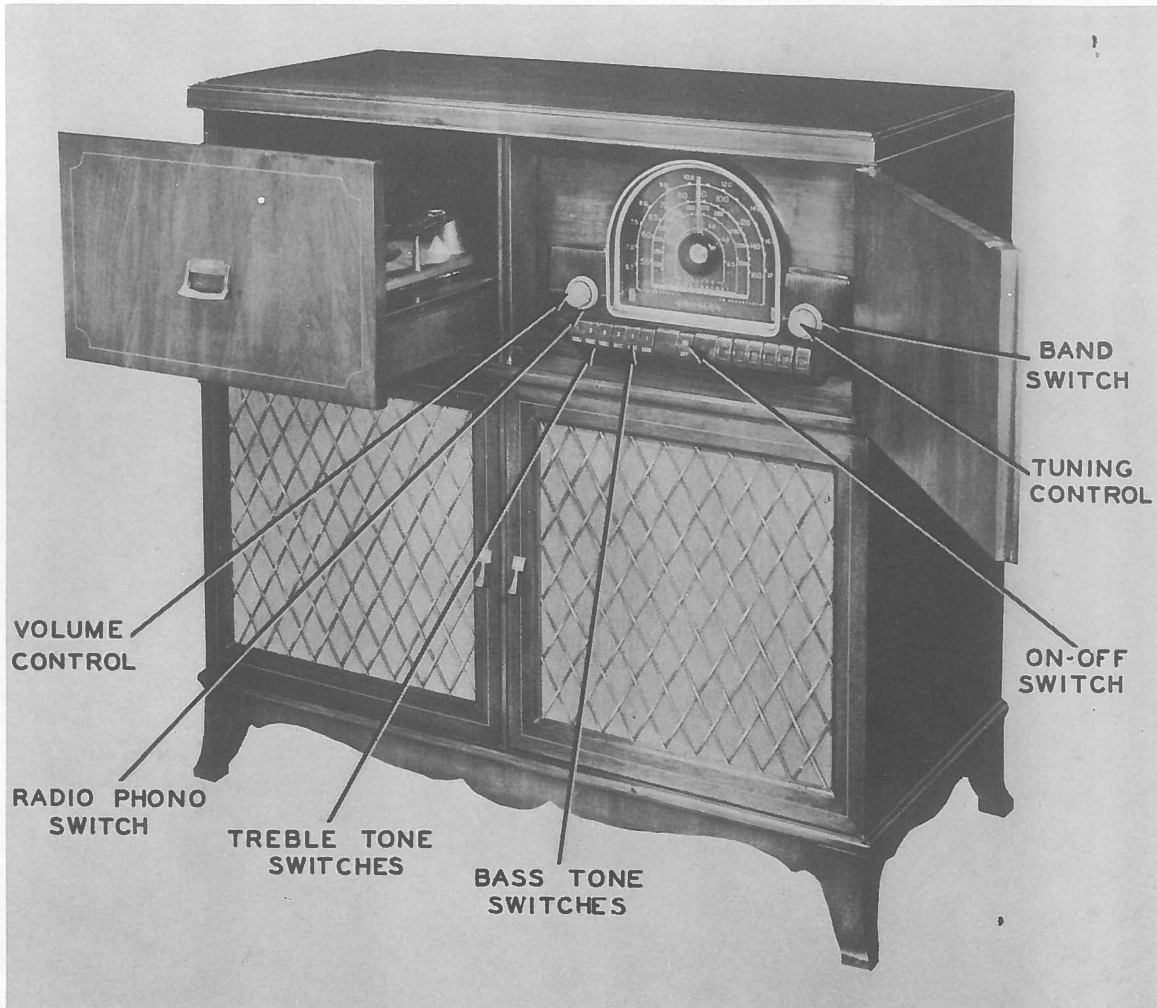


CROSLEY
MODEL 146CS



CROSLEY
MODEL 146CS
PAGE 1

CROSLEY MODEL 146CS

TRADE NAME	Crosley, Model 146CS
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC Operated FM-AM Radio-Phono Combination Superheterodyne with Loop Antenna and Pushbutton Tuning.
TUBES (FOURTEEN)	Types, 6SG7 RF Amp., 6AC7 FM Mixer, 6SA7 AM Converter, 7F8 FM Osc., 6SG7 AM-FM 1st IF Amp., 6SG7 AM-FM 2nd IF Amp., 6SH7 FM 3rd IF Amp., 6H6 FM Discriminator, 6E5 Tuning Eye, 6SQ7 AM Det.-AVC-AF, 6SQ7 Phase Inverter, (2) 6V6GT Power Output, 5U4G Rectifier.
POWER SUPPLY	110-120 Volts AC
RATING	1.1 Amps. @ 117 Volts AC
TUNING RANGES	- <u>BROADCAST</u> 535-1620KC, <u>SHORT WAVE</u> 2.25-6.7MC, 6.7-18.5MC <u>FREQ. MOD.</u> 88.1-107.9MC

HOWARD W. SAMS & CO., INC.

