15
9A936	Antenna Coil Assembly (Color—White; Range 650-1250 KC; Buttons 3 and 4)	.15
9A926	Antenna Coil Assembly (Color—Blue; Range 820-1600 KC; Buttons 5 and 6)	.15
9A927	Oscillator Coil Assembly (Color—Green; Range 520-980 KC; Buttons 1 and 2)	.15
9A937	Oscillator Coil Assembly (Color—Red; Range 650-1250 KC; Buttons 3 and 4)	.15
9A928	Oscillator Coil Assembly (Color—Yellow; Range 820-1600 KC; Buttons 5 and 6)	.15
9X47	Fiber Strip to Cover Setting Screws Doz.	.15
26A87	2 Call Letter Sheets and Celluloid Tabs	.45

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
C7480 2	R1	8,000 Ohm	1.0	$0.15
C75203	R2	20,000 Ohm	1.0	.10
A95105	R3	1 Megohm	0.2	.10
A95105	R4	1 Megohm	0.2	.10
A94302	R5	3,000 Ohm	0.2	.15
A94503	R6	50,000 Ohm	0.2	.15
B94203	R7	20,000 Ohm	0.5	.15
C94203	R8	20,000 Ohm	1.0	.15
B94803	R9	80,000 Ohm	0.5	.15
A95205	R10	2 Megohm	0.2	.15
A95401	R11	400 Ohm	0.2	.10
A95204	R13	200,000 Ohm	0.2	.10
A95405	R14	4 Megohm	0.2	.10

A95504	R15	500,000 Ohm	0.2	.15
A95502	R17	7,000 Ohm	0.2	.10
A94200	R18	20 Ohm	0.2	.15
D94201	R19	200 Ohm	2.0	.30
B93380	R20	38 Ohm	0.5	.20
B94403	R21	40,000 Ohm	0.5	.15
A94154	R23	150,000 Ohm	0.2	.15
A94104	R24	100,000 Ohm	0.2	.15
G94133	R25	13,000 Ohm	5.0	.40
A94101	R26	100 Ohm	0.2	.15
A93204	R27	200,000 Ohm	0.2	.15
A93L172	R28	11,700 Ohm	0.2	.20
A95204	R29	200,000 Ohm	0.2	.10

VARIABLE

36X245	R16	2.0 Megohm	Volume Control	.60
40X228	R22	1.0 Megohm	Tone and Selectivity Control	.90

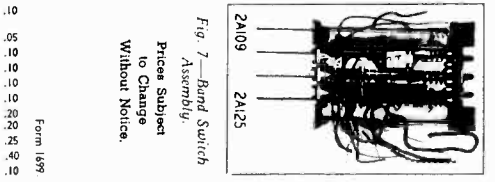


Fig. 7—Band Switch Assembly.

Prices Subject to Change Without Notice.

Form 1699

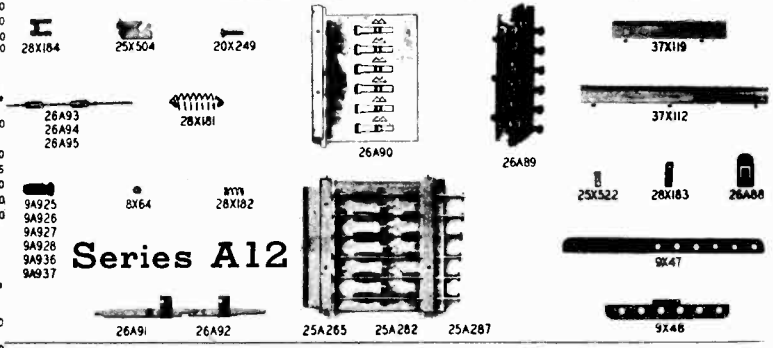


Fig. 6—Permeability Tuning Unit.

MODEL A14 Series
Schematic, Voltage
Coils, Socket, Phono.
Specs., Sensitivity

WELLS-GARDNER & CO.

SPECIFICATIONS

Power Consumption - 70 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 3.0 Watts Undistorted
4.0 Watts Maximum

Selectivity - 31.5 KC Broad at 1000 times Signal
(Sharp)

Sensitivity

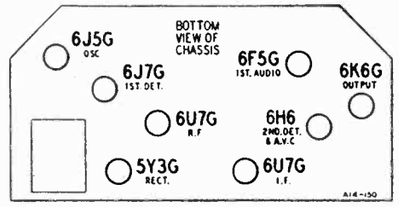
B Range (Manual Tuning)	1.0 Microvolt	Average
B Range (Automatic Tuning)	1.0 Microvolt	Average
C Range	3.0 Microvolts	Average
D Range	5.0 Microvolts	Average

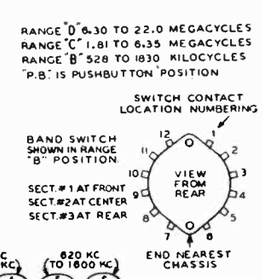
Intermediate Frequency - - - - - - - 456 KC.

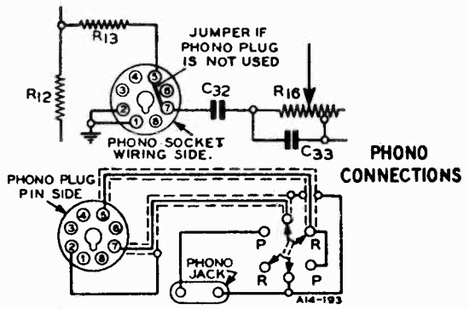
Speaker - - - - - - - - 10" or 12" Dynamic

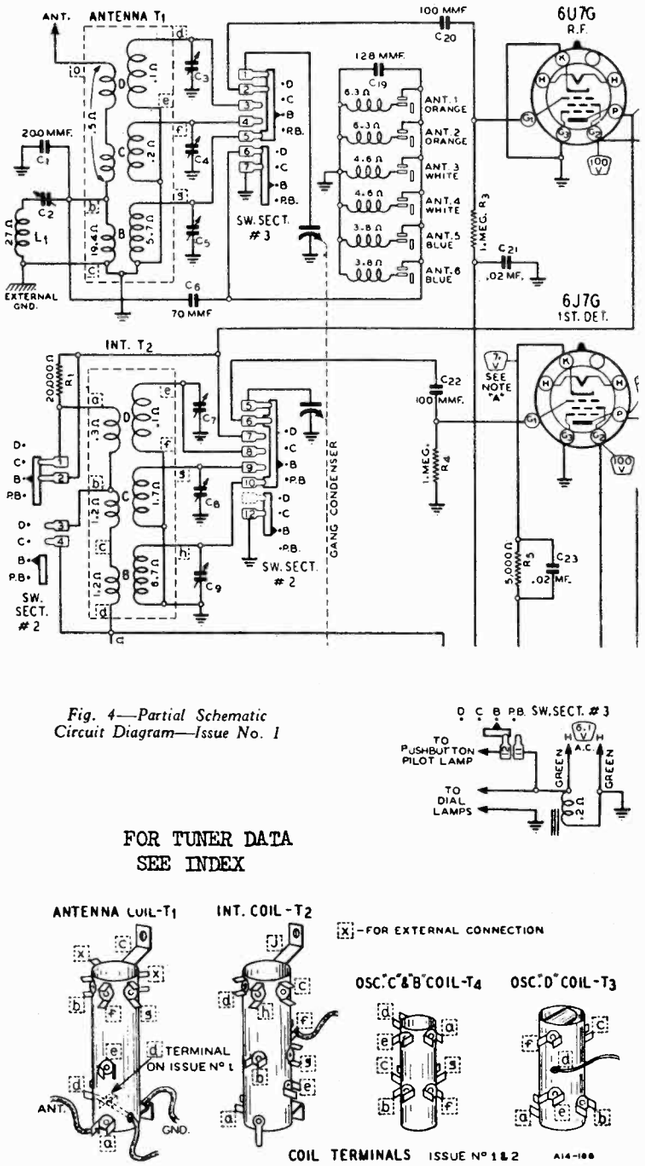
Tuning Frequency Range

B Range (Manual Tuning)	528 to	1830 KC
C Range (Manual Tuning)	1810 to	6350 KC
D Range (Manual Tuning)	6300 to	22000 KC
Buttons 1 & 2 (Automatic Tuning)	520 to	980 KC
Buttons 3 & 4 (Automatic Tuning)	650 to	1250 KC
Buttons 5 & 6 (Automatic Tuning)	820 to	1600 KC









HOME RADIO • A. C. POWER SUPPLY
9 TUBE • 3 BAND • ALL WAVE
WITH AUTOMATIC TUNING

Fig. 3—Schematic Circuit Diagram—Issue No. 2

Fig. 4—Partial Schematic Circuit Diagram—Issue No. 1

FOR TUNER DATA
SEE INDEX

SERIES A14

MAY, 1938

WELLS-GARDNER & CO.

MODEL A14 Series
Circuit Data, Changes
Phono. Data, Notes
Parts

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

placed by C44 in the automatic tuning coil circuit.

Drive Cord Replacement
SEE A12 SERIES.

ATTACHING DIAL POINTER—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 3. On the top of the chassis base and between the 6F6 and 6F5G tube sockets is a round knockout opening 1⅜ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (See parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made —See Fig. 3.

Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
Line Voltage—117.
Volume Control—Maximum.
Antenna Shorted to Ground.
Readings taken with 1000 ohm-per-volt meter.

Twenty-Five Cycle Models

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

Issue No. 1

Mechanical Assembly—The station button plunger has a length of 6 9/16 inches.

The locking plate for the station button plungers has 2 swivel tabs which fit into slots in the rear bracket of the tuner assembly—See Fig. 8.

Electrical Assembly—The schematic circuit diagram (Fig. 3) is that of issue No. 2 sets. The partial schematic illustration (Fig. 4) shows the sections of the issue No. 1 circuit which differ from the issue No. 2 circuit.

The A. V. C. voltage is applied directly to the R. F. tube grid circuit through a resistor.

Wave trap (L1 and C2) is in the antenna circuit.

Lugs 11 and 12 of band switch section No. 3 are used to connect a pilot lamp when the rotary band switch is in the automatic tuning (push button) position.

Issue No. 2

Mechanical Changes—The station button plunger has a length of 7⅝ inches.

The locking plate for the station button plungers has been re-designed and now employs 2 side arms mounted in rubber cushioned hinge brackets which are attached to the rear bracket of the tuner assembly by 2 screws—See Fig. 7.

Electrical Changes—The schematic circuit diagram (Fig. 3) is that of issue No. 2 sets.

The A. V. C. is fed into the R. F. tube grid circuit through the manual and the automatic tuning antenna coils.

The wave trap is in the R. F. tube plate circuit.

Lugs 11 and 12 of band switch section No. 3 are used to open the connection between the antenna circuit and the automatic tuning antenna coils.

The following changes are made to bring about the change mentioned above in the A. V. C. circuit:

C43 is inserted between the secondary of the antenna transformer and ground to isolate the A. V. C. from ground. C21 is replaced by C43. R23 is added to isolate the automatic tuning coils from the manual tuning coils. C1 is replaced by C42 and C45 in the automatic tuning coil circuit. R3 and C20 are removed from the R. F. tube grid circuit. C19 is removed from the antenna and interstage transformer secondaries are open circuited.

The plate of the R. F. tube is connected in series with resistor R1 to the B+ circuit. It is also connected through coupling condenser C22 to the grid of the 1st detector. The latter is connected through grid leak R4 to ground.

The oscillator cathode circuit is connected through the tap on tracking coil L2 to ground. This tracking coil is connected through the band switch to the control grid circuit of the oscillator tube. It is also connected to oscillator No. 1 coil through the One 1 switch. The tracking or oscillator grid coil is tuned by fixed condenser C17 and the inductance of oscillator coil No. 1.

One stage of I. F. amplification is employed using a 6U7G tube. An expander is used in the 1st I. F. transformer for high fidelity reception.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R. F. and I. F. tubes.

Across the volume control resistor R16 is a filter composed of condensers C33 and C34 and resistor R15. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6F5G A. F. tube. The output of this tube is fed through resistance coupling into the 6X6G output tube.

A dynamic reproducer is employed.

Degeneration or negative feedback is used in the audio amplifier. A portion of the voltage developed across the secondary of the output transformer is fed back into the cathode circuit of the 1st audio tube. The voltage fed back is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

The power unit uses a 5Y3G full wave rectifier. A 6U5 tuning indicator tube is employed.

General Service Data

Issue Number

The last digit of the number on the chassis number label identifies the radio as to the issue number.

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X212	C10	.01 mf.	350	$0.15
46X187	C21	.02 mf.	1500 (Issue No. 1 only)	.15
46X187		.02 mf.	1500	.15
46X223		.05 mf.	350	.15
46X185	C26	.1 mf.	350	.15
46X147		.1 mf.	350	.15
46X174		.25 mf.	350	.15
46X202	C38	.3 mf.	350	.15
46X100		.5 mf.	600	.15
46X88	C39, C41	1 mf.	180 (Issue No. 2)	.15
45X229	C37	10 mf. 25 Dry		.30
44X39	C40	20 mf. 390 Wet		.90
44X40	C41	40 mf. 300 Wet		.90

MOLDED

Part No.	Code	Capacitance	Voltage	List Price
47X97	C1	200 mmf.	(Issue No. 1 only)	.10
47X98		70 mmf.		.10
47X98		1600 mmf.		.10
47X93		35 mmf.		.15
47X97	C2	100 mmf.	(Issue No. 1 only)	.10
47X97		250 mmf.		.10
47X97		150 mmf.		.10
47X56		50 mmf.		.15
47X72		25 mmf.		.15
47X65	C35	250 mmf.		.10
47X106	C42, C45	500 mmf.	(Issue No. 2)	.20

ELECTROLYTIC

Part No.	Code	Capacitance			List Price
17A44	C2	30-90 mmf.	Wave Trap		$0.25
17A88	C3	1-12 mmf.	Antenna Range "C"		.25
	C4	1-12 mmf.	Antenna Range "B"		
	C5	1-12 mmf.	Antenna Range "A"		
17A35	C6	1-12 mmf.	Interstage Range "C"		.25
	C7	1-12 mmf.	Interstage Range "B"		
	C8	1-12 mmf.	Interstage Range "A"		
17A88	C9	40-100 mmf.	7000 KC Padder		.45
	C10	250-550 mmf.	600 KC Padder		
17A35	C11	1-12 mmf.	Oscillator Range "D"		.25
	C12	1-12 mmf.	Oscillator Range "C"		
17A88	C13	1-12 mmf.	Oscillator Range "B"		
	C14	1-12 mmf.	Oscillator Range "A"		
17A85	C15	70-110 mmf.	1st I.F.		.30
	C16	70-110 mmf.			
17A84	C17	70-150 mmf.	2nd I.F.		.35
	C18	150-250 mmf.			

TRIMMER

Capacitance			List Price
30-90 mmf.	Wave Trap		$0.25
1-12 mmf.	Antenna Range "C"		.25
1-12 mmf.	Antenna Range "B"		
1-12 mmf.	Antenna Range "A"		
1-12 mmf.	Interstage Range "C"		.25
1-12 mmf.	Interstage Range "B"		
1-12 mmf.	Interstage Range "A"		
1-12 mmf.	Oscillator Range "D"		.25
1-12 mmf.	Oscillator Range "C"		
1-12 mmf.	Oscillator Range "B"		
1-12 mmf.	Oscillator Range "A"		

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

12A310	10" Dynamic Speaker	14A93
	Cone and Voice Coil Assembly for above Speaker	4.75
12A311	12" Dynamic Speaker	2.00
	Cone and Voice Coil Assembly for above Speaker	4.00
12A316	10" Dynamic Speaker	2.80
	Cone and Voice Coil Assembly for above Speaker	5.40

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A953	T1	Antenna Transformer Assembly (Issue No. 1 only)	$1.45
9A994	T1	Antenna Transformer Assembly (Issue No. 2)	1.45
9A954	T2	R.F. Interstage Transformer Assembly	1.40
9A956	T3	Oscillator Coil Assembly "D" Range	.75
9A955	T4	Oscillator Coil Assembly "B" and "C" Range	1.00
9A957	T5	1st I.F. Transformer and Can Assembly	1.60
9A958	T6	2nd I.F. Transformer and Can Assembly	$1.30
53X102	T7	117 Volt, 60 Cycle, Standard Power Transformer	4.00
53X183	T7	117 Volt, 25 Cycle, Standard Power Transformer	4.75
53X184	T7	117 Volt, 40-60 Cycle, Universal Power Transformer	4.15
51X62	T8	Output Transformer	1.35
9A939	L1	Wave Trap Coil	.30
9A929	L2	Oscillator Tracking Coil	.85

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
C94203	R1	20,000 Ohm	1.0	$0.15
C94251	R2	25,000 Ohm	1.0	.15
A95105	R3	1 Megohm	0.2 (Issue No. 1 only)	.10
A95106	R4	2 Megohm	0.2	.10
A94502	R5	5,000 Ohm	0.2	.15
A94363	R6	35,000 Ohm	0.2	.15
C94105	R7	15,000 Ohm	0.2	.15
D94163	R8	16,000 Ohm	2.0	.30
B94803	R9	80,000 Ohm	0.5	.15
A95401	R10	400 Ohm	0.2	.10
A95205	R11, R12	2 Megohm	0.2	.10
A95284	R13	200,000 Ohm	0.2	.10
A95004	R14	500,000 Ohm	0.2	.10
A95702	R15	7,000 Ohm	0.2	.10
A95118	R17	150,000 Ohm	0.2	.10
A95254	R18	250,000 Ohm	0.2	.10
A94252	R20	2,500 Ohm	0.2	.15
C93203	R21	200 Ohm	1.0	.20
A94320	R22	32 Ohm	0.2	.15
A95504	R23	500,000 Ohm	0.2 (Issue No. 2)	.10

Part No.	List Price
25A528	
25A285	
26X291	
19X67	$0.15
24X350	.15
20X250	.10
	.10
26X174	.10
	.15
56X330	.15
15X131	.30
30X111	.15
17X32	.10
7A60	.10
	.10
	.10
	.10
	.15
133Z298	.20
	.15
3A266	.10

VARIABLE

363X250	R16	2 Megohm	Volume Control and On-Off Switch	.80
400X228	R19	1 Megohm	Tone and Selectivity Control	.90

Part No.	List Price
6A218	
3A12	
2A50	
10A90	

MISCELLANEOUS

			List Price
47X107	C17	130 mmf. Ceramic	$0.30
47X103	C19	128 mmf. Ceramic (Issue No. 1 only)	.25
47X105	C44	265 mmf. Silvered Mica (Issue No. 2)	.30
14A88		3 Gang Condenser less Dial and Drive Assembly (Issue No. 1 only)	3.45
		3 Gang Condenser less Dial and Drive Assembly (Issue No. 2)	3.45

DIAL AND DRIVE ASSEMBLY

No. 9 DIAL

Models using this dial may be identified by the round push buttons used on the tuning unit. The station call letters are mounted in the escutcheon above the buttons.

SEE PARTS 1-A 12 SERIES.

No. 10 DIAL

Models using this dial may be identified by the rectangular push buttons used on the tuning unit. The station call letter tabs are mounted in the push button.

26A114	Dial Mounting Plate only—Complete with 3 Idler Pulleys less Tuning Knob Shaft and Tone Control (See Fig. 5 for method of replacing drive cord)	$1.40
	Brace for above Mounting Plate (Top of Dial Mounting Plate to back of Chassis)	.10
25X528	Brace for Gang Condenser (Gang Mounting Bracket to side of Dial Mounting Plate)	.10
	Tuning Eye Tube Clamp Assembly	.10
	Tuning Knob Shaft only	.15
	Horse Shoe Washers for above Shaft Doz.	.10
	Drive Drum for Condenser	.10
20X250	Spring Clamp hold Drive Drum to Shaft Doz.	.20
	60" Drive Cord (See Fig. 5) Ea.	.25
26X174	Tension Spring for Drive Cord Doz.	.20
	Dial Glass (Specify Name and Chassis Number of Radio)	.40
	Dial Background	.85
	Pointer for Dial	.10
30X111	Clamp for Glass Crystal	.10
17X32	Plain Glass Crystal	.10
7A60	Dial Lamp Socket Assembly with Wire	.10
	Dial Lamp—No. 51	.20

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
133Z298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.70
3A266	Phono Socket—Octal (6 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (6 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.15
2A50	Phono Switch Only of Phono Cable	.20
10A90	Knob Only of Phono Cable	.10

AUTOMATIC TUNING ASSEMBLY

Part No.	Description	List Price
25A302	*Automatic Tuning Push Button Assembly Complete with 12 Coils less Push Buttons	$5.55
26A89	Front Bracket for Tuning Assembly—Includes 6 Setting Screws and Front Switch Contact Spring Strip	.75
20X249	Setting Screw Only—Part of above Bracket Doz.	.20
26A90	Rear Bracket for Tuning Assembly—Includes Rear Switch Contact Spring Strip—Issue No. 1 Only	.60
26A115	Rear Bracket for Tuning Assembly—Includes Rear Switch Contact Spring Strip—Issue No. 2	.60
26A92	Station Button Plunger with 2 Switch Contacts mounted on Fiber Strips and 1 Rubber Bumper—Issue No. 1 Only	.10
26A111	Station Button Plunger with 2 Switch Contacts mounted on Fiber Strips and 1 Rubber Bumper—Issue No. 2	.10
8X44	Rubber Bumper only for above Station Button Plunger Doz.	.10
28X198	Compression Spring for Station Button Plunger Doz.	.10
37X119	Locking Plate for Button Plungers (At Rear of Assembly—Length 4⅝")—Issue No. 1 Only	.10
28X183	Flat Pressure Spring for Locking Plate Doz.	.25
25X522	"L" Shaped Stop Bracket used behind above Spring (At back of Tuning Push Button Assembly)—Issue No. 1 Only Doz.	.10
37X130	Locking Plate for Button Plungers (At rear of Assembly)—Issue No. 2	.10
30X113	Hinge* Bracket for Locking Plate—Issue No. 2 Doz.	.10
8X71	Rubber Bushing for Hinge Bracket—Issue No. 2 Doz.	.18
26A88	Fiber Blinder and Felt Pad (Used on Button Plungers and located behind Button Escutcheon)—No. 9 Dial only Doz.	.10
28X504	Adjustable Coil Support Bracket for Rear (Antenna) Coils	.10
28X184	Spring Clamps for holding front and rear coils in place Doz.	.10
26A93	Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16" Washer, and 1 Compression Spring (for Buttons Nos. 1 and 2—520-980 KC)	.30
26A94	Tuning Rod Assembly—Includes 2 Iron Cores, one 3/16" Washer, and 1 Compression Spring (for Buttons Nos. 3 and 4—650-1250 KC)	$0.30
26A95	Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16" Washer, and 1 Compression Spring (for Buttons Nos. 5 and 6—920-1600 KC)	.30
28X181	Compression Spring for Tuning Rod Doz.	.25
9A925	Antenna Coil Assembly (Color—Orange; Range 520-980 KC; Buttons 1 and 2)	.15
9A934	Antenna Coil Assembly (Color—White; Range 650-1250 KC; Buttons 3 and 4)	.15
9A926	Antenna Coil Assembly (Color—Blue; Range 820-1600 KC; Buttons 5 and 6)	.15
9A927	Oscillator Coil Assembly (Color—Green; Range 520-980 KC; Buttons 1 and 2)	.15
9A937	Oscillator Coil Assembly (Color—Red; Range 650-1250 KC; Buttons 3 and 4)	.15
9A928	Oscillator Coil Assembly (Color—Yellow; Range 820-1600 KC; Buttons 5 and 6)	.15
9X48	Fiber Strip to Cover Setting Screws—No. 9 Dial Doz.	.15
9X60	Fiber Strip to Cover Setting Screws—No. 10 Dial Doz.	.15
26A97	2 Call Letter Sheets (U. S. Stations) and Celluloid Tabs —For Mounting in Escutcheon—No. 9 Dial	.40
26A113	1 Call Letter Sheet (U. S. Stations) and Celluloid Tabs —For Mounting on Push Button—No. 10 Dial	.15

Prices Subject to Change Without Notice.

Fig. 8—Issue No. 1 Automatic Tuning Unit Parts Which Differ From Issue No. 2.

Circuit

This model is a 3 band A.C. operated radio with a 6 button inductive type automatic tuning system.

A 4 position rotary switch is used to switch the tuning circuits from automatic (push button) tuning to any of the 3 manual tuning ranges (one broadcast and 2 short wave ranges).

In MANUAL TUNING, an R. F. antenna transformer with tuned secondary is used before the 6U7G R. F. tube. The output of this tube is fed through another R. F. transformer with tuned secondary into the 6U7G 1st detector tube. A 6U5G tube functions as a separate oscillator. The antenna, interstage, and oscillator circuits are tuned by sections of the gang condenser.

In AUTOMATIC TUNING, the gang condenser is not used. A single tuned circuit is used before the R. F. tube while a stage of resistance coupling is employed between this tube and the 1st detector. The other automatic tuned circuit is the oscillator grid circuit. Tuning of the R. F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil.

The iron cores within the automatic tuning antenna and oscillator coil forms are secured to a brass rod. This rod is moved back and forth by a screw at the front of the radio.

Alignment between the oscillator and antenna automatic tuning coils is obtained by changing the antenna (rear) coil position while the iron core remains stationary.

Now, to describe the connections for one MANUAL TUNING range: Let us assume that the rotary band switch is turned to the range B position. The antenna transformer B band secondary is connected to the R. F. tube grid circuit. The antenna transformer C and D band secondaries are open circuited.

In issue No. 1 sets, if any automatic tuning button is depressed, the automatic tuning antenna coil corresponding to that button is short circuited. In issue No. 2 sets, the connection between the antenna circuit and the automatic tuning antenna coils is open circuited by the band switch.

The interstage transformer B band secondary is connected to the 1st detector tube grid circuit. The interstage transformer C and D band secondaries are open circuited.

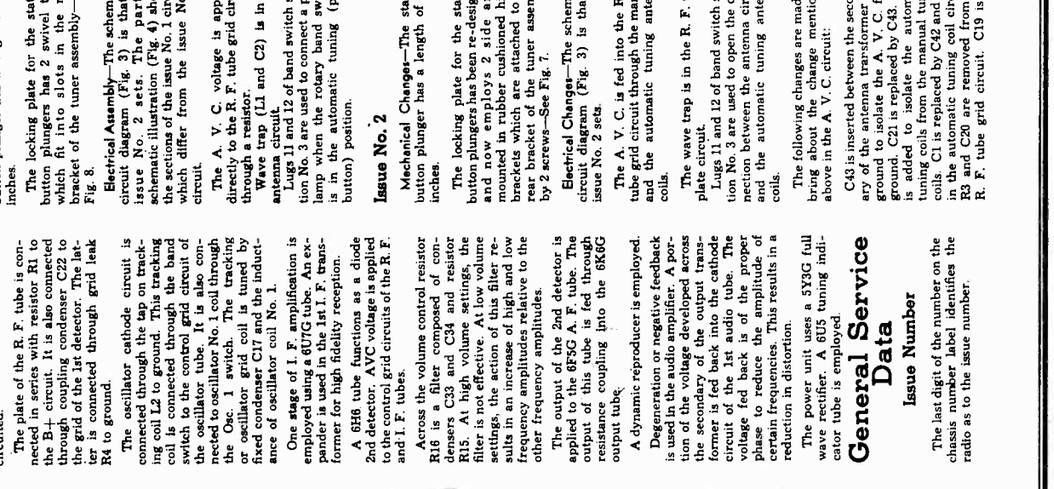


Fig. 1—Location of Controls and Push Buttons—No. 9 Dial Escutcheon

The oscillator B band grid coil is connected to the grid circuit of the oscillator tube. The oscillator B band cathode coil is connected to ground. The oscillator C and D band grid coils are open circuited. If any automatic tuning button is depressed, the automatic tuning oscillator coil corresponding to that button is short circuited.

In like manner, to describe the connections for one AUTOMATIC TUNING circuit, assume that the band switch is in the push button position and button number 1 is depressed.

In issue No. 1 sets, the antenna circuit is connected to the R. F. tube grid circuit through the band switch. The antenna circuit is also connected to the antenna No. 1 automatic tuning coil through Ant. 1 switch. The antenna No. 1 coil is tuned by fixed condenser C19.

In issue No. 2 sets, the antenna circuit is connected to the automatic tuning antenna coils through the band switch. The antenna No. 1 automatic tuning coil is connected to the R. F. tube grid circuit through the Ant. 1 switch. Antenna No. 1 coil is tuned by condensers C44 and C45.

In both issues, the connections from the antenna and interstage transformer secondaries are open circuited.

The plate of the R. F. tube is connected in series with resistor R1 to the B+ circuit. It is also connected through coupling condenser C22 to the grid of the 1st detector. The latter is connected through grid leak R4 to ground.

The oscillator cathode circuit is connected through the tap on tracking coil L2 to ground. This tracking coil is connected through the band switch to the control grid circuit of the oscillator tube. It is also connected to oscillator No. 1 coil through the One 1 switch. The tracking or oscillator grid coil is tuned by fixed condenser C17 and the inductance of oscillator coil No. 1.

One stage of I. F. amplification is employed using a 6U7G tube. An expander is used in the 1st I. F. transformer for high fidelity reception.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R. F. and I. F. tubes.

Across the volume control resistor R16 is a filter composed of condensers C33 and C34 and resistor R15. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6F5G A. F. tube. The output of this tube is fed through resistance coupling into the 6X6G output tube.

A dynamic reproducer is employed.

Degeneration or negative feedback is used in the audio amplifier. A portion of the voltage developed across the secondary of the output transformer is fed back into the cathode circuit of the 1st audio tube. The voltage fed back is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

The power unit uses a 5Y3G full wave rectifier. A 6U5 tuning indicator tube is employed.

ALIGNMENT PROCEDURE

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C29) & (C30)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C25) & (C26)
WAVE TRAP			Push Button Position Button No. 1 Depressed		
486 KC	Antenna Lead	200 mmf.			Wave Trap (C2) Adjust for MINIMUM Output
RANGE B					
1830 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Ant. Range B (C5) Int. Range B (C9)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C12) Rock Rotor—See Note B
RANGE C					
6350 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C4) Int. Range C (C8)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
20,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Int. Range D (C7) Rock Rotor—See Note B
7000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	7000 KC (C11) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT			BUTTON DEPRESSED (Each Push Button Position)	TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C
700 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
700 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
1100 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
1100 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

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

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the cord which holds the pointer to the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust for maximum until the peak of greatest intensity is obtained.

NOTE C—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or screwdriver through one of these openings and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

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. If the image frequency signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial.

Fig. 2—Location of Trimmers

It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tube shields are removed, tubes other than metal tubes, or vice versa, in the R.F. and I.F. stages.

MODEL A14 Series
Trimmers, Alignment
Parts List

WELLS-GARDNER & CO.

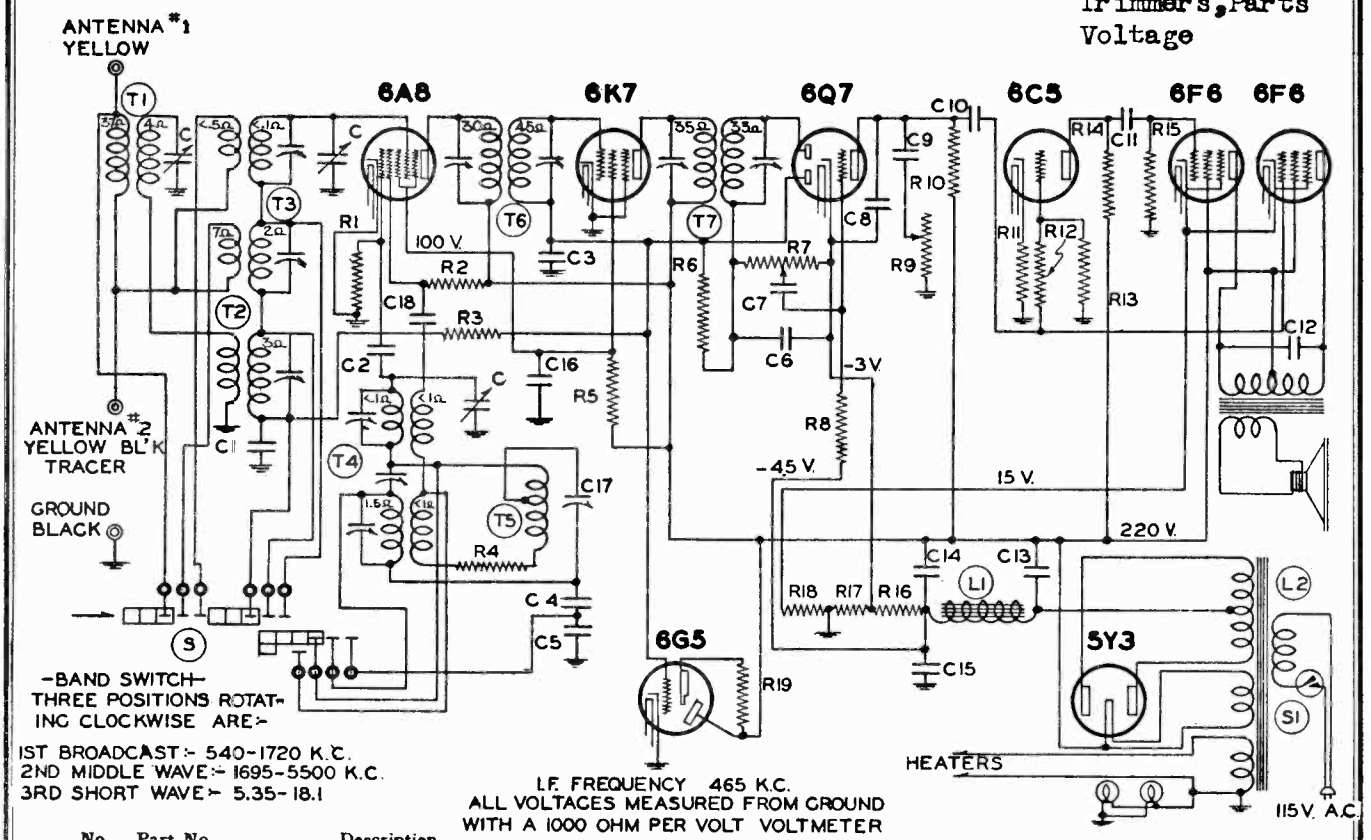
Series A14 Replacement Parts

NOTICE: There is a chassis number label on the chassis base. The chassis number identifies the radio as to chassis, dial, and issue number. When ordering parts or writing, be sure to mention the chassis number.

Manufacturer—Wells-Gardner & Co., 2701 N. Kildare Ave., Chicago, Ill., U. S. A.

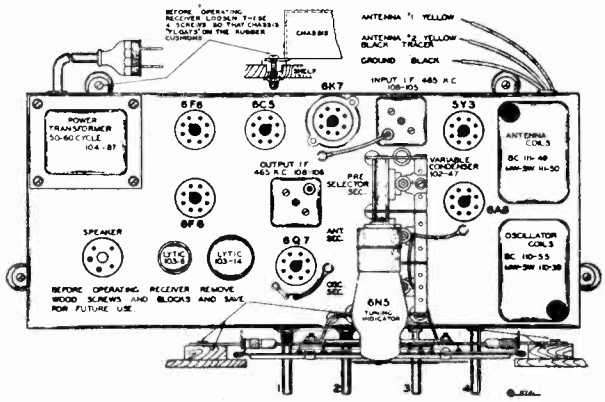
WESTERN AUTO SUPPLY CO.

MODEL D 699
Schematic, Socket
Trimmers, Parts
Voltage



No.	Part No.	Description
		RESISTORS
R1	130-12	50M ohms - 1/3 w.
R2	130-48	15M ohms - 1/3 w.
R3	130-103	100M ohms - 1/3 w.
R4	130-27	50 ohms - 1/3 w.
R5	130-96	25M ohms - 1/2 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-74	1 megohm - Volume Control
R8	130-4	3 megohm - 1/3 w.
R9	101-75	300M ohms - Tone Control
R10	130-103	100M ohms - 1/3 w.
R11	130-22	5M ohms - 1/3 w.
R12	130-163	400M ohms - 1/3 w.
R13	130-103	100M ohms - 1/3 w.
R14	130-12	50M ohms - 1/3 w.
R15	130-100	150M ohms - 1/3 w.
R16	106-37	20 ohms - Muter
R17	106-37	42 ohms - Muter
R18	106-37	250 ohms - Muter
R19	130-110	1 megohm - 1/10 w.
		NOTE: R16, R17 and R18 in one unit, No. 106-37
		CONDENSERS
C1	100-22	.05 x 200 v.
C2	129-39	.00005 Mica
C3	100-22	.05 x 200 v.
C4	129-55	.0034 Mica
C5	129-54	.003 Mica
C6	129-5	.0001 Mica
C7	100-11	.01 x 400 v.
C8	129-2	.0005 Mica
C9	100-57	.006 x 600 v.
C10	100-26	.02 x 400 v.
C11	100-26	.02 x 400 v.
C12	100-12	.003 x 600 v.
C13	103-6	8 mfd. x 350 v.
C14	103-14	16 mfd. x 250 v.
C15	100-20	.1 x 200 v.
C16	100-39	.1 x 400 v.
C17	124-35	Adjustable Padder - Working Capacity 740 mmf.
C18	100-12	.003 x 600 v.

		PARTS
C	102-47	One section of three gang condenser
T1	111-51	B.C. Pre-Selector
T2	111-49	B.C. Antenna Coil Assembly
T3	111-50	MW - SW Antenna Coil Assembly
T4	110-39	MW - SW Oscillator Coil Assembly
T5	110-55	B.C. Oscillator Coil Assembly
T6	108-105	Input I.F. - 465 kc.
T7	108-106	Output I.F. - 465 kc.
L1	114-66	6" Speaker (Field Resistance 900 ohms)
L2	104-87	Power Transformer (60 cycle) 115 volts
S	125-17	Band Switch
S1	101-74	On-off Switch on volume control.



Vol. Control On-Off Switch | Tone Control | Tuning Control | Band Switch

FIG. 1—TOP VIEW

MODEL D699

FACTORY NO. 840

Factory Number 840

8 Tube Including Cathode-Ray Tuning Indicator

3-Band All-Wave A.C. Superheterodyne Receiver

INSTRUCTIONS FOR INSTALLING, OPERATING AND SERVICING

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Outer Scale	540 to 1720 K.C. (Kilocycles)
Middle Wave	Center Scale	1690 to 5500 K.C. (Kilocycles)
Short Wave	Inner Scale	5.35 to 18.1 M.C. (Megacycles)

I. F. Frequency 465 K.C.

DESCRIPTION:

The tube complement of this chassis consists of the following metal and octal base glass tubes which are interchangeable with metal tubes:

1—Type 6A8G—Pentagrid mixer, first detector and oscillator.
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6C5 Inverter stage.
2—Type 6F6G—pentode push-pull output amplifier.
1—Type 5Y3G high vacuum rectifier.
1—Type 6G5 Cathode ray tuning indicator.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. **These voltages are clearly indicated on the circuit diagram.**

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION: No aligning adjusments should be attempted without first thoroughly checking over all other possible causes of trouble, such as defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

CATHODE-RAY TUNING INDICATOR:

A cathode-ray tube is used tor visually indicating when the receiver is accurately tuned to the incoming signal. The signal from the receiver is applied to the tube in such a manner as to cause a triangular shadow on the luminescent screen. The size of the shadow is determined by the strength of the incoming signal so that a change of tuning is readily exhibited on the cathode-ray screen, and therefore tuning to exact resonance can be definitely obtained.

The cathode-ray screen shows the dark sector (shadow) in the middle portion of the illuminated area at its minimum width when ideal tuning position (resonance) is attained for any particular station (see dotted lines on illustration of cathode-ray tuning indicator. (Fig. 2, Page 2.)

TUNING:

Set Band changing switch to the band desired, turn volume control to the right approximately three-quarters of its rotation, turn tuning knob slowly until a signal is heard, then turn slowly back and forth, noting the width of the shadow indicated on the screen of the Cathode-Ray Tuning Indicator. Minimum width indicates the ideal tuning position (resonance).

NOTE: Tuning on the short wave band is very critical. The tuning knob has been provided with a vernier mechanism to assist in tuning. The knob should be turned very slowly as the pointer passes over the shaded sections of the short wave band scale. A signal of suitable strength could easily be passed if tuned through in a rapid or haphazard manner.

The operation of this receiver is like that of any conventional receiver, with the exception that greater care must be exercised when tuning on the short wave band. It is also desirable that the user have a practical knowledge of the operating schedules and time differences of the broadcasting stations. A short wave map is included with your radio for your convenience.

Reception on the short wave band is often affected by interference from telephones, electrical appliances, automobile motors, oil burners, etc.

A GOOD ANTENNA IS ESSENTIAL FOR SATISFACTORY RECEPTION ON SHORT WAVES.

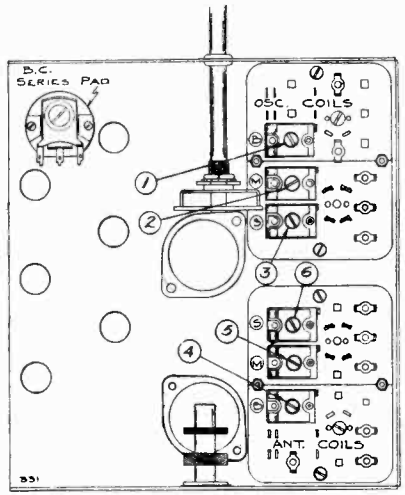


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106 Output I.F. Transformer
Part No. 108-105 Input I.F Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105) to resonance

BROADCAST BAND ALIGNMENT:

540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly, Fig. 3.)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:

5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

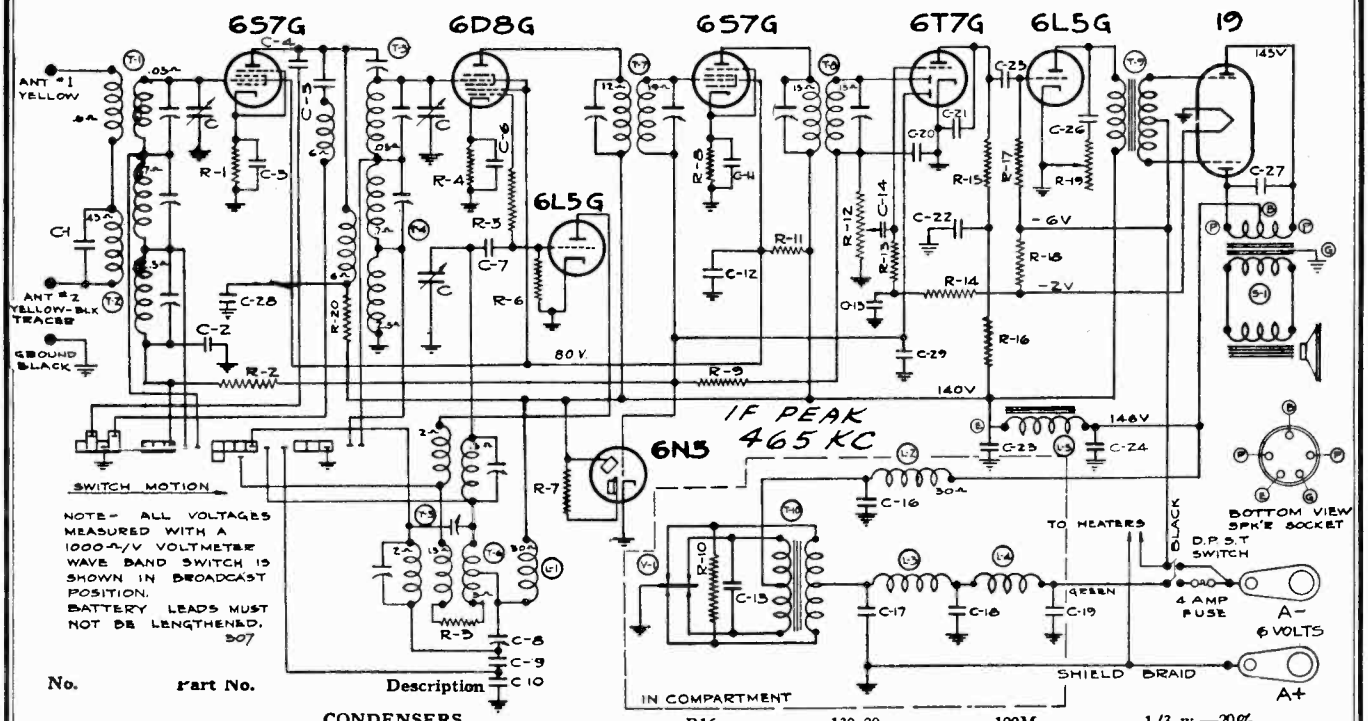
1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.
   (d) Recheck broadcast band alignment.