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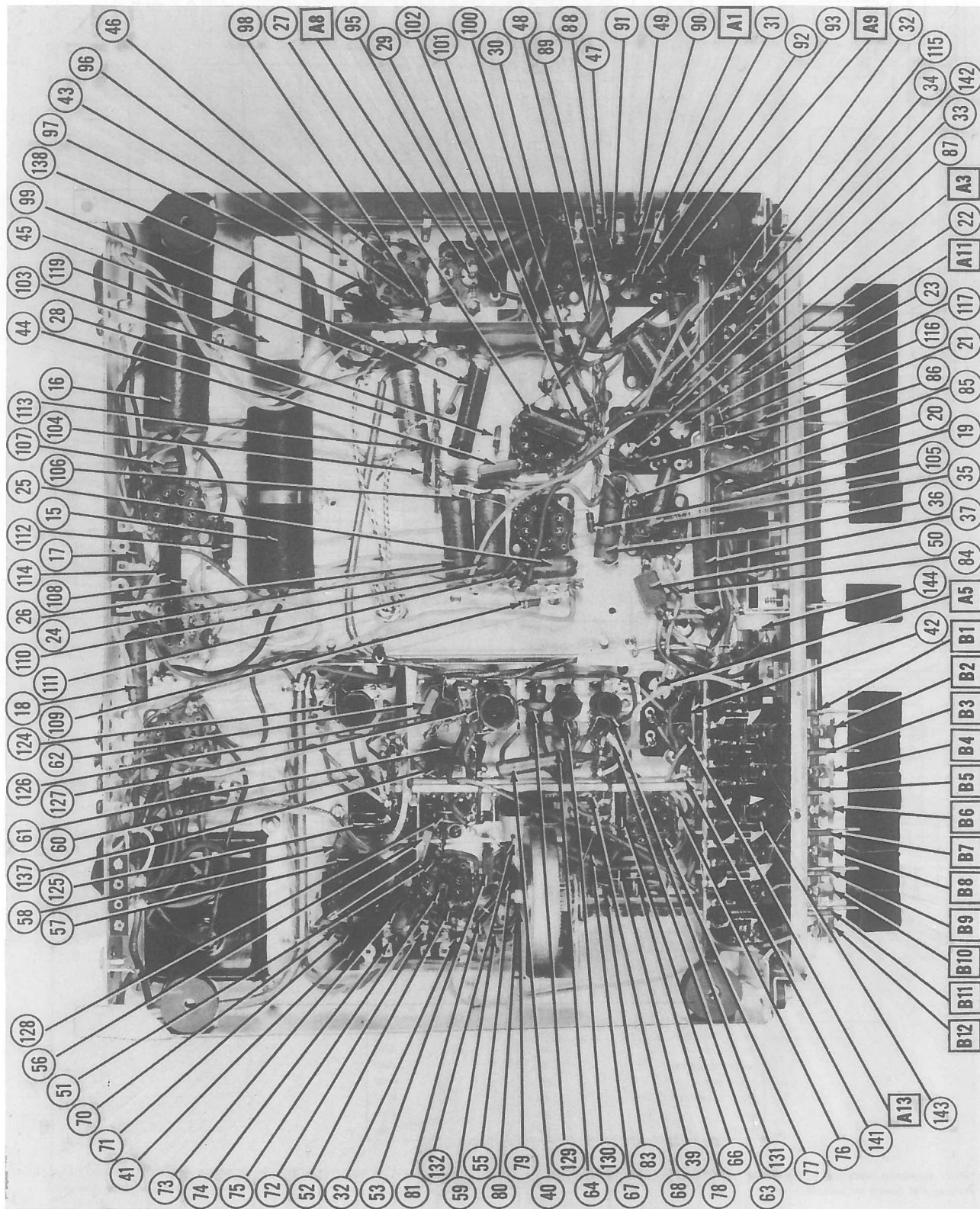
Indianapolis Indiana

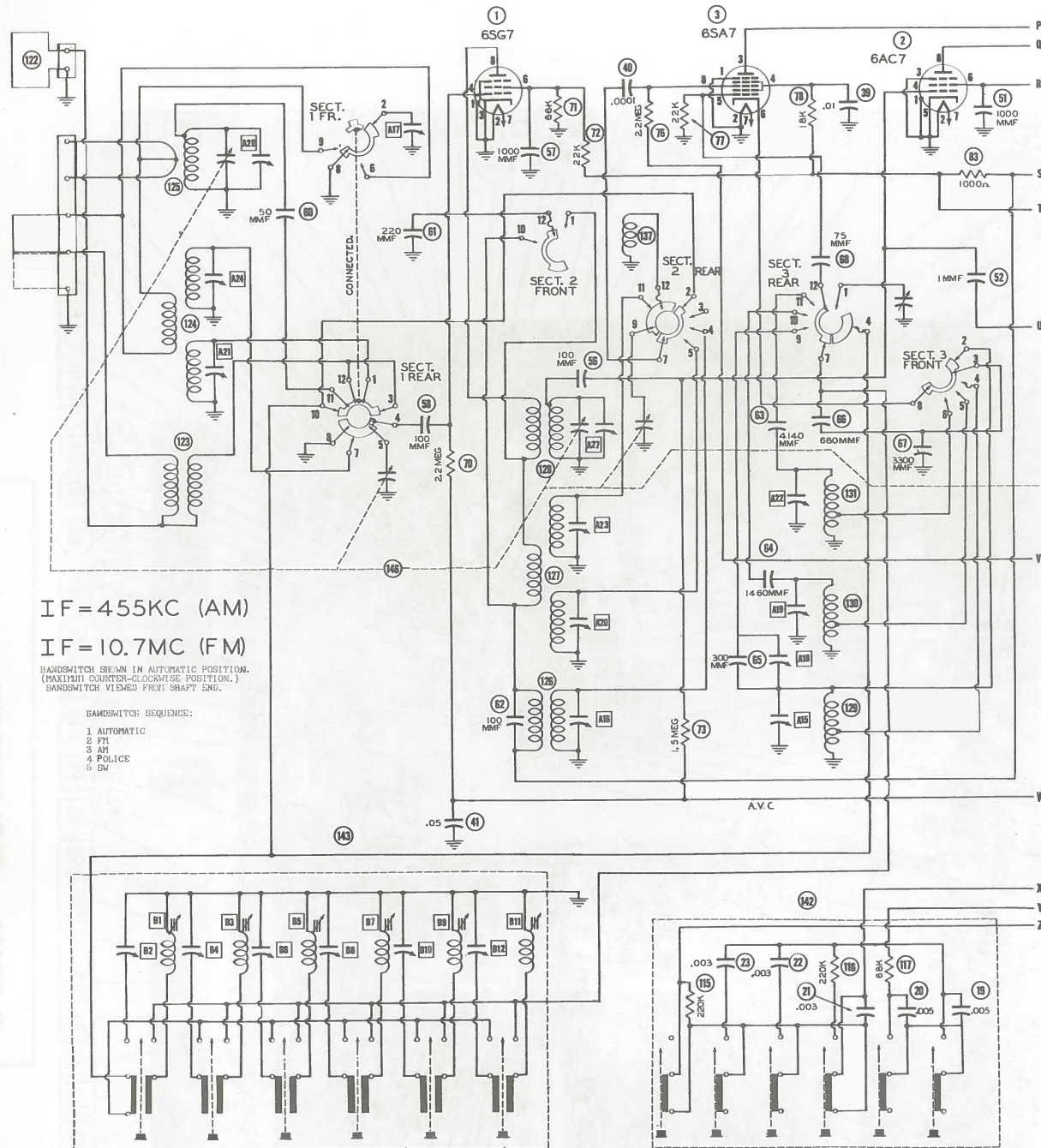
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DATE 9/47 SET 25 FOLDER #4715-10