Voltage, Trimmers
Parts List

WESTERN AUTO SUPPLY CO.

MODEL D 706
Schematic, Socket



No.	Part No.	Description
		CONDENSERS
C	102-40	Variable Condenser
C1	129-5	.0001 Mica—MO—O—20%
C2	100-9	.05 x 200 v.—25%
C3	100-9	.05 x 200 v.—25%
C4	129-72	.0004 Mica—MT—W—5%
C5	129-38	.00005 Mica—MO—O—10%
C6	100-9	.05 x 200 v.—25%
C7	129-38	.00005 Mica—MO—O—10%
C8	124-35	J.S. Series Pad
C9	129-70	.004 Mica MW—J—2½%
C10	129-71	.002—Mica MW—W—2½%
C11	100-20	.1 x 200v.—25%
C12	100-20	.1 x 200v.—25%
C13	100-34	.005 x 1200 v.—10%
C14	100-11	.01 x 400 v.—25%
C15	100-11	.01 x 400 v.—25%
C16	100-14	.1 x 200 v.—25%
C17	100-56	.5 x 200 v.—50%—10%
C18	100-56	.5 x 200 v.—50%—10%
C19	100-25	.002 x 600 v.—25%
C20	129-5	.0001 Mica MO—O—20%
C21	129-2	.0005 Mica MT—O—20%
C22	100-20	.1 x 200 v.—25%
C23	119-32	4. mfd. 200 w. v. Lytic
C24	119-32	8. mfd. 200 w. v. Lytic
C25	100-11	.01 x 400 v.—25%
C26	100-26	.02 x 400 v.—25%
C27	100-25	.002 x 600 v.—25%
C28	100-50	.25 x 200 v.—20%
C29	100-22	.05 x 200 v.—25%
		RESISTORS
R1	130-140	1200 ohm 1/3 w.—20%
R2	130-20	100M 1/3 w.—20%
R3	130-27	50 1/3 w.—20%
R4	130-54	500 ohm 1/3 w.—20%
R5	130-27	50 1/3 w.—20%
R6	130-2	75 M 1/3 w.—20%
R7		½ meg (in m. e. socket)
R8	130-140	1200 ohm 1/3 w.—20%
R9	130-38	2 meg 1/3 w.—20%
R10	130-84	200 ohm 1/3 w.—20%
R11	130-157	12M ½ w.—10%
R12	101-66	500M Volume Control
R13	130-19	1 meg 1/3 w.—20%
R14	130-19	1 meg 1/3 w.—20%
R15	130-20	100M 1/3 w.—20%
R16	130-20	100M 1/3 w.—20%
R17	130-4	3 meg 1/3 w.—20%
R18	130-158	16 ohm 1 w.—Insulated
R19	101-67	100M Tone Control
R20	130-85	3 M 1/3 w.—20%
		PARTS
T1	111-67	S.W. M.W. Ant. Coil
T2	111-68	B.C. Antenna Coil
T3	109-32	S.W. M. W. R.F. Coil
T4	109-33	B.C. R.F. Coil
T5	110-53	S.W. M.W. Osc. Coil
T6	110-55	B.C. Osc. Coil
T7	108-93	Input I.F. Coil
T8	108-92	Output I.F. Coil
T9	105-36	Audio Input Transformer
T10	104-81	Power Transformer
S1	114-64	P.M. Dynamic Spkr. 8"
L-1	123-3	Osc. "B" Choke
L-2	123-3	R.F. "B" Choke
L-3	105-19	"A" Choke
L-4	105-19	"A" Choke
L-5	105-30	"B" Filter Choke
V-1	126-4	Vibrator

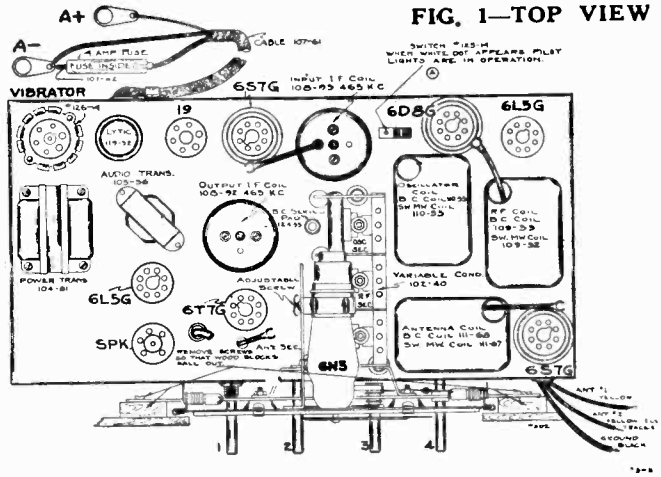


FIG. 1—TOP VIEW

Factory Number 804

8 Tube Including Cathode-Ray Tuning Indicator

3-Band All-Wave 6-Volt Battery Superheterodyne Receiver

INSTRUCTIONS FOR INSTALLING, OPERATING AND SERVICING

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Outer Scale	540 to 1720 K.C. (Kilocycles)
Middle Wave	Center Scale	1690 to 5500 K.C. (Kilocycles)
Short Wave	Inner Scale	5.35 to 18.1 M.C. (Megacycles)

I. F. Frequency 465 K.C.

CATHODE-RAY TUNING INDICATOR

A cathode-ray tube is used for visually indicating when the receiver is accurately tuned to the incoming signal. The signal from the receiver is applied to the tube in such a manner as to cause a triangular shadow on the luminescent screen. The size of the shadow is determined by the strength of the incoming signal so that a change of tuning is readily exhibited on the cathode-ray screen, and therefore tuning to exact resonance can be definitely obtained.

The cathode-ray screen shows the dark sector (shadow) in the middle portion of the illuminated area at its minimum width when ideal tuning position (resonance) is attained for any particular station (see dotted lines on illustration of cathode-ray tuning indicator. (Fig. 2, Page 2.)

TUNING:

Set Band changing switch to the band desired, turn volume control to the right approximately three-quarters of its rotation, turn tuning knob slowly until a signal is heard, then turn slowly back and forth, noting the width of the shadow indicated on the screen of the Cathode-Ray Tuning Indicator. Minimum width indicates the ideal tuning position (resonance).

NOTE: Tuning on the short wave band is very critical. The tuning knob has been provided with a vernier mechanism to assist in tuning. The knob should be turned very slowly as the pointer passes over the shaded sections of the short wave band scale. A signal of suitable strength could easily be passed if tuned through in a rapid or haphazard manner.

The operation of this receiver is like that of any conventional receiver, with the exception that greater care must be exercised when tuning on the short wave band. It is also desirable that the user have a practical knowledge of the operating schedules and time differences of the broadcasting stations. A short wave map is included with your radio for your convenience.

Reception on the short wave band is often affected by interference from telephones, electrical appliances, automobile motors, oil burners, etc.

A GOOD ANTENNA IS ESSENTIAL FOR SATISFACTORY RECEPTION ON SHORT WAVES.

ANTENNA AND GROUND LEADS:

You will notice three wires coming out of the back of the chassis, — the **yellow** wire and the **black with yellow tracer** wire are used for doublet antenna connections. The **black** wire is the ground connection.

For conventional types of antennas connect the **yellow** wire to the antenna lead and the **yellow with black tracer** and the **black** wire together to the ground lead.

When a doublet antenna is used connect the **yellow** wire and the **yellow with black tracer** wire to the doublet antenna and the solid **black** wire to the groud lead. (See Fig. 1—Top View.

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes.

The type and function of each tube is as follows:

1—Type 6S7G Remote cut-off pentode R.F. amplifier.
1—Type 6D8G Pentagrid first detector.
1—Type 6L5G Oscillator.
1—Type 6S7G Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6T7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6L5G Driver Amplifier.
1—Type 19 Class "B" Push-Pull Output Amplifier.
1—Type 6N5 Cathode Ray Tuning Indicator.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. Do not attempt to make any adjustments on the vibrator.

ALIGNING INSTRUCTIONS:

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as run down battery, defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

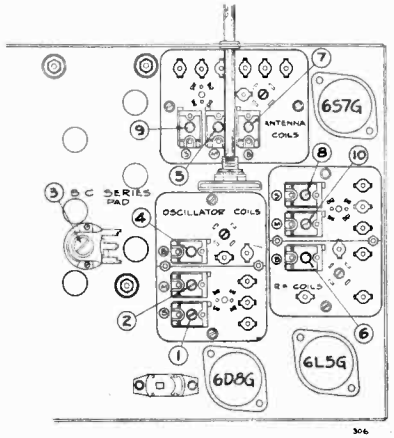


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plate terminals of the type 19 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-92 Output I.F. Transformer
Part No. 108-93 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-92) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap to 6D8G and adjust input I.F. transformer (No. 108-93) to resonance.

SHORT WAVE BAND ALIGNMENT:

5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 18 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:
   (a) Move dial pointer to 18 megacycles and adjust short wave oscillator trimmer (adjustment number 1) to resonance.
   (b) Re-set external oscillator to 17 megacycles and pick up signal by rotating variable condenser and adjust short wave R.F. trimmer (adjustment number 8), and short wave antenna trimmer (adjustment number 9), to resonance.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 6 megacycles for band coverage and sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5.5 megacycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:
   (a) Move dial pointer to 5.5 megacycles and adjust middle wave oscillator trimmer (adjustment number 2) to resonance.
   (b) Re-set external oscillator to 5 megacycles and pick up signal by rotating variable condenser and adjust middle wave R.F. trimmer (adjustment number 10), and middle wave antenna trimmer (adjustment number 5), to resonance.
   (c) Re-set external oscillator and check sensitivity at 1700 kilocycles.

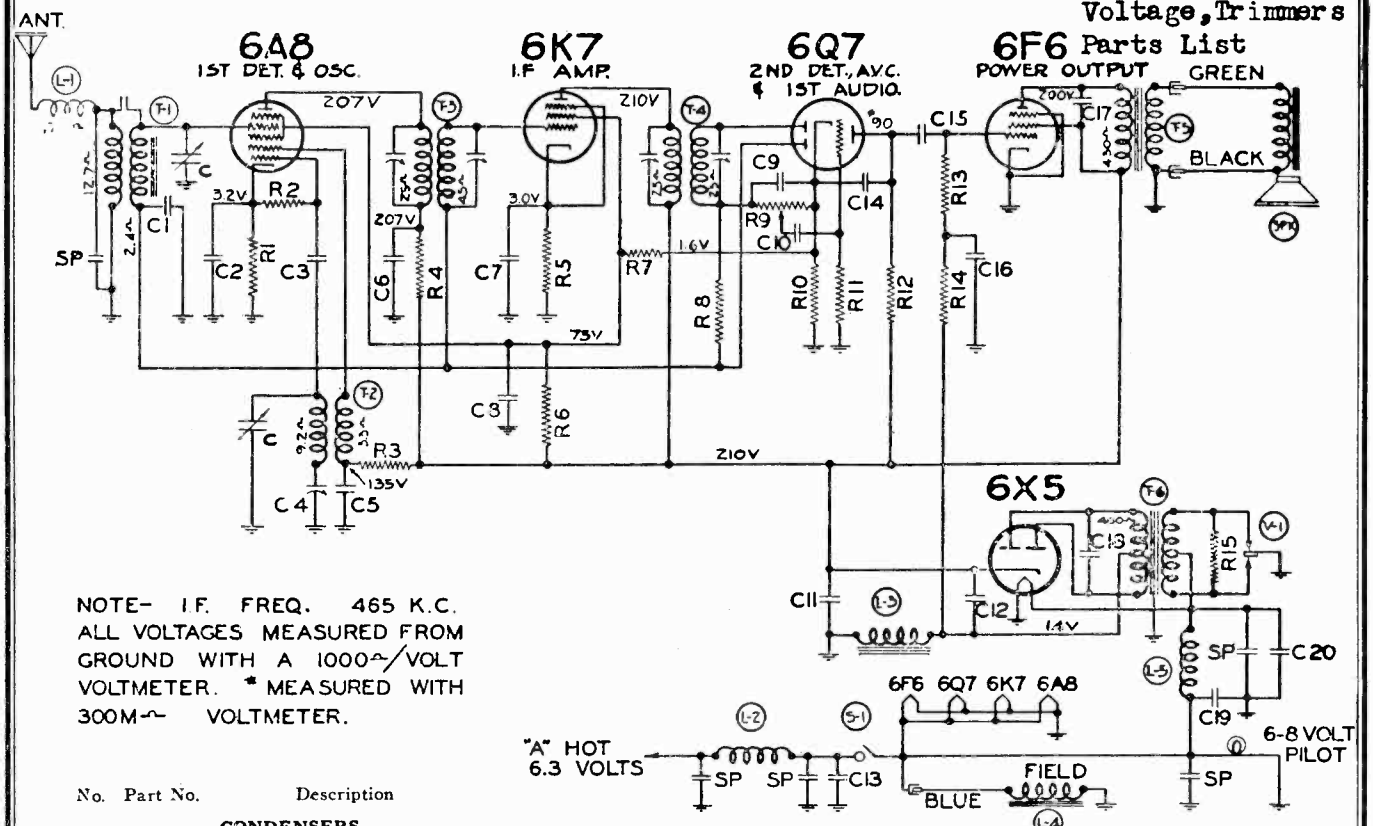
BROADCAST BAND ALIGNMENT:

540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground posts, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 4; see bottom view of coil assembly, Fig. 3)
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast R.F. trimmer (adjustment number 6) and broadcast antenna trmmer (adjustment number 7), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 3), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

WESTERN AUTO SUPPLY CO.

MODEL D 734
Schematic, Socket Voltage, Trimmers Parts List



NOTE- I.F. FREQ. 465 K.C.
ALL VOLTAGES MEASURED FROM GROUND WITH A 1000~/VOLT VOLTMETER. * MEASURED WITH 300M~ VOLTMETER.

No.	Part No.	Description
		CONDENSERS
C	102-27	2 Gang Variable Condenser
C1	100-59	.05 x 200 25%
C2	116-21	.05 x 200 (Yellow lead) 20%
C3	129-12	.00025 Mica 20%
C4	124-37	Series Pad 350 mmf. w. v.
C5	116-21	.1 x 400 (Red lead) 20%
C6	116-21	.1 x 400 (Green lead) 20%
C7	116-21	.05 x 200 (Black lead) 20%
C8	100-60	.25 x 200 25%
C9	129-12	.00025 Mica 20%
C10	100-55	.01 x 400 25%
C11	119-33	8 mfd. Lytic 300 w. v.
C12	119-33	4 mfd. Lytic 300 w. v.
C13	100 31	.5 x 120 10 - 50%
C14	129-5	.0001 Ceramicon 20%
C15	100-11	.01 x 400 25%
C16	100-60	.25 x 200 25%
C17	100-54	.006 x 600 v. 25%
C18	100-58	.005 x 1200 - 20 - 10%
C19	100-31	.5 x 120 10 - 50%
C20	100-31	.5 x 120 10 - 50%
		4 Spark Plates
		C2, C5, C6 and C7 in same block
		C11, C12 in same block
		C8, C16 in same block
		RESISTORS
R1	103-54	500 ohm—1/3 w.—20%
R2	130-162	50M ohm—1/3 w.—20%
R3	130-164	30M ohm—½ w.—20%
R4	130-137	1500 ohm—1/3 w.—20%
R5	130-24	400 ohm—1/3 w.—20%
R6	130-30	25M ohm—1 w.—20%
R7	130-139	40M ohm—1/3 w.—20%
R8	130-142	1 meg ohm—1/3 w.—20%
R9	101-41	500 M ohm Volume Control
R10	130-153	760 ohm—1/3 w.—20%
R11	130-19	1 meg ohm—1/3 w.—20%
R12	130-141	250M ohm—1/3 w.—20%
R13	130-5	300M ohm—1/3 w.—20%
R14	130-11	250M ohm—1/3 w.—20%
R15	130-84	200 ohm—1/3 w.—20%

PARTS

T1	111-70	Antenna Coil Complete
T2	110-57	Oscillator Coil Complete
T3	108-96	Input I.F. Complete
T4	108-95	Output I.F. Complete
T5	105-37	Output Transformer
T6	104-82	Power Transformer
L1	111-76	Antenna filter choke
L2	105-26	"A" Choke
L3	105-39	"B" Filter choke (335 ohms)
L4	114-59	Speaker field—4 ohm
L5	105-19	"A" Choke
Spkr.	114-59	Speaker
S1		Switch on Volume Control
V1	126-1	Vibrator

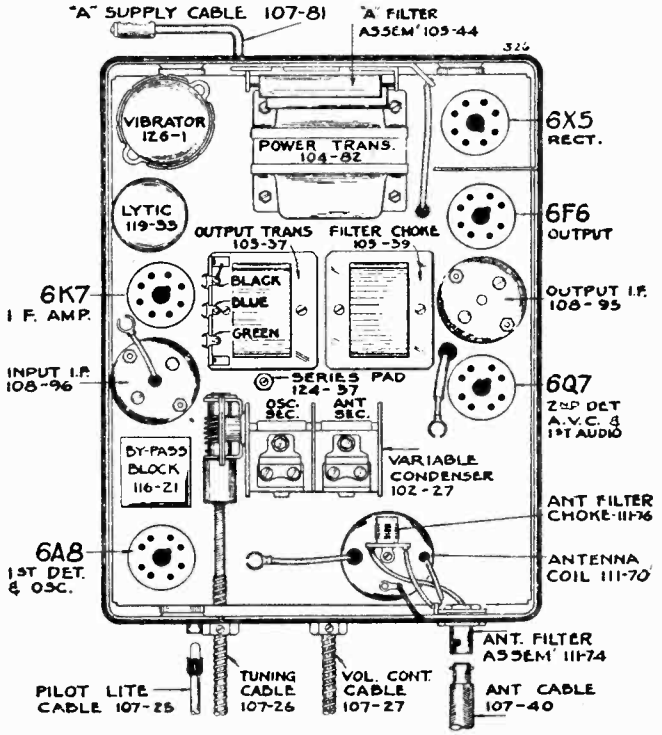


FIG. 2.—TOP VIEW

DESCRIPTION

Model No. 567 is a five-tube superheterodyne receiver having a tuning range of 530 K.C. to 1550 K.C., operates from a 6.0 volt storage battery and uses the automotive type 6.3 volt tubes. The "B" supply is obtained from a vibrator with a tube rectifier.

The I.F. frequency used is 465 K.C., the R.F. end of the receiver consisting of a high gain iron core antenna coil which gives high signal to noise ratio. The I.F. transformers are designed to give high gain and selectivity and yet to have a broad nose for ease of tuning and hi-fidelity response. They are of the air core type and wound with solid wire to give *minimum* drift and variation of gain due to climatic changes.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips, self tapping screws and trimount buttons.

All adjustments are accessible and any part replaceable without removing the chassis from the case.

TUBE COMPLEMENT

The tube complement of this chassis consists of the following octal base glass and metal tubes which are interchangeable with metal tubes.

1—Type No. 6A8 Pentagrid Converter (composite first detector and oscillator)
1—Type No. 6K7—Remote Cut-off Pentode as an I.F. Amplifier (465 K.C.)
1—Type No. 6Q7—Duplex Diode Triode Second Detector, A.V.C. and First Audio
1—Type No. 6F6—Pentode Output Amplifier
1—Type No. 6X5—High Vacuum Rectifier.

ANTENNA CONNECTION

Insert the antenna plug in cable into the chassis. The wire at the other end of the antenna cable is connected to the lead-in wire from the antenna. Keep the antenna cable as far away from car wiring as possible and ground the pigtail of the antenna cable shield at the antenna end.

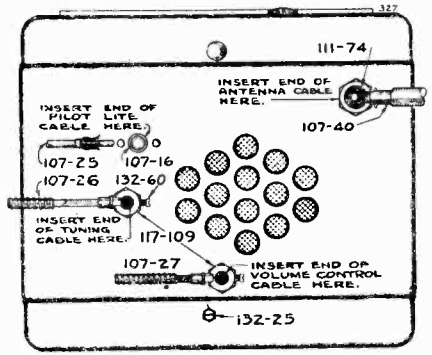


FIG. 1—SIDE VIEW

A 24 inch shielded antenna cable is regularly supplied. If a roof antenna is used, this cable will be long enough in practically all cases to reach the corner post or column at which the antenna lead comes down. The shielded cable should be pushed up into the column as far as possible. The reason for this is that ignition interference may be picked up by any unshielded portion of the antenna cable.

If an under car or running board antenna is used, the shielding must be extended to the antenna in all cases. The pigtail on the end of the antenna cable shield must be well grounded at the extreme antenna end. If it is necessary to extend the antenna cable shielding as described on following page, be sure that a pigtail is put on the end of the shielded extension and that it is well grounded at the extreme antenna end.

To extend the antenna cable shielding, the antenna lead wire should be covered with heavy insulation, such as loom, to properly separate the shielding from the wire. Then connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire.

Aerials suitable for steel roof and convertible cars can be purchased from your dealer. They should be mounted as far to the rear of the car as possible.

The majority of 1937 cars have steel roofs, and a running board or other type car antenna must be used. 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. Other cars without steel roofs such as Ford and Plymouth have a built-in roof antenna.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver a test oscillator, as well as an output meter, must be used.

DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 175 mmfd. condenser connected in series with the output lead of the test oscillator.

RESONANCE INDICATOR

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT: (465 K.C.)

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108-95 to resonance with oscillator.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-96 to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the section of the gang condenser nearest to the drive—see top view, Fig. 2).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust antenna trimmer to resonance (see top view, Fig. 2).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad rocking gang condenser to and fro at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis (see top view).
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

DIAL ADJUSTMENT

Tune set to some station of a known frequency (between 800 and 1200 K.C.) hold selector knob, then with a screw driver adjust the slotted screw on the back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

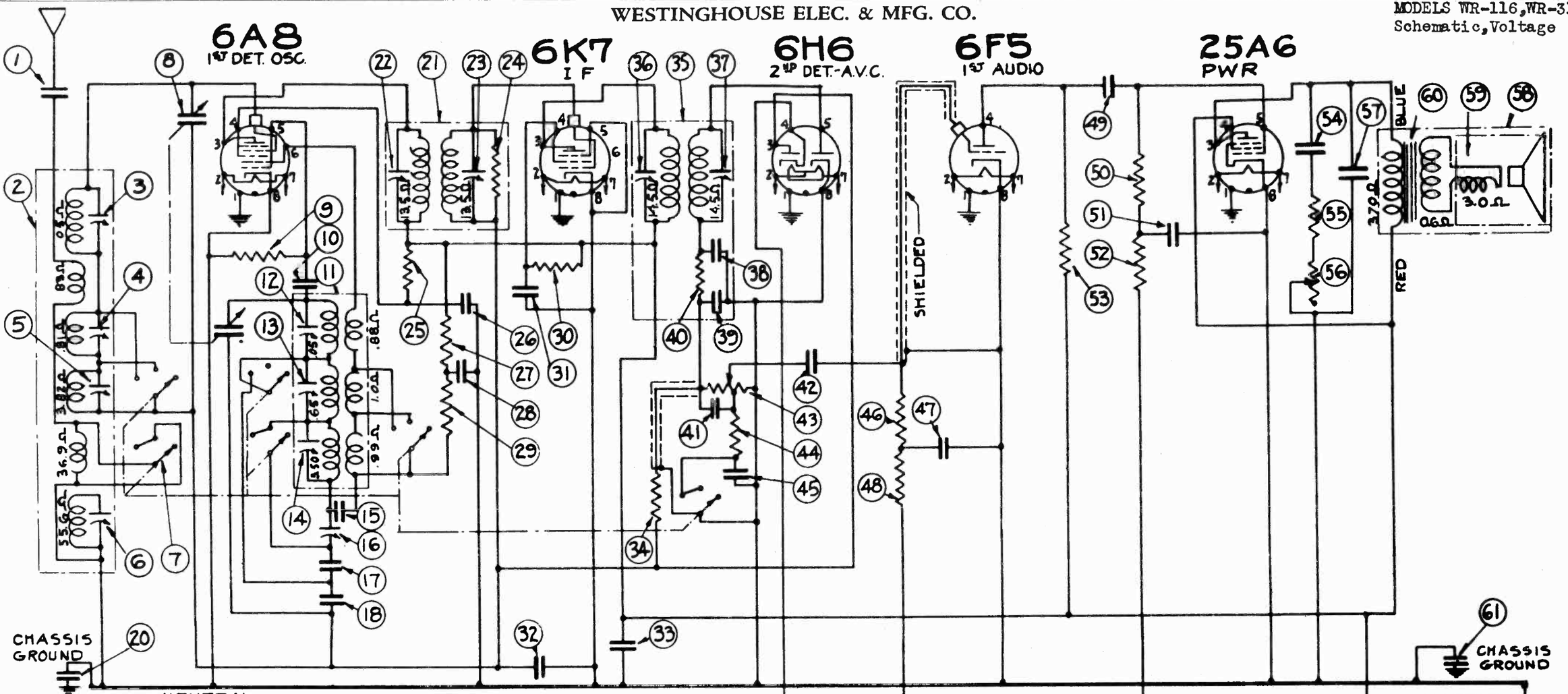
PILOT LAMP AND FUSE

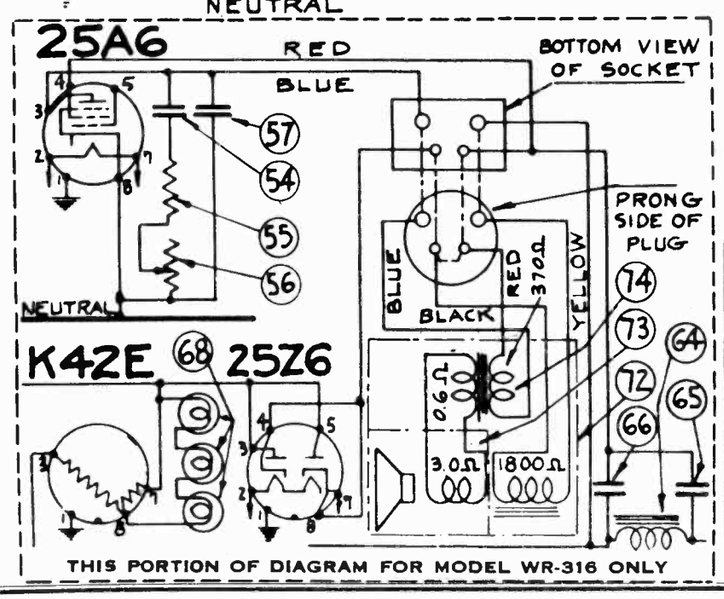
PILOT LAMP—A 6-8 volt type lamp is used (Bulb No. 116-13 Bulb).

Fuse—A15 ampere automobile fuse is used. CAUTION: BE SURE THE FUSE SHIELD IS ON THE FUSE BEFORE THE LATTER IS INSERTED IN THE RECEPTACLE.

WESTINGHOUSE ELEC. & MFG. CO.

MODELS WR-116, WR-316
Schematic, Voltage





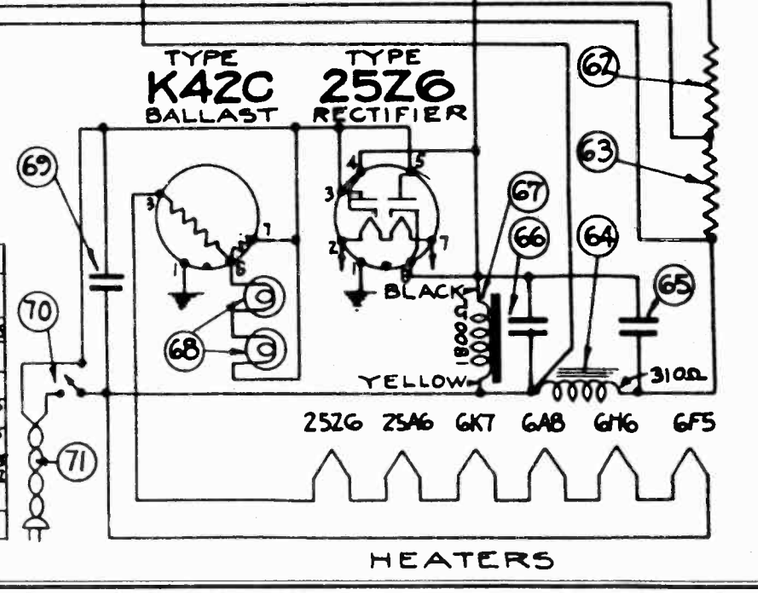
INT. FREQ. 465KC.

WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

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 PT. NOS
6A8	1ST DET-OSC	6.1	2-7	105 OSC. DET. 80 OSC.	3-8 6-8	58	4-8	
6K7	I. F.	6.0	2-7	105	3-8	70	4-8	
6H6	2ND DET-AVC	5.95	2-7					-2.07 ACROSS 62-63
6F5	1ST AUDIO	5.95	2-7	55*	4-8			-0.68 ACROSS 62
25A6	POWER PEN.	24.4	2-7	94	3-8	105	4-8	-17.5 ACROSS 62&63&67
25Z6	RECTIFIER	24.6	2-7	105	4 TO NEUTRAL			

* 600 VOLT SCALE



MODELS WR-116,WR316

WESTINGHOUSE ELEC. & MFG. CO.

Socket,Trimmers
Chassis Layout

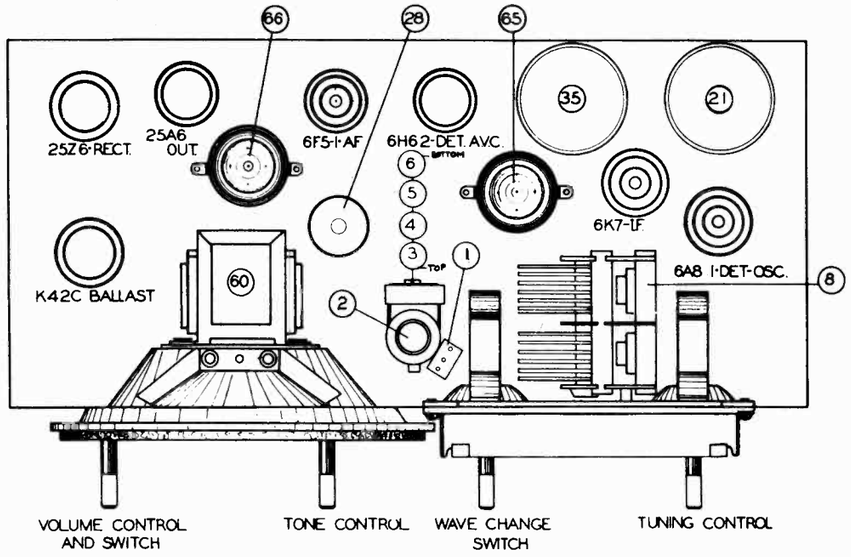


Figure No. 1

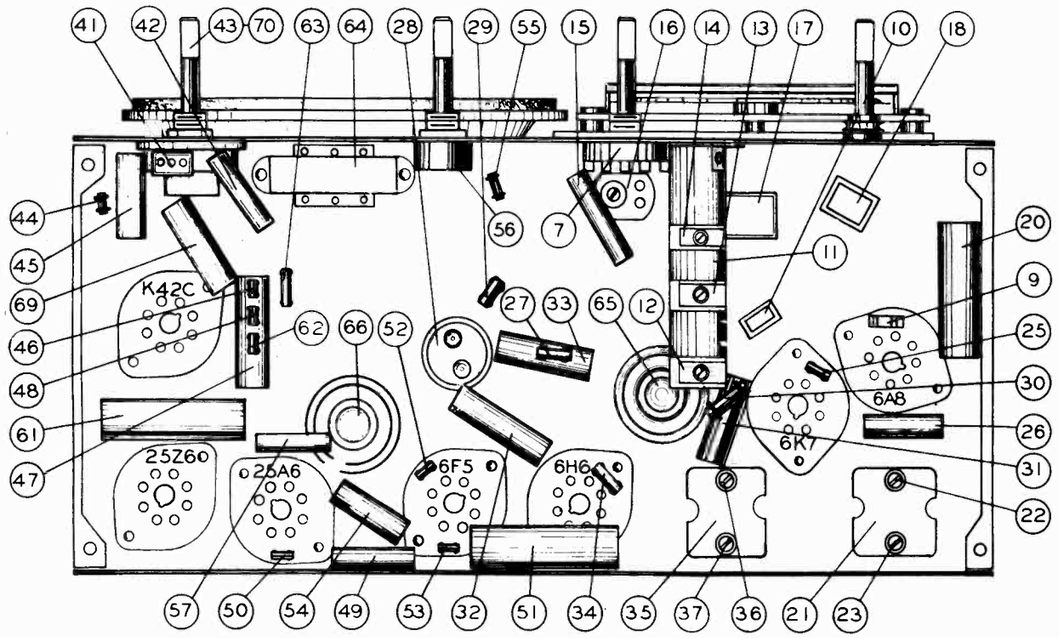


Figure No. 2

MODELS WR-116,WR-316
Alignment,Specs.Parts

WESTINGHOUSE ELEC. & MFG. CO.

Dia. #	Part #	(WR-116) Description of Parts	List Price
1	SA 1037775	.001 mfd. mica condenser	.20
2	RC 95202	Antenna coil assembly	2.25
3		4-25 mmf. trimmer condenser - part of RC 95202	
4		1.5-10 mmf. trimmer condenser - part of RC 95202	
5		1.5-10 mmf. trimmer condenser - part of RC 95202	
6		30-60 mmf. trimmer condenser - part of RC 95202	
7	SW 9548	Wave-change switch	1.00
8	CG 9549	Variable condenser (2 gang)	2.50
9	RE 9581	50,000 ohm, 1/4 W. resistor	.15
10	SA 106417	.0001 mfd. mica condenser	.20
11	RC 95203	Oscillator coil assembly	1.75
12		4-25 mmf. trimmer condenser - part of RC 95203	
13		1.5-10 mmf. trimmer condenser - part of RC 95203	
14		1.5-10 mmf. trimmer condenser - part of RC 95203	
15	CW 4-005	.005 mfd. 400 V. condenser	.15
16	CS 9545	300-600 mmf. oscillator series condenser	.40
17	CM 9525	.0027 mfd. mica condenser	.30
18	CM 9524	.0034 mfd. mica condenser	.35
19	CW 6-10	.1 mfd., 600 V. condenser	.20
20	IC 9573	1st I.F. coil (465 KC.)	2.00
21		30-100 mmf. trimmer condenser - part of IC 9573	
22		30-100 mmf. trimmer condenser - part of IC 9573	
23		500,000 ohm, 1/4 W. resistor - part of IC 9573	
24		20,000 ohm, 1/4 W. resistor - part of IC 9573	
25	RE 9536	500,000 ohm, 1/4 W. resistor	.10
26	CW 2-05	.05 mfd., 200 V. condenser	.15
27	SA 106549	5000 ohm, 1/4 W. resistor	.15
28	CE 9540	4 mfd., 150 V. condenser	.95
29	RA 9562	5000 ohm, 1/4 W. resistor	.15
30	CW 2-05	.05 mfd., 200 V. condenser	.10
31	CW 2-10	.1 mfd., 200 V. condenser	.15
32	RE 9577	2 meg., 1/2 W. resistor	.15
33	IC 9574	Second I.F. coil (465 KC.)	1.75
34		30-100 mmf. trimmer condenser - part of IC 9574	
35		30-100 mmf. trimmer condenser - part of IC 9574	
36		.0001 mfd. mica condenser - part of IC 9574	
37		50,000 ohm, 1/8 W. resistor - part of IC 9574	
38		.0005 mfd. mica condenser	.20
39	CM 9519	.005 mfd., 400 V. condenser	.15
40	CW 4-005	1/2 meg. volume control	1.10
41	VR 9533	25,000 ohm, 1/4 W. resistor	.10
42	RE 9568	.01 mfd., 400 V. condenser	.15
43	CW 4-01	500,000 ohm, 1/4 W. resistor	.15
44	CE 9572	50 mfd., 200 V. condenser	.15
45	CM 9570	500,000 ohm, 1/4 W. resistor	.15
46	RM 9572	.01 mfd., 400 V. condenser	.15
47	CW 4-01	500,000 ohm, 1/4 W. resistor	.15
48	RE 9572	1 mfd., 100 V. condenser	.40
49	CW 9525	100,000 ohm, 1/8 W. resistor	.10
50	RE 9534	250,000 ohm, 1/8 W. resistor	.10
51	RE 9531	20,000 ohm, 1/4 W. resistor	.15
52	CW 2-05	.05 mfd., 200 V. condenser	.15
53	RE 9550	2000 ohm, 1/4 W. resistor	.15
54	VR 9534	20,000 ohm tone control	.55
55	CW 4-01	.01 mfd., 400 V. condenser	.15
56	SK 9532	Speaker (6" Dia.)	6.50
57	SA 106617	Diaphragm and voice coil	1.15
58	TR 9554	Output transformer	1.25
59	CW 6-10	.1 mfd., 600 V. condenser	.15
60	RE 9571	15 ohm, 1/4 W. resistor	.15
61	RE 9556	25 ohm, 1/4 W. resistor	.15
62	CE 9538	Choke coil	6.50
63	CE 9538	20 mfd., 150 V. condenser	1.10
64	CE 9539	30 mfd., 150 V. condenser	.85
65	CL 9554	Field coil	.90
66	LP 9516	Dial lamp - 6.3 volts, 0.15 ampere	1.50
67	CW 2-10	.1 mfd., 200 V. condenser	.20
68		On-Off switch - part of VR 9533	.15
69	CB 9512	Line cable and plug	.50
		MAIN ASSEMBLIES	
70			
71			
	CH 95114	Chassis assembly	
	CA 9554	Cabinet	
	SK 9532	Speaker assembly	6.50

LINE-UP CAPACITOR ADJUSTMENTS

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 #36 and #37 to maximum output.
5. Apply the test signal to the grid of the type 6A8 first detector-oscillator tube and adjust trimmer condensers #22 and #23 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.

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 #14 until the signal is received.
4. Adjust the preselector trimmer condenser #5 to maximum output.
5. Set test oscillator and dial indicator to 600 KC. and adjust the oscillator series condenser #16 until the signal is received. Tune the receiver to a point where maximum and readjust trimmer #16 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.

ADJUSTMENT OF GREEN BAND

1. Set the wave-change switch to the Green Band position.
2. Set the test oscillator and dial indicator to 4000 KC. and adjust the oscillator trimmer condenser #13 until the signal is received.
3. Adjust the preselector trimmer condenser #4 to maximum output.
4. Check the sensitivity and calibration over scale.

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 #12 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.

PRICES ARE SUBJECT TO
CHANGE WITHOUT NOTICE

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ..... 1 #6A8, 1 #6K7, 1 #6H6, 1 #6F5, 1 #25A6, 1 #2526, 1 #K42C (Ballast) in Model WR-116, 1 #K42B (Ballast) in Model WR-316 - Total 7

Power Supply Characteristics .... 105-125 volts D.C. or 105-125 volts, 50-60 cycle A.C.

Power Consumption ..... 82 Watts

Maximum output ..... 1.0 Watts

Maximum Undistorted Output ..... 0.75 Watts

Tuning Ranges ..... (White Band - 540 to 1580 K.C.
(Green Band - 1500 to 4500 K.C.
(Red Band - 5500 to 16500 K.C.

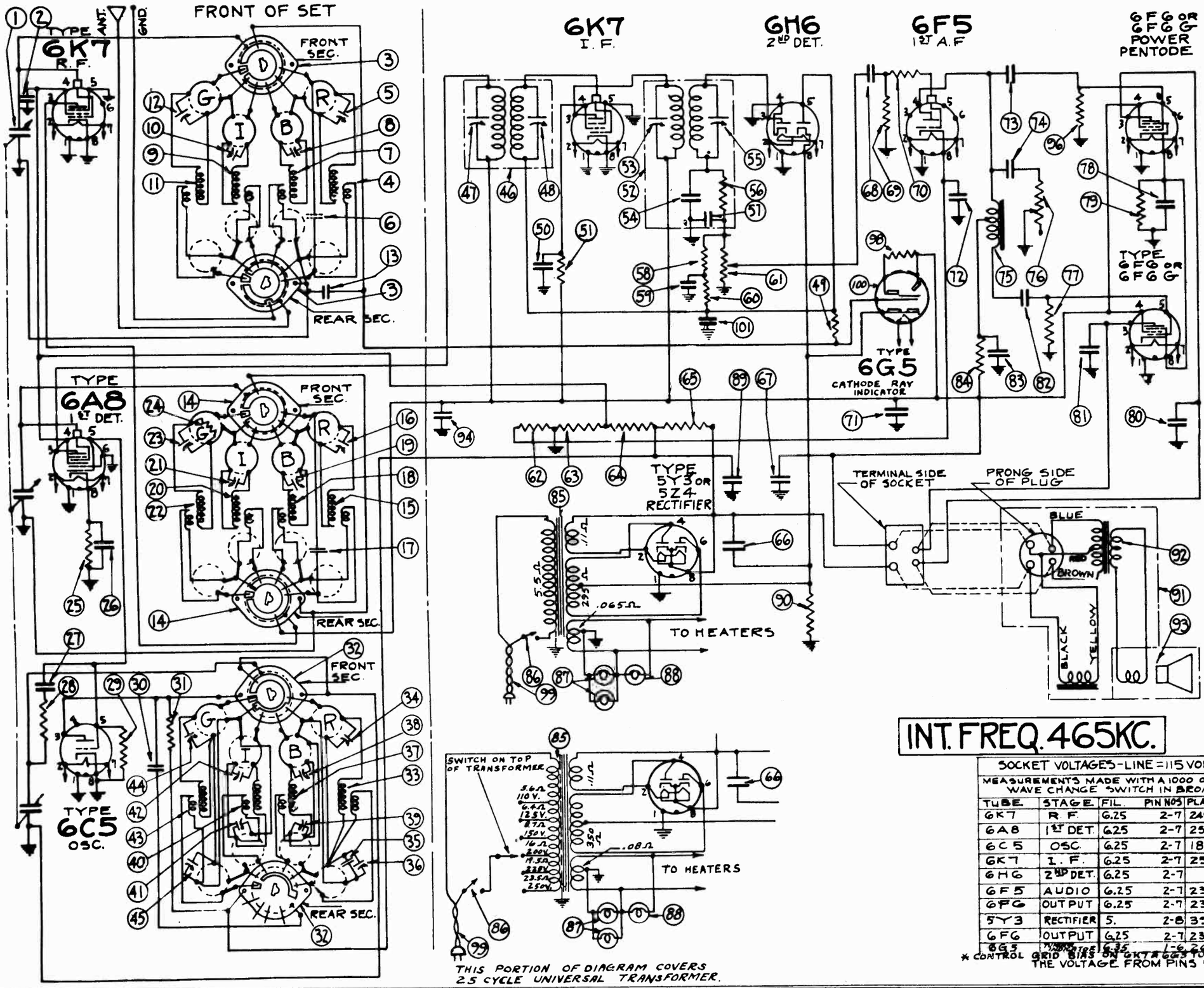
Line-Up Frequencies ..... I.F. 465 K.C., 1400 K.C., 600 K.C., 4000 K.C., 15000 K.C.

All service parts for Model WR-316 are the same as for Model WR-116 except for the following:

Dia. #	Part #	Description of Parts	List Price
32	CW 2-25	.25 mfd., 200 V. condenser	$ .20
43	VR 9535	1/2 meg. volume control	1.10
44	RE 9527	5000 ohm, 1/4 W. resistor	.10
45	CW 2-05	.05 mfd., 200 V. condenser	.15
70		On-Off switch - part of VR 9535	
72	SK 9538	Speaker assembly (14" Dia.)	10.00
73	DM 956	Diaphragm and voice coil assembly	1.25
74	TR 9556	Output transformer	1.55
80	CL 9556	Field coil	1.60

MODELS WR-214, WR-314
Schematic, Voltage
Resistances

WESTINGHOUSE ELEC. & MFG. CO.



D.C. RESISTANCE MEASURED WITH WAVE CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. NO.	PRIM.	SEC
G-ANT	11	120	20
G-R.F.	22	11	20
G-OSC.	43	6	8
I-ANT.	9	18.5	3.8
I-R.F.	20	0.8	10.7
I-OSC.	40	1.4	3.3
B-ANT.	7	2.1	1.0
B-R.F.	18	1.8	1.0
B-OSC.	37	0.5	0.9
R-ANT	4	0.7	403
R-R.F.	15	2.0	403
R-OSC	33	0.5	403
1ST I.F.	46	8.6	8.6
2ND I.F.	52	8.6	8.6
INTERSTAGE TRANS.	75	4200	9000
OUT PUT TRANS.	92	392	.03
SPKR FIELD		1800	
VOICE COIL	93	3.2	

INT. FREQ. 465KC.