CHASSIS—BOTTOM VIEW





IF = 455KC (AM)
IF = 10.7MC (FM)

BANDSWITCH SHOWN IN AUTOMATIC POSITION.
(MAXIMUM COUNTER-CLOCKWISE POSITION.)
BANDSWITCH VIEWED FROM SHAFT END.

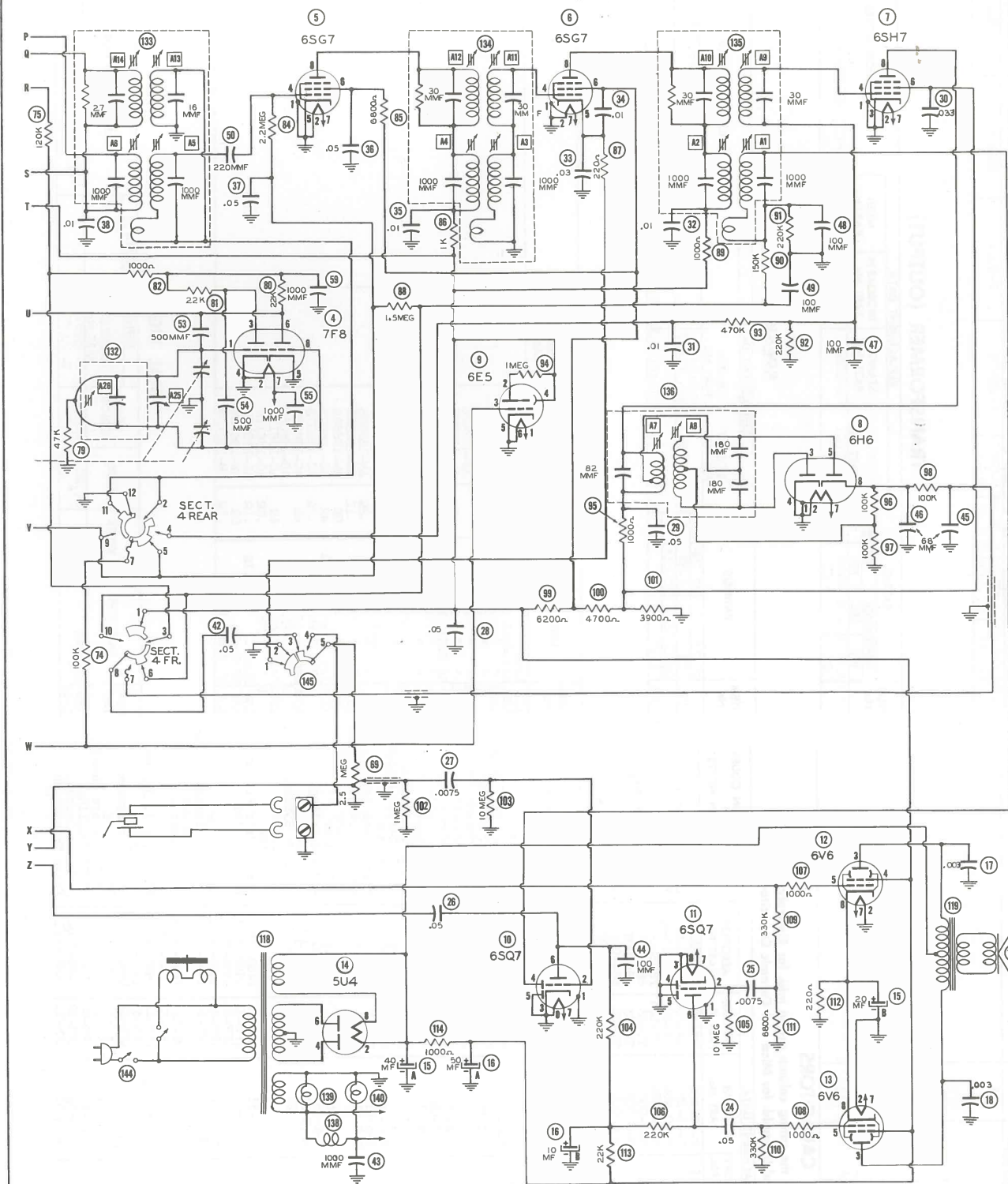
BANDSWITCH SEQUENCE:
1. AUTOMATIC
2. FM
3. AM
4. POLICE
5. SW

STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	2X	600KC
RF GRID TO CONVERTER GRID	10X	600KC
CONVERSION GAIN	10X	IN 600KC OUT 455KC
1st IF TRANSFORMER	.75X	455KC
1st IF TUBE	20X	455KC
2nd IF TRANSFORMER	.7X	455KC
2nd IF TUBE	70X	455KC
3rd IF TRANSFORMER	.8X	455KC
AUDIO	45X	400~
OUTPUT	20X	400~

A PHOTOFAC STANDARD NOTATION SCHEMATIC
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4715-10

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



A PHOTOFAC STANDARD NOTATION SCHEMATIC
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4715-10