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.	PIN NOS	PLATE	PIN NOS	SCREEN	PIN NOS	BIAS	PIN NOS
6K7	R.F.	6.25	2-7	245	3-1	100	4-1	*SEE NOTE	
6A8	1ST DET.	6.25	2-7	250	3-1	100	4-1	2.4	8-1
6C5	OSC.	6.25	2-7	180	3-1				
6K7	I.F.	6.25	2-7	250	3-1	105	4-1	* SEE NOTE	
6H6	2ND DET.	6.25	2-7					5.1	8-1
6F5	AUDIO	6.25	2-7	230	4-1			1.5	8-1
6F6	OUTPUT	6.25	2-7	235	3-1	250	4-1	21.5	8-1
5Y3	RECTIFIER	5.	2-8	395	8-1				
6F6	OUTPUT	6.25	2-7	235	3-1	250	4-1	21.5	8-1
6G5	INDICATOR	6.25	1-6	263	2-5			*SEE NOTE	

* CONTROL GRID BIAS ON 6K7 & 6G5 TUBES IS EQUAL TO APPROX. ONE-TENTH THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.

MODELS WR-214,WR-314
Socket,Trimmers
Chassis Layout

WESTINGHOUSE ELEC. & MFG. CO.

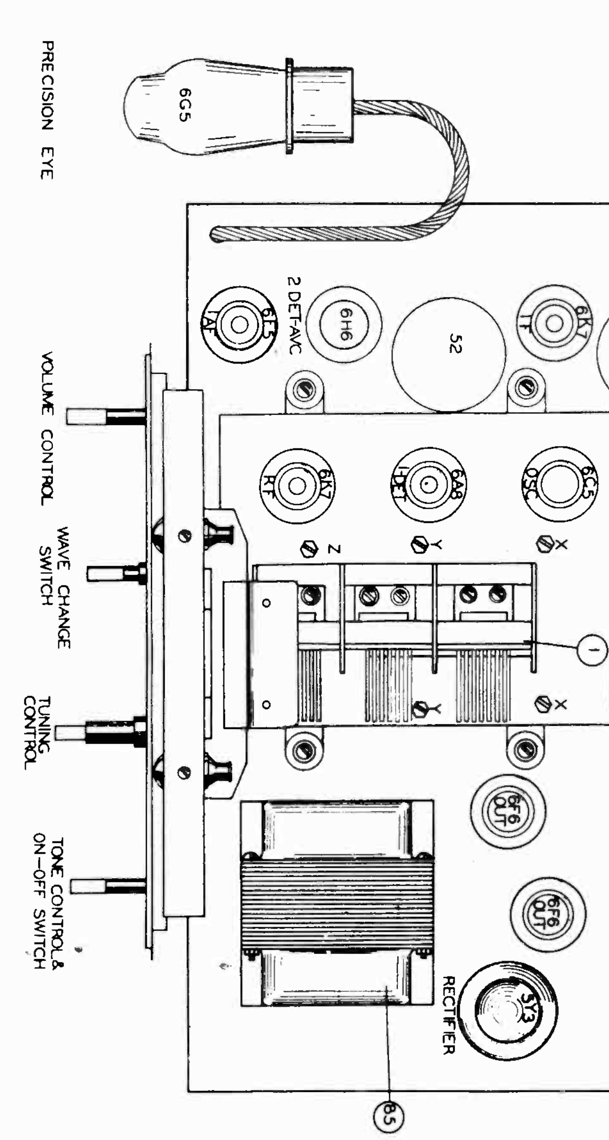


Figure No. 1

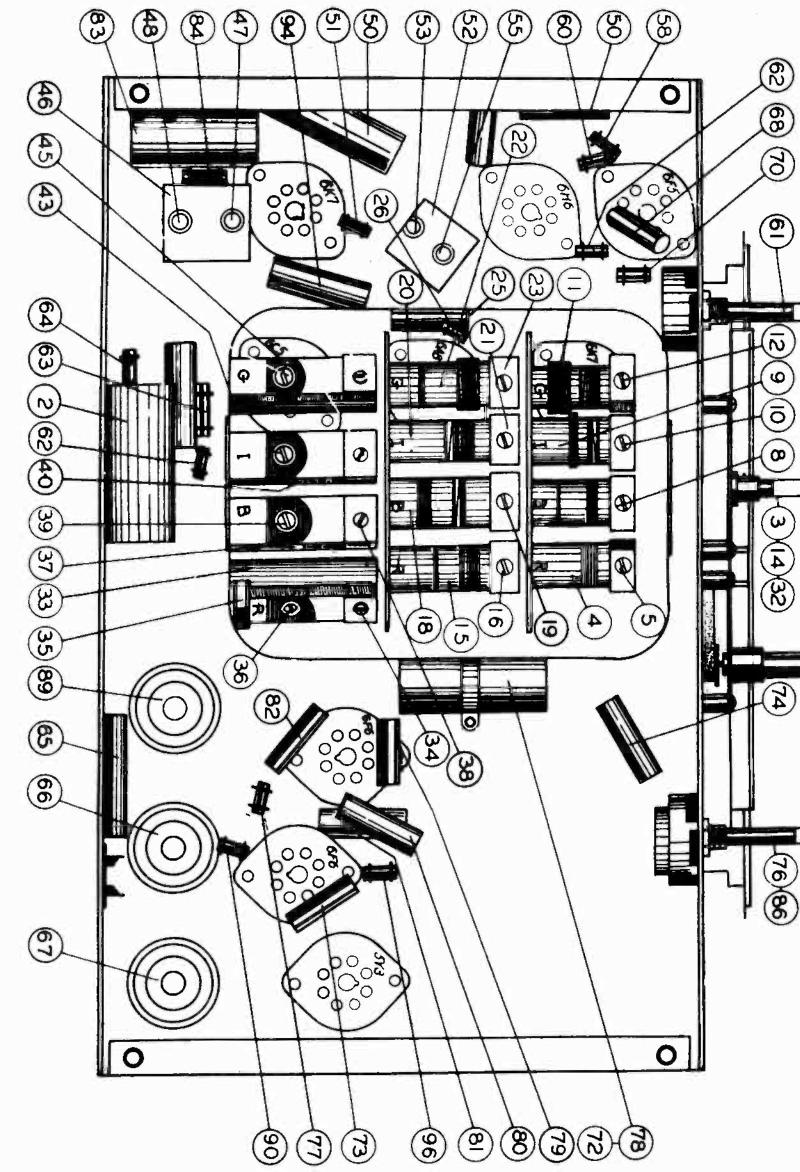


Figure No. 2

MODELS WR-214,WR-314
Specs.,Alignment,Parts

WESTINGHOUSE ELEC. & MFG. CO.

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ...... 2 #6K7, 1 #6A8, 1 #6C5, 1 #6H6, 1 #6F5, 2 #6F6, 1 #6G5, 1 #5Y3 - Total 10

Power Supply .... 105 to 125 volts, 50 to 60 cycles
Power Consumption .... 80 Watts
Maximum Undistorted Output .... 4.5 Watts
Maximum Output .... 6.5 Watts

Tuning Ranges ....
(Green Band - 150 to 390 KC.
(White Band - 525 to 1800 KC.
(Blue Band - 1750 to 6000 KC.
(Red Band - - 5800 to 18500 KC.

Line-Up Frequencies .. I.F. 465 KC.,350 KC.,165 KC.,1600 KC.,570 KC.,5500 KC.,1900 KC., 17000 KC., and 6000 KC.

LINE-UP CAPACITOR ADJUSTMENTS

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full and turn tone control to bass position.
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 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmers #53 and #55 for maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector and adjust #47 and #48 for maximum output.

ADJUSTMENT OF GREEN BAND

1. Set wave change switch to Green Band position.
2. Set test oscillator and dial indicator to 350 KC.
3. Apply test signal to antenna terminal of the chassis through a .0002 mfd. series condenser an' adjust #44, #23, and #12 for maximum output.
4. Set test oscillator and dial indicator to 165 KC. and adjust #45 for maximum output, at the same time rocking the variable tuning condenser.
5. Return to 350 KC. setting with both test oscillator and dial indicator and repeat adjustment of #44, #23 and #12 for accuracy.

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. and adjust #42, #21 and #10 for maximum output.
3. Set test oscillator and dial indicator to 570 KC., and adjust #41 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 1600 KC. setting and make readjustment of #42, #21 and #10.

ADJUSTMENT OF BLUE BAND

NOTE: In adjusting the Blue and Red Bands, 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 wave change switch to Blue Band position.
2. Set test oscillator and dial indicator to 5500 KC. and adjust #38, #19 and #8 for maximum output.
3. Set test oscillator and dial indicator to 1900 KC. and adjust #39 for maximum output, at the same time rocking the variable tuning condenser.

ADJUSTMENT OF RED BAND

1. Set wave change switch to Red Band position.
2. Set test oscillator and dial indicator to 17000 KC. and adjust #34, #16 and #5 for maximum output.
3. Set test oscillator and dial indicator to 6000 KC. and adjust #36 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 17000 KC. setting and make readjustment of #34, #16 and #5.

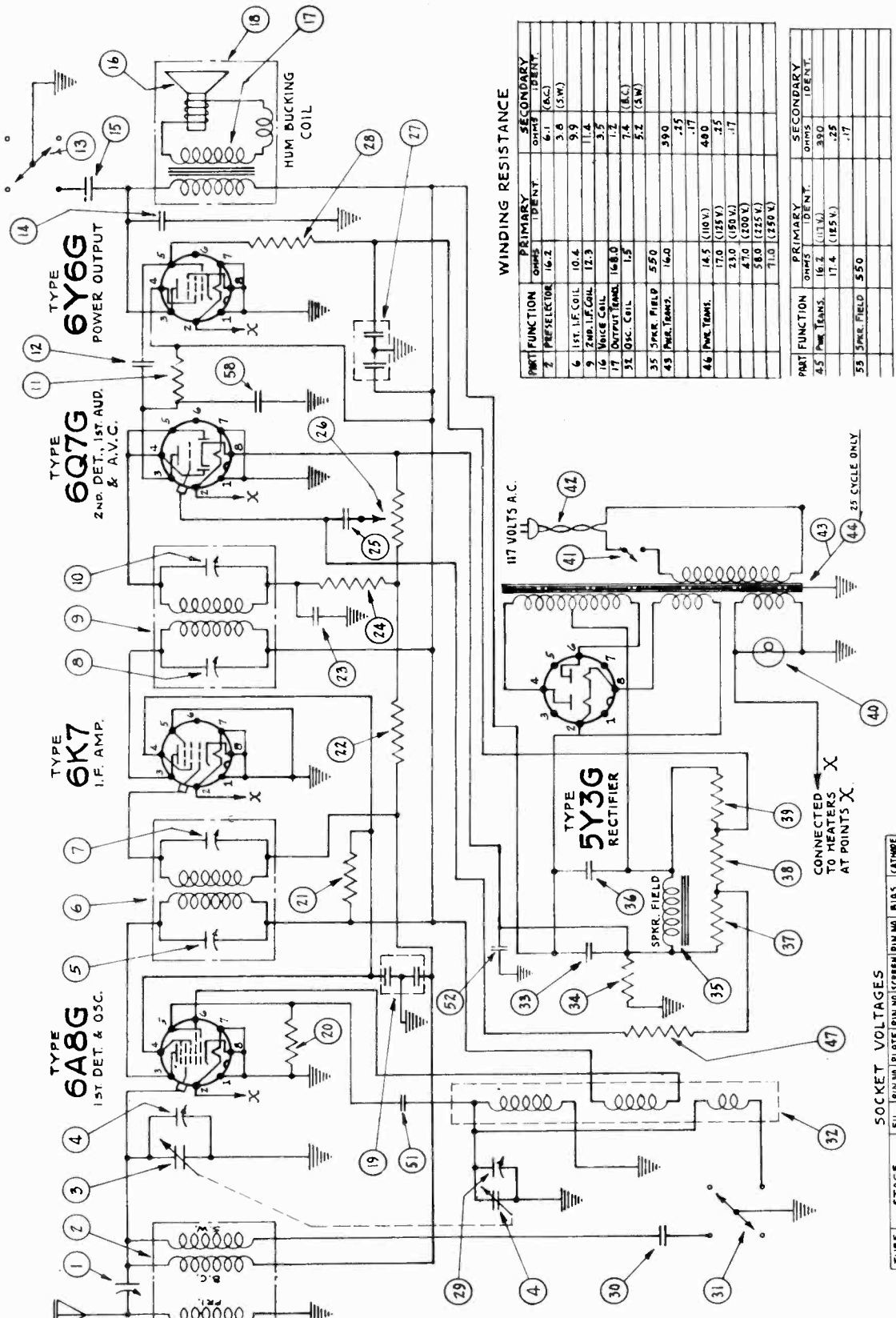
IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condenser will come out through the air vents making the condenser appear to be defective.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

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

Dia. #	Part #	Description of Parts	List Price
1	CG 9551	Variable condenser - 3 gang	$ 4.50
2	CW 2-100	1 mfd., 200 V. condenser	.40
3	SW 9555	Switch and bracket assembly - antenna section	1.40
4	RC 95220	Antenna coil (Red)	.95
5	CS 9554	4-30 mmf. trimmer condenser	.15
6		Twisted wire - part of RC 95220	
7	RC 95212	Antenna coil (Blue)	.80
8	CS 9554	4-30 mmf. trimmer condenser	.15
9	RC 95218	Antenna coil (White)	1.00
10	CS 9554	4-30 mmf. trimmer condenser	.15
11	RC 95219	Antenna coil (Green)	1.25
12	CS 9554	4-30 mmf., trimmer condenser	.15
13	CW 9513	.05 mfd., 200 V. condenser	.25
14	SW 9556	Switch and bracket assembly - R.F. section	1.40
15	RC 95217	R.F. coil (Red)	1.35
16	CS 9554	4-30 mmf. trimmer condenser	.15
17	CM 9512	6 mmf. mica condenser	.15
18	RC 95214	R.F. coil (Blue)	1.00
19	CS 9553	1.5-10 mmf. trimmer condenser	.15
20	RC 95215	R.F. coil (White)	1.00
21	CS 9554	4-30 mmf. trimmer condenser	.15
22	RC 95216	R.F. coil (Green)	1.30
23	CS 9553	1.5-10 mmf. trimmer condenser	.15
24		.1 meg., 1/4 W. resistor - part of RC 95216	
25	RE 9529	300 ohm, 1/4 W. resistor	.10
26	CW 2-05	.05 mfd., 200 V. condenser	.15
27	CM 9511	.000065 mfd. mica condenser	.15
28	RE 9537	50 ohm, 1/4 W. resistor	.10
29	RE 9524	50,000 ohm, 1/4 W. resistor	.10
30	CW 9513	.05 mfd., 200 V. condenser	.25
31	RE 9526	5,000 ohm, 1 W. resistor	.20
32	SW 9557	Switch and bracket assembly - oscillator section	1.50
33	RC 95223	Oscillator coil (Red)	2.50
34		3-15 mmf., trimmer condenser - part of CS 9557	.80
35	CM 959	.002 mfd., mica condenser	.25
36		800-1600 mmf. oscillator series cond. - part of CS 9557	
37	RC 95213	Oscillator coil (Blue)	1.75
38		3-15 mmf. trimmer condenser - part of CS 9520	.75
39		800-1600 mmf. osc. series condenser - part of CS 9520	
40	RC 95221	Oscillator coil (White)	1.80
41		300-600 mmf. osc. series condenser - part of CS 9517	.55
42		5-25 mmf. trimmer condenser - part of CS 9517	
43	RC 95222	Oscillator coil (Green)	1.85
44		50-100 mmf. trimmer condenser - part of CS 9558	.50
45		60-150 mmf. osc. series condenser - part of CS 9558	
46	IC 9576	First I.F. coil assembly - 465 K.C.	1.50
47		80-200 mmf. trimmer condenser - part of IC 9576	
48		80-200 mmf. trimmer condenser - part of IC 9576	
49	RE 9585	.25 meg., 1/4 W. resistor	.15
50	CW 2-25	.25 mfd., 200 V. condenser	.15
51	SA 105277	75,000 ohm, 1/4 W. resistor	.15
52	IC 9577	Second I.F. coil assembly - 465 KC.	1.85
53		80-200 mmf. trimmer condenser - part of IC 9577	
54		100 mmf. mica condenser - part of IC 9577	
55		80-200 mmf. trimmer condenser - part of IC 9577	
56		50,000 ohm, 1/4 W. resistor - part of IC 9577	
57		100 mmf. mica condenser - part of IC 9577	
58	SA 105281	1 meg., 1/4 W. resistor	.15
59	CW 2-05	.05 mfd., 200 V. condenser	.15
60	SA 105281	1 meg., 1/4 W. resistor	.15
61	VR 959	.5 meg. volume control	1.00
62	SA 105268	1500 ohm, 1/4 W. resistor	.15
63	SA 104966	30,000 ohm, 1/2 W. resistor	$ .15
64	SA 101404	15,000 ohm, 1 W. resistor	.20
65	SA 103835	10,000 ohm, 2 W. resistor	.25
66	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
67	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
68	CW 4-02	.02 mfd., 400 V. condenser	.15
69	SA 105281	1 meg., 1/4 W. resistor	.15
70	RE 9584	.1 meg., 1/4 W. resistor	.15
71	CW 4-10	.1 mfd., 400 V. condenser	.15
72	CE 9526	12 mfd., 25 V. electrolytic condenser	.90
73	CW 4-02	.02 mfd., 400 V. condenser	.15
74	CW 4-02	.02 mfd., 400 V. condenser	.15
75	TR 9563	Interstage transformer	2.50
76	VR 9537	.1 meg., tone control - 5,000 ohm min.	1.00
77	RE 9585	.25 meg., 1/4 W. resistor	.15
78		12 mfd. electrolytic condenser - part of CE 9526	
79	RE 9587	500 ohm resistor	.35
80	CW 4-005	.005 mfd., 400 V. condenser	.15
81	CW 4-005	.005 mfd., 400 V. condenser	.15
82	CW 4-02	.02 mfd., 400 V. condenser	.15
83	CW 9526	1 mfd., 400 V. condenser	.40
84	SA 105272	10,000 ohm, 1/4 W. resistor	.15
85	TR 9562	Power transformer - 105-125 V., 50-60 cycle	5.00
86		On & Off switch - part of VR 9537	
87	LP 9515	Dial lamp - 3.5 V., .35 amp.	.20
88	LP 9510	Tuning indicator lamp - 6.3 V., .25 amp.	.15
89	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
90	RE 95101	37 ohm, 1/4 W. resistor	.15
91	SK 9537	Speaker	7.50
92	TR 9577	Output transformer	1.75
93	SA 107282	Diaphragm and voice coil assembly	1.15
94	CW 4-05	.05 mfd., 400 V. condenser	.15
96	RE 9585	.25 meg., 1/4 W. resistor	.15
98		1 meg., 1/4 W. resistor - part of CB 9598	
99	CB 9512	Line cable and plug	.50
100	CB 9598	"Precision eye" cable assembly	.70
101	CW 2-05	.05 mfd., 200 V. condenser	.15

WESTINGHOUSE ELEC. & MFG. CO.

MODEL WR-222
Schematic, Voltage
Resistances



WINDING RESISTANCE

PART	FUNCTION	PRIMARY OHMS	PRIMARY IDENT.	SECONDARY OHMS	SECONDARY IDENT.
2	PREFSELECTOR	16.2		6.1	(B.C.)
				3.6	(S.W.)
6	1ST. I.F. COIL	10.4		9.9	
9	2ND. I.F. COIL	12.3		11.4	
16	VOICE COIL			3.5	
17	OUTPUT TRANS.	168.0		1.2	
51	OSC. COIL	1.5		7.4	(B.C.)
				5.2	(S.W.)
35	SPKR. FIELD	550		390	
43	PWR. TRANS.	16.0		.25	
				.17	
46	PWR. TRANS.	14.5	(110 V.)	400	
		17.0	(125 V.)	.25	
		23.0	(150 V.)	.17	
		47.0	(200 V.)		
		58.0	(225 V.)		
		71.0	(250 V.)		

PART	FUNCTION	PRIMARY OHMS	PRIMARY IDENT.	SECONDARY OHMS	SECONDARY IDENT.
45	PWR. TRANS.	16.2	(117 V.)	390	
		17.4	(125 V.)	.25	
				.17	
53	SPKR. FIELD	550			

SOCKET VOLTAGES

TUBE	STAGE	FIL.	PIN NO.	PLATE	PIN NO.	SCREEN	PIN NO.	BIAS	CATHODE
6A8G	DET. - OSC.	5.5	2 TO 7	135	1 TO 3	62	1 TO 4	-1.35	
6K7	I.F. AMPLIFIER	5.5	2 TO 7	135	1 TO 3	62	1 TO 4	-1.35	
6Q7G	2ND DET. 1ST A.F.	5.5	2 TO 7	55	1 TO 3			-.88	
6Y6G	OUTPUT A.F.	5.5	2 TO 7	130	1 TO 3	135	1 TO 4	-16.8	
5Y3G	RECTIFIER	6.6	2 TO 8						135

NOTE: ALL VOLTAGES EXCEPT BIAS ON 6Q7G & 6Y6G READ WITH 1000 OHM PER VOLT VOLTMETER FOR 117 VOLT LINE. BIAS ON 6Q7G & 6Y6G COMPUTED FROM I.R. DROP ACROSS POS. 37 & POS. 38.

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ..... 1 #6A8G, 1 #6K7, 1 #6Q7G, 1 #6Y6G, 1 #5Y3G - Total 5
Power Supply Characteristics ..... 105-125 volts, 50-60 cycle A.C.
Power Consumption ..... 45 Watts
Total Power Output ..... 3.3 Watts
Undistorted Power Output ..... 1.6 Watts
Tuning Ranges ..... (Broadcast Band 535 to 1550 KC. (Short-wave Band 1550 to 3600 KC.
Line-Up Frequencies ..... I.F. 455 KC., 1400 KC.

GENERAL DESCRIPTION

This model is a five-tube, alternating current, two-band superheterodyne receiver, designed to operate over the standard broadcast band extending from 535 to 1550 KC., and a short-wave band extending from 1550 to 3600 KC.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of this receiver, it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied and reduced sufficiently to prevent overload as the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the individual circuits are correctly aligned. The sensitivity of the meter must be sufficient to give satisfactory readings with low input signals.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the various tubes and alignment condensers.

ALIGNMENT OF I.F. (455 KC.)

1. Set the volume control to maximum position, the wave-change switch to standard broadcast band, and the dial pointer to approximately 600 KC.

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

3. Set the test oscillator to 455 KC., and adjust its output to produce a measureable reading on the output meter when the test signal is applied to the grid of the type 6A8G first detector-oscillator tube through a 0.5 mfd. blocking condenser.

4. Adjust the four I.F. trimmer condensers underneath the chassis (under the square coil housings) to maximum output.

ALIGNMENT OF OSCILLATOR AND R.F.

1. Check the pointer setting to be sure that it is exactly horizontal when the tuning condenser is completely closed.

2. Set the test oscillator and dial indicator to 1400 KC., and adjust the oscillator trimmer condenser (rear section of gang) to maximum output.

3. Apply the test signal to coil end of the antenna cable through a .0001 mfd. blocking condenser and adjust trimmer condenser (front section of gang) to maximum output.

4. Check sensitivity over the band.

5. Turn wave-change switch to the short-wave band and check the sensitivity over scale.

TRAP ALIGNMENT

This receiver is provided with a tuned trap (top section of antenna coil near gang condenser) which is adjusted to eliminate signals at the I.F. frequency. This trimmer does not need to be adjusted unless there is code interference, in which case adjustment is made to eliminate the undesired signal. The models with the suffix "S" are built without the tuned trap. Viewing the antenna coil from the top, it will be seen that the five lugs are somewhat grouped. The first lug at the left of the open space is #1, #2-3-4-5 being counted in a clockwise direction. The models with the trap are connected: antenna to #1 lug, ground to #2 lug and the trimmer condenser between lugs #1 and #4. The models without the trap are connected: ground to #1 lug, antenna to #5 lug and the fixed condenser between lugs #4 and #5. One model may be readily converted to the other by obtaining the opposite type of condenser and making the above wiring changes.

PARTS LIST

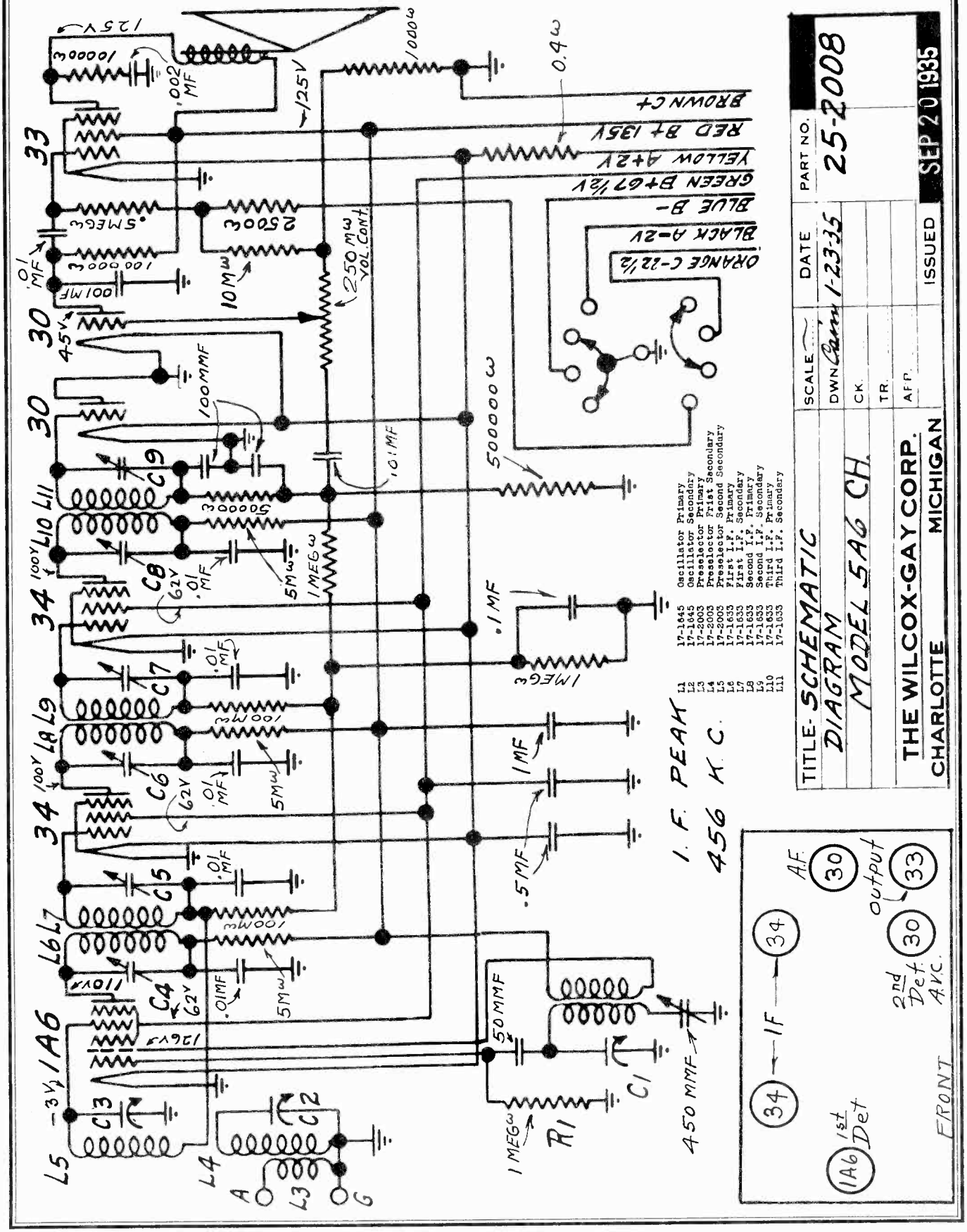
Dia. #	Part #	Description of Parts	List Price
1	CS 9584	Antenna trimmer condenser	$ .15
1	CM 952	Antenna condenser - "S" models	.20
2	RC 95295	Antenna coil assembly	1.00
2	RC 95343	Antenna coil assembly - "S" models	$ 1.00
3	CG 9560	Variable gang condenser	3.25
4,29		Trimmer condenser - part of CG 9560	
5,7		I.F. trimmers - part of IC 95109	
6	IC 95109	1st I.F. transformer assembly	1.20
8,10		I.F. trimmers - part of IC 95110	
9	IC 95110	2nd I.F. transformer	1.20
11	RE 2243	220,000 ohm, 1/2 W. resistor	.10
12	CW 6-005	.005 mfd., 600 V. condenser	.15
13	SW 9572	Tone control switch	.40
14	CW 6-01	.01 mfd., 600 V. condenser	.15
15	CW 6-10	.1 mfd., 600 V. condenser	.20
16	DM 9526	Speaker diaphragm and voice coil assembly	1.50
17	TR 95139	Speaker output transformer	1.35
18	SK 9571	Speaker assembly	4.75
19	CW 9535	.1 mfd., 400 V. dual condenser	.30
20	RE 4733	47,000 ohm, 1/2 W. resistor	.10
21	RE 2233	22,000 ohm, 1/2 W. resistor	.10
22	RE 1053	1 meg., 1/2 W. resistor	.10
23	CM 9514	.0002 mfd. mica condenser	.15
24	RE 4733	47,000 ohm, 1/2 W. resistor	.10
25	CW 6-005	.005 mfd., 600 V. condenser	.15
26	VR 9553	1/2 meg. volume control and switch	1.00
27	CW 9535	.1 mfd., 400 V. dual condenser	.30
28	RE 4743	470,000 ohm, 1/2 W. resistor	.10
30	CM 9541	.0007 mfd. mica condenser	.15
31	SW 9572	Wave-change switch	.40
32	RC 95294	Oscillator coil assembly	.60
33	CE 9565	16 mfd., 175 V. electrolytic condenser	.65
34	RE 2203	22 ohm, 1/2 W. resistor	.10
35		Field coil (not serviced separately) - part of SK 9571	
36	CE 9564	16 mfd., 250 V. electrolytic condenser	.75
37	RE 2233	22,000 ohm, 1/2 W. resistor	.10
38	RE 2243	220,000 ohm, 1/2 W. resistor	.10
39	RE 5643	560,000 ohm, 1/2 W. resistor	.10
40	LP 9510	6-8 volt dial light	.20
41		Line switch - part of VR 9553	
42	CB 9512	Line cable and plug	.50
43	TR 95112	Power transformer 105-125 V., 50-60 cycle	4.00
44	TR 95136	Power transformer 105-125 V., 25 cycle	5.00
47	RE 1053	1 meg., 1/2 W. resistor	.10
51	CM 9513	.0001 mfd. mica condenser	.10
52	CW 2-10	.1 mfd., 200 V. condenser	.15
58	CW 6-002	.002 mfd., 600 V. condenser	.15

MISCELLANEOUS

Part #	Description of Parts	List Price
BA 9524	Speaker cardboard baffle - on cabinet	$ .05
CV 954	Tube shield	.10
CV 95232	Coil shield - 1st I.F.	.25
CV 95233	Coil shield - 2nd I.F.	.25
DS 9590	Dial scale only	.80
FP 101869	Felt foot (4 used)	.05
IS 95216	Rubber pulley on drive shaft	.05
KA 9589	Cabinet	
KN 95128	Knob (4 used)	.12
NT 958	3/8" Pal nut for volume control and switches	.05
PL 95123	Dial supporting plate	.30
PL 95114	Escutcheon plate with celluloid cover	1.50
PR 97160	Drive cord ..... Per Yard	.05
PU 9527	Brass dial drive pulley assembly	.25
SI 9575	Dial indicator pointer	.20
SO 956	Octal base tube socket (5 used)	.20
SO 9534	Dial light socket assembly	.12
SP 9551	Drive cord spring - on pulley PU 9527	.05
TU 95170	Insulation tube for electrolytic condenser	.05

WILCOX-GAY CORP.

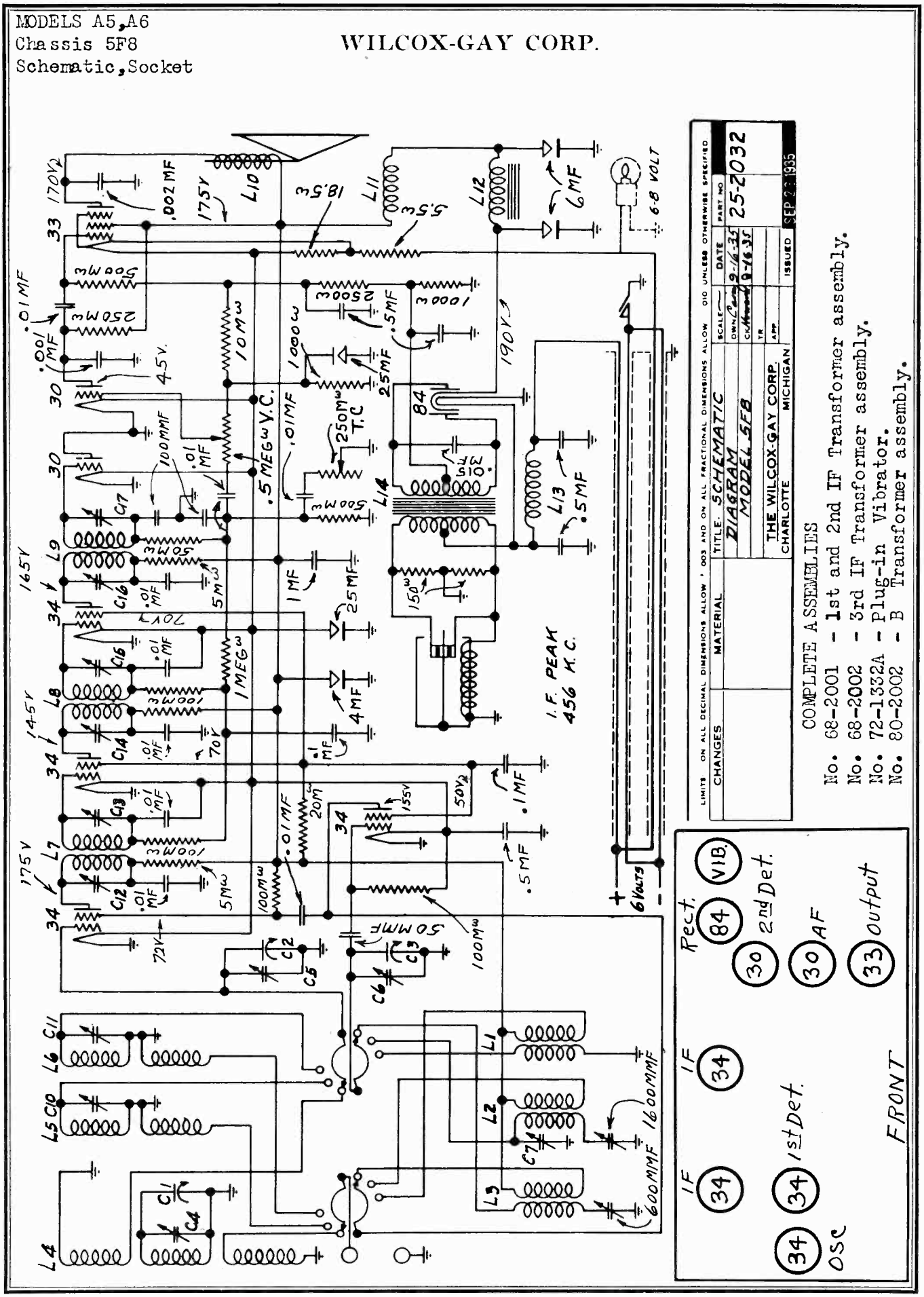
MODELS A3, A4
Chassis 5A6
Schematic, Socket



TITLE- SCHEMATIC DIAGRAM MODEL 5A6 CH.	SCALE ~	DATE	PART NO.
	DWN Rum	1-23-35	25-2008
	CK.		
	TR.		
THE WILCOX-GAY CORP. CHARLOTTE MICHIGAN	AFP.	ISSUED	SEP 20 1935

MODELS A5,A6
Chassis 5F8
Schematic,Socket

WILCOX-GAY CORP.



LIMITS ON ALL DECIMAL DIMENSIONS ALLOW ' 003 AND ON ALL FRACTIONAL DIMENSIONS ALLOW 010 UNLESS OTHERWISE SPECIFIED

CHANGES	MATERIAL	TITLE: SCHEMATIC DIAGRAM MODEL 5F8	SCALE	DATE	PART NO
			DWN	9-16-35	25-2032
			CK	9-16-35	
		THE WILCOX-GAY CORP. CHARLOTTE MICHIGAN	TR		
			APP		
			ISSUED		SEP 23 1935

COMPLETE ASSEMBLIES

No. 68-2001 - 1st and 2nd IF Transformer assembly.
No. 68-2002 - 3rd IF Transformer assembly.
No. 72-1332A - Plug-in Vibrator.
No. 80-2002 - B Transformer assembly.

MODEL 6T11
Schematic, Socket Parts

WILCOX-GAY CORP.

CHASSIS MODEL 6T11

FOR USE ONLY WITH
110-120 V . 50-60 CYCLE
PILOT LIGHTS 6-8 V
I. F. PEAK 456 K. C.

RESISTORS

CODE PART NO.		
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-923	100,000 Ohm A.V.C. Network Resistor
R4	53-494	75,000 Ohm R.F. & I.F. Screen Resistor
R5	53-941	20,000 Ohm Oscillator Plate Resistor
R6	53-926	1 Meg Ohm 6G5 Grid Cathode Resistor
R7	53-1063	1,500 Ohm A.V.C. Network Resistor
R8	53-926	500 Ohm Second I.F. Cathode Resistor
R9	53-919	5,000 Ohm Second I.F. Plate Isolation Resistor
R10	53-898	50,000 Ohm Diode Filter Resistor
R11	53-924	250,000 Ohm Diode Load Resistor
R12	53-923	100,000 Ohm Volume Control & Switch
R13	53-1291	500,000 Ohm Push-Pull Network Resistor
R14	53-1144	2,700 Ohm 6F5's Cathode Resistor
R15	53-925	800,000 Ohm Inverter Grid Resistor
R16	53-924	250,000 Ohm Inverter Plate Resistor
R17	53-924	250,000 Ohm First Audio Plate Resistor
R18	53-1317	250,000 Ohm Tone Control
R19	53-925	500,000 Ohm First Position 6F6 Grid Resistor
R20	53-923	100,000 Ohm 6F5's Plate Hum Resistor
R21	53-920	10,000 Ohm Push-Pull Network Resistor
R22	53-925	500,000 Ohm Second Position 6F6 Grid Resistor
R23	53-2011	250 Ohm 6F6's Cathode Resistor
R24	53-919	5,000 Ohm 6A8 Plate Isolation Resistor
R25	53-919	5,000 Ohm First I.F. Plate Isolation Resistor
R26	53-929	250,000 Ohm Diode Load Resistor

CONDENSERS

CODE PART NO.		
C1	77-1601	16-366 MMFD. Preselector Section of 3 Gang
C2	77-1601	16-366 MMFD. Preselector Section of 3 Gang
C3	77-1572	16-366 MMFD. Oscillator Section of 3 Gang
C4	78-1572	600 MMFD. Broadcast Oscillator Series Trimmer
C5	78-1572	1600 MMFD. Police Band Oscillator Series Trimmer
C6	78-1568	3-30 MMFD. Police Band Oscillator Parallel Trimmer
C7	78-1568	3-30 MMFD. Police Band Preselector Trimmer
C8	78-1568	3-30 MMFD. Foreign Band Preselector Trimmer
C9	78-2016	70-120 MMFD. First I.F. Primary Trimmer
C10	78-2016	70-120 MMFD. First I.F. Secondary Trimmer
C11	78-2016	70-120 MMFD. Second I.F. Primary Trimmer
C12	78-2016	70-120 MMFD. Second I.F. Secondary Trimmer
C13	78-2016	70-120 MMFD. Third I.F. Primary Trimmer
C14	78-2016	70-120 MMFD. Third I.F. Secondary Trimmer
C15	76-2001	.0001 Mfd. Diode Filter Condenser
C16	76-2001	.0001 Mfd. Diode Filter Condenser
C17	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C18	76-662	.002 Mfd. Mica First Audio Plate Filter Condenser
C19	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C20	75-2003	.01 Mfd. 400 V. Paper Tone Control Condenser
C21	75-2003	.1 Mfd. 200 V. Paper Inverter Feed Condenser
C22	75-2011	.5 Mfd. 200 V. Paper 6F5's Plate Hum Condenser
C23	75-2006	.1 Mfd. 200 V. Paper Audio Feed Condenser
C24	18-721	8 Mfd. 450 V. Dry Electrolytic Filter Condenser
C25	18-2006	12 Mfd. 325 V. Wet Electrolytic Filter Condenser
C26	75-2003	.01 Mfd. 400 V. Paper Line By-Pass Condenser
C27	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C28	75-2013	1. Mfd. 400 V. Paper B. Supply By-Pass Condenser
C29	75-2003	.01 Mfd. 400 V. Paper Second I.F. Plate Isolation Cond.
C30	75-2006	.1 Mfd. 200 V. Paper Second I.F. Cathode By-Pass Cond.
C31	75-2006	.1 Mfd. 200 V. Paper First I.F. Cathode By-Pass Cond.
C32	75-2005	.1 Mfd. 200 V. Paper First Det. Cathode By-Pass Cond.
C33	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C34	75-2003	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C35	75-2013	1. Mfd. 400 V. Paper B. Supply By-Pass Cond.
C36	75-2003	.01 Mfd. 400 V. Paper 6A8 Plate Isolation Cond.
C37	75-2003	.01 Mfd. 6A8 Plate Isolation Condenser
C38	75-2003	.01 Mfd. First I.F. Plate Isolation Condenser

INDUCTANCES

CODE PART NO.		
L1	17-2111	Broadcast Oscillator Coil Assembly
L2	17-2106	Police Band Oscillator Coil Assembly
L3	17-2096	Foreign Band Oscillator Coil Assembly
L4	17-2100	Broadcast Preselector Coil Assembly
L5	17-2104	Police Band Preselector Coil Assembly
L6	17-2096	Foreign Band Preselector Coil Assembly
L7	68-2027	First I.F. Transformer Assembly
L8	68-2013	Second I.F. Transformer Assembly
L9	68-2032	Third I.F. Transformer Assembly
L10	64-2039	Speaker, 1000 Ohm Field
		Push-Pull Output Trans. for 2 - 6F6's
L11	80-2019	Power Transformer

MODEL 6T11

SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	DIAL POSITION	WAVE BAND SWITCH POSITION	TRIMMER NUMBER	OUTPUT SIGNAL
Remove Grid Clip from 6A8					
Control Grid of 6A8	456 K.C.	1400 K.C.	Broadcast (Left)	1	Max. [1]
" " " "	" "	" "	" "	2	Max. [1]
" " " "	" "	" "	" "	3	Max. [1]
" " " "	" "	" "	" "	4	Max. [1]
" " " "	" "	" "	" "	5	Max. [1]
" " " "	" "	" "	" "	6 [2]	Max. [1]
Connect Grid Clip to 6A8					
* Antenna & Ground Posts	1400 K.C.	1400 K.C.	" "	7	Max. [1]
" "	" "	" "	" "	8	Max. [1]
" "	" "	" "	" "	9	Max. [1]
" "	600 "	600 "	" "	10	Max. [1]
" "	1400 "	1400 "	" "	7	Max. [1]
" "	600 "	600 "	" "	10	Max. [1]
" "	4.0 M.C.	4.0 M.C.	Police (Center)	11	Max. [1]
" "	" "	" "	" "	12	Max. [1]
" "	1.6 "	1.6 "	" "	13	Max. [1]
" "	4.0 "	4.0 "	" "	11	Max. [1]
" "	1.6 "	1.6 "	" "	13	Max. [1]
" "	14 "	14 "	Foreign (Right)	14	Max. [1]

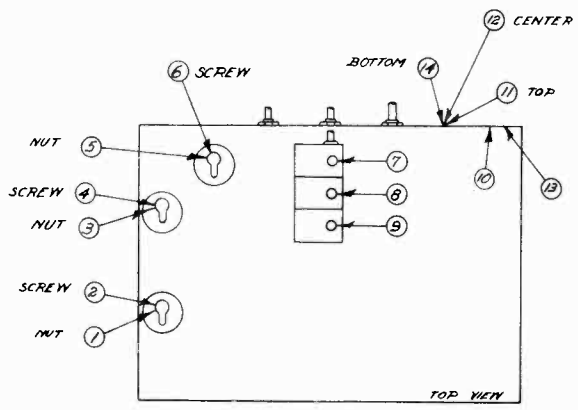
Volume Control in "Full on" position at all times.

* Connect a standard dummy antenna between signal generator and receiver.