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA			INSTALLATION NOTES
		CROSLLEY PART No.	STANDARD REPLACEMENT	BWA BASE TYPE	
1	RF Amp.	6SG7	6SG7	8BK	
2	FM Mixer	6AC7	6AC7	8N	
3	AM Converter	6SA7	6SA7	8R	
4	FM Oscillator	7F8	7F8	8BK	
5	AM-FM 1st IF Amp	6SG7	6SG7	8BK	
6	AM-FM 2nd IF Amp	6SG7	6SG7	8BK	
7	FM 3rd IF Amp	6SH7	6SH7	8BK	
8	FM Discriminator	6H6	6H6	7Q	
9	Tuning Eye	6E5	6E5	6R	
10	AM Det.-AVC-AF	6SQ7	6SQ7	8Q	
11	Phase Inv.	6SQ7	6SQ7	8Q	
12	Power Output	6V6GT	6V6GT	7AC	
13	"	6V6GT	6V6GT	7AC	
14	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REPLACEMENT DATA				IDENTIFICATION CODES AND INSTALLATION NOTES
		CROSLLEY PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SOLAR PART No.	
15A	40	B-137003	BR4045	FP339 \$	M-40-450	Filter
15B	25		BR202A	TP415	M-25-25	Filter
16A	50	B-137002	BR4045	TP415	M-25-25	Filter
16B	10		BR1235	TC62	UT-40	Cathode Bypass
17	.003	39001-76	DT6D3	TP406	UT-123	Filter
18	.003	39001-76	DT6D3	TP406	TC-23	Output Plate Bypass
19	.005	39001-11	DT6D5	TP408	TC-23	"
20	.005	39001-11	DT6D5	TP408	TC-23	"
21	.005	39001-11	DT6D5	TP408	TC-23	"
22	.003	39001-76	DT6D3	TP406	TC-23	"
23	.003	39001-76	DT6D3	TP406	TC-23	"
24	.05	600	39001-17	DT6S5	TC-15	Audio Coupling
25	.0075	600	39001-17	DT6S5	TC-15	"
26	.05	600	39001-17	DT6S5	TC-15	"
27	.0075	600	39001-17	DT6S5	TC-15	"
28	.05	600	39001-17	DT6S5	TC-15	"
29	.05	600	39001-17	DT6S5	TC-15	"
30	.003	39001-100	DT4S3	TP424	TC-13	RF Bypass Pwr. Supp.
31	.01	200	39001-61	DT4S1	TC-13	3rd IF Plate Decoup.
32	.03	600	39001-13	DT4S3	TC-11	FM Screen Bypass
33	.03	600	39001-13	DT4S3	TC-11	FM AVC Filter Decoup.
34	.01	600	39001-13	DT4S1	TC-11	2nd IF Plate Decoup.
35	.01	600	39001-13	DT4S1	TC-11	" Cathode Bypass
36	.05	200	39001-65	DT4S5	TC-11	" Screen Bypass
37	.05	200	39001-65	DT4S5	TC-15	1st IF Plate Decoup.
38	.01	600	39001-13	DT4S1	TC-15	AVC Filter
39	.01	600	39001-13	DT4S1	TC-11	Mixer Plate Decoup.
40	.0001	600	39001-65	DT4S1	TC-11	AM Conv. Screen Bypass
41	.05	200	39001-65	DT4S5	TC-11	AP Coupling
42	.05	200	39001-65	DT4S5	TC-11	AVC Filter
43	.05	200	39001-65	DT4S5	TC-11	Audio Coupling
44	100	500	B-226638-31	MC235	FM-21	FM Screen Bypass
45	500	500	39001-1	MC235	FM-21	FM Screen Bypass
46	500	500	39001-1	MC235	FM-21	FM Screen Bypass
47	500	500	39001-1	MC235	FM-21	FM Screen Bypass
48	100	500	39001-1	MC235	FM-21	FM Screen Bypass
49	100	500	39001-1	MC235	FM-21	FM Screen Bypass
50	220	500	39001-9	MC237	FM-32	FM Screen Bypass
51	1000	500	B-226638-31	MC235	FM-21	FM Screen Bypass
52	100	500	39001-1	MC235	FM-21	FM Screen Bypass
53	500	500	39001-1	MC235	FM-21	FM Screen Bypass
54	500	500	39001-1	MC235	FM-21	FM Screen Bypass
55	1000	500	39001-1	MC235	FM-21	FM Screen Bypass
56	100	500	39001-1	MC235	FM-21	FM Screen Bypass
57	1000	500	39001-1	MC235	FM-21	FM Screen Bypass
58	100	500	39001-1	MC235	FM-21	FM Screen Bypass
59	1000	500	39001-1	MC235	FM-21	FM Screen Bypass
60	50	500	39001-9	MC237	FM-32	FM Screen Bypass
61	220	500	39001-9	MC237	FM-32	FM Screen Bypass
62	100	500	39001-7	MC235	FM-31	FM Screen Bypass

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA	
	PRI.	SEC. 1	SEC. 2	CROSLLEY PART No.	STANCOR PART No.
11B117V AC @ 1.1A	640V CT @ 1.1A	5.0V AC @ 3.0A	6.3VAC @ 4.6A	B-135600	P-2954

TRANSFORMER (OUTPUT)