Note 1: Signal across primary of output transformer between 20 and 50 volts.

Note 2: Repeat above procedure and critically trim each adjustment to absolute resonance to insure perfect alignment. The I.F. sensitivity should be from 2 to 4 microvolts.

MODEL 6T11



TUBE	CIRCUIT	PLATE TO GROUND	SCREEN TO GROUND	CATHODE TO GROUND	2 PLATE TO GROUND	2 GRID TO GROUND
6A8	Osc. & First Detector	280	62	1.5	200	- 15
6K7	I. F. Amplifier	270	62	1.8		
6K7	I. F. Amplifier	270	62	1.7		
6H6	2nd. Detector & AVC					
6F5	First Audio	100		1.3		
6F5	Inverter	100		1.3		
6F6	Output	270	278	18		
6F6	Output	270	278	18		
6G5	Tuning	20			TARGET 270	
80	Rectifier					
80	Rectifier					

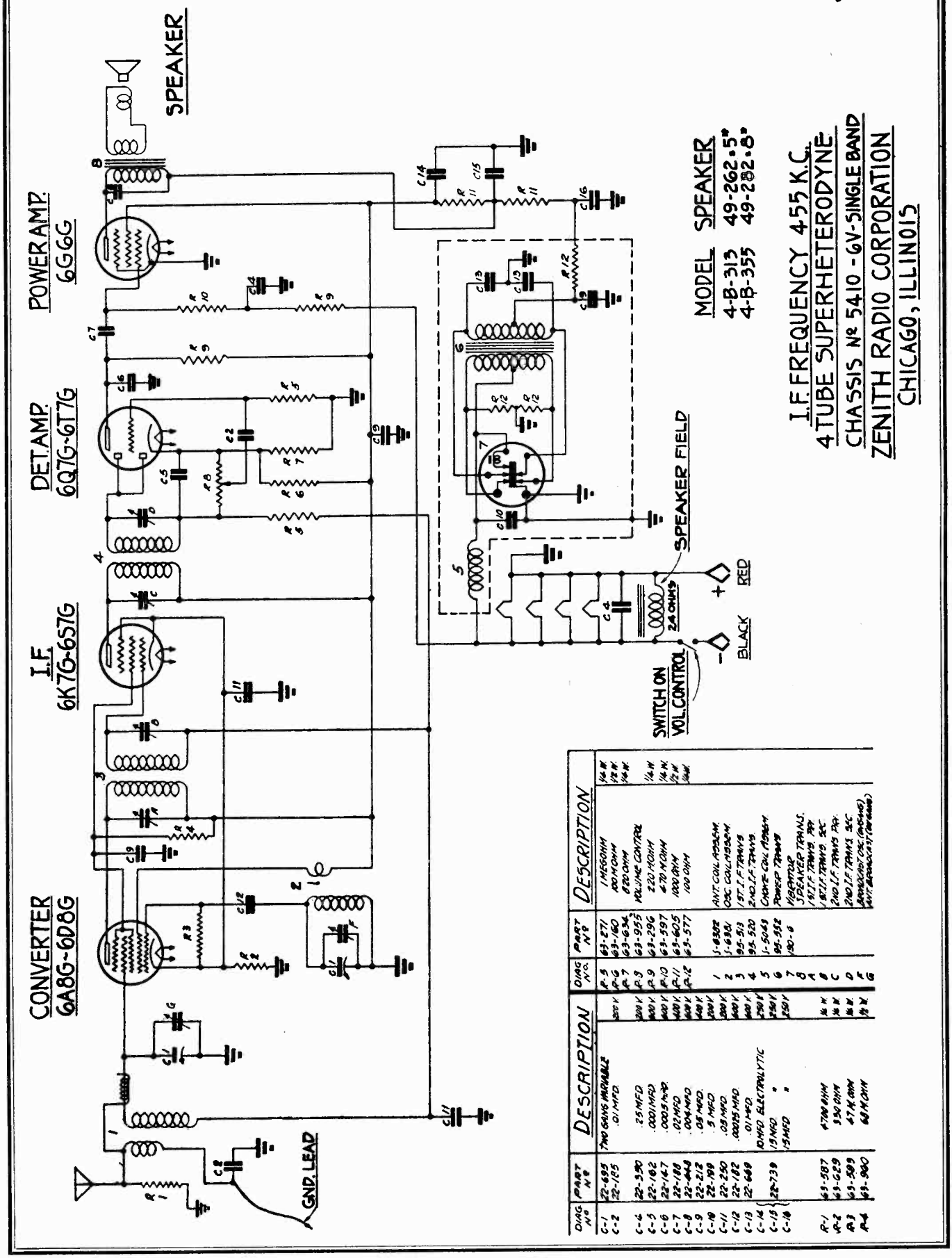
B- Voltage 278
Speaker Field Voltage 105

Meter 1000 ohms per volt
750 volt scale

WILCOX-GAY CORP.

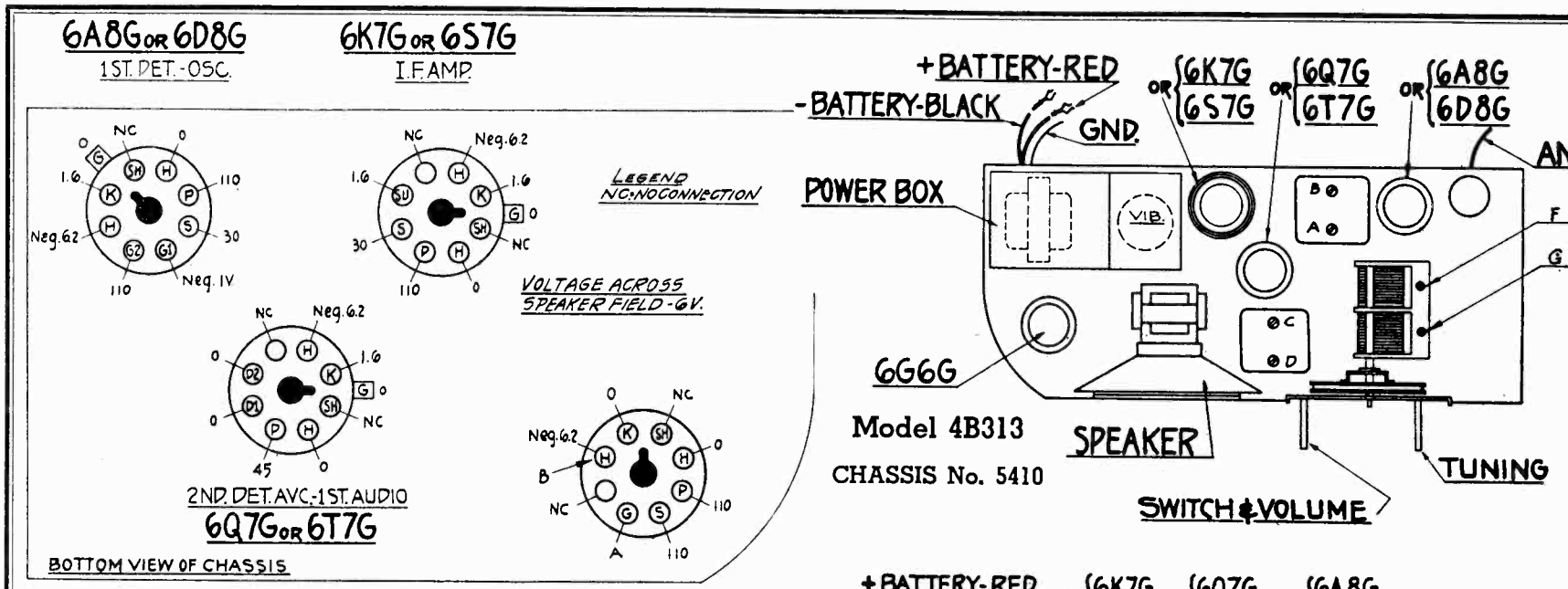
ZENITH RADIO CORP.

MODELS 4B313, 4B355
Chassis 5410
Schematic, Parts



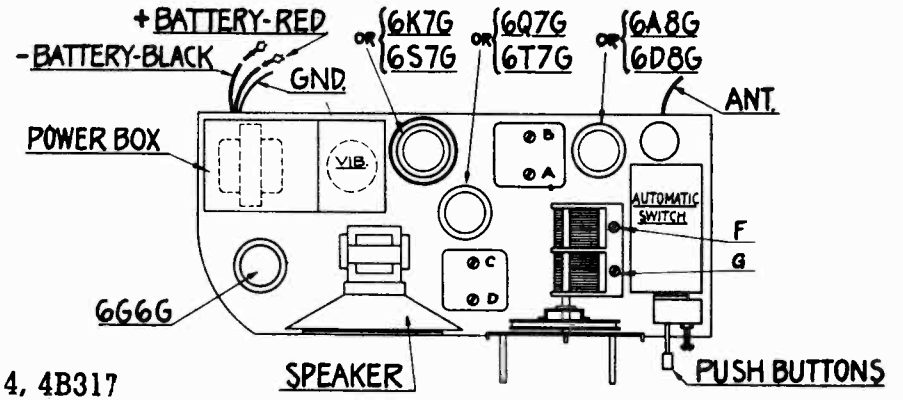
DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION	
C-1	22-695	TWO GANG VARIABLE		R-1	63-271	1 MEGOHM	1/4 W.
C-2	22-195	.01 MFD.	400 V.	R-2	63-160	100 OHM	1/2 W.
C-3	22-350	.25 MFD.	200 V.	R-3	63-634	220 OHM	1/4 W.
C-4	22-162	.0001 MFD.	400 V.	R-4	63-955	VOLUME CONTROL	
C-5	22-147	.0005 MFD.	400 V.	R-5	63-296	220 K OHM	1/4 W.
C-6	22-186	.02 MFD.	400 V.	R-6	63-597	470 K OHM	1/4 W.
C-7	22-188	.004 MFD.	400 V.	R-7	63-605	1000 OHM	1/2 W.
C-8	22-444	.05 MFD.	400 V.	R-8	63-577	100 OHM	1/4 W.
C-9	22-213	.05 MFD.	200 V.				
C-10	22-199	.5 MFD.	200 V.	1	1-6382	ANT. COIL ASSEM.	
C-11	22-230	.05 MFD.	400 V.	2	1-6381	OSC. COIL ASSEM.	
C-12	22-182	.0025 MFD.	400 V.	3	95-513	1ST I.F. TRANS.	
C-13	22-669	.01 MFD.	400 V.	4	95-520	2ND I.F. TRANS.	
C-14		10 MFD. ELECTROLYTIC	250 V.	5	1-5043	CHOKE COIL ASSEM.	
C-15	22-739	15 MFD. "	250 V.	6	95-552	POWER TRANS.	
C-16		15 MFD. "	250 V.	7	130-6	1/4 AMP. SPEAKER TRANS.	
				8		1ST I.F. TRANS. PRI.	
				A		1ST I.F. TRANS. SEC.	
				B		2ND I.F. TRANS. PRI.	
R-1	63-587	4700 OHM	1/4 W.	C		2ND I.F. TRANS. SEC.	
R-2	63-629	330 OHM	1/4 W.	D		ANTENNA OSC. (GANGED)	
R-3	63-593	47 K OHM	1/4 W.	E		ANT. & OSC. (GANGED)	
R-4	63-500	68 K OHM	1/2 W.	G			

ZENITH RADIO CORP.



Model 4B313

CHASSIS No. 5410



Models 4B314, 4B317

CHASSIS No. 5411

Location of Tubes and Trimmers

NOTE

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

Battery Voltage at chassis 6.2 v.

Battery Consumption 2.3 ampere.

(A) Bias for 6G6 measured from point "B" to chassis.

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.	455	Br'dc't	600	ABCD	I. F. Aligment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.

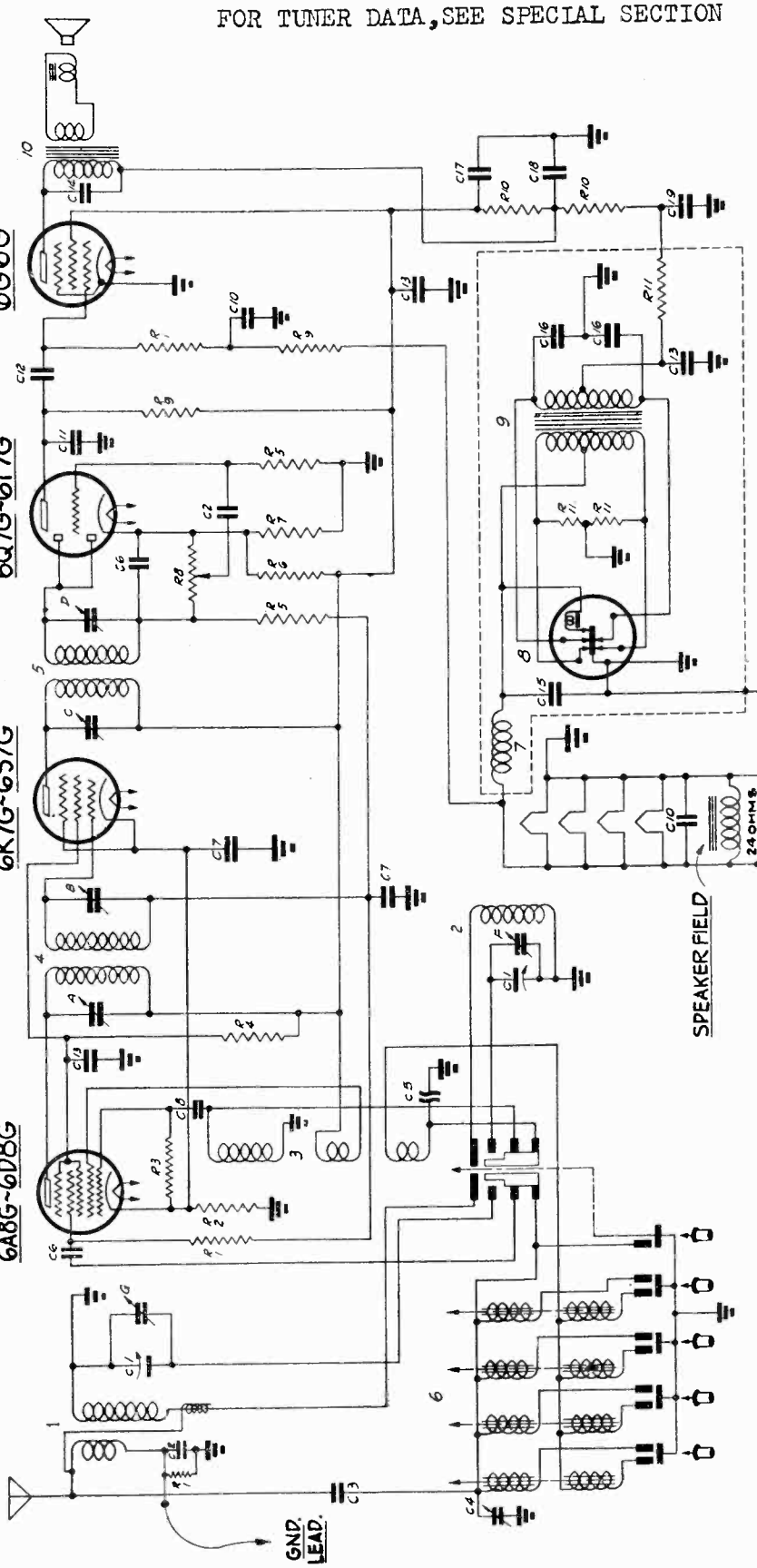
ZENITH RADIO CORP.

MODELS 4B314, 4B317
Chassis 5411
Schematic, Parts

FOR TUNER DATA, SEE SPECIAL SECTION

MODEL	SPEAKER
4-B-314	49-262 : 5"
4-B-317	49-262 : 5"

I.F. FREQUENCY 455 K.C.
4 TUBE SUPERHETERODYNE
CHASSIS № 5411 – 6V-SINGLE BAND
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

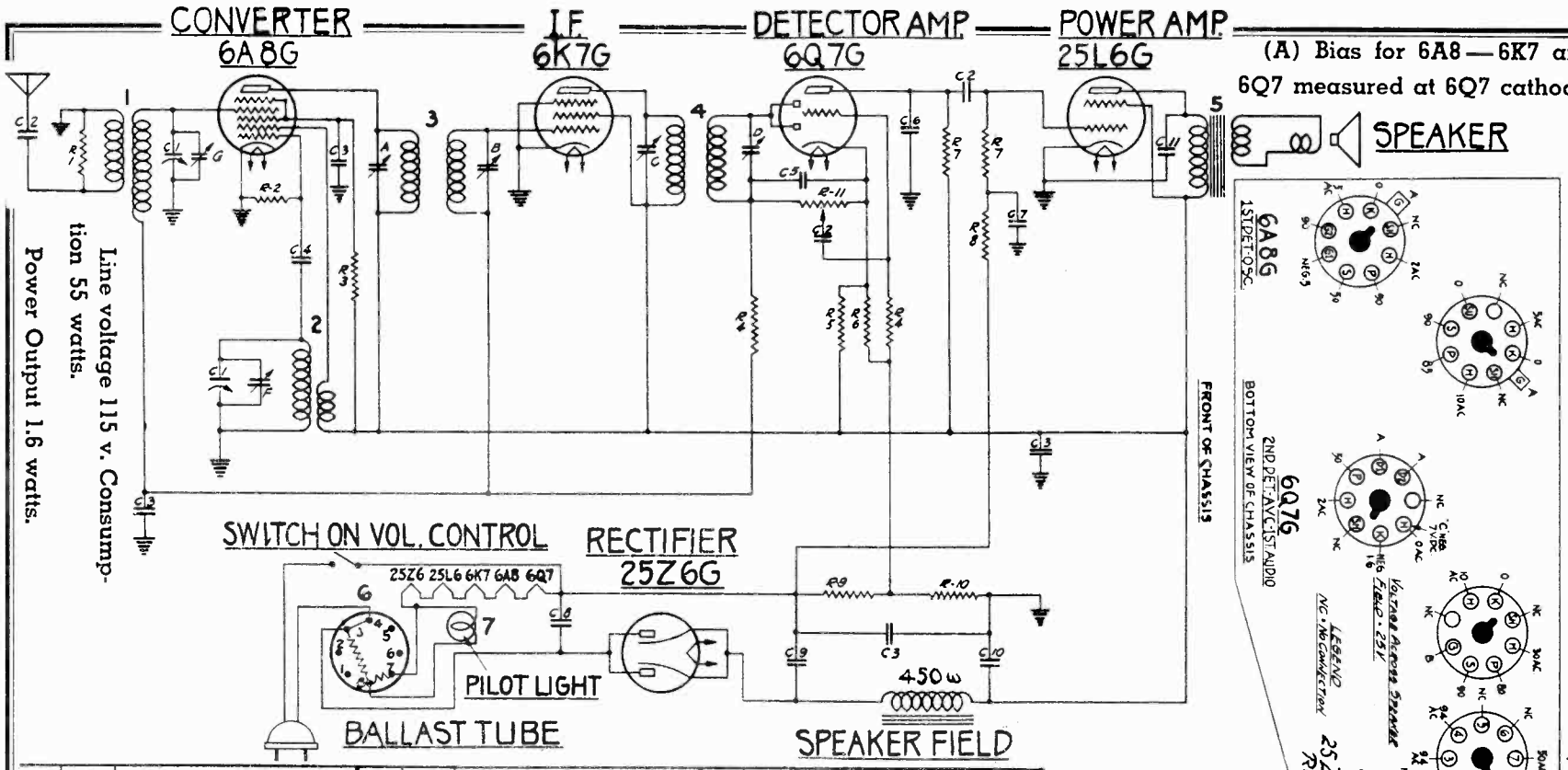


NOTE-MANUAL AUTOMATIC SWITCH SHOWN IN AUTOMATIC POSITION-

DIAG NO	PART NO	DESCRIPTION		DIAG NO	PART NO	DESCRIPTION		DIAG NO	PART NO	DESCRIPTION
C-1	22-695	TWO GANG VARIABLE	200V	P-1	63-597	470 OHM	1/4 W	4	95-513	1ST I.F. TRANS
C-2	22-185	.01 MFD	400V	P-2	63-629	330 OHM	1/4 W	5	95-520	2ND I.F. TRANS
C-3	22-269	50 MMFD TRIMMER CONDENSER		P-3	63-593	47 M OHM	1/4 W	6	J-5043	CHOKE ASSEM
C-4	22-519	COMPENSATING CONDENS.	400V	P-4	63-960	68 M OHM	1/2 W	7	190-6	VIBRATOR
C-5	22-129	.000 MFD	200V	P-5	63-271	1 MEGOHM	1/4 W	8	95-532	POWER TRANS.
C-6	22-162	.05 MFD	400V	P-6	63-160	100 M OHM	1/2 W	9		SPEAKER TRANS.
C-7	22-250	.00025 MFD	400V	P-7	63-634	820 OHM	1/4 W	10		
C-8	22-182	.01 MFD	200V	P-8	63-955	2.2 M OHM VOL CONT.		A		1ST I.F. TRANS PRI
C-9	22-243	.25 MFD	400V	P-9	63-296	2.2 M OHM	1/2 W	B		1ST I.F. TRANS SEC.
C-10	22-350	.005 MFD	400V	P-10	63-605	1000 OHM	1/2 W	C		2ND I.F. TRANS PRI
C-11	22-147	.02 MFD	400V	P-11	63-577	100 OHM	1/4 W	D		2ND I.F. TRANS SEC
C-12	22-188	.05 MFD	400V					F		BROADCAST OSC (W SWING)
C-13	22-212	.004 MFD	400V					G		ANT BROAD AST (TONGAN)
C-14	22-441	.5 MFD	200V							
C-15	22-199	.01 MFD	400V		J-6560	ANTENNA COIL ASSEM.				
C-16	22-669	(NAMED ELECTROLYTIC	25V	1	J-6039	OSC COIL ASSEM				
C-17		15 MFD	25V	2	20-187	COMPENSATING COIL				
C-18	22-739	15 MFD	25V	3						
C-19		15 MFD	"							

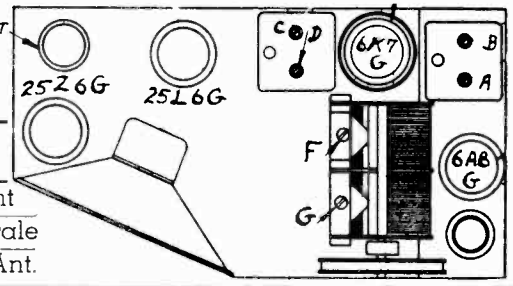
MODELS 6D311, 6D326, 6D336
6D360. Chassis 5646
Schematic, Parts, Voltage
Socket, Trimmers, Alignment

ZENITH RADIO CORP.



(A) Bias for 6A8 — 6K7 and 6Q7 measured at 6Q7 cathode.

(B) Bias for 26L6 measured between "C" at 6Q7 socket and 6D-360 chassis.



DIAG. Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION
C-1	22-679	TWO GANG VARIABLE COND.		R-3	63-643	18 M. OHM	1/4 W	2	5-5938	OSCILLATOR COIL ASSEM.
C-2	22-196	.01 MFD.	600V	R-4	63-271	1 MEG OHM	1/4 W	3	95-513	1ST I.F. TRANSFORMER
C-3	22-280	.05 MFD.	200V	R-5	63-681	56 M OHM	1/2 W	4	95-514	2ND I.F. TRANSFORMER
C-4	22-182	.00025 MFD.	600V	R-6	63-633	680 OHM	1/4 W	5		SPEAKER TRANSFORMER
C-5	22-162	.0001 MFD.	600V	R-7	63-296	220 M OHM	1/4 W	G	100-70	BALLAST TUBE -115 V
C-6	22-147	.0005 MFD.	600V	R-8	63-595	100 M OHM	1/4 W	7	100-36	PILOT LIGHT .25A-6.3V
C-7	22-327	.02 MFD.	200V	R-9	63-557	60 OHM WIREWOUND	1/2 W	A		1ST I.F. TRANS. PRI.
C-8	22-435	.02 MFD.	600V	R-10	63-956	50 OHM WIREWOUND	1/2 W	B		1ST I.F. TRANS. SEC.
C-9	22-681	40 MFD. ELECTROLYTIC	150V	R-11	63-953	220 M OHM VOL. CONTROL		C		2ND I.F. TRANS. PRI.
C-10	22-680	16 MFD. ELECTROLYTIC	150V					D		2ND I.F. TRANS. SEC.
C-11	22-730	.04 MFD.	600V							
R-1	63-587	4700 OHM	1/4W	1	S-5807	ANTENNA COIL ASSEM.		F		BRDCAST OSC. (ON GANG)
R-2	63-593	47 M OHM	1/4 W					G		ANT BRDCAST (ON GANG)

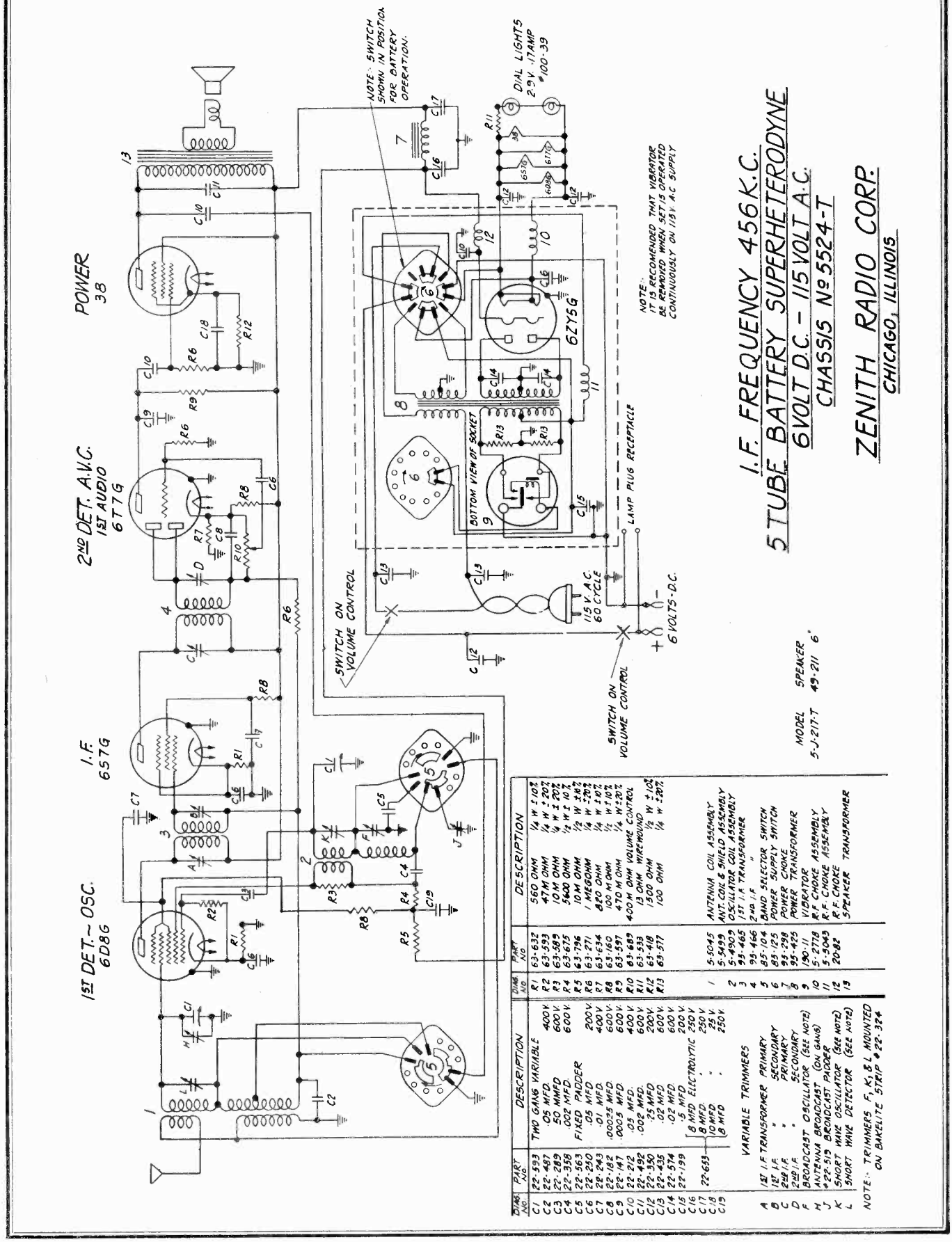
SPEAKER	MODEL
49-237-5 INCH.	6D-311
49-237-5 "	6D-326
49-237-5 "	6D-336
49-241-6 "	6D-360

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.	455	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.

MODEL 5J217T
Chassis 5524T
Schematic, Parts

ZENITH RADIO CORP.



SYMBOL NO.	PART NO.	DESCRIPTION
C1	22-593	TWO GANG VARIABLE 400V
C2	22-487	.05 MFD. "
C3	22-289	.50 MMFD. 600V.
C4	22-338	.002 MFD. "
C5	22-363	FIXED PADDER
C6	22-230	.05 MFD. 200V
C7	22-243	.01 MFD. 400V
C8	22-182	.00025 MFD. 600V.
C9	22-147	.0005 MFD. "
C10	22-212	.05 MFD. 400V
C11	22-492	.002 MFD. 600V
C12	22-350	.25 MFD. 200V
C13	22-435	.02 MFD. 600V
C14	22-574	.02 MFD. "
C15	22-199	.1 MFD. 200V
C16	22-633	8 MFD. ELECTROLYTIC 250V
C17		8 MFD. " 250V
C18		10 MFD. " 25V
C19		8 MFD. " 250V
		VARIABLE TRIMMERS
A		1ST I.F. TRANSFORMER PRIMARY
B		1ST I.F. " SECONDARY
C		2ND I.F. " PRIMARY
D		2ND I.F. " SECONDARY
F		BROADCAST OSCILLATOR (SEE NOTE)
H		ANTENNA BROADCAST (ON GANG)
J		*22-515 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

SYMBOL NO.	PART NO.	DESCRIPTION
R1	63-632	560 OHM ½ W ±10%
R2	63-593	47 M OHM ½ W ±20%
R3	63-589	10 M OHM ½ W ±20%
R4	63-675	5600 OHM ½ W ±10%
R5	63-796	10 M OHM ½ W ±20%
R6	63-271	1 MEGOHM ½ W ±20%
R7	63-634	820 OHM ½ W ±10%
R8	63-160	100 M OHM ½ W ±10%
R9	63-597	470 M OHM ½ W ±20%
R10	63-689	400 M OHM VOLUME CONTROL
R11	63-533	13 OHM WIREWOUND ½ W ±10%
R12	63-418	1500 OHM ½ W ±20%
R13	63-577	100 OHM ½ W ±20%
	5-5045	ANTENNA COIL ASSEMBLY
	5-4929	ANT. COIL & SHIELD ASSEMBLY
2	5-5439	OSCILLATOR COIL ASSEMBLY
3	95-465	1ST I.F. TRANSFORMER
4	95-466	2ND I.F. "
5	85-104	BAND SELECTOR SWITCH
6	85-125	POWER SUPPLY SWITCH
7	95-298	POWER CHOKE
8	95-425	POWER TRANSFORMER
9	130-11	VIBRATOR
10	5-2718	R.F. CHOKE ASSEMBLY
11	5-5043	R.F. CHOKE ASSEMBLY
12	20-82	SPEAKER TRANSFORMER
13		

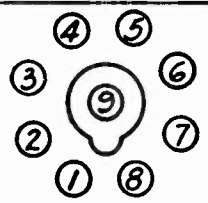
MODEL 5J217T
Chassis 5524T

ZENITH RADIO CORP.

Socket, Trimmers
Voltage, 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

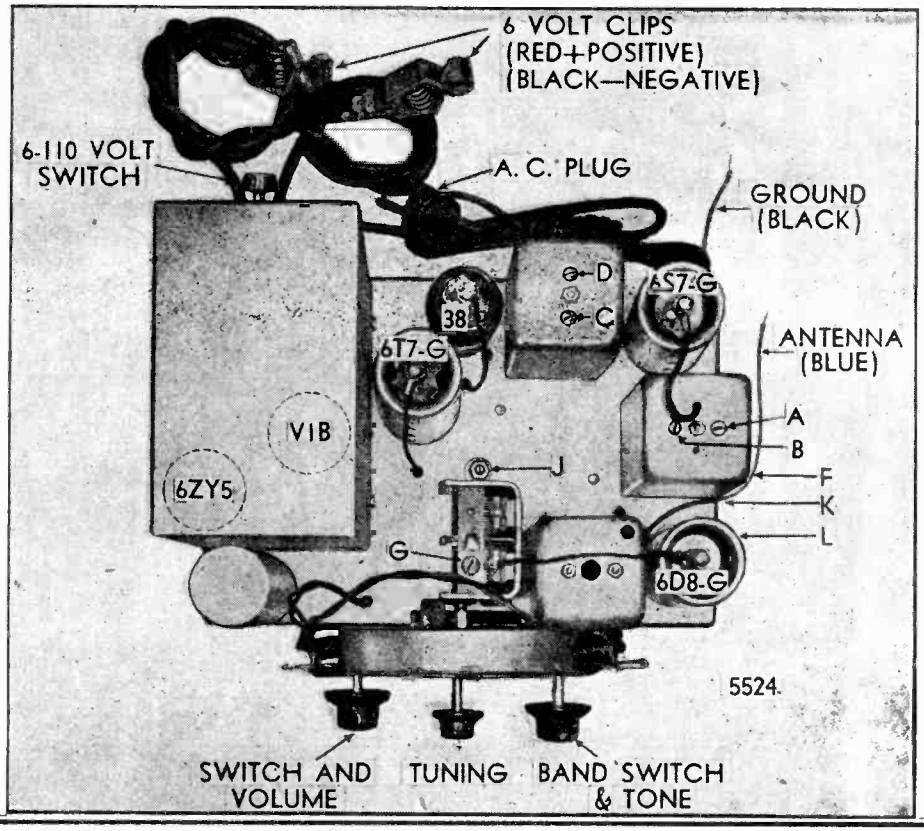
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 16W. Battery voltage 6.3V consumption 2.1 Amp. Power Output .84W.

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

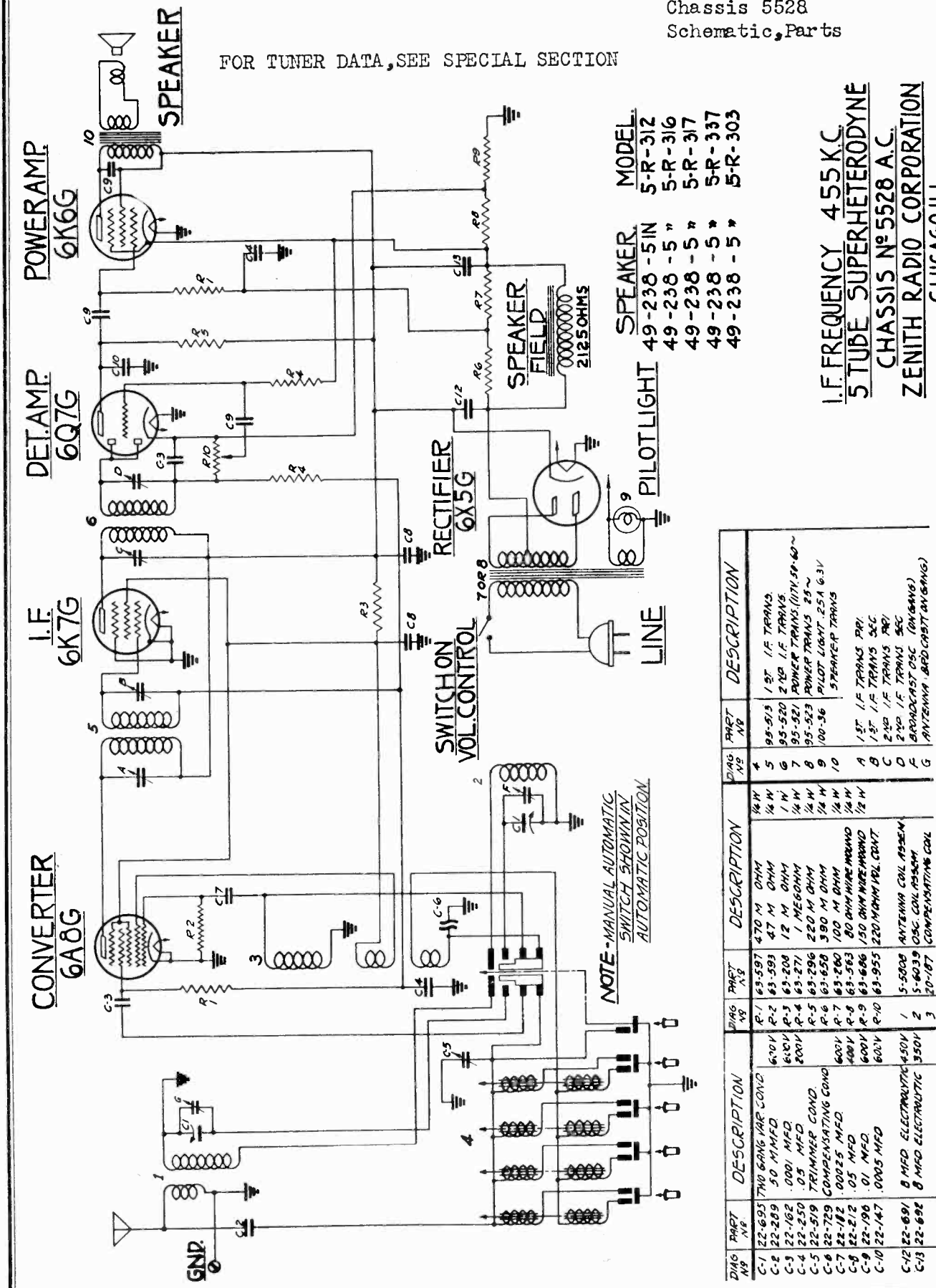
Chassis No. 5524T



ZENITH RADIO CORP.

MODELS 5R312, 5R316, 5R317
5R337, 5R303
Chassis 5528
Schematic, Parts

FOR TUNER DATA, SEE SPECIAL SECTION



DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION
C-1	22-695	TWO GANG VAR. COND.		R-1	63-597	470 M OHM	1/4 W	4		
C-2	22-289	50 MMFD	600V	R-2	63-593	47 M OHM	1/4 W	5	95-513	1ST I.F. TRANS.
C-3	22-162	.000I MFD	600V	R-3	63-208	12 M OHM	1 W	6	95-520	2ND I.F. TRANS.
C-4	22-250	.05 MFD	200V	R-4	63-271	1 MEGOHM	1/4 W	7	95-521	POWER TRANS. (117V. 50-60~
C-5	22-519	TRIMMER COND.		R-5	63-296	220 M OHM	1/4 W	8	95-523	POWER TRANS 25~
C-6	22-729	COMPENSATING COND.	600V	R-6	63-658	390 M OHM	1/4 W	9	100-36	PILOT LIGHT .25A 6.3V
C-7	22-112	.00025 MFD	400V	R-7	63-260	100 M OHM	1/4 W	10		SPEAKER TRANS
C-8	22-212	.05 MFD	600V	R-8	63-563	80 OHM WIREWOUND	1/4 W	A		1ST I.F. TRANS PRI.
C-9	22-196	.01 MFD	600V	R-9	63-686	150 OHM WIREWOUND	1/2 W	B		1ST I.F. TRANS SEC.
C-10	22-147	.0005 MFD	600V	R-10	63-955	220 M OHM VOL. CONT		C		2ND I.F. TRANS PRI.
								D		2ND I.F. TRANS SEC.
C-12	22-691	8 MFD ELECTROLYTIC	450V	1	5-5008	ANTENNA COIL ASSEM.		E		BROADCAST OSC. (ON GANG)
C-13	22-692	8 MFD ELECTROLYTIC	350V	2	5-6039	OSC. COIL ASSEM.		F		ANTENNA (BRD CAST ON GANG)
				3	20-187	COMPENSATING COIL		G		

MODELS 5R303, 5R312, 5R316
5R317, 5R337
Chassis 5528
Socket, Trimmers, Voltage
Alignment

ZENITH RADIO CORP.

NOTE

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

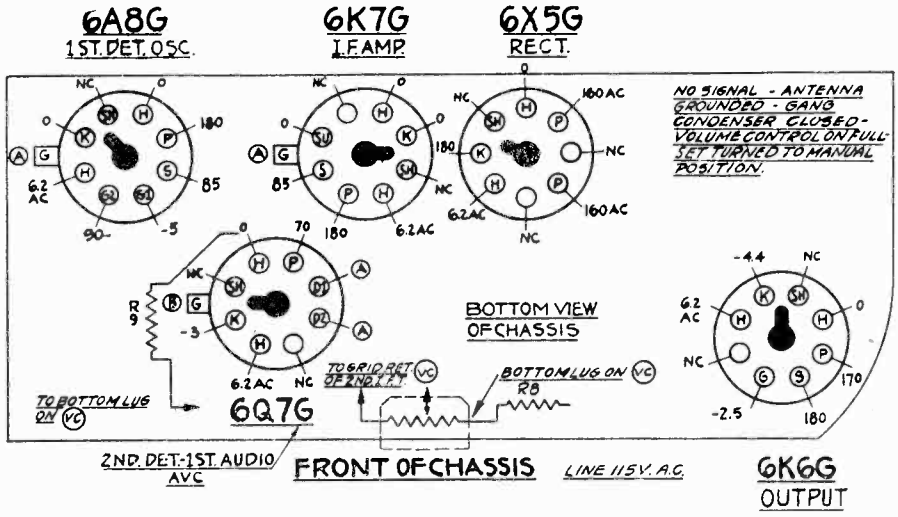
Line voltage 115 v. Consumption 45 watts.

Power output 3.5 watts.

(A) Bias for 6A8 — 6K7 and diodes of 6Q7 measured across resistor R9.

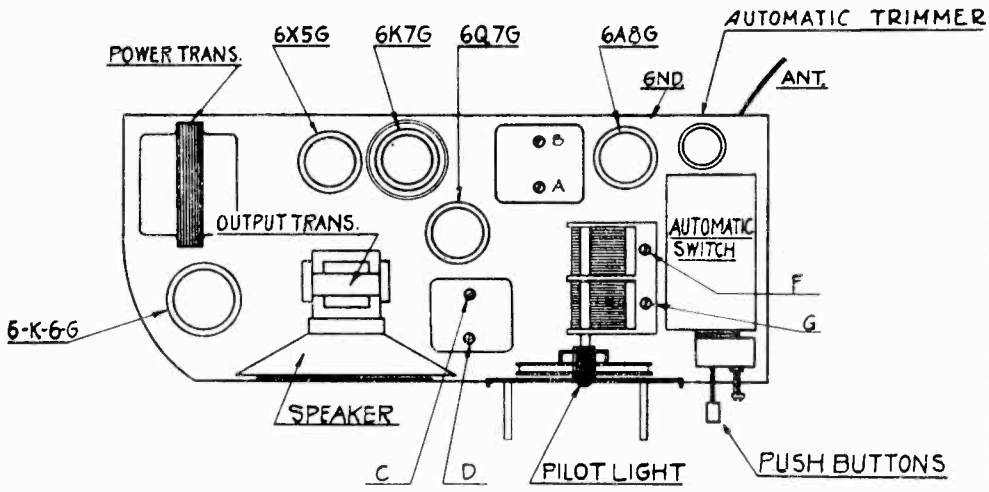
(B) Bias for triode section of 6Q7 and 6K6 measured across R8 and R9.

SOCKET VOLTAGES



LEGEND

NC — No Connection
VC — Volume Control
SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
F — Filament



Location of Tubes and Trimmers

Models 5R303, 5R312, 5R316, 5R317, 5R337

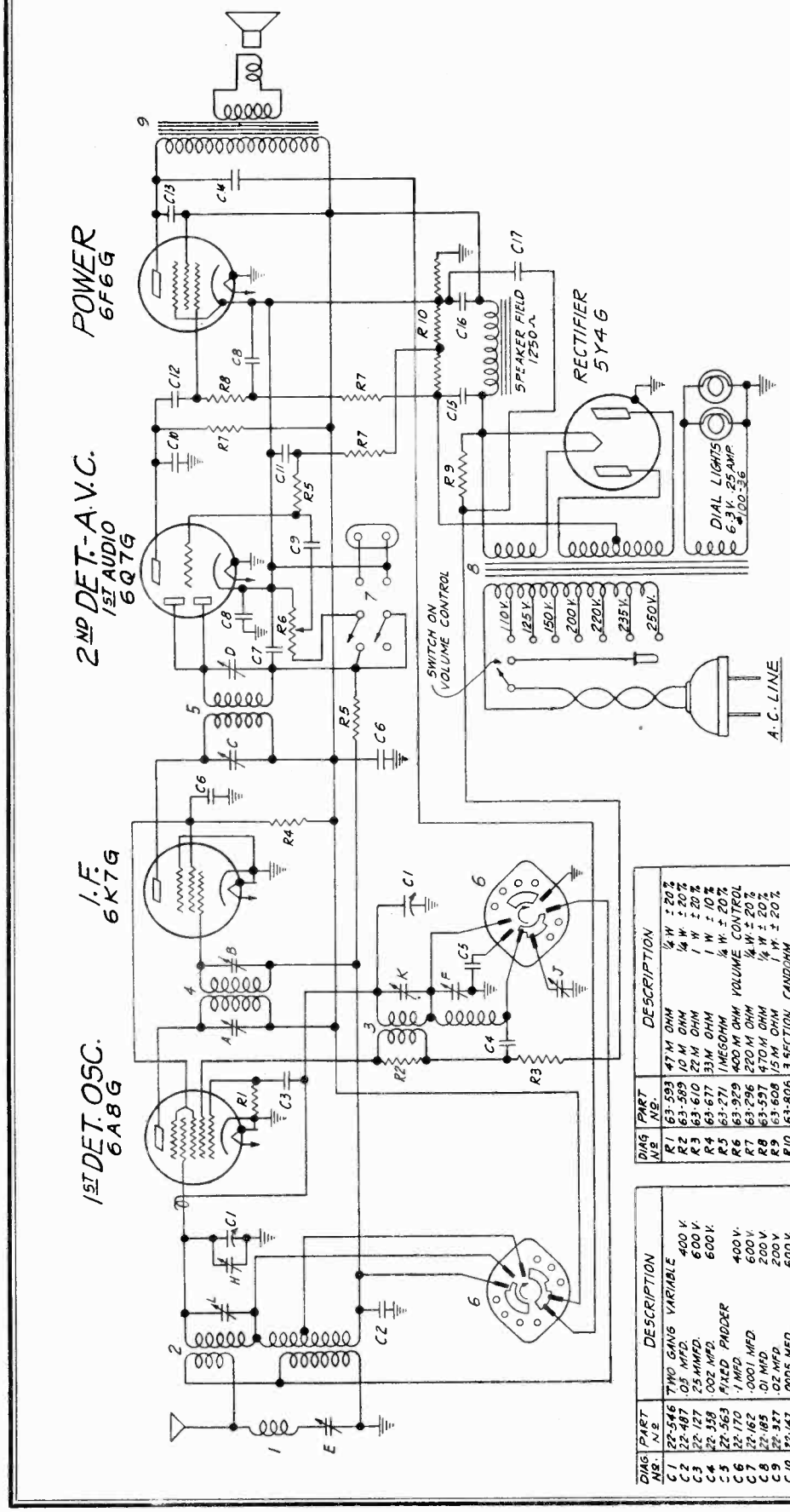
CHASSIS No. 5528

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.	455	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.

ZENITH RADIO CORP.

MODELS 5S218AT, 5S228AT
5S237AT. Chassis 5521AT
Schematic, Parts



I.F. FREQUENCY 456 K.C.
5 TUBE SUPERHETERODYNE
2 BAND
CHASSIS No 5521-AT

ZENITH RADIO CORP.
CHICAGO, ILLINOIS

MODEL	SPEAKER	
5S218AT	49-215	5"
5S228AT	49-215	5"
5S237AT	49-224	6"

DIAG NO.	PART NO.	DESCRIPTION
C1	22-546	TWO GANG VARIABLE 400 V.
C2	22-487	.05 MFD. 400 V.
C3	22-127	.25 MMFD. 600 V.
C4	22-158	.002 MFD. 600 V.
C5	22-363	#FILED PADDER 400 V.
C6	22-170	.1 MFD 600 V.
C7	22-162	.0001 MFD. 200 V.
C8	22-185	.01 MFD 200 V.
C9	22-327	.02 MFD 600 V.
C10	22-147	.0005 MFD. 200 V.
C11	22-190	.1 MFD 600 V.
C12	22-435	.02 MFD. 600 V.
C13	22-492	.002 MFD. 600 V.
C14	22-171	.05 MFD 600 V.
C15	22-686	8 MFD ELECT. 475 V.
C16	22-634	16 MFD ELECT. 450 V.
C17		4 MFD ELECT. 450 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)
		#22-305 SHORT WAVE DETECTOR

NOTE: TRIMMERS F & K MOUNTED ON BAKELITE STRIP #22-408

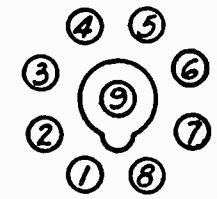
DIAG NO.	PART NO.	DESCRIPTION
R1	63-593	47 M OHM ½ W ± 20%
R2	63-569	10 M OHM ½ W ± 20%
R3	63-610	22 M OHM 1 W ± 20%
R4	63-617	33 M OHM 1 W ± 10%
R5	63-271	1 MEGOHM ½ W ± 20%
R6	63-929	400 M OHM VOLUME CONTROL
R7	63-296	220 M OHM ½ W ± 20%
R8	63-557	470 M OHM ½ W ± 20%
R9	63-608	15 M OHM 1 W ± 20%
R10	63-806	3 SECTION CANDOHM
		WAVE TRAP COIL MOUNTED ON
1		ANTENNA COIL ASSEMBLY
2	5-4908	ANTENNA COIL ASSEMBLY
	5-5634	ANTENNA COIL & SHIELD ASSEMBLY
3	5-4909	OSCILLATOR COIL ASSEMBLY
4	95-455	1ST I.F. TRANSFORMER
5	95-460	2ND I.F. TRANSFORMER
6	85-104	BAND SELECTOR SWITCH
7	85-39	PHONO. SWITCH
8	95-432	POWER TRANS. 25 CYCLE ALL-VOLTAGE
9		SPEAKER TRANSFORMER

MODELS 5S218AT, 5S228AT
5S237AT. Chassis 5521AT
Socket, Voltage, Trimmers
Alignment

ZENITH RADIO CORP.

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.3	244	97	—9	149	0	0	—.5
6K7	I. F.	0	6.3	246	97	0	—	0	0	—.5
6Q7	2nd Det. AVC 1st Audio	0	0	71	—2.5	—2.5	—	6.3	—2.5	—2.5
6F6	Power	0	0	231	246	—3.5	—	6.3	—2.5	—
5Y4	Rect.	0	—	AC	—	AC	—	316	316	—



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.

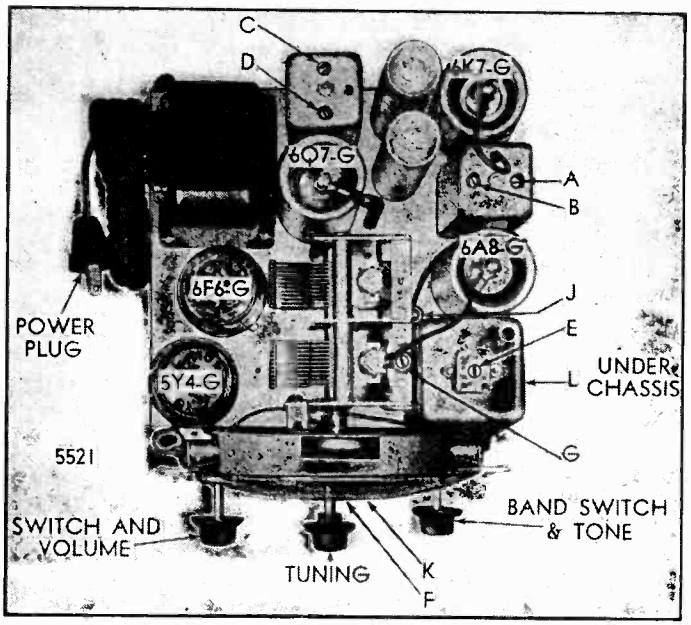
ALIGNMENT PROCEDURE

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	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.

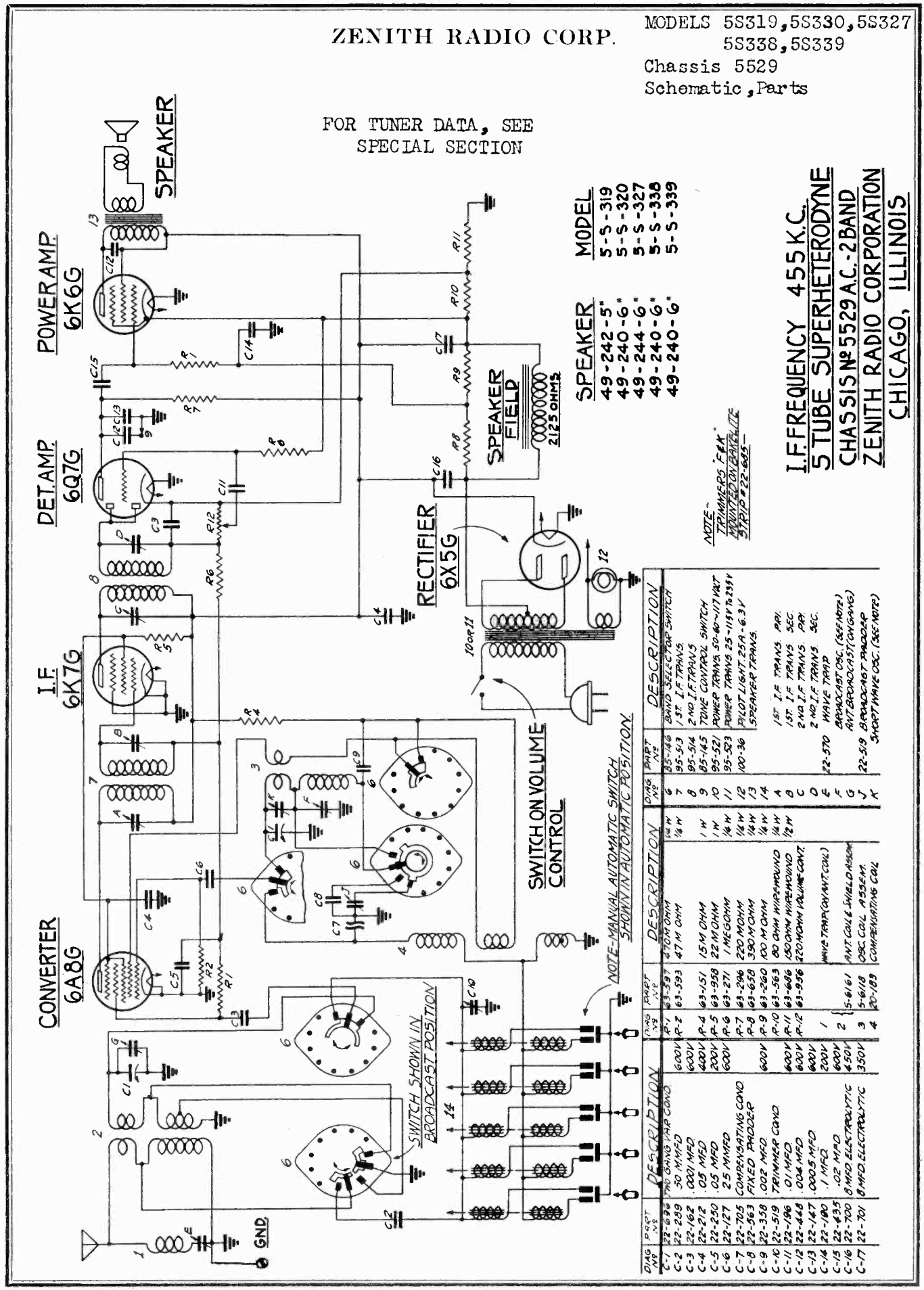
Chassis No. 5521AT

LOCATION OF TRIMMERS



ZENITH RADIO CORP.

MODELS 5S319, 5S330, 5S327
5S338, 5S339
Chassis 5529
Schematic, Parts



DIAG Nº	PART Nº	DESCRIPTION
C-1	22-638	TWO GANG VAR COND
C-2	22-239	30 MMFD
C-3	22-162	.0001 MFD
C-4	22-212	.05 MFD
C-5	22-250	.05 MFD
C-6	22-127	25 MMFD
C-7	22-705	COMPENSATING COND.
C-8	22-563	FIXED PADDER
C-9	22-358	.002 MFD
C-10	22-519	TRIMMER COND
C-11	22-196	.01 MFD
C-12	22-448	.004 MFD
C-13	22-147	.0005 MFD
C-14	22-180	.1 MFD
C-15	22-435	.02 MFD
C-16	22-700	8 MFD ELECTROLYTIC
C-17	22-701	8 MFD ELECTROLYTIC

DIAG Nº	PART Nº	DESCRIPTION		
R-1	63-337	470M OHM	1/4 W	600V
R-2	63-593	47 M OHM	1/4 W	600V
R-4	63-151	1.5 M OHM	1 W	400V
R-5	63-958	22 M OHM	1 W	200V
R-6	63-271	1 MEGOHM	1/4 W	600V
R-7	63-296	220 M OHM	1/4 W	
R-8	63-658	330 M OHM	1/4 W	
R-9	63-260	100 M OHM	1/4 W	600V
R-10	63-563	80 OHM WIREWOUND	1/4 W	
R-11	63-686	1500 OHM WIREWOUND	1/2 W	600V
R-12	63-936	420 OHM VOLUME CONT.		600V
		WAVE TRAP (ANT. COIL)		600V
1				200V
2	5-6161	ANT. COIL SHIELD ASSEM.		600V
		OSC. COIL ASSEM.		450V
3	5-6118	COMPENSATING COIL		350V
4	20-189			

DIAG Nº	PART Nº	DESCRIPTION
6	85-146	BAND SELECTOR SWITCH
7	95-513	1ST. I.F. TRANS.
8	95-514	2 ND I.F. TRANS.
9	85-145	TONE CONTROL SWITCH
10	95-521	POWER TRANS. 50-60~/117 VOLT
11	95-523	POWER TRANS. 25-115 V TO 235 V
12	100-36	PILOT LIGHT 25V - 6.3 V
13		SPEAKER TRANS.
14		
A		1ST I.F. TRANS PRI.
B		1ST. I.F. TRANS. SEC.
C		2 ND I.F. TRANS. PRI.
D		2 ND I.F. TRANS. SEC.
E	22-570	WAVE TRAP
F		BROADCAST OSC. (SEE NOTE)
G		ANT. BROADCAST (2 WIRE)
J	22-519	BROADCAST PADDER
K		SHORT WAVE OSC. (SEE NOTE)

MODELS 5S319, 5S330, 5S327
5S338, 5S339
Chassis 5529

ZENITH RADIO CORP.

Socket, Trimmers, Voltage Alignment

NOTE

Voltages measured from chassis to socket contacts using a 1000 ohm per volt meter. Antenna disconnected — volume control on full.

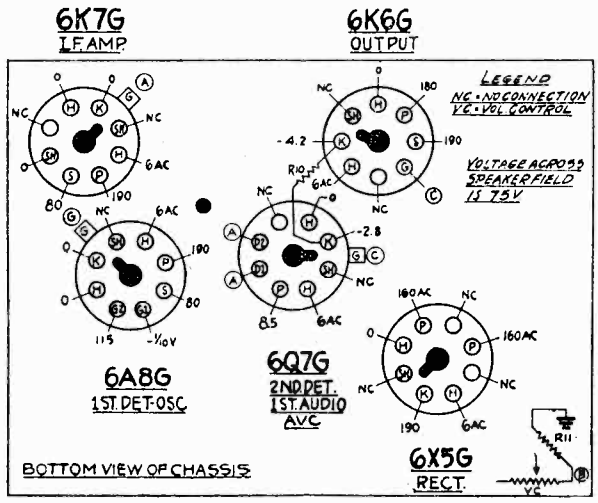
Line voltage 115 v. Consumption 45 watts.

Power output 3 watts.

(A) Bias for 6A8 — 6K7 and diodes measured across R11.

(B) Low side of volume control.

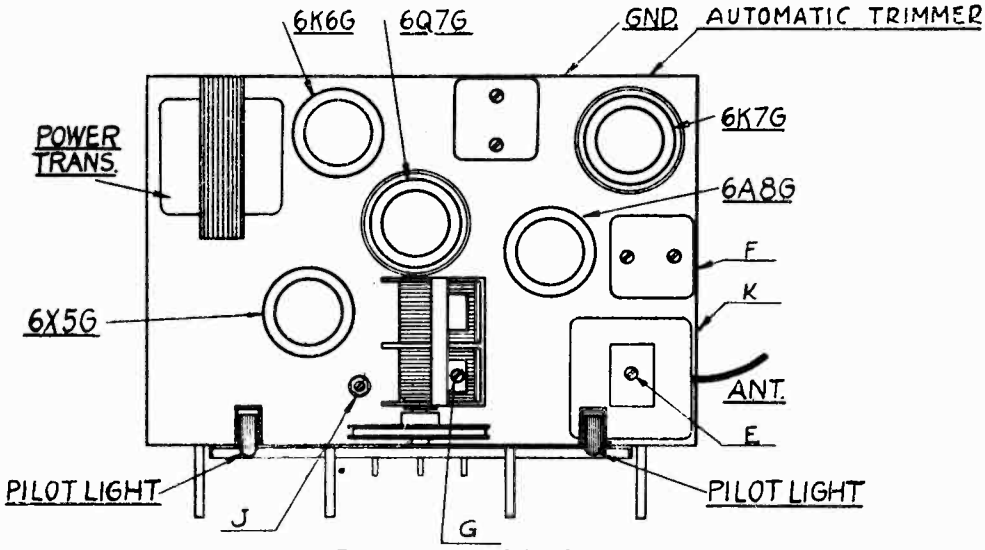
(C) Bias for triode section of 6Q7 and 6K6 measured across R10 and R11.



Models 5S319, 5S327, 5S330, 5S338, 57339

CHASSIS No. 5529

LEGEND
NC — No Connection
SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
F — Filament



Location of Tubes and Trimmers

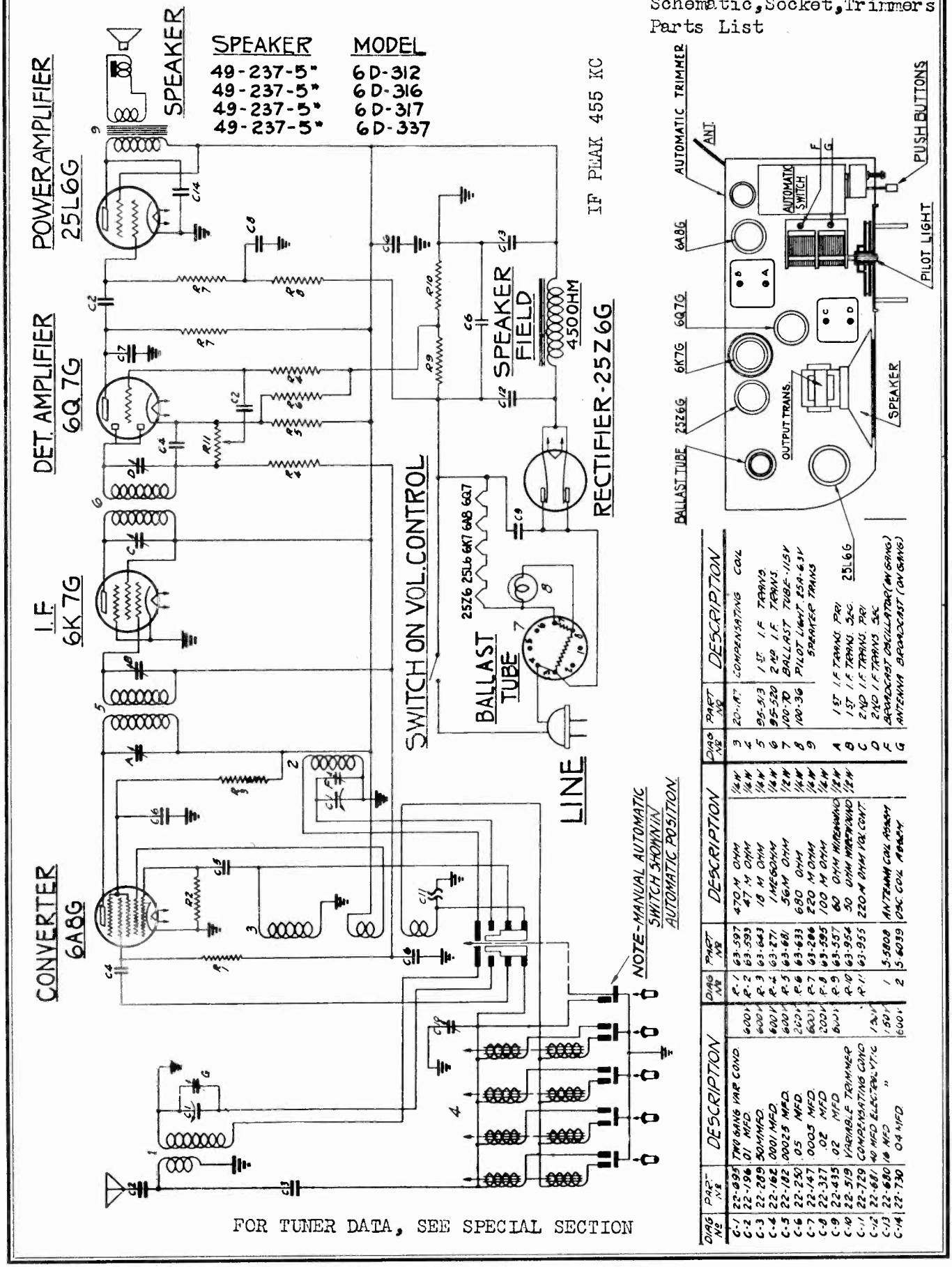
ALIGNMENT PROCEDURE

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.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	455	"	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	Rock gang & adj. for max. output

NOTE: If receiver is used in 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 6D312, 6D316, 6D317
6D337, Chassis 5647
Schematic, Socket, Trimmers
Parts List



SPEAKER	MODEL
49-237-5*	6D-312
49-237-5*	6D-316
49-237-5*	6D-317
49-237-5*	6D-337

DIAG NO	PART NO	DESCRIPTION
C-1	22-695	TWO GANG VAR COND
C-2	22-196	.01 MFD 600V
C-3	22-289	50 MMFD 600V
C-4	22-162	.001 MFD 600V
C-5	22-182	.0025 MFD 600V
C-6	22-230	.05 MFD 200V
C-7	22-147	.0025 MFD 600V
C-8	22-327	.02 MFD 200V
C-9	22-435	.02 MFD 600V
C-10	22-519	VARIABLE TRIMMER
C-11	22-729	COMPENSATING COND
C-12	22-681	40 MFD ELECTROLYTIC 150V
C-13	22-680	16 MFD " 150V
C-14	22-730	.04 MFD 600V

DIAG NO	PART NO	DESCRIPTION
R-1	63-597	470 M OHM 1/4W
R-2	63-593	47 M OHM 1/4W
R-3	63-643	18 M OHM 1/4W
R-4	63-271	1 MEGOHM 1/4W
R-5	63-681	56M OHM 1/2W
R-6	63-633	680 OHM 1/4W
R-7	63-286	220 M OHM 1/4W
R-8	63-595	100 M OHM 1/4W
R-9	63-557	60 OHM WIREWOUND 1/2W
R-10	63-954	30 OHM WIREWOUND 1/2W
R-11	63-955	220 M OHM VOL CONT.
1	5-5808	ANTENNA COIL ASSY
2	5-6039	OSC. COIL ASSY

DIAG NO	PART NO	DESCRIPTION
3	20-117	COMPENSATING COIL 1/4W
4		1/4W
5	95-513	1ST I.F. TRANS. 1/4W
6	95-520	2ND I.F. TRANS. 1/4W
7	100-70	BALLAST TUBE-115V 1/2W
8	100-36	PILOT LIGHT 150-43V 1/4W
9		SPEAKER TRANS 1/4W
A		1ST I.F. TRANS. PRI 1/4W
B		1ST I.F. TRANS. SEC. 25L6G
C		2ND I.F. TRANS. PRI
D		2ND I.F. TRANS. SEC
F		BROADCAST OSCILLATOR (2 GANG)
G		ANTENNA BROADCAST (2 GANG)

FOR TUNER DATA, SEE SPECIAL SECTION

MODELS 6D312,6D316,6D317,6D337
MODELS 6S301,6S304,6S305,6S306
6S321,6S322,6S340
Voltage,Alignment

ZENITH RADIO CORP.

Models 6D312, 6D316, 6D317, 6D337
CHASSIS No. 5647

Models 6S301, 6S304, 6S305, 6S306, 6S321, 6S322, 6S340
CHASSIS No. 5651

NOTE

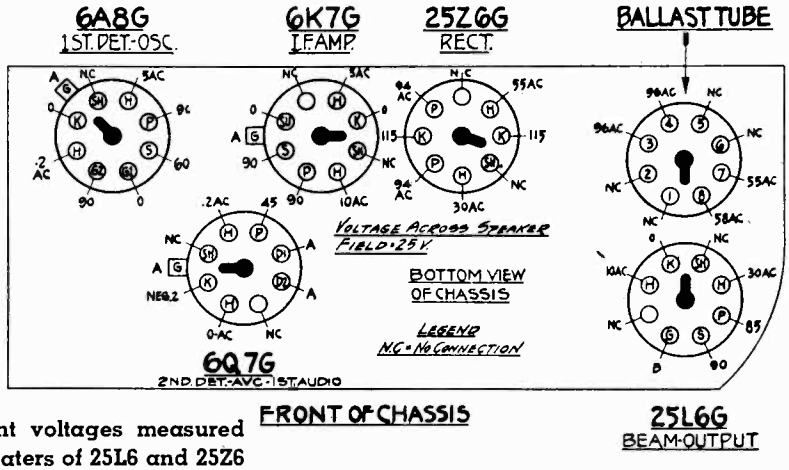
Voltages measured from socket contacts to chassis using a 1000 ohm per volt meter. Antenna disconnected — volume control on full.

Line voltage 115 v. Consumption 55 watts.

Power output 1.6 watts.

(A) Bias for 6A8 — 6K7 and 6Q7 measured at 6Q7 cathode.

(B) Bias for 25L6 measured at point C on 6Q7 socket. Filament voltages measured across heaters of 25L6 and 25Z6 is 22 volts A.C. Other tubes 6 v A.C.



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.	455	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.

NOTE

Voltages measured for socket contacts to chassis using a 1000 ohm per volt meter. Antenna disconnected — volume control on full.

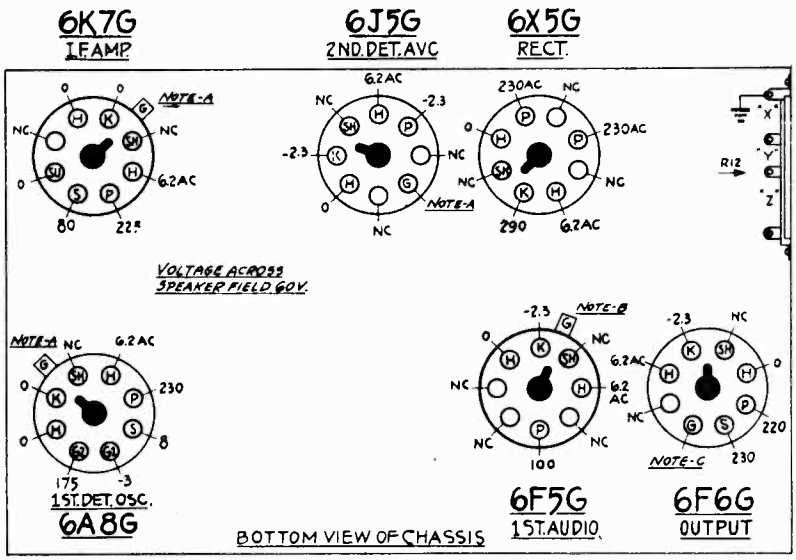
Line voltage 115 v. Consumption 60 watts.

Power Output 4.5 watts.

(A) Bias for 6A8 — 6K7 and 6J5 measured across X which is neg. 2.3 volts.

(B) Bias for 6F5 measured across X and Y which is neg. 3.8 volts.

(C) Bias for 6F6 measured across XY and Z which is neg. 16 volts.



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.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	455	"	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	18000	S.W.	18000	L	Rock Gang & adj. for max. output.
9	" " "	400 Ohms	6000	Police	6000	N	Rock Gang & adj. for max. output.

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

Schematic, Socket, Trimmers Parts

ZENITH RADIO CORP.

MODELS 6S301-6S306 incl., 6S321, 6S322, 6S340
Chassis 5651

MODEL	SPEAKER
6S301	49-179-8"
6S304	49-248-6"
6S305	49-266-12"
6S321	49-248-6"
6S322	49-248-6"
6S340	49-248-6"
6S306	49-255-12"

DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION
C-1	22-717	TWO GANG VARIABLE	600V	R-1	63-821	39 OHM
C-2	22-289	50 MMFD	600V	R-2	63-592	33 M OHM
C-3	22-182	.0001 MFD	600V	R-3	63-597	470 M OHM
C-4	22-127	.25 MFD	400V	R-4	63-677	56 M OHM
C-5	22-170	.1 MFD	400V	R-5	63-671	1 MEGOHM
C-6	22-559	TRIMMER COND.		R-6	63-603	100 OHM
C-7	22-740	COMPENSATING COND		R-7	63-660	10 M OHM
C-8	22-708	DUAL FIXED MICA	200V	R-8	63-903	22 M OHM CONT.
C-9	22-230	.05 MFD	200V	R-9	63-596	220 M OHM
C-10	22-218	.05 MFD	400V	R-10	63-595	100 M OHM
C-11	22-327	.02 MFD	200V	R-11	63-982	TONE CONTROL
C-12	22-358	.002 MFD	600V	R-12	63-904	3 SECTION CANDOHM
C-13	22-190	.1 MFD	200V			
C-14	22-147	.0005 MFD	600V			
C-15	22-415	.02 MFD	600V			
C-16	22-219	.03 MFD	200V			
C-17	22-492	.002 MFD	600V			
C-18	22-171	.05 MFD	600V			
C-19	22-195	.01 MFD	200V			
C-20	22-718	VITREO ELECTROLYTIC	450V			

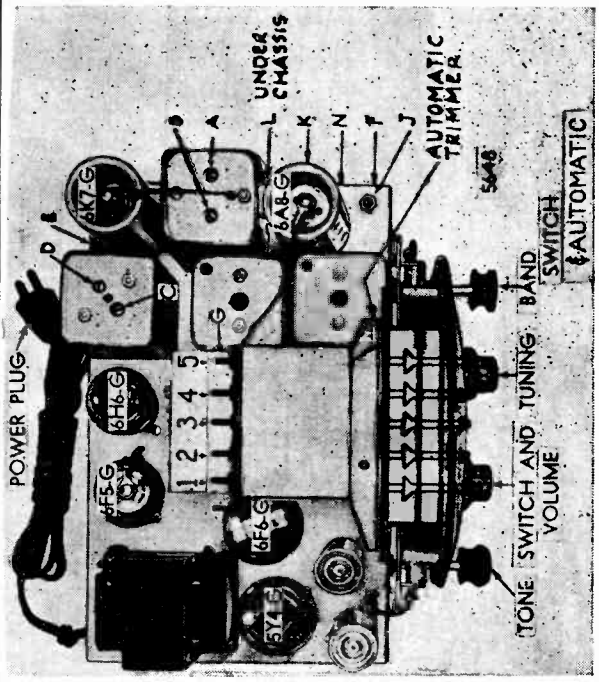
DIAG Nº	PART Nº	DESCRIPTION
1	20-154	WAVE TRAP
2	5-4366	ANT COIL & SHIELD ASSEM
3	5-6267	OSC COIL & SHIELD ASSEM
4	20-198	COMPENSATING COIL
5	85-140	BAND SELECTOR SWITCH
6	95-529	1ST I.F. TRANSFORMER
7	95-530	2ND I.F. TRANSFORMER
8	95-576	POWER TRANS. 117V-50-60 ~
9	95-535	POWER TRANS ALL VOLTAGE 25 CYCLE
10	100-36	DIAL LIGHT 2.5A - 6.3V
11		SPEAKER TRANS.
12		

DIAG Nº	PART Nº	DESCRIPTION
A		1ST I.F. TRANS. SEC.
B		1ST I.F. TRANS. PRI.
C		2 ND I.F. TRANS. SEC.
D		WAVE TRAP
E		BROADCAST OSC. (SEE NOTE)
F		ANTENNA BROADCAST (SEE NOTE)
G		BROADCAST PHOZER
J	22-443	SHORT WAVE OSC. (SEE NOTE)
K		SHORT WAVE DETECTOR
L	22-305	PILOT BAND OSC. (SEE NOTE)
M		
N		

NOTE: TRIMMERS "A" MAY BE MOUNTED ON BRACKET STRIP PART Nº 63-324

MODELS 6S330,6S361
Chassis 5648
Schematic, Socket
Trimmers, Parts

ZENITH RADIO CORP.

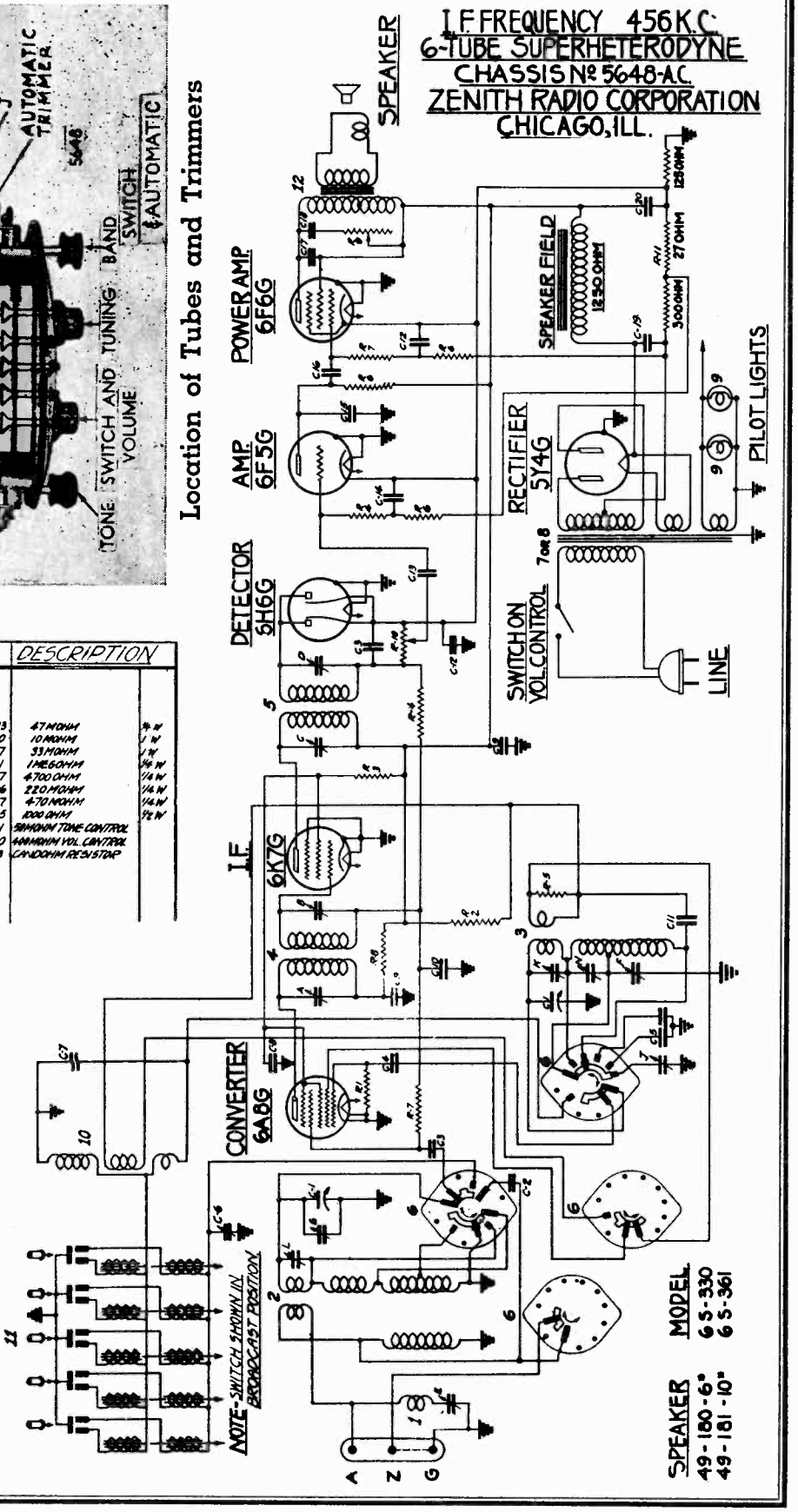


Location of Tubes and Trimmers

DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION	
C-1	22-547	TWO GANG VAR. COND.					
C-2	22-289	50 M.M.FD.	400 V.				
C-3	22-162	.0001 MFD.	400 V.				
C-4	22-127	25 MM.FD.	400 V.				
C-5	22-556	DUAL FIXED PADDER		R-1	63-593	47 M OHM	½ W
C-6	22-519	TRIMMER CONDENSER		R-2	63-680	10 M OHM	1 W
C-7	22-705	COMPENSATING COND.		R-3	63-677	33 M OHM	1 W
C-8	22-170	.1 MFD.	400 V.	R-4	63-271	1 MEGOHM	½ W
C-9	22-212	.05 MFD.	400 V.	R-5	63-587	4700 OHM	1/4 W
C-10	22-250	.05 MFD.	1600 V.	R-6	63-296	220 M OHM	1/4 W
C-11	22-358	.002 MFD.	600 V.	R-7	63-597	4.7 M OHM	1/4 W
C-12	22-185	.01 MFD.	600 V.	R-8	63-605	1000 OHM	½ W
C-13	22-327	.02 MFD.	400 V.	R-9	63-521	5M OHM TONE CONTROL	
C-14	22-190	.1 MFD.	200 V.	R-10	63-520	4 M OHM VOL. CONTROL	
C-15	22-147	.0005 MFD.	400 V.	R-11	63-613	CANOHM RESISTOR	
C-16	22-439	.02 MFD.	400 V.				
C-17	22-492	.002 MFD.	600 V.				
C-18	22-171	.05 MFD.	600 V.				
C-19	22-596	8 MFD. DRY ELECTROLYTIC	450 V.				
C-20		16 MFD. DRY ELECTROLYTIC	450 V.				

DIAG. NO.	PART NO.	DESCRIPTION
1	70-154	WAVE TRAP ASS'M.
2	5-4941	ANT. COIL & SHIELD ASS'M.
3	5-4942	OSC. COIL & SHIELD ASS'M.
4	95-413	1ST I.F. TRANSFORMER
5	95-414	2ND I.F. TRANSFORMER
6	85-139	BAND SELECTOR SWITCH
7	95-415	POWER TRANS. 117 V. - 50-60 CYCLE
8	95-450	POWER TRANSFORMER ALL VOLTAGE - 25 CYCLE
9	100-96	PILOT LIGHT. 25 A 6.3 V.
10	20-183	COMPENSATING COIL
11		
12		SPEAKER TRANSFORMER
A		1ST I.F. TRANS. PRI.
B		1ST I.F. TRANS. SEC.
C		2ND I.F. TRANS. PRI.
D		2ND I.F. TRANS. SEC.
E		WAVE TRAP
F		BROADCAST OSC. (See NOTE)
G		ANT. BROADCAST (ONE GANG)
J	22-519	BROADCAST PADDER
K		SHORT WAVE OSC. (See NOTE)
L	22-305	SHORT WAVE DETECTOR
N		POLICE BAND OSC. (See NOTE)

NOTE - TRIMMERS "F-K & N" MOUNTED ON BAKELITE STRIP - PART # 22-596



ZENITH RADIO CORP.

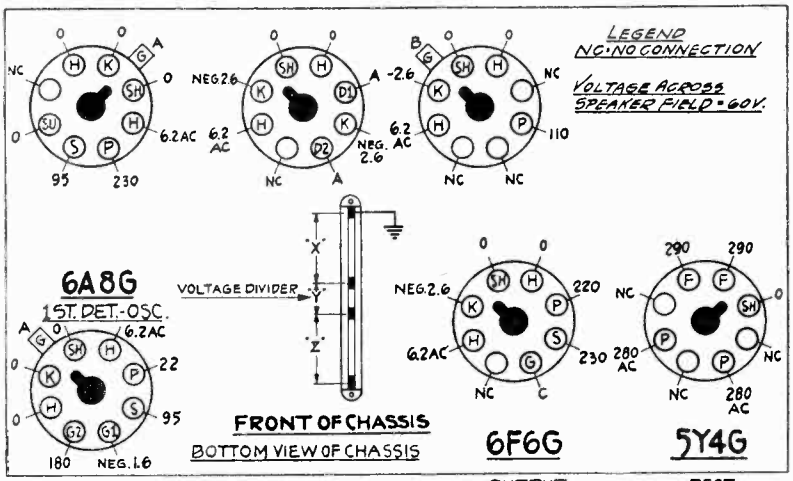
MODELS 6S330, 6S361
Voltage, Alignment
MODEL 6B321
Socket, Trimmers
Alignment

Models 6S330, 6S361
CHASSIS No. 5648

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 location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.



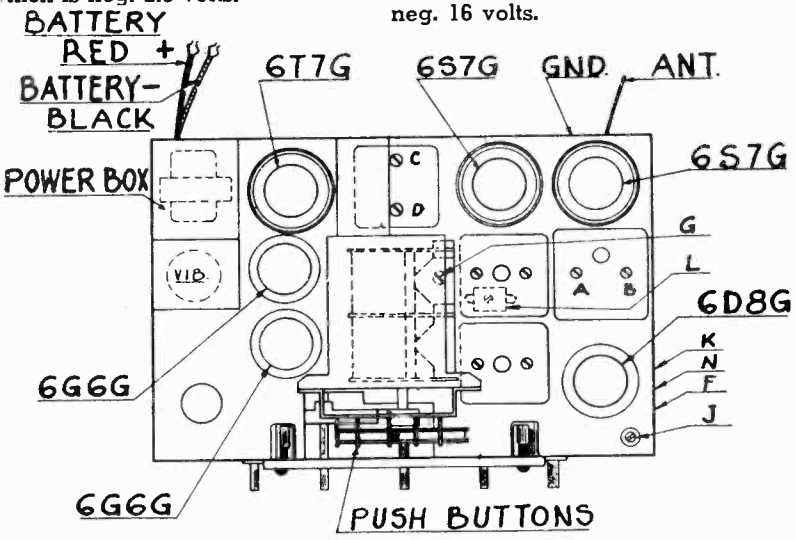
Line voltage 115 v. Consumption 65 watts.

Power Output 4.5 watts.

(A) Bias for 6A8—6K7 and 6H6 tubes measured across X which is neg. 2.6 volts.

(B) Bias for 6F5 tube measured across X and Y which is neg. 4 volts.

(C) Bias for 6F6 tube measured across X-Y and Z which is neg. 16 volts.