ITEM No.	RATING			REPLACEMENT DATA		INSTALLATION NOTES
	IMPEDANCE	DC RES.	CT	CROSLLEY PART No.	STANCOR PART No.	
119	12200Ω	4.3Ω	470Ω	B-137001	A-3824	Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		INSTALLATION NOTES
	FIELD	VO IMP.	VO DIA.	CROSLLEY PART No.	JENSEN PART No.	
120	11"	4.3Ω	1"	C-137058	ST-1021	Replace output transformer to match 8Ω voice coil.
121	11"	1"	1"			NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	CROSLLEY PART No.	MEISSNER PART No.
122	Loop	64Ω	.2Ω	AM-138536	
123	1st IF Coil	.5Ω	.6Ω	AM-138536	
124	"	0Ω	.8Ω	AM-138536	
125A	"	0Ω	0Ω	AB-137433	
125B	"	0Ω	0Ω	AM-138737	
126	RF Coil	70Ω	10Ω	AM-138536	
127A	"	.2Ω	0Ω	AM-138536	
127B	"	0Ω	0Ω	AM-138536	
128A	"	0Ω	0Ω	AM-138536	
128B	"	0Ω	0Ω	AM-138536	
129	Osc. Coil	6Ω	.3Ω	AM-138536	
130	"	1Ω	.1Ω	AM-138536	
131	"	1Ω	.1Ω	AM-138536	
132	"	1Ω	.1Ω	AM-138536	
133A	1st IF AM	3.2Ω	4Ω	AC-136073	
133B	"	4Ω	4Ω	AC-136073	
134A	2nd IF AM	4Ω	4Ω	AC-136059	
134B	"	4Ω	4Ω	AC-136059	
135A	3rd IF AM	4Ω	4Ω	AC-136112	
135B	"	4Ω	4Ω	AC-136112	
136	Discr.	.1Ω	.1Ω	AC-136090	
137	RF Choke	0Ω	0Ω	AM-138726	
138	RF Choke	.1Ω	.1Ω	AM-138720	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	REPLACEMENT DATA		INSTALLATION NOTES
				BEAD COLOR	CROSLLEY PART No.	
139	Bayonet	7.5"	0.20"	White	W-43557	Type 51
140	"	"	"	"	W-43557	"

PARTS LIST AND DESCRIPTIONS (Continued)

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	VOLT	REPLACEMENT DATA				IDENTIFICATION CODES AND INSTALLATION NOTES
			CROSLLEY PART No.	CORNBELL-DUBILIER PART No.	MALLORY PART No.	SOLAR PART No.	
63	4140	300	GC-210685-178				Fixed Padder SW
64	1460	300	GC-210685-179				Fixed Padder Pol. BC*
65	300	500	C-137727-64				Osc. Feedback P.B.
66	680	500	G-131502-20				" " "
67	3300	300	GC-210685-168				" " "
68	75		C-137727-63	MC230	1FM-476	1468-000076	Osc. Grid Cap.

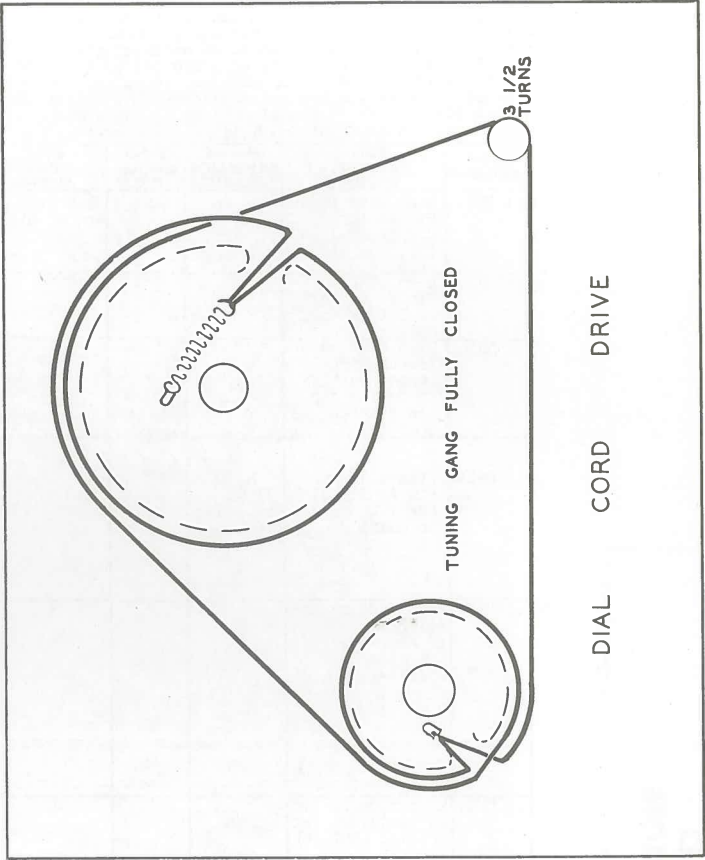
Parallel sections to obtain desired capacity.
*Not used in all models.

CONTROLS

ITEM No.	RATING RESIST-ANCE	WATTS	REPLACEMENT DATA			INSTALLATION NOTES
			CROSLLEY PART No.	MALLORY PART No.	IRC PART No.	
69	2.5 Meg.	1	D-135828			Volume Control