Location of Tubes and Trimmers

ALIGNMENT PROCEDURE

Model No. 6B321
CHASSIS No. 5653

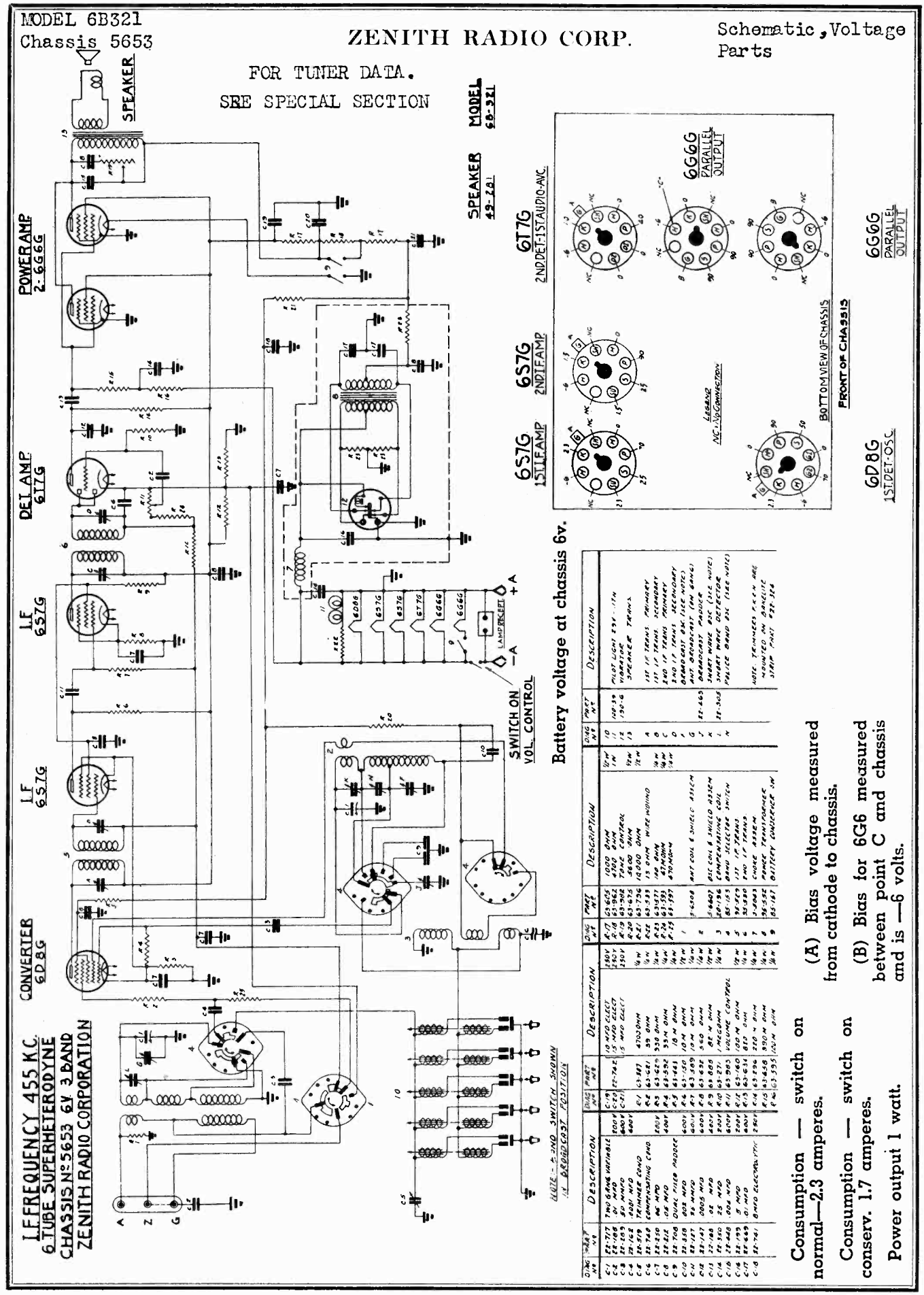
Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj for max. output
5	" " "	200 Mmfd.		"		FG	Repeat 2 & 3
6	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to scale
7	" " "	400 Ohms	18000	S.W.	18000	L	Rock gang & adj for max. output
8	" " "	400 Ohms	6000	Police	6000	N	Rock gang & adj for max. output

MODEL 6B321
Chassis 5653

ZENITH RADIO CORP.

Schematic, Voltage Parts

FOR TUNER DATA.
SEE SPECIAL SECTION



1.F. FREQUENCY 455 K.C.
6 TUBE SUPERHETERODYNE
CHASSIS Nº 5653 6V 3 BAND
ZENITH RADIO CORPORATION

DIAG. Nº	PART Nº	DESCRIPTION
C-1	22-717	TWO GANG VARIABLE
C-2	22-185	.01 MFD
C-3	22-155	.50 MMFD
C-4	22-158	.005 MFD
C-5	22-319	TRIMMER COND
C-6	22-240	COMPENSATING COND
C-7	22-230	.06 MFD
C-8	22-156	.001 MFD
C-9	22-176	DUAL FILM PADDER
C-10	22-159	.005 MFD
C-11	22-171	.25 MMFD
C-12	22-188	.01 MFD
C-13	22-190	.25 MFD
C-14	22-440	.004 MFD
C-15	22-193	.5 MFD
C-16	22-695	.01 MFD
C-17	22-761	DUAL ELECTROLYTIC

DIAG. Nº	PART Nº	DESCRIPTION
C-1/7	22-717	10 MFD ELECT
C-2	22-185	.5 MFD ELECT
C-3	22-155	.5 MFD ELECT
C-4	22-158	4700 OHM
C-5	22-319	63-387
C-6	22-240	63-641
C-7	22-230	63-640
C-8	22-156	63-642
C-9	22-176	63-389
C-10	22-159	63-632
C-11	22-171	63-885
C-12	22-188	63-271
C-13	22-190	63-385
C-14	22-440	63-631
C-15	22-193	63-460
C-16	22-695	63-396
C-17	22-761	63-458
C-18		63-395

DIAG. Nº	PART Nº	DESCRIPTION
R-1/7	63-625	1000 OHM
R-2/8	63-962	4700 OHM
R-3/9	63-382	3600 OHM
R-4/10	63-675	10000 OHM
R-5/11	63-756	10000 OHM
R-6	63-633	1.5 MEGOHM
R-12	63-391	47 MOHM
R-13	63-397	470 MOHM
1	5-6208	ANT COIL & SHIELD ASSEM
2	5-6207	OSC COIL & SHIELD ASSEM
3	20-196	COMPENSATING COIL
4	85-183	BAND SELECTOR SWITCH
5	95-229	1ST I.F. TRANS.
6	95-230	2ND I.F. TRANS.
7	37-2043	CHOKE ASSEM.
8	39-332	POWER TRANSFORMER
9	85-181	BATTERY CONSERVER SW

DIAG. Nº	PART Nº	DESCRIPTION
10	100-39	PILOT LIGHT SOCKET ASSEM
11	130-8	VIBRATOR
12		SPEAKER TRANS.
13		1ST I.F. TRANS. PRIMARY
14		1ST I.F. TRANS. SECONDARY
15		2ND I.F. TRANS. PRIMARY
16		2ND I.F. TRANS. SECONDARY
A	22-463	BROADCAST PADDER
B		ANT BROADCAST (SEE NOTE)
C		SHORT WAVE OSC (SEE NOTE)
D	22-303	SHORT WAVE DETECTOR
E		POLICE BAND OSC (SEE NOTE)

NOTE: TRIMMERS PACK-MOUNTED ON GANGING STRIP PART 22-314

Battery voltage at chassis 6v.

Consumption — switch on normal—2.3 amperes.

Consumption — switch on conserv. 1.7 amperes.

Power output 1 watt.

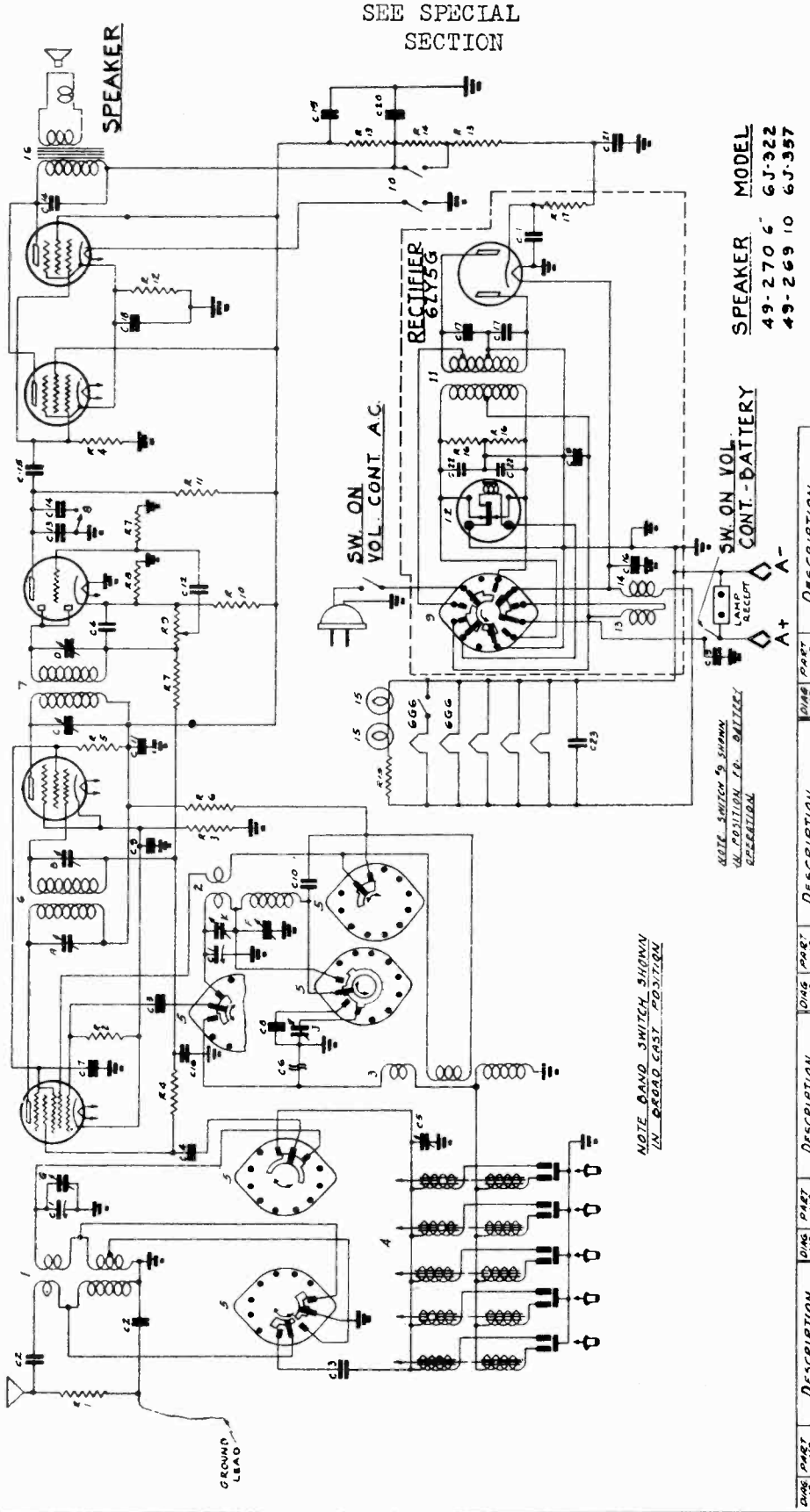
(A) Bias voltage measured from cathode to chassis.

(B) Bias for 6G6 measured between point C and chassis and is —6 volts.

ZENITH RADIO CORP.

MODELS 6J322, 6J357
Chassis 5654
Schematic, Parts

FOR TUNER DATA
SEE SPECIAL
SECTION



SPEAKER	MODEL
49-2706	6J-322
49-2690	6J-357

6 VOLT-DC, 110 VOLT-A.C.
I.F. FREQUENCY 455 K.C.
6 TUBE SUPERHETERODYNE
CHASSIS Nº 5654 2-BAND
ZENITH RADIO CORPORATION
CHICAGO, ILL.

DIAG. Nº	PART Nº	DESCRIPTION	DIAG Nº	PART Nº	DESCRIPTION
C-1	22-744	TWO GANG VARIABLE	C-19	22-742	.10 MFD ELECT 600V
C-2	22-744	.01 MFD 600V	C-20		.1 MFD ELECT 600V
C-3	22-285	.05 MFD 600V	C-21		.1 MFD ELECT 600V
C-4	22-162	.0001 MFD 600V	C-22	22-319	6 MFD 600V
C-5	22-319	TRIMMER CONDENSER	C-23	22-193	.5 MFD
C-6	22-740	.01 MFD 400V	R-1	63-587	4700 OHM ½W
C-7	22-243	PADD PADDER CONDENSER	R-2	63-595	47M OHM ½W
C-8	21-363	.25 MFD 200V	R-3	63-628	270 OHM ½W
C-9	21-380	.002 MFD 600V	R-4	63-597	470 M OHM ½W
C-10	22-338	.03 MFD 400V	R-5	63-606	56M OHM ½W
C-11	22-212	.01 MFD 600V	R-6	63-151	15M OHM 1W
C-12	22-185	.005 MFD 600V	R-7	63-171	1 MEGOHM ½W
C-13	22-147	.004 MFD 600V	R-8	63-634	820 OHM ½W
C-14	22-448	.25 MFD 400V	R-9	63-599	VOL CONTROL & SW 2M
C-15	22-188	.02 MFD 400V	R-10	63-160	120 M OHM ½W
C-16	22-350	.05 MFD 200V	R-11	63-296	220 M OHM ½W
C-17	22-374	.02 MFD 400V	R-12	63-633	680 OHM ½W
C-18	22-405	40MD ELECTROLYTIC 50V	R-13	63-605	1000 OHM 1W
			R-14	63-962	4700 OHM ½W

DIAG Nº	PART Nº	DESCRIPTION
T-1	63-553	1ST I.F. TRANS PRIMARY
T-2	63-554	1ST I.F. TRANS SECONDARY
T-3	63-555	2ND I.F. TRANS PRIMARY
T-4	20-196	BROAD CAST ANT. COIL (SEE NOTE)
T-5	63-571	ANT. OSCILLATOR COIL (SW BAND)
T-6	95-558	BROAD CAST PRIMARY
T-7	95-559	SHORT WAVE OSC. COIL (SEE NOTE)
T-8	95-565	POWER SUPPLY SWITCH
T-9	95-567	BATTERY CONVERTER TRANS
T-10	95-568	POWER TRANS
T-11	90-11	VIBRATOR
T-12	95-5043	CHOKE ASSEM
T-13		CHOKE ASSEM
T-14	3-2776	PILOT LIGHT 28V .17A
T-15	100-39	SPEAKER TRANS
T-16		
T-17	22-579	SHORT WAVE OSC. (SEE NOTE)

NOTE: TRIMMERS F & K ARE MOUNTED ON CABINET STRIP PART # 22-408

MODELS 6J322, 6J357
Chassis 5654
Voltage, Socket
Trimmers, Alignment

ZENITH RADIO CORP.

NOTE

Voltages measured from socket contacts to chassis using a 1000 ohm per volt meter with chassis operating on 110 volt A.C.

Antenna disconnected — volume control on full.

Line voltage 115 v. Consumption 18 watts.

Battery voltage at chassis 6v.

Consumption — switch on normal 2.3 amperes.

Consumption — switch on conserv. 1.95 amperes.

Power Output 1 watt.

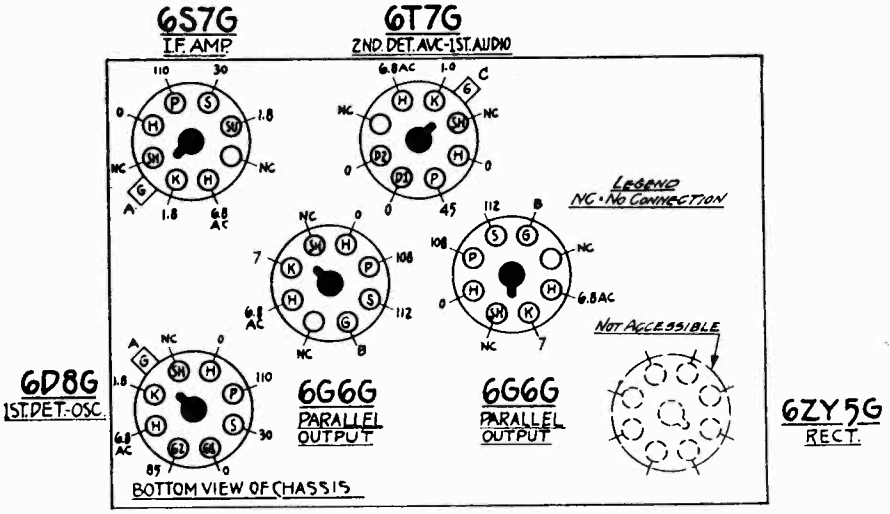
(A) Bias for 6D8 and 6S7 measured at K contacts of respective sockets which is +1.8 volts.

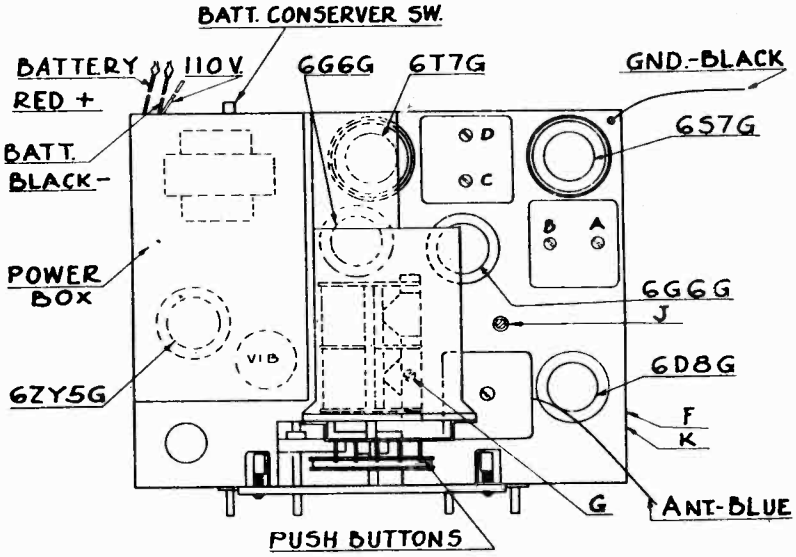
(B) Bias for 6G6 tubes measured at K contact of sockets which is +7 volts.

(C) Bias for 6T7 triode measured at K contact of same socket which is +1 volt.

LEGEND

NC — No Connection
SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
F — Filament





Location of Tubes and Trimmers

Models 6J322, 6J357

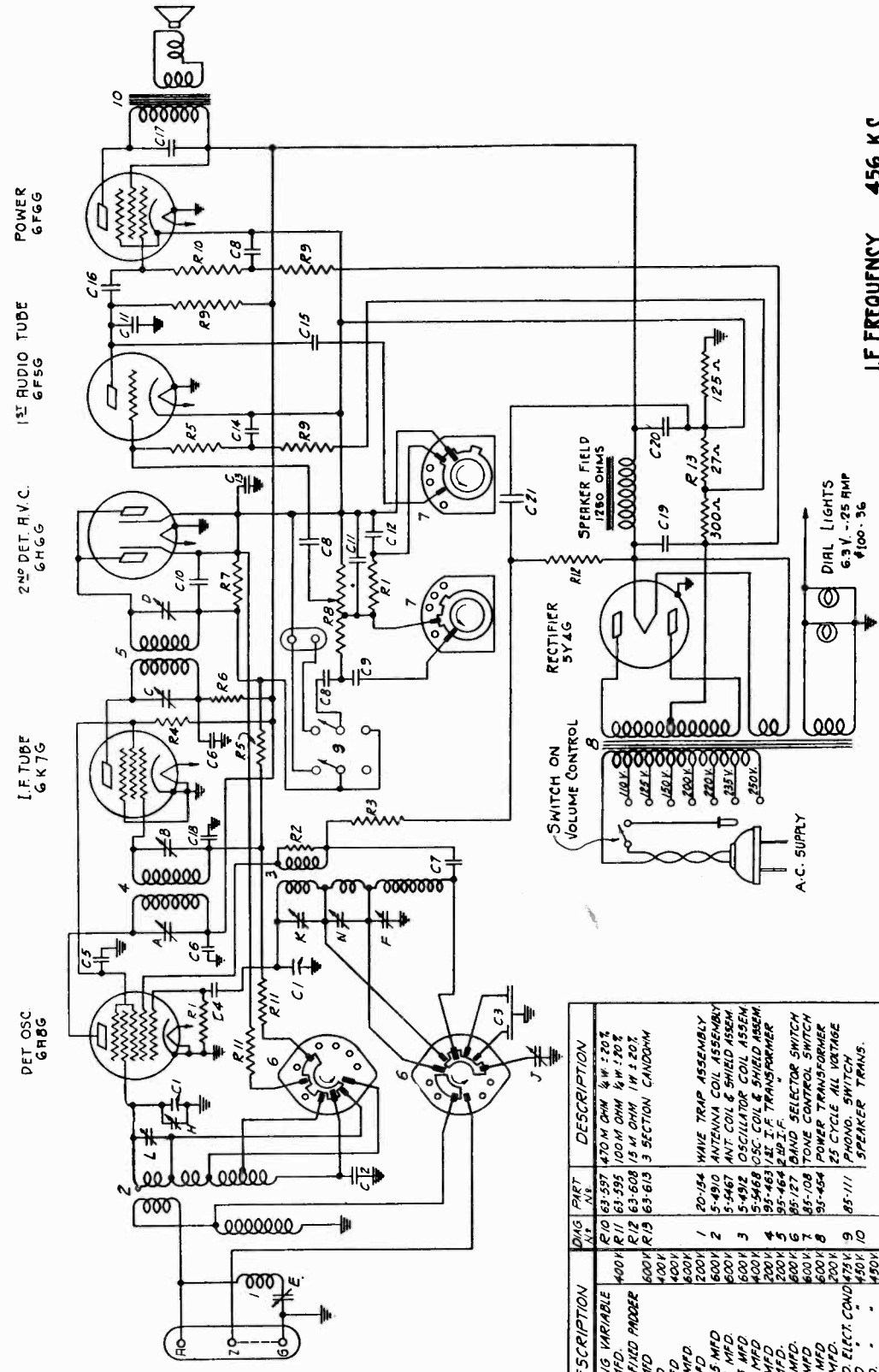
CHASSIS No. 5654

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.	455	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.		"		FG	Repeat 3 & 4
6	" " "	400 Ohms	18000	S.W.	18000	K	Rock gang & adj. for max. output

ZENITH RADIO CORP.

MODELS 6S254AT, 6S256AT
Chassis 5644AT
Schematic, Parts



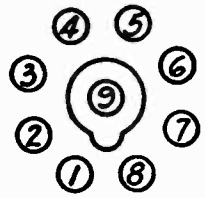
DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION
C1	22-547	2 GANG VARIABLE	400V	R10	63-597	470 M OHM ½W ±20%
C2	22-487	.05 MFD.		R11	63-595	100 M OHM ½W ±20%
C3	22-558	DUAL FIXED PADDER	600V	R12	63-608	15 M OHM 1W ±20%
C4	22-127	25 MMFD	400V	R13	63-613	3 SECTION CANDOHM
C5	22-170	.1 MFD	400V			
C6	22-212	.05 MFD	600V			
C7	22-358	.002 MFD	200V	1	20-134	WAVE TRAP ASSEMBLY
C8	22-327	.02 MFD	600V	2	5-4910	ANTENNA COIL ASSEMBLY
C9	22-182	.00025 MFD	600V	3	5-4967	ANT. COIL & SHIELD ASSEM
C10	22-162	.0001 MFD.	600V		5-4912	OSCILLATOR COIL ASSEM
C11	22-147	.0005 MFD	600V		5-4968	OSC. COIL & SHIELD ASSEM
C12	22-326	.003 MFD	400V	4	95-463	1ST I.F. TRANSFORMER
C13	22-185	.01 MFD.	200V	5	95-464	2ND I.F.
C14	22-190	.1 MFD.	200V	6	85-127	BAND SELECTOR SWITCH
C15	22-448	.004 MFD.	600V	7	85-108	TONE CONTROL SWITCH
C16	22-435	.02 MFD	600V	8	95-464	POWER TRANSFORMER
C17	22-432	.002 MFD	200V			25 CYCLE ALL VOLTAGE
C18	22-230	.03 MFD.	200V	9	85-111	PHONO. SWITCH
C19	22-633	8 MFD. ELECT. COND.	475V	10		SPEAKER TRANS.
C20		16 MFD " "	450V			
C21	22-634	4 MFD. " "	450V			
				A		1ST I.F. TRIMMERS
				B		VARIABLE TRIMMERS
R1	63-593	47 M OHM ½W ±20%		C		1ST I.F. TRANS. PRIMARY
R2	63-587	4700 OHM ½W ±20%		D		2ND I.F. " SECONDARY
R3	63-680	10 M OHM 1W ±20%		E		2ND I.F. " PRIMARY
R4	63-617	33 M OHM 1W ±10%		F		WAVE TRAP
R5	63-271	1 MEGOHM ½W ±10%		H		BROADCAST OSCILLATOR (SEE NOTE)
R6	63-605	1000 OHM ½W ±10%		J		ANTENNA BROADCAST (ON GANG)
R7	63-658	390 M OHM ½W ±10%		K		22-519 BROADCAST PADDER
R8	63-936	2 MEGOHM VOLUME CONT.		L		SHORT WAVE OSC. (SEE NOTE)
R9	63-296	220 M OHM ½W ±20%		N		22-305 SHORT WAVE DETECTOR
						POLICE BAND OSC. (SEE NOTE)

MODELS 6S254AT, 6S256AT
Chassis 5644AT
Voltage, Socket
Trimmers, Alignment

ZENITH RADIO CORP.

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.2	246	90	—9	190	0	0	—.5
6K7	I.F.	0	6.2	237	90	0	—	0	0	—.5
6H6	2nd Det. A.V.C.	0	0	—2.5	—2	—2.5	—	6.2	—2	—
6F5	1st Audio	0	0	—	104	—	—	6.2	—2	—2
6F6	Power	0	0	231	243	—3	—	6.2	—2	—
5Y4	Rect.	0	—	AC	—	AC	—	314	314	—



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.

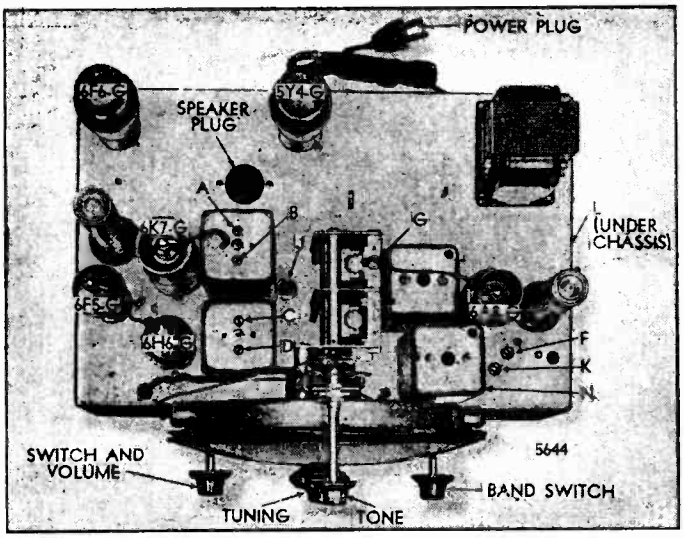
ALIGNMENT PROCEDURE

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.

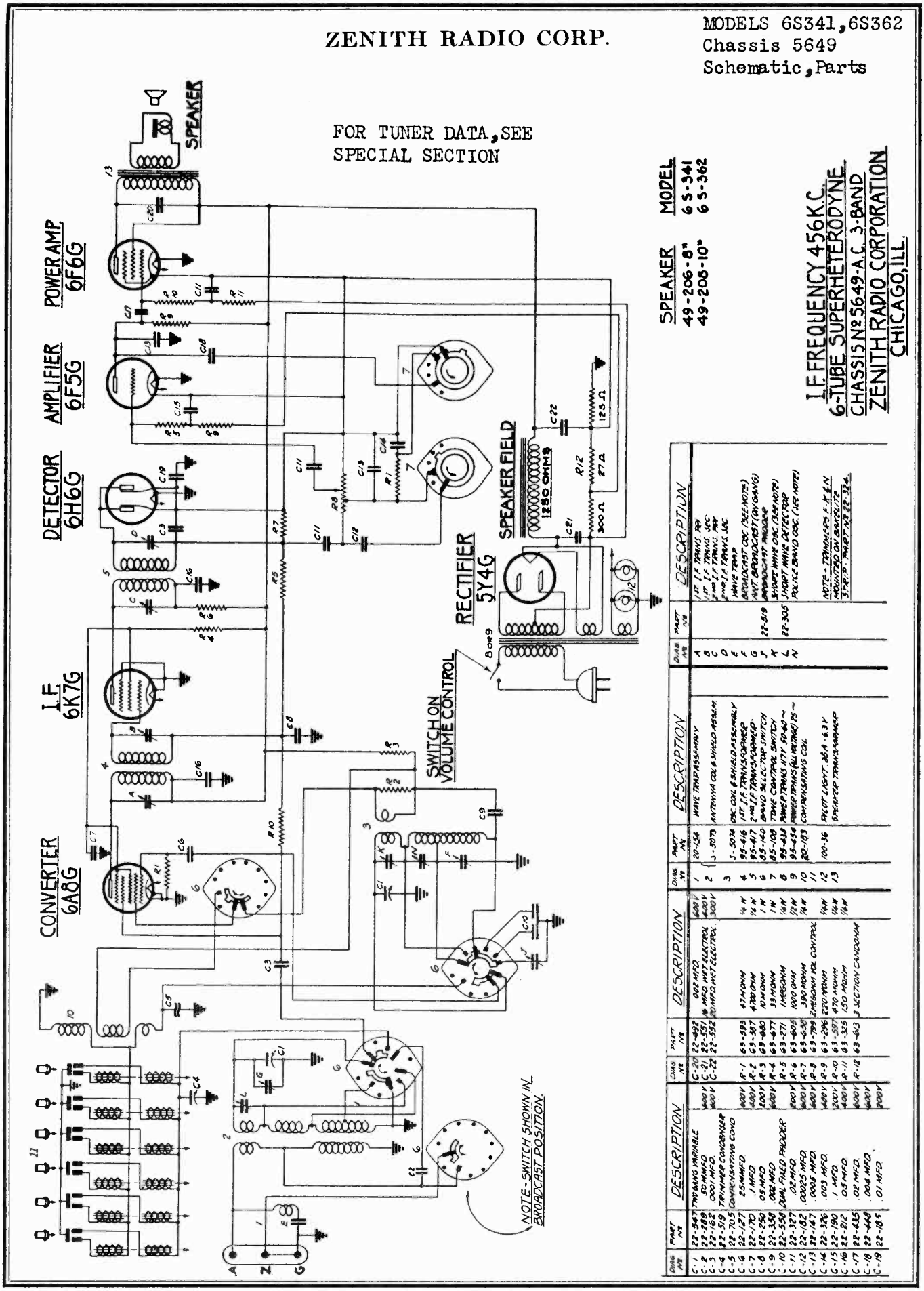
LOCATION OF TRIMMERS

Chassis No. 5644AT



ZENITH RADIO CORP.

MODELS 6S341, 6S362
Chassis 5649
Schematic, Parts



SPEAKER MODEL
49-206-8" 6S-341
49-208-10" 6S-362

I.F. FREQUENCY 456 K.C.
6-TUBE SUPERHETERODYNE
CHASSIS Nº 5649-A.C. 3-BAND
ZENITH RADIO CORPORATION
CHICAGO, ILL.

DIAG NO	PART NO	DESCRIPTION
C-1	22-347	TWO GANG VARIABLE 400 V
C-2	22-229	.50 MMFD. 400 V
C-3	22-162	.0001 MFD. 400 V
C-4	22-519	TRIMMER CONDENSER
C-5	21-705	CONDENSATING COND
C-6	22-127	.25 MMFD 400 V
C-7	22-170	.1 MFD 400 V
C-8	22-250	.05 MFD 200 V
C-9	22-359	.002 MFD 400 V
C-10	22-558	DUAL FILED PROOF
C-11	22-327	.02 MFD 400 V
C-12	22-182	.0025 MFD 400 V
C-13	22-147	.0005 MFD 400 V
C-14	22-326	.005 MFD 400 V
C-15	22-190	.1 MFD 200 V
C-16	22-212	.05 MFD 400 V
C-17	22-435	.02 MFD 400 V
C-18	22-449	.004 MFD. 400 V
C-19	22-185	.01 MFD 200 V
C-20	22-432	.002 MFD. 400 V
C-21	22-551	16 MFD WET ELECTROL 400 V
C-22	22-552	20 MFD WET ELECTROL 300 V
R-1	63-593	47 M OHM ½ W
R-2	63-587	470 M OHM ½ W
R-3	63-580	10 M OHM 1 W
R-4	63-577	33 M OHM 1 W
R-5	63-571	1 MEG OHM ½ W
R-6	63-605	1000 OHM 2 W
R-7	63-635	350 M OHM ½ W
R-8	63-599	2 MEGOHM VOL CONTROL
R-9	63-596	220 M OHM ½ W
R-10	63-597	470 M OHM ½ W
R-11	63-325	150 M OHM ½ W
R-12	63-603	3 SECTION CANDOHM
1	20-154	WAVE TRAP ASSEMBLY
2	J-3073	ANTENNA COIL & SHIELD ASSEM
3	J-3074	OSC COIL & SHIELD ASSEMBLY
4	95-416	1ST I.F. TRANSFORMER
5	95-417	2ND I.F. TRANSFORMER
6	45-140	BAND SELECTOR SWITCH
7	45-100	TONE CONTROL SWITCH
8	95-411	RANGE TRANS 477 KC 540 ~
9	95-454	RANGE TRANS (ALL WAVE) 25 ~
10	20-103	COMPENSATING COIL
11		
12	100-36	PILOT LIGHT .3A - 6.3 V
13		SPEAKER TRANSFORMER

DIAG NO	PART NO	DESCRIPTION
A		1ST I.F. TRANS PRI
B		1ST I.F. TRANS SEC
C		2ND I.F. TRANS PRI
D		2ND I.F. TRANS SEC
E		WAVE TRAP
F		BROADCAST OSC (SEE NOTE)
G	22-519	ANT BROADCAST (GANG)
		BROADCAST PADDER
J		S.W.ST WAVE OSC (SEE NOTE)
K		S.W.ST WAVE DETECTOR
L	22-305	S.W.ST WAVE DETECTOR
N		POLICE BAND OSC (SEE NOTE)

NOTE - TRIMMERS F, K & N MOUNTED ON BAND SWITCH
STATIC PART NO 22-324

MODELS 6S341,6S362
Chassis 5649
Voltage,Socket
Trimmers,Alignment

ZENITH RADIO CORP.

Voltages measured from socket contacts to chassis using a 1000 ohm per volt meter. Antenna disconnected — volume control on full.

Line voltage 115 v. Consumption 65 watts.

Power output 4.5 watts.

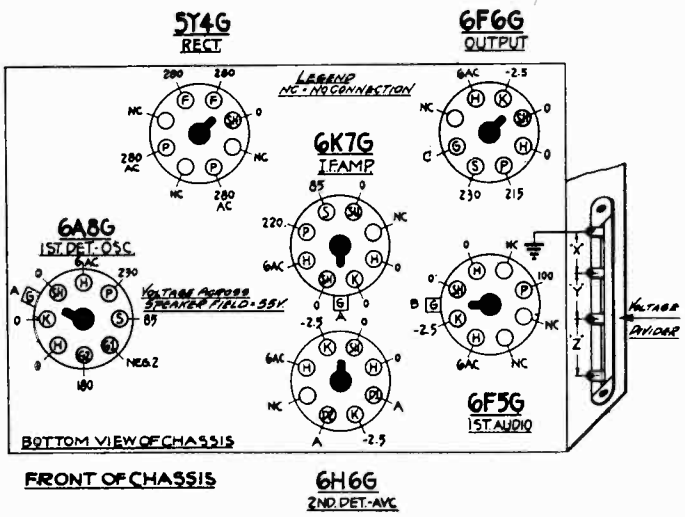
(A) Bias for 6A8 — 6K7 and 6H6 measured across X which is — 2.5 volts.

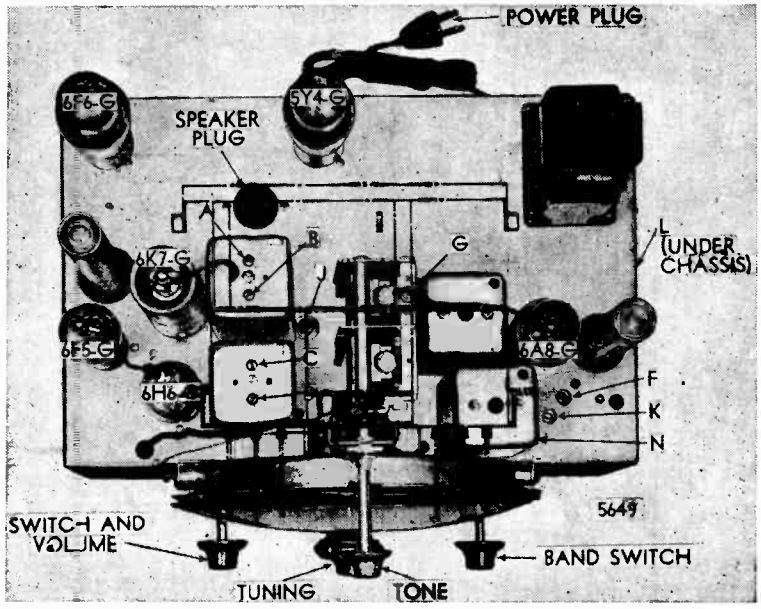
(B) Bias for 6F5 measured across X and Y which is neg. 4 volts.

(C) Bias for 6F6 measured across XY and Z which is neg. 16 volts.

LEGEND

NC — No Connection
SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
F — Filament





Location of Tubes and Trimmers

Models 6S341, 6S362

CHASSIS No. 5649

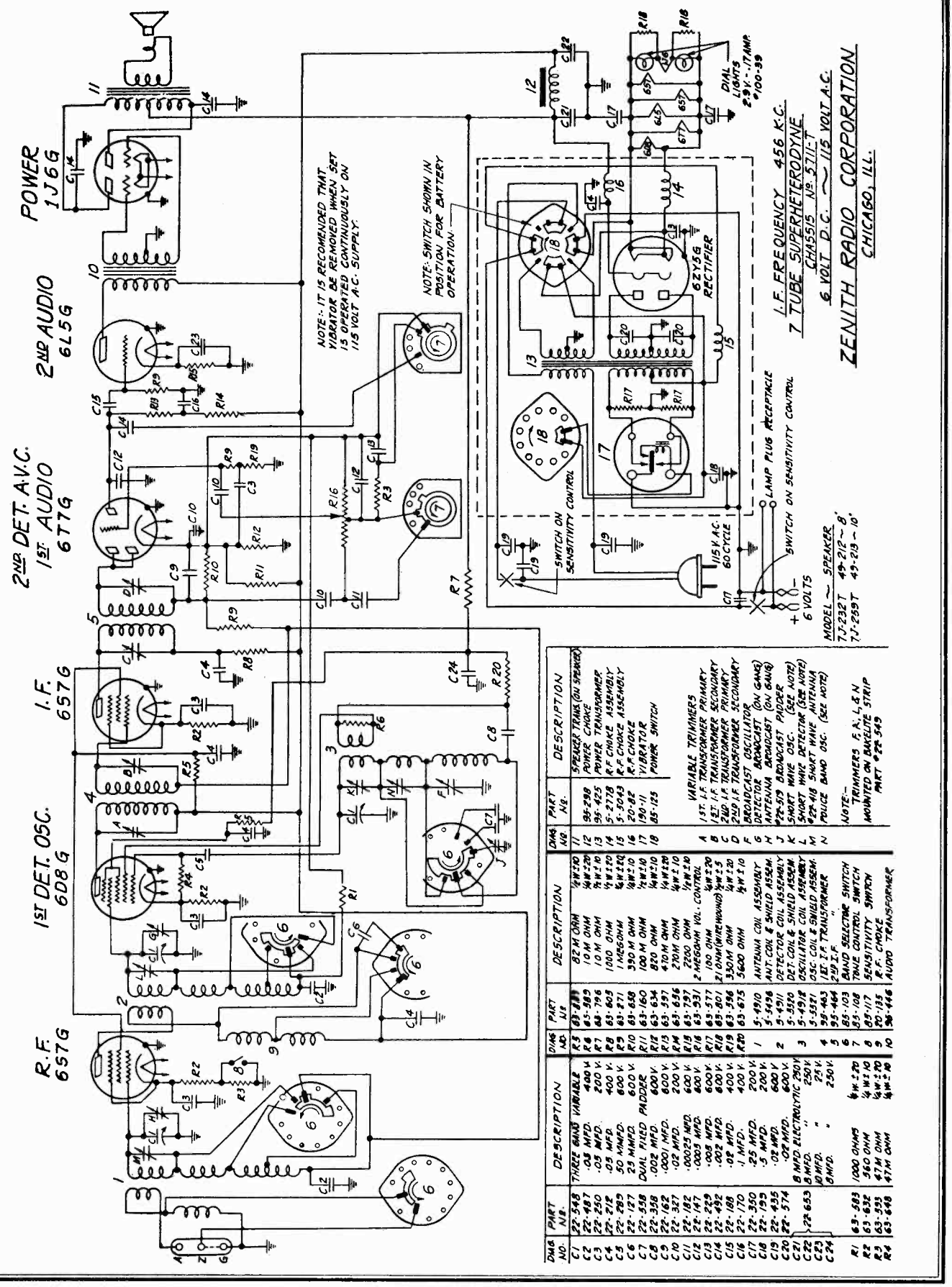
ALIGNMENT PROCEDURE

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 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 7J232T, 7J259T
Chassis 5711T
Schematic, Parts



DIAG. NO.	PART NO.	DESCRIPTION
C1	22-548	THREE GANG VARIABLE
C2	22-487	.03 MFD. 400 V.
C3	22-250	.05 MFD. 200 V.
C4	22-212	.05 MFD. 400 V.
C5	22-289	50 MMFD. 600 V.
C6	22-127	23 MMFD. 600 V.
C7	22-358	DUAL FIXED PADDER
C8	22-338	.002 MFD. 600 V.
C9	22-162	.0001 MFD. 600 V.
C10	22-327	.02 MFD. 200 V.
C11	22-182	.00025 MFD. 600 V.
C12	22-147	.0005 MFD. 600 V.
C13	22-229	.002 MFD. 600 V.
C14	22-492	.02 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	22-193	.5 MFD. 200 V.
C19	22-435	.02 MFD. 600 V.
C20	22-574	.02 MFD. 600 V.
C21		8 MFD ELECTROLYTIC 250 V.
C22	22 653	8 MFD. " 250 V.
C23		10 MFD. " 25 V.
C24		8 MFD. " 250 V.
R1	63-583	1000 OHMS ½ W ± 20
R2	63-632	360 OHM ½ W ± 10
R3	63-533	47 M OHM ½ W ± 20
R4	63-646	47 M OHM ½ W ± 10
R5	63-635	82 M OHM ½ W ± 20
R6	63-585	10 M OHM ½ W ± 20
R7	63-798	10 M OHM ½ W ± 10
R8	63-605	1000 OHM ½ W ± 10
R9	63-671	1 MEGOHM ½ W ± 10
R10	63-658	330 M OHM ½ W ± 10
R11	63-660	100 M OHM ½ W ± 10
R12	63-634	820 OHM ½ W ± 10
R13	63-597	470 M OHM ½ W ± 10
R14	63-636	270 M OHM ½ W ± 10
R15	63-797	2200 OHM ½ W ± 10
R16	63-931	2 MEGOHM VOL. CONTROL ½ W ± 20
R17	63-577	100 OHM (WIREWOUND) ½ W ± 5
R18	63-601	21 OHM (WIREWOUND) ½ W ± 5
R19	63-596	330 M OHM ½ W ± 20
R20	63-675	3600 OHM ½ W ± 10
1	5-4910	ANTENNA COIL ASSEMBLY
2	5-4916	ANT. COIL & SHIELD ASSEM.
	5-4911	DETECTOR COIL ASSEMBLY
	5-3520	DET. COIL & SHIELD ASSEM.
3	5-4918	OSCILLATOR COIL ASSEMBLY
	5-3521	OSC. COIL & SHIELD ASSEM.
4	35-463	1ST I.F. TRANSFORMER
5	35-464	2ND I.F. "
6	85-103	BAND SELECTOR SWITCH
7	85-108	TONE CONTROL SWITCH
8	85-117	SENSITIVITY SWITCH
9	70-135	R.F. CHOKE
10	36-446	AUDIO TRANSFORMER
11	36-230	SPEAKER FIELD (ON SPEAKER)
12	36-228	POWER CHOKE
13	36-425	POWER TRANSFORMER
14	5-2778	R.F. CHOKE ASSEMBLY
15	5-3243	R.F. CHOKE ASSEMBLY
16	20-82	R.F. CHOKE
17	190-11	VIBRATOR
18	85-125	POWER SWITCH
		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 (ON GANG)
G		DETECTOR BROADCAST (ON GANG)
H		#22-515 BROADCAST PADDER (SEE NOTE)
J		SHORT WAVE OSC. (SEE NOTE)
K		SHORT WAVE DETECTOR (SEE NOTE)
L		#22-418 SHORT WAVE ANTENNA
M		POLICE BAND OSC. (SEE NOTE)
N		

NOTE:- TRIMMERS F.A; L & N MOUNTED ON BAKELITE STRIP PART #22-549

MODELS 7J232T, 7J259T
Chassis 5711T
Voltage, Socket
Trimmers, Alignment

ZENITH RADIO CORP.

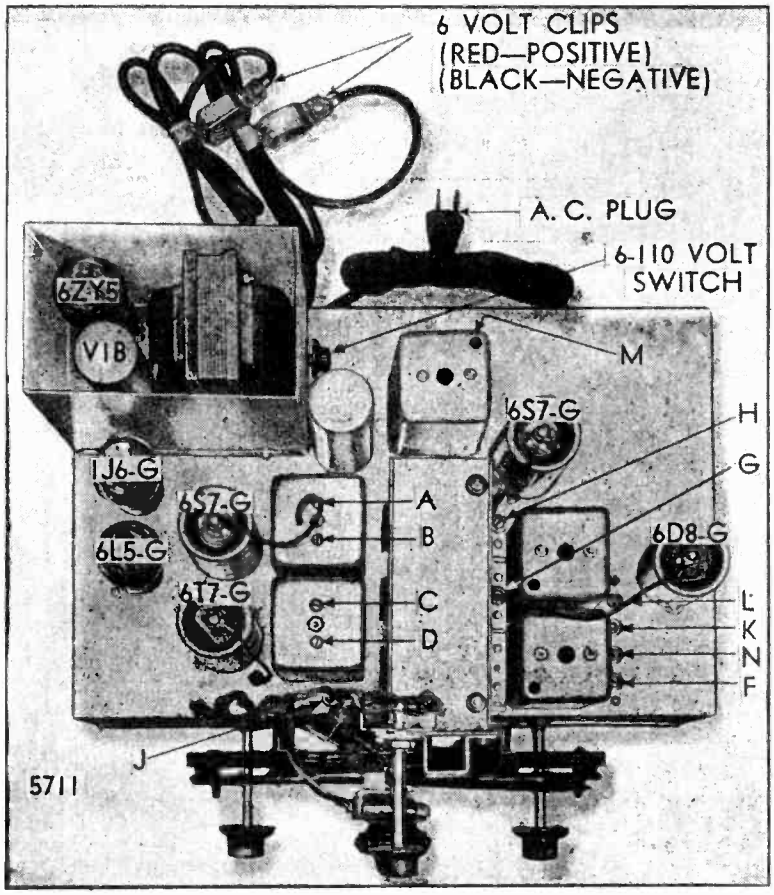
ALIGNMENT PROCEDURE

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

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.



LOCATION OF TRIMMERS

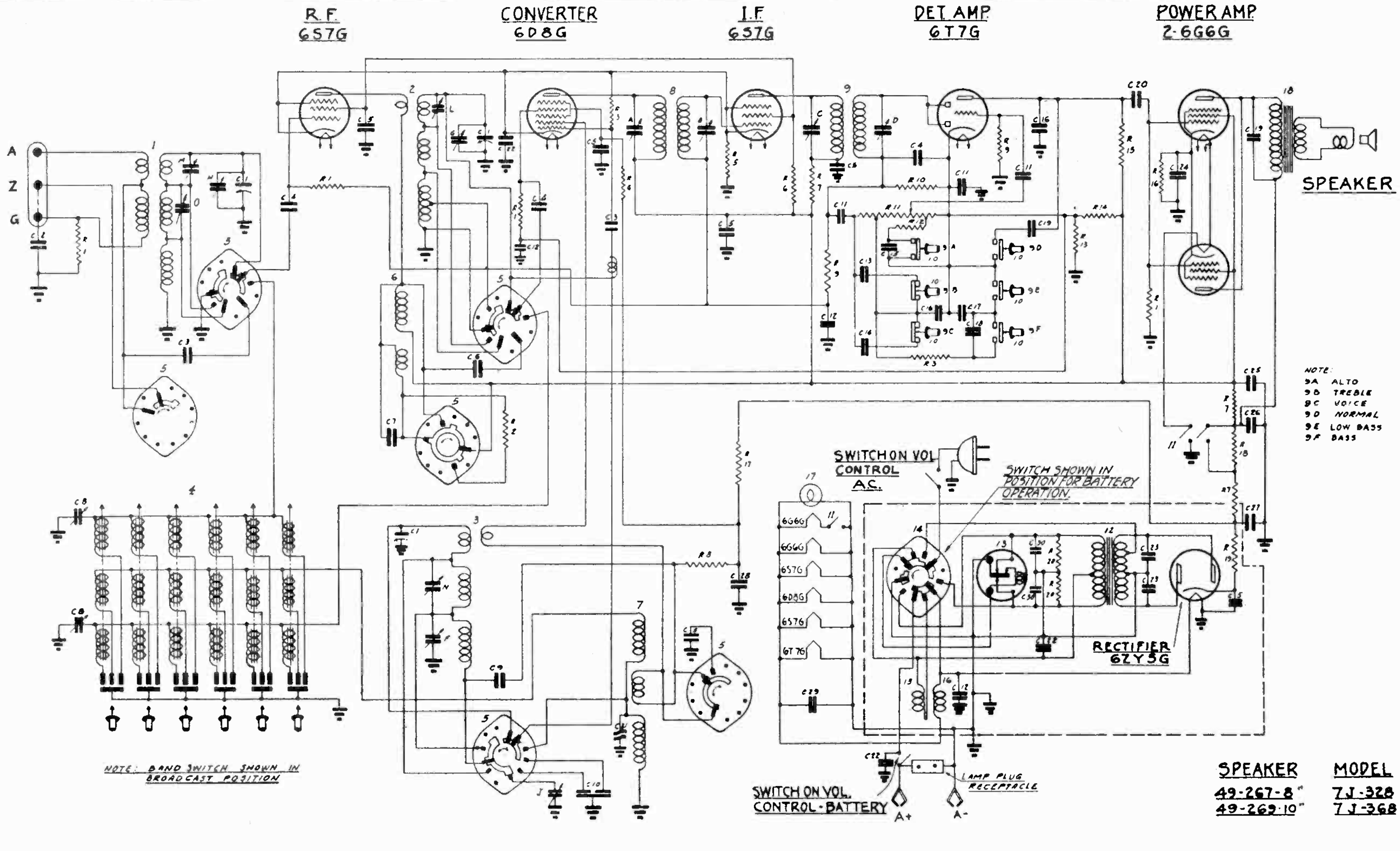
BOTTOM VIEW OF SOCKET

Chassis No. 5711T

MODELS 7J323, 7J368
Chassis 5715
Schematic, Parts

ZENITH RADIO CORP.

FOR TUNER DATA, SEE SPECIAL SECTION



DIAG NO	PART NO	DESCRIPTION	
C-1	22-746	THREE GANG VAR	
C-2	22-136	.01 MFD	600V
C-3	22-283	50 MMFD	600V
C-4	22-162	.0001 MFD	600V
C-5	22-212	.05 MFD	400V
C-6	22-285	10 MMFD	600V
C-7	22-127	75 MMFD	600V
C-8	22-519	TRIMMER COND.	
C-9	22-355	.002 MFD	600V
C-10	22-708	DUAL FIXED PADDER	
C-11	22-327	.02 MFD	200V
C-12	22-250	.05 MFD	200V
C-13	22-182	.00025 MFD	600V
C-14	22-470	.00015 MFD	600V
C-15	22-185	.01 MFD	200V
C-16	22-147	.0005 MFD	600V
C-17	22-438	.006 MFD	600V
C-18	22-326	.003 MFD	400V
C-19	22-448	.004 MFD	600V
C-20	22-188	.02 MFD	400V

DIAG NO	PART NO	DESCRIPTION	
C-21	22-755	COMPENSATING COND	
C-22	22-350	.25 MFD	200V
C-23	22-574	.02 MFD	600V
C-24	22-405	10 MFD ELECT	50V
C-25	22-742	10 MFD ELECT.	250V
C-26	22-742	15 MFD ELECT.	250V
C-27	22-742	15 MFD ELECT.	250V
C-28	22-741	8 MFD ELECT.	250V
C-29	22-199	.5 MFD	200V
C-30	22-319	.005 MFD	200V
R-1	63-597	470 M OHM	1/4 W
R-2	63-585	2200 OHM	1/4 W
R-3	63-593	47 M OHM	1/4 W
R-4	63-649	56000 OHM	1/4 W
R-5	63-627	180 OHM	1/4 W
R-6	63-885	82000 OHM	1/2 W
R-7	63-605	1000 OHM	1/2 W
R-8	63-675	5600 OHM	1/2 W
R-9	63-271	1 MEGOHM	1/4 W
R-10	63-655	220,000 OHM	1/4 W

DIAG NO	PART NO	DESCRIPTION	
R-11	63-990	VOL CONT.	
R-12	63-391	22000 OHM	1/4 W
R-13	63-634	820 OHM	1/4 W
R-14	63-160	100 M OHM	1/2 W
R-15	63-296	220 M OHM	1/4 W
R-16	63-588	680 OHM	1/4 W
R-17	63-796	10 M OHM	1/2 W
R-18	63-962	4700 OHM	1 W
R-19	63-577	100 OHM	1/4 W
R-20	63-963	120 OHM	1/2 W
1	5-6541	ANT COIL & SHIELD ASSEM.	
2	5-6208	DET COIL & SHIELD ASSEM	
3	5-6608	OSC COIL & SHIELD ASSEM	
4			

DIAG NO	PART NO	DESCRIPTION
5	85-147	BAND SELECTOR SW.
6	20-189	R F CHOKE
7	20-196	COMPENSATING COIL
8	95-562	1ST I.F TRANS.
9	95-561	2ND I.F TRANS
10	5-6224	TONE CONTROL SW ASSEM
11	85-157	BATT CONSERVER SW
12	95-555	POWER TRANSFORMER
13	190-11	VIBRATOR
14	85-155	POWER SUPPLY SW.
15	5-5043	CHOKE ASSEMBLY
16	5-2778	CHOKE ASSEM
17	100-67	PILOT LIGHT 6.3V .15A.
18		SPEAKER TRANS.
A		1ST IF TRANS. PRI.
B		1ST I.F TRANS SEC.
C		2ND I.F TRANS PRI.
D		2ND I.F TRANS. SEC

DIAG NO	PART NO	DESCRIPTION
F		BROADCAST OSC (SEE NOTE)
G		DETECTOR BROADC'ST (ON GANG)
H		ANT BROADC'ST (ON GANG)
J	22-463	BROADCAST PADDER
L		SHORT WAVE DET. (SEE NOTE)
M	22-305	SHORT WAVE ANTENNA
N		POLICE BAND OSC. (SEE NOTE)
O	22-305	POLICE BAND ANTENNA

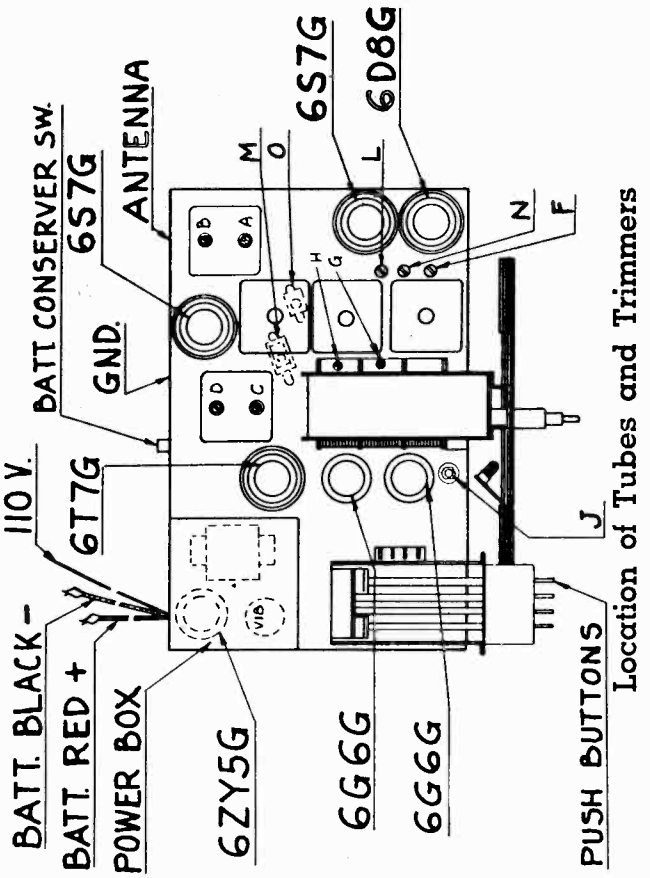
NOTE: TRIMMERS F, L & N. ARE MOUNTED ON BAKELITE STRIP PART # 22-598.

6 VOLT D.C. 110 VOLT A.C.
I.F FREQUENCY 455 K.C.
7 TUBE SUPERHETERODYNE
CHASSIS Nº 5715 3 BAND
ZENITH RADIO CORPORATION
CHICAGO, ILL.

MODELS 7J323,7J368
Chassis 5715
Voltage,Socket
Trimmers,Alignment

ZENITH RADIO CORP.

Models 7J323, 7J368
CHASSIS No. 5715



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.	455	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	Al'gment of Ant. and Det.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.		"		FGH	Repeat 2 & 3
6	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to scale
7	" " "	400 Ohms	18000	S.W.	18000	M	Rock gang & adj. for max. output
8	" " "	400 Ohms	6000	Police	6000	N	Rock gang & adj. for max. output

NOTE

Voltages measured from socket contacts to chassis using a 1000 ohm per volt meter with chassis operating on 110 volt A.C.

Line voltage 115 V. A.C. consumption 18 watts.

Battery voltage at chassis 6 volts.

Consumption with switch in normal position 2.6 amperes.

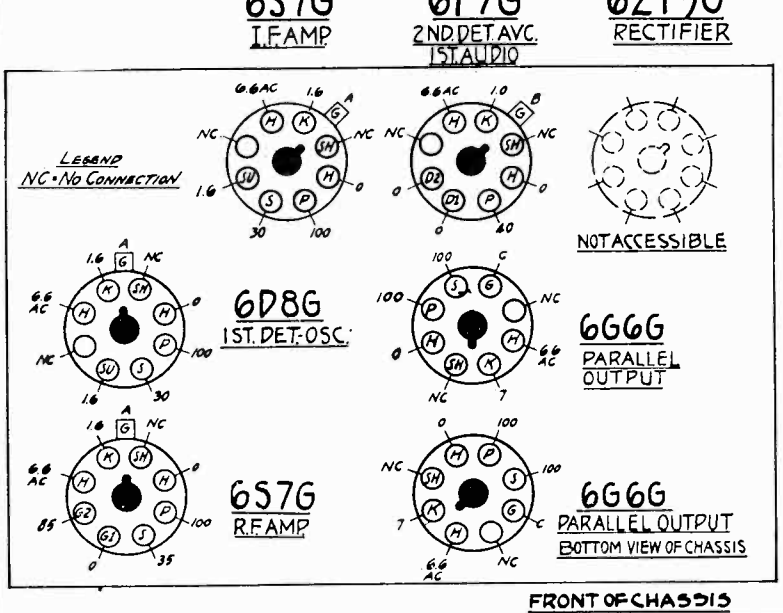
Consumption with switch in conserv. position 2.2 amperes.

Power output 1 watt.

(A) Bias for 6D8 and 6S7 R.F. and I.F. tubes measured at K of respective sockets which is +1.6 volts.

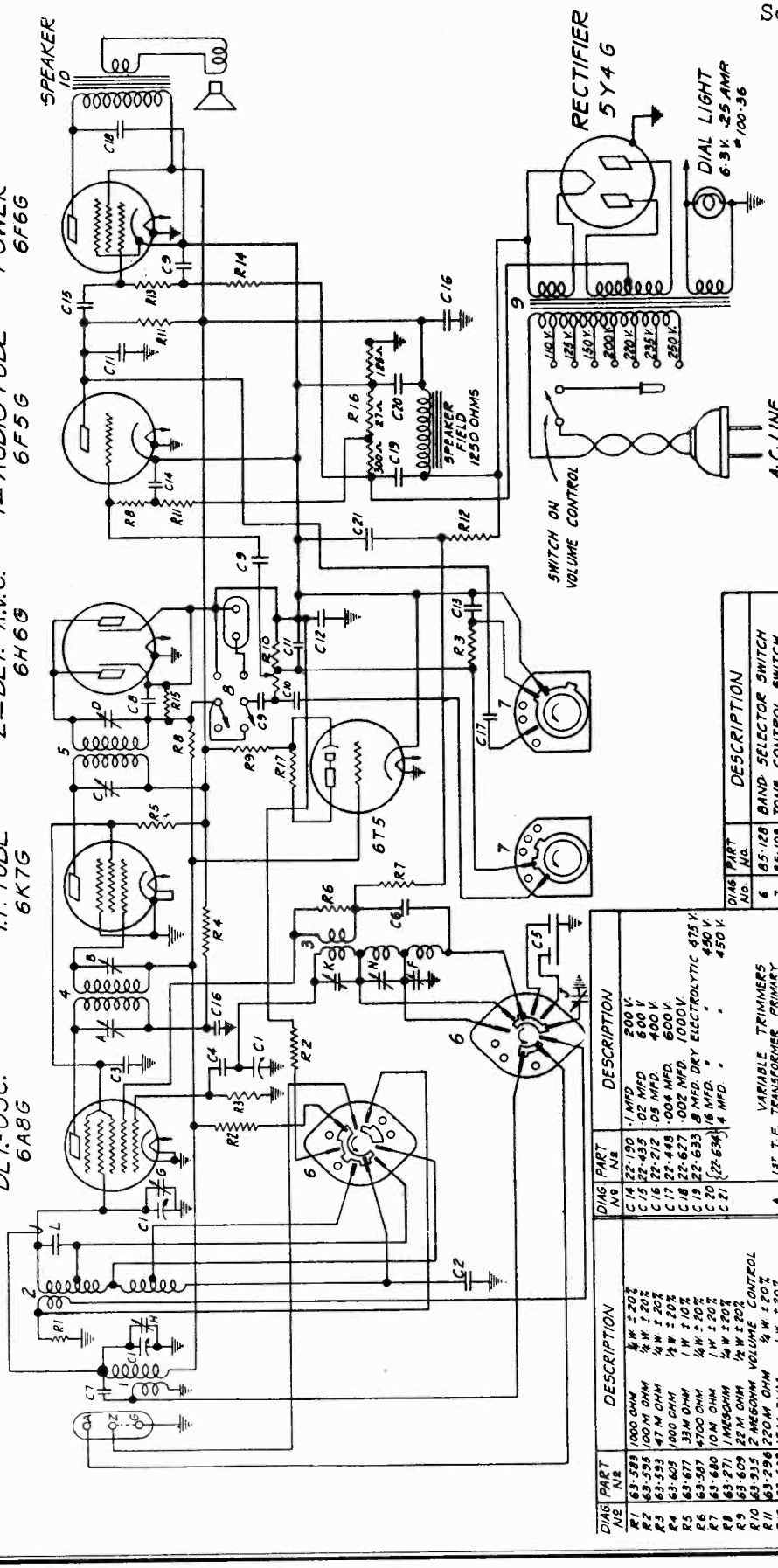
(B) Bias for 6T7 triode section measured at K of 6T7 socket which is +1 volt.

(C) Bias for 6G6 tubes measured at K of respective sockets which is +7 volts



ZENITH RADIO CORP.

MODELS 7S232AT, 7S240AT
7S242AT, 7S258AT, 7S260AT
Chassis 5709AT
Schematic, Parts



I.F. FREQUENCY 456 K.C.
7 TUBE SUPERHETERODYNE
3 BAND
CHASSIS Nº 5709-AT

ZENITH RADIO CORP.
CHICAGO, ILLINOIS

DIAG Nº	PART Nº	DESCRIPTION
R1	63-593	1000 OHM ½ W ± 20%
R2	63-595	100 M OHM ½ W ± 20%
R3	63-593	47 M OHM ½ W ± 20%
R4	63-603	1000 OHM ½ W ± 10%
R5	63-617	33 M OHM 1 W ± 10%
R6	63-587	4700 OHM ½W ± 20%
R7	63-680	10 M OHM 1 W ± 20%
R8	63-271	1 MEGOHM ½ W ± 20%
R9	63-609	22 M OHM ½ W ± 20%
R10	63-935	2 MEGOHM VOLUME CONTROL
R11	63-290	220 M OHM ½ W ± 20%
R12	63-608	15 M OHM 1 W ± 20%
R13	63-597	470 M OHM ½ W ± 20%
R14	63-325	150 M OHM ½ W ± 20%
R15	63-638	390 M OHM ½ W ± 10%
R16	63-613	3 SECTION CANDOHM
R17		1 MEGOHM MOUNTED IN TUNING TUBE SOCKET
C1	22-348	THREE GANG VARIABLE .05 MFD. 400 V.
C2	22-487	.1 MFD. 400 V.
C3	22-170	25 MMFD. 600 V.
C4	22-127	DUAL FIXED PADDER .002 MFD 600 V.
C5	22-358	10 MMFD CERAMIC 600 V.
C6	22-358	.0001 MFD 600 V.
C7	22-601	.02 MFD. 200 V.
C8	22-162	.00025 MFD 600 V.
C9	22-327	.0005 MFD. 600 V.
C10	22-182	.01 MFD. 200 V.
C11	22-147	.003 MFD. 400 V.
C12	22-185	.1 MFD 600 V.
C13	22-326	.02 MFD 400 V.
C14	22-190	.1 MFD 200 V.
C15	22-435	.02 MFD 600 V.
C16	22-212	.05 MFD. 400 V.
C17	22-448	.004 MFD. 600 V.
C18	22-627	.002 MFD. 1000 V.
C19	22-633	8 MFD. DRY ELECTROLYTIC 475 V.
C20	(22-634)	16 MFD. " " 450 V.
C21	(22-634)	4 MFD. " " 450 V.
A		VARIABLE TRIMMERS
B		1ST I.F. TRANSFORMER PRIMARY
C		" " SECONDARY
D		2ND I.F. " PRIMARY
E		" " SECONDARY
F		BROADCAST OSCILLATOR (SEE NOTE)
G		DETECTOR BROADCAST (ON GANG)
H		ANTENNA BROADCAST (ON GANG)
J	22-519	BROADCAST PADDER
K		SHORT WAVE OSCILLATOR (SEE NOTE)
L		SHORT WAVE DETECTOR (SEE NOTE)
N		POLICE BAND OSCILLATOR (SEE NOTE)
		NOTE - TRIMMERS F, K, L, N, ARE MOUNTED ON BAKELITE STRIP #22-349
1	5-4780	ANTENNA COIL ASSEMBLY
2	5-5046	DETECTOR COIL ASSEMBLY
	5-5490	DETECTOR COIL & SHIELD ASSEM.
3	5-4912	OSC. COIL ASSEMBLY
	5-5489	OSC. COIL & SHIELD ASSEMBLY
4	95-463	1ST I.F. TRANSFORMER
5	95-464	2ND " "

DIAG No.	PART No.	DESCRIPTION
6	85-128	BAND SELECTOR SWITCH
7	85-108	TONE CONTROL SWITCH
8	85-111	PHONOGRAPH SWITCH
9	95-451	POWER TRANS. 25~ ALL VOLTAGE
10		SPEAKER TRANSFORMER

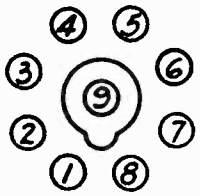
MODEL	SPEAKER
7S232AT	49-218 8"
7S240AT	49-219 8"
7S242AT	49-219 8"
7S258AT	49-217 10"
7S260AT	49-220 12"

MODELS 7S232AT, 7S240AT
7S242AT, 7S258AT, 7S260AT
Chassis 5709AT
Voltage, Socket
Trimmers, Alignment

ZENITH RADIO CORP.

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			



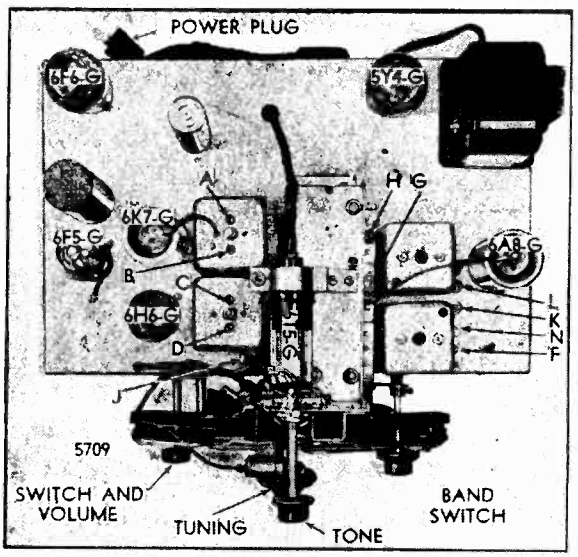
BOTTOM VIEW OF SOCKET

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

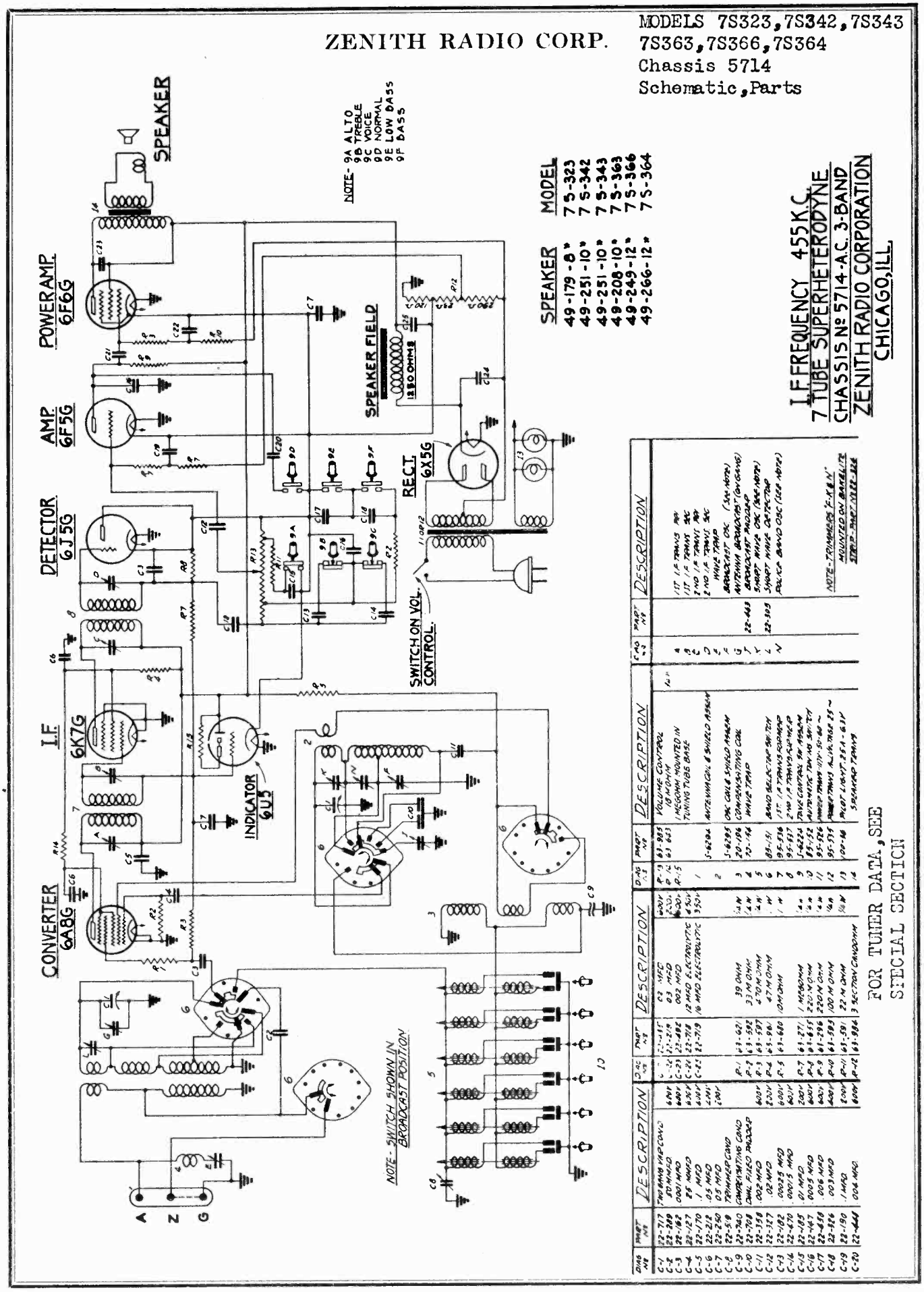
LOCATION OF TRIMMERS



Chassis No. 5709AT

ZENITH RADIO CORP.

MODELS 7S323, 7S342, 7S343
7S363, 7S366, 7S364
Chassis 5714
Schematic, Parts



SPEAKER	MODEL
49-179-8"	7S-323
49-251-10"	7S-342
49-251-10"	7S-343
49-208-10"	7S-363
49-249-12"	7S-366
49-266-12"	7S-364

I.F. FREQUENCY 455 K.C.
7 TUBE SUPERHETERODYNE
CHASSIS Nº 5714-A.C. 3-BAND
ZENITH RADIO CORPORATION
CHICAGO, ILL.

DIAG Nº	PART Nº	DESCRIPTION	D.C. VOLTS	DIAG Nº	PART Nº	DESCRIPTION	DIAG Nº	PART Nº	DESCRIPTION
C-1	22-217	TWIN MAN. TRIMMER COND.							
C-2	22-289	.01 MMFD	6 VAC		22-115	.02 MFD	600V	P-3	83-305	VOLUME CONTROL	A		
C-3	22-162	.0001 MFD	6 VAC	C-21	22-218	.03 MFD	600V	P-12	83-303	(WITH ON-OFF SWITCH MOUNTED IN TUNING TUBE BASE	B		
C-4	22-127	.25 MMFD	6 VAC	C-22	22-402	.002 MFD	600V	P-15			C		
C-5	22-170	.1 MFD	6 VAC	C-23	22-718	.12 MFD ELECTROLYTIC	450V				D		
C-6	22-212	.05 MFD	6 VAC	C-24	22-719	.16 MFD ELECTROLYTIC	350V		5-6204	ANTENNA COIL & SHIELD ASSEM.	E		
C-7	22-210	.05 MFD	200V					2			F		
C-8	22-519	TRIMMER COND.							5-6235	OSC. COIL & SHIELD ASSEM.	G		
C-9	22-340	COMPENSATING COND.		P-1	83-627	39 OHM	1/4W	3	20-196	COMPENSATING COIL	H	22-443	1ST I.F. TRANS. PRI.
C-10	22-708	DUAL FILTER PACKAGE		P-2	83-592	330 OHM	1/4W	4	20-14	WAVE TRAP	J		1ST I.F. TRANS. SEC.
C-11	22-318	.002 MFD	600V	P-3	83-597	470 OHM	1/4W	5	83-51	BAND SELECTOR SWITCH	K		2ND I.F. TRANS. PRI.
C-12	22-317	.02 MFD	200V	P-4	83-96	47 M OHM	1W	6	95-516	1ST I.F. TRANSFORMER	L		2ND I.F. TRANS. SEC.
C-13	22-182	.0025 MFD	600V	P-5	83-600	1 OHM	1W	7	95-517	2ND I.F. TRANSFORMER	M	22-103	WAVE TRAP
C-14	22-470	.0005 MFD	600V	P-6				8	95-518	ANTENNA COUPLING COIL	N		BROADCAST OSC. (SEE NOTE)
C-15	22-185	.01 MFD	200V	P-7	83-627	1 MEGOHM	1/2W	9	1-6234	TONE CONTROL 5K TAPER			ANTENNA BROADCAST (ON GANG)
C-16	22-187	.0005 MFD	600V	P-8	83-655	220 K OHM	1/2W	10	83-52	AUTOMATIC TUNING SET TOP		22-443	BROADCAST PRIMARY
C-17	22-456	.006 MFD	600V	P-9	83-596	220 M OHM	1/2W	11	83-526	POWER TRANS. WITH 350 VAC			SHORT WAVE OSC. (SEE NOTE)
C-18	22-326	.003 MFD	600V	P-10	83-593	100 M OHM	1/2W	12	95-515	POWER TRANS. ALIVE TAPS 25 V.		22-103	SHORT WAVE DETECTOR
C-19	22-190	.1 MFD	200V	P-11	83-591	22 M OHM	1/2W	13	100-16	PILOT LIGHT 2.5 A. - 6.3 V.			POLICE BAND OSC. (SEE NOTE)
C-20	22-441	.004 MFD	600V	P-12	83-984	3 SECTION CANADIAN		14		SPEAKER TAPS			

NOTE - TRIMMERS "A" & "N" MOUNTED ON BAKELITE STRIP - PART Nº 115-114

FOR TUNER DATA, SEE SPECIAL SECTION

MODELS 7S323,7S342,7S343
7S363,7S364,7S366
Chassis 5714
Voltage,Socket,Trimmers.
Alignment

ZENITH RADIO CORP.

NOTE

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

Line voltage 115 V. Consumption 65 watts.

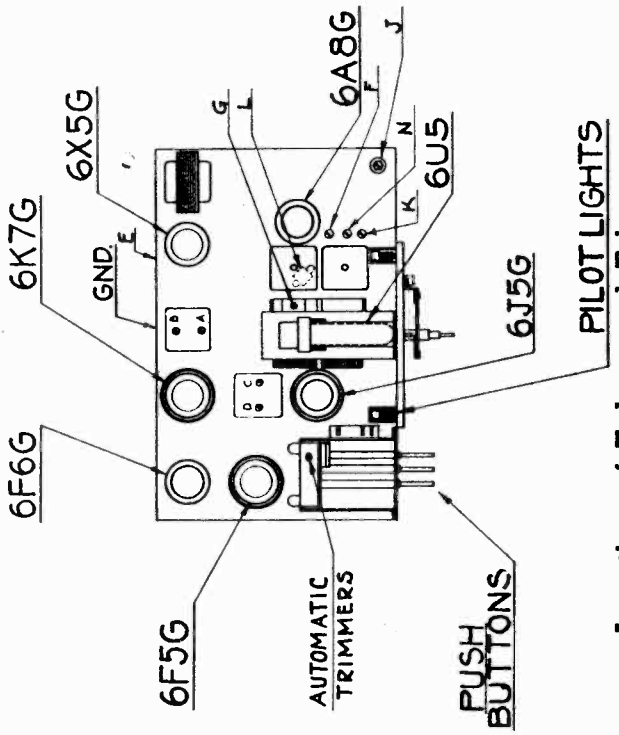
Power Output 4.5 watts.

(A) Bias for 6J5 — 6K7 and 6A8 measured across X of voltage divider is—2 volts.

(B) Bias for 6F5 measured across X and Y sections of voltage divider is—3.2 volts.

(C) Bias for 6F6 measured across XY and Z sections of voltage divider is—16 volts.

Models 7S323, 7S342, 7S343, 7S363, 7S364, 7S366
CHASSIS No. 5714



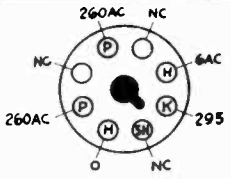
Location of Tubes and Trimmers

ALIGNMENT PROCEDURE

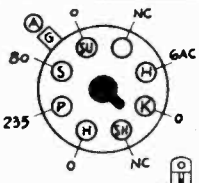
Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	455	"	600	E	See Note
3	" "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
6	" "	200 Mmfd.		"		FG	Repea 3 & 4
7	" "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" "	400 Ohms	18000	S.W.	18000	L	Rock Gang & adj. for max. output.
9	" "	400 Ohms	6000	Police	6000	N	Rock Gang & adj. for max. output.

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

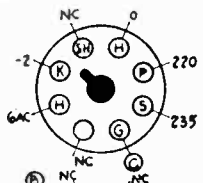
6X5G RECT.



6K7G I.F.AMP.

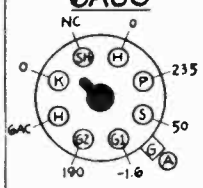


6F6G OUTPUT

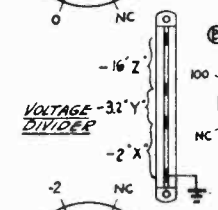


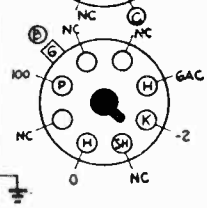
60V ACROSS SPEAKER FIELD

1ST. DET. OSC. 6A8G

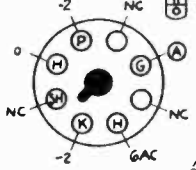


VOLTAGE DIVIDER





6F5G 1ST.AUDIO



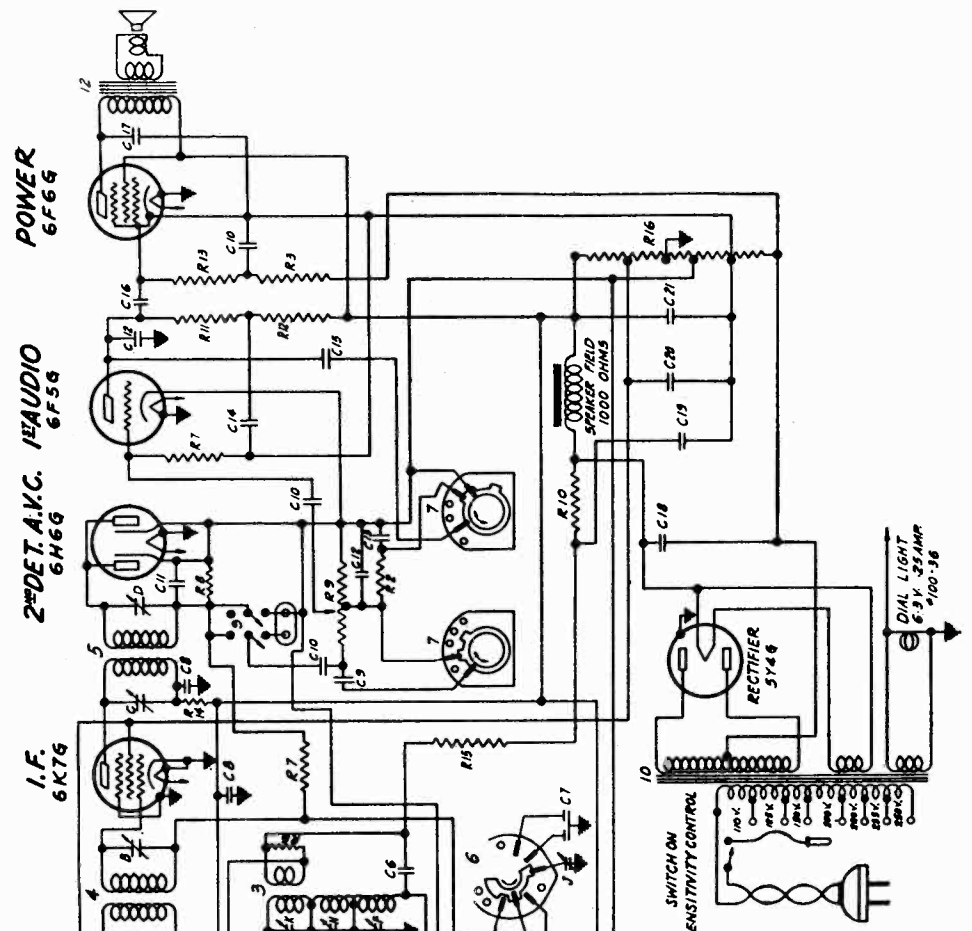
LEGEND
X - 120 OHMS
Y - 23 "
Z - 290 "
N.C. - NO CONNECTION

BOTTOM VIEW OF CHASSIS

6J5G 2ND.DET.AVC.

ZENITH RADIO CORP.

MODELS 9S232AT, 9S244AT
9S262AT, 9S264AT, 9S204AT
Chassis 5905AT
Schematic, Parts



DIAG. NO.	PART NO.	DESCRIPTION		DIAG.	PART NO.	DESCRIPTION
		THREE GANG VARIABLE CONDENSER				VARIABLE TRIMMERS
C1	23-348	365 MFD	250 V.	A		1ST I.F. TRANSFORMER PRIMARY
C2	23-170	.1 MFD	400 V.	B		1ST I.F. " SECONDARY
C3	23-187	.05 MFD	400 V.	C		2ND I.F. " PRIMARY
C4	23-188	.25 MFD	600 V.	D		2ND I.F. " SECONDARY
C5	23-358	.002 MFD	600 V.	E		BROADCAST OSCILLATOR (SEE NOTE)
C6	23-358	DUAL FIXED PADDER	600 V.	F		DETECTOR BROADCAST (ON BAND)
C7	23-358	.05 MFD	600 V.	G		ANTENNA BROADCAST (ON BAND)
C8	23-212	.0025 MFD	400 V.	H		BROADCAST PADDER
C9	23-182	.02 MFD	600 V.	J	23-519	SHORT WAVE OSCILLATOR (SEE NOTE)
C10	23-321	.02 MFD	600 V.	K		SHORT WAVE DETECTOR (SEE NOTE)
C11	23-182	.0005 MFD	600 V.	L		SHORT WAVE ANTENNA
C12	23-336	.003 MFD	400 V.	M	22-418	POLICE BAND OSCILLATOR (SEE NOTE)
C13	23-448	.1 MFD.	400 V.	N		NOTE - TRIMMERS F.K.L.&N ARE MOUNTED ON BAKELITE STRIP PART # 23-369
C14	23-435	.02 MFD.	600 V.			
C15	23-447	.004 MFD.	600 V.			
C16	23-617	.002 MFD	1000 V.			
C17	23-633	8 MFD DRY ELECTROLYTIC	475 V.	1	5-490	ANTENNA COIL ASSEMBLY
C18		4 MFD. " "	450 V.	2	5-496	" AND SHIELD ASSEMBLY
C19	23-637	4 MFD. " "	350 V.		5-491	DETECTOR COIL ASSEMBLY
C20		16 MFD. " "	450 V.	3	5-492	" AND SHIELD ASSEMBLY
C21					5-518	OSCILLATOR COIL ASSEMBLY AND SHIELD ASSEMBLY
					95-463	1ST I.F. TRANSFORMER
					95-464	2ND " "
					88-103	BAND SELECTOR SWITCH
					88-108	TONE CONTROL SWITCH
					88-109	SENSITIVITY CONTROL SWITCH
					88-110	PHONOGRAPH SWITCH 25~ ALL VOLTAGE
R1	63-609	22 M OHMS	1/2W ±10	10	89-411	POWER TRANSFORMER 25~ ALL VOLTAGE
R2	63-593	47 M OHMS	1/2W ±10	11	29-135	R.F. CHOKE
R3	63-595	100 M OHMS	1/2W ±10	12		SPEAKER TRANSFORMER
R4	63-561	470 OHMS	1/2W ±10			
R5	63-646	47 M OHMS	1/2W ±10			
R6	63-616	1500 MEGOHMS	1/2W ±10			
R7	63-618	390 M OHMS	1/2W ±10			
R8	63-931	2 MEGOHM VOLUME CONTROL				
R9	63-608	15 M OHMS	1W ±10			
R10	63-596	220 M OHMS	1/2W ±10			
R11	63-634	180 M OHMS	1/2W ±10			
R12	63-557	470 M OHMS	1/2W ±10			
R13	63-605	1000 OHMS	1/2W ±10			
R14	63-640	10 M OHMS	1/2W ±10			
R15	63-931	5 SECTION ELECTROLYTIC				
R16		TAPPED WIRE WOUND TUNING TUBE SOCKET	4W ±10			
R17	63-583	1000 OHM				
R18			4W ±10			

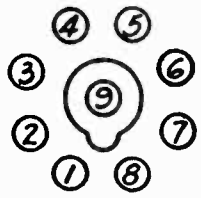
MODELS 9S204AT, 9S232AT
9S262AT, 9S244AT, 9S264AT

ZENITH RADIO CORP.