RESISTORS

ITEM No.	RATING RESISTANCE	WATTS	REPLACEMENT DATA		IDENTIFICATION CODES
			CROSLLEY PART No.	IRC PART No.	
70	2.2 Meg.		39294-33	BTS-68K	Red-Red-Grn. RF Grid
71	68K		39294-24	BTA-22K	Blue-Gray-Or. RF Screen Bleeder
72	22K		39015-41	BTS-100K	Red-Red-Or. RF Screen Dropping
73	1.5 Meg.		39294-32	BTS-100K	Br.-Grn.-Grn. RF Mixer Grid
74	100K		39294-25	BTS-100K	Br.-Blk.-Yl. AVC Network
75	120K		39014-50	BTS-100K	Br.-Red-Yl. FM-Mixer Screen Dropping
76	2.2 Meg.		39294-33	BTS-22K	Red-Red-Grn. AM Converter Grid
77	22K		39294-21	BTS-22K	Red-Red-Or. AM Converter Screen Dropping
78	18K		39016-40	BTA-22K	Yl.-Yl.-Or. FM-Oscillator Grid
79	47K		39294-23	BTS-47K	Red-Red-Or. FM-Oscillator Plate Load
80	22K		39015-41	BTA-22K	Red-Red-Or. FM-Oscillator Plate Load
81	22K		39015-41	BTA-22K	Red-Red-Or. FM-Oscillator Plate Decoupling
82	100K		39294-13	BTS-100K	Br.-Blk.-Red FM Mixer Plate Decoupling
83	100K		39294-13	BTS-100K	Red-Red-Grn. 1st IF Grid
84	2.2 Meg.		39294-33	BTS-680K	Blue-Gray-Red 1st IF Screen Dropping
85	680K		39014-35	BTS-100K	Br.-Blk.-Red 1st IF Plate Decoupling
86	100K		39294-13	BTS-100K	Red-Red-Br. 2nd IF Cathode
87	22K		39014-17	BW-2-220	Br.-Grn.-Grn. AVC Network
88	1.5 Meg.		39294-32	BTS-100K	Br.-Blk.-Red 2nd IF Plate Decoupling
89	100K		39294-13	BTS-100K	Red-Red-Yl. Diode Load
90	150K		39294-26	BTS-150K	Br.-Grn.-Yl. Diode RF Filter
91	220K		39294-27	BTS-220K	Red-Red-Yl. Limiter Grid
92	220K		39294-27	BTS-220K	Yl.-Yl.-Yl. AVC Network
93	470K		39294-29	BTS-470K	Br.-Blk.-Grn. Tuning Eye Plate Load
94	1 Meg.			BTS-1 Meg.	Br.-Blk.-Red 3rd IF Plate Decoupling
95	100K		39294-13	BTS-100K	Br.-Blk.-Yl. Discriminator Diode Load
96	100K		39294-25	BTS-100K	Br.-Blk.-Yl.
97	100K		39294-25	BTS-100K	Br.-Blk.-Yl. De-emphasis
98	100K		39294-25	BTS-100K	Blue-Red-Red Voltage Dropping
99	620K		W-136592-1	AB-6000	Yl.-Yl.-Red
100	470K		39015-33	BTA-4700	Or.-White-Red Bleeder
101	390K		39015-32	BTA-3900	Br.-Blk.-Grn. Volume Control Shunt
102	1 Meg.		39294-31	BTS-1 Meg.	Br.-Blk.-Blue AF Grid
103	10 Meg.		39294-37	BTS-10 Meg.	Red-Red-Yl. AF Plate Load
104	220K		39294-27	BTS-220K	Br.-Blk.-Blue Phase Inverter Grid
105	10 Meg.		39294-37	BTS-10 Meg.	Red-Red-Yl. Phase Inverter Plate Load
106	220K		39294-27	BTS-220K	Br.-Blk.-Red Parasitic Suppressor
107	100K		39294-13	BTS-100K	Or.-Or.-Yl. Output Grid
108	100K		39294-13	BTS-100K	Blue-Gray-Red " "
109	330K		39014-59	BTS-330K	Red-Red-Br. Output Cathode
110	330K		39014-59	BTS-330K	Red-Red-Or. Voltage Dropping
111	680K		39014-35	BTS-680K	Red-Red-Yl. Tone Compensation
112	22K		39016-17	BW-2-220	Red-Red-Yl.
113	22K		39016-17	BW-2-220	Blue-Gray-Or. "
114	100K		B-132976-12	AB-1000	" "
115	220K		39294-27	BTS-220K	" "
116	220K		39294-27	BTS-220K	" "
117	68K		39294-24	BTS-68K	" "



MISCELLANEOUS

ITEM No.	PART NAME	CROSLLEY PART No.	NOTES
141	Handswitch	C-135976	Tone Selector
142	Pushbutton Sw.	W-135741	Station Selector
143	Pushbutton Sw.	W-135742	BC Osc. Adj.
145	Trimmer Strip	W-135818	BC Osc. Padder
146	Trimmer Strip	W-135821	Police Osc. Adj.
147	Trimmer Strip	W-135821	SW Osc. Adj.
148	Trimmer Strip	W-135821	Police RF Adj.
149	Trimmer Strip	W-135821	BC Ant. Adj.
150	Trimmer	W-136327-28	Police Ant. Adj.
151	Trimmer	W-136327-22	FM Ant. Adj.
152	Trimmer	W-136327-29	FM RF Adj.
153	Trimmer	W-136327-27	FM Ant. Adj.
154	Trimmer	W-136327-26	P.B. #6 Ant. Adj.
155	Trimmer	W-136327-25	P.B. #5 Ant. Adj.
156	Trimmer	W-136327-24	P.B. #4 Ant. Adj.
157	Trimmer	W-136327-23	P.B. #3 Ant. Adj.
158	Trimmer	W-136327-22	P.B. #2 Ant. Adj.
159	Trimmer	W-136327-21	P.B. #1 Ant. Adj.
160	Trimmer	W-136327-20	P.B. #1 Ant. Adj.
161	Trimmer	W-136327-19	P.B. #1 Ant. Adj.
162	Trimmer	W-136327-18	P.B. #1 Ant. Adj.
163	Trimmer	W-136327-17	P.B. #1 Ant. Adj.
164	Trimmer	W-136327-16	P.B. #1 Ant. Adj.
165	Trimmer	W-136327-15	P.B. #1 Ant. Adj.
166	Trimmer	W-136327-14	P.B. #1 Ant. Adj.
167	Trimmer	W-136327-13	P.B. #1 Ant. Adj.
168	Trimmer	W-136327-12	P.B. #1 Ant. Adj.
169	Trimmer	W-136327-11	P.B. #1 Ant. Adj.
170	Trimmer	W-136327-10	P.B. #1 Ant. Adj.
171	Trimmer	W-136327-09	P.B. #1 Ant. Adj.
172	Trimmer	W-136327-08	P.B. #1 Ant. Adj.
173	Trimmer	W-136327-07	P.B. #1 Ant. Adj.
174	Trimmer	W-136327-06	P.B. #1 Ant. Adj.
175	Trimmer	W-136327-05	P.B. #1 Ant. Adj.
176	Trimmer	W-136327-04	P.B. #1 Ant. Adj.
177	Trimmer	W-136327-03	P.B. #1 Ant. Adj.
178	Trimmer	W-136327-02	P.B. #1 Ant. Adj.
179	Trimmer	W-136327-01	P.B. #1 Ant. Adj.
180	Trimmer	W-136327-00	P.B. #1 Ant. Adj.