Chassis 5905AT
Voltage, Socket
Trimmers, Alignment

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	Et	Ek	H			
6T5	Target	0	10	—2	240	—2	6.2			



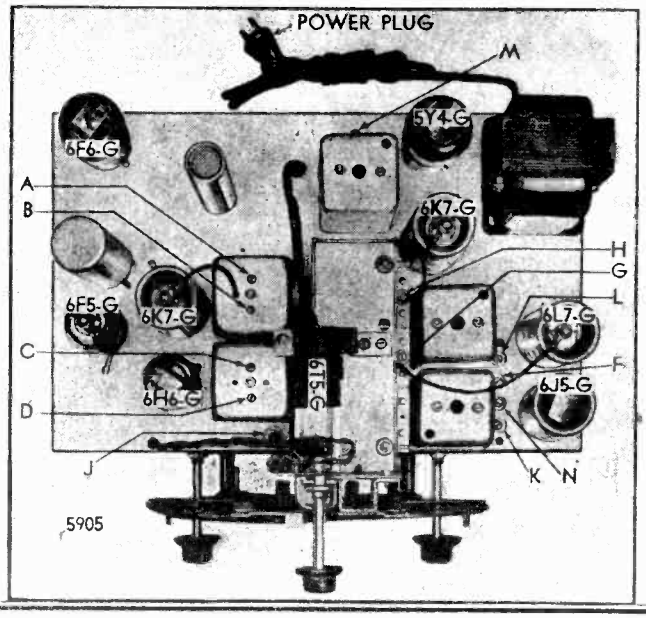
BOTTOM VIEW OF SOCKET

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

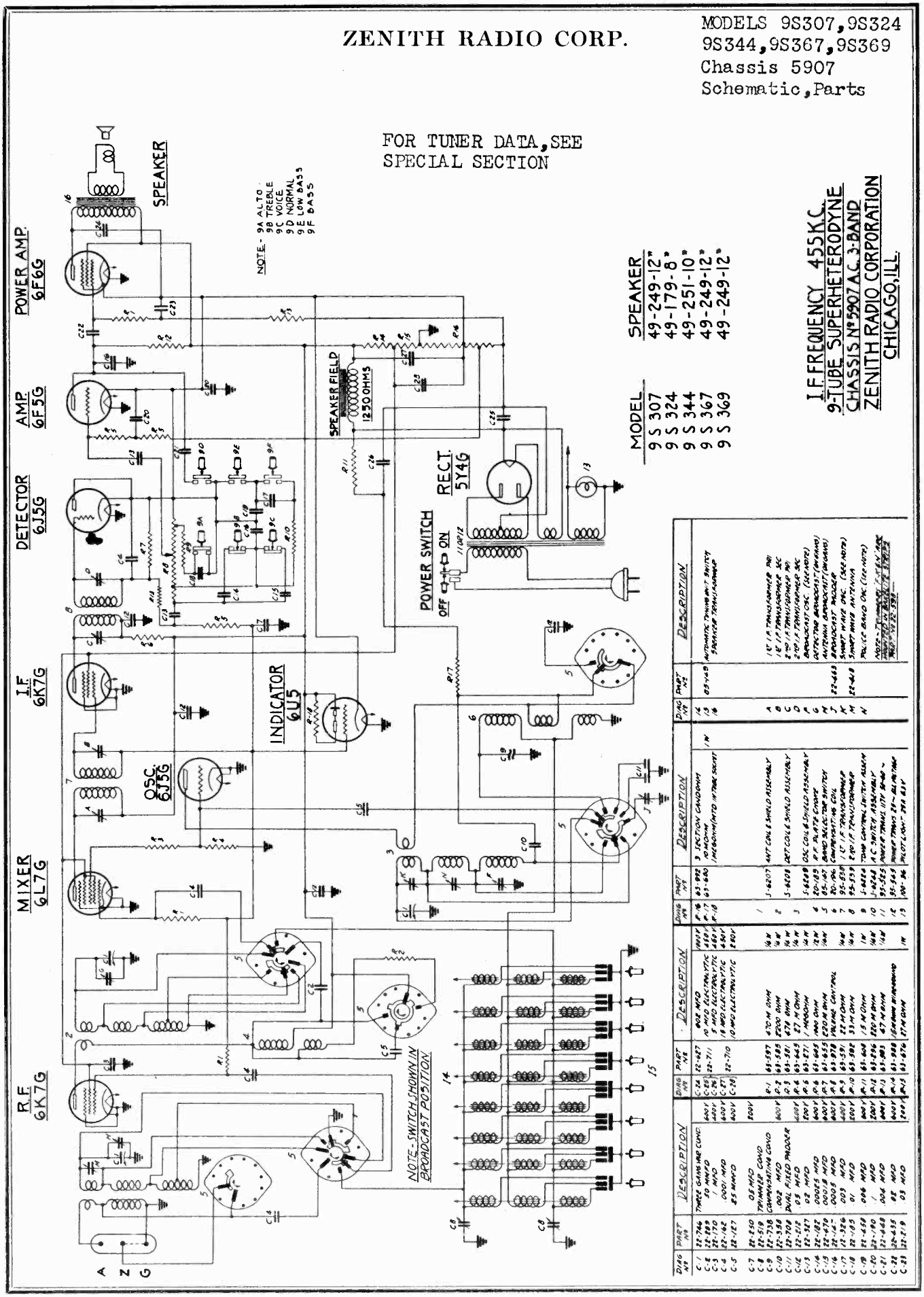
LOCATION OF TRIMMERS



Chassis No. 5905AT

ZENITH RADIO CORP.

MODELS 9S307, 9S324
9S344, 9S367, 9S369
Chassis 5907
Schematic, Parts



MODELS 9S307, 9S324, 9S344
9S367, 9S369. Chassis 5907
Voltage, Socket, Trimmers
Alignment

ZENITH RADIO CORP.

NOTE

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

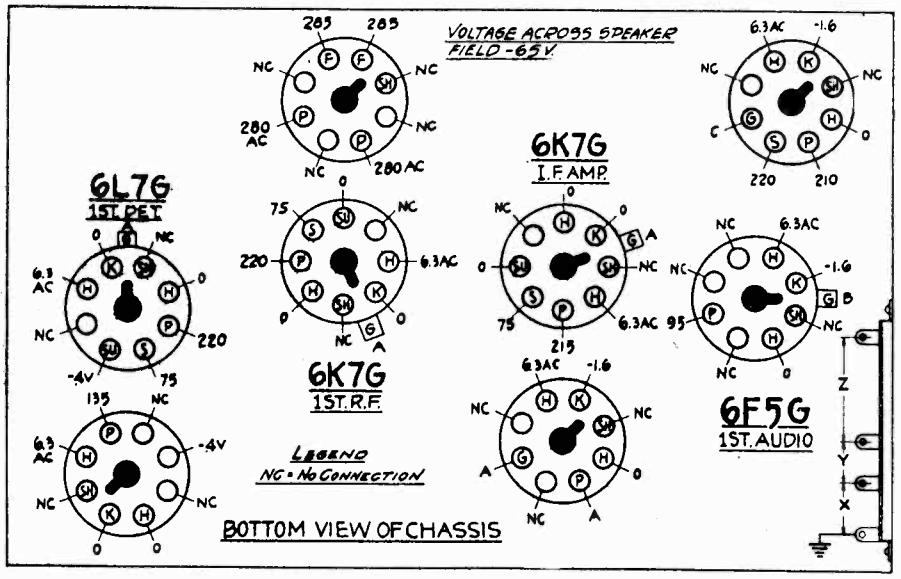
Line voltage 115 v. Consumption 75 watts

Power Output 4.5 watts.

(A) Bias for 6K7 R. F. and I.F. —6L7—6U5 and 6J5 second det. measured across X and is—1.6 volt.

(B) Bias for 6F5 measured across X and Y and is—3 volts.

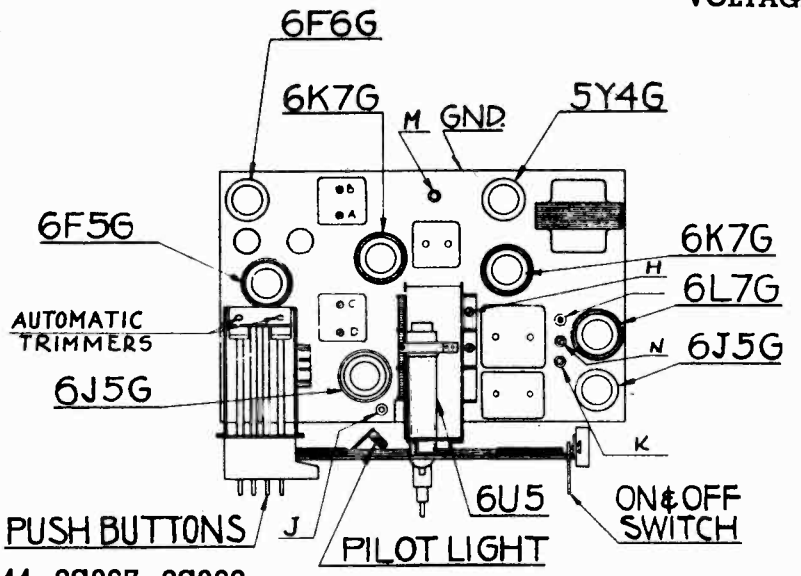
(C) Bias for 6F6 measured across XY and Z and is—16 volts.



LEGEND

SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
NC — No Connection
F — Filament

Location of Tubes and Trimmers



Models 9S307, 9S324, 9S344, 9S367, 9S369

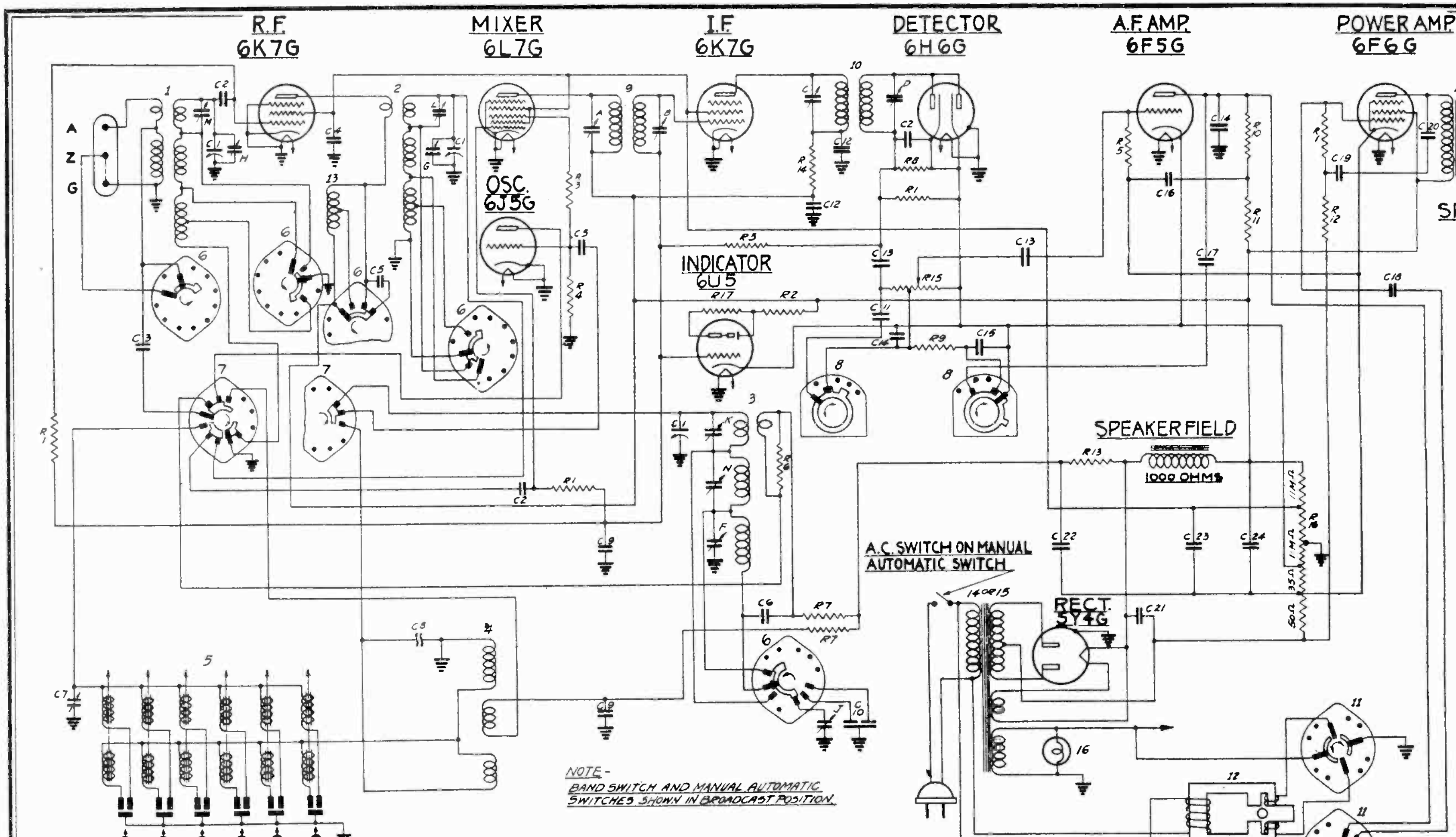
ALIGNMENT PROCEDURE

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.	455	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	Al'gment of Ant. and Det.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.		"		FGH	Repeat 2 & 3
6	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to scale
7	" " "	400 Ohms	18000	S.W.	18000	M	Rock gang & adj. for max. output
8	" " "	400 Ohms	6000	Police	6000	N	Rock gang & adj. for max. output

MODEL 9S365
Chassis 5906
Schematic, Parts

ZENITH RADIO CORP.

FOR TUNER DATA, SEE SPECIAL SECTION



DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION
C-1	22-548	THREE GANG VARIABLE COND.		C-21	22-569	12 MFD ELECTROLYTIC	450V	R-14	63-605	1000 OHM	1/2W	11	85-116	MOTOR CONTROL SWITCH
C-2	22-162	.0001 MFD	600V	C-22		2 MFD ELECTROLYTIC	450V	R-15	63-560	2 MEGOHM VOL. CONTROL		12	141-51	MOTOR
C-3	22-289	50 MMFD	600V	C-23	22-571	6 MFD ELECTROLYTIC	200V	R-16	63-570	CANDOHM RESISTOR		13	20-135	R.F. CHOKE
C-4	22-170	.1 MFD	400V	C-24		8 MFD ELECTROLYTIC	450V	R-17		1 MEGOHM (IN TUNING TUBE SOCKET)		14	95-418	POWER TRANS 117V-50-60~
C-5	22-127	25 MMFD	600V									15	95-451	POWER TRANS 25~ALL VOLTAGE
C-6	22-350	.002 MFD	600V									16	100-36	PILOT LIGHT
C-7	22-519	TRIMMER COND												
C-8	22-699	COMPENSATING COND.		R-1	63-597	470 M OHM	1/4W	1				A		1ST I.F. TRANS. PRI
C-9	22-487	.05 MFD	400V	R-2	63-609	22 M OHM	1/2W		5-5017	ANTENNA COIL & SHIELD ASSEM		B		1ST I.F. TRANS. SEC.
C-10	22-558	DUAL FIXED PADDER		R-3	63-581	470 OHM	1/4W	2				C		2ND I.F. TRANS. PRI.
C-11	22-182	.00025 MFD	600V	R-4	63-645	27 MOHM	1/4W		5-5018	DET. COIL & SHIELD ASSEMBLY		D		2ND I.F. TRANS. SEC.
C-12	22-212	.05 MFD	400V	R-5	63-271	1 MEGOHM	1/4W	3				F		BROADCAST OSC. (SEE NOTE)
C-13	22-327	.02 MFD	200V	R-6	63-586	3300 OHM	1/4W		5-5019	OSC COIL & SHIELD ASSEM		G		DET. BROADCAST (ON GANG)
C-14	22-147	.0005 MFD	600V	R-7	63-680	10 M OHM	1W	4	20-183	COMPENSATING COIL		H		ANT BROADCAST (ON GANG)
C-15	22-326	.003 MFD	400V	R-8	63-658	390 M OHM	1/4W	5				J	22-519	BROADCAST PADDER
C-16	22-177	.2 MFD	400V	R-9	63-593	47 M OHM	1/4W	6	85-103	BAND SELECTOR SWITCH		K		SHORT WAVE OSC (SEE NOTE)
C-17	22-448	.004 MFD	600V	R-10	63-296	220M OHM	1/4W	7	85-161	MANUAL AUTOMATIC SWITCH		L		SHORT WAVE DET. (SEE NOTE)
C-18	22-435	.02 MFD	600V	R-11	63-654	180 M OHM	1/4W	8	85-108	TONE CONTROL SWITCH		M	22-418	SHORT WAVE ANTENNA
C-19	22-250	.05 MFD	200V	R-12	63-595	100 M OHM	1/4W	9	95-416	1ST I.F. TRANSFORMER		N		POLICE BAND OSC (SEE NOTE)
C-20	22-627	.002 MFD	1000V	R-13	63-608	15 M OHM	1W	10	95-417	2ND I.F. TRANSFORMER				

NOTE - TRIMMERS "F-K-L & N" MOUNTED ON BAKELITE STRIP PART # 22-529 -

SPEAKER 49-148-12"

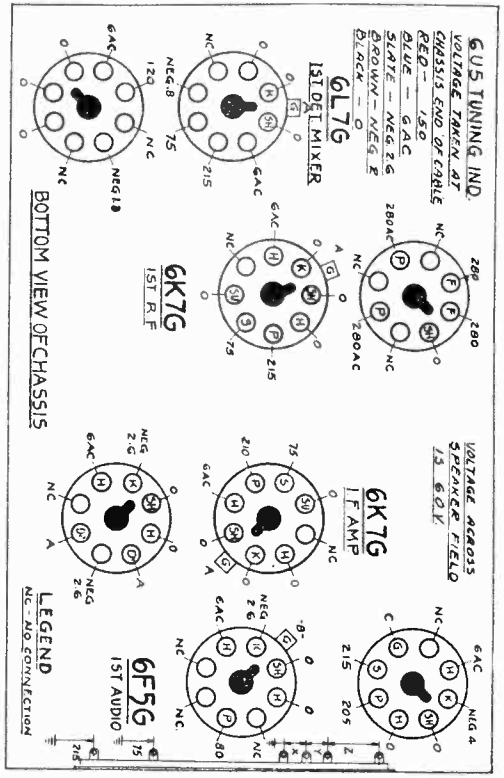
MODEL 9S-365

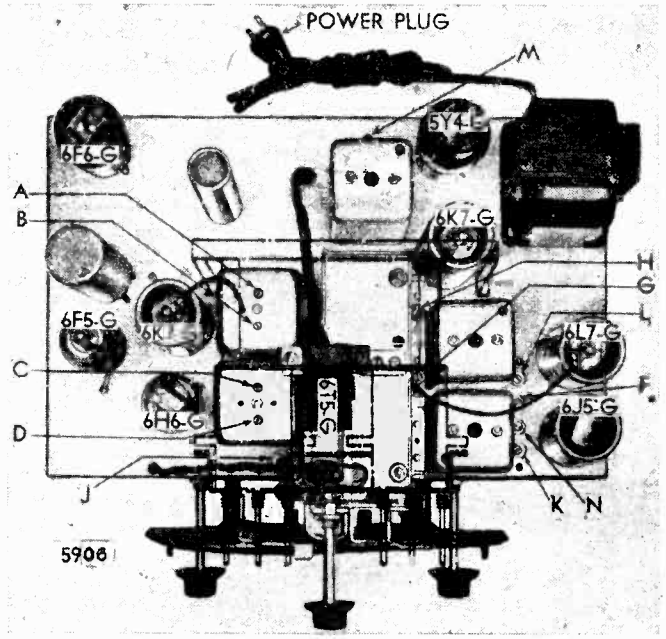
I.F. FREQUENCY 455 K.C.
9 TUBE SUPERHETERODYNE
CHASSIS Nº 5906 A.C. 3 BAND
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

MODEL 9S365
Chassis 5906
Voltage, Socket
Trimmers, Alignment

ZENITH RADIO CORP.

Model 9S365
CHASSIS No. 5906





Location of Tubes and Trimmers

NOTE

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

Line voltage 115 v. Consumption 75 watts.
Power Output 4.5 watts.

(A) Bias for 6A8 — 6K7 R.F. and I.F. and 6H6 measured at X is—2.6 volts.

(B) Bias for 6F5 measured at X and Y is—4 volts.

(C) Bias for 6F6 measured across XY and Z is—16 volts.

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	Al'gment of Ant. and 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

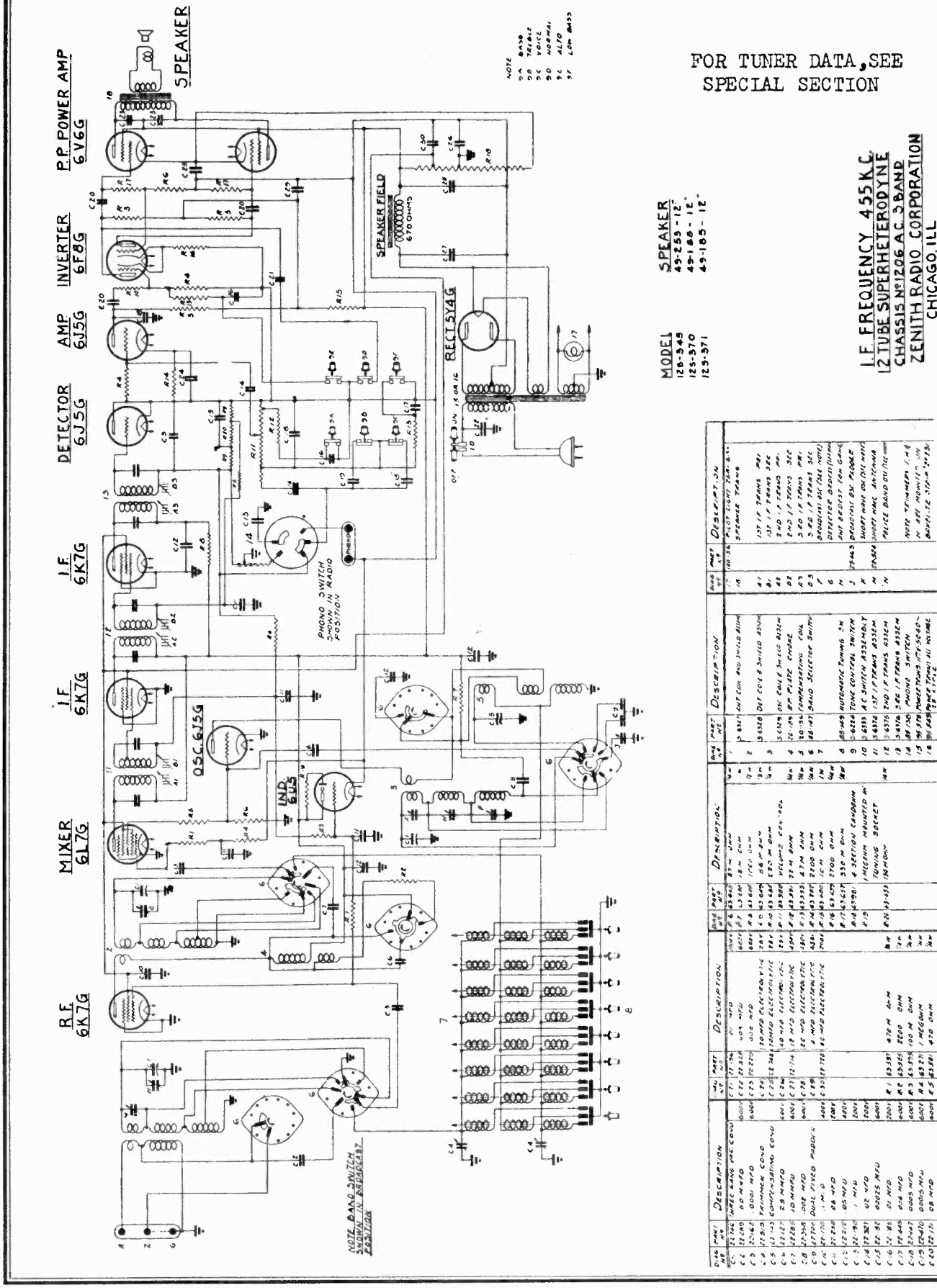
LEGEND

SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
NC — No Connection
F — Filament

ZENITH RADIO CORP.

MODELS 12S345, 12S370
12S371, Chassis 1206
Schematic, Parts

FOR TUNER DATA, SEE
SPECIAL SECTION



MODELS 12S345,12S370
12S371.Chassis 1206
Voltage,Socket
Trimmers,Alignment

ZENITH RADIO CORP.

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

Line voltage 115 volts. Consumption 110 watts.

Power Output 15 watts.

(A) Bias for 6J5 first audio is measured across R14 and is +2.3 volts.

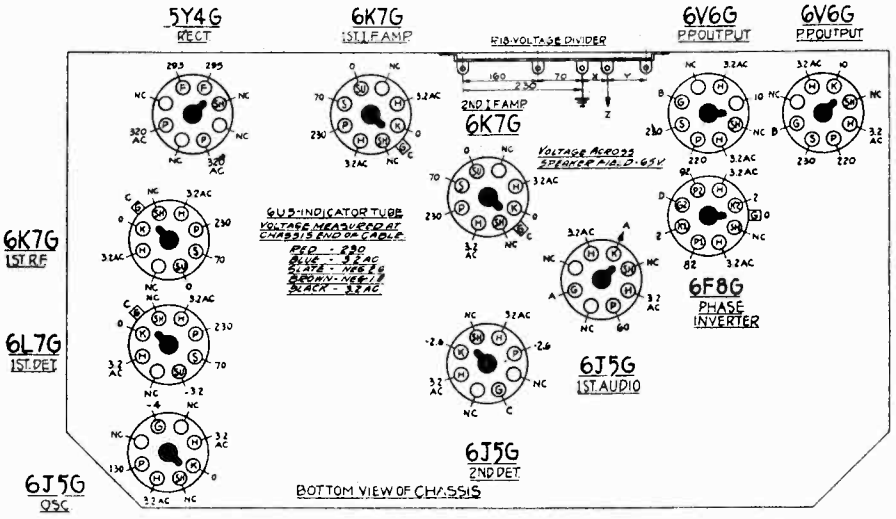
(B) Bias for 6V6 tubes measured across Y is +10 volts.

(C) Bias for 6K7 R.F. and I.F. and 6L7 measured across X is —2.6 volts.

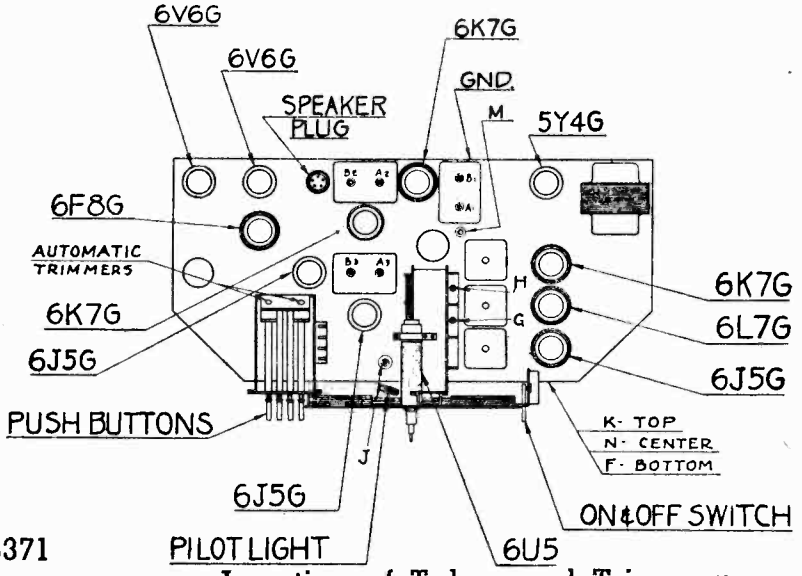
(D) Bias for 6F8 grids shown at cathodes of 6F8 sockets.

LEGEND

SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
NC — No Connection
F — Filament



SOCKET VOLTAGES



Location of Tubes and Trimmers

Models 12S345, 12S370, 12S371

CHASSIS No. 1206

ALIGNMENT PROCEDURE

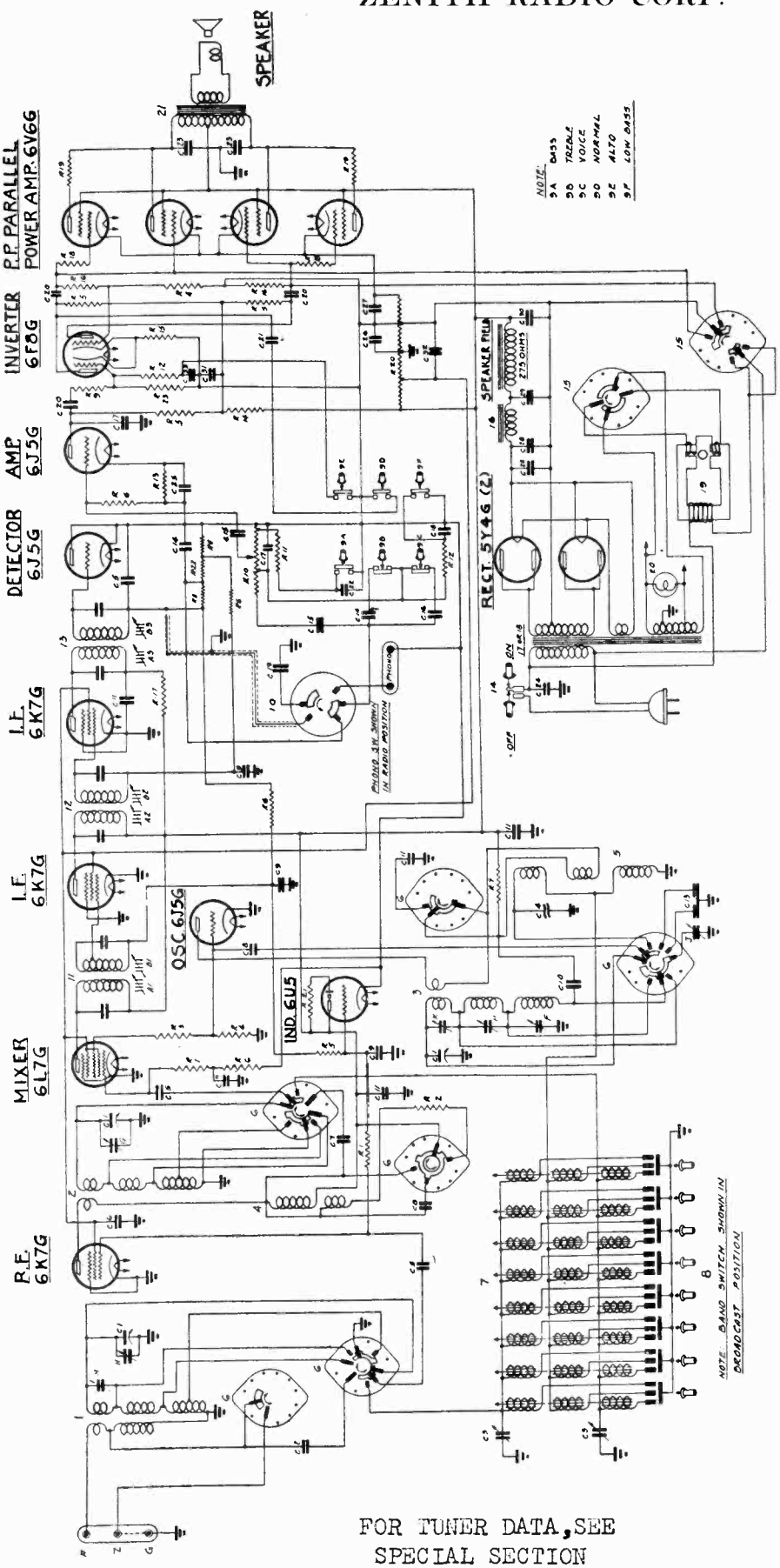
Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABABAB 112233	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Al'gment of Ant. and Det.
4	" " "	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	18000	S.W.	18000	M	Rock Gang & adj. for max. output
8	" " "	400 Ohms	6000	Police	6000	N	Rock gang & adj. for max. output

ZENITH RADIO CORP.

MODELS 15S308, 15S346
15S372, 15S373
Chassis 1502
Schematic, Parts

I.F. FREQUENCY 455 K.C.
15 TUBE SUPERHETERODYNE
CHASSIS Nº 1502 AC 3 BAND
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS.

MODEL	SPEAKER
15S-308	49-186-12
15S-346	49-254-12
15S-372	49-186-12
15S-373	49-186-12

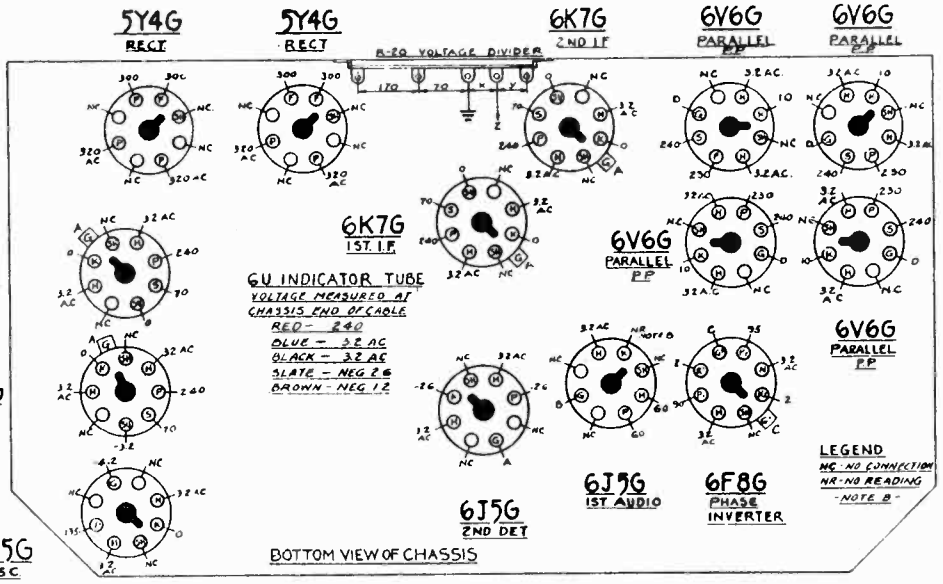


MODELS 15S308,15S346
15S372,15S373
Chassis 1502
Voltage,Socket
Trimmers,Alignment

ZENITH RADIO CORP.

LEGEND

SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
NC — No Connection
F — Filament
NR — No reading



6U INDICATOR TUBE
VOLTAGE MEASURED AT CHASSIS END OF CABLE
RED - 240
BLUE - 32 AC
BLACK - 32 AC
SLATE - NEG 2.6
BROWN - NEG 12

LEGEND
NC-NO CONNECTION
NR-NO READING
-NOTE B-

NOTE

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

Line voltage 115 volts. Consumption 160 watts.

Power Output 30 watts.

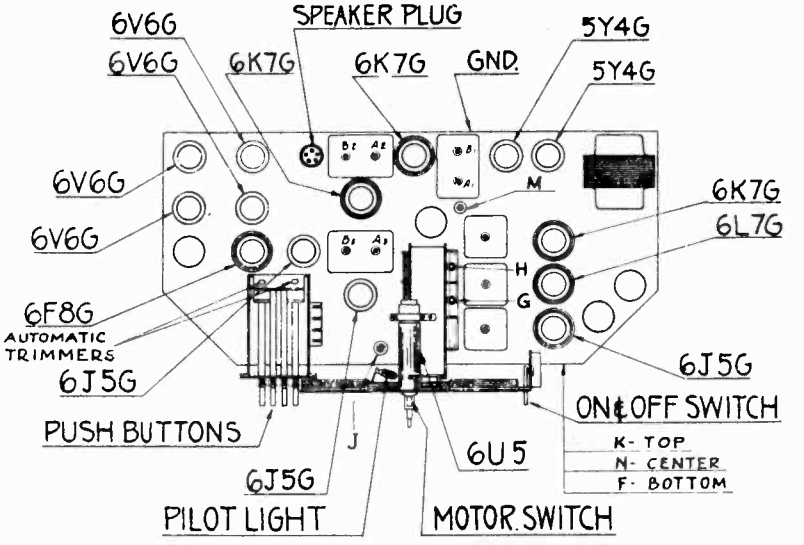
(A) Bias for 6K7 R.F. and I.F. — 6L7 — 6V5 triode and 6J5 second detector is measured across X and is—2.6 volts.

(B) Bias for 6J5 first audio is measured between points K of 6J5 socket and Z and is 2.4 volts.

(C) Bias for 6F8 measured at K^1 and K^2 and is 2 volts.

(D) Bias for the four 6V6 measured across X and Y and is 10 volts.

SOCKET VOLTAGES



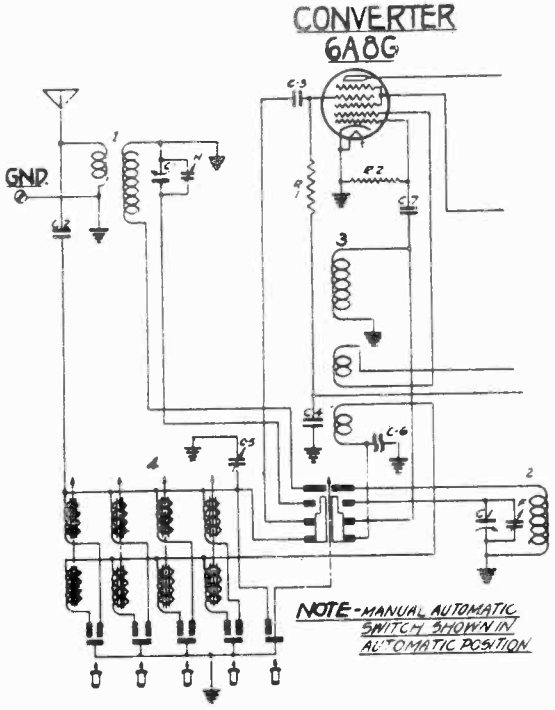
Models 15S308, 15S346, 15S372, 15S373
CHASSIS No. 1502

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.	455	Br'dc't	600	ABABAB 112233	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Al'gment of Ant. and Det.
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	18000	S.W.	18000	M	Rock Gang & adj. for max. output
8	" " "	400 Ohms	6000	Police	6000	N	Rock gang & adj. for max. output

ZENITH RADIO CORP.

AUTOMATIC TUNER
Schematic, Notes



ZENITH
AUTOMATIC TUNING SYSTEM

The Zenith automatic tuning system is designed so as to be very simple in adjustment, and to remain in adjustment regardless of changes in humidity, temperature or vibration. This system makes use of the fact that the inductance of a winding varies directly with any change in the permeability of the core material of the coil. A switch is incorporated in each receiver which allows the normal tuned circuits, consisting of a coil and variable condenser in the oscillator, first detector, and, in some cases, the R.F. section of the receiver to be disconnected and replaced by very small fixed windings which may be tuned over a considerable range of frequency by means of a change in the core material.

Specially prepared iron slugs which have very low losses at radio frequency are so arranged that they may be mechanically moved in and out of the field of the afore mentioned coils. The permeability of these iron slugs is naturally much higher than that of air, and as they are moved in or out of the field of the coil, the inductance and natural period of the coil varies accordingly. It is quite easy to arrange such coils and iron slugs so that they may be tuned in tandem, that is, two or more iron slugs moved simultaneously into corresponding coils. This allows the receiver to be designed having only one tuning adjustment for each bank of coils and corresponding button.

As you will see on the circuit above, one button can be pressed to disconnect all automatic coils, and allows the normal tuning system of a coil and variable condenser to operate. On those receivers having short wave band, this switch is a part of the band switch. When the band switch is turned to the automatic position, or, in the smaller receivers, when one of the automatic buttons is pushed, this tuned circuit is disconnected, and the automatic coils are in circuit. The range of each set of coils will vary from 300 k.c. to 600 k.c., depending over which portion of the broadcast band they are designed to operate, and after being adjusted for a certain station within their range will come into operation whenever the corresponding button is pushed in.

The antenna is coupled to the input of the 1st detector by means of a 50 mmfd. condenser (C2) and an antenna compensating condenser (C5) is used to compensate for variations in antenna capacity. This condenser is preset at the factory, and under most conditions it will not be necessary to change it. However, where there is a seeming lack of sensitivity when tuning automatically, the condenser may very easily be reset by setting one of the automatic buttons at approximately the center of the broadcast band, tuning the button to a point where no station is heard, and readjusting the antenna compensating condenser to a point where the background noise is loudest. The button may then be re-set for whatever station is desired. This setting of the antenna condenser will be effective over the entire broadcast band and for all buttons.

In the oscillator circuit, it is necessary to alter the tuning curve so as to provide for tracking between the oscillator and first detector circuits. In the normal tuned circuit, this may be easily accomplished by means of a trimmer and padding condenser working in conjunction with the oscillator section of the variable condenser. However, as no variable condenser is used with the iron core coils, a different method must be resorted to. A small winding connected in series with the grid end of the automatic windings, and so placed as not to be affected by the iron core will, if properly designed, alter the shape of the tuning curve at the high frequency portion of the coil's range. Also, when two inductances are connected in parallel, the maximum inductance is limited by the size of the smaller of the two inductances. The upper portion of coil No. 3 in the above drawing is the padder winding, and also serves as a means of coupling to the oscillator plate circuit, and when used in conjunction with the smaller winding mentioned above alters the shape of the tuning curve so as to allow excellent tracking.

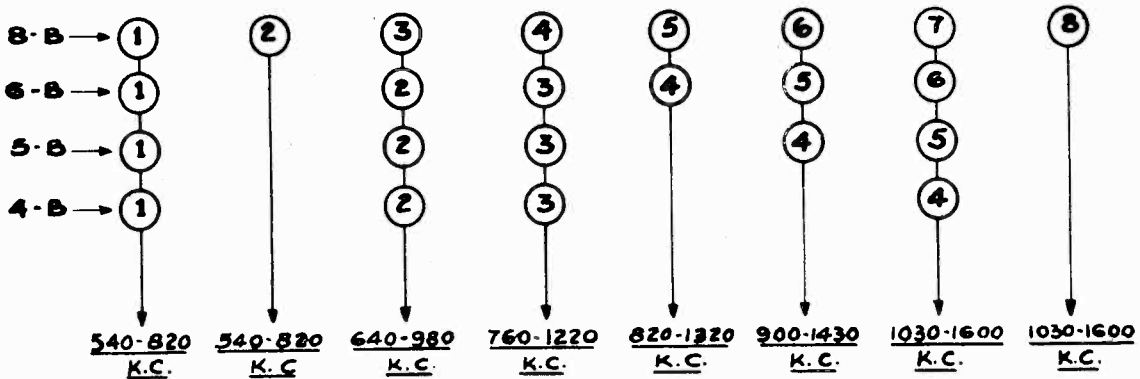
Variations in humidity and temperature are compensated for by means of condenser C6 which consists of a small fixed condenser composed of silver surfaces sprayed on a special ceramic tube which changes its capacity in the opposite way from any changes in the coil, and will compensate for the same.

This automatic system is remarkably simple and trouble free, and once set up for a customer should not require any further attention until it is desired to reset for other stations which can be easily accomplished by the customer himself.

AUTOMATIC TUNER
Push Button Ranges
Alignment Data
Service Hints

ZENITH RADIO CORP.

AUTOMATIC RANGES



NOTE—Buttons numbered from left to right, or top to bottom as they appear on receivers, except on model 6B321 (Chassis 5653) and Models 6S322 and 6S357 (Chassis 5654) which are reversed.

ALIGNMENT INSTRUCTIONS

The proper procedure for the correct alignment of each chassis is outlined on the page opposite each circuit diagram.

The operations are outlined in consecutive order, and the instructions are under the following headings —

OSC. CONNECTED TO — tells where the output of the service oscillator is to be connected.

DUMMY — gives the proper capacity or resistance which should be connected in series with the service oscillator output.

TEST OSC. — Set test oscillator to frequency shown.

BAND — Set the receiver band switch to the position shown.

DIAL — The receiver should be set at the frequency shown.

TRIMMER — This column tells which trimmer (or trimmers) are to be adjusted for each operation. The chassis drawing has each trimmer indicated by a letter corresponding to the instructions.

PURPOSE—This column tells what is being accomplished by each operation.

If these instructions are carefully followed each chassis will be easily and correctly realigned.

SERVICE HINTS

Chassis	Complaint	Cause and Remedy
5907 & 1206 only	Distortion	Very much like blocking AVC action. Can usually be traced to open filter section.
1502 only	Won't log	Can be traced to loose PK screw in gang hub gear.
5714 only	Noisy automatic or automatic dead	Dirt on contacts or warped strip. Shorted at switch to ground or shorted compensating condenser.
	Automatic dead 1 or more positions Automatic weak	Open coils — usually broken leads or poor contact at switch. Open leads to R. F. section of automatic or leaky or open compensating condenser. Padder loose — out of adjustment or all plates not soldered.
	Eye flutters	Open filter.
	Eye overlaps on strong signal	Open AVC resistors
	No eye action	Shorted condenser (C7.)
	Chirps on medium to loud signal	Leaky condenser across speaker
Radiorgan	No effect	Insulation on 33m resistor cut through and shorts to cathode lug. Open leads, poor contact at switch, open condenser. 5714 only — plate lead of I.F. too far away from chassis. Push down close to metal base.
	Too much change on some, none on others.	Condenser shorted or leads shorting to switch.
	Tone changes with different settings of volume control.	Defective volume control or shorted terminal either of tone switch or volume control. Poor contacts and defective or shorted volume control taps.
	Noisy when tuning	Dirty wipers or gang plates. Flywheel touching band switch lug. Volume control or drive shaft not making good contact to ground. 5714 — Volume control shaft and drive shaft out of line.
	Volume control has two peaks and distorts at low volume.	Isolate 6F5 grid circuit from I.F. plate leads. (Later sets have I.F. plate lead shielded.)
5714 only	Set whistles at medium volume. Noisy between signals	Open filter condenser. —Loose connection or open condenser across RF choke.
Battery Sets	Hash	Loose cover of power pack.
	Hash on automatic position.	Automatic assembly touching power pack. Insulate at point of contact.

ZEPHYR RADIO CO.

MODEL C
MODEL DA
Schematics