RADIO-PHONO SWITCH IN RADIO POSITION.

† VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SG7	OV.	OV.	OV.	-4VDC	OV.	135VDC	6.3VAC	250VDC
2	6AC7	OV.	OV.	OV.	-1VDC	OV.	103VDC	6.3VAC	250VDC
3	6SA7	OV.	OV.	260VDC	115VDC	-5.6VDC	OV.	6.3VAC	-.3VDC
4	7F8	-1.4VDC	OV.	155VDC	OV.	OV.	143VDC	6.3VAC	-.6VDC
5	6SG7	OV.	OV.	OV.	OV.	OV.	112VDC	6.3VAC	270VDC
6	6SQ7	OV.	OV.	2VDC	OV.	2VDC	135VDC	6.3VAC	270VDC
7	6SH7	OV.	OV.	OV.	-.45VDC	OV.	53VDC	6.3VAC	58VDC
8	6H6	OV.	OV.	-4.6VDC	-.3VDC	-.3VDC	-1.8VDC	6.3VAC	OV.
10	6SQ7	OV.	-.5VDC	OV.	-.3VDC	OV.	112VDC	6.3VAC	OV.
11	6SQ7	OV.	-.5VDC	OV.	OV.	OV.	115VDC	6.3VAC	OV.
12	6V6GT	OV.	OV.	350VDC	280VDC	OV.	OV.	6.3VAC	17VDC
13	6V6GT	OV.	OV.	350VDC	280VDC	OV.	OV.	6.3VAC	17VDC
14	5U4G	OV.	360VDC	OV.	320VAC	6.3VAC	320VAC	OV.	360VDC

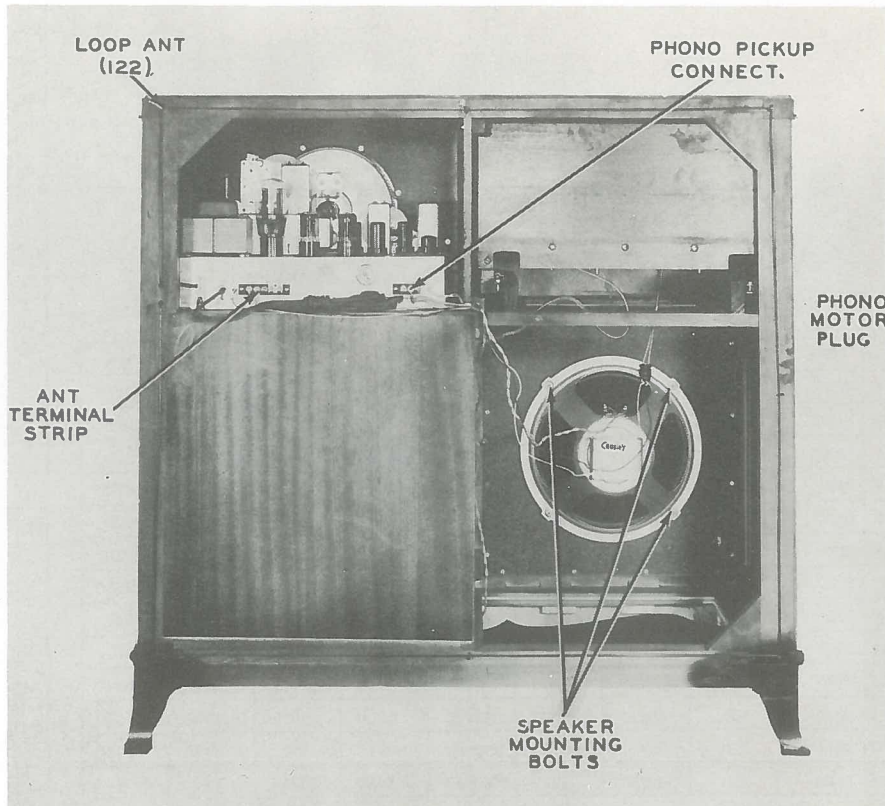
§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SG7	0Ω	0Ω	0Ω	3 Meg.	0Ω	24KΩ	.1Ω	14KΩ
2	6AC7	0Ω	0Ω	0Ω	2.3 Meg.	0Ω	130KΩ	.1Ω	14KΩ
3	6SA7	0Ω	0Ω	14KΩ	32KΩ	25KΩ	.5Ω	.1Ω	4 Meg.
4	7F8	50KΩ	0Ω	34KΩ	0Ω	0Ω	34KΩ	.1Ω	50KΩ
5	6SG7	0Ω	0Ω	0Ω	4.5 Meg.	0Ω	15KΩ	.1Ω	14KΩ
6	6SG7	0Ω	0Ω	230Ω	6Ω	230Ω	8KΩ	.1Ω	14KΩ
7	6SH7	0Ω	0Ω	0Ω	250KΩ	0Ω	4KΩ	.1Ω	5KΩ
8	6H6	0Ω	0Ω	110KΩ	210KΩ	110KΩ	110KΩ	.1Ω	0Ω
10	6SQ7	0Ω	10 Meg.	0Ω	240KΩ	0Ω	235KΩ	.1Ω	0Ω
11	6SQ7	0Ω	10 Meg.	0Ω	0Ω	0Ω	235KΩ	.1Ω	0Ω
12	6V6GT	INF.	0Ω	14KΩ	14KΩ	320KΩ	320KΩ	.1Ω	250Ω
13	6V6GT	INF.	0Ω	14KΩ	14KΩ	310KΩ	310KΩ	.1Ω	250Ω
14	5U4G	INF.	14KΩ	INF.	65Ω	.1Ω	69Ω	INF.	14KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

- DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
- Socket connections are shown as bottom views.
- Measured values are from socket pin to common negative.
- Line voltage maintained at 117 volts for voltage readings.
- Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
- Volume control at maximum, no signal applied for voltage measurements.



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DISASSEMBLY INSTRUCTIONS

1. Remove two push-on type control knobs.
2. Remove FM antenna leads from terminal strip on chassis.
3. Remove loop antenna leads from terminal strip on chassis.
4. Remove phono-pickup leads from terminal strip on chassis.
5. Disconnect phono-motor plug.
6. Unsolder speaker leads from speaker.
7. Remove four hex head bolts holding chassis in cabinet. Remove chassis from cabinet.
8. Remove four hex head nuts holding speaker in cabinet.

PUSHBUTTON ADJUSTMENTS

The ranges of the pushbuttons reading from left to right are as follows: 540-900KC, 590-1000KC, 680-1150KC, 750-1300KC, 880-1500KC and 1000-1620KC.

1. Turn on receiver and allow it to warm up for about 10 or 15 minutes.
2. Make a list of desired stations arranged in order from low to high frequency. Make sure each station will fall within range of button to be set up.
3. Turn bandswitch to "AM" position and manually tune in first desired station.
4. Turn bandswitch to "AUTO" position and adjust B1 to tune in desired station.
5. Adjust B2 for maximum volume.
6. Turn bandswitch back to "AM" position. There should be no change in tone quality when switched from one to the other.
7. Follow same procedure for remaining buttons adjusting B3, B5, B7, B9 and B11 to tune in desired stations and B4, B6, B8, B10 and B12 for maximum volume.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to reference line at the low freq. end of the SW Band. Release all tone buttons to the "out" position. The low impedance loop antenna should be left connected while aligning all RF circuits. If chassis is removed from the cabinet a 16.6 micro-henry coil shunted by a 50 MUF capacitor may be substituted for the loop. Connect link for external antenna operation. When using scope adjust the internal sweep of the scope to twice the sweep frequency of the signal generator. Volume control should be at maximum reading. Use an insulated alignment screwdriver for adjusting.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1 .1 MFD.	High side to Pin #4 (grid) of 2nd IF Amp. 6SG7 (7). Low side to chassis.	455KC	AM	High freq. end of dial.	Across voice coil	A1, A2.	Adjust for maximum output.
2 .1 MFD.	High side to Pin #4 (grid) of 1st IF Amp. 6SG7 (6).	"	"	"	"	A3, A4.	" " " "
3 .1 MFD.	High side to stator of large center section of tuning cap. Low side to chassis.	"	"	"	"	A5, A6.	Adjust for maximum output. Repeak A1, A2, A3, A4, A5 and A6 with signal input same as Step 3.
4 .1 MFD.	High side to Pin #4 (grid) of 6SH7. Low side to chassis.	10.7MC (Freq. modulated 500KC sweep)	FM	"	SCOPE CONNECT High side to center term. on phono-radio switch (145) Low side to chassis	A7, A8	Adjust A7 for maximum peak amplitude. Adjust A8 for maximum straightness of lines between peaks and crossover of lines in center of pattern. (Peaks should be from 150KC to 200KC apart).
5 .1 MFD.	High side to Pin #4 (grid) of 2nd IF Amp. 6SG7 (7). Low side to chassis.	"	"	"	High side to junction of resistors 92 and 93 on 3rd IF Trans. in series with 200KC resistor. Low side to chassis	A9, A10	Adjust for maximum amplitude, symmetry and coincidence of pattern.
6 .1 MFD.	High side to Pin #4 (grid) of 1st IF Amp. 6SG7 (6).	"	"	"	"	A11, A12	Adjust for maximum amplitude, symmetry and coincidence of pattern. Repeak A9 and A10.
7 .1 MFD.	High side to stator of small center section of tuning capacitor. Low side to chassis.	"	"	"	"	A13, A14	Adjust for maximum amplitude, symmetry and coincidence of patterns. Repeak A9 through A14.
8 200MMF.	High side to Ant. 1. Low side to chassis.	1400KC	AM	1400KC	OUTPUT METER Across voice coil	A15	Adjust for maximum output
9 200MMF.	"	"	"	Tune for maximum output.	"	A16, A17	" " " "
10 200MMF.	"	600KC	"	"	"	A18	Rock tuning cap. and adjust for maximum output. Repeat Steps 8, 9 and 10 until no further improvement can be made.
11 400Ω carbon res.	"	6.0MC	Police	6.0MC	"	A19	Adjust for maximum output
12 "	"	6.0MC	"	Tune for maximum output.	"	A20, A21	" " " "
13 "	"	18.0MC	SW	18.0MC	"	A22	Adjust for maximum output. Set signal generator to approx. 18.9MC and increase output. Image should be heard. If not, reset signal generator to 18.0MC and open A22 to next peak. Recheck for image.
14 "	"	"	"	Tune for maximum output.	"	A23, A24	Rock tuning cap. and adjust for maximum output.
15 Two 375Ω carbon res.	High side to Ant. terminal #1 in series with 37.5 ohm. Low side to chassis. Connect a 37.5Ω resistor between Ant. Terminal #2 and chassis.	108.1MC (Freq. Mod. 500 KC sweep.)	FM	Tuning cap. fully open.	SCOPE CONNECT High side to junction of resistors 92 and 93 on 3rd IF Trans. in series with 200KC resistor. Low side to chassis	A25	Adjust for coincidence of patterns.
16 "	"	87.9MC (Freq. Mod. 500KC sweep)	"	Tuning cap. fully closed	"	A26	Adjust for coincidence of patterns. Repeat Steps 15 and 16 until no further improvement can be made.
17 "	"	105.9MC (Freq. Mod. 500KC sweep)	"	Tune for coincidence of patterns on scope.	"	A27, A28.	Adjust for maximum amplitude of pattern.